Institutional investors: their incentives for monitoring companies and the effect on corporate governance

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Declaration of Original Authorship

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Abstract

This thesis attempts to deepen our understanding of the role of institutional investors in corporate governance. While numerous studies have examined the effectiveness of institutional investors' monitoring and have taken into account the heterogeneity of the various types of such investors, there has been less research on differences in their portfolios and specifically on the incentives that they may have to monitor individual companies. Due to resource constraints, it would be logical for institutional investors to concentrate their monitoring efforts on a subset of the firms held in their portfolios that offer the greatest likelihood of obtaining benefits that exceed the cost of monitoring. This thesis attempts to identify whether such a policy is actually adopted by institutional investors and assesses the outcome of such attention.

The first factor that might plausibly influence investors' monitoring incentives is the weighting of a firm in their portfolio. When a firm accounts for a greater weighting in the investor's portfolio, one might reasonably argue that the benefits of monitoring might be expected to exceed the cost. Therefore, the incentive to monitor that firm would be stronger. The first empirical study in this thesis investigates whether firms that tend to be heavily represented in institutional portfolios exhibit more investment efficiency. The study reveals that corporations do significantly improve the efficiency of their investment decisions when their shares represent a greater proportion of the holdings of institutional portfolios. Monitoring may mitigate the tendency of management to focus on their own career aims and build empires rather than enhancing shareholder value. The second empirical study investigates the market valuation of the firm's cash holdings. Historically,

it has been suggested that an increase in cash holding is associated with poorer performance by the firm. This study shows that this effect changes when one takes into account the influence of institutional investors as a result of their monitoring. It demonstrates that the presence of motivated institutional investors appears to significantly increase the marginal value of cash holdings of a firm. It is shown that when a firm accounts for a greater weighting in an institutional portfolio, the adverse effect of high levels of cash held by the firm on its operational performance largely disappears – a result that would be consistent with investors monitoring those firms more effectively.

The final empirical chapter studies the relation between investors' horizons and the monitoring incentive. Since the monitoring cost is borne in the present while any consequent pay-off would occur in the future, institutional investors' monitoring incentives are likely to be positively related to the investment horizon. I find that the long-term holdings of different types of investors could all improve firm performance. The effect is persistent and long-lasting. These findings support the hypothesis that monitoring attention by institutional investors is related to their holding horizon.

Acknowledgements

I remember the day I arrived at the ICMA centre and became a PhD candidate. When I picked up a copy of a thesis written by my predecessor, I was terrified. How could I complete a work so heavy and thick? It looked like an impossible mission. Yet, four years later, here I am. With the help and love of many people, I have finally come to the day when my thesis could appear in print.

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致

勤劳的汗水

倔强的眼泪

还有永不熄灭的梦!

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1. Introduction

The manner in which institutional investors participate in corporate governance is an important issue that has been subject to extensive research in the corporate finance literature. Personal (retail) investors are unlikely to possess much power to change corporate behaviour; it is difficult for individuals to form groups of active shareholders unless the behaviour of firms has been widely publicised and has been extreme. It is therefore to institutions that one looks when examining the active relationship between shareholders and corporate management. However, even with institutions, it is not easy for one investor to influence corporate policy. Active shareholding often involves several institutions gaining awareness of harmful or potentially ineffective management before intervention occurs. Monitoring a firm may create value for all shareholders, albeit at a cost. When making the decision whether to engage in monitoring, institutional investors need to consider the trade-off between monitoring costs and benefits. For two important reasons, institutional investors are unlikely to be able or even to desire to monitor all the firms in their portfolio with the same intensity. First, institutional investors are not homogeneous: they differ in their investment styles, investment horizons, fiduciary duties, and other characteristics (Bushee 1998; Chen, Harford, & Li 2007; Schmidt & Fahlenbrach 2016). Second, institutional investors' monitoring resources are limited. They are therefore unlikely to distribute their resources evenly across all firms in their portfolios. (Kempf, Manconi, & Spalt 2017). Many existing studies have focused on the heterogeneity of investors and the effects of this on driving the different incentives to monitor firms; however, the allocation of monitoring attention within institutional portfolios has attracted less attention.

This thesis intends to deepen our understanding of the varieties of institutional investor monitoring incentives within their portfolios. Fich, Harford, and Tran (2015) propose that institutional investors' motivation for monitoring is determined by the weighting of firms in their portfolios. Considering the costs of monitoring, institutions would be expected to spend more time monitoring firms that account for a greater weighting in their portfolios. To test this hypothesis, this thesis defines the 10% of firms that account for the highest weighting in an institution's portfolio as being the subset that would account for the greatest motivation to engage in monitoring. The first two empirical chapters of this thesis therefore explore the implications for corporate decisions of a firm being shown to figure frequently in this subset of institutional portfolios.

The first empirical chapter of the thesis examines the role of motivated monitoring by institutional investors in improving corporate investment efficiency. Following Richardson (2006), I measure both under-investment and over-investment using a model of overall investment inefficiency. I find that all measures of inefficient investment are negatively correlated with cumulative excess stock returns over the following year, suggesting that investment inefficiency is harmful to shareholders and that improving investment efficiency would be beneficial.

After carefully addressing the endogeneity issue, the study demonstrates that firms with greater motivated monitoring institutional ownership (IO) appear to make more efficient investment decisions: their level of new investment is closer to the level modelled as optimal. Both under- and over-investment are negatively related to motivated monitoring institutional ownership, suggesting that firms with less attention to monitoring by institutional investors tend to invest less efficiently. The results are consistent with the

argument that investors that engage in motivated monitoring mitigate the empire-building and career concern problems that may be causes of inefficient investment.

The second empirical chapter validates the limited attention hypothesis from a different angle: its implication for corporate cash management. Firms may hold more cash or other liquid assets as a precautionary motive should they face higher cash-flow uncertainty, market competition, or credit constraints (Haushalter, Klasa, & Maxwell 2007; Bates, Chang, & Chi 2017; Bates, Kahle, & Stulz 2009). However, the use of cash is mainly at the discretion of managers. Firm managers may either directly take the cash in the form of perks or excessive salaries, or invest it in projects that do not maximise shareholders' profits. That is, managerial agency problems may reduce the value of corporate cash holdings.

Following the specification of Faulkender and Wang (2006) for quantifying the marginal value of cash holdings, I find strong evidence that the marginal value of cash increases in companies with the greatest motivated monitoring IO. This result demonstrates that maximal motivated monitoring by institutional investors may significantly increase the market valuation of a firm's cash holdings. Furthermore, I provide evidence that motivated monitoring by institutional investors may significantly mitigate the negative impact of a high level of cash holdings on a firm's operational performance, validating my hypothesis that improvement in the market valuation of the cash holdings is the result of reduced managerial agency problems and better firm operations.

The first two empirical chapters of this thesis find that the institutional monitoring incentive is closely related to the weighting of firms in the institutional investor's

portfolio. However, it is also reasonable to believe that investors' monitoring incentives may be associated with other characteristics. One may be investors' holding horizons. When institutional investors hold shares in a firm for an extended period of time, they are more likely to establish a closer relationship with the firm. Therefore, their involvement in corporate governance of the firm is likely to be stronger. In contrast, when they only hold shares in a firm for a short time, monitoring the firm closely may not be a rational choice, since the cost of monitoring will be borne immediately while the benefits would only be attained in the long run.

Consistent with my hypothesis, I find that long-term holdings by institutional investors lead to better firm performance. This effect is long-lasting and persistent. It is robust in relation to various measures of the investment horizon and a variety of performance measures. It is also robust with regard to various types of investors. On the other hand, short-term holdings by institutional investors are associated with lower firm performance. These findings indicate that the investment horizon is also be an important factor for the allocation of monitoring attention.

2. Institutional Investors: a Brief Literature Review

The agency problem has long been recognised as a critical issue in corporate governance. Jensen and Meckling (1976) define an agency relationship as 'a contract under which one or more persons (the principals) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent'. The 'separation of ownership and control' shapes the relationship between shareholders and managers (Fama & Jensen 1983). As managers are obliged to act in the best interests of the shareholders they represent, their relationship logically fits the pure definition of the agency relationship.

However, the self-interested manager will not always act in the best interests of shareholders. The potential failure of managers to maximise shareholder wealth and instead seek to maximise their own benefit has proved a central concept in the research literature on corporate governance. Institutional investors play an increasingly dominant role in the financial market. They own, on average, more than 60% of the total shares outstanding in each firm (Zeng 2016). The influence of these investors on monitoring managers and reducing agency costs must, therefore, become an important area for extensive investigation.

2.1. The Importance of Institutional Investors

Shareholder monitoring may be crucial both in restraining and in directing managers' behaviour. However, if institutions are seen to be regarding management closely, other shareholders might feel that it is unnecessary for them to expend any effort on monitoring. This will create the 'free-rider problem' in which the effort of one is be enjoyed by many.

The recognition of this effect by institutions will inhibit monitoring (Grossman & Hart 1980). In other words, when ownership is diffused, there will be little incentive for an investor to monitor management since the monitor will bear the entire monitoring cost while the other shareholders enjoy the benefits (Gillan & Starks 2003). A natural solution would be a concentrated ownership structure. For a given shareholder, the percentage of monitoring benefit they would obtain is largely based on the proportion of outstanding shares held. A higher percentage of shareholding will result in a greater proportion of the benefits. On the other hand, the difficulty and cost of the monitoring role will decrease as the proportion of the holding increases, since a great degree of ownership could enable a shareholder to gain access to the board and management (Chen et al. 2007).

The effect of block-holders or large institutional shareholders on corporate governance has been widely documented in the literature. For example, Bethel, Liebeskind, and Opler (1998) found that activist block-purchases are followed by increases in the value of the firm, as measured by both stock returns and operational performance (Kaplan & Minton 1994). Kang and Shivdasani (1995) found that an increase in the number of large shareholders leads to higher managerial non-routine turnover, suggesting that less effective managers are more quickly pressurised to perform. Bertrand and Mullainathan (2001) argue that large shareholders could change compensation plans to reward managers more for their skill than for outcomes arising from chance or taking on excessive risks.

Even though the monitoring role of block-holders on corporate governance is widely recognised, studies on the effect of block-holders on a firm's outcomes show mixed results. Previous studies have found no significant link between block-ownership and

corporate outcomes. For instance, Holderness and Sheehan (1988) found that firms with majority block-holders do not appear to differ in terms of investment, accounting returns, Tobin's Q leverage, and control transactions when compared with their peer companies with a diffused ownership structure. McConnell and Servaes (1990) and Mehran (1995) found no correlation between outside block-holder and firm value. International evidence on this issue are similarly inconclusive. Lins (2003), using a sample spanning 18 countries, found that block-holdings are positively related to firm value, while Claessens et al. (2002) argue that when control rights exceed cash-flow ownership, an increase in the number of block-holdings leads to lower firm value.

Edmans (2014) argues that the inconsistency of the findings could be attributed to two causes. First, if block-ownership is always chosen at the optimal level, there should be no correlation between block size and firm value after controlling for other factors which could influence both. Second, because the block-holding is chosen by the block-holder rather than by the firm, the block size would be chosen to maximise shareholders' value (rather than, for example, firm value) (Edmans 2014). Cronqvist and Fahlenbrach (2009) provide a different explanation. They argue that the early literature examines block-holdings at an aggregated level. This treatment may over-simplify the reality since each block-holder is different in many aspects. They allow for the effect of block-holder heterogeneity by using block-holding fixed effects in their panel regressions; they found that certain types of block-holders, such as pension funds and corporations, do have significant positive effects on a firm's investment, leverage, and performance. Similar findings are also reported by Clifford and Lindsey (2016). They found that only ownership by block-holders who are more likely to engage in shareholder activism leads

to higher profitability for the firm and greater performance sensitivity for chief executive officer (CEO) pay.

2.2. Costs of Large Shareholders

Although the dominance of large institutional shareholders may be a solution to the free-rider problem and may play an important role in reducing agency problems, block-holder monitoring is expected to come with costs. The first type of cost is related to managerial incentives. Burkart, Gromb, and Panunzi (1997) argue that institutional intervention is *ex-post* desirable since it promotes the adoption of value maximising projects. However, because of the managers' concerns that a private benefit-enhancing project will not be approved, institutional monitoring reduces the *ex-ante* incentive for managers to actively seek new investment opportunities. The trade-off between monitoring benefits and intervention may imply a potential optimal level of block-holding size (Edmans 2014).

The second type of cost is related to shareholders' own private interests. When block-holders pursue their own utility, which may not be consistent with that of minority investors, firm value may potentially be reduced. The private benefit may take different forms. For example, a union pension fund could vote for labour-friendly directors (Agrawal 2012), a mutual fund might support underperforming management merely to preserve business ties (Davis & Kim 2007), and a fund with a large stake may be so concerned about idiosyncratic risk that the firm has to relinquish some risky but value-enhancing projects in order to accommodate the needs of portfolio management (Dhillon & Rossetto 2014). Previous studies have also found that a strong second-largest shareholder and a more equally divided ownership structure could effectively curb private

benefit-extraction behaviour (Attig, Guedhami, & Mishra 2008; Maury & Pajuste 2005).

2.3. How Do Institutional Investors Exert Their Influence?

Institutional investors may exert influence on a firm through two mechanisms. The first is the 'voice' that represents the direct intervention of the investor in corporate activities. McCahery, Sautner, and Starks (2016) surveyed institutional investors and investigated how they engage with firms. They found that the most frequently used intervention methods, in decreasing order of frequency, are: (1) voting against management at the annual general meeting, (2) initiating discussion with the executive board, (3) contacting the supervisory board, (4) disclosing their voting against management, and (5) publicly criticising executive board members. Their study provides direct evidence of institutional investors intervention in corporate governance. There are also several studies that observe the effects of institutional intervention on the firm. These studies frequently use shareholder activism to represent the intervention of shareholders through the voice channel. For example, Bradley et al. (2010) found that institutional investors could force the closed-end funds to be open-ended, thereby creating value by eliminating the closed-end fund discount. Brav et al. (2008) applied an event-study framework and found that shareholder activism leads to an average 7% abnormal return around the announcement date. They also found evidence that such events lead to improvements in the pay-out ratio, return on assets, and operating margins. Brav, Jiang, & Kim (2015) used plant-level data and found that shareholder intervention leads to improved productivity, especially in business strategy-orientated interventions.

Recent studies have begun to investigate the second mechanism through which

institutional investors may monitor firm operations and reduce agency problems – trading firms' shares. This effect is frequently referred to as the 'exit' channel. If a manager does not behave in a manner that improves shareholder value, investors, especially block-holders, may sell their shareholdings. This selling would lead to a decrease in the share price and punish the irresponsible behaviour of management *ex post*. The possibility that shareholders may walk away also creates an *ex-ante* threat that compels managers to act in a way that would fulfils their fiduciary duty (Edmans 2014).

The strength and effectiveness of the 'governance through exit' channel is closely related to market liquidity. When underlying stocks are more liquid, the exit of shareholders, especially large shareholders or block-holders, becomes easier. As a result, the exit threat will be more serious, and the monitoring effect will be more prominent. Meanwhile, market liquidity is likely to be less related to the 'voice' channel. This difference provides a setting for distinguishing between the voice and exit channels. For example, Fang, Noe, and Tice (2009) exploited the exogenous liquidity shocks caused by decimalisation and found that increases in liquidity lead to better firm performance. Bhagat and Bolton (2013) and Roosenboom, Schlingemann, and Vasconcelos (2014) investigated the role of liquidity in the monitoring in takeovers. They found that when firms have multiple block-holders, thereby making 'exit' monitoring more effective, the negative relationship between liquidity and acquirer returns could largely be mitigated.

2.4. Heterogeneity of Institutional Investors

One of the issues that has been widely recognised in the recent literature is that institutional investors are not homogeneous. Due to their differences as regards

independence, investment horizons, and investment strategies, their incentives for and effectiveness in monitoring management are widely different.

The independence of institutional investors is defined by their relationship with the investee firm. Brickley, Lease, and Smith (1988) found that, compared to banks, insurance companies and private pension funds usually undertake business with firms under management control. Such a relationship may be assumed to produce more favourable attitudes from this type of investor. In contrast, mutual funds, foundations, and public pension funds are far more independent and are more likely to vote against managers. The former type of investors are therefore usually referred to as 'grey investors', while the latter are referred to as 'independent investors'. Chen et al. (2007) further note that the independent investors' monitoring activities lead to better deal performance. Using international data from 27 countries, Ferreira and Matos (2008) found that foreign independent investors do appear to improve firm valuation and enhance operational performance compared to the effect associated with grey investors. Almazan, Hartzell, and Starks (2005) argue that independent investors play a more important role in increasing the sensitivity of pay in relation to firm performance compared to other types of investors. Cornett et al. (2007) found that the positive influence of block-ownership on operating cash flows exists only for independent investors, who are by definition less likely to have other business relationships with the firm.

Another frequently mentioned investor characteristic is the investment horizon. Investors are usually categorised into long-term and short-term groups using the 'churn ratio', which essentially measures their investment turnover. Investors who trade more

frequently and have a higher portfolio turnover are usually defined as short-term investors, while investors who trade stocks infrequently are defined as long-term investors. (Gaspar, Massa, & Matos 2005; Yan & Zhang 2009; Derrien, Kecskés, & Thesmar 2013). Other studies have further classified investors into three categories based on turnover and levels of portfolio diversification. Diversified investors that trade infrequently are classified as 'quasi-indexers', concentrated investors who trade infrequently are classified as 'dedicated-investors', and investors who trade frequently are classified as 'transient' investors (Bushee 2001; Bushee 1998a). Quasi-indexers and dedicated investors are sometimes aggregated into a group of 'non-transient' investors who tend to hold shares in a firm for longer periods (Chen et al. 2007).

It is widely recognised that long-term investors play a more effective role in monitoring firm operations than do short-term investors. For example, Attig et al. (2012) found that the monitoring by long-term institutional investors could mitigate asymmetrical-information and agency problems. Therefore, the difference between the difficulty involved in obtaining finance externally and obtaining it internally is reduced. This change leads to firms being less sensitive to available internal cash flow as regards their investment decisions. Chen et al. (2007) founds that long-term investors may improve deal performance in mergers and acquisitions (M&As) due to their tendency to monitor the decisions of the firm. Elyasiani and Jia (2010) conclude that a stable ownership structure leads to better operational performance by a firm, and Elyasiani, Jia, and Mao (2010) discovered that it also results in lower costs of capital.

Long-term investors have also been found to be stabilisers of the stock market. For example, Chichernea, Petkevich, and Zykaj (2015) found that long-term investors reduce

idiosyncratic volatility, and Cella, Ellul, and Giannetti (2013) found that long-term investors are less likely to sell their share-holdings during periods of crisis.

Institutional investors' activity in managing their portfolios is another characteristic that has attracted considerable interest. In general, investors can be classified as active or passive based on their proximity to track a market index. Passive investors follow the index very closely, with the result that a firm's weighting in their portfolios reflects the weighting of the firm in the index. In contrast, an active investor's portfolio is constructed to outperform the benchmark. Therefore, the weighting of a firm in an active investor's portfolio may differ considerably from its weighting in the benchmark index.

There is ongoing debate on the role of passive investors in corporate governance. Appel, Gormley, and Keim (2016) argue that, in one sense, passive investors are actually 'active' owners. Their ownership may result in a higher proportion of independent board members, reduce the intensity of using takeover defences, and more equal voting rights. They vote in blocks and their ownership is associated with better long-term performance for the firm. Mullins (2014) supports this view and shows that passive investors may induce higher pay for good performance, higher CEO turnover, a lower passage rate of manager proposals, and a higher adoption rate of shareholder proposals. These findings suggest an active role for passive investors in corporate governance. However, Schmidt and Fahlenbrach (2017) found the opposite relationship. They argue that an increase in passive ownership would lead to an increase in CEO power and the appointment of fewer independent directors. These changes would result in lower returns and worse performance in M&As. These authors argue that these differences are due to the difference in the cost of monitoring. For low-cost governance activities, passive investors

would be more involved; however, they are unlikely to be willing to undertake monitoring if the costs are high.

2.5. Monitoring Incentives and Portfolio Weightings

Variation in the share-holdings of institutional investors' monitoring incentives has received relatively little attention in the research literature. Fich et al. (2015) pioneered such investigations. When an investor holds a large proportion of a firm's total shares, the investor is defined as a block-holder. Block-holders have more power to influence corporate decision-making, and share the benefits of monitoring. Therefore, theoretically, their presence would significantly mitigate the free-rider problem and therefore should be value enhancing (Shleifer & Vishny 1986). However, empirical tests of this hypothesis have not been conclusive (Fich et al. 2015).

As pointed out by Fich et al. (2015), the inconsistent findings on institutional monitoring outcomes may be partially explained by the fact that previous studies had not taken account of variations in monitoring incentives among the holding firms. An institutional investor may be a block-holder of a given firm although the firm might only represent a small component of the institution's total portfolio. As a result, the total institutional ownership and the prevalence of block-holding could be a noisy measure of the underlying variables of interest. In this thesis it is argued that these involve the likelihood of a firm being sufficiently important to a number of institutional investors.

Fich et al. (2015) argue that the monitoring incentives of institutional investors are related to the weighting of the firm in the institutional portfolio. Investors have greater incentives to monitor companies that account for a higher proportion of their portfolios. Using the

outcome of an M&A as the setting, they found that 10% of the companies that account for the highest weighting in the portfolios of institutional investors tend to perform better in takeover deals. They define an institutional investor as a motivated monitoring investor for a firm if the firm is in the 10% of firms accounting for the highest portfolio weighting, and find that the presence of these investors has an even stronger effect on corporate governance than do block-holders.

Although the findings of Fich et al. (2015)[1] are intuitive, the evidence for the effect of motivated ownership on corporate governance and other corporate outcomes is not yet conclusive. This thesis attempts to extend this strand of the literature and provide more solid evidence for this matter.

[1] Block holders and motivated owners can be largely different. For a given investor, its investment in a given firm could account for a significantly proportion of its portfolio, but only account for a very tiny percentage of firms' total shares outstanding. The investor would be then defined as motivated owner but not a block holder. On the other hand, when an investor holds a large proportion of the total shares outstanding of a firm but the firm only accounts for a small proportion of its portfolio value, the investor would be a block holder but not a motivated owner.

3. Motivated Monitoring Ownership and Firm Investment Efficiency

3.1 Introduction

This chapter examines the role of motivated monitoring institutional investors in improving the efficiency of corporate investment. Decisions on project investment are amongst the most important determinants of a firm's future growth. It may be the case that firms do not invest efficiently because of conflicts of interest between managers and shareholders. Agency problems have been identified as leading both to over-investment (Jensen & Meckling 1976; Shleifer & Vishny 1997; Richardson 2006) and under-investment (Porter 1992; Bertrand & Mullainathan 2003; Aghion, Van Reenen, & Zingales 2013). As less efficient investment is associated with lower firm performance (Titman, Wei, & Xie 2004; Jie Cai & Zhang 2011), understanding the relationship between institutional investors' monitoring and firm investment efficiency is of particular importance.

As economic agents have a limited capacity for processing information, it is rational for them to vary the attention they give to different sources of information when making decisions (Sims 2003). Based on the assumption of limited attention, Kacperczyk, Van Nieuwerburgh, and Veldkamp (2016) developed an attention-allocation model to predict optimal information choices for mutual funds'. Kempf et al. (2017) found that an institutional investor's monitoring attention to the firms it holds may become distracted if an exogenous shock effects the stock returns of unrelated firms in its portfolio. Fich et al. (2015) argue that when institutions have limited attention to monitoring, a greater

proportion of an institution's portfolio that is represented by a firm will be associated with greater benefits of monitoring that firm. They used the relative importance of a firm in institutional investors' portfolios as a proxy for the motivation of institutional monitoring in M&As and found that targets with more motivated monitoring IO have higher deal premiums and deal completion probabilities[2]. Motivated by these studies, I measure an institutional investor's motivation to monitor a firm by means of the fraction of the institution's portfolio represented by the firm. If the optimal level of monitoring attention is determined by the trade-off between monitoring benefits and costs, an institutional investor will be more motivated to monitor firms which are relatively more important in its portfolio[3]. I extend Fich et al.'s (2015) study to firms' general investment decisions and compare the effect of motivated monitoring institutional investors with those that potentially have the least motivation to monitor.

Using a large US sample for the period 1995–2015, I measure inefficient investment as the abnormal investment estimated by Richardson's (2006) investment model. Firm over-investment (under-investment) is reflected in a positive (negative) regression residual. In addition to Richardson's (2006) single panel regression, inefficient investment for each year is estimated by a historical panel regression from 1981 to that year. The historical panel regression method allows one to avoid having to use unknown future information 'to predict the current optimal level of investment. All my measures of inefficient investment are negatively associated with cumulative excess stock returns over the

[2] Similarly, Masulis and Mobbs (2014) find that directors who have multiple directorships are motivated to monitor firms in which their directorships are relatively more prestigious.

[3] The opportunity costs of monitoring may not be ignored in the trade-off given the limited investors' attention.

following year, suggesting that reducing investment inefficiency is beneficial to shareholders. This measure of institutional investors' monitoring motivation follows Fich et al. (2015), sorting all stocks into ten decile groups by their holding value weighting within each institutional portfolio. Institutional investors have the highest (least) motivation to monitor firms in the decile 1 (10) group.[4]. This motivation measure can also be taken as the intensity of institution monitoring, given that the monitoring attention of institutional investors is limited.

To test the relation between institutional ownership and inefficient investment by a firm, it is necessary to address the endogeneity of institutional ownership. Firms with higher or lower institutional ownership may differ in terms of unobservable characteristics. Therefore, comparing the investment efficiency of firms with higher and lower institutional ownership may simply capture the effect of the unobservable differences rather than the effect of institutional investor monitoring. Furthermore, institutional investors may already know the firms in their portfolios well, and choose to invest more in firms with higher investment efficiency and better corporate governance. The endogeneity due to the omitted variables and reverse causality is mitigated by using the instrumental variables (IV) model based on the Russell index annual reconstitution. When firms switch between the Russell 1000 and 2000 indexes, are included in the Russell 2000 index for the first time, or leave the Russell 2000 index, there appear to be exogenous changes in institutional holdings (Xin Chang et al. 2014; Fich et al. 2015;

[4] In my robustness tests, I extend my study to all ten decile groups and find that institutional investors are motivated to monitor the firms in the top 3 decile groups.

Crane, Michenaud, & Weston 2016; Schmidt & Fahlenbrach 2017). I estimate the relationship between institutional ownership and inefficient investment by firms within a standard two-stage least squares (2SLS) estimation framework, in a manner similar to that of Fich et al. (2015) and Schmidt and Fahlenbrach (2017).

My analyses yield three key findings. First, firms with greater motivated monitoring IO appear to make more efficient investment decisions: their new investment deviates less from predicted levels. Both under- and over-investment are negatively related to motivated monitoring IO, suggesting that firms with more institutional investor monitoring attention tend to invest more efficiently. The monitoring role of motivated institutions is economically important. A one standard deviation increase in motivated monitoring IO leads to a $22.8 million reduction in annual under-investment and a $60.1 million reduction in annual over-investment for the average sample-size firm with $2,648.1 million in total assets[5]. Second, the effect of the least motivated IO on firm under-investment is positive and statistically significant although the effect on firm over-investment is statistically insignificant. This result supports the view that the effectiveness of institutional monitoring is influenced by the relative importance of the monitored firms within the institutional portfolios. Second, this study shows that the motivation of institutional investors to monitor a firm's investment increases monotonically with increases in the weighting of the firm's market value in their portfolios. Third, the research in this chapter reveals channels through which motivated

[5] The marginal effect numbers reported here are based on the inefficient investment estimated by the historical panel regressions.

institutional investors improve investment efficiency. Motivated monitoring investors mitigate the over-investment problem in firms with more cash reserves or free cash flows and mitigate the under-investment problem by reducing the career concerns of firm managers.

This chapter contributes to the literature in four ways. First, it contributes to a growing body of research that studies the relation between the monitoring attention of institutional investors and corporate decision-making. Fich et al. (2015) studied motivated monitoring institutional investors in the context of M&As and found that targets with greater motivated monitoring IO receive better bidding prices. Kempf et al. (2017) and Liu et al. (2016) found that the monitoring attention of institutional investors to one firm can be distracted by large shocks to the other firms in their portfolios. The results reported here are consistent with these studies and support the limited-attention hypothesis, to the effect that institutional investors do not evenly distribute their monitoring attention among all firms in their portfolios. By examining the investment inefficiency of the firms in a large panel sample, my results further reveal that institutional investors' monitoring attention to a firm decreases monotonically when the relative importance of the firm's stock in their portfolios decreases. Based on this finding, a weighted general monitoring motivation institutional ownership measure is constructed. Firms with greater weighted monitoring motivation institutional ownership are shown to make more efficient investments.

Second, this chapter adds to the studies examining the factors that affect corporate investment, such as free cash flow (Jensen 1986; Richardson 2006), earnings management (McNichols & Stubben 2008), the quality of financial reporting (Biddle,

Hilary, & Verdi 2009; Cheng, Dhaliwal, & Zhang 2013; Balakrishnan, Core, & Verdi 2014), management forecasting ability (Goodman et al. 2013), product market competition (Gu 2016; Stoughton, Wong, & Yi 2016), policy uncertainty (Gulen & Ion 2016), accounting conservatism (Lara, Osma, & Penalva 2016), mutual fund flow (Lou & Wang 2016), and changes in generally accepted accounting principles (Shroff 2017). My thesis identifies motivated monitoring IO as a new factor that can mitigate both over- and under-investment by firms.

Third, the results shed light on the debate on the institutions that are more likely to monitor corporate activities. Previous studies have found that institutional investors are heterogeneous and only a subset plays an active role in corporate governance (Brickley et al. 1988; Bushee 1998; Chen et al. 2007; Cronqvist & Fahlenbrach 2009; Fich et al. 2015). Recently, Schmidt and Fahlenbrach (2017) found that exogenous increases in passive institutional ownership weaken firm corporate governance and reduce subsequent firm performance, while Appel et al. (2016) document that passive mutual funds influence firms' governance choices by means of their large voting blocs and improve firms' long-term performance. This chapter reports that all types of motivated monitoring institutional investors, regardless of whether they are active or passive, mitigate inefficient investment by firms, supporting the view that passive institutional investors pay attention to important firms in their portfolios.

Finally, this chapter complements a working paper on institutional investors and corporate investment. Wong and Yi (2015) found that the total institutional ownership of a firm is positively related to firm investment and that this relation is more pronounced for passive investors than for types of institutional investors. The research in this chapter

examines both over- and under-investment and uses different definitions of inefficient investment. Contrary to Wong and Yi (2015), a negative relation is reported between motivated monitoring IO and inefficient investment by firms. More importantly, this negative relation is robust for different types of institutional investors.

The rest of this chapter is organised as follows. Section 3.2 develops the hypotheses. Section 3.3 describes the data sources and variable definitions. Section 3.4 presents the main test results and addresses endogeneity. Section 3.5 discusses how motivated monitoring IOs can reduce inefficient investment and provides robustness test results. Finally, section 3.6 concludes the chapter.

3.2 Hypotheses and Empirical Predictions

In a perfect, frictionless capital market (Modigliani & Miller 1959), firms make their financing and investment decisions independently. The neoclassical theory of investment predicts that a firm's opportunity for growth, commonly measured by Tobin's Q, is the major determinant of its investment policy (Hayashi 1982; Abel 1983) . Within this ideal framework, the optimal level of investment is achieved when the new investment's marginal benefit is equal to its marginal cost. It must be recognised, however, that actual investment by firms may deviate from the optimal level due to frictions in the capital market, such as managerial optimism or pessimism, information asymmetry, conflict of interests between managers and shareholders, and external financing costs (Malmendier & Tate 2005; Biddle et al. 2009; Aghion et al. 2013; Asker, Farre-Mensa, and Ljungqvist 2014).

Despite this proviso, previous studies have suggested that greater inefficient investment is associated with lower subsequent performance by firms (Titman et al. 2004; Jie Cai & Zhang 2011) Therefore, firm shareholders have a strong incentive to monitor managers' investment decisions. Institutional investors are usually more active and effective than individual investors in these monitoring activities as shareholder activism is costly and it is difficult for individual investors to intervene collectively. Indeed, even the attention of institutional investors is limited, and they may not allocate their monitoring attention equally to all the stocks in their portfolios (Kempf et al. 2017). The motivation for institutions to engage in monitoring is likely to be positively related to the benefits of monitoring and negatively related to the cost of monitoring. Fich et al. (2015) found that the institutional investors in M&A targets have a greater incentive to monitor deal transactions when the target stocks are more important relative to the other stocks in their portfolios. Following this study, this thesis defines the most (least) motivated monitoring investors as those for whom the shareholding of a firm ranks in the top (bottom) 10% of their portfolio value. Intuitively, the rank of a stock's weight in an institutional investors' portfolio is positively related to the benefits of monitoring. Given limited attention, even if the actual costs of monitoring are equal for all firms in the portfolio, the opportunity cost of monitoring is highest for firms in the bottom 10% of the portfolio. When institutional investors monitor the firms in the bottom 10% of their portfolios, the relatively more important firms receive less effective monitoring. This discussion leads to the first hypothesis:

H1: Motivated monitoring institutional ownership is positively associated with investment efficiency.

The next two hypotheses examine the direction of inefficient investment by a firm. Previous studies have documented two agency problems leading to firm under-investment. First, it takes managers' time and effort to look for positive net present value (NPV) projects. Managers may instead enjoy 'the quiet life' if there is a lack of corporate governance or incentives (Hart 1983; Bertrand & Mullainathan 2003). Institutional investor monitoring may inhibit this kind of managerial inefficiency. Second, the outcomes of new projects remain uncertain even if managers spend a great amount of effort supervising the projects. When information is asymmetrical, the *ex-ante* qualities of new projects and managerial effort are not observable. Many managers' employment and compensation contracts are based on the noisy *ex-post* profitability of projects, instead of the *ex-ante* expectation of the projects' returns and actual managerial effort. Managers may choose not to invest in positive NPV projects because the possibility of loss could damage their reputation and job security. Institutional investors may possess greater professional awareness of the volatility of profitability than do other investors, which may then encourage investment. Aghion et al. (2013) found that institutional investors may reduce managers' career concerns and increase firms' innovation activities. In addition to these two agency problem-based explanations, firms may not capture positive NPV investment opportunities due to a debt-overhang problem (Hennessy 2004). Institutional investors may mitigate the debt-overhang problem by reducing a firm's debt borrowing cost. This discussion leads to the second hypothesis:

H2: Motivated monitoring institutional investors reduce under-investment.

Managers may use excessive firm cash holdings to pursue benefits for themselves. Jensen (1986) predicts that the managerial-empire building tendency leads to over-investment

by firms. The prediction is supported by the empirical findings of Blanchard, Lopez-de-Silanes, and Shleifer (1994), to the effect that firms over-invest cash windfalls. Harford (1999) found that firms with higher cash holdings tend to make acquisitions with poor subsequent operational performance, while Richardson (2006) found that firms with positive free cash flow tend to over-invest. Titman et al. (2004) documented a negative relation between over-investment and stock returns, indicating that over-investment by managers is not in the interest of shareholders. One would expect that a firm with greater motivated monitoring IO would exhibit less over-investment. Formally stated, the third hypothesis is as follows:

H3: Motivated monitoring institutional investors reduce firms' tendencies to over-invest.

3.3 Data and Variable Descriptions

3.3.1 Data sources

The sample covers US firms with available stock-return data at the Centre for Research in Security Prices (CRSP) and accounting information in the Compustat Fundamentals Annual files. Firms in the financial (SIC 6000--6999) and regulated utility (SIC 4900--4999) industries are excluded from the sample. Data on institutional holdings were obtained from the Thomson Financial CDA/Spectrum Institutional (13F) database. In order to prevent the reuse of institutional investor identifiers and institution-type misclassification in the 13F database, Bushee's institution-type correction is applied to the institutional holding data. The sample period is from 1995 to 2015, a period for which

Russell index constituent data are available for use on Bloomberg. Once these screening criteria had been applied, the baseline sample contained 11,903 unique firms with 92,546 firm-year observations. In addition, a corporate governance measure, the G-index score (Gompers, Ishii, & Metrick 2003), was obtained from Institutional Shareholder Services (ISS, formerly RiskMetrics).

3.3.2 Definition of motivated monitoring institutions

Existing institutional investor literature has documented the growth of general institutional investors in the US stock market over the past four decades. The two panels of Figure 3.1 display the time-series plots of institutional investors' market shares and institutional investor numbers at the end of each quarter from 1995 to 2015. Figure 3.1.1 illustrates that the percentages of market value held by all institutions, the 100 largest institutions, the 50 largest institutions, and the 10 largest institutions were stable over the sample period. Figure 3.2.2 illustrates the sharp increase in the number of institutional investors. The total number of institutions exceeded 3,000 for the first time in the first quarter of 2013. Panel A of Table 3.1 shows that both the US stock market value and the total market value of institutional holdings grew approximately four times during the sample period. Institutional holdings accounted for about 50% of the total stock market value in September 1995; 65.5%, the highest level, in September 2009; and 59.6% in September 2015 – thus the time-series trend of institutional ownership is not a major concern in this study. The annual average number of stocks in an institutional investor's portfolio is over 200, suggesting that a typical institutional investor is unlikely to allocate its monitoring attention evenly to every firm.

The stock-holding value ranking in an investor's portfolio is used to differentiate the monitoring motivation among all the stocks in the portfolio. All stocks in an investor's portfolio are sorted into the ten decile groups by each stock's holding value. As shown in Panel B of Table 3.1, institutional investors distribute their holding value unevenly across these ten decile groups. On average, more than 40% of their portfolio value is concentrated in the decile 1 group, which comprises the largest stocks in their portfolios. In addition, the average holding value per stock position ($105.4 million) in the decile 1 group is almost five times e than that in the decile 2 group ($23.7 million). In comparison, only 0.7% of institutional investors' portfolio value is represented by the decile 10 group, which comprises the smallest 10% of the holding positions in their portfolios. It is obvious that the performance of the firms in the decile 1 group is much more important to institutional investors than is the performance of the rest of the holding firms in their portfolios. Therefore, one would expect that the benefits of monitoring and the motivation to monitor the firms in the decile 1 group should be the highest of all the decile groups.

Following Fich et al. (2015), a firm's motivated monitoring institutional investors are defined as the institutional investors whose decile 1 groups include the firm's stock. The holdings of all motivated monitoring investors is aggregated at the firm level and the sum of the total motivated monitoring institutional holdings is denoted as $Tmi1_{i,t}$. Similarly, the firms in the decile 10 group are those that institutional investors have the least incentive to monitor. For comparative purposes, the holdings of these institutional investors are also aggregated at the firm level and are constructed as the variable $Tmi10_{i,t}$, the holdings of investors who have the least motivation to monitor firm *i*. Panel C of Table 3.1 shows that, on average, the most motivated monitoring investors hold

approximately 9% of firm shares, while the least motivated monitoring investors only hold 1% of firm shares. Two alternative measures of motivated monitoring IO are also constructed: $Nmi1_{i,t}$, the number of motivated monitoring institutional investors, and $Pmi1_{i,t}$, the ratio of $Nmi1_{i,t}$ to the number of total institutional investors in firm *i*.

3.3.3 Investment inefficiency measures

Inefficient investment is defined as the deviation from the level of investment that would be predicted by a firm-specific model. Motivated by Richardson (2006) and Stoughton et al. (2016), the following regression is estimated and the residuals are used as proxies for firm-specific inefficient investment:

$$INew_{i,t} = \alpha + \beta_1 \frac{V}{P}_{i,t-1} + \beta_2 Leverage_{i,t-1} + \beta_3 Cash_{i,t-1} + \beta_4 Age_{i,t-1} +$$

$$\beta_5 Size_{i,t-1} + \beta_6 Return_{i,t} + \beta_7 INew_{i,t-1} + \delta_i + \mu_t + \epsilon_{i,t} \quad (3.1)$$

where $INew_{i,t}$ is the new investment level for firm *i* in year *t*, and $INew_{i,t} = ITotal_{i,t} - IMaintenance_{i,t}$. $ITotal_{i,t}$ is the overall investment, and $IMaintenance_{i,t}$ is the investment expended to maintain the assets.

Existing finance and economics literature has shown that investment in a firm is jointly determined by growth opportunities, financial constraints, and other firm characteristics (Hubbard 1998)[6]. Firm growth opportunities are measured by *V/P*, where *V* represents the assets in place and *P* is the market value of the firm (Ohlson 1995)[7]. Because *P* is the

[6] See Hubbard (1998) for a detailed literature review.
[7] Richardson (2006) provides the detailed definition of V=P.

sum of *V* and the value of future growth, *V/P* is negatively related to a firm's growth opportunities. One would expect a negative relation between *V/P* and *INew*. The financial constraints are measured by *Leverage* and *Cash*. Because a lower leverage ratio and higher cash holdings indicate lower financial constraints, *INew* is expected to be negatively related to *Leverage* and positively related to *Cash*. The regression also controls for the other firm characteristics in Equation 3.1: firm age (*Age*), the natural log of a firm's total assets (*Size*), cumulative stock returns over the previous year (*Return*), and the lag of new investment ($INew_{t-1}$). Firm fixed effects (δ_i) are used to control for unobserved firm characteristics, and year fixed effects (μ_t) to control for the factors such as stock market level trends and business cycles. $\epsilon_{i,t}$ is clustered by firm.[8] Following Richardson (2006), all variables are winsorised at the top and bottom 1%. (Please refer to Appendix A1 for detailed definitions and the construction of these variables.)

Inefficient investment in a firm is defined in the empirical analyses as $Inef_{i,t} = |INew_{i,t} - \widehat{INew_{i,t}}|$. As discussed in the previous sections, both under- and over-investment are detrimental to the interests of shareholders. However, the underlying mechanisms of these two cases could be different. The under-investment proxy variable is defined as $Und_{i,t} = |INew_{i,t} - \widehat{INew_{i,t}}|$ if $INew_{i,t} < \widehat{INew_{i,t}}$ and the over-investment proxy variable as $Ovr_{i,t} = |INew_{i,t} - \widehat{INew_{i,t}}|$ if $INew_{i,t} > \widehat{INew_{i,t}}$. The inefficient investment is further modified as regards its direction in order to distinguish

[8] Petersen (2009) suggests that when the number of firms is much larger than the number of years, clustering standard errors by firm is similar to double clustering standard errors by firm and year.

the roles of motivated monitoring institutional investors in mitigating two different sources of investment inefficiency.

To avoid concerns involving the 'look-ahead bias' due to the use of unknown information at the time of my model prediction, Equation 3.1 is estimated for each year *t* of the period 1995–2015 using the historical panel data from 1981 to year *t*. The sample goes back to 1981 in order to increase the power of my optimal investment prediction. For example, the panel regression is run from 1981 to 1995 to estimate $\widehat{INew_{i,1995}}$, a panel regression from 1981 to 1996 to estimate$\widehat{INew_{i,1996}}$, and so on. The predicted investment $\widehat{INew_{i,t}}$ is the result of twenty-one historical panel regressions, for each year *t* from 1995 to 2015. The inefficient investment proxy variables estimated by this procedure are denoted as $Inef1_{i,t}$, $Und1_{i,t}$, and $Ovr1_{i,t}$[9]. Alternatively, following Richardson (2006) and Stoughton et al. (2016), Equation 3.1 is estimated by a single panel regression from 1995 to 2015. The inefficient investment proxy variables are defined as $Inef2_{i,t}$, $Und2_{i,t}$, and $Ovr2_{i,t}$.

Table 3.2 reports the corresponding regression results for the two specifications of Equation 3.1. The left panel displays the average co-efficients estimated by the twenty-one historical panel regressions. The numbers of negative (-) and positive (+) significant co-efficients at the 1% level are reported in parentheses. The right panel presents the co-efficients estimated by the single panel regression between 1995 and 2015. The negative co-efficients of *V/P* suggest that firms with good growth opportunities increase their

[9] I also estimate Equation 3.1 with five-year historical rolling windows between year t-4 and year t. My untabulated results are qualitatively similar to those reported in this paper.

investment. The negative co-efficients of *Leverage* and the positive co-efficients of *Cash* indicate that firms with lower financial constraints increase their investment. The negative co-efficients of *Size* and *Age* are consistent with the findings in Stoughton et al. (2016) and the firm life-cycle hypothesis. The positive co-efficients of *Return* and $INew_{i,t-1}$ are consistent with Richardson (2006) and Stoughton et al. (2016). The average R^2 of the historical panel regressions is 0.208 and the R^2 of the single panel regression is 0.259, suggesting that both investment model specifications can explain a significant portion of the variations in firm-specific investment.

