Institutional Investors and Corporate Investment

Cristina Cella

Stockholm School of Economics

Abstract

This paper investigates whether institutional investors' ownership influences real investments policies in firms in which managers make sub-optimal investment decisions. Using investors' horizons to capture their incentives to collect information on firms' policies and monitor management's decisions, this paper shows that an increase in the ownership stake held by long-term institutional investors is associated with a *subsequent* decrease (increase) in real investments precisely in firms that suffer from over- (under-) investment problems. On the contrary, institutional investors with a short-term horizon are not found to influence firms' investment policies. Importantly, changes in investment following an increase in the stake held by long-term investors are associated with higher firm's stock returns in both firms that over-invest and under-invest.

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Address for correspondence: Finance Department, Stockholm School of Economics, P.O. Box 6501, Sveavagen 65,113 83 Stockholm. E-mail: cristina.cella@hhs.se, telephone: +46-8-736 90 00

Introduction

Institutional investors have become increasingly important in firms' ownership structures. Yet, the role they play within a firm is still largely ambiguous and debated. In particular, while some critics argue that frequent trading and fragmented ownership of institutional investors could exacerbate agency conflicts (Porter (1992)), others argue that because of their large stakes and sophistication, institutional investors could instead discipline managers, ensuring that they maximize long-run value (Shleifer and Vishny (1986); Dobrzynski (1993); Edmans (2009)). Finally, another strand of the literature argues that institutional investors have no influence on firms' policies because they have not enough incentives to discipline managers (Maug (1998), and Kahn and Winton (1998)). This paper tests these contrasting views by investigating the impact of institutional investors on firms' real investment policies[1] specifically in those firms that suffer from agency conflicts in investment choices.

Existing empirical and theoretical literature[2] finds significant cross-sectional heterogeneity across institutional investors in terms of their incentives to monitor management decisions. This implies that not all institutional investors are expected to collect information on real investments, monitor managers' investments decisions and act upon sub-optimal investment policies also if these are value-destroying.

Recent studies suggest that an institutional investor's investment horizon captures her incentives to monitor managers because it proxies for both the information advantage that the institution might have with respect to other investors and her preferences for long-term rather than short-term firm value (Bushee (2001) Chen *et al.* (2007), among others). In particular, these studies

[1] Importantly, it might be easier for investors to monitor real investment activities rather than R&D. Since R&D is immediately expensed in financial reports, no information on value and productivity changes of R&D is reported to investors. On the other hand, rules mandate that firms provide investors with updated information about changes in asset values and investment. This different accounting treatment suggests that it might be less costly for investors to gather and process information about real investment.

[2] See for instance Shleifer and Vishny (1986); Admati, Pfleiderer, and Zechner (1994); Burkart, Gromb, and Panunzi (1997); Kahn and Winton (1998); Maug (1998); DeMarzo and Urosevic (2006), Bushee (1998); Bushee (2001); Chen et al. (2007); Cronqvist and Fahlenbrach (2009).

suggest that institutions with a long-term presence in a firm will have naturally more incentives to monitor managers than institutions that simply trade for short-term gains.[3] Hence, following these arguments, this paper distinguishes between institutional investors that are more likely to monitor (long-term investors) and those that should have lower incentives to do so (short-term investors) and studies their respective influence on real investments in firms that over-invest, under-invest and firms that do not seem to suffer any agency conflict in investment choices.

In the empirical analysis, I test whether changes in the stake held by long-term and short-term institutional investors are associated with subsequent changes in real investments. While long-term investors can monitor using either voice or exit, Chen *et al.* (2007) argue that the monitoring efforts of long-term institutions produce information that helps them choose whether to increase their holdings in a firm or not. In particular, they show that long-term institutions gather information about the firm's management that helps them assess whether the management is receptive of their influence or not, and then adjust their position in the firm accordingly. Parrino *et al.* (2009) also find evidence that selling by more informed institutional investors to less informed institutional investors occurs mostly when the former believe that the corporate governance structure makes direct action too costly. Finally, by increasing her stake, an investor does not only increase the rewards she would eventually obtain with improved firms valuations, but also boosts her power vis-à-vis the management. Therefore, if an increase in the stake held by long-term institutional investors is associated with subsequent changes in investment policies, then it is unlikely that the documented correlation can be driven by exit rather than voice.