3.3.4 Descriptive statistics

Panel C of Table 3.1 presents the descriptive statistics of all the variables in the empirical analyses. The mean and standard deviation of *INew* are 0.10 and 0.15, respectively, which are comparable to those (0.08 and 0.13) reported in Richardson (2006). The mean and standard deviation of the difference between *INew* and $\widehat{INew}_{i,t}$ estimated by the single panel regression are 0.00 and 0.13, respectively, which are similar to those (0.00 and 0.11) reported in Richardson (2006). The summary statistics of all the investment related variables are also comparable to those of Stoughton et al. (2016). The means of the motivated monitoring institutional investor proxies are 0.09 (*Tmi1*), 9.3 (*Nmi1*), and 0.03 (*Pmi1*), which are comparable to those (0.07, 9.0, and 0.02, respectively) reported in Fich et al. (2015). The proxies here are slightly larger because Fich et al. (2015) focus on the institutional investors of M&A targets and their sample is from 1984 to 2011. The correlation matrix is displayed in panel A of table A1. In that table, we observe that the correlation between *Tmi1* and *Size* is relatively high (0.56). This may be expected as

investors tend to invest more heavily in larger firms. However, all the correlations are within a reasonable range, showing that multicollinearity is unlikely to be a concern.

3.4 Main Results

In this section, the empirical test results for the effectiveness of motivated monitoring institutional investors are presented. They first reveal a negative relation between the inefficient investment proxies and the firm's subsequent stock performance. This is followed by an investigation of the role of motivated monitoring institutional investors in firm investment decisions with both ordinary least squares (OLS) and 2SLS regressions. Finally, the monitoring motivation across different types of institution is analysed.

3.4.1 Inefficient investment and subsequent stock returns

Previous empirical studies have suggested that inefficient investment has a negative impact on firm performance (Titman et al. 2004). In an efficient market, all information, including a firm's investment decisions, will ultimately be transferred to the firm's stock prices. It is important to confirm the negative relation between the inefficient investment proxies and subsequent stock returns before examining the monitoring role of motivated institutions in investment in a firm. In order to accomplish this, one can check whether the subsequent stock returns of firms with more inefficient investment are significantly lower than those with less inefficient investment.

In a manner similar to that of Daniel and Titman (1997); Faulkender and Wang (2006), and Fich, Harford, and Yore (2016), the subsequent stock returns are measured as the

differences between the buy-and-hold returns of my sample firms and the buy-and-hold returns of a benchmark portfolio:

$$Excess\ Return_{i,t} = \left[\prod_{j=1}^{12}(1 + Ret_{i,j}) - 1\right] - \left[\prod_{j=1}^{12}(1 + Benchmark\ Ret_{i,j}) - 1\right] \quad (3.2)$$

where $Ret_{i,j}$ is the stock return of firm *i* during the month *j* of the fiscal year *t*, and $Benchmark\ Ret_{i,j}$ is the return of the benchmark portfolio of firm *i* during the same month. Following Fama and French (1993), the sample firms are sorted into quintile portfolios based on their market capitalisation on June 30 each year and the book-to-market ratios at the end of December of the previous year. Each firm *i* is assigned to one of the five-by-five portfolios every June, and then the corresponding portfolio is used as the benchmark portfolio. The mean and median of *Excess Return* in the sample are -1.6% and -9.1%, respectively, which are comparable to those (-0.5% and -8.5%) reported in Faulkender and Wang (2006).

Next, the excess returns are regressed on the inefficient investment proxies:

$$Excess\ Return_{i,t} = \alpha + \beta_1 Inefficient\ investment_{i,t} + B * Control\ Variables_{i,t} + \theta_j + \mu_t + \epsilon_{i,t} \quad (3.3)$$

where *Inefficient investment* is one of the following six variables: *Inef1*, *Und1*, *Ovr1*, *Inef2*, *Und2*, and *Ovr2*. The control variables include *MTB*, *Leverage*, *Cash*, and *Size*. θ_j is the industry fixed effects based on the Fama-French 48 industry classification, and μ_t is the calendar year fixed effects. Equation 3.3 is estimated using a standard panel regression. $\epsilon_{i,t}$ is clustered by firm. To correct for the cross-sectional correlation among

standard errors, the Fama and MacBeth (1973) regression is used as an alternative method to estimate Equation 3.3[10].

The results of both regressions are presented in Table 3.3. The co-efficients of all the inefficient investment proxies are negative and statistically significant. Column (1) of Table 3.3 suggests that one standard deviation increase in *Inef1* is associated with a 2.96% decrease in a firm's annual excess returns. It is worth noting that the negative effect of inefficient investment on subsequent stock returns is relatively symmetrical for under- and over-investment. For example, Column (3) of Table 3.3 shows that one standard deviation increase in *Und1* is associated with a 2.62% decrease in a firm's annual excess returns, and Column (5) of Table 3.3 shows that one standard deviation increase in *Ovr1* is associated with a 3.19% decrease in a firm's annual excess returns. The evidence in Table 3.3 suggests that inefficient investment hurts a firm's subsequent stock performance and thus that institutional investors should have a good incentive to monitor the firm's investment activities.

3.4.2 Motivated monitoring institutional ownership and inefficient investment: baseline OLS regressions

Given the findings in section 3.4.1, one would expect that motivated monitoring institutional investors will monitor a firm's investment activities and increase its

[10] The panel regression coefficients may also be affected by the years that have more observations. This concern is mitigated by the Fama and MacBeth (1973) regression, in which all years are treated as equally important.

investment efficiency. To explore this expectation, the following baseline model is used to capture the effects of institutional investors on investment:

$$Inefficient\ Investment_{i,t+1} = \alpha + \beta_1 Tmi1_{i,t} + \beta_2 Tmi10_{i,t} + B * Controls_{i,t} + \theta_j + \mu_t + \epsilon_{i,t} \quad (3.4)$$

where *Inefficient investment* is one of the following six proxies: *Inef1*, *Und1*, *Ovr1*, *Inef2*, *Und2*, and *Ovr2*. *Tmi1* is the total ownership of motivated monitoring institutions. To help us differentiate the monitoring roles of the most motivated monitoring investors from those of the least motivated monitoring investors, *Tmi10* is added to Equation 3.4, either individually or jointly, along with *Tmi1*. Following Stoughton et al. (2016) *MTB*, *Leverage*, *Cash*, *Size*, *Tangibility*, and *Age*[11]are included. To control for industry-specific and time-specific investment variations, the Fama-French 48 industry (θ_j) and year (μ_t) fixed effects in Equation (3.4) are also incorporated. The standard errors are clustered by firm.

Table 3.4 presents the results of estimating Equation 3.4. Panel A is based on the inefficient variables estimated by the historical panel regressions and Panel B is based on those estimated by the single panel regression. All the co-efficients of *Tmi1* are negative and statistically significant, suggesting that motivated monitoring institutional investors improve firm investment efficiency. Both under- and over-investment are mitigated by

[11] Appendix A provides the detailed definitions and construction of these variables.

motivated monitoring institutional investors. These results are consistent with my three hypotheses. In contrast, *Tmi10* has a significantly positive effect on *Inef* in both Panel A and Panel B, indicating that firms with greater *Tmi10* (least motivated monitoring IO) make more inefficient investments. This positive relation is only statistically significant in the under-investment sub-sample, which may be explained by either the 'quiet life' hypothesis or managers' career concerns. These two explanations ae further investigated in section 3.5.

3.4.3 Motivated monitoring institutional ownership and inefficient investment: 2SLS regressions

My baseline regression results may be driven by the endogeneity between motivated monitoring IO and inefficient investment. The first concern is the potential omitted-variable bias. Although several firm characteristics are controlled for in Equation 3.4, there may be some unobserved firm characteristics correlate with both motivated monitoring IO and inefficient investment. The second concern involves reverse causality, to the effect that motivated monitoring institutional investors may have private information on firms' investment efficiency, and may choose to invest more in firms with higher investment efficiency (Giannetti & Simonov 2006). Motivated by recent studies on firms switching between the Russell 1000 and 2000 indexes, an IV approach is adopted based on Fich et al. (2015), Crane et al. (2016), and Schmidt and Fahlenbrach (2017).

The Russell 1000 and 2000 indexes are reconstituted in June each year. Based on the market capitalisation of the common stocks of US firm as at May 31, the largest 1,000

firms are included in the Russell 1000 index and the subsequent 2,000 firms are included in the Russell 2000 index[12]. In 2005, about $90 billion worth of institutional assets tracked the Russell 1000 index and about $200 billion worth of institutional assets tracked the Russell 2000 index (Chang, Hong, & Liskovich 2015). Both indexes are value-weighted and no other criterion besides market capitalisation is used in the reconstitution of the index. Therefore, when a stock drops from the Russell 1000 to the Russell 2000 index or is added in the Russell 2000 index for the first time, the index tracking institutional ownership of the stock will increase exogenously. In a similar manner, there is a negative and exogenous shock on a firm's index tracking institutional ownership when a stock moves up from the Russell 2000 to the Russell 1000 index or is excluded from the Russell 2000 index.

Depending on whether they experience an index switch, firms in the sample universe may be divided into two groups. The first group comprises firms that experienced a switch. Two potential outcomes may occur as the result of the switch. On the one hand, the index switch could lead to greater investor attention, and therefore the firm would attract more investors and total ownership of institutional investors would change. Greater investor attention could also lead the firm to undertake greater investment, and therefore *Tmi1* would increase too.

[12] The London Stock Exchange bought Russell Investments in 2014. The merged firm is called FTSE Russell. For the detailed explanations of the Russell Index reconstitution, please refer to www.ftserussell.com/research-insights/russell-reconstitution.

The second group is the majority of firms, those that are not directly affected by the switch. When membership of the index changes by, for example, a firm moving from the Russell 1000 to the Russell 2000 index, passive investors following the Russell 1000 need to adjust the weighting of their portfolios, not only for the switched firm, but also for the firms that did not switch. As the result, investors' holdings of firms near 10% cut-off might need to be reclassified, even though the holding might be in firms that hadn't switched at all). Furthermore, the counter party to the trade may increase or decrease its holding in all other firms too. In this process, the total holdings of institutional investors will not change. However, classification of the motivated investors could differ significantly, and this would in turn lead to significant variation in motivated institutional ownership.

The switch of firms between the two Russell indexes and the inclusion of firms in or their exclusion from the Russell 2000 index are used as the IVs in the first-stage regression:

$$Tmi1_{i;t} = \alpha + \beta_1 R1TR2_{i,t} + \beta_2 R2TR1_{i,t} + \beta_3 R2TN_{i,t} + \beta_4 NTR2_{i,t} + B * Control\ variables_{i;t} + \theta_j + \mu_t + \epsilon_{i,t} \quad (3.5)$$

where *R1TR2* (*R2TR1*) is an indicator variable equal to 1 if firm *i* switches from the Russell 1000 (2000) index to the Russell 2000 (1000) index in year *t*, or equal to 0 otherwise. *R2TN* (*NTR2*) is an indicator variable equal to 1 if firm *i* enters (leaves) the Russell 2000 index, or equal to 0 otherwise. The relevancy condition of the IVs is satisfied because the index reconstitution affects the motivated institutional ownership in all firms. The exclusion restriction is also satisfied because stock returns are stochastic and the only index assignment rule is mechanically based on the ranking of stock market capitalisation. Firms switching between the two Russell indexes should not respond by

changing their investment decisions. *MTB*, *Leverage*, *Cash*, *Size*, *Tangibility*, and *Age* are controlled for in Equation 3.5. θ_j and μ_t are the Fama-French 48 industry and year fixed effects, respectively. In the second-stage regression, Equation 3.4 is estimated by replacing *Tmi1* with $\widehat{Tmi1}$, the predicted value of motivated monitoring IO from Equation 3.5.

Panel A of Table 3.5 presents the 2SLS regression results. Column (1) presents the first-stage regression results. *R1TR2*, *R2TN*, and *NTR2* are negatively associated with *Tmi1*, while *R1TR2* is positively correlated with it. The signs of the IV co-efficients are generally in line with those of Fich et al. (2015). The results of the second-stage regressions are presented in Columns (2)–(7). In Columns (2) and (5), the dependent variables are proxies for firm inefficient investment: *Inef1* and *Inef2*. The coefficients of $\widehat{Tmi1}$ are negative and statistically significant at the 1% level, supporting hypothesis ***H1*** – that motivated monitoring institutional investors improve firm investment efficiency. In Columns (3) and (6), the dependent variables are under-investment proxies: *Und1* and Und2. The co-efficients of $\widehat{Tmi1}$ remain negative and statistically significant at the 1% level. The marginal effect of $\widehat{Tmi1}$ on the under-investment proxies is economically significant. For example, one standard deviation increase in $\widehat{Tmi1}$ is associated with a 0.86% decrease in *Und1* for the average sample-size firm with $2,648.1 million worth of total assets. This result confirms hypothesis **H2** – that motivated monitoring institutional investors reduce firm under-investment. In Columns (4) and (7), the dependent variables are over-investment proxies: *Ovr1* and *Ovr2*. The negative and statistically significant co-efficients of $\widehat{Tmi1}$ confirm that motivated monitoring institutional investors reduce firm over-investment. The economic significance is such that one standard deviation

increase in $\widehat{Tmi1}$ results in a 2.27% decrease in *Ovr1*, which translates into a $60.1 million reduction in annual over-investment for the average sample-size firm. This result provides direct support for hypothesis **H3** – that motivated monitoring institutional investors reduce firm over-investment.

As an alternative test, a first-difference specification used in Schmidt and Fahlenbrach (2017) is adopted to remove any firm-specific, time-invariant, unobservable firm characteristics. All the dependent variables and control variables of the firm's characteristics in Panel A of Table 3.5 are replaced by their annual change terms. The first difference specification may further reduce the causality concern, to the effect that institutional investors choose to invest more in firms with higher investment efficiency. Panel B of Table 3.5 presents the results of 2SLS regressions with the first difference specification. The increase in motivated monitoring IO reduces the subsequent firms' investment inefficiency.

3.4.4 Monitoring motivation and institution types

Institutional investors differ in terms of investment strategies, fiduciary duties, and trading horizons. Previous studies have documented that long-term investors and independent investors are more active in monitoring firms than are short-term and grey investors (Chen et al. 2007). However, Appel et al. (2016) found that passive mutual funds may actually improve firm governance and long-term performance. The motivated monitoring investors in this study include all of the types of investors covered in the 13F universe. Therefore, a natural question is whether the monitoring motivation of institutional investors varies across different institution types.

First, in this regard, all motivated monitoring institutional investors are classified as independent (*Tmi_Ind*) and grey investors (*Tmi_Grey*), based on the business relationship between the institutional investors and the firms in which they hold stocks (e.g. Brickley et al. 1988; Almazan et al. 2005; Chen et al. 2007). Independent investment advisors, investment companies, and public pension funds are classified as independent investors. Private pension funds, banks, and insurance companies are classified as grey investors because their monitoring ability may be compromised due to their business interests[13]. Second, institutional investors are classified as transient (*Tmi_Tran*) and non-transient investors (*Tmi1_NonTran*) based on their investment horizons. As previously mentioned, Bushee (1998) classifies institutional investors as dedicated, quasi-index, and transient investors based on their investment patterns such as those of portfolio turnover, diversification, momentum, and the like. Following Chen et al. (2007), transient investors are classified as short-term investors, while dedicated and quasi-index investors as non-transient or long-term investors.

Panel A of Table 3.6 presents the 2SLS regression results of inefficient investment on *Tmi_Ind* and *Tmi_Grey*, and Panel B of Table 3.6 presents similar regression results for those variables in first-difference terms. Similarly, Panel C of Table3.6 presents the 2SLS regression results of inefficient investment on *Tmi_Tran* and *Tmi_NonTran*, and Panel D of Table 3.6 presents the regression results for those variables in first-difference terms. Among all specifications, the motivated monitoring IO proxies are negatively related to investment inefficiency. These results suggest that the monitoring incentives derived

[13] I follow Brian Bushee's institution type classification for institutional investors after 1998

from the relative importance of firms in institutional investors' portfolios are independent of investor characteristics. Even for the institutions that are usually taken as inefficient monitoring or passive investors, the benefits of monitoring still increases with the weight of firms within in their portfolios. Therefore, overall, motivated monitoring institutional investors improve firm investment efficiency.

3.5 Further Discussions and Robustness Tests

The results so far have documented a significantly negative relation between motivated monitoring IO and firm's inefficient investment. The next step is to investigate the channels through which motivated monitoring institutional investors mitigate over- and under-investment of firms. This section concludes with a battery of robustness tests.

3.5.1 Motivated monitoring investors, cash, and over-investment

Empire-building activities may increase the resources under the control of a firm's managers (Jensen 1986) From an agency perspective, managers have an incentive to over-invest and grow their firms beyond their optimal size. Previous studies have documented that the empire-building problem is more severe for firms with larger amounts of free cash flow (e.g. Stulz 1990; Lang, Stulz, & Walkling 1991; Brush, Bromiley, & Hendrickx 2000; Richardson 2006). Motivated monitoring institutions should therefore have a more important role of curbing managers' over-investment tendencies when firms have more cash reserves or free cash flows. This hypothesis is tested with the following model specification:

$$Ovr_{i,t} = \alpha + \beta_1 \widehat{Tmi1}_{i,t} + \beta_2 \widehat{Tmi1}_{i,t} * Cash\ measures_{i,t} + B * Controls_{i,t} + \theta_j +$$

$$\mu_t + \epsilon_{i,t} \quad (3.6)$$

where $\widehat{Tmi1}_{i,t}$ is the predicted value of $Tmi1_{i,t}$ in Equation 3.5, cash measures are either the cash reserve ratio (*Cash*) or the free cash flow (*FCF*), and the control variables are the same as those used in Equation (4). Richardson's (2006) FCF definition[14] is adopted:

$$FCF_{i,t} = Operating\ cash\ flow_{i,t} - IMaintanance_{i,t} + R\&D_{i,t} - \widehat{INew}_{i,t} \quad (3.7)$$

Empire building is usually observed in firms with positive free cash flows (Richardson 2006). Equation 3.6 is estimated following Dittmar and Mahrt-Smith (2007) and excludes the firm-year observations with negative *FCF*. The regression results of Equation 3.6, presented in Table 3.7, show that firms with more cash holdings and free cash flows are more likely to over-invest. This finding is consistent with the prediction that managers may engage in empire building and over-invest firms' abundant cash. More importantly, the co-efficients β_2 of the interaction terms are all negative and statistically significant, indicating that the role of motivated monitoring institutional investors in a firm's over-investment is more important for firms with excess cash.

3.5.2 Quiet life or career concerns

Firms may under-invest if managers do not exert enough effort to seek investment opportunities. There are two possible explanations that predict firm under-investment given a lack of investor monitoring. On the one hand, as previously mentioned, managers

[14] Because two different specifications are used to estimate the predicted new investment $\widehat{INew}$, I accordingly have two measures of free cash flows. $\widehat{INew}$ is estimated by the historical panel regressions in FCF1 and the single panel regression in FCF2.

may prefer a ‘quiet life’ (Hart 1983; Bertrand & Mullainathan 2003) because it is costly for them to seek positive NPV projects and make difficult investment decisions. The first explanation is therefore referred to as the ‘quiet life’ hypothesis. On the other hand, managers are risk-averse and may choose not to invest in risky projects. Rather than being lazy, managers may have job-security concerns if their new projects have unfavourable outcomes due to random factors (Aghion et al. 2013). The second potential explanation is therefore referred to as the ‘career concern’ hypothesis.

Although motivated monitoring investors may mitigate a firm’s under-investment, the predicted joint effect of shareholder monitoring and other external monitoring on a firm’s under-investment differs according to the quiet life and career concern hypotheses. If the quiet life hypothesis is correct, monitoring investors have a less important role when market competition is higher. This is because the level of market competition is positively related to the probability of firm bankruptcy (Hart 1983). Firm managers are less likely to enjoy ‘quiet lives’ in a competitive market. However, the ‘career concern’ hypothesis predicts the opposite. In a highly competitive market, the probability of failure of new projects is higher, which would thus increase the career concerns of firm managers and lead to under-investment. Institutional investors may alleviate the managers’ career concerns as these investors are informed and can effectively distinguish random negative outcomes from a lack of managerial ability (Aghion et al. 2013). Therefore, if the career concern hypothesis is correct, monitoring institutional investors have a more important role in mitigating under-investment when market competition is greater.

These two hypotheses also have opposite predictions when managerial entrenchment is high. If the quiet life hypothesis is correct, managers with a lower risk of being fired have

less incentive to seek investment opportunities. Therefore, monitoring investors have a stronger effect on reducing a firm's under-investment when managers are more entrenched. However, managers have more job security when managerial entrenchment is higher. If the career concern hypothesis is correct, managers are less likely to under-invest when their jobs are more entrenched. Therefore, monitoring investors have a weaker effect in reducing a firm's under-investment in this case. The following model specification is used to test the two hypotheses:

$$Und_{i,t+1} = \alpha + \beta_1 \widehat{Tmi1}_{i,t} + \beta_2 \widehat{Tmi1}_{i,t} * Competition\ or\ Entrenchment_{i,t} + B * Controls_{i,t} + \theta_j + \mu_t + \epsilon_{i,t} \quad (3.8)$$

where *Competition* is *1-Lerner ratio* (Aghion et al. 2013) and *Entrenchment* is Gompers et al. 's (2003) G-index. The Lerner ratio is the median growth margin of the industry to which firms are assigned[15]. As the G-index is only available for the S&P 1500 companies from 1995 to 2007, the sample size for the entrenchment analysis is smaller than it is for the main tests.

Table 3.8 presents the results. Consistent with the career concern hypothesis, when market competition is greater and managers are less entrenched, the under-investment problem is more severe. Furthermore, when career concerns are greater, the effect of

[15] Following (Aghion, Van Reenen, and Zingales 2013), the Lerner ratio is based on 3-digit SIC codes and the industry fixed effects are based on 4-digit SIC codes in the regressions related to market competition.

motivated monitoring investors on under-investment is more prominent. These results support the career concern hypothesis but oppose the quiet life hypothesis.

3.5.3 Institutional ownership by decile monitoring motivation

Table 3.4 indicates that *Tmi1* and *Tmi10* have opposite effects on a firm's investment inefficiency. To further support the view that the motivation of institutional monitoring is positively associated with the relative importance of firm stocks in institutional portfolios, stocks are sorted into decile groups by their holding value in institutional portfolios. Panel C of Table 3.1 presents the summary statistics for these decile groups. Extending the definitions of *Tmi1* and *Tmi10*, I define *TmiN* where *N* takes an integer value from 1 to 10. *TmiN* represents the ownership of a firm held by institutional investors whose portfolios include the firm's stock in the decile *N* group. The relation between *Inef* and *TmiN* is tested using the 2SLS regression specification presented in Table 3.5.

Panel A and Panel B of Table 3.9. present the results of the second-stage regressions. The dependent variables are *Inef1* in Panel A and *Inef2* in Panel B. The co-efficients of *TmiN* follow a similar pattern in both Panel A and Panel B. The estimated co-efficients of *Tmi1–Tmi3* are negative and statistically significant, suggesting that institutional investors have a monitoring role in a firm's investments when the weighting of the firm's stock is among the top 30% in their portfolios. The co-efficient of *Tmi4* is negative but statistically insignificant. In contrast, the estimated co-efficients of *Tmi5–Tmi10* are positive and statistically significant, suggesting that institutional investors have less motivation to monitor a firm that appears in the bottom 60% weighting ranking in their portfolios. In addition, the results show that the estimated co-efficients of *Tmi1–Tmi10* increase

monotonically from negative to positive. Taken together, the results indicate that as monitoring motivation decreases, firm investment inefficiency increases. The monitoring motivation of institutional investors is not evenly allocated among all firms in institutional portfolios.

3.5.4 Alternative measures of motivated monitoring investors

In the main analyses, ownership by motivated monitoring institutional investors is used as a proxy for investor monitoring attention. To check the robustness of my results, two alternative measures of motivated monitoring IO that were used in Fich et al. (2015) are employed: (1) the proportion of motivated monitoring institutional investors among a firm's institutional investors (*Pmi1*), and (2) the natural log of one plus the number of motivated monitoring institutional investors (*Ln(1+Nmi1)*), and the 2SLS regression is rerun, that is, equations 3.4 and 3.5. *Pmi1* and *Ln(1+Nmi1)* are used as the dependent variables in the first-stage regressions and their predicted values are used as independent variables in the second-stage regressions. The results are tabulated in Panel A and Panel B of Table 3.10. The negative relation between motivated monitoring IO and inefficient investment remains robust with these two alternative measures.

As shown in Panel C of Table 1, the main independent variable of interest, *Tmi1*, represents about 9% of a firm's ownership. Subsequently, an aggregate measure of institutional investor monitoring attention to a firm is used that covers all the firm's institutional investors:

$$TMA_{i,t} = \ln(1 + \sum_{j=1}^{N} w_{i,j} * IO_{i,j} * 10000) \quad (3.9)$$

where $TMA_{i,t}$ is the total institutional investor monitoring attention to firm *i*, *N* is the total number of institutions investing in firm *i*, $w_{i,j}$ is the market value weighting of firm "s stock in institution j's portfolio, and $IO_{i,j}$ is the ownership by institution *j* in firm *i*. In the aggregate measure, $w_{i,j}$ represents institution *j*'s motivation to monitor firm *i*, and $IO_{i,j}$ represents institution *j*'s monitoring power over firm *i*. Intuitively, *TMA* is a weighted average of a firm's institutional ownership, with the weighting being the institutional investors' monitoring motivation. Panel C of Table 3.1 presents the summary statistics for *TMA*. One would predict that a firm with a greater *TMA* has higher aggregated institutional investor monitoring attention. Consistent with this prediction, Panel C of Table 10 shows that the co-efficients of IVTMA are all negative and statistically significant in the second-stage regressions[16].

3.5.5 Discussion of IV identification using the Russell index reconstitution

The identification of the IVs in this study is slightly different from that found in Fich et al. (2015) and Schmidt and Fahlenbrach (2017). Russell's float-adjusted market cap-based rankings are not used as IV in these 2SLS regressions. As indicated by Appel et al. (2016), these rankings are affected by insider ownership and liquid outstanding shares. The impact of the Russell index reconstitution on changes in institutional holdings may be over-stated if the rankings are included as IVs[17]. The other issue is that in 2007 Russell adopted a 'banding' rule to index assignment (Crane et al. 2016)[18]. Although the IV

[16] My findings are robust in OLS regressions
[17] Please refer to Appel, Gormley, and Keim (2016) for detailed discussions.
[18] Please refer to Crane, Michenaud, and Weston (2016) for detailed discussions.

method, rather than the regression discontinuity method (Chang et al. 2015), is used in this thesis, the regressions presented in Table 3.5 are rerun in a restricted sample for the period 1995–2006. My untabulated test results are similar to those presented in Table 3.5.

3.6 Conclusions

Managers may potentially either under-invest or over-invest due to agency problems. Both types of inefficient investment may negatively impact firms' subsequent performance. Institutional investors may mitigate a firm's inefficient investment through monitoring and activism, thereby benefiting from the subsequent improved performance. However, the attention of institutional investors is limited (Kempf et al. 2017). If a firm represents only a very small proportion of institutional investors' portfolios, the opportunity cost of monitoring a firm may exceed the benefit of doing so. Following the manner that Fich et al. (2015) in measuring the motivation of an institutional investor to monitor a firm by the relative importance of the firm's stock in the institution's portfolio. The results of this chapter indicate that institutional investors with greater motivation to monitor a firm's performance are associated with improvement in the firm's investment efficiency. By extending the measure of abnormal investment developed in Richardson (2006), higher motivated monitoring IO is associated with inefficient investment (both too little and too much). A similar relation is not found between investors with the least motivation to monitor and firms' inefficient investment; this result is consistent with the limited attention hypothesis.

This chapter sheds light on the ongoing debate on whether all types of institutional investors, including grey and passive ones, contribute to an improvement in corporate governance. The evidence suggests that as long as the holdings of a firm's stock are important to institutional investors, even grey and passive institutional investors may improve firms' investment decisions. Also documented are the channels through which motivated institutional investors can reduce inefficient investment. The role of monitoring investors in reducing over-investment is stronger if firms have greater cash reserves and free cash flows, while the role of monitoring investors in reducing under-investment is stronger when firm managers are more likely to have concerns about their future careers. Overall, the results establish a robust link between motivated monitoring institutional investors and corporate investment efficiency.

4. Motivated Monitoring Ownership and the Value of Cash Holdings.

4.1 Introduction

By the end of the fiscal year 2015, the aggregate cash holdings reported by non-financial and non-utility firms listed on the New York Stock Exchange (NYSE), Nasdaq, and the American Stock Exchange (AMEX) had reached $2.3 trillion, representing 22.4% of total firm assets and equivalent to 12.5% of annual US gross domestic product. Firms may hold more cash or other liquid assets as a precautionary motive should they face higher cash-flow uncertainty, market competition, or credit constraints (Haushalter et al. 2007; Bates et al. 2009; Harford, Klasa, & Maxwell 2014). However, the use of cash is mainly at the discretion of managers'. A firm's managers may either directly take the cash in the form of perks or excessive salaries, or invest it in projects that do not maximise shareholders' profits. Therefore, managerial agency problems may reduce the value of corporate cash holdings.

This chapter studies how institutional investor attention affects their governance role in monitoring corporate cash holdings. With the growth of institutional investors in the US stock market, large shareholders are likely to be active in firms' governance[19]. Previous studies have usually measured institutional monitoring by total institutional ownership or ownership by institutional investors with similar characteristics, such as institution types, investment horizon, degree of activity in engagement with firms, and a certain ownership

[19] Edmans and Holderness (2017) provides a detailed survey of previous studies on the role of large shareholders in corporate governance.

threshold (Bushee 1998a; Chen et al. 2007; Cremers & Petajisto 2009; Cronqvist & Fahlenbrach 2009). However, institutional investors hold a large number of stocks in their portfolios[20]. Recent theoretical and empirical studies support the view that institutional investor attention is a scarce resource (Sims 2003; Kacperczyk et al. 2016; Kempf et al. 2017). If the optimal level of monitoring attention to a holding firm is determined by the trade-off between monitoring benefits and costs, it may not be optimal for institutional investors to distribute their monitoring attention evenly to all the stocks in their portfolios. Fich et al. (2015) demonstrate that in M&As, the monitoring attention of institutional investors to a target firm is positively associated with the relative importance of the firm's stock in their portfolios. Following Fich et al. (2015), and previously indicated, a firm's most motivated monitoring institutional investors are defined as those whose holdings in the firm are in the top 10% of their portfolios[21]. If motivated monitoring institutional investors are indeed more actively engaged in firm governance than other institutional investors, then the perceived market value of cash should be higher for firms with greater motivated monitoring IO.

To test the institutional investor limited-attention hypothesis, this chapter examines the three research questions that follow. First, is there a negative relation between institutions' monitoring attention and the relative importance of firms in their portfolios? Second, does my measure of monitoring motivation vary across different institution types? Third, does motivated monitoring institutional ownership differ from other

[20] On average, an institutional investor's portfolio included 219 stocks during 1980—2010 (Zeng 2016).
[21] Later in the thesis, I extend the top 10\% cutoff and construct a general monitoring motivation-weighted institutional ownership measure. Therefore, I append ``most'' to motivated monitoring institutional investors

traditional corporate governance measures? There are several advantages to using the marginal value of cash as an empirical setting to answer these questions. First, the effect of motivated monitoring IO on the marginal value of cash can be measured by a dollar value perceived by stock market participants. Second, the pecuniary numbers documented in my panel sample not only contain time-varying and cross section-varying information on the value of institutional monitoring, but also provide us with an empirical framework to examine how institutional investors allocate their monitoring attention to all firms in their portfolios. Lastly, conflicts of interest between shareholders and managers may cause firms to invest cash inefficiently (Jensen 1986; Harford, Mansi, & Maxwell 2008); thus, whether and, if so, to what extent motivated monitoring institutional investors impinge on the value of corporate cash holdings is an important question.

The sample includes 67,404 firm-year observations from the CRSP/Compustat Merged dataset for the period 1995–2015. To quantify the effect of motivated monitoring institutional investors on firm cash holdings, this chapter adopts Faulkender and Wang's (2006) specification and estimates the change in firm market value associated with a change of one dollar in cash holdings[22]. The findings provide strong evidence that the marginal value of cash increases with the most motivated monitoring IO. Controlling for other factors, one standard deviation increase in the most motivated monitoring IO is associated with 9.2 cents higher marginal value of cash. This economic effect is even

[22] In this paper, I use ``the marginal value of cash'' and ``the change in firm market value associated with a change of one dollar in cash holdings'' interchangeably.

stronger if I replace the most motivated monitoring IO with either the ratio of the number of the most motivated monitoring institutional investors to the number of total institutional investors (23.7 cents), or the natural log of one plus the number of the most motivated monitoring institutional investors (19.9 cents).

This chapter next examines whether the positive effect of most motivated monitoring IO on the marginal value of cash can be explained by other traditional firm governance measures. Four proxies from previous literature, Gompers et al.'s (2003) G-index, Bebchuk, Cohen, and Ferrell (2009), total institutional ownership, and block-holder ownership, are used to represent the traditional measures. The positive relation between the most motivated monitoring IO and the marginal value of cash remains statistically and economically significant after controlling for both anti-takeover indices and other institutional ownership measures. More importantly, total institutional ownership and block-holder ownership do not have a significantly additional positive effect on the marginal value of cash in addition to the most motivated monitoring IO. This suggests that the motivation of an institutional investor to monitor a firm is related to a greater degree to how important the firm is to the investor than to how important the investor is to the firm. These findings demonstrate that the role of the most motivated institutional investors in monitoring a firm's cash holdings is unlikely to be driven by the traditional firm governance measures.

This chapter also determines whether my measure of institutional monitoring motivation can only be applied to a particular type of institution. Based on Brickley et al.'s (1988) classification, I find that both independent and grey most motivated institutional investors have a positive association with the marginal value of cash. I further use Bushee's (1998)

classification and show that all three types of most motivated monitoring IOs have a positive effect on the marginal value of cash, while the effect is only statistically significant for transient and quasi-indexer institutions. These findings indicate that institutions, whose monitoring role is believed to be ineffective due to the potential business ties (grey) and short investment horizons (transient), still have a positive contribution to make in monitoring firms that are relatively important in their portfolios.

To explore how an institutional investor's monitoring attention to a firm changes with the firm's market value weighting in the portfolio, all firms in an institutional investor's portfolio are sorted into ten decile groups in descending order according their market value weighting in the portfolio. This chapter also extends Fich et al.'s (2015) 10% threshold and examines the allocation of monitoring attention to all the stocks in institutional portfolios. I predict that an institutional investor's monitoring attention should be higher for firms in the top decile than for those in the bottom decile. If firm *i* is assigned to the decile group *j* of an institutional investor's portfolio, the institutional investor would be classified as a class *j* investor in firm *i*, where *j* represents a value from 1 to 10. Next, all class *j* investors in firm *i* are identified as the total ownership by these investors as $MMIO_{i,j}$ are defined as motivated monitoring $IO_{i,j}$. My prediction is that $MMIOi,_1$ *(*$MMIOi,_{10}$*)* should denote the ownership by institutional investors who have the strongest (weakest) motivation to monitor firm *i*[23]. Consistent with this prediction, I document that the positive effect of *IO* on the marginal value of cash decreases with institutional investors' monitoring motivation. The two highest classes, $MMIO_{i,1}$ and

[23] $MMIO_{i,1}$ and most motivated monitoring IO are used interchangeably in the rest of my paper.

$MMIO_{i,2}$, are positively related to the marginal value of cash, and this relation is statistically significant. The relation between the ownership of classes 3–5 ($MMIO_{i,3}$ to $MMIO_{i,5}$) and the marginal value of cash is not statistically significant. The relation between the ownership of classes 6–10 ($MMIO_{i,6}$ to $MMIO_{i,10}$) and the marginal value of cash is negative and statistically significant.

A battery of robustness tests is conducted to validate these findings. First, the results are robust after accounting for the endogeneity issues arising from unobserved firm characteristics and potential investor self-selection bias. Three identification strategies are used to mitigate any endogeneity issues: (1) 2SLS with IVs based on the Russell index reconstitution, (2) high-dimensional fixed effects, and (3) change in the motivated monitoring IO. Second, the weighting of a stock in institutional portfolios is used as a proxy for institutional monitoring motivation. I construct a monitoring motivation-weighted IO, and a positive relation between this and the marginal value of cash is documented. Third, Halford et al. (2017) indicate that it is important to control for cash regimes when researchers study the effect of corporate governance on the marginal value of cash. After controlling for these cash regimes, the positive effect of $MMIO_{i,1}$ on the marginal value of cash remains positive and statistically significant in the raising cash and distributing cash regimes. Fourth, this chapter examines whether firms actually benefit from institutional monitoring and shows that the most motivated monitoring institutional investors may improve the operating performance of firms through monitoring a firm's cash holdings. Fifth, the positive relation between $MMIO_{i,1}$ and the marginal value of cash remains robust after controlling for firm size and its interaction with the change in cash. Sixth, following Dittmar and Mahrt-Smith (2007), this study

estimates the value of a firm's excess cash holdings using Fama and French's (1998) empirical method and finds that $MMIO_{i,1}$ is positively related to the value of a firm's excess cash holdings. Finally, this chapter shows that the relation between my monitoring motivation-related IO measures and the marginal value of cash remains robust over time.

This chapter makes three contributions to the literature. First, it adds to the emerging literature, showing that institutional investors' monitoring attention affects their monitoring effectiveness. In particular, Fich et al. (2015) find that M&A deal premiums and completion probabilities are positively associated with the most motivated monitoring IO of target firms. Liu et al. (2016) and Kempf et al. (2017) use the exogenous shocks to unrelated firms' stocks in an institutional investor's portfolio as a proxy for the distraction that may divert the institutional investor's monitoring attention to a firm. This chapter contributes to this line of research by generalising Fich et al.'s (2015) study of M&A targets to US public firms' cash holdings. It shows the positive impact of institutional monitoring attention on the marginal value of corporate cash holdings, as well as the mechanisms through which this outcome manifests. More importantly, the empirical setting in this chapter helps us to examine the allocation of institutional monitoring attention among all stocks in their portfolios. It shows that institutional investors' monitoring attention to a firm drops monotonically when the relative importance of the firm's stock decreases in their portfolios.

Second, this study sheds light on two ongoing debates. The first debate addresses the role of passive institutional investors in corporate governance. Some previous studies suggest that passive institutional investors weaken firm corporate governance (Schmidt & Fahlenbrach 2017), while others argue that they can still contribute to shareholder

activism (Appel, Gormley, and Keim 2016). This chapter contributes to this debate by providing evidence that both active and passive institutional investors effectively monitor firms that are relatively important in their portfolios. The second debate concerns the value of cash. Dittmar and Mahrt-Smith (2007) found that corporate governance measured by anti-takeover indexes and block-holder ownership improves the marginal value of corporate cash holdings. However, Halford et al. (2017) show that the positive relation between corporate governance and the marginal value of cash is not robust after accounting for *ex-post* classified cash regimes. After controlling for the anti-takeover indexes and block-holder ownership, I find that not only does motivated monitoring IO improve the marginal value of cash, but also that this positive effect remains statistically significant in Halford et al.'s (2017) raising cash and distributing cash regimes.

Third, this chapter adds to the previous literature that examines the determinants of the value of corporate cash holdings, such as corporate financial policy (Faulkender & Wang 2006), corporate governance (Dittmar & Mahrt-Smith 2007), financial constraints and investment opportunities (Denis & Sibilkov 2010), firm-specific and time-varying information asymmetry (Drobetz, Grüninger, & Hirschvogl 2010), corporate diversification (Duchin 2010; Tong 2011), accounting conservatism (Louis, Sun, & Urcan 2012), credit rights (Kyröläinen, Tan, & Karjalainen 2013), product market competition (Alimov 2014), refinancing risk (Harford et al. 2014), the adoption of state-level business combination laws (Fich et al. 2016), internal control over financial reporting (Gao & Jia 2016), and cash regimes (Halford et al. 2017). The results presented in this chapter show that firms with greater institutional monitoring attention have a higher marginal value of

cash, and provide new insights into the role of motivated monitoring institutions in corporate activities.

The remainder of the chapter is organised as laid out in what follows. Section 4.2 describes my baseline regression, proxies for institution monitoring motivation, and sample data. Section 4.3 presents my main test results. Section 4.4 discusses the analyses I perform to assess the robustness of my main results, and section 4.5 is the conclusion. Appendix A2 provides a detailed definition of all the variables used in my empirical analyses.

4.2 Research Design and Sample

4.2.1 Baseline regression model

The objective of this chapter is to identify the effect of motivated monitoring institutional investors on the marginal value of corporate cash holdings. The primary regression model builds on Faulkender and Wang's (2006) empirical framework in estimating the value of one additional dollar of cash holdings, an approach which has been widely used in the previous literature (e.g. Dittmar & Mahrt-Smith 2007; Denis & Sibilkov 2010). Faulkender and Wang (2006) use OLS regressions to examine the association between firms' excess stock returns and unexpected changes in their cash holdings, controlling for other firm-specific characteristics. This study extends Faulkender and Wang's (2006) model by adding motivated monitoring IO and the interaction of it with unexpected changes in cash. My baseline regression model 4.1 is described as follows:

$$r_{i,t} - R^{B}_{i,t} = \beta_0 + \beta_1 MMIO_{i,1,t-1} * \frac{\Delta C_{i,t}}{M_{i,t-1}} + \beta_2 MMIO_{i,1,t-1} + \beta_3 \frac{\Delta C_{i,t}}{M_{i,t-1}} + \beta_4 \frac{\Delta E_{i,t}}{M_{i,t-1}} +$$

$$\beta_5 \frac{\Delta NA_{i,t}}{M_{i,t-1}} + \beta_6 \frac{\Delta R\&D_{i,t}}{M_{i,t-1}} + \beta_7 \frac{\Delta I_{i,t}}{M_{i,t-1}} + \beta_8 \frac{\Delta D_{i,t}}{M_{i,t-1}} + \beta_9 \frac{\Delta NF_{i,t}}{M_{i,t-1}} + \beta_{10} \frac{C_{i,t-1}}{M_{i,t-1}} + \beta_{11} L_{i,t} + \epsilon_{i,t} \quad (4.1)$$

where *i* represents a firm and *t* represents the end of a fiscal year. The dependent variable $r_{i,t} - R^{B}_{i,t}$ is the annual return on firm 's stock minus the annual return on one of the Fama and French (1993) 25-size and book-to-market portfolios to which firm *i* belongs at the beginning of year *t*. Δ indicates a change in the corresponding variables over year *t*. $MMIO_{i,1,t}$ is the most motivated monitoring IO described in section 4.1=, *C* is cash and marketable securities, *E* is earnings, *NA* is net assets, *R&D* is research and development expenditures, *I* is interest expenses, *D* is dividends, *NF* is net financing proceeds, and *L* is leverage. As both the excess stock returns and firm-specific control variables are normalised by the market value of equity (*M*) at the end of the fiscal year *t*-1, the coefficient of my independent variable of interest, β_3, can be interpreted as the answer to the query: 'By how many dollars would a firm's market capitalisation change if it obtained one more dollar of cash?' This value represents the marginal value of cash holdings (Faulkender & Wang 2006). The result, the effect of most motivated monitoring IO on the marginal value of cash, could be represented by the value β_1. If institutional monitoring mitigates the agency problem and leads to the better use of cash, β_1 is expected to be positive – that is, the marginal value of cash increases with the most motivated monitoring IO. The detailed definitions of these variables are provided in Appendix A2.

In the main empirical analyses, the baseline regression Model 4.1 is modified to account for other factors that may affect the marginal value of cash. First, Faulkender and Wang (2006) found that the marginal value of cash is sensitive to a firm's cash in hand and capital structure. The interaction terms $C_{i,t-1} * \Delta C_{i,t}/M_{i,t-1}$ and $L_{i,t} * \Delta C_{i,t}/M_{i,t-1}$ are therefore added to control for these two factors. Second, the marginal value of cash may be associated with time-varying differences across industries. Therefore, I also control for industry and year fixed effects. Third, an unexpected change in cash is measured by the difference between $C_{i,t}$ and $C_{i,t-1}$ in Model 4.1. The implicit assumption is that the market expected value of $C_{i,t}$ is equal to $C_{i,t-1}$. Following Faulkender and Wang (2006), ΔC is replaced by three alternative definitions of the unexpected change in cash. Lastly, Dittmar and Mahrt-Smith (2007) document a positive relation between corporate governance and the marginal value of cash. In Model 4.1, to differentiate my proxy for institution monitoring attention from other traditional corporate governance measures, I control for Dittmar and Mahrt-Smith's (2007) two corporate governance measures: anti-takeover indexes and block-holder ownership.

4.2.2 Proxies for institutional investor monitoring motivation

The proxies for institutional monitoring incentives are the same as those used in Chapter 3. To measure the relative importance of a holding firm, all firms in an institutional investor's portfolio are sorted into decile groups in descending order according to their descending market value weighting in the portfolio. Firms assigned in decile group 1 (10) have the highest (lowest) weighting by market value and are therefore the most (least) importance to the institutional investor. The main analyses focus on the ownership by the

most motivated institutional investors ($MMIO_{i,1}$)[24], which generally follows Fich et al.'s (2015) definition of motivated monitoring institutional investors in M&A targets.

Two alternative proxies of most motivated monitoring IO are used to confirm that these results are not driven by the definition of $MMIO_{i,1}$. The first alternative proxy is the proportion of the most motivated monitoring institutional investors ($PMMI_{i,1}$), defined as the ratio of the number of firm *i*'s class 1 institutional investors ($NMMI_{i,1}$) to the number of all institutional investors holding firm *i*'s stock. The second alternative proxy is the natural log of one plus the number of firm *i*'s class 1 institutional investors ($Ln(1+NMMI_{i,1})$)[25].

4.2.3 Data and summary statistics

The firm-year observations were collected from the CRSP/Compustat Merged dataset. The sample is restricted to firms with stock-return data from CRSP and annual accounting information from Compustat. To calculate excess stock returns, benchmark break points and benchmark portfolio returns were obtained from Kenneth French's data library. Quarterly institutional investor holding data was collected from Thomson Reuters institutional ownership database. The classification of institutional investors was extracted from Brian Bushee's personal website. Data from ISS is used to construct corporate governance indexes. The sample period is from 1995 to 2015 because the instrumental variables used in this study are available for this period. The Russell index constituent data are from Bloomberg and are available for use starting from 1995.

[24] The *MMIO* in this chapter is equivalent to *TMI* in the chapter 3
[25] The PMMI and NMMI are the same as the PMI and NMI used in chapter 3.

Following the standard sample selection criteria in the value of cash and institutional investor studies (Faulkender & Wang 2006; Dittmar & Mahrt-Smith 2007; Cella, Ellul, & Giannetti 2013), firms in financial (SIC 6000 to 6999) and public utility (SIC 4900 to 4999) industries are excluded and the sample is restricted to firms listed on the NYSE, NASDAQ, and AMEX. In a manner similar to Faulkender and Wang (2006), firm-year observations with negative net assets, negative equity, or negative dividend were deleted. Following the application of these data selection criteria, 67,404 firm-year observations are included in my final sample. The accounting and stock return data are winsorised at the 1% and 99% levels. All data are converted to real values in 2016 US dollars using the consumer price index from the website of the Federal Reserve Bank of St. Louis[26].

Figure 4.1 plots the increasing trend of US corporate cash holdings over my sample period. The total nominal cash holdings increased by 456.6% (from $490.1 billion in 1995 to $2,237.6 billion in 2015). The total real cash holdings in 2016 dollars increased by 295.2% (from $773.9 billion in 1995 to $2,284.6 billion in 2015). In addition, there was significant growth in the cash to total asset ratios over my sample period, from 14.7% in 1995 to 22.4 % in 2015. Given the substantial cash holdings of US firms in the sample, the effect of motivated monitoring institutional investors on the marginal value of cash documented in my study is of great economic importance.

Table 4.1 presents the summary statistics of the variables used in my empirical analyses. The average $MMIO_j$ decreases with decreasing institutional monitoring motivation, from

[26] When I started working on this chapter, I had the consumer price index data up to 2016.

10.6% ($MMIO_1$) to 0.8% ($MMIO_{10}$). Although most of the sample period does not overlap with the sample period of 1971–2001 in Faulkender and Wang (2006), the summary statistics of firm-specific variables in these two samples are relatively comparable. The mean and median excess returns of my sample firms are -0.1% and -9%, while Faulkender and Wang (2006) report a mean (median) of -0.5% (-8.5%). The mean and median of the independent variables in my sample are: *Cash holdings* (21.3% and 11.1%), Δ*Cash holdings* (0.6% and 0.1%), Δ *Earnings* (1.6% and 0.5%), Δ*Net assets* (1.7% and 1.4%), Δ*R&D* (-0.1% and 0.0%), Δ*Interest expenses* (0.1% and 0.0%), Δ*Dividends* (0.0% and 0.0%), *Leverage* (20.3% and 13.1%), and *Net financing* (3.6% and 0.1%).

The correlation table is displayed in Panel B of Table A1. All the correlations are within the range of -0.265 to 0.48, showing that multicollinearity is unlikely to be a concern.

4.3 Main Results

4.3.1 Baseline regression results

Empirical analyses begin by replicating Faulkender and Wang's (2006) main results over their sample period of 1971–2001. Column (1) of Table 4.2 shows that an additional dollar of cash is valued by the stock market at 77.2 cents, consistent with Faulkender and Wang's (2006) finding of 75.1 cents. After controlling for cash on hand and leverage, the marginal value of cash in column (2) is 1.07 (1.529 + (-0.728 * 0.184) + (-1.609 * 0.203)), which is comparable to 0.94 in Faulkender and Wang's (2006) findings[27].

[27] My replication sample size is slightly larger than Faulkender and Wang (2006), for two reasons. First, Faulkender and Wang (2006) trim their sample variables at the 1\% tails, while I winsorize my variables at the 1\% and 99\%

The primary objective of this study is to estimate the effect of motivated monitoring institutional investors on the marginal value of cash holdings. Column (3) of Table 4.2 presents the results from estimating Model 4.1 using OLS. Model 4.1 is then extended by controlling for the industry and year fixed effects in column (4), and further includes two interaction terms to control for firms' cash in hand and capital structure in column (5). In columns (3)–(5), the co-efficients of the independent variable of interest ($MMIO_1$*$\Delta Cash\ holdings$) are all positive and statistically significant at the 1% and 5% levels. Based on the estimates in column (3), a change of one dollar in cash holdings is associated with an additional change of 7.6 (0.714 * 0.106 * 100) cents in market value for a firm with an average motivated monitoring IO. After I add the additional control variables in columns (4) and (5), the marginal value of cash increases by 8.3 cents and 6.0 cents for a firm with an average most motivated monitoring IO[28].

Next, two alternative measures of most motivated monitoring institutional investors are examined. In columns (6)–(8), I replace $MMIO_1$ with $PMMI_1$, the number of the most motivated monitoring institutional investors in a firm divided by the total number of its institutional investors. In columns (9)–(11), $MMIO_1$ is replaced by $Ln(1+ NMMI_1)$, the natural log of one plus the number of the most motivated monitoring institutional investors in a firm. The co-efficients of $PMIO_1$ * $\Delta Cash\ holdings$ and $Ln(1+ NMMI_1)$ *

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tails. Second, I use the CRSP/Compustat Merged dataset, which may not have been available in 2006.

[28] I also normalize MMIO_1 by firm total institutional ownership. My baseline results are robust to the normalized measure of most motivated monitoring IO.

Δ *Cash holdings* are all positive and statistically significant at the 1% level. The marginal value of cash increases by 13.8 (3.949 * 0.035 * 100) cents to 17.6 cents for a firm with an average $PMMI_1$. The marginal value of cash increases by 15.5 (0.146 * 1.059 * 100) cents to 18.9 cents for a firm with an average $Ln(1+ NMMI_1)$. The changes in these three proxies for institutional monitoring attention also have an economically significant effect on the marginal value of cash. Columns (5), (8), and (11) imply that one standard deviation increase in $MMIO_1$, $PMMI_1$, or $Ln(1+NMMI_1)$ is associated with 9.2 (0.565 * 0.162 * 100) cents, 23.7 (3.949 * 0.060 * 100) cents, and 19.9 (0.146 * 1.361 * 100) cents higher marginal value of cash, respectively[29].

4.3.2 Alternative measures of expected change in cash holdings

According to Fama's (1970) efficient market hypothesis, stock prices in an informationally efficient stock market incorporate all the available information about firm future values. The value of any expected change in cash should have already been incorporated into stock prices at the beginning of the fiscal year. In Table 4.2, $\Delta Cash\ holdings_t$, the unexpected change in cash, is the difference between $Cash\ holdings_t$ and $Cash\ holdings_{t-1}$. An implicit assumption is that the market expected cash holdings at the end of fiscal year *t* to be equal to the actual cash holdings at the end of fiscal year *t*-1. To mitigate the concern about this implicit assumption, the research of this chapter follows Faulkender and Wang's (2006) three alternative measures of expected change in cash. I

[29] For brevity, I focus on $MMIO_1$ in the rest of my paper. My empirical results are robust for $PMMI_1$ and $Ln(1+NMMI_1)$. The economic effects of $PMMI_1$ and $Ln(1+NMMI_1)$. on the marginal value of cash are more pronounced than those of $MMIO_1$.

thus calculate the unexpected change in cash as the difference between the actual change in cash and the expected change in cash.

Motivated monitoring institutional investors may affect numerous corporate policies, for example, the investment policy, which in turn affects the valuation of cash. In three alternative measures of expected change in cash, firm size, growth opportunities, cash flows, capital expenditures, acquisition expenses, investment in net working capital, leverage, and industry fixed effects are directly controlled. The first alternative measure is the average change in cash for all firms in one of the Fama–French 25-size and book-to-market portfolios to which a firm belongs. Given that the dependent variable $r_{i,t} - R_{i,t}^{B}$ is adjusted for the same benchmark portfolio returns, it is likely that $R_{i,t}^{B}$ should already incorporate information on the average change in cash of firms in the corresponding benchmark portfolio. The first alternative, Δ*Alternative cash holdings* I, is equal to the difference between Δ*Cash holdings* and average the Δ*Cash holdings* for all firms in the benchmark portfolio. The second and third alternative measures are motivated by Almeida, Campello, and Weisbach (2004), who use firms' cash sources and uses of cash to predict the change in cash holdings. The expected changes in cash are the predicted values of ΔC in the following two regression models:

$$\Delta C_{i,t} = \beta_0 + \beta_1 Cash\ Flow_{i,t-1} + \beta_2 Q_{i,t-1} + \beta_3 Size_{i,t-1} + Industry\ FE_i + \epsilon_{i,t} \quad (4.2)$$

$$\Delta C_{i,t} = \beta_0 + \beta_1 Cash\ Flow_{i,t-1} + \beta_2 Q_{i,t-1} + \beta_3 Size_{i,t-1} + \beta_4\ Capital\ Structure_{i,t-1} + \beta_5 Acquisitions_{i,t-1} + \beta_6 \Delta Net\ working\ capital_{i,t} + \beta_7 \Delta Short\ term\ debt_{i,t} + Industry\ FE_i + \epsilon_{i,t} \quad (4.3)$$

Following Faulkender and Wang (2006), all the variables in models 4.2 and 4.3 are normalised by the market value of assets in the fiscal year *t*-1. Δ*Alternative cash holdings II* and Δ*Alternative cash holdings III* are the residuals of models 4.2 and 4.3[30].

Table 4.3 reports the results of estimating Model 4.1 with the three Δ*Alternative cash holdings*. All the co-efficients of my variable of interest, $MMIO_1$ * Δ*Alternative cash holdings*, are positive and statistically significant at the 1% and 5% levels. Columns (1)–(9) imply that the marginal value of cash increases by 5.3 cents to 9.0 cents for a firm with an average $MMIO_1$. One standard deviation increase in $MMIO_1$ is associated with 8.1 cents to 13.8 cents greater marginal value of cash. The positive effect of the most motivated monitoring institutional investors on the marginal value of cash remains, both statistically and economically, significant with respect to the three alternative measures of expected change in cash.

4.3.3 Traditional measures of corporate governance

One concern regarding the results is that institutional investors may be attracted to taking large stakes in firms because the firms are seen to have strong governance measures in place. Therefore, the positive effect of $MMIO_1$ on the marginal value of cash may primarily be driven by other corporate governance measures. Dittmar and Mahrt-Smith (2007) use anti-takeover governance indexes and block-holder ownership as two corporate governance measures. They document a positive relation between firm

[30] Please refer to Almeida, Campello, and Weisbach (2004) and Faulkender and Wang (2006)for the detailed discussions of these three alternative measures.

corporate governance and the marginal value of cash. To mitigate this concern, additional tests are designed to examine whether most motivated monitoring IO has any positive effect on the marginal value of cash in addition to the effect of traditional corporate governance proxies. It is worth noting that the effective sample size is substantially reduced by requiring firm-year observations with corporate governance index data.

Table 4.4 reports the results from estimating Model 4.1 by controlling for corporate governance indexes and alternative institutional ownership simultaneously. In columns (1)–(3), the corporate governance index is the G-index developed by Gompers et al. (2003)[31], and the alternative institutional ownership proxies are total institutional ownership (*TIO*), block-holder ownership (*Block1*), and block-holder ownership tercile indicator variable (*Block2*), respectively. In columns (4)–(6), I repeat my analyses in columns (1)–(3) but replace the G-index with the E-index developed by Bebchuk et al. (2009).[32]

Columns (1)–(6) of Table 4.4 show that the co-efficients for the interaction term $MMIO_1$*Δ *cash holdings* are all positive and statistically significant at the 1% and 5% levels, which is consistent with the evidence in Table 4.2. After controlling for the corporate governance indexes and other institutional ownership measures simultaneously, the marginal value of cash increases from 10.6 cents to 22.1 cents for a

[31] Because the ISS stops reporting the G-index values after 2007, I follow Li and Li (2016) and extrapolate firms' G-index values after 2007, from their last available G-index values in the ISS.
[32] The entrenchment index, E-index, is composed of six anti-takeover provisions: staggered board, limits to shareholder bylaw amendments, limitations on amending the charter, poison pills, golden parachutes, and supermajority requirements to approve mergers and charter amendments (Bebchuk, Cohen, and Ferrell 2009)

firm with an average $MMIO_1$. One standard deviation increase in $MMIO_1$ is associated with 16.2 cents to 33.7 cents higher marginal value of cash. Therefore, the positive effect of the most motivated monitoring institutional investors on the marginal value of cash remains robust after controlling for managerial entrenchment and other institutional ownership measures. In columns (1)–(5), the co-efficients of the interactions between Δ *cash holdings* and corporate governance indexes are negative and statistically significant at the 5% and 10% levels, which is consistent with Dittmar and Mahrt-Smith's (2007) finding that better corporate governance is associated with a higher marginal value of cash. Fich et al.'s (2015) identify the motivated monitoring IO of M&A targets as being positively related to deal completion probability, the likelihood of bid revision, and the deal premium, while the proxies of traditional institutional ownership of targets are not related to these deal outcomes. Consistent with Fich et al. (2015), the co-efficients of the interactions between Δ*cash holdings* and traditional institutional ownership measures in this test are not significantly positive, suggesting that the motivation of institutional monitoring is more likely to be related to the relative importance of a firm to institutional investors.

The analyses in Table 4.4 are based on a smaller sample than my main sample. Firms are required to have anti-takeover provision data in the ISS, and I discard the observations with middle terciles of block-holder ownership in columns (3) and (6). I therefore remain cautious about over-interpreting and generalising these results. However, the positive relation between the most motivated monitoring institutional investors and the marginal value of cash is even stronger in my restricted samples and after controlling for governance indexes and traditional institutional ownership proxies. In untabulated

results, the pairwise correlation between $MMIO_1$ and *TIO* is 0.38 and is statistically significant, indicating that $MMIO_1$ and *TIO* are not highly correlated. In contrast, the pairwise correlation between $MMIO_1$ and *Block1* is -0.02 and is statistically significant, and the pairwise correlation between $MMIO_1$ and *G-index (E-index)* is 0.12 (0.03) and statistically significant, suggesting that my motivated monitoring IO measure captures firm governance which may not be explained by these traditional corporate governance proxies.

4.3.4 Motivated monitoring institutional investor types

It is possible that different types of institutional investors may have different incentives for monitoring the firms in their portfolios. To ensure that the positive effects of the most motivated monitoring institutional investors on the marginal value of cash are not driven by a specific type of institution, $MMIO_1$ are refined by institution type and I rerun Model 4.1. I adopt two popular classifications from the institutional investor literature. First, following Brickley et al. (1988), Almazan et al. (2005), and Chen et al. (2007), $MMIO_1$ is divided into $MMIO_{1,Independent}$, and $MMIO_{1,Grey}$, according to the institutional investors' potential business ties with the invested firm. Independent institutional investors include independent investment advisors, investment companies, and public pension funds. Grey institutional investors include banks, insurance companies, private pension funds, university endowments, and foundations [33] . Second, I adopt Bushee's (1998)

[33] After 1998, the institution type classification is not accurate in the Thomson Reuters ownership database. I follow Brian Bushee's institution type classification for institutional investors after 1998.

classification and divide $MMIO_1$ into $MMIO_{1,Transient}$, $MMIO_{1,Quasi\text{-}indexer}$, and $MMIO_{1,Dedicated}$.

$MMIO_1$ is then replaced by the refined motivated monitoring IO in Model 4.1, and the regression results are presented in Table 4.5. The co-efficients for the interaction $MMIO_{i,IOType} * \Delta Cash\ holdings$ are positive and statistically significant in columns (1)–(4). For independent, grey, transient, and quasi-indexer, the marginal value of cash increases by 6.0 cents, 4.0 cents, 5.1 cents, and 4.0 cents, respectively, for a firm with an average $MMIO_{i,IOType}$. One standard deviation increase in these four $MMIO_{i,IOTypes}$ is associated with 7.3 cents to 10.3 cents higher marginal value of cash. The co-efficient of $MMIO_{i,Dedicated} * \Delta Cash\ holdings$ is positive but not statistically significant at the 10% level. One possible explanation for this statistical insignificance is that the number of dedicated institutions is much less than the number of transient and quasi-indexer institutions according to Bushee's (1998) classification. These results suggest that the positive effect of institutional investors' monitoring motivation on the marginal value of cash does not depend on a certain type of institution. Even grey and transient institutions, which are commonly believed to be less active monitors, have a positive role in monitoring the firms that are important to them.

4.3.5 Institutional ownership by ten decile monitoring motivation

In the previous analyses, most motivated monitoring IO is measured by $MMIO_1$, the ownership by institutional investors whose holding value in a firm places it in the top decile stock group in their portfolios. These tests follow Fich et al. (2015) and I chose the top decile in my definition. However, there is no reason to assume that institutional

investors lack the motivation to monitor firms in the remaining nine decile groups. To examine the relation between institutional investors with different monitoring motivations and the marginal value of cash, Model 4.1 is replicated by interacting Δ*Cash holdings* with all ten decile $MMIO_j$ individually. The monitoring motivation of institutional investors is expected to decrease gradually from $MMIO_1$ to $MMIO_{10}$, where $MMIO_{10}$ represents ownership by institutional investors with the least monitoring motivation.

The results of the ten decile $MMIO_j$ are presented in Table 4.6. The co-efficients of the interactions between Δ*Cash holdings* and $MMIO_1$–$MMIO_2$ are positive and statistically significant at the 1% level, indicating that institutional investors may have a high motivation to monitor the cash holdings of firms in the top two deciles of their portfolios. For $MMIO_3$–$MMIO_5$, the effect of these IO measures on the marginal value of cash becomes statistically insignificant. On the other side, the co-efficients of the interactions between Δ*Cash holdings* and $MMIO_6$–$MMIO_{10}$ are negative and statistically significant at the 1% and 5% levels, suggesting that institutional investors may lack the motivation to monitor the cash holdings of a firm in the bottom five decile groups of their portfolios. The value effect of an average $MMIO_j$ on the marginal value of cash and the 95% confidence intervals of the effect are plotted in Figure 4.2. The value effect of an average $MMIO_j$ on the marginal value of cash varies from positive 8.3 cents ($MMIO_1$) to negative 4.9 cents ($MMIO_8$). An obvious decreasing trend could be observed for the value effect from $MMIO_1$ to $MMIO_{10}$. Together, the results in tables 2-6 support the predictions that motivated monitoring institutional investors increase the marginal value of corporate cash

holdings and that institutional investors do not allocate their monitoring attention evenly to every stock in their portfolios.

4.4 Robustness Tests and Further Discussions

This section presents the results of a battery of robustness tests and discusses the effect of most motivated institutional investors on firms' accounting performance through monitoring their cash holdings.

4.4.1 Endogeneity of motivated monitoring IO

The previous literature on the relation between institutional investors and corporate activities has long recognised the difficulty of disentangling the effects of institutional investor monitoring and other unobserved firm characteristics. A similar challenge in this study is to ensure that the effect of motivated monitoring institutional investors on the marginal value of cash is not driven by the effect of confounding variables. It is possible that institutional investors have private information about their holding firms and choose to invest more in those with a higher marginal value of cash. To address this potential endogeneity issue resulting from unobserved confounding variables and investors' self-selection, three identifications are used: 2SLS, high-dimensional fixed effects, and the change in most motivated monitoring IO.

4.4.1.1 Two-stage least squares

This sub-section adopts the same IV approach as presented in Chapter 3 to exploit the exogenous shock of a Russell index switch to institutional ownership to construct a 2SLS

estimator (see Chapter 3.4.3 for details). The first stage of my analysis estimates the following regression:

$$MMIO1i;t = \alpha + \beta_1 R1TR2_{i,t} + \beta_2 R2TR1_{i,t} + \beta_3 R2TN_{i,t} + \beta_4 NTR2_{i,t}$$

$$+ B * Control\ variables_{i;t} + \theta_j + \mu_t + \epsilon_{i,t} \quad (4.4)$$

where $R1TR2_{i,t}(R2TR1_{i,t})$ is an indicator variable equal to 1 if firm *i* switches from the Russell 1000 (2000) index to the Russell 2000 (1000) index in year *t*, and $R2TRN_{i,t}$ $(NTR1_{i,t})$ is an indicator variable equal to 1 if firm *i* enters (leaves) the Russell 2000 index. The predicted $MMIO1$ from Model 4.4 enters my second stage regression of Model 4.1 as an explanatory variable. The control variables in Model 4.4 are the same as those in Model 4.1[34].

Panel A of Table 4.7 presents results that replicate those of Table 4.2 using the Russell index reconstitution as IVs for most motivated monitoring IO. Columns (1)–(3) present the results of the first-stage regressions. The co-efficients of the IVs are statistically significant in the first-stage regression, suggesting that my Russell index switch indicators satisfy their relevance condition as IVs. The results presented in columns (4)–(6) show that the co-efficients of the interaction terms between the predicted motivated monitoring IO and Δ*Cash holdings* remain positive and statistically significant. In further robustness tests, Table 4.3 is replicated using the IV identification and results are presented in Panel B of Table 4.7. The effect of the predicted most motivated monitoring

[34] In my untabulated tests, I follow Appel, Gormley, and Keim (2016)and add *ln(firm market capitalization)* and $ln(firm\ market\ capitalization)^2$ as the control variables in my 2SLS regressions. Firm market capitalizations are measured at the end of May. My results remain qualitatively the same.

IO on the marginal value of cash remains positive and statistically significant across the three alternative definitions of the expected change in cash holdings.

4.4.1.2 High-dimensional fixed effects

The potential endogeneity associated with motivated monitoring institutional investors may be due to unobserved firm characteristics affecting both institutional investor monitoring motivation and the value of corporate cash holdings. Previous studies have documented many factors related to the value of corporate cash holdings[35]. However, it is impracticable to control for all of them in my empirical studies. Additional tests in this section adopt the identification from Gormley and Matsa (2014) and use high-dimensional fixed effects to indirectly control for any unobserved or omitted firm characteristics. Columns (1) and (2) of Table 4.8 shows the estimation result of Model 4.1 and its extension by controlling for the firm and year fixed effects. In columns (3) and (4), I rerun these two regressions by controlling for the triple fixed effects of Firm * Year * Fama-French 48 industry. All the co-efficients of $MMIO_1$*Δ*Cash holdings* are positive and statistically significant at the 1% level. The marginal value of cash increases by 3.9 cents to 4.6 cents for a firm with an average $MMIO_1$. One standard deviation increase in $MMIO_1$ is associated with 6.0 cents to 7.0 cents higher marginal value of cash. The positive effect of most motivated monitoring IO on the marginal value of cash remains both statistically and economically significant after controlling for unobserved firm characteristics.

[35] I have reviewed some of them at the end of Section 4.1

4.4.1.3 Change in motivated monitoring institutional ownership

The principal analyses in this chapter use the level of IO as the main explanatory variable. To further address the endogeneity due to the reverse-causality concern that institutional investors choose to invest more in firms with a higher marginal value of cash, a semi-difference-in-difference test is conducted in which $MMIO_1$ in Model 4.2 is replaced by the change in $MMIO_1$ from March to September in year t (Δ' $MMIO_1$). Δ' $MMIO_1$ may extract the impact of the changes in most motivated monitoring IO on the marginal value of cash. The test results are presented in Table 4.9. The coefficients of Δ' $MMIO_1$ * $\Delta Cash\ holdings$ are all positive and statistically significant at the 1% level, suggesting that the increase in most motivated monitoring IO is positively related to the marginal value of cash. One standard deviation increase in Δ' $MMIO_1$ (0.07) is associated with 10.1 cents to 11.4 cents increase in the marginal value of cash.

4.4.2 Monitoring motivation-weighted IO

In sub-section 4.3.5, a firm's IO was divided into ten groups and it indicated a decreasing trend in the value effects of these ten *MMIOs* on corporate cash holdings, from $MMIO_1$ to $MMIO_{10}$. Based on these findings, a measure of general monitoring motivation-weighted IO, TMA (total monitoring attention), was constructed to include all the ownership by a firm's institutional investors:

$$TMA_{it} = \ln(1 + \sum_{j=1}^{N} w_{i,j} * IO_{i,j} * 10000) \qquad (4.5)$$

where N is the total number of institutions investing in firm i, $w_{i,j}$ is the market value weighting of firm i's stock in institution j's portfolio, and $IO_{i,j}$ is the ownership of

institution j in firm i. Because institutions' monitoring attention to a firm is positively related to the relative importance of the firm's stock in their portfolios, $w_{i,j}$ may represent institution j's motivation to monitor firm i. $IO_{i,j}$ may represent the monitoring effectiveness of institution j on firm i. As the measure of general monitoring motivation-weighted IO, TMA_{it} takes account of both institutional investors' monitoring motivation and their voting power in firm i. The effect of *TMA* on the marginal value of cash in Table 4.10. Columns (1)–(2) present the OLS regression results and columns (3)–(4) present the results of the second-stage regression in my 2SLS regressions. The co-efficients of *TMA* * Δ*Cash holdings* and *IVTMA* * Δ*Cash holdings* are all positive and statistically significant at the 1% level, suggesting that firms with a greater *TMA* attract greater aggregated institutional investor monitoring attention. Column (2) indicates that the marginal value of cash increases by 10.1 cents for a firm with an average *TMA* and that one standard deviation increase in *TMA* is associated with 6.4 cents increase in the marginal value of cash.

4.4.3 Institutional monitoring across three cash regimes

Faulkender and Wang (2006) uses firms' interest coverage and industry market-to-book ratio to classify three cash regimes: raising cash, distributing cash, and servicing debt[36]. Across these three *ex-ante* classified cash regimes, the value of one additional dollar of

[36] interest coverage is defined as the sum of cash holdings and earnings in the beginning of fiscal year t divided by the interest expense over the same year

cash varies considerably, with the highest value being 1.16 in the raising cash regime and the lowest 0.45 in the servicing debt regime. Untabulated results show that $MMIO_1$ has a positive effect on the marginal value of cash across the three cash regimes defined by Faulkender and Wang (2006).

Halford et al. (2017) assume that stock prices can unbiasedly incorporate firms' actions in the future and use an *ex-post* classification to group firms into the three cash regimes described below. First, firms that issue equity and do not pay dividends in fiscal year *t* are within the raising cash regime in that year. Second, firms that distribute cash to shareholders and do not issue equity in fiscal year *t* are within the distributing cash regime in that year. Third, firms that have their market-leverage ratios in the top decile distribution of firms at the beginning of fiscal year *t*, and do not raise or distribute cash over that year, are within the servicing debt regime in that year[37]. More importantly, Halford et al. (2017) found that the two corporate governance measures examined in Dittmar and Mahrt-Smith (2007) do not have a significant effect on the marginal value of cash in any of these three cash regimes. Model 4.1 is replicated with the IV identification in Halford et al.'s (2017) three cash regimes and the results are presented in Table 4.11. In the raising cash and distributing cash regimes, the co-efficients of $MMIO_1$ * Δ*Cash holdings* are positive and statistically significant at the 1% level. In the servicing debt regime, the co-efficient of $MMIO_1$ * Δ*Cash holdings* is positive but not statistically significant at the 10% level.

[37] A firm may be classified into different cash regimes according to the classifications of Faulkender and Wang (2006) and Halford et al. (2017). It is not my paper's objective to compare these two classifications. I only check if my main results are robust to different cash regime classifications.

As argued in Halford et al. (2017), ‘'the foundational theory is silent as to the regimes in which corporate governance should affect the marginal value of cash''. The empirical results in this section suggest that stronger motivated monitoring IO is associated with a higher marginal value of cash for firms that are in the raising cash and distributing cash regimes. For firms in the servicing debt regime, it is possible that debtholders have the main claims on the cash holdings and, therefore, that equity holders may have less motivation to monitor these firms.

4.4.4 Monitoring and firm operating performance

Thus far, the results in this chapter indicate that motivated monitoring IO is positively related to the stock market valuation of corporate cash holdings. It remains unknown whether firms actually benefit from the increase in the value of their cash holdings. For example, the marginal value of cash is higher for firms that are more financially constrained. In order to show that the increase in the marginal value of cash is actually the result of good corporate policy, the real outcomes of monitoring by motivated institutional investors are also examined. Cash is a firm’s most liquid asset, subject to the highest level of managerial discretion (Jensen 1986). If institutional investors inhibit the agency cost of managerial discretion, it is expected to observe a positive relation between firms’ cash holdings and operating performance when motivated monitoring IO is high.

This sub-section examines four Fama–French 48 industry-adjusted operating performance measures studied in Kim, Mauldin, and Patro (2014): return on assets, return on equity, net profit margin, and asset turnover. To address the endogeneity between most motivated monitoring IO and firm operating performance, the IV approach discussed in

section 4.4.1.1 is employed and Table 4.12 presents the estimation results. Consistent with expectations, the co-efficients of the interaction between predicted $MMIO_1$ and cash holdings are all positive and statistically significant in the second-stage regressions.

4.4.5 Motivated monitoring IO and firm size

For firms with a large market capitalisation, it is more likely that their market value weightings are ranked at the top of an institution's portfolio. One alternative explanation of my main results is that most motivated monitoring IO is positively associated with firm size. Gompers and Metrick (2001) found that institutional investors invest more in large firms and therefore stock returns are positively related to firm size. As a result, the positive effect of most motivated monitoring IO on the marginal value of cash documented in this chapter may only indicate that cash is more valuable in larger firms. The correlation between $MMIO_1$ and firm size is 0.63 in my sample. This model does not directly control for firm size as an independent variable in Model 4.1 as the dependent variable is annual firm returns, adjusted by Fama–French 25-size and book-to-market portfolio returns. In untabulated tests, I add *Size* and *Size* * Δ*Cash holdings* as control variables in Model 4.1 and the co-efficient of $MMIO_1$ * Δ*Cash holdings* remains positive and statistically significant at the 1% level. The co-efficient of *Size* is not statistically significant at the 10% level and the co-efficient of *Size* * Δ*Cash holdings* is negative and statistically significant at the 1% level. My results, presented in Table 4.6, are also robust after controlling for *Size* and *Size* * Δ*Cash holdings*. These results suggest that the positive effect of $MMIO_1$ on the marginal value of cash does not arise solely from the firm-size effect.

4.4.6 Motivated monitoring institutional investors and the value of excess cash

In previous empirical analyses in this chapter, I adopted Faulkender and Wang's (2006) specification and estimated the change in firm market value associated with a change of one dollar in cash holdings. Several previous studies on the value of cash employ another framework, initiated by Fama and French (1998) and estimate the value of firm excess cash based on a price-level regression (e.g. Dittmar & Mahrt-Smith 2007; Kyröläinen et al. 2013; Gao & Jia 2016). Dittmar and Mahrt-Smith (2007) argue that excess cash might be more relevant to the agency problem than are cash holdings[38]. The dependent variable in the price-level regression is the market value of assets, normalised by the book value of net assets, which is similar to the market-to-book ratio. The IV approach discussed in sub-section 4.4.1.1 is then used to estimate the predicted most motivated monitoring IO because the market-to-book ratio is a standard proxy for firm growth opportunities and may be endogenously correlated with IO. I then add both the predicted most motivated monitoring IO and the interaction term of it and excess cash in the price-level regression. Untabulated results, based on the price-level regression, are consistent with my main results. Greater motivated monitoring IO is associated with a higher value of excess cash.

4.4.7 The Value of cash over time

Bates, Chang, and Chi (2017) have documented a positive time trend in the value of corporate cash holdings from 1980 to 2009. They further found that institutional block-holdings only had a significantly positive effect on the marginal value of cash in the

[38] Please refer to Dittmar and Mahrt-Smith (2007) for the detailed discussion of the price-level regression.

1990s, but not in the 1980s or the 2000s. Table 4.4 has illustrated that the positive effect of institutional block-holdings on the marginal value of cash disappears when I add most motivated monitoring IO to the tests. In unreported tests, I follow Bates, Chang, and Chi (2017), the sample is split into two sub-periods: 1995–2004, and 2005–2015. The 2SLS method described in sub-section 4.4.1.1 is applied and it is demonstrated that $MMIO_1$, $PMMI_1$, $NMMI_1$, and *TMA* all have a significantly positive effect on the marginal value cash over both time periods. Qualitatively similar results are also found if I use my baseline OLS regressions. These suggest that the institutional monitoring motivation measured in this chapter does not vary over my sample period.

4.4.8 Institutional investors and oversea cash holdings

It is a well-known phenomenon that US firms hold a large proportion of foreign cash. A recent report shows that the Fortune 500 firms hold more than $2.6 trillion in cash abroad[39]. US regulators aim to repatriate these oversea cash holdings[40].

There are two possible reasons that an increase in institutional holdings may leads to higher level of foreign cash holdings. The first is closely linked to the findings of this thesis. Effective institutional monitoring may reduce agency costs, thereby increasing the value of cash holdings. Therefore, firms with better institutional monitoring would not be

[39] https://itep.org/fortune-500-companies-hold-a-record-26-trillion-offshore/

[40] http://uk.businessinsider.com/trump-tax-reform-plan-repatriation-14-us-companies-with-most-cash-overseas-2017-9

penalised if they were to hold cash. This would also apply if the firm held cash abroad; thus, firms might be expected to hold higher levels of overseas cash.

As noted by Foley et al. (2007), the other reason that firms hold high amount of cash overseas is tax avoidance. Recent studies have begun investigate the tax incentives of institutional investors. For example, Blouin, Bushee, and Sikes (2017) found that investors differ significantly in their reaction to 'tax-loss-selling'. Investors that trade aggressively to avoid tax are classified as tax-sensitive investors. Other investors are treated as tax insensitive. Although there is no direct evidence, it is quite likely that institutional investors may influence managers and consequently influence firms' decisions on the level of cash holdings. If this were correct, we could expect that ownership by tax-sensitive investors would lead to higher levels of foreign cash holdings. This issue remains an interesting and important one for further research.

4.5 Conclusions

Firms may hold cash because they are uncertain about their immediate future environment, or because they want to retain the flexibility to exploit investment opportunities that may arise unexpectedly. The retention of cash might therefore be expected to be valued positively if investors have confidence in a firm's managers. However, cash reserves offer managers the scope to exploit their agency position and might, therefore, be seen as value reducing by sceptical investors. In attempting to curb agency discretion, investors need to monitor managerial decisions and, therefore, it is natural to examine those investors who have the greatest motivation to undertake the

monitoring activities. Institutional investors, because of the size of their holdings, are likely to be willing to spend time and resources in monitoring the actions of boards controlling the firms in which they hold stock. However, institutions' monitoring attention is limited and, therefore, it seems reasonable that even large institutional investors will allocate their monitoring activities to those firms in which they invest most of their money.

This chapter follows Fich et al. (2015) in identifying motivated monitoring institutional investors and has analysed motivated monitors using the marginal value of corporate cash holdings as an empirical setting. Clearly, the market impounds past and expected cash holdings in observed prices, so the task is to examine the stock price reactions to unexpected changes in cash holdings. For those firms in which there is greater motivated monitoring IO, the marginal value of cash has indeed been found to be higher – thereby lending support to the argument that institutional investors contribute to the efficiency of corporate governance through their monitoring activities. This idea is further strengthened by the finding that accounting-based performance measures are also positively related to the institutions monitoring a firm's cash holdings. This chapter also finds that the changes in valuation I ascribe to the investors identified as having the strongest motivation to monitor are not subsumed in other suggested indicators of corporate governance, such as total institutional ownership, block-holdings, or corporate governance indexes. The effect found in this chapter is not restricted to any specific type of institution and my findings remain robust in including other alternative explanatory variables. The classifications of institution monitoring motivation provide a rational direction for positive valuation effects – investors that hold less significant stakes in firms

do not appear to be associated with the increased valuations that are found in firms with more motivated investors.

The general conclusion of these findings is that institutional investors' monitoring attention focuses on firms whose market value weightings are at the top of the investors' portfolios. Motivated monitoring institutional investors appear to perform a valuable role through their monitoring activities by ensuring that corporate cash holdings are not wasted and that managerial decisions are in this manner more appropriately aligned with shareholders' interests.

5. Monitoring Incentives and Institutional Investment Horizons

5.1 Introduction

Chapters 3 and 4 of this thesis have investigated the importance of firms' weightings in institutional investors' portfolios in shaping their monitoring incentives. However, institutional investors have multi-dimensional characteristics. The weighting of firms in their portfolios is only one aspect that may be related to their monitoring attention allocation.

This chapter examines another specific dimension of the features of institutions, the investment horizon. Investment horizons matter because shareholder activism and monitoring activities are costly and challenging to implement and require a sufficiently long period to realise benefits (Chen et al. 2007). Investment horizons reflect the investor's choice between short-term transactions and longer-term commitment to the firm being held, hence, long-term institutional ownership may be an important factor in determining the policies and operational efficiency of the firms in which institutions have invested.

In contrast to the previous literature that examines investors' investment horizons at the investor level (Yan & Zhang 2009; Chichernea et al. 2015; Cella et al. 2013), the notion of investment horizon in this study is classified with respect to each stock held in institutional investors' portfolios. The evidence in this chapter indicates that institutional investors' holding horizons may vary more substantially than previously assumed. On average, short-term investors (using the received definition) typically hold more than a quarter of the stocks in their portfolios for more than three years. As a corollary, in the

portfolios of investors traditionally classified as long term, less than 50% of the stocks in firms are held for more than three years. These statistics indicate that although institutions may be classified as long- or short-term investors, they can hold portfolios of stocks that do not uniformly fit into these categorisations. Taking these variations within portfolios into account, this chapter re-examines the question of whether a greater monitoring incentive, measured by the duration of institutions' holdings in a firm, enhances firm value. My results suggest that the answer is yes. The results in the chapter demonstrate that an increase in the long-term holdings of institutional investors is associated with higher subsequent return on assets, Tobin's Q ratio, and earnings yields. This is a persistent effect which lasts for at least five years and is consistent for all three performance measures used.

A potential interpretation of these results is that as the measure of incentive variation is positively correlated with the range of different institutional investors, these findings may simply reflect the different types of investors. For example, the effect on a firm's performance ascribed to an increase in long-term holdings by all investors could more simply be ascribed to an increase in the type of investor previously classified as being long term. In other words, it is necessary to distinguish between the effect of the type of investor and the behaviour of investors in general. To clarify this issue, this chapter investigates the long-term holdings of each type of investor in terms of three different classification schemes. The evidence in this chapter indicates that greater long-term holdings by all types of investors are consistently associated with the superior future performance of a firm. Even for transient investors, whose overall investment horizon would be short (Chen et al. 2007), and grey investors, such as banks and insurance

companies, whose monitoring capability might be compromised by their business links with the firm (Ferreira & Matos 2008; Luong et al. 2016; Chung, Fung, & Hung 2012), long-term holdings are still found to be value enhancing. These consistent findings indicate that the monitoring effect that stems from variation within investors' portfolios is clearly distinct from differences in the type of institution.

To address concerns of endogeneity about whether investors will hold firms with better performance for longer periods, and following the recent literature, this chapter uses an IV approach by exploiting exogenous shocks on long-term ownership generated by changes in the composition of the Russell indices (Schmidt & Fahlenbrach 2016; Appel et al. 2016; Fich et al. 2015). When firms are included in or excluded from the Russell 1000 and Russell 2000 indices due to relative market capitalisation changes, the change in the weighting of these firms in the relevant index will drive index tracker funds to rebalance their portfolios and therefore lead to associated trading by other institutions. Therefore, the shock provides a clear method for identifying the effect of long-term holdings on a firm's performance free from endogeneity concerns. All estimates remain valid in this 2SLS framework. Moreover, to avoid the concern that my results may be affected by an idiosyncratic choice of variable, alternative measures are also used to test the robustness of the approach. My results and conclusion remain valid.

A related issue is whether short-term investors have the same effect on the firm's performance. Studies, such as that of Aghion et al. (2013), find that short-term holdings may also lead to improved firm operations because they can readily exercise their power by selling their holdings; while other studies conclude that short-term investors' holdings may have a negative effect on subsequent performance (Chichernea et al. 2015; Gaspar

et al. 2005). Thus, the account concerning whether short-term investors influence future performance is somewhat ambiguous. By applying the same analytical framework to short-term investors, this chapter finds that a firm's performance is reduced following an increase in ownership by short-term institutional investors. These findings imply that even if institutions have the capability to undertake firm monitoring, the lack of incentive arising from their short-term perspective would fail to increase performance.

This chapter finds evidence that the institutional monitoring incentive, as measured by its holding horizon, tends to be positively related to firm performance. These findings support the argument that investor monitoring creates value. This assessment accords with recent evidence, such as that of Fich et al. (2015), that investors distribute their attention allocation unevenly and tilt resources for monitoring to a subset of firms held in their portfolios.

These findings contribute to two strands of the literature. First, they provide new evidence that institutional shareholders increase firm value. There is an ongoing debate on the overall effect of institutional monitoring of firms. Some authors argue that strong shareholders that are willing to intervene cause worse operational outcomes because the active institutional investor might exploit the private benefits of control or might increase managerial myopia (La Porta, Lopez-De-Silanes, & Shleifer 1999; Cai, Hillier, & Wang 2016; Cronqvist & Fahlenbrach 2009). Other studies hold the opposing view and emphasise the benefits of institutional monitoring and engagement, with a consequent reduction in agency costs (Chen et al. 2007; Fich et al. 2015). Test results in this chapter provide evidence that the benefits of shareholder monitoring clearly outweigh the costs of monopolistic shareholder power.

In addition, this chapter also relates to the literature that discusses the effect of heterogeneity among institutions on firm outcomes (Appel et al. 2016; Schmidt & Fahlenbrach 2017). It concludes, in accordance with the argument of Fich et al. (2015), that incentive variation in institutional portfolios has an independent and stronger effect on a firm's performance than do changes in the distribution of different types of institutional investor.

The rest of the chapter is organised as presented in what follows. The second section specifies the issues investigated. This is followed by descriptions of my data source and variable construction. The main empirical test is discussed in the subsequent section, and this is followed by reports on the endogeneity and robustness tests before the conclusions are presented.

5.2 Issues to be investigated

The analyses in this chapter can be expressed as four closely related questions:

Q1: Do long-term holdings by institutional investors enhance firm value?