[3] Existing literature finds results consistent with the conclusion that long-term investors should have more incentive to monitor than short-term investors. Using survey data McCahery et al. (2010) find that institutional investors frequently use their "voice" or "vote with their feet" if they are dissatisfied with the manager's long-term corporate strategy. Brav et al. (2008) documents that hedge funds that engage in monitoring have an average holding period of 22 months, and Bushee (1998) and Chen et al. (2007) show that only long-term institutional investors influence important firm decisions: Managers are less likely to cut R&D investments when long-term institutions are present, moreover long-term institutions make withdrawal of bad bids more likely.

Finally, if institutional investors collect information and monitor, then we would expect them to have an influence on real investments solely in those firms in which the manager deviates from the firm's optimal investment policy. To capture a firm investment problem, each year I measure the deviation between the firm's investment and several proxies for its optimal investment. I measure a firm's optimal investment using three different methodologies: Harvey *et al.* (2004), Titman *et al.* (2004), and Richardson (2006). If only long-term investors monitor, I expect that in firms that over- (under-) invest changes in the stake held by long-term investors are associated with a *subsequent* decrease (increase) in investment in real assets, while short-term investors have no influence on investment.

As described in Section I, to investigate the hypotheses described above, I use a panel dataset containing all U.S. non-financial companies in COMPUSTAT during the period 1980-2006, and focus on all institutional investors that file 13Fs with the SEC. Following Chen *et al.* (2007), I define as long-term institutional investors those investors that remain in a firm's ownership structure for at least one year to distinguish them from short-term institutional investors defined as those investors that remain in the firm for less than one year.[4] To directly study whether the changes in the stake held by long-term and short-term investors is associated with subsequent changes in investment policies, this paper uses first difference regressions. Importantly, first difference regressions methodology is particularly suited for this study because it controls for observed and un-observed firm and industry time-invariant characteristics and is also less affected by spurious correlation issues (Granger and Newbold (1978) and Harvey (1980)).

Consistent with the monitoring hypothesis, I find that in firms that over-invest (under-invest), *an increase* in the stake held by long-term investors is associated with a *subsequent* decrease (increase) in real investment. On the other hand, there is no evidence that short-term investors have

[4] Using each institutional investor's portfolio data from 1980 to 2006, I find that an investor classified as long-term in a firm usually spends at least one year in more than 74% of the stocks in her portfolio, while a short-term investor on average takes a short-term position in more than 70% of the stocks in her portfolio. These results confirm that investors' horizon can be treated as a persistent investor characteristic across time and across firms.

any impact on investment. Results are obtained after controlling for various firm characteristics, such as firm size, investment opportunities, cash flow, leverage, profitability, firms' inclusion in the S&P500, internal corporate governance, stock liquidity, stock volatility, stock market performance, and are also robust to the inclusions of year dummies which control for aggregate fluctuations in investment policies and institutional ownership over time.

Notably, the multivariate analysis suggests that long-term investors are associated with better investment choices particularly in firms that over-invest. To investigate this result, I further restrict the definition of a firm that over-invests by requiring that, on top of being identified as such by *all* the proxies used in this study, a firm that over-invests has also the characteristics identified by Jensen (1986). This test confirms the finding that long-term institutional investors particularly curb over-investment problems.

Admati, Pfleiderer and Zechner (1994) suggest that monitoring by institutional investors influences the payoffs of a firm. If so, one expects that the improvements in investment policies I document should be associated with better firm performance. Using a two stage least squares methodology, I find that both in firms that over-invest and under-invest a change in investment *subsequent* to an increase in the stake held by long-term investors is associated with higher stock returns.

To corroborate the evidence about long-term institutional monitoring, Section IV explores several robustness tests. First, similar in spirit of the analysis of Baker and Wurgler (2002), I study my maintained hypotheses in a sample of firms for which I can determine the IPO date. Next, I consider that institutional investors may buy an ownership stake in firms because they have specific preferences for certain levels of investment, and therefore examine reverse-causality. I also consider that among the group of long-term investors there could be indexers that are unlikely to monitor, and also focus on the largest long-term (short-term) investors since a larger stake should increase investors' monitoring incentives. Finally, I measure the importance of each individual ownership stake in the entire portfolio

of each institutional investor since if the stake held by an investor in a given firm is trivial with respect to the other positions in her portfolio, then the investor's incentives to monitor may not be strong. All these tests confirm the main findings discussed above.

This paper makes several contributions to the existing literature. To begin with, while many scholars have investigated the impact of institutional investors on research and development (Bushee (1998), Wahal and McConnell (2000), Aghion *et al.* (2008)) and take-over activities (Gaspar *et al.* (2005), and Chen *et al.* (2007)), their potential influence on investment in real assets and, in particular their effect on sub-optimal investment policies, has been very little investigated. This is a surprising gap in the literature because real investments are a key determinant of firm value and this paper contributes to the literature by filling this gap.

Next, to the best of my knowledge, this paper is the first in the literature that directly investigates whether institutional investors are associated with over-investment or under-investment problems[5]. In fact, this is the first paper that distinguishes between firms that over-invest and under-invest and shows that only long-term investors are systematically correlated with less agency conflicts in investment choices specifically in firms in which the manager deviates from a firm's optimal investment policy. Moreover, consistent with the idea that institutional investor monitoring is costly and therefore investors should engage in such activities only when necessary, institutional investors have no influence on investments in firms in which the manager does not deviate from a firm's optimal. The results that institutional investors are associated with reductions in *over-investment in real assets* are also completely novel in the literature.

Such results also contribute to the on-going debate in the literature on whether institutional investors are a potential solution to managerial agency problems (Shleifer and Vishny (1986) and Maug (1998) for theoretical evidence, and Gillar and Starks (2007) for a survey of the empirical

[5] Exceptions include Cho (1998), who focuses on insider ownership and concludes that this has no influence on investment, and Wahal and MacConnell (2000) who conclude that institutional ownership has a positive influence on investment. More recently, Bohren *et al.* (2007) look at how corporate governance affect investment in real assets and find that increased governance quality (measured using the G-index) is positively associated with higher levels of investment.

results), and corroborate the conclusion recently reached by some scholars (Bushee (1998), Gaspar *et al.* (2005), Chen *et al.* (2007) and Aghion *et al.* (2009), among others), not all institutional investors have a short-termist approach and inhibit investments.

Finally, this paper is related to two recent papers by Derrien, Kecskés, and Thesmar (2011) and Kisin (2011). This paper differs from these concurrent papers because it directly investigates the impact of institutional investors and, importantly, their horizons on firms' specific investment problems and not just on investment levels. Sub-optimal investment policies should have a first-order effect on firm valuations.

II. Sample and Variables Construction

A. Data

I obtain data from a variety of sources. Information on firm's real investment and firms' characteristics is from COMPUSTAT. I begin with all firms in COMPUSTAT from 1980 to 2006 and then exclude regulated utilities (SIC codes 4900-4949) and financial institutions (SIC codes in the 6000 range), on the assumption that the relation between fundamental characteristics and firm ownership differs for these firms because of regulatory constraints. Further, I only consider firms with at least 4 years of accounting data.