The key research question of this chapter is whether a greater institutional investor monitoring incentive leads to enhanced values. Since the monitoring incentive is higher for investors that hold stocks in a firm for longer periods of time, this question could be viewed as being equivalent to asking whether institutions' long-term holdings positively influence the performance of a firm. Given the improvement in firms' operations associated with long-term institutional holdings, would these findings persist over time?

Q2: Does increased monitoring arise from an increase in the number of investors classified as long term, or does it stem from an increase in the length of time that investors in general hold stocks in a firm?

The results demonstrate the effect of institutions' attention variation across their portfolios instead of simply catching the impact of changes in the distribution of different investors documented in the previous literature (Bushee 2001; Chen et al. 2007). The effect of a long-term institutional holding on a firm's performance is distinguished according to each type of investor, each of which is defined by its characteristics. If the characteristics of institutional investors, such as turnover and portfolio concentration, investment style, index-following incentives, or fiduciary duties are more important factors than the firm-specific investment horizon, we should observe that the value-enhancing effect is concentrated within specific types of institutions. Alternatively, if the difference between investors is not as important as investment-horizon differences within institutional portfolios, we should observe that changes in the distribution of long-term holdings by all types of investors have similar effects on a firm's values.

Q3: Do changes in short-term holdings by institutional investors have a similar value-enhancing effect on a firm's value?

Some studies argue that institutional holdings, even those that only last a short time, have significantly positive effects on a firm's value (e.g. Aghion et al. 2013). Compared to long-term owners who influence the firm by means of 'voice' (Chen et al. 2007), short-term investors can influence firm using 'exit threats' (Edmans 2009). If this argument were valid, the value-enhancing effect of institutional investors would be found for both

short-term and long-term holdings. However, the investment horizon is closely related to incentives to monitor and investors have less incentive to monitor firms that they do not intend to hold for a long period. Therefore, increases in the holdings of short-term investors are not expected to be associated with the enhanced future performance of the firms in which stocks are held.

Q4: Are the results influenced by endogeneity and are they robust to alternative measurements?

It is a natural concern that the results in this chapter may be influenced by endogeneity. For one thing, firm value and long-term holdings might be simultaneously influenced by unobservable factors that cannot be controlled for. For another, it is also possible that institutional investors hold firms that outperform for longer period of times, which could lead to a reversed causality – stocks continue to be held in firms that exhibit increasing profitability. To ensure that the results are consistent and free from endogeneity concerns, additional tests rely a 2SLS approach and employ exogenous IVs to establish causality. If the argument that long-term holdings enhance firm value is valid, my results would hold consistently within this framework. In addition, to avoid concerns that the results arise from the manner in which the independent variables are constructed, alternative measures are also employed.

5.3. Data and Variable Definitions

5.3.1 Data sources

The main source of data for the accounting data and financial ratios is Compustat. Ownership data were sourced the Thomson Financial Ownership Database which reports all holdings of US institutional investors having more than 100 million assets under management. To avoid the potential problems of misidentification, and recycled and unreliable classifications, the 13F data were updated by using the information provided by Bushee[41]. Data related to stock prices, returns, and trading volumes were downloaded from CRSP.

5.3.2 Variables definition

Firm performance measures

Three different measurements are used as proxies for firm performance. The first is return on assets (ROA), defined as net income divided by firm asset value. This is a direct measurement of how much net income is generated by a firm per unit of assets. Higher ROAs signal more efficient earnings generation and therefore better performance. The second measure is Tobin's Q ratio (TBQ), the market value of a firm's assets divided by their book value. Tobin's Q reflects the market view of how valuable a firm's current assets are. When a firm has high growth prospects, Tobin's Q has a higher value. The

[41] Bushee's website, http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html

third ratio used is the firm's earnings yield or earnings price ratio (EY), which is defined as the prospective earnings per share divided by the current stock price. I use EY rather than percentage change in earnings to measure firms' earning growth in order to avoid the measurement problem associated with negative or small earnings. When the EY is higher, the firm is valued as having good earnings capacity. Earnings yield is different from the P/E ratio because it is future earning standardised by current stock price. The variation of future stock price is irrelevant to my measure of the future EY ratio.

Although industry fixed effects have been controlled in all the regression specifications, the time variantindustry characteristic may still influence my results. To minimise such concerns, the three performance measures have been adjusted by deducting the industry median value from the calculated figures. In untabulated results, the findings remain essentially similar if unadjusted firm performance measures are used.

Long-term institutional ownership

Institutional ownership is classified into long-term and short-term categories based on the actual holding horizon of each institution for each firm. In the main specification, all institutional holdings lasting more than three years are classified as long-term ownership. To mitigate the classification error that may be induced by long-term investors' market-timing activity, if an investor exits the firm but returns within the following year, its holding period is deemed to be continuous with the previous period in which it sold its shares. However, if the investor leaves the firm for more than one year, its holding period is reset to 0 when it returns. I then aggregate the ownership of long-term investors at the firm level to create a variable of long-term ownership (L3).

This classification method differs from that frequently used in the literature. Much of the existing literature classifies investors as long term or short term based on a measure of how quickly they turn over their aggregate portfolio. When portfolio turnover is relatively fast, investors are identified as short-term investors. In contrast, when investors have a relatively low turnover, they are classified as long-term investors. The measurement normally used is the 'churn ratio' (Yan & Zhang 2009; Cella et al. 2013; Attig et al. 2012; Attig et al. 2013; Gaspar et al. 2005; Gaspar & Massa 2006; Chichernea et al. 2015)

The churn ratio or turnover-based investor classification scheme assumes that investors maintain the same attitude, preference, and behaviour regardless of the firms in which they invest. For two reasons, this assumption may be too strong. First, in reality, institutional investors do not have the same incentives and motivations with regard to all the firms in which they invest (Fich et al. 2015). The assumption that an investor will treat all the firms held equally is too strong to be realistic. The second reason that the aggregate churn ratio may be misleading is that, due to the limitations of the 13F holding report, portfolio turnover is reported at the company or institutional level rather than at the fund level. As a result, a single institution may have several different constituent investing entities that follow different strategies and styles and this will make the churn ratio-based classification unreliable. The quantitative estimation of the potential misclassification problem is provided in section 5.4.1.

The classification of ownership is free of look-ahead bias. Institutional investors are only classified as long-term owners once their actual observable investment horizons extend beyond three years. For example, if investor A holds firm B from December 2005 to December 2008, its holding is classified as a long-term holding only in 2008 when its

holding is actually observed to be long term. This definition may underestimate the actual long-term holding of the firm as some investors may intend to take long-term positions yet sell their stock holdings in a firm after only a short period. Additionally, to avoid concerns regarding using *ex-post* information to form a current variable, the main tests in this chapter do not to impute the holding behaviour to long-term investors in their first three years of their holding stock. In untabulated results, I have also used alternative long-term ownership variables that classify the holdings of the same investor in the first three years as long-term holdings (in my example, holdings of B by A from December 2005 to December 2008). All my test results remain robust.

Control variables

Other firm characteristics that may distort the findings are controlled in the analysis. To account for firm financing and investment levels, leverage (debt to asset ratio, *DTA*) and capital expenditure ratio (*CAPX*) have been controlled. Firm size (natural log of market capitalisation, *LOGMV*) and firm age (*AGE*) are added in the model to control for the fact that firms may be in different stages of their life cycles. Lastly, to control for the liquidity environment firms might be facing, turnover (*TOV*) is added in the regressions. Detailed variable definitions can be found in the appendix. The extended specifications with additional control variables, such as book-to-market ratio, stock returns, and dividend yield are also tested; the results are untabulated. All my results remained qualitatively similar in these additional tests. However, to avoid concerns about potential multicollinearity, I delete these variables in the final specifications.

5.4 Empirical Results: Institutional Investment Horizons and Firm Performance

5.4.1 Summary statistics

Who are the long-term investors? Horizon preferences of different types of investors

Before the main analysis of the regression results is presented, the chapter summarises the investment horizon preferences of different investors. Three classification schemes provided by Bushee (2001) are used to categorise different institutional investors. The first classification is based on institutional portfolio diversification and turnover. To recap, investors that hold more concentrated portfolios with low turnover are classified as dedicated investors and are normally believed to be the investors most likely engage in corporate governance (Chen et al. 2007). Investors with more diversified portfolios and lower turnover are classified as quasi-indexers, and investors that have high portfolio turnover and diversified portfolios are classified as transient investors. The second classification is based on the investors' investment styles. Investors who prefer high (low) dividend yield, a low (high) market-to-book ratio, and a low (high) price-to-earnings ratio are classified as value (growth) investors, while all other investors are classified as growth-income investors on the basis that they do not show clear preferences (Bushee 2001). The final classification scheme is based on institutional investors' fiduciary duties. The Thomson Financial 13F database classifies investors into seven categories that reflect their fiduciary responsibilities. These categories comprise public pension funds, banks, insurance, corporate (private) pension funds, university and foundation endowments, investment companies and independent investment advisors.

Table 5.1 presents the institutional preferences in terms of their holding horizons. The average holding column shows the percentage of total shares outstanding held by each type of institutional investor. The nest column shows the percentage of total shares outstanding that have been held by investors for more than three years. The last column shows the proportion of each type of institutional investors' holdings that are classified as long term. It can be seen from the table that transient investors, growth investors, independent investment advisors, and corporate pension funds have the lowest proportions of shares held for more than three years (the proportion of long-term holdings range from approximately 25% to 40%). In other words, these investors tend to have shorter horizons. On the other hand, quasi-indexers and value and growth investors, banks, investment companies, insurance companies, and public pension funds tend to have more long-term holdings in their portfolios (the proportion of their long-term holdings range from approximately 45% to 58%).

Although institutional investors of different kinds show variation in their preferences for long-term holdings, the differences may not be as great as expected. For example, in the dedicated-quasi-indexer-transient scheme, dedicated investors, that might have been expected to be long-term monitoring investors (Chen et al. 2007), hold less than half of their stocks for more than three years; while transient investors, that would normally be expected to have the least incentive to take long-term positions, still hold more than a quarter of their portfolios for the long term. These findings demonstrate that within portfolios, variations of institutional investors' holdings are substantial and should not be ignored.

Descriptive statistics

Table 5.2 presents the descriptive statistics for the variables used in my main analysis. As may be observed, long-term ownership, by my definition, accounts, on average, for 15% of firms' shares outstanding, as well as accounting for about half of total institutional ownership. After adjusting for industry effects in the dependent variables, the average and median of all three performance measures are close to 0. It is also worth noting that, on average, about half of the institutional holdings are long term, indicating that long-term ownership is important in terms of shareholder control. The correlation table is displayed in panel B of Table A1. All the correlations are within the range of -0.06 to 0.48, indicating that multicollinearity is unlikely to be a concern.

5.4.2 Baseline regression: long-term holdings and firm performance

The key research question investigated in this chapter is whether a higher level of long-term ownership, and therefore greater incentive to monitor, is associated with superior firm performance. The following model is the baseline model specification:

$$Performance_{i,t,t+4} = \alpha\_i + \beta L3_{i,t} + B * Control\ Variables_{i,t} + \theta_i + \mu_t + \epsilon_{i,t} \qquad (5.1)$$

where firm performance measures are industry adjusted ROAs, Tobin's Q, and EY.

All performance measures are quarterly averages from quarter *t* to quarter *t*+4. Long-term ownership (*L3*) is defined as the proportion of institutional investors that hold a firm's stocks for more than 3 years. Control variables include leverage (*DTA*), capital expenditure ratio (*CAPX*), firm size (*LOGMV*), and firm age (*AGE*). This empirical

setting also controls for SIC 2-digit industry (θ_i) and quarterly time (μ_t) fixed effects. My standard errors are clustered at the firm level.

As may be observed in Table 5.3, long-term ownership is positively and significantly related to all three measures of firm performance. These results suggest that long-term holdings by institutional investors increase a firm's value. These findings are consistent with the literature that argues that long-term institutional ownership may improve a firm's governance and increase its value (Chen et al. 2007), and they support my claim that institutional investors' monitoring leads to better firm performance.

4.3. Long-term Ownership and Long-run Performance

The main analysis is extended to longer horizons by investigating the persistence of the influence of long-term ownership on firm value. In order to achieve this, the regressions are extended to varying subsequent time horizons:

$$Performance_{i,t,t+4*N} = \alpha\_i + \beta L3_{i,t} + B * Control\ Variables_{i,t} + \theta_i + \mu_t + \epsilon_{i,t} \qquad (5.2)$$

where the subscript *N* takes values from 1 to 5. For each performance measure, the model is estimated by using the performance measure at quarter *t*+4*N* for six time periods.

Over the three performance measures, 18 regressions are estimated. Figure 5.1 shows the estimation of β and the corresponding confidence interval at the 95% level.

As may be observed in Figure 5.1, in all 18 regressions, long-term ownership is always positively related to firm performance and the co-efficients are all significant at the 1%

level. Moreover, there is a rising trend in the co-efficient estimates. These findings clearly demonstrate that the value-enhancing effect of long-term ownership is persistent.

5. 5 Endogeneity and 2SLS Regressions

There is a natural concern that my results might arise as a result of an endogeneity problem. In contradistinction to the interpretation that monitoring investors improve firm value, it is also possible that investors tend to hold firms that they believe will continue to outperform. In other words, the longer holding length may be the result of rather than the reason for longer term ownership, thereby giving rise to a reversed causality interpretation. In addition, there may be some factors that influence both ownership and firm performance for which I failed to control. This could be interpreted as omitted variable bias.

The main analysis in this chapter does not ignore such concerns. First, the results indicate that the positive impact of ownership on performance lasts for extended periods of time. The reversed causality problem is unlikely to be a concern as my dependent variables occur much later in time than the independent variable. Second, the industry and year fixed effects, and industry adjustment of the dependent variables would be expected to eliminate a large part of potential concerns about omitted variables. Nevertheless, even with these measures, the endogeneity concern cannot be fully eliminated.

To mitigate such a concern, an IV approach similar to that used in chapters 3 and 4 has been adopted to address the endogeneity issue. The identification strategy follows the studies of Fich et al. (2015), Schmidt and Fahlenbrach (2016), and Crane et al. (2016) which exploit ownership changes caused by the annual changes in the Russell index (as

previously indicated, the Russell 1000 and 2000 indices are reconstituted in June every year).

The long-term holdings in investors' portfolios would be influenced by this exogenous variation. First, stocks held for a long time by index-tracking investors are included in my long-term ownership measurement. The occurrence of index reconstitution leads to rebalancing by these investors. Second, investors who are not classified as passive investors may be involved as counter-parties of trades by index trackers and will therefore be affected.

Based on the rationale above, a IV-regression framework is used to overcome the endogeneity problem. The 2SLS approach applies following model:

$$L3_{i,t} = \alpha + \beta_1 R1TR2_{i,t} + \beta_2 R2TR1_{i,t} + \beta_3 R2TN_{i,t} + \beta_4 NTR2_{i,t} + B * Control_{i,t} + \theta_i + \mu_t + \epsilon_{i,t} \quad (5.3)$$

where *R1TR2* (*R2TR1*) is a dummy variable taking the value of 1 in the year following a stock moving from one Russell index to another. *R2TN* is a dummy variable taking the value of 1 in the year that the firm drops out of the Russell index due to a relative fall in its market capitalisation. *NTR2* is a dummy variable taking the value of 1 in the year the firm moves from below into the Russell 2000 index. The control variables, industry and time fixed effects, are added as before. The predicted values of long-term ownership (L3) are then substituted for L3 in the main regression to perform the second-stage regression.

The results of the first-stage regression are presented in first three columns of Table 5.4. Three of the index-switching dummies have significant impacts on long-term ownership,

which is generally in line with Fich et al. (2015). Columns 4–6 present the results of the second-stage estimation results. I observe that the initial results of my main analysis stand. I still observe that long-term institutional ownership has a positive impact on firms' performance.

5.6 Robustness Tests and Further Discussion

5.6.1 Characteristics vs. incentives

Numerous studies have found that certain characteristics (legal, etc.) of institutional investors appear to have an impact in determining the influence of institutions on the firms in which they hold stock. To ensure that these findings are not purely driven by investors with specific characteristics, this section accords the literature (Bushee 2001; Bushee 1998b; Bushee & Noe 2000; Bushee & Goodman 2007) and classifies investors into three categories, and then examines the impact of the long-term holding of each type of investor on a firm's performance.

Investors classified by fiduciary responsibility

The first classification is based on fiduciary responsibilities. The Thomson Financial 13F database classifies investors into seven categories based on their fiduciary responsibilities. As previously indicated, these categories comprise public pension funds, banks, insurance, corporate (private) pension funds, university and foundation endowments, investment companies, and independent investment advisors. Investors with different fiduciary responsibilities may be associated with different investment

horizons (Cox, Brammer, & Millington 2004; Neubaum & Zahra 2006; Ryan & Schneider 2002) In addition, they may have informal links that may lead to firms being differentially affected by investor action (David, Kochhar, & Levitas 1998; Elyas Elyasiani et al. 2010; Brickley et al. 1988; Ferreira & Matos 2008; Cornett et al. 2007). The tests in this section follow the literature in aggregating investors into pressure-insensitive investors (independent investment advisors, investment companies, and public pension funds, designated IND) and pressure-sensitive investors (banks, and insurance companies and others, designated GRY) (Chen et al. 2007).

Investors classified by investment style

Institutional investors may have different investment styles. Some may prefer growth and be more interested in firms with high growth rates, lower dividend yields, and higher market-to-book valuations. Other investors may prefer value and be more attracted to firms with higher dividend pay-outs or that are potentially undervalued. Following Bushee's classification, and as previously indicated, investors are divided into value, growth and growth-income investors (the third category indicating that the investor cannot easily be attributed to either of the two previous types).

Investors classified by portfolio turnover and holding concentration

Based on portfolio turnover and concentration, institutions can also be classified as transient investors, dedicated investors and quasi-indexers (Bushee & Goodman, 2007; Aghion et al. 2013).

To distinguish between the monitoring incentive and the investor characteristics, long-term holdings of each type of investors are calculated under the three abovementioned classification schemes. The models then examine the association between the long-term holdings of each type of investor and subsequent firm performance. If the monitoring incentive is a more important factor than investor characteristics in its effect on a firm's performance, distinguishable effects of the long-term holdings of different investors on firm performance should be expected. In contrast, if the monitoring incentive is more important than investors' characteristics, the monitoring incentive will dominate, and all types of investor will have similar impacts on firm value.

Table 5.5 presents the findings of these models. After regressing all three performance measures on the long-term holdings of each type of institutional investor. For the sake of simplicity, only the second-stage results of my 2SLS regressions are presented. As can be observed from Table 5.5, long-term ownership by all types of investors is consistently positively correlated with a firm's future performance. Even with transient and grey investors who, for one reason or another, might be not be expected to be actively engaged with the firms in which they invest, an increase in the proportion of long-term holdings is still found to be value-enhancing. These results clearly indicate that the institutional monitoring incentive is the most important factor contributing to firms' overall performance.

5.6.2 Alternative measures of long-term ownership

To ensure that these results are not subject to ambiguity with regard to horizon choice and variable stability, additional tests apply alternative measures of long-term

institutional ownership. The first alternative measure this study uses is *L5*, which is defined as ownership by institutional investors that hold shares in a firm for more than *5* years. This measure leads to a stricter definition of long-term investors as the monitoring incentive may be expected to be stronger when the observed holding period is extended. The second measure (*LIOP*) is the definition of long-term ownership used by Yan and Zhang (2009): long- and short-term investors are classified according to their portfolio turnover. This measure is noisier because although investors with lower portfolio turnover are more likely to have more long-term positions, a large proportion of their holdings could, for reasons explained above, be short term.

The 2SLS estimation results are presented in Table 5.6 where the conclusions drawn from the baseline regression are largely supported by the regressions using alternative measures. When measured over longer horizons, long-term ownership is associated with higher ROA, higher Tobin's Q, and higher EY (columns 4-6). Even if I use the noisier LIOP measure, long-term ownership is still positively related to ROA and Tobin's Q, although EY is no longer significant.

5.6.3 The effect of short-term investors on the firm's performance

The analyses in this section so far show that holdings by long-term investors have a positive effect on a firm's value. A related question is whether short-term investors are associated with a similar increase in firm profitability. Several studies argue that, in general, institutional investors have a significant impact on firms (Aghion et al. 2013; Yan & Zhang 2009). To examine whether more short-term institutional investors have a

beneficial effect similar to that of long-term investors, similar tests should be applied to short-term institutional investors.

Three variables are constructed to measure ownership by short-term investors. Short-term investors' holding horizons are calculated as the overall holding period from when they first buy stock in the firm to when they sell it. A holding period of less than one year is classified as S1, a 2-year or briefer period is classified as S2, and so on. In addition, by using portfolio turnover, investors whose portfolio turnovers are among the highest 30% of all investors are classified as short-term investors and designated SIOP. I then regress firm performance on ownership by these investors and control variables. As with the analysis of long-term investors, I continue to apply 2SLS regression.

The effect of short-term investors on firm performance is presented in Table 5.7. It may be observed that short-term institutional ownership is negatively associated with subsequent firm performance. Greater short-term ownership appears to lead to lower ROA, lower Tobin's Q, and lower EY. Moreover, the negative impact appears to become weaker when the horizon used to define short-term holders becomes longer. These results support my argument that when the investment horizon increases, the institutional investors' impact on a firm's value increases.

5.7 Conclusion

The beneficial effects on a firm's performance resulting from the monitoring of its management by institutional investors has long been recognised. Tests in this chapter have endeavoured to drill down to a finer analysis of the type of institutional behaviour most closely responsible for any improvement in managerial decision-making by

identifying the holding period of institutions for each firm in which they hold stock. Long-term investors were defined on the basis that they have already held stock in each firm for a specified period and that the longer the investor holds stock in a company, the greater is the incentive for the investor to actively engage in monitoring the performance of the firm's management. This chapter have found evidence that an increase in the proportion of long-term investors does indeed lead to better performance, as measured by ROA, Tobin's Q, and EY. Additional tests were designed to guard against misinterpretation of the results on the basis of endogeneity, and the robustness of test results were examined by attempting different definitions of 'long term', including classification on a fiduciary basis, and links between the investors and the firms in which they invest. The conclusions remain consistent across the range of additional tests and techniques used. Finally, by investigating short-term institutional investors, using similar techniques and tests, the evidence has demonstrated that they are not associated with better performance, but, more typically, with worse. This is consistent with my prior belief that short-term investors have less incentive than long-term investors to actively engage with the management of the firms in which they hold stock and reinforces the belief that a strong base of long-term institutional investor ownership contributes to an improvement in a firm's management and performance.

6. Conclusion

This thesis has aimed to provide new evidence for the relationship between institutional investors' monitoring incentives and corporate performance. Most previous studies of institutional investors' monitoring focus on the various incentives resulting from the heterogeneity of their characteristics, such as their independence, investment style, or their active involvement in a firm's operations. However, variations in the incentives of these investors in monitoring firms in their portfolio holdings have rarely been discussed.

This thesis demonstrates that institutional investors have differential levels of incentives to monitor the firms in their portfolios. The first argument is that this incentive variation is closely related to the importance of the firm in an investor's portfolio, proxied by the weighting of the firm in institutional investors' portfolios. The monitoring incentive of an institutional investor will be significantly greater for a firm that represents a greater weighting in its portfolio.

The first two empirical chapters (chapters 3 and 4) validate this argument. Institutional investors holdings in the 10% of firms that account for the highest weighting in their portfolios, which is described as the most motivated monitoring ownership, appears to be associated with significantly better investment decisions by corporations. Chapter 3 examined one of the most important decisions a firm needs to make: its decision to investment. I found that most motivated monitoring ownership by institutional investors can significantly reduce inefficient investment. It can effectively mitigate the empire-building problem that leads to inefficient over-investment, and problems relating to career concerns that lead to inefficient under-investment. Chapter 4 investigated the role of the

most motivated monitoring ownership of the firm and focused on liquidity management. The valuation of cash holdings is positively associated with the likelihood of the firm being relatively more important in institutional investors' portfolios, a result that shows that the presence of these investors can largely mitigate the concerns of other investors about the potential agency problems faced by those firms when holding cash. These chapters support the first argument of this thesis and confirm that the effectiveness of institutional investors' monitoring does depend on the importance of the firm to the investor.

I further asked whether, in addition to the weighting of firm in institutional investors' portfolios, there any other factors indicating a monitoring incentive by institutional investors. The last empirical chapter of this thesis (Chapter 5) attempted to answer this question and demonstrated that, in addition to the weighting of the firm in an investor's portfolio, investors' different holding horizons also impact on their differential levels of monitoring incentives. Institutional investors' long-term holdings are associated with better future performance by firms. This finding is consistent for all the performance horizons proxies used.

In each empirical chapter, extensive robustness tests were applied. To mitigate the concern of endogeneity, the exogenous shock caused by Russell index switches was used to conduct 2SLS regressions to confirm the robustness of the findings. To show that the results are not driven by certain types of institutional investors, a proxy for institutional investors monitoring motivation was applied for each type of institutional investor; the findings are shown not to be driven by the involvement of a certain type of investor. To mitigate the concern that the results were subject to a specific manner of creation of

variables, different approaches, frameworks and proxies were used for each measure. My results are consistent and robust with regard to the additional tests.

This thesis has important implications for institutional ownership studies. Traditionally, the mainstream view is that the monitoring incentives of institutional investors vary because of their heterogeneity. Some investors are believed to be more effective monitors than other (Chen et al. 2007; Bushee & Goodman 2007; Schmidt & Fahlenbrach 2017). This thesis clarifies this perspective on institutional monitoring. It has revealed that the sources of their monitoring incentive differences are derived in another dimension, and it had accomplished this by identifying the relationship between each investor and the company in which the investor holds shares. This thesis finds that both the weighting of a firm in the portfolio and the investment horizon are factors relevant to the allocation of monitoring resources; it therefore deepens our understanding of institutional monitoring. In addition, this thesis provides a possible explanation for the conflicting findings of previous studies. For example, there is a lively debate on the role of passive investors in corporate governance. Some studies argue they are effective monitors (Appel et al. 2016), though others argue the opposite (Schmidt & Fahlenbrach 2017). This thesis provides an alternative view as it finds that the effectiveness of monitoring depends on the incentives of investors to monitor each specific firm they hold. Passive investors appear to monitor the firms that are important to them, while dedicated investors are less effective when firms are less important components in their portfolios.

Despite the increasing attention to the allocation of institutional monitoring resources, there remain many important issues that have not been extensively investigated. For example, clear evidence is provided in this thesis that institutional investors can assist in

improving corporate governance, thereby creating value for shareholders. A natural implication of such a finding is that the stock market should react to these value-enhancing activities. If a trading strategy were to be created based on such idea, would the investment be profitable? The asset-pricing implications of institutional monitoring-resource allocation would be an important extension to this study.

The other issue this thesis has not answered concerns how the monitoring incentives of shareholders impact on the interest of other parties. There are some studies that have begun to address this issue. For example, some authors have documented a trend that suggests that debtholders would consider the intervention of equity investors potentially detrimental to their interests (King & Wen 2011; Klein & Zur 2011). As a result, the cost of the debt-financing of firms that experience more frequent shareholder intervention would be much higher than firms that experience no shareholder intervention (Klein & Zur 2011). These attempts improve our understanding of the issue; however, the externality of institutional equity investors monitoring other stakeholders' interests has not yet attracted close attention from researchers. Would employees' interests be hurt by shareholder intervention? Would the welfare of firms' suppliers or customers be influenced by the monitoring of institutional equity investors? Many questions remain for future research to answer.

This thesis has not revealed the channels through which motivated institutional investors engage in mitigating agency problems and improving corporate governance. There are two ways in which institutional investors might influence corporate policies and operational outcomes. One is to directly exert the shareholder rights to which they are entitled. For example, they may submit shareholder proposals, participate in proxy

contests, or even take over the firm. As surveyed by Denes, Karpoff, and McWilliams (2017), these activities are not always effective when adopted by shareholders as a group. The other way that institutional investors can improve corporate governance is through indirect channels. For example, the existence of institutional investors may reduce information asymmetry between shareholders and management. They may also influence the market liquidity of firms in which they have invested, thereby changing the intensity of takeover threats firms may face. It is still unclear how the various incentives an investor might have for monitoring firms may influence the effectiveness of these investors' roles in corporate governance.

7. Reference

Abel, A. B. 1983. Optimal Investment Under Uncertainty. *The American Economic Review* 73:228–33.

Aghion, P., J. Van Reenen, and L. Zingales. 2013. Innovation and Institutional Ownership. *The American Economic Review* 103:277–304.

Agrawal, A. K. 2012. Corporate Governance Objectives of Labor Union Shareholders: Evidence from Proxy Voting. *The Review of Financial Studies* 25:187–226.

Alimov, A. 2014. Product Market Competition and the Value of Corporate Cash: Evidence from Trade Liberalization. *Journal of Corporate Finance* 25:122–39.

Almazan, A., J. C. Hartzell, and L. T. Starks. 2005. Active Institutional Shareholders and Costs of Monitoring: Evidence from Executive Compensation. *Financial Management* 34:5–34.

Almeida, H., M. Campello, and M. S. Weisbach. 2004. The Cash Flow Sensitivity of Cash. *The Journal of Finance* 59:1777–1804.

Appel, I., T. A. Gormley, and D. B. Keim. 2016. Identification Using Russell 1000/2000 Index Assignments: A Discussion of Methodologies. SSRN Scholarly Paper, Rochester, NY: Social Science Research Network.

Appel, I. R., T. A. Gormley, and D. B. Keim. 2016. Passive Investors, Not Passive Owners. *Journal of Financial Economics* 121:111–41.

Asker, J., J. Farre-Mensa, and A. Ljungqvist. 2014. Corporate Investment and Stock Market Listing: A Puzzle? *Review of Financial Studies* :hhu077.

Attig, N., S. Cleary, S. El Ghoul, and O. Guedhami. 2012. Institutional Investment Horizon and Investment–cash Flow Sensitivity. *Journal of Banking & Finance* 36:1164–80.

Attig, N., S. Cleary, S. El Ghoul, and O. Guedhami. 2013. Institutional Investment Horizons and the Cost of Equity Capital. *Financial Management* 42:441–77.

Attig, N., O. Guedhami, and D. Mishra. 2008. Multiple Large Shareholders, Control Contests, and Implied Cost of Equity. *Journal of Corporate Finance* 14:721–37.

Balakrishnan, K., J. E. Core, and R. S. Verdi. 2014. The Relation Between Reporting Quality and Financing and Investment: Evidence from Changes in Financing Capacity. *Journal of Accounting Research* 52:1–36.

Bates, T. W., C. (Henry) Chang, and J. D. Chi. 2017. Why Has the Value of Cash Increased Over Time? SSRN Scholarly Paper, Rochester, NY: Social Science Research Network.

Bates, T. W., K. M. Kahle, and R. M. Stulz. 2009. Why Do U.S. Firms Hold So Much More Cash than They Used To? *The Journal of Finance* 64:1985–2021.

Bebchuk, L., A. Cohen, and A. Ferrell. 2009. What Matters in Corporate Governance? *Review of Financial Studies* 22:783–827.

Bertrand, M., and S. Mullainathan. 2001. Are CEOs Rewarded for Luck? The Ones Without Principals Are. *The Quarterly Journal of Economics* 116:901–32.

Bertrand, M., and S. Mullainathan. 2003. Enjoying the Quiet Life? Corporate Governance and Managerial Preferences. *Journal of Political Economy* 111:1043–75.

Bethel, J. E., J. P. Liebeskind, and T. Opler. 1998. Block Share Purchases and Corporate Performance. *The Journal of Finance* 53:605–34.

Bhagat, S., and B. Bolton. 2013. Director Ownership, Governance, and Performance. *Journal of Financial and Quantitative Analysis* 48:105–35.

Biddle, G. C., G. Hilary, and R. S. Verdi. 2009. How Does Financial Reporting Quality Relate to Investment Efficiency? *Journal of Accounting and Economics* 48:112–31.

Blanchard, O. J., F. Lopez-de-Silanes, and A. Shleifer. 1994. What Do Firms Do with Cash Windfalls? *Journal of Financial Economics* 36:337–60.

Blouin, J. L., B. J. Bushee, and S. A. Sikes. 2017. Measuring Tax-Sensitive Institutional Investor Ownership. Research-article, *https://doi.org/10.2308/accr-51719* Research-article.

Bradley, M., A. Brav, I. Goldstein, and W. Jiang. 2010. Activist Arbitrage: A Study of Open-Ending Attempts of Closed-End Funds. *Journal of Financial Economics* 95:1–19.

Brav, A., W. Jiang, and H. Kim. 2015. The Real Effects of Hedge Fund Activism: Productivity, Asset Allocation, and Labor Outcomes. *The Review of Financial Studies* 28:2723–69.

Brav, A., W. Jiang, F. Partnoy, and R. Thomas. 2008. Hedge Fund Activism, Corporate Governance, and Firm Performance. *The Journal of Finance* 63:1729–75.

Brickley, J. A., R. C. Lease, and C. J. Smith. 1988. Ownership Structure and Voting on Antitakeover Amendments. *Journal of Financial Economics* 20:267–91.

Brush, T. H., P. Bromiley, and M. Hendrickx. 2000. The Free Cash Flow Hypothesis for Sales Growth and Firm Performance. *Strategic Management Journal* 21:455–72.

Burkart, M., D. Gromb, and F. Panunzi. 1997. Large Shareholders, Monitoring, and the Value of the Firm. *The Quarterly Journal of Economics* 112:693–728.

Bushee, B. J. 1998a. The Influence of Institutional Investors on Myopic R&D Investment Behaviour. *The Accounting Review* 73:305–33.

Bushee, B. J. 1998b. The Influence of Institutional Investors on Myopic R&D Investment Behaviour. *The Accounting Review* 73:305–33.

Bushee, B. J. 2001. Do Institutional Investors Prefer Near-Term Earnings over Long-Run Value?*. *Contemporary Accounting Research* 18:207–46.

Bushee, B. J., and T. H. Goodman. 2007. Which Institutional Investors Trade Based on Private Information About Earnings and Returns? *Journal of Accounting Research* 45:289–321.

Bushee, B. J., and C. F. Noe. 2000. Corporate Disclosure Practices, Institutional Investors, and Stock Return Volatility. *Journal of Accounting Research* 38:171–202.

Cai, C. X., D. Hillier, and J. Wang. 2016. The Cost of Multiple Large Shareholders. *Financial Management* 45:401–30.

Cai, J., and Z. Zhang. 2011. Leverage Change, Debt Overhang, and Stock Prices. *Journal of Corporate Finance* 17. Financial Flexibility and Corporate Liquidity:391–402.

Cella, C., A. Ellul, and M. Giannetti. 2013. Investors' Horizons and the Amplification of Market Shocks. *Review of Financial Studies* 26:1607–48.

Chang, X., S. Dasgupta, G. Wong, and J. Yao. 2014. Cash-Flow Sensitivities and the Allocation of Internal Cash Flow. *The Review of Financial Studies* 27:3628–57.

Chang, Y.-C., H. Hong, and I. Liskovich. 2015. Regression Discontinuity and the Price Effects of Stock Market Indexing. *The Review of Financial Studies* 28:212–46.

Chen, X., J. Harford, and K. Li. 2007. Monitoring: Which Institutions Matter? *Journal of Financial Economics* 86:279–305.

Cheng, M., D. Dhaliwal, and Y. Zhang. 2013. Does Investment Efficiency Improve after the Disclosure of Material Weaknesses in Internal Control over Financial Reporting? *Journal of Accounting and Economics* 56:1–18.

Chichernea, D. C., A. Petkevich, and B. B. Zykaj. 2015. Idiosyncratic Volatility, Institutional Ownership, and Investment Horizon. *European Financial Management* 21:613–45.

Chung, R., S. Fung, and S.-Y. K. Hung. 2012. Institutional Investors and Firm Efficiency of Real Estate Investment Trusts. *The Journal of Real Estate Finance and Economics* 45:171–211.

Claessens, S., S. Djankov, J. P. H. Fan, and L. H. P. Lang. 2002. Disentangling the Incentive and Entrenchment Effects of Large Shareholdings. *The Journal of Finance* 57:2741–71.

Clifford, C. P., and L. Lindsey. 2016. Blockholder Heterogeneity, CEO Compensation, and Firm Performance. *Journal of Financial and Quantitative Analysis* 51:1491–1520.

Cornett, M. M., A. J. Marcus, A. Saunders, and H. Tehranian. 2007. The Impact of Institutional Ownership on Corporate Operating Performance. *Journal of Banking & Finance* 31:1771–94.

Cox, P., S. Brammer, and A. Millington. 2004. An Empirical Examination of Institutional Investor Preferences for Corporate Social Performance. *Journal of Business Ethics* 52:27–43.

Crane, A. D., S. Michenaud, and J. P. Weston. 2016. The Effect of Institutional Ownership on Payout Policy: Evidence from Index Thresholds. *Review of Financial Studies* 29:1377–1408.

Cremers, K. J. M., and A. Petajisto. 2009. How Active Is Your Fund Manager? A New Measure That Predicts Performance. *The Review of Financial Studies* 22:3329–65.

Cronqvist, H., and R. Fahlenbrach. 2009. Large Shareholders and Corporate Policies. *Review of Financial Studies* 22:3941–76.

Daniel, K., and S. Titman. 1997. Evidence on the Characteristics of Cross Sectional Variation in Stock Returns. *The Journal of Finance* 52:1–33.

David, P., R. Kochhar, and E. Levitas. 1998. The Effect of Institutional Investors on the Level and Mix of Ceo Compensation. *Academy of Management Journal* 41:200–208.

Davis, G. F., and E. H. Kim. 2007. Business Ties and Proxy Voting by Mutual Funds. *Journal of Financial Economics* 85. The economics of conflicts of interest financial institutions:552–70.

Denes, M. R., J. M. Karpoff, and V. B. McWilliams. 2017. Thirty Years of Shareholder Activism: A Survey of Empirical Research. *Journal of Corporate Finance* 44:405–24.

Denis, D. J., and V. Sibilkov. 2010. Financial Constraints, Investment, and the Value of Cash Holdings. *The Review of Financial Studies* 23:247–69.

Derrien, F., A. Kecskés, and D. Thesmar. 2013. Investor Horizons and Corporate Policies. *Journal of Financial and Quantitative Analysis* 48:1755–1780.

Dhillon, A., and S. Rossetto. 2014. Ownership Structure, Voting, and Risk*. *Review of Financial Studies* :hhu071.

Dittmar, A., and J. Mahrt-Smith. 2007. Corporate Governance and the Value of Cash

Holdings. *Journal of Financial Economics* 83:599–634.

Drobetz, W., M. C. Grüninger, and S. Hirschvogl. 2010. Information Asymmetry and the Value of Cash. *Journal of Banking & Finance* 34:2168–84.

Duchin, R. 2010. Cash Holdings and Corporate Diversification. *The Journal of Finance* 65:955–92.

Edmans, A. 2009. Blockholder Trading, Market Efficiency, and Managerial Myopia. *The Journal of Finance* 64:2481–2513.

Edmans, A. 2014. Blockholders and Corporate Governance. *The Annual Review of Financial Economics is* 6:23–50.

Edmans, A., and C. G. Holderness. 2017. Blockholders: A Survey of Theory and Evidence. SSRN Scholarly Paper, Rochester, NY: Social Science Research Network.

Elyasiani, E., and J. Jia. 2010. Distribution of Institutional Ownership and Corporate Firm Performance. *Journal of Banking and Finance* 34:606–20.

Elyasiani, E., J. (Jane) Jia, and C. X. Mao. 2010. Institutional Ownership Stability and the Cost of Debt. *Journal of Financial Markets* 13:475–500.

Fama, E. F. 1970. Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance* 25:383–417.

Fama, E. F., and K. R. French. 1998. Taxes, Financing Decisions, and Firm Value. *The Journal of Finance* 53:819–43.

Fama, E. F., and M. C. Jensen. 1983. Separation of Ownership and Control. *Journal of Law and Economics* 26:301–25.

Fama, E. F., and J. D. MacBeth. 1973. Risk, Return, and Equilibrium: Empirical Tests. *Journal of Political Economy* 81:607–36.

Fama, E., and K. French. 1993. Common Risk Factors in the Returns on Stocks and Bonds. *Journal of Financial Economics* 33:3–56.

Fang, V. W., T. H. Noe, and S. Tice. 2009. Stock Market Liquidity and Firm Value. *Journal of Financial Economics* 94:150–69.

Faulkender, M., and R. Wang. 2006. Corporate Financial Policy and the Value of Cash. *The Journal of Finance* 61:1957–90.

Ferreira, M. A., and P. Matos. 2008. The Colors of Investors' Money: The Role of Institutional Investors around the World. *Journal of Financial Economics* 88. Darden - JFE Conference Volume: Capital Raising in Emerging Economies:499–533.

Fich, E. M., J. Harford, and A. L. Tran. 2015. Motivated Monitors: The Importance of

Institutional Investors′ Portfolio Weights. *Journal of Financial Economics* 118:21–48.

Fich, E. M., J. Harford, and A. S. Yore. 2016. The Effect of Takeover Protection on the Value of Cash: Evidence from a Natural Experiment. SSRN Scholarly Paper, Rochester, NY: Social Science Research Network.

Fritz Foley, C., J. C. Hartzell, S. Titman, and G. Twite. 2007. Why Do Firms Hold so Much Cash? A Tax-Based Explanation. *Journal of Financial Economics* 86:579–607.

Gao, X., and Y. Jia. 2016. Internal Control over Financial Reporting and the Safeguarding of Corporate Resources: Evidence from the Value of Cash Holdings. *Contemporary Accounting Research* 33:783–814.

García Lara, J. M., B. García Osma, and F. Penalva. 2016. Accounting Conservatism and Firm Investment Efficiency. *Journal of Accounting and Economics* 61:221–38.

Gaspar, J., and M. Massa. 2006. Idiosyncratic Volatility and Product Market Competition. *The Journal of Business* 79:3125–52.

Gaspar, J.-M., M. Massa, and P. Matos. 2005. Shareholder Investment Horizons and the Market for Corporate Control. *Journal of Financial Economics* 76:135–65.

Giannetti, M., and A. Simonov. 2006. Which Investors Fear Expropriation? Evidence from Investors' Portfolio Choices. *The Journal of Finance* 61:1507–47.

Gillan, S. L., and L. T. Starks. 2003. Corporate Governance, Corporate Ownership, and the Role of Institutional Investors: A Global Perspective. *Journal of Applied Finance; Tampa* 13:4–22.

Gompers, P. A., and A. Metrick. 2001. Institutional Investors and Equity Prices. *The Quarterly Journal of Economics* 116:229–59.

Gompers, P., J. Ishii, and A. Metrick. 2003. Corporate Governance and Equity Prices. *The Quarterly Journal of Economics* 118:107–55.

Goodman, T. H., M. Neamtiu, N. Shroff, and H. D. White. 2013. Management Forecast Quality and Capital Investment Decisions. *The Accounting Review* 89:331–65.

Gormley, T. A., and D. A. Matsa. 2014. Common Errors: How to (and Not to) Control for Unobserved Heterogeneity. *The Review of Financial Studies* 27:617–61.

Grossman, S. J., and O. D. Hart. 1980. Takeover Bids, The Free-Rider Problem, and the Theory of the Corporation. *The Bell Journal of Economics* 11:42–64.

Gu, L. 2016. Product Market Competition, R&D Investment, and Stock Returns. *Journal of Financial Economics* 119:441–55.

Gulen, H., and M. Ion. 2016. Policy Uncertainty and Corporate Investment. *The Review*

of Financial Studies 29:523–64.

Halford, J. T., J. J. McConnell, V. Sibilkov, and N. S. Zaiats. 2017. Cash Regimes and the Marginal Value of Cash. SSRN Scholarly Paper, Rochester, NY: Social Science Research Network.

Harford, J. 1999. Corporate Cash Reserves and Acquisitions. *The Journal of Finance* 54:1969–97.

Harford, J., S. Klasa, and W. F. Maxwell. 2014. Refinancing Risk and Cash Holdings. *The Journal of Finance* 69:975–1012.

Harford, J., S. A. Mansi, and W. F. Maxwell. 2008. Corporate Governance and Firm Cash Holdings in the US. *Journal of Financial Economics* 87:535–55.

Hart, O. D. 1983. The Market Mechanism as an Incentive Scheme. *The Bell Journal of Economics* 14:366–82.