To construct the ownership variables, I use data on the quarterly holdings of institutional investors that have discretion over 13F securities that are worth $100 million or more from Thomson Financial.[6] I extract data on the holdings of all common stocks traded on the New York Stock Exchange (NYSE), NASDAQ and the American Stock Exchange (AMEX) for the period from the first quarter of 1980 to the second quarter of 2006. Finally, I obtain data on share prices, number of shares outstanding and stock characteristics from the Center for Research in Security Prices (CRSP). After all screenings, the resulting sample is composed of 8,511 firms for a total of 81,678 firm-year observations over the period 1983 to 2006.

[6] The SEC requires that all investment managers with discretion over 13F securities worth $100 million or more report all equity positions greater than 10,000 shares or $200,000 to the SEC at the end of each quarter.

I first winsorize all variables at the 5th and 95th percentiles to exclude extreme values, and then, I exclude from the sample those firms for which also only one of the proxies for sub-optimal investment, described in section II.C, cannot be calculated. This process leaves me with a sample of about 6,913 firms for a total of 40,155 firm-year observations over the period 1980 to 2006.

B. Investors' Horizons

To measure institutional investors' investment horizons I implement the strategy used by Chen *et al.* (2007) and distinguish between long-term and short-term institutional investors. Long-term investors are defined as those that hold their ownership stakes in a firm for at least one year, while short-term investors hold their stakes for less than one year. For each firm and using the total number of 13Fs filed by each institutional investor from when they first invest to the time they disappear from the firm ownership structure, I split the group of institutional investors in long-term and short-term. Then, I measure institutional investors' stakes as the total number of shares they own divided by the total number of shares outstanding.

Since horizon is measured for each institutional investor at the firm level, one may wonder how persistent such a measure is for the same investor across all firms. If an investor takes long-term and short-term positions just in a few firms in her portfolio, it would be hard to argue that this investor is particularly interested in monitoring those firms. To address this concern, I investigate whether horizon can be treated as a persistent investor's characteristic, i.e. whether investors with long-term (short-term) horizon systematically take a long-term (short-term) position in most of the firms in their portfolios. I find that in the sample period covered by this study an investor that is identified as long-term (short-term) in a firm using the Chen *et al.* (2007) methodology is also classified as a long-term investor in more than 74% (70%) of the stocks in her portfolio. This result provides comfort about the validity of the methodology used to classify investors.

C. Investment and Measures of Optimal Investment

To test my maintained hypothesis, I use a firm's investment at time *(t)* normalized by expenditure in PP&E at time *(t-1)* (henceforth Investment) as the measure of its investment in real assets. Investment, for company *i* in year *t*, is computed as total investment minus investment to keep existing assets in place. Total investment is given by the sum of all outlays on capital expenditure, acquisitions and R&D investment less receipts from the sale of PP&E, while depreciation and amortization[7] is the measure of investment to maintain assets in place.

A firm can suffer two types of investment problems: over-investment and under-investment. Over-investment arises in those firms in which managers select all positive NPV projects, and then make additional negative NPV investments.[8] Under-investment arises when managers fail to pursue valuable investment opportunities.[9] A central issue in this research design is finding appropriate proxies for a firm's optimal investment used to determine deviations in firms' actual investment policies. Broadly speaking, the existing literature provides three such proxies.

First, Titman *et al.* (2004) compare a firm's current investment with its average investment in the previous three years. Specifically, a firm's capital investment (CI_t) in year *t* is measured as follows:

$$CI_t = \frac{Investment_t}{(Investment_{t-1} + Investment_{t-2} + Investment_{t-3})/3} - 1$$

By this definition, a CI value equal to (greater than, less than) zero indicates that the current year's capital investment is the same as (greater than, less than) the prior three years average. Thus

[7] Since depreciation and amortization may misrepresent investment to maintain assets in place in some firms, I repeated the entire analysis removing maintenance from the calculations and just decompose total investment. Results are qualitatively unchanged.

[8] Managers may over-invest because they derive private benefits from controlling more assets (Jensen (1986, 1993)). They could also be overconfident in evaluating the value of the assets under their control (Roll (1986), Heaton (2002)) or particularly keen to invest in projects that require their specific human capital (Shleifer and Vishny (1989)). Over-investment could also be related to excessive continuation of existing negative-NPV projects due to the fact that managers prefer a "quiet life" (Bertrand and Mullainathan (2003)) or because of reputational concerns (Baker (2000)).

[9] Managers may under-invest because they are concerned with maintaining short-term earnings growth (e.g., Stein (1988, 1989), Shleifer and Vishny (1990), Thakor (1990), Narayanan (1985, 1996), Bebchuk and Stole (1993) among others). While there is no clear empirical evidence about under-investment induced by myopia (McConnell and Wahal (2000) among others), theoretical (Aggarwal and Samwick (1999)) and empirical evidence (Bertrand and Mullainathan (2003)), suggest that managers in general prefer to work less, and since investing requires them to spend more time overseeing firms' activities, managers may under-invest because additional investment imposes private costs on them.

such a proxy can be viewed as a measure of abnormal investment with respect to the firm's past trend in investment. Hence, in year *(t)*, a firm that over-invests has positive *abnormal capital investment* and a firm that under-invests has negative abnormal capital investment.

Since one cannot perfectly observe a firm's investment opportunities, using the past three years average investment as the only benchmark could lead to inaccuracies in the classification of some firms. For example, if one year a firm has good investment opportunities, it should invest more than it did in the past but this does not inevitably imply over-investment. To overcome such problem, it is necessary to combine the abnormal capital investment measure with other additional proxies. To achieve a more robust measure of investment deviations, this study relies on two additional proxies, one measured at the industry level and a second one computed at the firm level.

Following Harvey *et al.* (2003), I identify firms that over-invest or under-invest with respect to their industry peers. This measure is based on the evidence that managers are keen to behave as their industry peers (Scharfstein and Stein (1990)), and thus corporate investment decisions made by their industry peers may be a fundamental benchmark for them. Building on this argument, I use a firm's industry median investment as a proxy for the firm's optimal investment, and, each year, measure abnormal investment as the difference between a firm's actual investment and its industry median. A firm's industry is identified using the first two digits of the SIC code. I refer to this proxy as the *industry-adjusted investment*. Positive (negative) values of industry-adjusted investment identify firms that over-invest (under-invest) with respect to their industry peers.

The third proxy considers that a firm's investment depends on its investment opportunities, cash flows, leverage and other firm characteristics such as size and past performance. Following Richardson (2006), to find a firm's investment I use the following panel regression:

$$\text{Investment}_{(i;t)} = \beta_0 + \beta_1 \text{Market-to-Book}_{(i;t-1)} + \beta_2 \text{Cash flows}_{(i;t-1)} + \beta_3 \text{Leverage}_{(i;t-1)} + \beta_4 \text{Size}_{(i;t-1)} + \beta_5 \text{Past Returns}_{(i;t-1)} + \beta_6 \text{Z-score}_{(i;t-1)} + \beta_7 \sum_{t=1}^{T} t + \alpha_i + \varepsilon_{(i;t)} \quad (1)$$

In this regression, the dependent variable is investment at time *(t)*, while the independent variables are all measured at time (*t-1)*. Besides controlling for investment opportunities, cash flows, leverage and firm's size and firm's past returns to control for firm's stock market performance, I also include a firm's Z-score (Altman (1968) and Altman (2000)) to control for financial distress.[10] Regressions are run with firm fixed effects, to control for firm and industry observed and un-observed time-invariant characteristics, and year dummies, to control for possible time trends in the variables of interest. Standard errors are clustered at the firm level and thus are robust to correlation within the observations of each firm. The fitted value from regression (1) is the estimate of a firm's optimal investment, while the unexplained portion (or residual) is the estimate of abnormal investment. Positive values of the residuals identify firms that over-invest and negative values identify firms that under-invest. I refer to this proxy as the *abnormal investment*.