Haushalter, D., S. Klasa, and W. F. Maxwell. 2007. The Influence of Product Market Dynamics on a Firm's Cash Holdings and Hedging Behaviour. *Journal of Financial Economics* 84:797–825.

Hayashi, F. 1982. Tobin's Marginal q and Average q: A Neoclassical Interpretation. *Econometrica* 50:213–24.

Hennessy, C. A. 2004. Tobin's Q, Debt Overhang, and Investment. *The Journal of Finance* 59:1717–42.

Holderness, C. G., and D. P. Sheehan. 1988. The Role of Majority Shareholders in Publicly Held Corporations. *Journal of Financial Economics* 20. The Distribution of Power Among Corporate Managers, Shareholders, and Directors:317–46.

Hubbard, R. 1998. Capital-Market Imperfections and Investment. *Journal of Economic Literature* 36:193–225.

Jensen, M. C. 1986. Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review* 76:323–29.

Jensen, M. C., and W. H. Meckling. 1976. Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Structure. *Journal of Financial Economics* 3:305–60.

Kacperczyk, M., S. Van Nieuwerburgh, and L. Veldkamp. 2016. A Rational Theory of Mutual Funds' Attention Allocation. *Econometrica* 84:571–626.

Kang, J.-K., and A. Shivdasani. 1995. Firm Performance, Corporate Governance, and Top Executive Turnover in Japan. *Journal of Financial Economics* 38:29–58.

Kaplan, S. N., and B. A. Minton. 1994. Appointments of Outsiders to Japanese Boards:

Determinants and Implications for Managers. *Journal of Financial Economics* 36:225–58.

Kempf, E., A. Manconi, and O. Spalt. 2017. Distracted Shareholders and Corporate Actions. *The Review of Financial Studies* 30:1660–95.

Kim, K., E. Mauldin, and S. Patro. 2014. Outside Directors and Board Advising and Monitoring Performance. *Journal of Accounting and Economics* 57:110–31.

King, T.-H. D., and M.-M. Wen. 2011. Shareholder Governance, Bondholder Governance, and Managerial Risk-Taking. *Journal of Banking & Finance* 35:512–31.

Klein, A., and E. Zur. 2011. The Impact of Hedge Fund Activism on the Target Firm's Existing Bondholders. *The Review of Financial Studies* 24:1735–71.

Kyröläinen, P., I. Tan, and P. Karjalainen. 2013. How Creditor Rights Affect the Value of Cash: A Cross-Country Study. *Journal of Corporate Finance* 22:278–98.

La Porta, R., F. Lopez-De-Silanes, and A. Shleifer. 1999. Corporate Ownership Around the World. *The Journal of Finance* 54:471–517.

Lang, L. H. P., R. Stulz, and R. A. Walkling. 1991. A Test of the Free Cash Flow Hypothesis. *Journal of Financial Economics* 29:315–35.

Li, D., and E. X. N. Li. 2016. Corporate Governance and Costs of Equity: Theory and Evidence. *Management Science* .

Lins, K. V. 2003. Equity Ownership and Firm Value in Emerging Markets. *The Journal of Financial and Quantitative Analysis* 38:159–84.

Liu, C. Y., A. Low, R. W. Masulis, and L. Zhang. 2016. Monitoring the Monitor: Distracted Institutional Investors and Board Governance. SSRN Scholarly Paper, Rochester, NY: Social Science Research Network.

Lou, X., and Y. A. Wang. 2016. Flow-Induced Trading Pressure and Corporate Investment. SSRN Scholarly Paper, Rochester, NY: Social Science Research Network.

Louis, H., A. X. Sun, and O. Urcan. 2012. Value of Cash Holdings and Accounting Conservatism*. *Contemporary Accounting Research* 29:1249–71.

Luong, L. H., F. Moshirian, L. H. G. Nguyen, X. Tian, and B. Zhang. 2016. How Do Foreign Institutional Investors Enhance Firm Innovation? SSRN Scholarly Paper, Rochester, NY: Social Science Research Network.

Malmendier, U., and G. Tate. 2005. CEO Overconfidence and Corporate Investment. *The Journal of Finance* 60:2661–2700.

Masulis, R. W., and S. Mobbs. 2014. Independent Director Incentives: Where Do

Talented Directors Spend Their Limited Time and Energy? *Journal of Financial Economics* 111:406–29.

Maury, B., and A. Pajuste. 2005. Multiple Large Shareholders and Firm Value. *Journal of Banking & Finance* 29:1813–34.

McCAHERY, J. A., Z. Sautner, and L. T. Starks. 2016. Behind the Scenes: The Corporate Governance Preferences of Institutional Investors. *The Journal of Finance* :n/a-n/a.

McConnell, J. J., and H. Servaes. 1990. Additional Evidence on Equity Ownership and Corporate Value. *Journal of Financial Economics* 27:595–612.

McNichols, M. F., and S. R. Stubben. 2008. Does Earnings Management Affect Firms' Investment Decisions? *The Accounting Review* 83:1571–1603.

Mehran, H. 1995. Executive Compensation Structure, Ownership, and Firm Performance. *Journal of Financial Economics* 38:163–84.

Modigliani, F., and M. H. Miller. 1959. The Cost of Capital, Corporation Finance, and the Theory of Investment: Reply. *The American Economic Review* 49:655–69.

Mullins, W. 2014. The Governance Impact of Index Funds: Evidence from Regression Discontinuity.

Neubaum, D. O., and S. A. Zahra. 2006. Institutional Ownership and Corporate Social Performance: The Moderating Effects of Investment Horizon, Activism, and Coordination. *Journal of Management* 32:108–31.

Ohlson, J. A. 1995. Earnings, Book Values, and Dividends in Equity Valuation*. *Contemporary Accounting Research* 11:661–87.

Petersen, M. A. 2009. Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches. *The Review of Financial Studies* 22:435–80.

Porter, M. E. 1992. Capital Disadvantage: America's Failing Capital Investment System. *Harvard Business Review* .

Richardson, S. 2006. Over-Investment of Free Cash Flow. *Review of Accounting Studies* 11:159–89.

Roosenboom, P., F. P. Schlingemann, and M. Vasconcelos. 2014. Does Stock Liquidity Affect Incentives to Monitor? Evidence from Corporate Takeovers. *The Review of Financial Studies* 27:2392–2433.

Ryan, L. V., and M. Schneider. 2002. The Antecedents of Institutional Investor Activism. *Academy of Management Review* 27:554–73.

Schmidt, C., and R. Fahlenbrach. 2017. Do Exogenous Changes in Passive Institutional

Ownership Affect Corporate Governance and Firm Value? *Journal of Financial Economics* 124:285–306.

Shleifer, A., and R. W. Vishny. 1986. Large Shareholders and Corporate Control. *Journal of Political Economy* 94:461–88.

Shleifer, A., and R. W. Vishny. 1997. A Survey of Corporate Governance. *The Journal of Finance* 52:737–83.

Shroff, N. 2017. Corporate Investment and Changes in GAAP. *Review of Accounting Studies* 22:1–63.

Sims, C. A. 2003. Implications of Rational Inattention. *Journal of Monetary Economics* 50. Swiss National Bank/Study Center Gerzensee Conference on Monetary Policy under Incomplete Information:665–90.

Stoughton, N., K. P. Wong, and L. Yi. 2016. Investment Efficiency and Product Market Competition. SSRN Scholarly Paper, Rochester, NY: Social Science Research Network.

Stulz, R. 1990. Managerial Discretion and Optimal Financing Policies. *Journal of Financial Economics* 26:3–27.

Titman, S., K. C. J. Wei, and F. Xie. 2004. Capital Investments and Stock Returns. *Journal of Financial and Quantitative Analysis* 39:677–700.

Tong, Z. 2011. Firm Diversification and the Value of Corporate Cash Holdings. *Journal of Corporate Finance* 17. Financial Flexibility and Corporate Liquidity:741–58.

Wong, K. P., and L. Yi. 2015. Institutional Investors and Corporate Investment.

Yan, X. (Sterling), and Z. Zhang. 2009. Institutional Investors and Equity Returns: Are Short-Term Institutions Better Informed? *Review of Financial Studies* 22:893–924.

Zeng, Y. 2016. Institutional Investors: Arbitrageurs or Rational Trend Chasers. *International Review of Financial Analysis* 45:240–62.

8. Appendix

Appendix A 1

This table provides variable definitions and corresponding data sources for chapter 3. CRSP refers to the Centre for Research in Security Prices, ISS refers to the Institutional Shareholder Services (formerly RiskMetrics), 13F refers to the Thomson Reuters 13F Database, and Bushee's website refers to http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html

Variable	Definition	Source
Investment regression variables		
AT	Total assets.	Compustat
ITotal	Annual total investment expenditure normalized by AT: [Capital expenditure(CAPX) + acquisition expenditure(AQC) + R&D expenditure(XRD) - Receipts from sale of property, plant and equipment(SPPE)]/AT (Richardson, 2006)	Compustat
IMaintenance	Annual required investment expenditure to maintain assets in place normalized by AT: Depreciation and amortization(DPC)/AT (Richardson, 2006)	Compustat
INew	Annual investment expenditure on new projects normalized by AT: ITotal - IMaintenance (Richardson, 2006)	Compustat
MV	Market value of equity: price(PRCCF) * common shares outstanding (CSHO).	Compustat
V/P	Growth opportunity: Assets in place/MV, where the assets in place are estimated as (1-ar)BV+ a(1+r)X- ard, a=o/1+r-o, r=12%, o=0.62, BV is the book value of equity(CEQ), d is annual dividend (DVC), and X is operating income after depreciation (OIADP) (Ohlson 1995; Richardson, 2006).	Compustat

Leverage	Leverage ratio: the book value of total debt (long-term debt(DLTT) + short-term debt(DLC)) divided by the sum of the book value of total debt and BV (Richardson, 2006).	Compustat
Cash	Cash holding ratio: cash and short-term investment(CHE) divided by AT at the start of year (Richardson, 2006).	Compustat
Age	Firm age: the natural log of (1 + the number of years the firm has been listed on CRSP as of the start of year) (Richardson, 2006).	CRSP
Size	The natural log of AT at the start of year (Richardson, 2006).	Compustat
Return	The percentage change of firm market value over the previous year: MV(t)/MV(t-1) -1 (Richardson, 2006).	CRSP
MTB	Market-to-book ratio: market value of asset (MV+ Total debt) divided by AT (Stoughton, Wong, and Yi 2016).	Compustat
Tangibility	Firm asset tangibility: text{Property Plant and Equipment(PPENT)/AT (Stoughton, Wong, and Yi 2016)	Compustat
Inef1	Inefficient investment proxy variable: $\|INEW - \widehat{INEW}\|$ where $\widehat{INEW}$ is estimated by historical panel regressions between 1982 and year t.	Compustat & CRSP
Und1	Under-investment proxy variable: Und1=|Inef1| if $INEW < \widehat{INEW}$.	Compustat & CRSP
Ovr1	Over-investment proxy variable: Ovr1=|Inef1| if $INEW > \widehat{INEW}$.	Compustat & CRSP
Inef2	Inefficient investment proxy variable: $\|INEW - \widehat{INEW}\|$ where $\widehat{INEW}$ is estimated by panel regressions between 1995 and 2015 (Richardson, 2006).	Compustat & CRSP

Und2	Under-investment proxy variable: Und2=|Inef2| if $INEW < \widehat{INEW}$.	Compustat & CRSP
Ovr2	Over-investment proxy variable: Ovr2=|Inef2| if $INEW > \widehat{INEW}$.	Compustat & CRSP
Variables related to institutional investors: (note: IV is used as a prefix for all predicted institutional investor variables in 2SLS regressions.)		
Nmi1	Number of motivated monitoring investors: number of investors whose holding value in the firm is in the top 10% of their portfolios (Fich, Harford, and Tran 2015)	13F
Nmi10	Number of investors who have the least motivation to monitor firms: number of investors whose holding value in the firm is in the bottom 10% of their portfolios.	13F
Tmi1	Total firm ownership of motivated monitoring investors (Fich, Harford, and Yore 2016).	13F
Tmi10	Total firm ownership of investors who have the least motivation to monitor firms.	13F
Tmi1Ind	Total firm ownership of motivated monitoring investors who are classified as independent institutional investors.	13F &Bushee's Website
Tmi1Grey	Total firm ownership of motivated monitoring investors who are classified as grey institutional investors.	13F &Bushee's Website
Tmi1Tran	Total firm ownership of motivated monitoring investors who are classified as transient institutional investors.	13F &Bushee's Website
Tmi1NonTran	Total firm ownership of motivated monitoring investors who are classified as non-transient institutional investors.	13F &Bushee's Website
Pmi1	Proportion of motivated institutional investors: ratio of Nmi1 to number of firm institutional investors.	13F &Bushee's Website

TMA	Total institutional investor monitoring attention.	13F &Bushee's Website
IV in 2SLS regressions		
R1TR2	Indicator variable: 1 if a firm switches from the Russell 1000 to the Russell 2000 index, and 0 otherwise (Fich, Harford, and Tran 2015).	Bloomberg
R2TN	Indicator variable: 1 if a firm drops out of the Russell 2000 index due to decrease in market value, and 0 otherwise (Fich, Harford, and Tran 2015).	Bloomberg
R2TR1	Indicator variable: 1 if a firm switches from the Russell 2000 to the Russell 1000 index, and 0 otherwise (Fich, Harford, and Tran 2015).	Bloomberg
NTR2	Indicator variable: 1 if a firm gets newly included in the Russell 2000 index due to increase in market value, and 0 otherwise (Fich, Harford, and Tran 2015)	Bloomberg
Others		
Competition	Industry competition level is defined as 1-Lerner index, where the Lerner ratio is the industry median gross margin (Revenue(SALE) - Cost of goods sale(COGS))/Revenue. Firms are assigned by 3-digit SIC codes (Aghion, Van Reenen, and Zingales 2013).	Compustat
G-index	Numbers of anti-takeover provisions (Paul Gompers, Ishii, and Metrick 2003).	ISS
FCF1	Free cash ow: Operating cashflow(OANCF) - IMaintenance + R&D(XRD)- $\widehat{INEW}$, where $\widehat{INEW}$ is estimated by historical panel regressions between 1982 and year t.	Compustat & CRSP
FCF2	Free cash ow: Operatingcashflow(OANCF) - IMaintenance + R&D(XRD) - $\widehat{INEW}$, where $\widehat{INEW}$ is estimated by panel regressions between 1995 and 2015 (Richardson, 2006).	Compustat & CRSP

Appendix A 2

This table provides variable definitions and corresponding data sources for chapter 4. CRSP refers to the Centre for Research in Security Prices, ISS refers to the Institutional Shareholder Services (formerly RiskMetrics), 13F refer to the Thomson Reuters 13F Database, Bushee's website refers to http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html, and FF refers to Kenneth French's website http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html#Benchmarks.

Variable	Definition	Source
MMIO1--MMIO10	MMIOi is the ownership of institutional investors whose holding value in a firm is within the range of the top 10(i-1)% and 10i% portfolio stock holdings in September of year t (Fich, Harford, and Tran 2015).	13F
PMMI1	Ratio of the number of most motivated monitoring investors to the total number of institutional investors (Fich, Harford, and Tran 2015).	13F
NMMI1	Number of the most motivated monitoring institutional investors (Fich, Harford, and Tran 2015).	13F
TIO	Total institutional ownership.	13F
$MMIO1_{\_independent}$	Ownership of most motivated monitoring investors who are classified as independent ones (Chen, Harford, and Li 2007)	13F & Bushee's website
$MMIO1_{\_grey}$	Ownership of most motivated monitoring investors who are classified as grey ones (Chen, Harford, and Li 2007)	13F & Bushee's website

$MMIO1_{\_transient}$	Ownership of most motivated monitoring investors who are classified as transient ones (Bushee 2001)	13F & Bushee's website
$MMIO1_{\_quasi\text{-}indexer}$	Ownership of most motivated monitoring investors who are classified as quasi-indexer ones (Bushee 2001)	13F & Bushee's website
$MMIO1_{\_dedicated}$	Ownership of most motivated monitoring investors who are classified as dedicated ones (Bushee 2001)	13F & Bushee's website
Δ' MMIO_1	Change in MMIO_1 from March to September of year t (Fich, Harford, and Tran 2015)	13F & Bushee's website
TMA	Monitoring motivation-weighted institutional ownership.	13F & Bushee's website
$r_i - R_i^b$	Excess stock returns with the benchmark portfolios defined as Fama--French 25 portfolios formed on size and book-to-market (Faulkender and Wang 2006)	CRSP, Compustat, and FF
MV	Market value of equity, defined as the number of shares outstanding (CSHPRI) multiplied by stock price (PRCC_F) (Faulkender and Wang 2006)	Compustat
Cash holdings	Cash plus marketable securities (CHE) normalized by MV (Faulkender and Wang 2006)	Compustat
Δ Cash holdings	Change in cash holdings from fiscal year t-1 to year t, normalized by MV at the start of fiscal year t (Faulkender and Wang 2006).	Compustat
Δ Earnings	Change in earnings from fiscal year t-1 to year t, normalized by MV at the start of fiscal year t. Earnings are calculated as earnings before extraordinary items (IB) plus interest (XINT), deferred tax credits (TXDI), and investment tax credits (ITCI) (Faulkender and Wang 2006)	Compustat

Δ Net assets	Change in net assets from fiscal year t-1 to year t, normalized by MV at the start of fiscal year t. Net assets are calculated as total assets (AT) minus cash holdings (CHE) (Faulkender and Wang 2006).	Compustat
Δ R&D	Change in R&D expenditure (XRD) from fiscal year t-1 to year t, normalized by MV at the start of fiscal year t (Faulkender and Wang 2006)	Compustat
Δ Interest expenses	Change in interest expenses (XINT) from fiscal year t-1 to year t, normalized by MV at the start of fiscal year t (Faulkender and Wang 2006)	Compustat
Δ Dividends	Change in total common share dividends (DVC) from fiscal year t-1 to year t, normalized by MV at the start of fiscal year t (Faulkender and Wang 2006)	Compustat
Leverage	Calculated as total debt (DLC+DLTT) divided by the sum of total debt and MV (Faulkender and Wang 2006).	Compustat
Δ Net financing	Net financing proceeds are defined as equity issuance (SSTK) minus repurchases (PRSTKC), plus debt issuance (DLTIS) minus debt redemption (DLTR) (Faulkender and Wang 2006)	Compustat
R1TR2	Indicator takes one when firms switch from the Russell 1000 to the Russell 2000 index due to the relative decrease in market value, zero otherwise (Fich, Harford, and Tran 2015)	Bloomberg
R2TR1	Indicator takes one when firms switch from the Russell 2000 to the Russell 1000 index due to the relative increase in market value, zero otherwise (Fich, Harford, and Tran 2015)	Bloomberg
R2TN	Indicator takes one when firms drop out of the Russell 2000 index due to the relative decrease in market value, zero other wise (Fich, Harford, and Tran 2015).	Bloomberg
NTR2	Indicator takes one when firms are newly added into the Russell 2000 index due to the	Bloomberg

	relative increase in market value, zero otherwise (Fich, Harford, and Tran 2015).	
ROA	Fama--French 48 industry-adjusted return on asset, calculated as income before extraordinary items (IB) divided by average book value of assets (AT) between fiscal year t and t-1 (Kim, Mauldin, and Patro 2014).	Compustat
ROE	Fama--French 48 industry-adjusted return on equity, calculated as income before extraordinary items (IB) net of preferred stock dividend (DVP) divided by average book value of equity (CEQ) between fiscal year t and t-1 (Kim, Mauldin, and Patro 2014).	Compustat
Nmargin	Fama--French 48 industry-adjusted net profit margin, calculated as income before extraordinary items (IB) divided by net sales (SALE) (Kim, Mauldin, and Patro 2014).	Compustat
AssetTO	Fama--French 48 industry adjusted asset turnover, calculated as net sales (SALE) divided by average book value of assets (AT) (Kim, Mauldin, and Patro 2014).	Compustat
Cash/Total assets	Cash plus marketable securities (CHE) normalized by total assets (AT).	Compustat
Age	Firm age, calculated as Ln(1+Number of years since the first time the firm appeared in Compustat) (Kim, Mauldin, and Patro 2014)	Compustat
Size	Firm size, calculated as Ln(book value of asset (AT)) (Kim, Mauldin, and Patro 2014).	Compustat
MTB	Market-to-book ratio, calculated as market value of assets (MV+total debt) divided by book value of assets (AT) (Kim, Mauldin, and Patro 2014)	Compustat
Tangibility	Asset tangibility, calculated as property plant and equipment (PPENT) divided by total assets (AT) (Kim_2014).	Compustat

Capital expenditure	Capital expenditure (CAPEX) normalized by total assets (AT).	Compustat
G-index	Corporate governance index composed of twenty-four provisions on investor rights and takeover protections applied to the company (Paul Gompers, Ishii, and Metrick 2003).	ISS
E-index	Entrenchment index composed of the six most important provisions in G-index (Bebchuk, Cohen, and Ferrell 2009).	ISS
Block1	Aggregate ownership of all institutional investors whose ownership exceeds 5\% of common shares outstanding of a firm.	13F
Block2	Blockholder ownership indicator variable which is equal to 1 if a firm is among the top tercile blockholder ownership distribution and zero if a firm is among the bottom tercile blockholder ownership distribution (Dittmar_2007).	13F

Appendix A 3

This table provides variable definitions and corresponding data sources for chapter 5. CRSP refers to the Centre for Research in Security Prices, ISS refers to the Institutional Shareholder Services (formerly RiskMetrics), 13F refer to the Thomson Reuters 13F Database, Bushee's website refers to http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html

Variables:	Definition:	Source:
Dependent Variables:		
$ROA_{i,t,t+4}$	Average quarterly return on assets from t to t+4 quarter. ROA is defined as net income(NIQ)/total asset(ATQ).	Compustat
$TBQ_{i,t,t+4}$	Average Tobin's from t to t+4 quarter. Tobin's Q is defined as market value of equity(CSHOQ*PRCCQ) +book value of debt(DLTTQ+DLCQ)) standardized by total asset(ATQ)	Compustat
$EY_{i,t,t+4}$	Average earnings per share(EPSFXQ) from t to t+4 quarter standardized by stock price at t.	Compustat
Industry adjustment is applied to all dependent variables. I deduct quarterly median value of industry (2 digit SIC code) performance from the firm performance variables to make such adjustment.		
Ownership Variables:		
L3	Ownership of investors who hold shares of the firm for more than 3 years, aggregated at firm level. If an investor sold out all the holdings but returned within one year, the holding period is carried forward from previous holding.	13F
L5	Ownership of investors who hold shares of the firm for more than 5 years, aggregated at firm level. If an investor sold out all the holdings but returned within	13F

	one year, the holding period is carried forward from previous holding.	
LIOP	Ownership of investors who are classified as long term investors based on Yan and Zhang (2009), aggregated at firm level. The classification is based on the "churn ratio" while each quarter investors whose churn ratio is in the lowest 1/3 (slow turnover) long term investors. See Yan and Zhang (2009) for detail.	13F
S1	Ownership of investors whose entire holding period from enter to exit are less than 1 year and don't return with in the next 1 year, aggregated at firm level.	13F
S2	Ownership of investors whose entire holding period from enter to exit are less than 2 year and don't return with in the next 1 year, aggregated at firm level.	
SIOP	Ownership of investors who are classified as long term investors based on Yan and Zhang (2009), aggregated at firm level. The classification is based on the "churn ratio" where each quarter investors whose churn ratio is in the highest 1/3 (faster turnover) are classified short term investors. See Yan and Zhang (2009) for detail.	13F
Classification by Bushee (2007)		
GROL3	Percentage shares of the firm held by "growth investors" who holds the stocks for more than 3 years. aggregated at firm level. If an investor sold out all the holdings but returned within one year, the holding period is carried forward from previous holding. Growth investors are defined as those who prefer higher price to book ratio, higher price to earning ration and lower dividend yield.	13F & Bushee (2007)

VALL3	Percentage shares of the firm held by “value investors” who holds the stocks for more than 3 years. aggregated at firm level. If an investor sold out all the holdings but returned within one year, the holding period is carried forward from previous holding. Value investors are defined as those who prefer lower price to book ratio, lower price to earning ration and higher dividend yield.	13F & Bushee (2007)
GIL3	Percentage shares of the firm held by “growth/income” who holds the stocks for more than 3 years. aggregated at firm level. If an investor sold out all the holdings but returned within one year, the holding period is carried forward from previous holding. Investors who follow neither growth or value style are classified as growth/income investors.	13F & Bushee (2007)
DEDL3	Percentage shares of the firm held by “dedicate investors” who holds the stocks for more than 3 years. aggregated at firm level. If an investor sold out all the holdings but returned within one year, the holding period is carried forward from previous holding Dedicate investors are defined as investors with low turnover and concentrated portfolios.	13F & Bushee (2007)
QIXL3	Percentage shares of the firm held by “quasi-indexers” who holds the stocks for more than 3 years. aggregated at firm level. If an investor sold out all the holdings but returned within one year, the holding period is carried forward from previous holding. Quasi-indexers are defined as investors with low portfolio turnover and diversified portfolio.	13F & Bushee (2007)
TRAL3	Percentage shares of the firm held by “growth/income” who holds the stocks for more than 3 years. aggregated at firm level. If an investor sold out all the holdings but returned within one year, the holding period is carried forward from previous holding. Transient investors are those who have high portfolio turnover and highly diversified portfolio.	13F & Bushee (2007)

INDL3	Percentage shares of the firm held by "independent investors" who holds the stocks for more than 3 years, aggregated at firm level. If an investor sold out all the holdings but returned within one year, the holding period is carried forward from previous holding. independent investors are those who have less business relation with underlying firm, including independent investment advisors, investment companies and public pension funds.	13F & Bushee (2007)
GRYL3	Percentage shares of the firm held by "Grey investors" who holds the stocks for more than 3 years. aggregate at firm level. If an investor sold out all the holdings but returned within one year, the holding period is carried forward from previous holding. Grey investors are those who have more business relation with underlying firm, including banks, insurance companies, corporate pension funds, public pension funds university and foundation endowments and other investors. All Bushee's classification are from Bushee's website	13F & Bushee (2007)
Control variables:		
LOGMV	Log of firm market capitalization. Market capitalization calculated as price(PRC)*total shares outstanding(SHROUT).	CRSP
DTA	Book leverage, calculated as total debt(DLTTQ+DLCQ) to total asset(ATQ).	Compustat
AGE	Number of years since the stock first emerged in the CRSP database.	CRSP
TOV	Quarterly turnover, calculated as quarterly trading volume(VOL) divided by shares outstanding(SHROUT).	CRSP
CAPX	Capital expenditure ratio. CAPX is defined as CAPX/ATQ.	Compustat
Instrument variables:		

R1TR2	Dummy Variable. Take value of one at in 4 quarterly follows a firm switch from Russell 1000 to Russell 2000 index. Zero otherwise.	Bloomberg
R2TR1	Dummy Variable. Take value of one at in 4 quarterly follows a firm switch from Russell 2000 to Russell 1000 index. Zero otherwise.	Bloomberg
R1TR2	Dummy Variable. Take value of one at in 4 quarterly follows a firm drops out from Russell 2000 due to decrease in market value. Zero otherwise.	Bloomberg
R1TR2	Dummy Variable. Take value of one at in 4 quarterly follows a firm included first time in Russell 2000 due to market value increase. Zero otherwise.	Bloomberg

9. Tables and Figures

Tables for Chapter 3:

Table 3- 1 Summary statistics

Panel A: Time series of institutional holdings. This panel presents the number of reported institutional positions, the number of institutional investors, the total market value of institutional holdings (billion dollars), the stock market value (billion dollars), the percentage of stock market share held by institutions, and the average number of stocks in institutional investor portfolios. I report these summary statistics in every September from 1995 to 2015.

Time	Reported Positions	Number of institutions	Market value of institutional holdings	Stock market value	Percentage	Average Number of stocks per institution
Sep-95	343,187	1,212	3,303	6,570	50.00%	283
Sep-96	340,827	1,174	3,896	7,951	49.60%	290
Sep-97	400,135	1,363	5,677	10,898	52.30%	294
Sep-98	428,053	1,484	5,761	11,232	53.30%	288
Sep-99	459,388	1,553	8,260	14,232	50.90%	296
Sep-00	514,160	1,740	9,699	18,102	54.30%	295
Sep-01	491,891	1,822	6,997	12,615	55.40%	270
Sep-02	504,951	1,878	6,061	10,495	56.70%	269
Sep-03	524,618	1,867	7,843	13,283	54.00%	281
Sep-04	574,246	2,045	9,443	15,343	61.20%	281
Sep-05	605,990	2,224	11,002	17,694	64.50%	272
Sep-06	654,812	2,447	12,333	19,113	64.80%	268
Sep-07	690,667	2,656	15,036	22,036	62.90%	260
Sep-08	683,039	2,834	10,966	16,680	64.70%	241
Sep-09	660,354	2,702	10,154	15,538	65.50%	244
Sep-10	664,732	2,705	11,101	17,092	65.20%	246
Sep-11	673,870	2,895	10,779	16,568	64.60%	233
Sep-12	673,732	2,893	12,769	20,517	63.70%	233
Sep-13	687,379	3,018	13,524	23,669	62.20%	228
Sep-14	714,804	2,974	14,910	26,842	54.70%	240
Sep-15	649,619	2,732	13,686	23,274	59.60%	238

Panel B. Institutional stock holdings by decile portfolios. This panel reports the summary statistics of stock holdings in institutional investor portfolios. I sort all stocks of an institutional investor into decile groups by the market value of holdings. Decile group 1 is the top decile that includes the stocks with the top 10% holding value ranks. For each decile group, I report the average holding value (thousand dollars) of individual stocks, the average ratio of the decile group holding value to the total institutional portfolio value, the median ratio of the decile group holding value to the total institutional portfolio value, the 25th percentile of the ratios of the decile group holding value to the total institutional portfolio value, and the 75th percentile of the ratios of the decile group holding value to the total institutional portfolio value. The sample period is from March 1995 to December 2015.

	Individual Stocks	Decile Portfolio to Total Portfolio value			
Groups	Average holding value	Mean	Median	25th pct.	75th pct.
Decile 1	105,443.70	41.50%	38.10%	27.20%	53.00%
Decile 2	23,676.60	18.80%	18.90%	15.90%	21.70%
Decile 3	11,977.70	12.50%	13.10%	9.90%	15.30%
Decile 4	6,999.60	8.60%	9.00%	5.90%	11.30%
Decile 5	4,339.20	6.10%	6.10%	3.50%	8.60%
Decile 6	2,790.40	4.70%	4.30%	2.20%	6.80%
Decile 7	1,745.80	3.30%	2.80%	1.30%	4.70%
Decile 8	1,057.90	2.30%	1.80%	0.80%	3.20%
Decile 9	594.2	1.50%	1.10%	0.50%	2.10%
Decile 10	235.7	0.70%	0.50%	0.20%	1.00%

Panel C. Main variables. This panel presents the descriptive statistics of the firm and institutional investor variables in my sample. The sample period is between 1995 and 2015. All firms have complete information in the CRSP and Compustat databases. I also require that my sample firms have institutional ownership information from the Thomson Financial CDA/Spectrum Institutional (13F) database. The number of observations, mean, standard deviation, minimum, 25th percentile, median, 75th percentile, and maximum are reported from left to right in sequence for each variable. Detailed definitions of all variables can be found in Appendix

Variable	Obs.	Mean	S.D.	Min	P25	Median	P75	Max
Investment Regression Variables								
AT	92,546	2,648.10	7,563.30	2.30	62.20	265.50	1,302.20	47,604.00
ITotal	92,546	0.15	0.15	-0.03	0.05	0.10	0.20	0.74
IMaintenance	92,546	0.05	0.04	0.00	0.03	0.04	0.06	0.24
INew	92,546	0.10	0.15	-0.18	0.00	0.05	0.14	0.71
MV	92,546	3,864.90	17,935.90	0.00	60.70	281.60	1,327.00	630,000.00
V/P	92,546	0.49	0.71	-2.74	0.20	0.44	0.74	3.07
Leverage	92,546	0.31	0.33	0.00	0.01	0.24	0.48	1.71
Cash	92,546	0.22	0.30	0.00	0.02	0.10	0.30	1.59
Age	92,546	2.24	1.01	0.00	1.61	2.30	3.00	4.19
Size	92,546	5.35	2.46	0.00	3.79	5.36	7.01	10.69
Return	92,546	0.21	0.85	-0.87	-0.25	0.00	0.39	4.48
MTB	92,546	1.86	1.81	0.27	0.83	1.25	2.10	11.10
Tangibility	92,546	0.26	0.24	0.00	0.08	0.18	0.39	0.91
Excess	78,602	-0.02	0.57	-2.03	-0.33	-0.09	0.18	14.63
INew-$\widehat{INEW}1$	84,731	0.01	0.13	-0.43	-0.06	-0.01	0.05	0.77
INew-$\widehat{INEW}2$	84,731	0.00	0.13	-0.44	-0.07	-0.02	0.04	0.76
Inef1	84,731	0.09	0.10	0.00	0.03	0.06	0.11	0.77
Und1	47,613	0.07	0.05	0.00	0.03	0.06	0.09	0.43
Ovr1	37,118	0.11	0.13	0.00	0.03	0.06	0.15	0.77
Inef2	84,731	0.09	0.09	0.00	0.03	0.06	0.11	0.76
Und2	47,613	0.08	0.05	0.00	0.04	0.07	0.10	0.44
Ovr2	37,118	0.10	0.13	0.00	0.02	0.05	0.13	0.76
Variables related to institutional investors								
Tmi1	92,546	0.09	0.15	0.00	0.00	0.00	0.13	1.00
Tmi10	92,546	0.01	0.02	0.00	0.00	0.00	0.01	1.00
Nmi1	92,546	9.30	41.00	0.00	0.00	0.00	3.00	1058.00
Nmi10	92,546	9.20	10.00	0.00	3.00	6.00	12.00	295.00
Tmi1	92,546	0.07	0.11	0.00	0.00	0.00	0.10	1.00
Tmi1	92,546	0.02	0.06	0.00	0.00	0.00	0.00	1.00
Tmi1	92,546	0.02	0.05	0.00	0.00	0.00	0.03	1.00
Tmi1	92,546	0.06	0.12	0.00	0.00	0.00	0.08	1.00
Pmi1	92,546	0.03	0.06	0.00	0.00	0.00	0.04	1.00
Instrumental Variables in 2SLS								
R1TR2	94,648	0.01	0.10	0.00	0.00	0.00	0.00	1.00
R2TN	94,648	0.03	0.17	0.00	0.00	0.00	0.00	1.00
R2TR1	94,648	0.01	0.11	0.00	0.00	0.00	0.00	1.00
NTR2	94,648	0.04	0.19	0.00	0.00	0.00	0.00	1.00
Others								
Competition	92,545	0.63	0.15	0.15	0.53	0.64	0.74	3.04
G-index	7,317	8.94	2.66	1.00	7.00	9.00	11.00	17.00
FCF1	84,731	-0.04	0.18	-0.92	-0.10	-0.01	0.06	0.60
FCF2	84,731	-0.05	0.18	-0.94	-0.11	-0.02	0.05	0.50

Table 3- 2: Optimal investment expenditure regressions

This table reports the regression coefficients of the optimal investment expenditure model developed by (Richardson 2006). The dependent variable is INEW measured in year t. The independent variables are V/P, Leverage, Cash, Size, Return, Age, and $INew_{t-1}$. Detailed definitions of these variables are described in Appendix 1. In the historical panel regressions, I run a panel regression with firm-year observations between 1982 and year t, for each year t in my sample period 1995--2015. I only report the time-series average of the coefficients estimated by twenty-one historical panel regressions. The numbers of positive and negative coefficients with 1% significance level are reported in parentheses. In the single panel regression, I run a panel regression over my sample period 1995--2015. The standard errors are clustered by firm in both regressions. t-values are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 1% levels, respectively. Firm and year fixed effects are controlled in all regressions.

Historical Panel		**Panel Regression**	
V/P $_{t-1}$	-0.016	V/P $_{t-1}$	-0.021***
	(- 21, + 0)		[-19.26]
Leverage $_{t-1}$	-0.091	Leverage $_{t-1}$	-0.082***
	(- 21, + 0)		[-24.76]
Cash $_{t-1}$	0.033	Cash $_{t-1}$	0.030***
	(- 0, + 21)		[10.10]
Size $_{t-1}$	-0.008	Size $_{t-1}$	-0.009***
	(- 21, + 0)		[-18.42]
Return $_{t-1}$	0.009	Return $_{t-1}$	0.007***
	(- 0, + 21)		[11.35]
Age $_{t-1}$	-0.011	Age $_{t-1}$	-0.002
	(- 21, + 0)		[-1.01]
I_New $_{t-1}$	0.115	I_New $_{t-1}$	0.124***
	(- 0, + 21)		[19.24]
Constant	0.166	Constant	0.166***
	(- 0, + 21)		[50.69]
Average Observation	89,129	Observations	84,731
Average R-Squared	0.010	R-squared	0.098
Fixed effects	FIRM & YEAR	Fixed effects	FIRM & YEAR
Number of Years	21		

Table 3- 3 Investment inefficiency and stock returns

This table presents the regression results of firm cumulative stock excess returns in year t+1 on investment inefficiency proxy variables in year t. The coefficients of both the panel regressions and the (Eugene F. Fama and MacBeth 1973) regressions are reported. My sample consists of 68,840 firm-year observations during 1995--2015. The dependent variable is firm cumulative annual stock returns and the independent variables of interest are the inefficient investment estimated by the investment regressions reported in Table 3-2 Inefficient investment. Inef1, Und1, and Ovr1 are estimated by the historical panel regressions. Inef2, Und2, and Ovr2 are estimated by the single panel regression. Detailed definitions of the independent variables are described in Appendix 1. Fama--French 48 industry fixed effects are controlled for in all regressions. Year fixed effects are controlled for and the standard errors are clustered by firm in the panel regressions. t-values are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Variables	Panel	F&M	Panel	F&M	Panel	F&M	Panel	F&M	Panel	F&M	Panel	F&M
Inef1	-0.296***	-0.264***										
	[-10.67]	[-8.77]										
Und1			-0.524***	-0.310***								
			[-7.62]	[-3.29]								
Ovr1					-0.245***	-0.237***						
					[-7.59]	[-7.71]						
Inef2							-0.297***	-0.264***				
							[-10.22]	[-8.42]				
Und2									-0.552***	-0.346***		
									[-7.73]	[-3.73]		
Ovr2											-0.249***	-0.235***
											[-7.55]	[-7.67]
MTB	-0.003	-0.006*	-0.010***	-0.012***	0.007**	0.003	-0.003	-0.006**	-0.010***	-0.012***	0.007**	0.003
	[-1.16]	[-2.09]	[-3.36]	[-4.22]	[2.04]	[0.78]	[-1.27]	[-2.13]	[-3.34]	[-4.22]	[2.02]	[0.73]
Leverage	0.035***	0.026	-0.022	-0.023	0.119***	0.105***	0.033***	0.025	-0.020	-0.021	0.117***	0.103***
	[3.20]	[0.98]	[-1.55]	[-0.85]	[6.86]	[3.39]	[3.04]	[0.93]	[-1.36]	[-0.77]	[6.77]	[3.35]
Cash	-0.069***	-0.036	-0.053***	-0.018	-0.078***	-0.047	-0.070***	-0.036	-0.057***	-0.020	-0.077***	-0.047
	[-5.78]	[-1.10]	[-3.33]	[-0.53]	[-4.25]	[-1.44]	[-5.88]	[-1.12]	[-3.53]	[-0.59]	[-4.22]	[-1.42]
Size	-0.027***	-0.024***	-0.030***	-0.026***	-0.022***	-0.020***	-0.027***	-0.024***	-0.030***	-0.027***	-0.022***	-0.020***
	[-21.49]	[-7.99]	[-16.98]	[-8.02]	[-11.81]	[-5.22]	[-21.59]	[-8.06]	[-17.12]	[-7.99]	[-11.83]	[-5.27]
Constant	0.109***	0.291***	0.169***	0.337***	0.021	0.069	0.113***	0.294***	0.182***	0.341***	0.019	0.068
	[4.88]	[4.40]	[5.87]	[3.52]	[0.61]	[1.27]	[5.04]	[4.49]	[6.21]	[3.63]	[0.54]	[1.27]

Observations	68,840	68,840	38,829	38,829	30,011	30,011	68,840	68,840	38,829	38,829	30,011	30,011
Adj. R-squared	0.016	0.092	0.016	0.092	0.018	0.120	0.016	0.091	0.016	0.092	0.018	0.120
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes		Yes		Yes		Yes		Yes		Yes	
Number of groups		21		21		21		21		21		21

Table 3- 4 Motivated institutional ownership and inefficient investment: Baseline regressions

Panel A. Inefficient investment estimated by the historical panel regressions. This panel presents the panel regression results of firm inefficient investment on institutional ownership. My sample consists of 80,031 firm-year observations during 1995--2015. The dependent variables are the firm inefficient investment proxy variables: Inef1, Und1, and Ovr1, estimated by the historical panel regressions. The independent variables of interest are the most motivated institutional investor ownership (Tmi1) and the least motivated institutional investor ownership (Tmi10). Detailed definitions of all variables are described in Appendix A1. Fama--French 48 industry and year fixed effects are controlled for in all regressions. The standard errors are clustered by firm. t-values are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	(1) Inef1	(2) Inef1	(3) Inef1	(4) Und1	(5) Und1	(6) Und1	(7) Ovr1	(8) Ovr1	(9) Ovr1
TMI1	-0.007**		-0.006*	-0.009***		-0.007***	-0.019***		-0.018***
	[-2.26]		[-1.94]	[-3.40]		[-2.90]	[-3.62]		[-3.52]
TMI10		0.079***	0.075***		0.081***	0.076***		0.064	0.049
		[3.57]	[3.37]		[4.84]	[4.57]		[1.24]	[0.95]
MTB	0.006***	0.006***	0.006***	-0.001**	-0.001**	-0.000	0.009***	0.008***	0.009***
	[13.84]	[14.17]	[13.98]	[-2.00]	[-2.08]	[-1.59]	[13.14]	[13.08]	[13.13]
Leverage	0.008***	0.008***	0.008***	-0.028***	-0.028***	-0.028***	0.019***	0.019***	0.018***
	[3.67]	[3.65]	[3.60]	[-21.31]	[-21.36]	[-21.44]	[5.83]	[6.02]	[5.80]
Cash	0.024***	0.024***	0.024***	0.014***	0.014***	0.014***	0.023***	0.023***	0.023***
	[11.86]	[12.00]	[11.85]	[9.96]	[10.05]	[9.91]	[6.55]	[6.83]	[6.55]
Size	-0.008***	-0.008***	-0.008***	-0.008***	-0.009***	-0.008***	-0.010***	-0.011***	-0.010***
	[-33.04]	[-34.90]	[-32.77]	[-46.53]	[-50.77]	[-46.20]	[-21.29]	[-25.26]	[-21.17]
Tangibility	0.017***	0.017***	0.017***	0.011***	0.011***	0.011***	0.020***	0.021***	0.020***
	[5.93]	[6.03]	[5.95]	[4.55]	[4.64]	[4.53]	[3.80]	[3.99]	[3.83]
Age	-0.003***	-0.003***	-0.003***	-0.005***	-0.005***	-0.005***	-0.002*	-0.002*	-0.002*
	[-6.13]	[-6.21]	[-6.18]	[-13.44]	[-13.38]	[-13.53]	[-1.72]	[-1.89]	[-1.74]
Constant	0.119***	0.119***	0.118***	0.130***	0.129***	0.129***	0.146***	0.148***	0.145***
	[25.41]	[25.44]	[25.15]	[36.75]	[36.68]	[36.40]	[14.31]	[14.64]	[14.23]
Observations	80,031	80,031	80,031	45,018	45,018	45,018	35,013	35,013	35,013
Adj. R-squared	0.160	0.160	0.160	0.246	0.246	0.246	0.184	0.184	0.184
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel B. Inefficient investment estimated by the panel regressions. This panel presents the panel regression results of firm inefficient investment on institutional ownership. My sample consists of 80,031 firm-year observations during 1995--2015. The dependent variables are the firm inefficient investment proxy variables: Inef1, Und1, and Ovr1, estimated by a single panel regressions. The independent variables of interest are the most motivated institutional investor ownership (Tmi1) and the least motivated institutional investor ownership (Tmi10). Detailed definitions of all variables are described in Appendix A1. Fama--French 48 industry and year fixed effects are controlled for in all regressions. The standard errors are clustered by firm. t-values are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	(1) Inef2	(2) Inef2	(3) Inef2	(4) Und2	(5) Und2	(6) Und2	(7) Ovr2	(8) Ovr2	(9) Ovr2
TMI1	-0.017***		-0.016***	-0.007***		-0.006**	-0.022***		-0.021***
	[-5.97]		[-5.59]	[-2.85]		[-2.33]	[-4.39]		[-4.30]
TMI10		0.095***	0.082***		0.083***	0.079***		0.060	0.042
		[4.21]	[3.71]		[4.70]	[4.48]		[1.18]	[0.83]
MTB	0.005***	0.005***	0.005***	-0.000	-0.000	-0.000	0.008***	0.008***	0.008***
	[12.97]	[12.83]	[13.14]	[-0.44]	[-0.40]	[-0.01]	[12.67]	[12.46]	[12.65]
Leverage	0.004*	0.004*	0.003*	-0.017***	-0.017***	-0.017***	0.010***	0.011***	0.010***
	[1.85]	[1.95]	[1.77]	[-12.22]	[-12.30]	[-12.36]	[3.18]	[3.43]	[3.16]
Cash	0.021***	0.021***	0.021***	0.011***	0.011***	0.011***	0.023***	0.024***	0.023***
	[10.77]	[11.10]	[10.76]	[7.70]	[7.76]	[7.64]	[6.88]	[7.21]	[6.88]
Size	-0.009***	-0.009***	-0.009***	-0.009***	-0.009***	-0.009***	-0.010***	-0.011***	-0.010***
	[-37.91]	[-42.10]	[-37.56]	[-50.77]	[-55.04]	[-50.47]	[-20.22]	[-24.52]	[-20.10]
Tangibility	0.013***	0.013***	0.013***	0.011***	0.011***	0.011***	0.016***	0.018***	0.017***
	[4.66]	[4.92]	[4.67]	[4.46]	[4.52]	[4.43]	[3.17]	[3.39]	[3.19]
Age	-0.001**	-0.001***	-0.001***	0.004***	0.004***	0.004***	-0.008***	-0.009***	-0.008***
	[-2.54]	[-2.65]	[-2.59]	[10.70]	[10.67]	[10.63]	[-8.27]	[-8.52]	[-8.28]
Constant	0.127***	0.128***	0.126***	0.135***	0.134***	0.133***	0.141***	0.144***	0.141***
	[28.94]	[29.32]	[28.63]	[38.14]	[38.01]	[37.78]	[14.56]	[14.99]	[14.48]
Observations	80,031	80,031	80,031	45,018	45,018	45,018	35,013	35,013	35,013
Adj. R-squared	0.165	0.164	0.165	0.238	0.238	0.238	0.192	0.192	0.192
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3- 5 Motivated monitoring institutional ownership and inefficient investment: 2SLS

Panel A. Motivated monitoring institutional ownership and inefficient investment. This panel presents the 2SLS regression results of the firm inefficient investment on the motivated monitoring institutional ownership. The dependent variable in the first stage regression is the motivated institutional investor ownership (Tmi1). The IVs used in the first stage regressions are the indicator variables: R1TR2 indicating whether a firm switches from the Russell 1000 to the Russell 2000 index, R2TR1 indicating whether a firm switches from the Russell 2000 to the Russell 1000 index, R2TN indicating whether a firm drops out of the Russell 2000 index due to its market value decrease, and NTR2 indicating whether a firm gets included in the Russell 2000 index due to its market value increase. My sample in the first stage regressions consists of 92,546 firm-year observations with available data from the CRSP, Compustat, and 13F databases during 1995--2015. The dependent variables of the second stage regressions reported in Columns (2)--(4) are the firm inefficient investment proxy variables: Inef1, Und1, and Ovr1, estimated by the historical panel regressions. The dependent variables of the second stage regressions reported in Columns (5)--(7) are the firm inefficient investment proxy variables: Inef2, Und2, and Ovr2, estimated by the panel regressions. The independent variable of interest in the second stage regressions is IVTmi1, the predicted Tmi1 by the first stage regressions. Detailed definitions of all variables are described in Appendix A1. Fama--French 48 industry and year fixed effects are controlled for in all regressions. The standard errors are clustered by firm. t-values are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	Tmi1	Inef1	Und1	Ovr1	Inef2	Und2	Ovr2
IVTmi1		-0.104***	-0.057***	-0.151***	-0.112***	-0.063***	-0.148***
		[-3.85]	[-3.12]	[-2.95]	[-4.28]	[-3.45]	[-2.95]
R1TR2	-0.059***						
	[-14.93]						
R2TR1	0.041***						
	[8.67]						
R2TN	-0.053***						
	[-33.55]						
NTR2	-0.033***						
	[-17.30]						
MTB	0.018***	0.008***	0.000	0.011***	0.007***	0.001**	0.010***
	[33.16]	[11.24]	[0.91]	[9.28]	[10.67]	[2.19]	[8.96]
Leverage	-0.025***	0.005**	-0.029***	0.015***	0.001	-0.018***	0.007**
	[-9.21]	[2.41]	[-20.95]	[4.54]	[0.60]	[-12.54]	[2.08]
Cash	-0.035***	0.020***	0.012***	0.018***	0.017***	0.008***	0.019***
	[-12.82]	[8.88]	[7.72]	[4.45]	[7.90]	[5.45]	[4.79]
Size	0.039***	-0.004***	-0.007***	-0.005***	-0.005***	-0.007***	-0.005**
	[56.85]	[-3.92]	[-9.04]	[-2.63]	[-4.99]	[-9.66]	[-2.44]
Tangibility	-0.040***	0.013***	0.009***	0.015***	0.009***	0.009***	0.012**
	[-6.88]	[4.16]	[3.58]	[2.61]	[3.00]	[3.37]	[2.05]
Age	0.001	-0.003***	-0.005***	-0.002*	-0.001**	0.004***	-0.008***
	[1.22]	[-5.80]	[-12.99]	[-1.65]	[-2.23]	[11.05]	[-8.23]
Constant	-0.115***	0.108***	0.124***	0.131***	0.116***	0.128***	0.128***
	[-13.15]	[18.63]	[29.56]	[11.00]	[21.24]	[30.43]	[11.17]
Observations	92,546	80,031	45,018	35,013	80,031	45,018	35,013
Adj. R-squared	0.379	0.160	0.246	0.184	0.164	0.238	0.192
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel B. Change in motivated monitoring institutional ownership and change in inefficient investment. This panel presents the 2SLS regression results of the change in firm inefficient investment on the change in motivated monitoring institutional ownership. The dependent variable in the first stage regression is the change in the motivated institutional investor ownership (Tmi1) from year t-1 to year t. The IVs used in the first stage regressions are the indicator variables: R1TR2 indicating whether a firm switches from the Russell 1000 to the Russell 2000 index, R2TR1 indicating whether a firm switches from the Russell 2000 to the Russell 1000 index, R2TN indicating whether a firm drops out of the Russell 2000 index due to its market value decrease, and NTR2 indicating whether a firm gets included in the Russell 2000 index due to its market value increase. My sample in the first stage regressions consists of 83,778 firm-year observations with available data from the CRSP, Compustat, and 13F databases during 1995--2015. The dependent variables of the second stage regressions reported in Columns (2)--(4) are the changes in the firm inefficient investment proxy variables from year t to year t+1: Δ Inef1, ΔUnd1, and ΔOvr1. The level of these variables is estimated by the historical panel regressions. The dependent variables of the second stage regressions reported in Columns (5)--(7) are the changes in the firm inefficient investment proxy variables from year t to year t+1: ΔInef2, ΔUnd2, and ΔOvr2. The level of these variables is estimated by the panel regressions. The independent variable of interest in the second stage regressions is the predicted ΔTmi1 by the first stage regressions. All the other control variables are in their change terms from year t-1 to year t. Detailed definitions of all variables are described in Appendix A1. Fama--French 48 industry and year fixed effects are controlled for in all regressions. The standard errors are clustered by firm. t-values are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	(1) Tmi1	(2) Inef1	(3) Und1	(4) Ovr1	(5) Inef2	(6) Und2	(7) Ovr2
IVTmi1		-0.878***	-0.346**	-1.587***	-0.810***	-0.260	-1.609***
		[-3.38]	[-2.17]	[-3.57]	[-3.25]	[-1.62]	[-3.71]
R1TR2	-0.007**						
	[-2.43]						
R2TR1	0.013***						
	[3.64]						
R2TN	0.002**						
	[2.42]						
NTR2	0.002*						
	[1.77]						
MTB	0.005***	0.009***	0.002**	0.016***	0.008***	0.001	0.016***
	[21.19]	[5.95]	[2.36]	[6.50]	[5.77]	[1.40]	[6.81]
Leverage	-0.007***	-0.063***	-0.042***	-0.088***	-0.060***	-0.033***	-0.094***
	[-4.96]	[-12.56]	[-15.61]	[-10.18]	[-12.91]	[-11.83]	[-11.23]
Cash	0.010***	0.014***	0.034***	0.001	0.013***	0.027***	0.007
	[9.31]	[3.57]	[14.95]	[0.23]	[3.52]	[11.84]	[1.14]
Size	-0.000	-0.003***	-0.007***	0.003**	-0.003***	-0.008***	0.004***
	[-0.67]	[-6.36]	[-24.77]	[2.56]	[-7.55]	[-28.41]	[3.14]
Tangibility	-0.020***	-0.023*	0.120***	-0.086***	-0.010	0.129***	-0.088***
	[-4.76]	[-1.92]	[13.55]	[-4.21]	[-0.84]	[14.07]	[-4.39]
Age	0.007***	0.003	-0.009***	-0.034***	0.006*	0.015***	-0.052***
	[3.38]	[0.99]	[-3.62]	[-4.22]	[1.70]	[5.83]	[-6.75]
Constant	0.001	0.006**	-0.008***	-0.019***	0.008***	-0.012***	-0.016**
	[0.44]	[2.50]	[-3.81]	[-2.74]	[3.46]	[-5.44]	[-2.37]
Observations	83,778	73,466	40,880	32,586	73,466	40,880	32,586
Adj. R-squared	0.018	0.018	0.086	0.035	0.020	0.089	0.037
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3- 6 Motivated monitoring institutional ownership by institution type

Panel A. Motivated monitoring institutional ownership and inefficient investment: Independent vs. grey investors. This panel presents the 2SLS regression results of firm inefficient investment on motivated monitoring institutional ownership. I divide total motivated monitoring institutional ownership Tmi1 into motivated monitoring independent institutional ownership $Tmi1_{\_Ind}$ and motivated monitoring grey institutional ownership $Tmi1_{\_Grey}$. In Columns (1) and (4), the dependent variables in the first stage regressions are $Tmi1_{\_Ind}$ and $Tmi1_{\_Grey}$. The IVs used in the first stage regressions are the indicator variables: R1TR2 indicating whether a firm switches from the Russell 1000 to the Russell 2000 index, R2TR1 indicating whether a firm switches from the Russell 2000 to the Russell 1000 index, R2TN indicating whether a firm drops out of the Russell 2000 index due to its market value decrease, and NTR2 indicating whether a firm gets included in the Russell 2000 index due to its market value increase. My sample in the first stage regressions consists of 92,546 firm-year observations with available data from the CRSP, Compustat, and 13F databases during 1995--2015. In Columns (2), (3), (4), and (5), the dependent variables in the second stage regressions are firm inefficient investment proxy variables Inef1 estimated by the historical panel regressions and Inef2 estimated by the single panel regression. The independent variables of interest in the second stage regressions are IVTmi1_Ind and IVTmi1_Grey, the predicted ownership by the first stage regressions. Detailed definitions of all variables are described in Appendix A1. Fama--French 48 industry and year fixed effects are controlled for in all regressions. The standard errors are clustered by firm. t-values are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

		(1)	(2)		(3)	(4)
Variables	$Tmi1_{\_Ind}$	Inef1	Inef2	$Tmi1_{\_Grey}$	Inef1	Inef2
$IVTmi1_{\_Ind}$		-0.140***	-0.112***			
		[-3.95]	[-4.28]			
$IVTmi1_{\_Grey}$					-0.281***	-0.309***
					[-3.12]	[-3.58]
R1TR2	-0.038***			-0.021***		
	[-12.40]			[-10.41]		
R2TR1	-0.038***			-0.016***		
	[-28.83]			[-23.13]		
R2TN	0.046***			-0.005***		
	[11.64]			[-2.88]		
NTR2	-0.021***			-0.012***		
	[-13.09]			[-14.99]		
MTB	0.013***	0.008***	0.007***	0.005***	0.007***	0.007***
	[32.03]	[11.50]	[10.67]	[23.64]	[11.13]	[10.53]
Leverage	-0.017***	0.005**	0.001	-0.007***	0.006***	0.002
	[-8.16]	[2.51]	[0.60]	[-6.78]	[2.62]	[0.82]
Cash	-0.019***	0.021***	0.017***	-0.016***	0.019***	0.016***
	[-8.78]	[9.93]	[7.90]	[-14.88]	[7.44]	[6.47]
Size	0.027***	-0.004***	-0.005***	0.012***	-0.005***	-0.006***
	[57.01]	[-4.58]	[-4.99]	[39.27]	[-4.60]	[-5.63]
Tangibility	-0.028***	0.013***	0.009***	-0.012***	0.013***	0.009***
	[-6.50]	[4.31]	[3.00]	[-5.09]	[4.42]	[3.24]
Age	-0.002**	-0.004***	-0.001**	0.003***	-0.003***	-0.000
	[-2.54]	[-6.58]	[-2.23]	[6.71]	[-3.90]	[-0.60]
Constant	-0.071***	0.110***	0.116***	-0.045***	0.108***	0.115***
	[-9.31]	[20.21]	[21.24]	[-13.61]	[17.00]	[19.26]
Observations	92,546	80,031	80,031	92,546	80,031	80,031
Adj. R-squared	0.328	0.160	0.164	0.241	0.160	0.164
Industry fixed effects	Yes	Yes	Yes	Yes	YES	Yes
Year fixed effects	Yes	Yes	Yes	Yes	YES	Yes

Panel B. Change in motivated monitoring institutional ownership and change in inefficient investment: Independent vs. grey investors. This panel presents the 2SLS regression results of the change in firm inefficient investment on the change in motivated monitoring institutional ownership. I divide total motivated monitoring institutional ownership Tmi1 into motivated monitoring independent institutional ownership $Tmi1_{Ind}$ and motivated monitoring grey institutional ownership $Tmi1_{Grey}$. In Columns (1) and (4), the dependent variables in the first stage regressions are the changes in $Tmi1_{Ind}$ and $Tmi1_{Grey}$, from year t-1 to year t. The IVs used in the first stage regressions are the indicator variables: R1TR2 indicating whether a firm switches from the Russell 1000 to the Russell 2000 index, R2TR1 indicating whether a firm switches from the Russell 2000 to the Russell 1000 index, R2TN indicating whether a firm drops out of the Russell 2000 index due to its market value decrease, and NTR2 indicating whether a firm gets included in the Russell 2000 index due to its market value increase. My sample in the first stage regressions consists of 84,731 firm-year observations with available data from the CRSP, Compustat, and 13F databases during 1995--2015. In Columns (2), (3), (4), and (5), the dependent variables in the second stage regressions are the changes in the firm inefficient investment proxy variables from year t to year t+1 Δ Inef1 estimated by the historical panel regressions and Δ Inef2 estimated by the single panel regression. The independent variables of interest in the second stage regressions are Δ IVTmi1_Ind and Δ IVTmi1_Grey, the predicted ownership changes by the first stage regressions. All the other control variables are the change terms from year t-1 to year t. Detailed definitions of all variables are described in Appendix A1. Fama--French 48 industry and year fixed effects are controlled for in all regressions. The standard errors are clustered by firm. t-values are reported in brackets. ***, **, and * denote statistical significance at the 1\%, 5\%, and 10\% level, respectively.

		(1)	(2)		(3)	(4)
Variables	ΔTmi1_Ind	ΔInef1	ΔInef2	ΔTmi1_Grey`	ΔInef1	ΔInef2
IVΔTmi1_Ind		-1.068***	-0.972***			
		[-3.48]	[-3.31]			
IVΔTmi1_Grey					-1.647**	-1.592**
					[-2.18]	[-2.25]
R1TR2	-0.003			-0.004***		
	[-1.54]			[-2.96]		
R2TR1	0.001			0.001		
	[0.97]			[1.35]		
R2TN	0.012***			0.000		
	[4.03]			[0.05]		
NTR2	0.001			0.000		
	[1.34]			[0.52]		
Δ MTB	0.004***	0.009***	0.008***	0.001***	0.006***	0.005***
	[19.51]	[6.16]	[5.92]	[9.38]	[6.56]	[6.56]
ΔLeverage	-0.006***	-0.064***	-0.061***	-0.001	-0.059***	-0.057***
	[-5.33]	[-12.57]	[-12.88]	[-1.47]	[-12.38]	[-12.83]
ΔCash	0.009***	0.015***	0.014***	0.001	0.006**	0.006**
	[9.71]	[3.68]	[3.59]	[1.45]	[2.11]	[2.17]
ΔSize	0.000	-0.003***	-0.003***	-0.000*	-0.003***	-0.004***
	[0.55]	[-5.54]	[-6.76]	[-1.92]	[-6.27]	[-7.37]
ΔTangibility	-0.017***	-0.024**	-0.011	-0.002	-0.010	0.003
	[-5.15]	[-2.01]	[-0.92]	[-1.24]	[-0.86]	[0.25]
ΔAge	0.003*	0.000	0.003	0.004***	0.004	0.006
	[1.92]	[0.16]	[1.00]	[3.58]	[0.88]	[1.55]
Constant	0.003**	0.009***	0.010***	-0.003***	0.000	0.002
	[2.13]	[3.42]	[4.22]	[-3.45]	[0.10]	[0.80]
Observations	84,731	73,466	73,466	84,731	73,466	73,466
Adj. R-squared	0.016	0.018	0.020	0.011	0.018	0.020

Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Panel C. Motivated monitoring institutional ownership and inefficient investment: Transient vs. non-transient investors. This panel presents the 2SLS regression results of firm inefficient investment on institutional ownership. I divide total motivated monitoring institutional ownership Tmi1 into motivated monitoring transient institutional ownership $Tmi1_{\_Tran}$ and motivated monitoring non-transient institutional ownership $Tmi1_{\_NonTran.}$ In Columns (1) and (4), the dependent variables in the first stage regressions are $Tmi1_{\_Tran}$ and $Tmi1_{\_NonTran}$. The IVs used in the first stage regressions are the indicator variables: R1TR2 indicating whether a firm switches from the Russell 1000 to the Russell 2000 index, R2TR1 indicating whether a firm switches from the Russell 2000 to the Russell 1000 index, R2TN indicating whether a firm drops out of the Russell 2000 index due to its market value decrease, and NTR2 indicating whether a firm gets included in the Russell 2000 index due to its market value increase. My sample in the first stage regressions consists of 92,546 firm-year observations with available data from the CRSP, Compustat, and 13F databases during 1995--2015. In Columns (2), (3), (4), and (5), the dependent variables in the second stage regressions are the firm inefficient investment proxy variables Inef1 estimated by the historical panel regressions and Inef2 estimated by the single panel regression. The independent variables of interest in the second stage regressions are IVTmi1_Tran and IVTmi1_NonTran, the predicted ownership by the first stage regressions. Detailed definitions of all variables are described in Appendix A1. Fama--French 48 industry and year fixed effects are controlled for in all regressions. The standard errors are clustered by firm. t-values are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

		(1)	(2)		(3)	(4)
Variables	$Tmi1_{\_Tran}$	Inef1	Inef2	$Tmi1_{\_NonTran}$	Inef1	Inef2
$IVTmi1_{\_Tran}$		-0.237***	-0.245***			
		[-3.62]	[-3.90]			
$IVTmi1_{\_NonTran}$					-0.132***	-0.143***
					[-3.50]	[-3.95]
R1TR2	-0.012***			-0.046***		
	[-8.23]			[-13.30]		
R2TR1	-0.013***			-0.039***		
	[-16.74]			[-32.21]		
R2TN	0.037***			0.005		
	[15.93]			[1.27]		
NTR2	-0.004***			-0.029***		
	[-3.87]			[-21.05]		
MTB	0.005***	0.007***	0.006***	0.013***	0.008***	0.007***
	[27.78]	[12.16]	[11.29]	[30.39]	[11.22]	[10.63]
Leverage	-0.002**	0.007***	0.003*	-0.022***	0.005**	0.001
	[-2.34]	[3.47]	[1.76]	[-10.55]	[2.16]	[0.35]
Cash	0.002**	0.025***	0.022***	-0.037***	0.019***	0.016***
	[2.47]	[12.28]	[11.41]	[-17.07]	[7.42]	[6.45]
Size	0.009***	-0.006***	-0.007***	0.030***	-0.004***	-0.005***
	[56.28]	[-9.97]	[-12.36]	[51.10]	[-3.90]	[-4.86]
Tangibility	-0.009***	0.015***	0.011***	-0.030***	0.013***	0.009***
	[-5.61]	[5.09]	[3.96]	[-6.28]	[4.21]	[3.03]
Age	-0.003***	-0.004***	-0.002***	0.004***	-0.003***	-0.001
	[-8.51]	[-7.09]	[-3.67]	[5.17]	[-4.73]	[-1.25]
Constant	-0.023***	0.115***	0.123***	-0.092***	0.108***	0.116***
	[-9.72]	[23.02]	[26.49]	[-11.98]	[17.96]	[20.42]
Observations	92,546	80,031	80,031	92,546	80,031	80,031
Adj. R-squared	0.172	0.160	0.164	0.350	0.160	0.164
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Panel D. Change in motivated monitoring institutional ownership and change in inefficient investment: Transient vs. non-transient investors. This panel presents the 2SLS regression results of the change in firm inefficient investment on the change in institutional ownership. I divide total motivated monitoring institutional ownership Tmi1 into motivated monitoring transient institutional ownership $Tmi1_{Tran}$ and motivated monitoring non-transient institutional ownership $Tmi1_{NonTran.}$ In Columns (1) and (4), the dependent variables in the first stage regressions are the changes in $Tmi1_{Tran}$ and $Tmi1_{NonTran}$, from year t-1 to year t. The IVs used in the first stage regressions are the indicator variables: R1TR2 indicating whether a firm switches from the Russell 1000 to the Russell 2000 index, R2TR1 indicating whether a firm switches from the Russell 2000 to the Russell 1000 index, R2TN indicating whether a firm drops out of the Russell 2000 index due to its market value decrease, and NTR2 indicating whether a firm gets included in the Russell 2000 index due to its market value increase. My sample in the first stage regressions consists of 84,731 firm-year observations with available data from the CRSP, Compustat, and 13F databases during 1995--2015. In Columns (2), (3), (4), and (5), the dependent variables in the second stage regressions are the changes in the firm inefficient investment proxy variables from year t to year t+1 Δ Inef1 estimated by the historical panel regressions and Δ Inef2 estimated by the single panel regression. The independent variables of interest in the second stage regressions are Δ IVTmi1_Tran and Δ IVTmi1_NonTran, the predicted ownership changes by the first stage regressions. All the other control variables are the changes terms from year t-1 to year t. Detailed definitions of all variables are described in Appendix A1. Fama--French 48 industry and year fixed effects are controlled for in all regressions. The standard errors are clustered by firm. emph{t-values are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

		(1)	(2)		(3)	(4)
Variables	Δ Tmi1_Tran	Δ Inef1	Δ Inef2	Δ Tmi1_NonTran	Δ Inef1	Δ Inef2
IVΔ Tmi1_Tran		-2.140***	-1.910***			
		[-3.92]	[-3.65]			
IVΔ Tmi1_NonTran					-1.421***	-1.298***
					[-3.57]	[-3.42]
R1TR2	-0.002*			-0.005**		
	[-1.72]			[-2.45]		
R2TR1	0.000			-0.000		
	[0.36]			[-0.66]		
R2TN	0.006***			0.009***		
	[3.45]			[3.33]		
NTR2	0.002**			-0.000		
	[2.03]			[-0.26]		
Δ MTB	0.003***	0.010***	0.009***	0.003***	0.008***	0.007***
	[18.15]	[6.37]	[6.04]	[16.64]	[6.86]	[6.64]
Δ Leverage	-0.003***	-0.063***	-0.060***	-0.005***	-0.065***	-0.062***
	[-3.56]	[-12.81]	[-13.13]	[-5.51]	[-12.54]	[-12.84]
Δ Cash	0.006***	0.018***	0.017***	0.004***	0.010***	0.010***
	[9.08]	[4.09]	[3.91]	[5.83]	[3.26]	[3.22]
Δ Size	-0.000	-0.003***	-0.003***	0.000*	-0.002***	-0.003***
	[-0.70]	[-6.44]	[-7.61]	[1.67]	[-4.35]	[-5.55]
Δ Tangibility	-0.009***	-0.024**	-0.010	-0.011***	-0.021*	-0.008
	[-3.44]	[-2.03]	[-0.89]	[-3.91]	[-1.82]	[-0.71]
Δ Age	0.000	-0.002	0.000	-0.001	-0.004	-0.001
	[0.18]	[-0.87]	[0.08]	[-0.33]	[-1.44]	[-0.45]
Constant	0.001	0.007***	0.009***	0.001	0.007***	0.009***
	[0.78]	[2.96]	[3.85]	[1.22]	[2.98]	[3.89]
Observations	84,731	73,466	73,466	84,731	73,466	73,466
Adj. R-	0.014	0.018	0.020	0.010	0.018	0.020
Industry fixed	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed	Yes	Yes	Yes	Yes	Yes	Yes

Table 3- 7 How do motivated monitoring institutional investors mitigate firm over-investment?

This table presents the second stage regressions of firm over-investment on the product of the predicted motivated monitoring institutional ownership and firm cash. The first stage regression is the same as the one reported in Panel A of Table 3-5. In Columns (1) and (3), the dependent variables are the firm over-investment proxy variable Ovr1, estimated by the historical panel regressions. In Columns (2) and (4), the dependent variables are the firm over-investment proxy variable Ovr2, estimated by the single panel regression. The independent variables of interest in the second stage regressions are the product of the predicted Tmi1 by the first stage regressions and Cash (IVTmi1*Cash) in Columns (1)--(2) and the product of the predicted Tmi1 by the first stage regressions and FCF (IVTmi1*FCF) in Columns (3)--(4). FCF1 (FCF2) is estimated by Equation 3.7 with the historical panel regressions (the single panel regression). Detailed definitions of all variables are described in Appendix A1. Fama--French 48 industry and year fixed effects are controlled for in all regressions. The standard errors are clustered by firm. t-values are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
Variables	Ovr1	Ovr2	Ovr1	Ovr2
IVTmi1	-0.106**	-0.106**	-0.128*	-0.132*
	[-2.02]	[-2.07]	[-1.86]	[-1.82]
IVTmi1*Cash	-0.130***	-0.120***		
	[-3.80]	[-3.58]		
IVTmi1*FCF1			-0.264**	
			[-2.06]	
FCF1			0.128***	
			[5.09]	
IVTmi1*FCF2				-0.302**
				[-2.28]
FCF2				0.124***
				[4.66]
Cash	0.025***	0.025***	0.013**	0.011*
	[5.67]	[5.90]	[2.00]	[1.73]
MTB	0.011***	0.011***	0.008***	0.008***
	[9.40]	[9.07]	[4.85]	[4.57]
Leverage	0.016***	0.007**	0.013***	0.007
	[4.62]	[2.16]	[3.22]	[1.61]
Size	-0.006***	-0.006***	-0.005**	-0.005*
	[-3.05]	[-2.84]	[-1.98]	[-1.82]
Tangibility	0.015***	0.012**	0.022***	0.016**
	[2.66]	[2.09]	[3.16]	[2.23]
Age	-0.002**	-0.009***	-0.003**	-0.008***
	[-2.09]	[-8.69]	[-2.14]	[-6.32]
Constant	0.132***	0.128***	0.131***	0.131***
	[11.14]	[11.31]	[8.14]	[7.97]
Observations	35,013	35,013	19,333	17,529
Adj. R-squared	0.185	0.192	0.134	0.144
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Table 3- 8 How do motivated monitoring institutional investors mitigate firm under-investment?

This table presents the second-stage regressions of firm under-investment on the product of the predicted motivated institutional ownership and the variables proxy for firm managers' career concern. The first stage regression is the same as the one in Panel A of Table 3-5. In Columns (1) and (3), the dependent variables are the firm under-investment proxy variable Und1, estimated by the historical panel regressions. In Columns (2) and (4), the dependent variables are the firm under-investment proxy variable Und2, estimated by the panel regressions. In Columns (1) and (2), the independent variable of interest is the product of the predicted Tmi1 by the first stage regressions and Competition (IVTmi1*Competition). In Columns (3) and (4), the independent variable of interest is the product of the predicted Tmi1 by the first stage regressions and G-index (IVTmi1*GIndex). Detailed definitions of all variables are described in Appendix A1. Fama--French 48 industry and year fixed effects are controlled for in all regressions. The standard errors are clustered by firm. t-values are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
Variables	Und1	Und2	Und1	Und2
IVTmi1	-0.029	-0.033	-0.116**	-0.119**
	[-1.15]	[-1.28]	[-2.00]	[-1.99]
IVTmi1*Competition	-0.059**	-0.062**		
	[-2.29]	[-2.34]		
Competition	0.035***	0.034***		
	[4.94]	[4.65]		
IVTmi1*G-index			0.008*	0.008*
			[1.65]	[1.80]
G-index			-0.002**	-0.002**
			[-2.01]	[-2.13]
MTB	-0.001***	-0.001**	0.000	0.001
	[-2.83]	[-2.17]	[0.23]	[0.64]
Leverage	-0.032***	-0.027***	-0.029***	-0.015***
	[-23.57]	[-18.32]	[-7.51]	[-3.68]
Cash	0.016***	0.013***	0.007	0.006
	[10.03]	[7.70]	[1.40]	[1.20]
Size	-0.004***	-0.005***	-0.007***	-0.008***
	[-6.15]	[-6.57]	[-3.87]	[-4.21]
Tangibility	0.012***	0.011***	0.021***	0.023***
	[4.06]	[3.79]	[2.66]	[2.87]
Age	-0.001**	0.006***	-0.007***	0.003***
	[-2.52]	[13.55]	[-7.55]	[3.46]
Constant	0.047***	0.051***	0.136***	0.141***
	[6.39]	[6.90]	[10.97]	[11.53]
Observations	47,445	47,445	3,082	3,082
R-squared	0.198	0.181	0.251	0.265
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

Table 3- 9 Institutional ownership by decile holding size and inefficient investment

Panel A. Inefficient investment estimated by the historical rolling panel regressions. This panel presents the 2SLS regression results of firm inefficient investment on institutional ownership by decile holding size. In Columns (1)--(10), the first stage regressions are estimated by Equation 3.5 with the dependent variables being Tmi1--Tmi10, respectively. I omit the first stage regression results. The dependent variables in the second stage regressions are the firm inefficient investment proxy variable Inef1, estimated by the historical panel regressions. In Columns (1)--(10), the independent variables of interest are IVTmi1--IVTmi10, the predicted Tmi1--Tmi10 by the first stage regressions. I omit the coefficients of the control variables in the second stage regressions. Detailed definitions of all variables are described in Appendix A1. Fama--French 48 industry and year fixed effects are controlled for in all regressions. The standard errors are clustered by firm. t-values are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Variables	(1) Inef1	(2) Inef1	(3) Inef1	(4) Inef1	(5) Inef1	(6) Inef1	(7) Inef1	(8) Inef1	(9) Inef1	(10) Inef1
IVTmi1	-0.104*** [-3.85]									
IVTmi2		-0.087*** [-3.52]								
IVTmi3			-0.112*** [-2.68]							
IVTmi4				-0.044 [-0.66]						
IVTmi5					0.169** [2.06]					
IVTmi6						0.278*** [3.04]				
IVTmi7							0.336*** [3.51]			
IVTmi8								0.532*** [3.96]		
IVTmi9									0.830*** [4.25]	
IVTmi10										1.262*** [4.19]
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	80,031	80,031	80,031	80,031	80,031	80,031	80,031	80,031	80,031	80,031
R-squared	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160

Panel B. Inefficient investment estimated by the single panel regression. This panel presents the 2SLS regression results of firm inefficient investment on institutional ownership by decile holding size. In Columns (1)--(10), the first stage regressions are estimated by Equation 3.5, with the dependent variables being Tmi1--Tmi10, respectively. I omit the first stage regression results. The dependent variables in the second stage regressions are the firm inefficient investment proxy variable Inef2, estimated by the single panel regressions. In Columns (1)--(10), the independent variables of interest are IVTmi1--IVTmi10, the predicted Tmi1--Tmi10 by the first stage regressions. I omit the coefficients of the control variables in the second stage regressions. Detailed definitions of all variables are described in Appendix A1. Fama--French 48 industry and year fixed effects are controlled for in all regressions. The standard errors are clustered by firm. t-values are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Variables	(1) Inef2	(2) Inef2	(3) Inef2	(4) Inef2	(5) Inef2	(6) Inef2	(7) Inef2	(8) Inef2	(9) Inef2	(10) Inef2
IVTmi1	-0.112*** [-4.28]									
IVTmi2		-0.087*** [-3.68]								
IVTmi3			-0.106*** [-2.64]							
IVTmi4				-0.024 [-0.38]						
IVTmi5					0.196** [2.47]					
IVTmi6						0.304*** [3.43]				
IVTmi7							0.360*** [3.89]			
IVTmi8								0.562*** [4.33]		
IVTmi9									0.864*** [4.60]	
IVTmi10										1.298*** [4.49]
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	80,031	80,031	80,031	80,031	80,031	80,031	80,031	80,031	80,031	80,031
R-squared	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164

Table 3- 10 Alternative measures of motivated monitoring institutional ownership

Panel A. The proportion of motivated monitoring institutional investors in a firm's institutional investors: Pmi1. This panel presents the 2SLS regression results of inefficient investment on Pmi1. The dependent variable in the first stage regression is Pmi1, the proportion of motivated monitoring institutional investors in a firm's institutional investors. The IVs used in the first stage regressions are the indicator variables: R1TR2 indicating whether a firm switches from the Russell 1000 to the Russell 2000 index, R2TR1 indicating whether a firm switches from the Russell 2000 to the Russell 1000 index, R2TN indicating whether a firm drops out of the Russell 2000 index due to its market value decrease, and NTR2 indicating whether a firm gets included in the Russell 2000 index due to its market value increase. My sample in the first stage regressions consists of 92,546 firm-year observations with available data from the CRSP, Compustat, and 13F databases during 1995--2015. In Columns (2)--(4), the dependent variables in the second stage regressions are the firm inefficient investment proxy variables: Inef1, Und1, and Ovr1, estimated by the historical panel regressions. In Columns (5)--(7), the dependent variables in the second stage regressions are the firm inefficient investment proxy variables: Inef2, Und2, and Ovr2, estimated by the single panel regression. The independent variable of interest in the second stage regressions is IVPmi1, the predicted Pmi1 by the first stage regressions. Detailed definitions of all variables are described in Appendix A1. Fama--French 48 industry and year fixed effects are controlled for in all regressions. The standard errors are clustered by firm. t-values are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Variables	(1) Pmi1	(1) Inef1	(2) Und1	(3) Ovr1	(4) Inef2	(5) Und2	(6) Ovr2
IVPmi1		-0.265***	-0.145***	-0.392***	-0.288***	-0.172***	-0.382***
		[-3.41]	[-2.84]	[-2.63]	[-3.87]	[-3.33]	[-2.62]
R1TR2	-0.017***						
	[-14.61]						
R2TR1	-0.017***						
	[-29.90]						
R2TN	0.023***						
	[13.78]						
NTR2	-0.011***						
	[-16.84]						
MTB	0.007***	0.008***	0.000	0.011***	0.007***	0.001**	0.010***
	[25.70]	[10.48]	[0.90]	[8.47]	[10.01]	[2.25]	[8.18]
Leverage	-0.012***	0.005**	-0.030***	0.015***	0.001	-0.018***	0.006*
	[-10.27]	[2.11]	[-20.41]	[4.04]	[0.30]	[-12.40]	[1.74]
Cash	-0.013***	0.020***	0.012***	0.018***	0.017***	0.008***	0.019***
	[-10.00]	[8.80]	[7.71]	[4.37]	[7.81]	[5.36]	[4.71]
Size	0.013***	-0.005***	-0.007***	-0.006***	-0.006***	-0.007***	-0.006***
	[34.88]	[-4.46]	[-9.62]	[-2.94]	[-5.53]	[-10.09]	[-2.76]
Tangibility	-0.013***	0.013***	0.010***	0.016***	0.009***	0.009***	0.013**
	[-5.88]	[4.45]	[3.76]	[2.80]	[3.28]	[3.51]	[2.24]
Age	0.001**	-0.003***	-0.005***	-0.002	-0.001**	0.004***	-0.008***
	[2.15]	[-5.53]	[-12.72]	[-1.46]	[-1.96]	[11.20]	[-7.98]
Constant	-0.024***	0.114***	0.127***	0.139***	0.122***	0.131***	0.136***
	[-3.51]	[22.14]	[33.46]	[12.84]	[25.39]	[34.49]	[13.11]
Observations	92,546	80,031	45,018	35,013	80,031	45,018	35,013
Adj. R-squared	0.328	0.160	0.246	0.184	0.164	0.238	0.192
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel B. Natural log of one plus motivated institutional investor number: Ln(1+Nmi1). This panel presents the 2SLS regression results of the firm inefficient investment on Ln(1+Nmi1). The dependent variable in the first stage regression is Ln(1+Nmi1): the natural log of one plus the motivated institutional investor number (Nmi1). The IVs used in the first stage regressions are the indicator variables: R1TR2 indicating whether a firm switches from the Russell 1000 to the Russell 2000 index, R2TR1 indicating whether a firm switches from the Russell 2000 to the Russell 1000 index, R2TN indicating whether a firm drops out of the Russell 2000 index due to its market value decrease, and NTR2 indicating whether a firm gets included in the Russell 2000 index due to its market value increase. My sample in the first stage regressions consists of 92,546 firm-year observations with available data from the CRSP, Compustat, and 13F databases during 1995--2015. In Columns (2)--(4) of the second stage regressions, the dependent variables are the firm inefficient investment proxy variables: Inef1, Und1, and Ovr1 estimated by the historical panel regressions. In Columns (5)--(7) of the second stage regressions, the dependent variables are the firm inefficient investment proxy variables: Inef2, Und2, and Ovr2 estimated by the single panel regression. The independent variable of interest in the second stage regressions is IVLn(1+Nmi1), the predicted Ln(1+Nmi1) by the first stage regressions. Detailed definitions of all variables are described in Appendix A1. Fama--French 48 industry and year fixed effects are controlled for in all regressions. The standard errors are clustered by firm. t-values are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Variables	(1) Ln(1+Nmi1)	(1) Inef1	(2) Und1	(3) Ovr1	(4) Inef2	(5) Und2	(6) Ovr2
IVLn(1+Nmi1)		-0.011***	-0.006***	-0.016***	-0.012***	-0.007***	-0.015***
		[-4.11]	[-3.33]	[-3.04]	[-4.49]	[-3.54]	[-3.03]
R1TR2	-0.070**						
	[-2.36]						
R2TR1	-0.551***						
	[-49.14]						
R2TN	1.134***						
	[37.22]						
NTR2	-0.278***						
	[-20.76]						
MTB	0.180***	0.008***	0.001	0.011***	0.007***	0.001**	0.010***
	[38.09]	[11.27]	[1.16]	[9.33]	[10.68]	[2.31]	[9.01]
Leverage	-0.266***	0.005**	-0.030***	0.015***	0.001	-0.018***	0.007**
	[-12.89]	[2.19]	[-20.81]	[4.41]	[0.39]	[-12.52]	[1.97]
Cash	-0.338***	0.020***	0.012***	0.018***	0.017***	0.008***	0.019***
	[-15.29]	[8.89]	[7.62]	[4.57]	[7.94]	[5.42]	[4.92]
Size	0.366***	-0.004***	-0.006***	-0.006***	-0.005***	-0.007***	-0.005***
	[61.84]	[-3.97]	[-8.98]	[-2.91]	[-5.13]	[-9.73]	[-2.71]
Tangibility	-0.346***	0.013***	0.009***	0.016***	0.009***	0.009***	0.012**
	[-7.53]	[4.31]	[3.63]	[2.78]	[3.16]	[3.46]	[2.21]
Age	0.041***	-0.003***	-0.005***	-0.001	-0.001	0.004***	-0.008***
	[4.83]	[-5.06]	[-12.29]	[-1.20]	[-1.55]	[11.37]	[-7.60]
Constant	-1.125***	0.107***	0.123***	0.131***	0.115***	0.127***	0.127***
	[-14.48]	[18.45]	[29.24]	[11.05]	[21.08]	[30.16]	[11.23]
Observations	92,546	80,031	45,018	35,013	80,031	45,018	35,013
Adj. R-squared	0.513	0.160	0.246	0.184	0.164	0.238	0.192
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel C. Aggregate institutional investor monitoring attention: TMA. This panel presents the 2SLS regression results of the firm inefficient investment on TMA. The dependent variable in the first stage regression is TMA, calculated by Equation 3.9. The IVs used in the first stage regressions are the indicator variables: R1TR2 indicating whether a firm switches from the Russell 1000 to the Russell 2000 index, R2TR1 indicating whether a firm switches from the Russell 2000 to the Russell 1000 index, R2TN indicating whether a firm drops out of the Russell 2000 index due to its market value decrease, and NTR2 indicating whether a firm gets included in the Russell 2000 index due to its market value increase. My sample in the first stage regressions consists of 92,546 firm-year observations with available data from the CRSP, Compustat, and 13F databases during 1995--2015. In Columns (2)--(4) of the second stage regressions, the dependent variables are the firm inefficient investment proxy variables: Inef1, Und1, and Ovr1 estimated by the historical panel regressions. In Columns (5)--(7) of the second stage regressions, the dependent variables are the firm inefficient investment proxy variables: Inef2, Und2, and Ovr2 estimated by the single panel regression. The independent variable of interest in the second stage regressions is IVTMA, the predicted TMA by the first stage regressions. Detailed definitions of all variables are described in Appendix A1 . Fama--French 48 industry and year fixed effects are controlled for in all regressions. The standard errors are clustered by firm. emph{t-values are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Variables	(1) TMA	(1) Inef1	(2) Und1	(3) Ovr1	(4) Inef2	(5) Und2	(6) Ovr2
IVTMA		-0.002**	-0.006***	-0.003**	-0.004***	-0.004**	-0.005***
		[-2.57]	[-8.88]	[-2.03]	[-5.05]	[-2.34]	[-7.62]
R1TR2	-0.136***						
	[-3.48]						
R2TR1	-0.716***						
	[-24.22]						
R2TN	0.961***						
	[21.39]						
NTR2	-0.996***						
	[-52.63]						
MTB	0.089***	0.006***	0.000	0.009***	0.006***	0.008***	0.000*
	[18.23]	[13.64]	[0.65]	[12.66]	[13.01]	[12.19]	[1.82]
Leverage	-0.169***	0.007***	-0.030***	0.018***	0.003	0.010***	-0.018***
	[-5.91]	[3.43]	[-22.10]	[5.75]	[1.50]	[3.14]	[-12.99]
Cash	0.226***	0.024***	0.014***	0.024***	0.022***	0.024***	0.011***
	[8.19]	[12.05]	[10.14]	[6.85]	[11.18]	[7.24]	[7.85]
Size	0.333***	-0.007***	-0.006***	-0.010***	-0.008***	-0.009***	-0.007***
	[70.81]	[-18.77]	[-22.18]	[-14.07]	[-20.62]	[-13.28]	[-25.84]
Tangibility	-0.222***	0.016***	0.010***	0.020***	0.012***	0.016***	0.010***
	[-3.90]	[5.70]	[3.87]	[3.70]	[4.31]	[3.07]	[3.86]
Age	-0.132***	-0.004***	-0.006***	-0.003**	-0.002***	-0.009***	0.003***
	[-12.05]	[-6.91]	[-15.88]	[-2.44]	[-4.17]	[-9.22]	[7.49]
Constant	1.274***	0.121***	0.133***	0.150***	0.131***	0.147***	0.138***
	[14.59]	[25.94]	[37.89]	[14.90]	[30.15]	[15.28]	[39.05]
Observations	92,546	80,031	45,018	35,013	80,031	35,013	45,018
Adj. R-squared	0.416	0.160	0.248	0.184	0.165	0.192	0.239
Industry fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Tables of chapter 4:

Table 4- 1 Summary statistics

This table reports summary statistics of all variables used in my empirical tests. The sample consists of 67,404 firm-year observations of US firms over the sample period 1995--2015 with required data for my regressions. The number of observations, mean, standard deviation, minimum, 25th percentile, median, 75th percentile, and maximum are reported from left to right, in sequence for each variable. Detailed definitions of all variables are described in Appendix A2.