Once I obtain the three different proxies of sub-optimal investment described above, I assume that a firm over-invests only if *all three measures* of sub-optimal investment are positive, while a firm under-invests only if *all three measures* of sub-optimal investment are negative. To summarize, a firm overinvests if: (1) it invests more than its average investment in the previous three years, (2) it invests too much with respect to its industry peers, and (3) it invests too much given its growth opportunities, cash flows, leverage, firm and industry time-invariant characteristics, and trend in investment. A firm under-invests if in all cases it invests below its proxies of optimal investment.

Using Fama and French 30 industries classification, Panel A of Figure 1 shows the time-series cross-sectional distribution of firms that over-invest and under-invest in each industry over the period 1983-2006. Panel B of Figure 1 shows the time-series cross-sectional average ownership stake held by long-term and short-term investors in each industry over the period 1983-2006.

[Insert Figure2 here]

[10] I use a modified version of the Z-score, as in MacKie-Mason (1990), to avoid multicollinearity with other control variables included in the rest of the analysis. In fact, Altman's (1968) Z-score includes the ratio of market-to-book and debt, and I exclude these terms since I already use them directly in the analysis.

Figure 1 confirms two important facts. In Panel A of Figure 1 it appears that firms that over-invest or under-invest are not concentrated in any specific industry but widespread across all industries in the dataset. Instead, Panel B shows that long-term institutional investors also do not seem to be investing particularly in any given industry. More specifically, in the Food, Recreation, Petroleum, Telecommunications and Personal & Business Services industries, which have the highest capital expenditure per unit of total assets and therefore could be considered industries with lumpy investments[11], the number of firms that over-invest or under-invest is not larger than in other industries. Even more importantly, in the industries with lumpy investment, long-term ownership is not larger than in any other industries: The time-series cross-sectional average long-term institutional investors' stake in the Food, Recreation, Petroleum, Telecommunications and Personal & Business Services industries is about 23% while the average across all industries is about 24%. This is important because in industries with lumpy investments a firm could be investing too much or too little in one year just because of this type of business requires that the manager invest large sums all at once and subsequently disinvests. Then, if these industries attract more long-term investors than other industries, this could generate the results found in this paper. Figure 1 provides some comfort that this should not be the case. However, to further investigate whether results are driven by industries with lumpy investments, for robustness checks, I completely exclude these industries from the analysis. Results remain qualitatively unchanged.

One final important thing to point out is that in the majority of the cases the three measures described above give contrasting results, thus I cannot identify whether the firm over-invests or under-invests. This suggests that firm doesn't suffer from any specific investment problem and thus, as explained in more details below, these firms are classified as "non-deviation firms".

[11] Industries in which the investment-to-capital ratio exceeds 20% are considered lumpy (Cooper *et al.* (1999)). For each industry, I measure the investment-to-capital as the industry total capital expenditure divided by the industry total assets and consider as lumpy industry those in which such ratio is about 15%. I use the 15% threshold rather than the 20% one because both capital expenditure and total assets are winsorized at the 95th percentile, and therefore firms with very lumpy investment are already excluded from the analysis.

Panel B of Table II shows descriptive statistics for the three proxies of investment deviations used to classify the firms in this study: Abnormal Capital Investment, Industry-adjusted Investment and Abnormal Investment. Figure 2 shows the median investment in the entire sample, in firms that over-invest, under-invest and firms that cannot be classified.

Results in Panel B of Table II suggest that firms that cannot be clearly classified do not seem to suffer from a specific investment problem. In particular, on average, investment deviations in such firms are extremely close to zero suggesting that their managers might be investing more closely to their optimal investment policy than in the rest of the sample. Figure 2 endorses this conclusion.

[Insert Figure 2 here]

Figure 2 graphically shows that over time the median firm that over- (under-) invests has indeed larger (lower) investment that the median firm in the sample. This further validates the fact that the proxies used in this work seem to correctly identify firms that over-invest and under-invest. Figure 2 also shows that investment in the sample of firms that cannot be clearly classified as firms that over-invest or under-invest seems to move very closely with the median in the overall sample. Thus, it is possible that in these latter firms the manager makes investment choices that are somewhat more aligned with the interest of shareholders. Consistent with this evidence, the latter firms are identified as "non-deviation firms." Since these firms seem not to suffer any specific investment problem, consistent with the fact that institutional investors should only monitor when the manager deviates from the firm's optimal investment, in this firms long-term institutional investors should not be associated with real investment.