Variable	n	Mean	S.D.	Min	0.25	Mdn	0.75	Max
MIO1	67,404	0.106	0.162	0.000	0.000	0.015	0.155	1.000
MIO2	67,404	0.086	0.107	0.000	0.000	0.045	0.141	0.997
MIO3	67,404	0.071	0.087	0.000	0.000	0.041	0.112	0.996
MIO4	67,404	0.058	0.072	0.000	0.000	0.033	0.087	0.970
MIO5	67,404	0.047	0.061	0.000	0.001	0.026	0.068	0.996
MIO6	67,404	0.038	0.051	0.000	0.003	0.020	0.053	0.994
MIO7	67,404	0.029	0.041	0.000	0.003	0.014	0.038	0.944
MIO8	67,404	0.021	0.033	0.000	0.003	0.010	0.026	0.933
MIO9	67,404	0.014	0.025	0.000	0.002	0.006	0.017	0.977
MIO10	67,404	0.008	0.017	0.000	0.001	0.003	0.008	0.796
NMI1	67,404	11.519	45.548	0.000	0.000	1.000	5.000	1100.000
Ln(1+NMI1)	67,404	1.059	1.361	0.000	0.000	0.693	1.792	6.965
PMI1	67,404	0.035	0.060	0.000	0.000	0.011	0.046	1.000
TIO	67,404	0.476	0.305	0.000	0.193	0.490	0.739	1.000
MIO1,Independent	67,404	0.078	0.119	0.000	0.000	0.005	0.120	1.000
MIO1,Grey	67,404	0.028	0.065	0.000	0.000	0.000	0.016	0.993
MIO1,Transient	67,404	0.027	0.054	0.000	0.000	0.000	0.034	0.995
MIO1,Quasi-indexer	67,404	0.065	0.117	0.000	0.000	0.000	0.083	0.998
MIO1,Dedicated	67,404	0.012	0.046	0.000	0.000	0.000	0.000	1.000
Δ' MIO1	67,404	-0.001	0.070	-0.980	-0.007	0.000	0.006	1.000
r_i-R^B_i	67,404	-0.001	0.600	-1.021	-0.355	-0.090	0.204	2.631
Cash holdingst-1	67,404	0.184	0.242	0.001	0.035	0.100	0.231	1.425
ΔCash holdings	67,404	0.006	0.137	-0.503	-0.032	0.001	0.036	0.633
Δ Equity	67,404	0.016	0.216	-0.765	-0.031	0.005	0.040	1.102
ΔNet assets	67,404	0.017	0.418	-2.167	-0.061	0.014	0.104	1.810
Δ R\&D	67,404	-0.001	0.021	-0.111	0.000	0.000	0.001	0.074
ΔInterest expenses	67,404	0.001	0.022	-0.134	-0.002	0.000	0.002	0.115
Δ Dividends	67,404	0.000	0.009	-0.051	0.000	0.000	0.000	0.038
Leverage	67,404	0.203	0.223	0.000	0.009	0.131	0.321	0.883
Net financing	67,404	0.036	0.214	-0.715	-0.031	0.001	0.053	1.160
R1TR2	67,404	0.011	0.105	0.000	0.000	0.000	0.000	1.000
R2TR1	67,404	0.013	0.114	0.000	0.000	0.000	0.000	1.000
R2TN	67,404	0.031	0.172	0.000	0.000	0.000	0.000	1.000
NTR2	67,404	0.032	0.176	0.000	0.000	0.000	0.000	1.000
Cash/Total assets	67,404	0.190	0.213	0.000	0.030	0.105	0.279	0.871
ROA	67,404	-0.015	0.187	-0.846	-0.033	0.035	0.079	0.256
ROE	67,404	-0.032	0.399	-1.960	-0.071	0.074	0.159	0.615
Nmargin	67,404	-0.237	1.299	-9.320	-0.028	0.030	0.078	0.351
AssetTO	67,404	1.119	0.802	0.000	0.569	0.963	1.462	4.700
Age	67,404	2.592	0.742	0.000	1.946	2.565	3.178	4.190
Size	67,404	5.857	2.132	0.849	4.275	5.741	7.330	10.797
MTB	67,404	1.662	1.463	0.285	0.813	1.187	1.910	9.160
Tangibility	67,404	0.273	0.236	0.000	0.086	0.196	0.400	0.997
Capital expenditure	67,404	0.056	0.061	0.000	0.018	0.036	0.070	0.361
G-index	17,341	8.998	2.678	2.000	7.000	9.000	11.000	17.000
E-index	16,973	2.795	1.353	0.000	2.000	3.000	4.000	6.000
Blockholder ownership	67,404	0.168	0.162	0.000	0.051	0.136	0.256	1.000

Table 4- 2 Most motivated monitoring institutional ownership and the marginal value of cash

This table reports the OLS regressions of firm excess returns on changes in cash holdings, proxies for most motivated monitoring IO, the interaction of the prior two variables, and control variables. The sample consists of 67,404 firm-year observations of US firms over the sample period 1995--2015 with required data for the regressions. The dependent variable is $r_i - R_i^B$, the annual excess stock return relative to the (Fama and French 1993) 25 size and book-to-market portfolios. Delta indicates the change in the corresponding variables from year t-1 to t. Columns (1)--(2) replicate cites (Faulkender and Wang 2006) baseline regressions over their sample period of 1971--2001. The proxies for motivated monitoring IO are MMIO1 in columns (3)--(5), PMMI1 in columns (6)--(8), and Ln(1+NMMI1) in columns (9)--(11). The coefficients of the calendar year and Fama--French 48 industry fixed effects are suppressed for brevity in the respective columns. Detailed definitions of all variables are described in Appendix A2. Standard errors are clustered at the firm level. t-statistics are reported in brackets. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(11)	(12)
MIO_1 * ΔCash holdings			0.714***	0.780***	0.565**						
			[2.65]	[2.87]	[2.38]						
MIO_1			0.337***	0.333***	0.330***						
			[28.28]	[26.36]	[26.56]						
PMI_1 * ΔCash holdings						4.879***	5.028***	3.949***			
						[6.38]	[6.53]	[5.34]			
PMI_1						1.020***	1.011***	1.002***			
						[17.04]	[16.79]	[16.85]			
Ln(1+NMI_1) * ΔCash holdings									0.178***	0.188***	0.146***
									[6.49]	[6.88]	[5.67]
Ln(1+NMI_1)									0.047***	0.049***	0.049***
									[29.05]	[27.86]	[28.14]
ΔCash holdings	0.772***	1.529***	1.108***	1.125***	1.887***	1.064***	1.080***	1.822***	1.055***	1.071***	1.813***
	[38.50]	[39.94]	[36.15]	[36.44]	[37.82]	[34.82]	[35.08]	[36.65]	[33.30]	[33.63]	[35.40]
Δ Earnings	0.531***	0.526***	0.546***	0.553***	0.543***	0.544***	0.551***	0.542***	0.545***	0.551***	0.542***
	[41.43]	[41.51]	[32.24]	[32.47]	[32.39]	[32.14]	[32.41]	[32.35]	[32.21]	[32.44]	[32.40]
ΔNet assets	0.168***	0.177***	0.178***	0.173***	0.185***	0.176***	0.171***	0.183***	0.174***	0.168***	0.180***
	[26.19]	[27.98]	[18.67]	[17.99]	[19.46]	[18.53]	[17.86]	[19.29]	[18.23]	[17.49]	[18.90]
Δ R&D	1.259***	1.171***	0.937***	0.952***	0.867***	0.925***	0.940***	0.855***	0.919***	0.932***	0.845***
	[9.42]	[8.87]	[5.98]	[6.07]	[5.56]	[5.90]	[6.01]	[5.50]	[5.86]	[5.96]	[5.44]
ΔInterest expenses	-1.667***	-1.591***	-2.012***	-2.027***	-1.828***	-2.009***	-2.019***	-1.827***	-2.010***	-2.029***	-1.837***
	[-19.42]	[-18.75]	[-11.54]	[-11.47]	[-10.55]	[-11.53]	[-11.45]	[-10.56]	[-11.54]	[-11.51]	[-10.61]
Δ Dividends	3.385***	3.345***	2.075***	2.048***	2.032***	1.984***	1.943***	1.931***	1.958***	1.913***	1.901***

	[16.86]	[16.76]	[8.47]	[8.36]	[8.26]	[8.10]	[7.94]	[7.85]	[8.01]	[7.83]	[7.74]
Cash holdings_t-1	0.314***	0.248***	0.395***	0.444***	0.378***	0.396***	0.444***	0.382***	0.409***	0.463***	0.402***
	[25.80]	[19.39]	[26.63]	[27.61]	[22.12]	[26.57]	[27.58]	[22.57]	[27.30]	[28.57]	[23.67]
Leverage	-0.494***	-0.491***	-0.452***	-0.538***	-0.538***	-0.445***	-0.530***	-0.530***	-0.445***	-0.528***	-0.528***
	[-58.33]	[-59.32]	[-43.96]	[-45.61]	[-45.82]	[-43.21]	[-44.92]	[-45.18]	[-43.22]	[-44.74]	[-44.98]
Net financing	0.093***	0.068***	0.054***	0.067***	0.028	0.050**	0.065***	0.028	0.059***	0.072***	0.035*
	[7.28]	[5.46]	[2.73]	[3.34]	[1.40]	[2.54]	[3.26]	[1.41]	[2.99]	[3.60]	[1.78]
Cash holdings_t-1 * ΔCash holdings		-0.728***			-0.903***			-0.843***			-0.828***
		[-12.51]			[-11.62]			[-10.92]			[-10.63]
Leverage * ΔCash holdings		-1.609***			-1.764***			-1.753***			-1.774***
		[-21.16]			[-17.75]			[-17.70]			[-18.01]
Constant	0.058***	0.058***	-0.037***	0.026	0.018	-0.040***	0.012	0.005	-0.057***	0.011	0.004
	[18.04]	[18.46]	[-8.86]	[0.84]	[0.59]	[-9.26]	[0.39]	[0.16]	[-12.80]	[0.38]	[0.13]
Observations	89,555	89,555	67,404	67,404	67,404	67,404	67,404	67,404	67,404	67,404	67,404
R^2-adjusted	0.191	0.204	0.193	0.202	0.215	0.197	0.207	0.218	0.197	0.207	0.219
Year fixed effects	No	No	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Industry fixed effects	No	No	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

Table 4- 3 Three alternative definitions of the expected change in cash holdings

This table reports the OLS regressions of firm excess returns on alternative proxies for changes in cash holdings, proxies for most motivated monitoring IO, the interaction of the prior two variables, and control variables. The sample consists of 67,404 firm-year observations of US firms over the sample period 1995--2015 with required data for the regressions. The dependent variable is $r_i - R_i^B$, the annual excess stock return relative to the citetFama_1993 25 size and book-to-market portfolios. Δ indicates the change in the corresponding variable from year t-1 to t. Δ Alternative cash holdings is the difference between the realized change in cash holdings and the expected change in cash holdings. Following (Faulkender and Wang 2006), I define three alternative measures of the expected change in cash holdings from year t-1 to year t: (1) The average change in cash holdings of firms in the (Eugene Fama and French 1993) 25 size and book-to-market benchmark portfolios over fiscal year t; (2) the predicted value of the citetAlmeida_2004 regression specification I: $\Delta Cash\ Holdings_{i,t} = \beta_0 + \beta_1 Cash\ Flow_{i,t-1} + \beta_2 Q_{i,t-1} + \beta_3 Size_{i,t-1} + Industry\ fixed\ effects + \epsilon_{i,t}$; (3) the predicted value of the (Almeida, Campello, and Weisbach 2004) regression specification II with the additional explanatory variables: capital expenditures, acquisitions, change in net working capital, and change in short-term debt, all normalized by the lagged market value of assets. The coefficients of the calendar year and Fama--French 48 industry fixed effects are suppressed for brevity in the respective columns. Detailed definitions of all variables are described in Appendix A2. Standard errors are clustered at the firm level. t-statistics are reported in brackets. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

	Alt. 1			Alt. 2			Alt. 3		
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
MIO1 * ΔAlternative cash holdings	0.671**	0.691**	0.498**	0.678***	0.761***	0.591**	0.757***	0.850***	0.691***
	[2.45]	[2.54]	[2.20]	[2.59]	[2.85]	[2.57]	[2.87]	[3.17]	[3.02]
MIO1	0.361***	0.360***	0.361***	0.336***	0.333***	0.332***	0.312***	0.309***	0.308***
	[29.17]	[27.39]	[27.91]	[27.38]	[25.50]	[25.58]	[25.72]	[24.01]	[24.14]
ΔAlternative cash holdings	1.083***	1.089***	1.685***	1.111***	1.135***	1.729***	1.063***	1.086***	1.654***
	[35.17]	[35.28]	[36.54]	[35.43]	[35.88]	[36.70]	[32.58]	[33.04]	[33.30]
Δ Earnings	0.557***	0.560***	0.552***	0.520***	0.526***	0.519***	0.529***	0.536***	0.529***
	[32.56]	[32.69]	[32.57]	[30.25]	[30.45]	[30.33]	[29.31]	[29.55]	[29.46]
ΔNet assets	0.175***	0.170***	0.180***	0.195***	0.191***	0.201***	0.193***	0.189***	0.197***
	[18.18]	[17.58]	[18.84]	[19.99]	[19.42]	[20.59]	[19.06]	[18.51]	[19.51]
Δ R&D	0.971***	1.005***	0.925***	1.136***	1.149***	1.103***	1.150***	1.155***	1.112***
	[6.14]	[6.37]	[5.89]	[7.17]	[7.26]	[6.99]	[6.84]	[6.86]	[6.65]
ΔInterest expenses	-2.046***	-2.060***	-1.880***	-2.128***	-2.141***	-1.952***	-2.194***	-2.204***	-2.023***
	[-11.61]	[-11.56]	[-10.80]	[-11.93]	[-11.84]	[-11.04]	[-11.65]	[-11.54]	[-10.82]

Δ Dividends	1.989***	2.035***	2.031***	2.206***	2.204***	2.213***	2.159***	2.160***	2.175***
	[8.10]	[8.29]	[8.27]	[8.74]	[8.73]	[8.75]	[8.33]	[8.33]	[8.39]
Cash holdingst-1	0.386***	0.429***	0.406***	0.362***	0.411***	0.390***	0.337***	0.386***	0.366***
	[26.09]	[26.96]	[24.82]	[24.91]	[26.18]	[24.14]	[22.71]	[24.05]	[22.06]
Leverage	-0.461***	-0.545***	-0.543***	-0.456***	-0.544***	-0.547***	-0.437***	-0.522***	-0.525***
	[-44.66]	[-46.06]	[-46.12]	[-44.15]	[-45.89]	[-46.18]	[-41.20]	[-42.99]	[-43.34]
Net financing	0.068***	0.082***	0.049**	0.028	0.037*	0.002	0.007	0.018	-0.012
	[3.40]	[4.07]	[2.47]	[1.41]	[1.82]	[0.08]	[0.34]	[0.86]	[-0.56]
Cash holdingst-1 * ΔCash holdings			-0.510***			-0.469***			-0.427***
			[-8.10]			[-7.32]			[-6.32]
Leverage * ΔCash holdings			-1.325***			-1.428***			-1.387***
			[-16.14]			[-17.18]			[-15.93]
Constant	-0.029***	0.042	0.036	-0.022***	0.041	0.032	-0.018***	0.053*	0.046
	[-6.88]	[1.34]	[1.12]	[-5.29]	[1.33]	[1.02]	[-4.22]	[1.70]	[1.43]
Observations	67,404	67,404	67,404	66,669	66,669	66,669	61,626	61,626	61,626
R^2-adjusted	0.190	0.198	0.209	0.191	0.201	0.212	0.185	0.195	0.206
Year fixed effects	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Industry fixed effects	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

Table 4- 4 Most motivated monitoring institutional ownership and corporate governance measures

This table reports the OLS regressions of firm excess returns on alternative proxies for changes in cash holdings, proxies for most motivated monitoring IO, the interaction of the prior two variables, and control variables. The sample consists of 67,404 firm-year observations of US firms over the sample period 1995--2015 with required data for the regressions. The dependent variable is $r_i - R_i^B$, the annual excess stock return relative to the (Eugene Fama and French 1993) 25 size and book-to-market portfolios. Δ indicates the change in the corresponding variable from year t-1 to t. In columns (1)--(3), I control for Governance measured by the (Paul Gompers, Ishii, and Metrick 2003) index and the interaction between it and ΔCash holdings. In columns (4)--(6), I control for Governance measured by the (Bebchuk, Cohen, and Ferrell 2009) index and the interaction between it and ΔCash holdings. In columns (1) and (4), I control for total institutional ownership (TIO) and the interaction between it and ΔCash holdings. In columns (2) and (5), I control for blockholder ownership (Block1) and the interaction between it and ΔCash holdings. In columns (3) and (6), I control for blockholder ownership tercile dummy (Block2) and the interaction between it and ΔCash holdings. All regressions include controls for calendar year and Fama--French 48 industry fixed effects whose coefficients are suppressed for brevity. Detailed definitions of all variables are described in Appendix A2. Standard errors are clustered at the firm level. t-statistics are reported in brackets. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively

	Gindex			Eindex		
Variables	(1)	(2)	(3)	(4)	(5)	(6)
MIO1 * Δ Cash holdings	1.399***	1.490***	2.082***	1.002**	1.191***	2.055***
	[3.54]	[4.08]	[4.94]	[2.55]	[3.21]	[4.54]
MIO1	0.293***	0.310***	0.305***	0.288***	0.295***	0.310***
	[15.55]	[16.28]	[12.46]	[16.10]	[16.30]	[12.54]
Governence* Δ Cash holdings	-0.042*	-0.043*	-0.050*	-0.100**	-0.088**	-0.077
	[-1.78]	[-1.79]	[-1.66]	[-2.25]	[-1.98]	[-1.41]
Governence	0.002	0.002*	0.004**	0.005*	0.006**	0.009***
	[1.59]	[1.68]	[2.35]	[1.69]	[2.36]	[2.76]
TIO	0.048**			0.035		
	[2.23]			[1.59]		
TIO * Δ Cash holdings	0.044			0.134		
	[0.16]			[0.44]		
Block1		-0.137***			-0.144***	
		[-5.37]			[-5.75]	
Blcok1 * Δ Cash holdings		-0.575			-0.871**	
		[-1.35]			[-2.00]	
Block2			-0.022**			-0.028***
			[-2.32]			[-2.82]
Blcok2 * Δ Cash holdings			-0.258			-0.363*
			[-1.34]			[-1.70]
Δ Cash holdings	1.911***	2.051***	1.980***	1.838***	2.040***	1.839***
	[6.40]	[7.90]	[6.19]	[6.68]	[9.43]	[6.23]
Δ Equity	0.592***	0.587***	0.614***	0.613***	0.607***	0.648***
	[15.05]	[14.87]	[12.83]	[14.43]	[14.26]	[11.74]
Δ Net assets	0.137***	0.137***	0.111***	0.145***	0.144***	0.122***
	[6.19]	[6.20]	[3.98]	[6.31]	[6.25]	[3.77]
Δ R&D	0.150	0.152	0.218	0.194	0.187	-0.020
	[0.37]	[0.38]	[0.46]	[0.47]	[0.46]	[-0.04]
Δ Interest expense	-2.340***	-2.308***	-1.698***	-2.726***	-2.679***	-1.773***
	[-5.14]	[-5.05]	[-3.28]	[-5.53]	[-5.43]	[-2.87]
Δ Dividends	0.718	0.665	1.295**	0.877*	0.822*	0.961
	[1.48]	[1.36]	[2.26]	[1.86]	[1.72]	[1.47]
Cash holdingst-1	0.410***	0.416***	0.369***	0.429***	0.433***	0.382***
	[11.17]	[11.13]	[8.64]	[11.23]	[11.11]	[8.12]

Leverage	-0.476***	-0.462***	-0.454***	-0.453***	-0.442***	-0.448***
	[-20.31]	[-19.52]	[-16.87]	[-18.94]	[-18.32]	[-15.49]
Net financing	-0.116***	-0.117***	-0.122**	-0.101**	-0.100**	-0.120**
	[-2.61]	[-2.61]	[-2.35]	[-2.26]	[-2.20]	[-2.11]
Cash holdingst-1 * Δ Cash holdings	-0.659***	-0.643***	-0.669**	-0.630***	-0.610***	-0.612**
	[-3.15]	[-3.06]	[-2.57]	[-2.84]	[-2.73]	[-2.11]
Leverage * Δ Cash holdings	-1.694***	-1.681***	-1.351***	-1.664***	-1.656***	-1.286***
	[-6.36]	[-6.45]	[-4.60]	[-5.79]	[-5.91]	[-3.75]
Constant	-0.071	-0.027	-0.066	-0.084**	-0.047	-0.041
	[-1.30]	[-0.51]	[-1.12]	[-1.97]	[-1.16]	[-0.70]
Observations	17,341	17,341	10,519	16,973	16,973	9,270
R^2-adjusted	0.217	0.218	0.222	0.219	0.221	0.230
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 4- 5 Most motivated monitoring institutional ownership by institutional investor type

This table reports the OLS regressions of firm excess returns on changes in cash holdings, proxies for most motivated monitoring IO, the interaction of the prior two variables, and control variables. The sample consists of 67,404 firm-year observations of US firms over the sample period 1995--2015 with required data for the regressions. The dependent variable is $r_i - R_i^B$, the annual excess stock return relative to the citetFama_1993 25 size and book-to-market portfolios. Delta indicates the change in the corresponding variable from year t-1 to t. In columns (1) and (2), I divide MMIO1 into most motivated monitoring independent IO (MMIO_1,textIndependent) and most motivated monitoring grey IO (MMIO_1,Grey). In columns (3)--(5), I follow (Bushee 1998a) and divide MMIO_1 into most motivated monitoring transient IO (MMIO_1,Transient), most motivated monitoring quasi-indexer IO (MMIO_1, Quasi-indexer), and most motivated monitoring dedicated IO (MMIO_1, Dedicated). All regressions include controls for calendar year and Fama--French 48 industry fixed effects whose coefficients are suppressed for brevity. Detailed definitions of all variables are described in Appendix A2. Standard errors are clustered at the firm level. t-statistics are reported in brackets. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Variables	(1)	(2)	(3)	(4)	(5)
MIO1_Independent * Δ Cash holdings	0.769**				
	[2.03]				
MIO1_Grey * Δ Cash holdings		1.424***			
		[2.72]			
MIO1_Transient * Δ Cash holdings			1.903*		
			[1.93]		
MIO1_Quasi-indexer * Δ Cash holdings				0.620*	
				[1.95]	
MIO1_Dedicated* Δ Cash holdings					0.118
					[0.17]
MIO1_Independent	0.507***				
	[27.56]				
MIO1_Grey		0.364***			
		[11.63]			
MIO1_Transient			1.034***		
			[20.73]		
MIO1_Quasi-indexer				0.319***	
				[20.34]	
MIO1_Dedicated					0.521***
					[10.00]
Δ Cash holdings	1.128***	1.160***	1.122***	1.159***	1.169***
	[36.44]	[39.67]	[34.63]	[38.67]	[41.13]
Δ Equity	0.553***	0.552***	0.551***	0.552***	0.552***
	[32.48]	[32.34]	[32.35]	[32.41]	[32.30]
Δ Net assets	0.172***	0.183***	0.173***	0.180***	0.184***
	[17.88]	[18.99]	[17.99]	[18.77]	[19.16]
Δ R&D	0.940***	0.985***	0.914***	0.986***	0.974***
	[6.00]	[6.27]	[5.83]	[6.28]	[6.19]
Δ Interest expense	-2.023***	-2.035***	-2.008***	-2.039***	-2.025***
	[-11.45]	[-11.52]	[-11.34]	[-11.55]	[-11.48]
Δ Dividends	2.020***	2.184***	2.091***	2.106***	2.227***
	[8.28]	[8.86]	[8.54]	[8.56]	[9.05]
Cash holdings_t-1	0.446***	0.423***	0.431***	0.435***	0.413***
	[27.70]	[26.62]	[27.34]	[27.22]	[26.22]
Leverage	-0.536***	-0.550***	-0.539***	-0.545***	-0.552***
	[-45.43]	[-46.78]	[-46.16]	[-46.35]	[-46.98]
Net financing	0.069***	0.051**	0.055***	0.060***	0.047**

	[3.42]	[2.55]	[2.74]	[2.98]	[2.34]
Constant	0.026	0.046	0.037	0.045	0.037
	[0.85]	[1.48]	[1.18]	[1.49]	[1.20]
Observations	67,404	67,404	67,404	67,404	67,404
R^2-adjusted	0.204	0.196	0.204	0.198	0.196
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes

Table 4- 6 Monitoring motivation by ten decile levels and the marginal value of cash

This table reports the OLS regressions of firm excess returns on changes in cash holdings, IO by decile holding size, the interaction of the prior two variables, and control variables. The sample consists of 67,404 firm-year observations of US firms over the sample period 1995--2015 with required data for the regressions. The dependent variable is $r_i - R_i^B$, the annual excess stock return relative to the(Fama and French 1993) 25 size and book-to-market portfolios. Δ indicates the change in the corresponding variable from year t-1 to t. I sort stocks of an institutional investor into ten decile groups based on the stock's holding value. MMIOj represents a firm's ownership held by institutional investors whose portfolios include the firm's stock in the decile j groups. All regressions include controls for calendar year and Fama--French 48 industry fixed effects whose coefficients are suppressed for brevity. Detailed definitions of all variables are described in Appendix A2. Standard errors are clustered at the firm level. t-statistics are reported in brackets. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MIO1 * Δ Cash holdings	0.780***									
	[2.87]									
MIO2 * Δ Cash holdings		0.847***								
		[3.34]								
MIO3 * Δ Cash holdings			0.411							
			[1.43]							
MIO4 * Δ Cash holdings				0.418						
				[1.29]						
MIO5 * Δ Cash holdings					-0.218					
					[-0.61]					
MIO6 * Δ Cash holdings						-0.880**				
						[-2.38]				
MIO7 * Δ Cash holdings							-1.409***			
							[-2.95]			
MIO8 * Δ Cash holdings								-2.348***		
								[-4.15]		
MIO9 * Δ Cash holdings									-1.995***	
									[-2.76]	
MIO10 *Δ Cash holdings										-3.711***
										[-3.72]
MIO1	0.333***									
	[26.36]									
MIO2		0.378***								
		[19.58]								

MIO3			0.263***							
			[11.19]							
MIO4				0.068**						
				[2.46]						
MIO5					-0.136***					
					[-4.19]					
MIO6						-0.448***				
						[-11.76]				
MIO7							-0.790***			
							[-15.90]			
MIO8								-1.366***		
								[-21.10]		
MIO9									-2.291***	
									[-18.07]	
MIO10										-4.015***
										[-13.75]
Δ Cash holdings	1.125***	1.123***	1.149***	1.155***	1.183***	1.204***	1.215***	1.222***	1.199***	1.188***
	[36.44]	[35.26]	[35.27]	[34.90]	[36.18]	[37.06]	[37.27]	[38.03]	[37.21]	[38.08]
Observations	67,404	67,404	67,404	67,404	67,404	67,404	67,404	67,404	67,404	67,404
R^2-adjusted	0.202	0.199	0.196	0.194	0.194	0.196	0.197	0.200	0.203	0.206
Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 4- 7 Using instrumental variables to mitigate endogeneity concern

Panel A. Endogeneity: most motivated monitoring institutional ownership and the marginal value of cash. In this panel I replicate my results reported in Table 4-2 using a 2SLS approach. The sample consists of 67,404 firm-year observations of US firms over the sample period 1995--2015 with required data for the regressions. \Δ indicates the change in the corresponding variable from year t-1 to t. Columns (1)--(3) report the results of the first stage regression with the dependent variables being MMIO1, PMMI1, and Ln(1+NMMI1), respectively. The IVs used in the first stage regressions are the indicator variables: R1TR2 indicating whether the firm switches from the Russell 1000 index into the Russell 2000 index, R2TR1 indicating whether the firm switches from the Russell 2000 index into the Russell 1000 index, R2TN indicating whether the firm drops out of the Russell 2000 index due to a market value decrease, and NTR2 indicating whether the firm gets included in the Russell 2000 index due to a market value increase. My IVs are measured at year t-1. Columns (4)--(6) report the second stage regression results. The dependent variable in the second stage regression is $r_i - R_i^B$,, the annual excess stock return relative to the (Eugene Fama and French 1993) 25 size and book-to-market portfolios. The independent variables of interest in the second stage regressions are the interaction terms of ΔCash holdings with IVMMIO_1, IVPMMI_1, and IVLn(1+NMMI_1), predicted by the first stage regressions. All regressions include controls for calendar year and Fama--French 48 industry fixed effects whose coefficients are suppressed for brevity. Detailed definitions of all variables are described in Appendix A. Standard errors are clustered at the firm level. t-statistics are reported in brackets. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

	First Stage			Second Stage		
	MIO1	PMI1	Ln(1+NMI1)	(1)	(2)	(3)
IVMIO1 * ΔCash holdings				3.196***		
				[8.34]		
IVMIO1				0.501***		
				[3.70]		
IVPMI1 * ΔCash holdings					10.863***	
					[9.96]	
IVPMI1					1.819***	
					[3.86]	
IVLn(1+NMI1) * ΔCash						0.314***
						[8.36]
IVLn(1+NMI1)						0.047***
						[3.60]
R1TR2	0.011**	-0.003**	0.328***			
	[2.21]	[-2.20]	[8.23]			
R2TN	-0.056***	-0.017***	-0.568***			
	[-20.55]	[-17.81]	[-25.12]			
R2TR1	0.073***	0.014***	0.843***			
	[13.00]	[7.70]	[22.22]			
NTR2	-0.064***	-0.021***	-0.587***			
	[-21.30]	[-18.49]	[-22.74]			
ΔCash holdings	0.028***	0.010***	0.216***	0.971***	0.956***	0.984***
	[5.54]	[6.01]	[5.60]	[25.40]	[26.50]	[26.27]
Δ Earnings	-0.004**	0.000	0.006	0.544***	0.540***	0.542***
	[-2.47]	[0.40]	[0.36]	[31.24]	[31.02]	[31.10]
ΔNet assets	0.039***	0.013***	0.358***	0.167***	0.163***	0.170***
	[20.07]	[19.77]	[22.83]	[15.15]	[14.04]	[15.82]
Δ R&D	0.092***	0.034***	0.911***	0.862***	0.840***	0.862***
	[4.40]	[4.74]	[5.14]	[5.34]	[5.19]	[5.34]
ΔInterest expenses	0.019	0.003	0.290	-2.042***	-2.025***	-2.045***
	[0.78]	[0.35]	[1.46]	[-11.24]	[-11.16]	[-11.26]
Δ Dividends	0.536***	0.269***	6.212***	1.942***	1.717***	1.927***
	[9.30]	[13.18]	[13.36]	[7.47]	[6.13]	[7.34]
Cash holdingst-1	-0.110***	-0.039***	-1.172***	0.447***	0.458***	0.447***

	[-19.92]	[-18.44]	[-25.85]	[20.11]	[18.54]	[19.90]
Leverage	-0.051***	-0.023***	-0.525***	-0.518***	-0.501***	-0.519***
	[-7.71]	[-9.39]	[-9.04]	[-38.43]	[-32.21]	[-38.40]
Net financing	-0.076***	-0.025***	-0.669***	0.066***	0.069***	0.057**
	[-17.37]	[-14.17]	[-17.85]	[2.77]	[2.83]	[2.48]
Constant	0.094***	0.044***	0.896***	0.012	-0.023	0.017
	[3.67]	[4.51]	[4.23]	[0.35]	[-0.61]	[0.53]
Observations	63,973	63,973	63,973	63,973	63,973	63,973
R^2-adjusted	0.108	0.094	0.159	0.195	0.196	0.195
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Panel B. Endogeneity: three alternative definitions of the expected change in cash holdings. In this panel I replicate my results reported in Table 4-3: Three alternative cash holdings using a 2SLS approach. The sample consists of 67,404 firm-year observations of US firms over the sample period 1995--2015 with required data for the regressions. Δ indicates the change in the corresponding variable from year t-1 to t. Columns (1)--(3) report the first stage regression results. The dependent variable in the first stage regression is the motivated monitoring IO (MMIO1). The IVs used are the same as those used in Panel A of Table 4-7 Columns (4)--(6) report the second stage regression results. The dependent variable in the second stage regression is $r_{it} - R_{it}^{B}$, the annual excess stock return relative to the citetFama_1993 25 size and book-to-market portfolios. The independent variables of interest in the second stage regressions are IVMMIO1, the predicted MMIO1 by the first stage regressions, and its interaction with ΔAlternative cash holdings. ΔAlternative cash holdings is the difference between the realized change in cash holdings and the expected change in cash holdings. Following citetFaulkender_2006, I define three alternative measures of the expected change in cash holdings from year t-1 to year t: (1) the average change in cash holdings of firms in the citetFama_1993 25 size and book-to-market benchmark portfolios over fiscal year t: (2) the predicted value of the citetAlmeida_2004 regression specification I: $\Delta Cash\ Holdings_{i,t} = \beta_0 + \beta_1 Cash\ Flow_{i,t-1} + \beta_2 Q_{i,t-1} + \beta_3 Size_{i,t-1} + Industry\ fixed\ effects + \epsilon_{i,t}$ (3) the predicted value of the citetAlmeida_2004 regression specification II with the additional explanatory variables, capital expenditures, acquisitions, change in net working capital, and change in short-term debt, all normalized by the lagged market value of assets . All regressions include controls for calendar year and Fama--French 48 industry fixed effects whose coefficients are suppressed for brevity. Detailed definitions of all variables are described in Appendix A2. Standard errors are clustered at the firm level. t-statistics are reported in brackets. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

	First Stage			Second Stage		
	MIO1	PMI1	Ln(1+NMI1)	(1)	(2)	(3)
IVMIO_1 * ΔAlternative cash holdings				2.829***	3.158***	3.075***
				[7.28]	[8.11]	[7.80]
IVMIO_1				0.605***	0.536***	0.543***
				[4.45]	[3.90]	[4.02]
R1TR2	0.011**	0.011**	0.008			
	[2.25]	[2.21]	[1.54]			
R2TN	-0.056***	-0.056***	-0.059***			
	[-20.58]	[-20.33]	[-20.71]			
R2TR1	0.073***	0.072***	0.067***			
	[12.94]	[12.85]	[11.95]			
NTR2	-0.064***	-0.064***	-0.068***			
	[-21.31]	[-21.17]	[-21.79]			
ΔAlternative cash holdings	0.001	0.038***	0.034***	0.967***	0.968***	0.924***
	[0.15]	[7.42]	[6.27]	[25.67]	[24.37]	[22.45]
Δ Earnings	-0.002	-0.006***	-0.006***	0.551***	0.518***	0.529***
	[-0.97]	[-3.37]	[-3.22]	[31.47]	[29.38]	[28.69]
ΔNet assets	0.036***	0.040***	0.040***	0.162***	0.183***	0.179***
	[19.13]	[20.15]	[19.29]	[14.81]	[16.13]	[15.34]
Δ R&D	0.107***	0.098***	0.123***	0.904***	1.047***	1.022***
	[5.08]	[4.56]	[5.21]	[5.56]	[6.44]	[5.93]
ΔInterest expenses	0.016	0.017	0.049*	-2.074***	-2.156***	-2.223***
	[0.67]	[0.72]	[1.94]	[-11.34]	[-11.62]	[-11.35]
Δ Dividends	0.534***	0.549***	0.619***	1.906***	2.084***	2.035***
	[9.28]	[9.36]	[10.29]	[7.31]	[7.77]	[7.35]
Cash holdings_t-1	-0.115***	-0.110***	-0.114***	0.450***	0.415***	0.395***
	[-20.78]	[-20.40]	[-19.60]	[19.92]	[18.74]	[17.49]
Leverage	-0.052***	-0.051***	-0.053***	-0.520***	-0.525***	-0.503***
	[-7.85]	[-7.68]	[-7.53]	[-38.11]	[-38.71]	[-36.38]
Net financing	-0.069***	-0.079***	-0.080***	0.084***	0.040	0.023
	[-16.04]	[-17.55]	[-16.88]	[3.62]	[1.63]	[0.93]
Constant	0.095***	0.094***	0.104***	0.028	0.026	0.028

	[3.71]	[3.64]	[3.72]	[0.81]	[0.76]	[0.80]
Observations	63,895	63,260	58,590	63,895	63,260	58,590
R^2-adjusted	0.108	0.109	0.110	0.189	0.193	0.189
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 4- 8 Using high-dimensional fixed effects to mitigate endogeneity concerns

This table reports the OLS regressions of firm excess returns on changes in cash holdings, most motivated monitoring IO, the interaction of the prior two variables, and control variables. The sample consists of 67,404 firm-year observations of US firms over the sample period 1995--2015 with required data for the regressions. The dependent variable is $r_{it} - R_{it}^{B}$, the annual excess stock return relative to the (Eugene Fama and French 1993) 25 size and book-to-market portfolios. Δ indicates the change in the corresponding variable from year t-1 to t. Following (Gormley and Matsa 2014), I use the high-dimensional fixed effects model to control for unobserved firm characteristics. In columns (1) and (2), I control for the firm and year fixed effects. In columns (3) and (4), I control for the firm * year * Fama--French 48 industry fixed effects. The coefficients of fixed effects are suppressed for brevity. Detailed definitions of all variables are described in Appendix A2. Standard errors are clustered at the firm level. t-statistics are reported in brackets. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Variables	(1)	(2)	(3)	(4)
MIO1 * Δ Cash holdings	0.434***	0.419***	0.383***	0.370***
	[15.94]	[15.64]	[14.46]	[14.13]
MIO1	0.838***	0.748***	0.625***	0.565***
	[3.53]	[3.57]	[2.91]	[2.90]
Δ Cash holdings	1.264***	1.925***	1.219***	1.831***
	[38.53]	[37.46]	[37.78]	[36.55]
Δ Equity	0.473***	0.466***	0.459***	0.453***
	[28.48]	[28.41]	[27.82]	[27.74]
Δ Net assets	0.122***	0.132***	0.123***	0.131***
	[11.43]	[12.47]	[11.68]	[12.64]
Δ R&D	0.723***	0.661***	0.682***	0.621***
	[4.37]	[4.02]	[4.15]	[3.81]
Δ Interest expense	-1.216***	-1.049***	-1.094***	-0.937***
	[-6.66]	[-5.84]	[-6.11]	[-5.32]
Δ Dividends	1.064***	1.079***	1.273***	1.292***
	[4.21]	[4.25]	[5.20]	[5.24]
Cash holdings_t-1	1.032***	0.974***	1.012***	0.961***
	[40.95]	[37.79]	[40.78]	[37.75]
Leverage	-1.154***	-1.154***	-1.115***	-1.118***
	[-49.76]	[-49.80]	[-49.26]	[-49.51]
Net financing	0.136***	0.101***	0.128***	0.097***
	[6.13]	[4.64]	[5.89]	[4.53]
Cash holdings_t-1 * Δ Cash holdings		-0.645***		-0.569***
		[-8.06]		[-7.21]
Leverage * Δ Cash holdings		-1.865***		-1.785***
		[-18.34]		[-17.76]
Observations	67,404	67,404	67,404	67,404
R^2-adjusted	0.251	0.262	0.297	0.306
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	No	No	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes

Table 4- 9 Using changes in most motivated monitoring institutional ownership to mitigate endogeneity concerns

This table reports the OLS regressions of firm excess returns on changes in cash holdings, changes in most motivated monitoring IO, the interaction of the prior two variables, and control variables. The sample consists of 67,404 firm-year observations of US firms over the sample period 1995--2015 with required data for the regressions. The dependent variable is $r_{it} - R_{it}^{B}$, the annual excess stock return relative to the (Eugene Fama and French 1993) 25 size and book-to-market portfolios. Δ' MMIO1 represents the change in MMIO1 from March to September year t. Δ indicates the change in the corresponding variable from year t-1 to t. The coefficients of the calendar year and Fama-French 48 industry fixed effects are suppressed for brevity in columns (2) and (3). Detailed definitions of all variables are described in Appendix A2. Standard errors are clustered at the firm level. t-statistics are reported in brackets. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)
Δ' MIO_1 * ΔCash holdings	1.617***	1.629***	1.438***
	[2.91]	[3.00]	[2.70]
Δ' MIO_1	1.022***	1.013***	1.002***
	[30.72]	[30.59]	[30.26]
ΔCash holdings	1.120***	1.139***	1.893***
	[39.92]	[40.20]	[40.55]
Δ Earnings	0.534***	0.543***	0.533***
	[31.63]	[31.95]	[31.89]
ΔNet assets	0.189***	0.184***	0.196***
	[20.03]	[19.34]	[20.80]
Δ R&D	0.946***	0.956***	0.873***
	[6.04]	[6.10]	[5.60]
ΔInterest expenses	-2.010***	-2.012***	-1.813***
	[-11.60]	[-11.46]	[-10.53]
Δ Dividends	2.325***	2.269***	2.251***
	[9.53]	[9.32]	[9.21]
Cash holdings_t-1	0.353***	0.399***	0.332***
	[24.37]	[25.50]	[20.00]
Leverage	-0.454***	-0.542***	-0.541***
	[-44.81]	[-46.30]	[-46.40]
Net financing	0.025	0.040**	0.001
	[1.29]	[2.04]	[0.06]
Cash holdings_t-1 * ΔCash holdings			-0.914***
			[-12.02]
Leverage * ΔCash holdings			-1.750***
			[-17.62]
Constant	0.009**	0.043	0.036
	[2.55]	[1.43]	[1.17]
Observations	67,404	67,404	67,404
R^2-adjusted	0.200	0.210	0.222
Year fixed effects	No	Yes	Yes
Industry fixed effects	No	Yes	Yes

Table 4- 10 Monitoring motivation-weighted institutional ownership and the marginal value of cash

This table reports the regressions of firm excess returns on changes in cash holdings, monitoring motivation-weighted IO (TMA), the interaction of the prior two variables, and control variables. The sample consists of 67,404 firm-year observations of US firms over the sample period 1995--2015 with required data for the regressions. The dependent variable is $r_{it} - R_{it}^{B}$, the annual excess stock return relative to the (Fama and French 1993) 25 size and book-to-market portfolios. Delta indicates the change in the corresponding variable from year t-1 to t. Columns (1)--(2) report the OLS regression results. Columns (3)--(4) report the second stage regression results of the 2SLS regressions similar to those reported in Panel A of Table 4-7. The coefficients of the calendar year and Fama--French 48 industry fixed effects are suppressed for brevity. Detailed definitions of all variables are described in Appendix A2. Standard errors are clustered at the firm level. t-statistics are reported in brackets. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

	OLS		2SLS	
	(1)	(2)	(3)	(4)
TMA* ΔCash holdings	0.037**	0.039***		
	[2.52]	[2.69]		
TMA	0.032***	0.034***		
	[22.66]	[22.18]		
IVTMA* ΔCash holdings			0.221***	0.023***
			[14.58]	[6.53]
IVTMA			0.466***	0.238***
			[9.93]	[7.08]
ΔCash holdings	1.063***	1.078***	-0.021	0.624***
	[25.89]	[26.19]	[-0.18]	[7.61]
ΔEarnings	0.550***	0.556***	0.568***	0.543***
	[32.40]	[32.64]	[33.30]	[31.99]
ΔNet assets	0.178***	0.171***	0.093***	0.182***
	[18.50]	[17.70]	[7.91]	[18.67]
ΔR&D	0.883***	0.900***	0.419**	0.924***
	[5.63]	[5.75]	[2.57]	[5.84]
ΔInterest expenses	-2.019***	-2.037***	-1.915***	-2.006***
	[-11.54]	[-11.50]	[-11.09]	[-11.56]
ΔDividends	2.149***	2.117***	1.280***	2.197***
	[8.79]	[8.66]	[5.06]	[8.89]
Cash holdings_t-1	0.384***	0.440***	0.491***	0.362***
	[26.28]	[27.77]	[26.11]	[24.70]
Leverage	-0.451***	-0.536***	-0.370***	-0.457***
	[-44.42]	[-45.75]	[-31.07]	[-43.68]
Net financing	0.048**	0.061***	0.180***	0.041**
	[2.44]	[3.04]	[7.95]	[2.05]
Constant	-0.081***	-0.019	-0.617***	-0.056***
	[-14.03]	[-0.61]	[-14.30]	[-5.11]
Observations	67,404	67,404	67,404	67,404
R^2-adjusted	0.192	0.202	0.192	0.187
Year fixed effects	No	Yes	No	Yes
Industry fixed effects	No	Yes	No	Yes