D. Control Variables

The analysis includes several control variables. All regressions control for firm characteristics that could influence investment: Investment opportunities, availability of internal funds (Fazzari *et al.* (1988)), size and leverage (Myers (1977), Jensen (1986), Stulz (1990) and McConnell and Servaes (1995)). I also control for the inclusion of the firm in the S&P500 and firm's governance.

Firms in the S&P500 are usually less opaque, and thus they may be less exposed sub-optimal investment problems. It can also be argued that institutional investors invest more in firms with better corporate governance. In such a case, it is possible that investment policies do not improve because of the monitoring activity exercised by long-term institutional investors but because of the mechanisms already in place in the firms in which these latter invest. To insure that results are not affected by this channel, I control for the quality of a firm's internal corporate governance using the entrenchment index developed by Bebchuk *et al.* (2009).[12, 13]

To complete the analysis, I also control for firm's profitability, measured as the Return on Assets, and also use ownership concentration among the largest long-term and short-term investor using the normalized Herfindahl Index. All variables are described in detail in Appendix A. For simplicity, control variables are not shown in the Tables, but full Tables are available in the internet appendix of this paper.

E. Descriptive Statistics

E.1 Descriptive Statistics at the Institutional Investors' Portfolios Level

Table I provides descriptive statistics for institutional investors' major portfolios' characteristics.

[Insert Table I here]

In the sample, individual institutional investors' shareholdings in each firm represent very small stakes (the 95th percentile is only 0.42% of a firm's shares outstanding). Yet, each firm accounts for a large percentage of investors' portfolios: The mean (median) stock accounts for 25.48% (21.12%) of the largest position the investor holds. The average (median) size of the portfolio of institutions is about $613 million ($112 million) and they hold on average 147 stocks.

[12] If the entrenchment index is missing in year t, but available for year *(t-1)*, I assume that in year *t* the entrenchment index is the same than in year *(t-1)*.
[13] For robustness checks I also use the GIM (Gompers *et al.* (2003)) index as a measure of corporate governance and results are qualitatively unchanged.

The average (median) firm in the portfolio of the institutional investors has investment equal to 0.23 (0.21) of PP&E and about 25.16% of the firms in their portfolio over-invest. The average (median) firm in their portfolio has a market-to book of about 2.84 (2.67), cash flows equal to 0.14 (0.15) of total assets and a leverage ratio of about 0.24 (0.24). Moreover, the average (median) size of the firms in their portfolio is about $2,213 ($1,986) million, while the ROA is 4.79% (6.02%). Given the characteristics of the average firm in the sample institutional investors seem to invest in the largest, more profitable and growth oriented firms with more cash on hand. This confirms that in the multivariate analysis it is important to control for such characteristics.

E.2 Descriptive Statistics at the Firm Level

To better compare average firm in the sample with the average firm in COMPUSTAT, Table II Panel A describes firm-level characteristics for all the firms in the dataset before excluding firms for which also only one of the proxies for a firm's sub-optimal investment described in section II.C could not be calculated. Then, Panel B of Table II shows descriptive statistics for sub-samples of firms classified with respect to their investment problem.