Table 4- 11 Re-examination of the relation between MMIO1 and the value of cash across three cash regimes

This table reports the 2SLS regressions of firm excess returns on changes in cash holdings, proxies for most motivated monitoring IO, the interaction of the prior two variables, and control variables. The sample consists of 67,404 firm-year observations of US firms over the sample period 1995--2015 with required data for the regressions. Δ indicates the change in the corresponding variable from year t-1 to t. Column (1) reports the first stage regression results. The dependent variable in the first stage regression is MMIO_1. The IVs used are the same as those used in Panel A of Table 4-7. Columns (2)--(4) report the second stage regression results. The dependent variable in the second stage regression is $r_{it} - R_{it}^{B}$, the annual excess stock return relative to the (Fama and French 1993)25 size and book-to-market portfolios. The independent variables of interest in the second stage regressions are IVMMIO_1, the predicted MMIO_1 by the first stage regressions, and its interaction with Δ{Cash holdings. I follow (Halford et al. 2017)and define three cash regimes. Firms in the raising cash regime issue equity and do not pay dividends, firms in the distributing cash regime pay dividends or repurchase equity, and firms in the servicing debt regime have market leverage ratio in the top decile of all firms and do not raise or distribute cash. All regressions include controls for calendar year fixed effects and Fama--French 48 industry fixed effects whose coefficients are suppressed for brevity. Detailed definitions of all variables are described in Appendix A2. Standard errors are clustered at the firm level. t-statistics are reported in brackets. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
VARIABLES	MMIO1	Raising cash	Distribution	Debt servicing
IVMIO_1*ΔCash holdings		3.872***	1.550**	1.522
		[4.10]	[2.43]	[1.60]
IVMIO_1		1.204***	0.233	-1.816*
		[3.23]	[1.14]	[-1.67]
R1TR2	0.011**			
	[2.21]			
R2TN	-0.056***			
	[-20.55]			
R2TR1	0.073***			
	[13.00]			
NTR2	-0.064***			
	[-21.30]			
ΔCash holdings	0.028***	1.469***	0.839***	0.487***
	[5.54]	[15.97]	[12.19]	[5.03]
Δ Earnings	-0.004**	0.418***	0.564***	0.308***
	[-2.47]	[9.22]	[18.28]	[7.45]
ΔNet assets	0.039***	0.219***	0.182***	0.103**
	[20.07]	[6.84]	[10.04]	[2.30]
Δ R&D	0.092***	0.755**	1.154***	1.138
	[4.40]	[2.56]	[3.42]	[1.18]
ΔInterest expenses	0.019	-0.780	-2.200***	-0.714**
	[0.78]	[-1.63]	[-6.82]	[-2.26]
Δ Dividends	0.536***	3.785***	2.195***	1.234
	[9.30]	[2.98]	[7.08]	[0.73]
Cash holdings_t-1	-0.110***	1.012***	0.265***	0.313**
	[-19.92]	[16.40]	[8.37]	[2.47]
Leverage	-0.051***	-0.918***	-0.375***	-1.861***
	[-7.71]	[-19.25]	[-19.92]	[-8.26]
Net financing	-0.076***	0.124**	-0.140***	-0.165*
	[-17.37]	[2.01]	[-3.71]	[-1.71]
Constant	0.094***	0.092	-0.014	0.970***
	[3.67]	[0.67]	[-0.32]	[4.28]

Observations	63,973	8,782	27,563	1,579
R^2-adjusted	0.108	0.263	0.173	0.341
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes

Table 4- 12 Operating performance

This table reports the 2SLS regressions of firm operating performance on changes in cash holdings, proxies for most motivated monitoring IO, the interaction of the prior two variables, and control variables. The sample consists of 63,973 firm-year observations of US firms over the sample period 1995--2015 with required data for the regressions. Delta indicates the change in the corresponding variable from year t-1 to t. Columns (1), (3), (5), and (7) report the first stage regression results. The dependent variable in the first stage regression is MMIO_1. The IVs used are the same as those used in Panel A of Table 4-7: 2SLS. Columns (2), (4), (6), and (8) report the second stage regression results. The four dependent variables are firms' industry-adjusted operating performance proxies: return on assets (ROA), return on equity (ROE), net profit margin (Nmargin), and asset turnover (AssetTO). All regressions include controls for calendar year fixed effects and Fama--French 48 industry fixed effects whose coefficients are suppressed for brevity. Detailed definitions of all variables are described in Appendix hyperref[AppendixA]A. Standard errors are clustered at the firm level. t-statistics are reported in brackets. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

	ROA		ROE		Nmargin		AssetTo	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IVMMIO_1 *Cash holdings		0.726***		1.197***		3.212***		0.150***
		[19.18]		[15.06]		[9.23]		[3.01]
IVMMIO_1		0.086		0.528***		0.376		0.456***
		[1.25]		[3.10]		[0.83]		[4.03]
R1TR2	-0.052***		-0.052***		-0.051***		-0.051***	
	[-11.94]		[-11.90]		[-11.81]		[-11.81]	
R2TN	-0.018***		-0.018***		-0.017***		-0.017***	
	[-6.55]		[-6.38]		[-6.14]		[-6.14]	
R2TR1	0.003		0.003		0.002		0.002	
	[0.72]		[0.63]		[0.58]		[0.58]	
NTR2	-0.028***		-0.028***		-0.028***		-0.028***	
	[-10.71]		[-10.83]		[-10.95]		[-10.94]	
Cash holdings	-0.034***	-0.100***	-0.032***	-0.180***	-0.030***	-0.735***	-0.030***	-0.214***
	[-11.66]	[-15.49]	[-11.01]	[-13.05]	[-10.39]	[-13.17]	[-10.33]	[-20.24]
Age	0.020***	0.002	0.020***	0.001	0.020***	-0.005	0.020***	-0.005*
	[30.56]	[1.25]	[30.35]	[0.17]	[30.13]	[-0.52]	[30.11]	[-1.95]
Size	0.055***	0.002	0.055***	-0.006	0.054***	-0.012	0.054***	-0.040***
	[213.20]	[0.46]	[212.38]	[-0.62]	[219.37]	[-0.50]	[219.34]	[-6.42]
Leverage	-0.111***	-0.086***	-0.110***	-0.276***	-0.108***	-0.215***	-0.108***	-0.036**
	[-43.84]	[-10.24]	[-43.26]	[-13.13]	[-43.05]	[-4.09]	[-42.93]	[-2.58]
MTB	0.020***	-0.006***	0.020***	-0.024***	0.020***	-0.050***	0.020***	-0.003
	[55.68]	[-3.92]	[55.81]	[-6.16]	[56.00]	[-4.52]	[56.24]	[-1.21]
Tangibility	-0.032***	0.013***	-0.031***	0.048***	-0.031***	-0.035	-0.031***	-0.005

	[-9.61]	[2.83]	[-9.50]	[4.06]	[-9.41]	[-1.12]	[-9.42]	[-0.50]
Capital expenditure	-0.017*	-0.069***	-0.019*	-0.145***	-0.022**	-0.061	-0.021**	-0.098***
	[-1.74]	[-5.03]	[-1.93]	[-4.16]	[-2.17]	[-0.63]	[-2.12]	[-4.04]
ROA_t-1	-0.023***	0.642***						
	[-7.72]	[86.78]						
ROE_t-1			-0.007***	0.573***				
			[-4.85]	[63.07]				
Nmargin_t-1					0.000	0.668***		
					[-0.78]	[52.74]		
AssetTO_t-1							-0.001	0.899***
							[-0.91]	[248.92]
Constant	-0.256***	0.019	-0.255***	0.113**	-0.254***	0.274**	-0.254***	0.253***
	[-32.85]	[1.01]	[-32.73]	[2.39]	[-32.60]	[2.19]	[-32.51]	[7.18]
Observations	63,973	63,973	63,973	63,973	63,973	63,973	63,973	63,973
R^2-adjusted	0.529	0.529	0.529	0.421	0.529	0.513	0.529	0.863
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Tables of chapter 5:

Table 5- 1 Summary Statistic

Table 1 shows which type of investors tend to be long term investors. The sample period is from 1982-2013.All firms have completed information in CRSP and Compustat database. Institutional ownership data is from Thomson Financial Institutional Holding database. Average Holdings are the average percentage holdings of each type of investor in each company. Average Long-Term Holdings are average percentage holdings of each type of investors in each company which exceeds three years. Proportion of long term holdings are the ratio of long term holding of each type of investor to the average holding of this type of investor. Classifications are provided by Bushee (1998).

	Average Holding	Average Long-Term Holdings	Proportion of Long-term Holdings
Investors classified by portfolio diversification and turnover:			
Dedicated Investors	4.61%	2.16%	46.92%
Quasi Indexer	17.53%	9.53%	54.37%
Transient Investors	7.63%	1.93%	25.33%
Investors classified by Style			
Value Style	9.77%	4.47%	45.73%
Growth & Income	13.37%	6.70%	50.08%
Growth Style	6.95%	2.41%	34.68%
Investors classified by fiduciary duties.			
Indep.Investment advisors	17.36%	6.63%	38.18%
Banks	5.17%	3.02%	58.46%
Investment Companies	4.03%	2.16%	53.59%
Insurance Companies	1.79%	0.93%	51.69%
Public Pension Funds	0.86%	0.46%	53.19%
miscellaneous	0.75%	0.28%	37.73%
Corporate Pension Funds	0.31%	0.11%	34.17%
University and Fundaments	0.12%	0.05%	39.12%
All institutional investors.	32.87%	15.22%	46.30%

Table 5- 2 Descriptive statics

Table 5- 2 displays summary statistics of variables used in regression analysis. The sample period is from 1982-2013.All firms have completed information in CRSP and Compustat database. Institutional ownership data is from Thomson Financial Institutional Holding database. The number of observation, mean, standard deviation, minimum,25th percentile, median, 75th, and maximum are displayed from left to right. Detailed definitions of all variables can be found in Appendix A. All missing data in ownership, control variables and instrumental variables are filled with 0. $ROA_{i,t,t+4,}$,$TBQ_{i,t,t+4}$ and $EY_{i,t,,t+4,}$ are averages from quarter t+1 to quarter t+4. All other variables are measured at quarter t.

Variable	N	Mean	S.D.	Min	25%	50%	75%	Max
Firm performance:								
ROA	570639	-0.01	0.05	-0.25	-0.01	0.00	0.01	0.06
TBQ	529308	0.33	1.20	-1.25	-0.26	0.00	0.47	6.25
EP	571536	-0.01	0.06	-0.40	-0.01	0.00	0.01	0.08
Long term ownership measures:								
L3	640784	0.15	0.19	0.00	0.00	0.06	0.25	0.99
L5	640784	0.10	0.15	0.00	0.00	0.00	0.14	0.97
LIOP	640784	0.09	0.10	0.00	0.01	0.06	0.14	1.00
Long term ownership measures:								
L3IND	638385	0.10	0.13	0.00	0.00	0.04	0.16	0.95
L3GRY	638385	0.05	0.08	0.00	0.00	0.01	0.08	0.95
L3QIX	638385	0.11	0.15	0.00	0.00	0.03	0.16	0.96
L3DED	638385	0.03	0.06	0.00	0.00	0.00	0.02	0.93
L3TRA	638385	0.02	0.04	0.00	0.00	0.00	0.02	0.96
L3VAL	638385	0.05	0.08	0.00	0.00	0.01	0.07	0.96
L3GRO	638385	0.03	0.06	0.00	0.00	0.00	0.03	0.92
L3GI	638385	0.08	0.11	0.00	0.00	0.02	0.11	0.98
Control Variables:								
LOGMV	640784	18.97	1.94	15.24	17.54	18.78	20.22	24.15
DTA	640784	0.18	0.20	0.00	0.00	0.12	0.31	0.86
AGE	640784	14.28	12.08	1.00	5.00	11.00	20.00	64.00
TOV	640784	0.10	0.11	0.00	0.03	0.06	0.12	0.65
CAPX	640784	0.01	0.03	-0.19	-0.01	0.00	0.01	0.30
Instrument Variables:								
R1TR2	395045	0.01	0.09	0.00	0.00	0.00	0.00	1.00
R2TR1	395045	0.01	0.10	0.00	0.00	0.00	0.00	1.00
R2TN	395045	0.04	0.18	0.00	0.00	0.00	0.00	1.00
NTR2	395045	0.06	0.24	0.00	0.00	0.00	0.00	1.00

Table 5- 3 Baseline regression, long term ownership and firm performance

This Table reports the panel regression coefficients of baseline regression. The dependent variables are ROA Tobin's Q and Earning yield measured as average from quarter t+1 to t+4. Sample period are from 1982 to 2013. All independent variables are measured at time t. Missing data in independent variables are filled with 0. ***, **, and * denote statistical significance at 1%, 5% and 10% levels, respectively. Industry (2 digit SIC number) and quarter fixed effects are in all the regressions. Standard error is clustered at firm level. Detailed definitions of variables are in the appendix A3.

	(1) $ROA_{i,\,t,,t+4}$	(2) $TBQ_{i,t,,t+4}$	(3) $EY_{i,t,,t+4}$
$L3_{i,t}$	0.009***	0.079***	0.005***
	(0.00)	(0.00)	(0.00)
$ROA_{i,t}$	0.599***		
	(0.00)		
$TBQ_{i,t}$		0.798***	
		(0.00)	
$EY_{i,t}$			0.403***
			(0.00)
$LOGMV_{i,t}$	0.002***	0.003**	0.004***
	(0.00)	(0.01)	(0.00)
$DTA_{i,t}$	-0.000	-0.062***	-0.016***
	(0.33)	(0.00)	(0.00)
$AGE_{i,t}$	0.000***	-0.002***	0.000***
	(0.00)	(0.00)	(0.00)
$TOV_{i,t}$	-0.018***	-0.319***	-0.034***
	(0.00)	(0.00)	(0.00)
$CAPX_{i,t}$	0.018***	-0.128***	0.018***
	(0.00)	(0.00)	(0.00)
Constant	-0.040***	0.281***	-0.073***
	(0.00)	(0.00)	(0.00)
Industry FE	Y	Y	Y
Time FE	Y	Y	Y
Observations	549,400	507,429	550,107
R-squared	0.522	0.749	0.279

*** p<0.01, ** p<0.05, * p<0.1

Table 5- 4 2SLS estimation, long term ownership and firm performance

This Table displays 2SLS estimations results of firm performance on long term ownership. The sample period is from 1995 to 2013 when the instrumental variable is available. Column 1 to 3 display the result of my first step estimation. Then the fitted value of L3(IVL3) is used as substitutes in the second stage regressions (Column 4 to Column 6). All independent variables are measured at time t. Missing data in independent variables are filled with 0. ***, **, and * denote statistical significance at 1%, 5% and 10% levels, respectively. Industry (2 digit SIC number) and quarter fixed effects are in all the regressions. Standard errors are clustered at firm level. Detailed definitions of variables are in the appendix A3.

	First Stage			Second Stage		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	L3	L3	L3	$ROA_{i,t,,t+4}$	$TBQ_{i,,t,t+4}$	$EY_{i,t,,t+4}$
$IVL3_{i,t}$				0.019***	1.127***	0.011**
				(0.00)	(0.00)	(0.04)
$R1TR2_{i,t}$	0.119***	0.103***	0.117***			
	(0.00)	(0.00)	(0.00)			
$R2TR1_{i,t}$	-0.004	0.010	-0.001			
	(0.45)	(0.11)	(0.85)			
$R2TN_{i,t}$	-0.008***	-0.016***	-0.010***			
	(0.00)	(0.00)	(0.00)			
$NTR2_{i,t}$	-0.097***	-0.090***	-0.097***			
	(0.00)	(0.00)	(0.00)			
$ROA_{i,t}$	0.108***			0.616***		
	(0.00)			(0.00)		
$TBQ_{i,t}$		-0.018***			0.807***	
		(0.00)			(0.00)	
$EP_{i,t}$			-0.033***			0.400***
			(0.00)			(0.00)
$LOGMV_{i,t}$	0.052***	0.056***	0.053***	0.001***	-0.054***	0.004***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$DTA_{i,t}$	0.028***	0.014**	0.025***	0.001	-0.067***	-0.015***
	(0.00)	(0.01)	(0.00)	(0.12)	(0.00)	(0.00)
$AGE_{i,t}$	0.004***	0.004***	0.004***	0.000***	-0.006***	0.000***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$TOV_{i,t}$	0.045***	0.061***	0.039***	-0.017***	-0.377***	-0.034***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$CAPX_{i,t}$	-0.118***	-0.084***	-0.114***	0.021***	-0.047	0.018***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.37)	(0.00)
$Constant_{i,t}$	-0.963***	-1.015***	-0.984***	-0.069***	1.937***	-0.107***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Industry FE	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y
Observations	360,431	337,295	364,650	344,618	321,106	348,949
R-squared	0.542	0.558	0.542	0.552	0.731	0.283

Table 5- 5 Type of long term investors and firm performance

Panel A displays 2SLS estimations results of future ROA on different types of long term ownership. The sample period is from 1995 to 2013 when the instrumental variable is available. Column 1-8 represents the regressions of ROA on long term ownership of independent investors, grey investors, qusi-indexers, dedicated institutional investors, transient investors value investors and growth investors respectively. Instrument variables are R1TR2, R2TR1, R2TN and NTR2. First stage estimation is not displayed for simplicity. The fitted values of long term ownerships are used as substitutes in the second stage regressions (denoted with a leading"). All independent variables are measured at time t. Missing data in independent variables are filled with 0. ***, **, and * denote statistical significance at 1%, 5% and 10% levels, respectively. Industry (2 digit SIC number) and quarter fixed effects are in all the regressions. Standard errors are clustered at firm level. Detailed definitions of variables are in the Appendix A3.

	(1) $ROA_{i,t,t+4}$	(2) $ROA_{i,t,t+4}$	(3) $ROA_{i,t,t+4}$	(4) $ROA_{i,t,t+4}$	(5) $ROA_{i,t,t+4}$	(6) $ROA_{i,t,t+4}$	(7) $ROA_{i,t,t+4}$	(8) $ROA_{i,t,t+4}$
$IVL3IND_{i,t}$	0.027***							
	(0.00)							
$IVL3GRY_{i,t}$		0.060***						
		(0.00)						
$IVL3QIX_{i,t}$			0.025***					
			(0.00)					
$IVL3DED_{i,t}$				0.146***				
				(0.00)				
$IVL3TRA_{i,t}$					0.125***			
					(0.00)			
$IVL3VAL_{i,t}$						0.061***		
						(0.00)		
$IVL3GRO_{i,t}$							0.096***	
							(0.00)	
$IVL3GI_{i,t}$								0.036***
								(0.00)
$ROA_{i,t}$	0.002***	0.001***	0.001***	0.001***	0.001***	0.002***	0.001***	0.001***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$LOGMV_{i,t}$	0.001*	0.001	0.001*	0.000	0.001	0.001	0.001*	0.001
	(0.09)	(0.20)	(0.06)	(0.58)	(0.27)	(0.12)	(0.05)	(0.13)
$DTA_{i,t}$	0.000***	0.000	0.000***	0.000***	0.000***	0.000	0.000***	0.000***
	(0.00)	(0.11)	(0.00)	(0.00)	(0.00)	(0.18)	(0.00)	(0.00)
$AGE_{i,t}$	-0.017***	-0.018***	-0.018***	-0.011***	-0.019***	-0.016***	-0.016***	-0.018***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$TOV_{i,t}$	0.020***	0.021***	0.020***	0.021***	0.021***	0.021***	0.020***	0.020***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$CAPX_{i,t}$	-0.072***	-0.063***	-0.069***	-0.072***	-0.067***	-0.073***	-0.067***	-0.068***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	0.002***	0.001***	0.001***	0.001***	0.001***	0.002***	0.001***	0.001***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	344,618	344,618	344,618	344,618	344,618	344,618	344,618	344,618
R-squared	0.552	0.552	0.552	0.552	0.552	0.551	0.552	0.552
Method	Panel	Panel	Panel	Panel	Panel	Panel	Panel	Panel

Panel B of Table 5 displays 2SLS estimations results of future Tobin's Q on different types of long term ownership. The sample period is from 1995 to 2013 when the instrumental variable is available. Column 1-8 represents the regressions of Tobins' Q on long term ownership of independent investors, grey investors, qusi-indexers, dedicated institutional investors, transient investors value investors and growth investors respectively. Instrument variables are R1TR2, R2TR1, R2TN and NTR2. First stage estimation is not displayed for simplicity. The fitted value of long term ownerships is used as substitutes in the second stage regressions (denoted with a leading"). All independent variables are measured at time t. Missing data in independent variables are filled with 0. ***, **, and * denote statistical significance at 1%, 5% and 10% levels, respectively. Industry (2 digit SIC number) and quarter fixed effects are in all the regressions. Standard errors are clustered at firm level. Detailed definitions of variables are in the Appendix A3.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	$TBQ_{i,t,t+4}$	$TBQ_{i,t,t+4}$	$TBQ_{i,t,t+4}$	$TBQ_{i,t,t+4}$	$TBQ_{i,t,t+4}$	$TBQ_{i,t,t+4}$	$TBQ_{i,t,t+4}$	$TBQ_{i,t,t+4}$
$IVL3IND_{i,t}$	1.724***							
	(0.00)							
$IVL3GRY_{i,t}$		3.129***						
		(0.00)						
$IVL3QIX_{i,t}$			1.463***					
			(0.00)					
$IVL3DED_{i,t}$				9.857***				
				(0.00)				
$IVL3TRA_{i,t}$					7.139***			
					(0.00)			
$IVL3VAL_{i,t}$						4.366***		
						(0.00)		
$IVL3GRO_{i,t}$							4.789***	
							(0.00)	
$IVL3GI_{i,t}$								2.068***
								(0.00)
$TBQ_{i,t}$	0.807***	0.804***	0.807***	0.812***	0.797***	0.829***	0.787***	0.803***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$LOGMV_{i,t}$	-0.049***	-0.061***	-0.051***	-0.060***	-0.052***	-0.046***	-0.045***	-0.058***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$DTA_{i,t}$	-0.063***	-0.072***	-0.055***	-0.107***	-0.088***	-0.064***	-0.059***	-0.067***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$AGE_{i,t}$	-0.005***	-0.006***	-0.006***	-0.006***	-0.004***	-0.008***	-0.002***	-0.006***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$TOV_{i,t}$	-0.356***	-0.415***	-0.414***	0.015	-0.461***	-0.346***	-0.302***	-0.420***
	(0.00)	(0.00)	(0.00)	(0.66)	(0.00)	(0.00)	(0.00)	(0.00)
$CAPX_{i,t}$	-0.056	-0.041	-0.063	-0.003	-0.025	-0.023	-0.046	-0.071
	(0.28)	(0.43)	(0.23)	(0.95)	(0.63)	(0.67)	(0.38)	(0.17)
Constant	1.805***	2.054***	1.872***	1.807***	1.925***	1.841***	1.766***	1.944***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	321,106	321,106	321,106	321,106	321,106	321,106	321,106	321,106
R-squared	0.731	0.731	0.731	0.731	0.731	0.731	0.731	0.731
Method	Panel	Panel	Panel	Panel	Panel	Panel	Panel	Panel

Panel C of Table 5 displays 2SLS estimations results of future Earning Yield on different types of long term ownership. The sample period is from 1995 to 2013 when the instrumental variable is available. Column 1-8 represents the regressions of Earning Yield on long term ownership of independent investors, grey investors, qusi-indexers, dedicated institutional investors, transient investors value investors and growth investors respectively Instrument variables are R1TR2, R2TR1, R2TN and NTR2. First stage estimation is not displayed for simplicity. The fitted value of long term ownerships is used as substitutes in the second stage regressions (denoted with a leading"). All independent variables are measured at time t. Missing data in independent variables are filled with 0. ***, **, and * denote statistical significance at 1%, 5% and 10% levels, respectively. Industry (2 digit SIC number) and quarter fixed effects are in all the regressions. Standard errors are clustered at firm level. Detailed definitions of variables are in the appendix A3.

	(1) $EY_{i,t,t+4}$	(2) $EY_{i,t,t+4}$	(3) $EY_{i,,t,t+4}$	(4) $EY_{i,,t,t+4}$	(5) $EY_{i,t,t+4}$	(6) $EY_{i,t,,t+4}$	(7) $EY_{i,t,t+4}$	(8) $EY_{i,t,t+4}$
IVL3IND $_{i\ t}$	0.012							
	(0.12)							
IVL3GRY $_{i.t}$		0.049***						
		(0.00)						
IVL3OIX $_{i\ t}$			0.017**					
			(0.02)					
IVL3DED $_{i.t}$				-0.034				
				(0.48)				
IVL3TRA $_{i.t}$					0.069**			
					(0.04)			
IVL3VAL $_{i.t}$						0.035*		
						(0.08)		
IVL3GRO $_{i.t}$							0.057**	
							(0.02)	
IVL3GI $_{i.t}$								0.021**
								(0.03)
EY $_{i.t}$	0.399***	0.401***	0.400***	0.399***	0.399***	0.399***	0.400***	0.400***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LOGMV $_{i.t}$	0.004***	0.003***	0.004***	0.005***	0.004***	0.004***	0.004***	0.004***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
DTA $_{i.t}$	-0.015***	-0.015***	-0.015***	-0.014***	-0.015***	-0.015***	-0.015***	-0.015***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
AGE $_{i.t}$	0.000***	0.000**	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
TOV $_{i.t}$	-0.034***	-0.035***	-0.034***	-0.035***	-0.035***	-0.033***	-0.033***	-0.034***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
CAPX $_{i.t}$	0.017***	0.019***	0.018***	0.016***	0.018***	0.018***	0.018***	0.017***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	-0.111***	-0.098***	-0.105***	-0.121***	-0.107***	-0.110***	-0.106***	-0.106***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	348,949	348,949	348,949	348,949	348,949	348,949	348,949	348,949
R-squared	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283
Method	Panel	Panel	Panel	Panel	Panel	Panel	Panel	Panel

Table 5- 6 2SLS, Alternative Measures of Long term ownership

This Table displays 2SLS estimations results of firm performance on the alternative measures of long term ownership. The sample period is from 1995 to 2013 when the instrumental variable is available. First Estimation is not displayed for simplicity. The fitted value of LIOP(IVLIOP) and L5(IVL5) are used as substitutes in the second stage regressions. All independent variables are measured at time t. Missing data in independent variables are filled with 0. ***, **, and * denote statistical significance at 1%, 5% and 10% levels, respectively. Industry (2 digit SIC number) and quarter fixed effects are in all the regressions. Standard errors are clustered at firm level. Detailed definitions of variables are in the Appendix A3.

	(1)	(2)	(3)	(4)	(5)	(6)
	$ROA_{i,t,t+4}$	$TBQ_{i,t,t+4}$	$EY_{i,t,t+4}$	$ROA_{i,t,t+4}$	$TBQ_{i,t,t+4}$	$EY_{i,t,t+4}$
$IVLIOP_{i,t}$	0.055***	3.463***	-0.028			
	(0.00)	(0.00)	(0.37)			
$IVL5_{i,t}$				0.031***	1.499***	0.023***
				(0.00)	(0.00)	(0.00)
$ROA_{i,t}$	0.627***			0.630***		
	(0.00)			(0.00)		
$TBQ_{i,t}$		0.776***			0.765***	
		(0.00)			(0.00)	
$EY_{i,t}$			0.508***			0.509***
			(0.00)			(0.00)
$LOGMV_{i,t}$	0.001***	-0.061***	0.005***	0.001***	-0.047***	0.004***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$DTA_{i,t}$	0.001	-0.093***	-0.013***	0.001*	-0.084***	-0.013***
	(0.15)	(0.00)	(0.00)	(0.07)	(0.00)	(0.00)
$AGE_{i,t}$	0.000**	-0.007***	0.000***	-0.000	-0.009***	0.000
	(0.04)	(0.00)	(0.00)	(0.70)	(0.00)	(0.30)
$TOV_{i,t}$	-0.019***	-0.345***	-0.030***	-0.019***	-0.315***	-0.031***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$CAPX_{i,t}$	0.019***	-0.030	0.013***	0.020***	-0.006	0.016***
	(0.00)	(0.63)	(0.00)	(0.00)	(0.91)	(0.00)
Constant	-0.034***	1.454***	-0.094***	-0.028***	1.451***	-0.069***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Industry FE	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y
Observations	344,618	321,106	348,949	344,618	321,106	348,949
R-squared	0.551	0.731	0.283	0.552	0.731	0.283

Table 5- 7 Short Term Ownership and firm performance

This Table displays 2SLS estimations results of firm performance on short term ownership. The sample period is from 1995 to 2013 when the instrumental variable is available. First Estimation is not displayed for simplicity. The fitted value of S1(IVS1) and SIOP(IVSIOP) are used as substitutes in the second stage regressions. All independent variables are measured at time t. Missing data in independent variables are filled with 0. ***, **,and * denote statistical significance at 1%, 5% and 10% levels, respectively. Industry (2 digit SIC number) and quarter fixed effects are in all the regressions. Standard errors are clustered at firm level. Detailed definitions of variables are in the Appendix A3.

	(1) $ROA_{i,t,t+4}$	(2) $ROA_{i,t,t+4}$	(3) $ROA_{i,t,t+4}$	(4) $TBQ_{i,t,,t+4}$	(5) $TBQ_{i,t,t+4}$	(6) $TBQ_{i,t,t+4}$	(7) $EY_{i,t,t+4}$	(8) $EY_{i,t,t+4}$	(9) $EY_{i,t,t+4}$
IVS1 $_{i,t}$	-0.066***			-3.954***			-0.036*		
	(0.00)			(0.00)			(0.06)		
IVS2 $_{i,t}$		-0.029***			-1.717***			-0.019**	
		(0.00)			(0.00)			(0.03)	
IVSIOP $_{i,t}$			-0.020**			-2.095***			-0.004
			(0.01)			(0.00)			(0.77)
ROA $_{i,t}$	0.624***	0.623***	0.622***						
	(0.00)	(0.00)	(0.00)						
TBQ $_{i,t}$				0.783***	0.780***	0.782***			
				(0.00)	(0.00)	(0.00)			
EY $_{i,t}$							0.401***	0.400***	0.399***
							(0.00)	(0.00)	(0.00)
LOGMV $_{i,t}$	0.003***	0.003***	0.003***	0.024***	0.028***	0.058***	0.004***	0.004***	0.004***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
DTA $_{i,t}$	0.001**	0.002***	0.002***	-0.058***	-0.050***	-0.030**	-0.015***	-0.014***	-0.015***
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.02)	(0.00)	(0.00)	(0.00)
AGE $_{i,t}$	0.000***	0.000***	0.000***	-0.003***	-0.004***	-0.003***	0.000***	0.000***	0.000***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
TOV $_{i,t}$	-0.005**	-0.008***	-0.012***	0.361***	0.152***	0.150***	-0.027***	-0.028***	-0.033***
	(0.04)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
CAPX $_{i,t}$	0.019***	0.019***	0.018***	-0.112**	-0.115**	-0.164***	0.017***	0.017***	0.016***
	(0.00)	(0.00)	(0.00)	(0.03)	(0.03)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	-0.084***	-0.089***	-0.094***	0.820	0.558	-0.046	-0.117***	-0.120***	-0.119***
	(0.00)	(0.00)	(0.00)	(0.14)	(0.31)	(0.94)	(0.00)	(0.00)	(0.00)
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	344,618	344,618	344,618	321,106	321,106	321,106	348,949	348,949	348,949

R-squared	0.552	0.552	0.551	0.731	0.731	0.731	0.283	0.283	0.283

Table A 1 Correlation matrices

Panel A correlation matrix for Chapter 3

	TMI1	MTB	LEV	CASH	SIZE
TMI1	1.000				
MTB	0.057	1.000			
LEV	0.032	-0.170	1.000		
CASH	-0.030	0.344	-0.308	1.000	
SIZE	0.561	-0.234	0.186	-0.111	1.000

Panel B correlation matrix for Chapter 4

	TMI1	DC	DE	DNA	DRD	DI	DD	C_1	L	NF2
TMI1	1.000									
DC	0.032	1.000								
DE	-0.009	0.101	1.000							
DNA	0.071	-0.035	0.077	1.000						
DRD	0.044	0.055	-0.190	0.147	1.000					
DI	0.014	0.007	-0.021	0.406	0.051	1.000				
DD	0.050	0.003	0.023	0.111	0.024	0.026	1.000			
C_1	-0.153	-0.265	0.107	-0.088	-0.131	-0.067	-0.027	1.000		
L	-0.094	-0.043	-0.056	-0.092	-0.021	0.064	-0.095	0.033	1.000	
NF2	-0.040	0.233	-0.020	0.484	0.051	0.350	0.034	-0.032	0.076	1.000

Panel C correlation matrix for Chapter 5

	L3	S1	LOGMV	DTA	AGE	QTOV	CAPX
L3	1.00						
S1	0.105	1.000					
LOGMV	0.610	0.232	1.000				
DTA	0.080	0.014	0.051	1.000			
AGE	0.478	-0.061	0.376	0.110	1.000		
QTURNOVER	0.234	0.450	0.297	-0.005	-0.029	1.000	
CAPX	-0.001	0.055	0.046	0.048	-0.045	0.057	1.000

Figure 3.1 Institutional ownership over the sample period 1995-2015

Figure 3.1.1 Market shares of institutional investors. This figure presents the cumulative institutional holdings as a percentage of total U.S. stock market value for all, top 100, top 50, and top 10 institutional investors, respectively. The sample period is from March 1995 to December 2015.

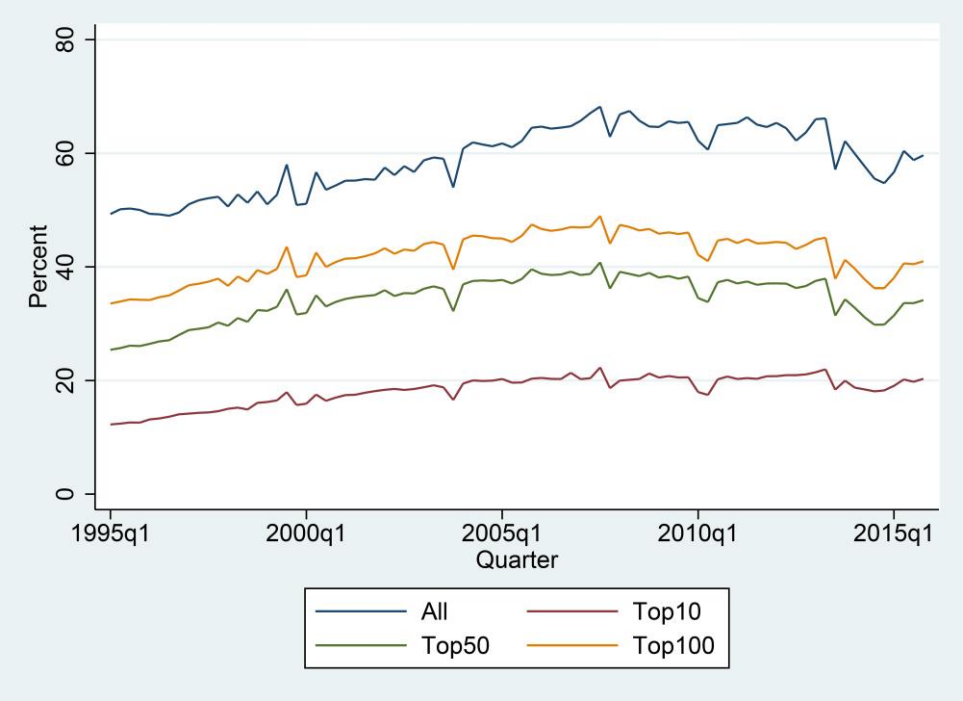

Figure 3.1.2. Number of institutional investors. This figure plots the number of institutional investors in the U.S. stock market. The sample period is from March 1995 to December 2015.

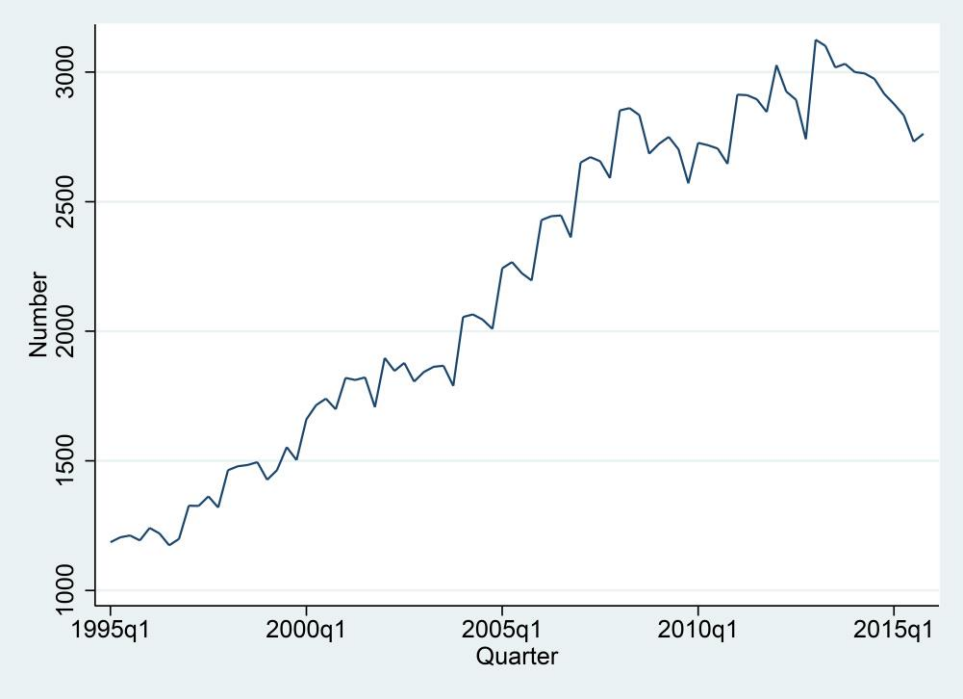

Figure 4.1 US corporate cash holdings

This figure plots the total cash holdings and cash to total assets ratios of US firms in our sample, which consists of all non-financial and non-utility firm-year observations for the period 1995--2015. All firms are covered by the CRSP/Compustat Merged dataset and listed on NYSE, NASDAQ, and AMEX. The bar charts represent total cash holdings, the sum of cash and marketable securities, in nominal and real terms. The line plot represents the ratios of total cash holdings to total assets.

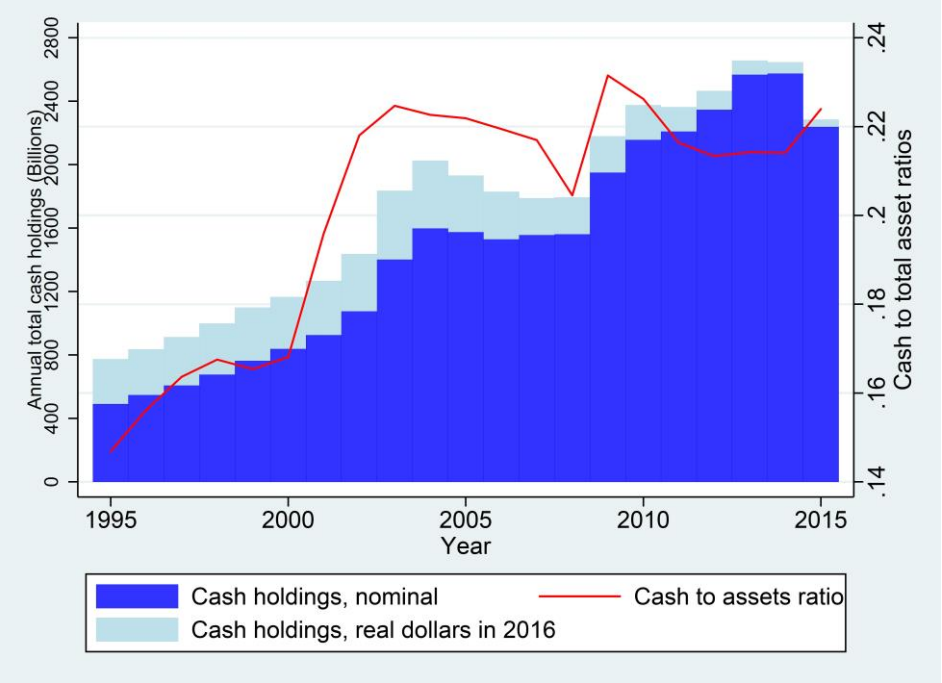

Figure 4.1 The economic effect of average *MMIO$_j$* on the marginal value of cash

This figure plots the economic effect of MMIO$_j$ on the marginal value of cash, for j from 1 to 10. The solid line plot represents the economic effect of an average MMIO$_j$ on the marginal value of cash. The dashed lines and the shaded area represent the 95% confidence intervals of the economic effect. This figure is based on the estimated coefficients of MMIO$_j$ * Δ Cash holdings reported in Table 4.6

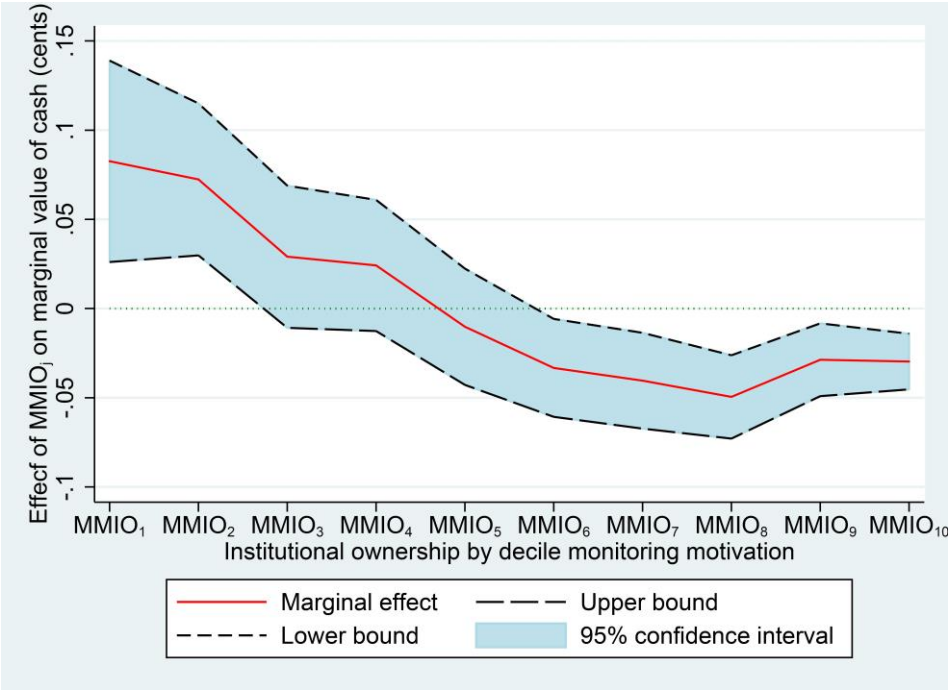

Figure 5.1 Long term ownership and firm performance in longer future

Figure 1 display the coefficients of L3 in regressions of future firm performance on the long term ownership and control variables which include LOGMV, DTA, AGE, TOV, CAPX, industry (2 digit SIC) and time fixed effect(quarter). Firm performance is measured at quarter t+4, t+8, t+12, t+16 and t+20 as displayed in the horizontal axis. Coefficients of long term ownership(L3) is labelled at vertical axis. Three parts of the figure displays ROA Tobin's Q and Earning Yield from top to bottom. Standard errors are clustered at firm level and the red dash line shows the confidence interval of estimates at 95% level. Detailed definitions of variables are in the appendix.