[Insert Table II here]

In Panel A, the average (median) firm has investment equal to 0.23 (0.19) of PP&E. While the firms in the dataset seem not to invest in R&D (both the median and mean R&D investment is zero in the sample)[14], the major component of total investment is capital expenditure. The average (median) firm spends 0.27 (0.22) of PP&E to acquire or upgrade physical assets, such as property, industrial buildings or equipment.[15] Depreciation and amortization account for 0.05 (0.04) of PP&E.[16] The

[14] It is important to notice that, in the raw data from COMPUSTAT, only 33% of the companies report non missing *R&D* expenditure. On the contrary, almost 95% of the firms in COMPUSTAT report acquisitions. However, only 30% of the observations reported by these latter firms are different than zero. Moreover, for robustness checks, I use *only* capital expenditure at time *t* divided by net value of PP&E at time (*t-1)* as measure of investment in real assets. Results are qualitatively unchanged. Therefore, including or excluding *R&D* expenditure and acquisition to calculate a firm's investment does not impact the general conclusion of this paper.

[15] These figures are consistent with those found by existing literature. For example, Wahal and McConnell (2000) find an average investment equal of 24% over the period 1988-1994, while Bøhren *et al.* (2007) find an average investment equal to 23% of PP&E over the period 1991-2003.

average (median) firm in the dataset has market-to-book equal to about 2.50 (1.71), cash flows equal to 0.07 (0.11) of total assets and a leverage ratio of about 0.25 (0.23). Moreover, the average (median) value of total assets is about $530 ($113) million and the average (median) ROA is -0.14% (3.56%).

In the sample, there are 8,793 firm-year observations for firms that over-invest and 14,546 firm-year observations for firms that under-invest and 16,816 firm-year observation for non-deviation firms. The average (median) firm that over-invests has investment equal to 0.39 (0.36) of PP&E. Depreciation and amortization account for 0.05 (0.04) of PP&E. The mean level of market-to-book is about 2.42 (1.76). The average (median) firm has cash flows equal to 0.11 (0.13) of total assets and a leverage ratio of about 0.22 (0.20). Moreover, the average (median) value of total assets is about $569 ($193) million and the average ROA is 3.38% (5.54%). As expected, companies that over-invest have larger investment, more assets in place and more cash on hand than the average firm in the sample.

With respect to the median firm that over-invest, the median firm that under-invests is smaller ($126 million in total assets on average) and less profitable (0.2%) and has lower market-to-book (about 1.38), a similar level of cash flows (0.11 of total assets), and a higher leverage ratio (about 0.25). On the other hand, firms that are classified as non-deviation firms have on average significantly lower investment (0.19), less investment opportunities, about the same amount of cash on hand and leverage than both the average firms that over-invest and under-invest.

Finally, the average firm in the sample has 41 institutional investors that filed a 13F at least once during the sample period. Long-term institutional investors own, as a group, an average stake of about 24%, while the group of short-term institutional investors owns a total average stake of about 3.49%. Importantly, there is a large variation in the stake held by long-term and short-term investors (the standard deviations are 21.02% and 4.75% respectively) and in the change in the ownership stake these investors own. The average annual change in the stake held by long-term investors is about 1.5% with a standard deviation of about 8.5%, while the average (median) annual change in the stake held

[16] Notice that, for the sake of clarity, in the text sometimes I refer to investment as capital expenditure to avoid confusion with the investment choice made by institutional investors.

by short-term investors is about 0.1% with a standard deviation of 5.4%. Finally, the average investor has filed on average five 13Fs, thus she stays in a firm for at least four years. Panel B of Table II also shows that in firms that over-invest both long-term and short-term institutional investors have a significantly larger presence than in firms that under-invest.

III. Results

A. Empirical Methodology

I start my investigation using sample splits and studying the association between long-term (short-term) investors change ownership with subsequent changes in real investment in firms that over-invest, under-invest and non-deviation firms, respectively. Using sample splits has two main disadvantages. First of all, this methodology could create problems in the calculation of the standard errors because the firms in each sub-sample are classified according to a specific variable of interest.[17] Second, when using sample splits it is not possible to *directly* compare the effect that institutional investors have on investment and investment deviations in different types of firms.

To solve these issues, next I use all the observations in the dataset and introduce a dummy variable to capture the firm specific investment problem. I start by creating an over-investment dummy variable that is equal to one if a firm over-invests and takes the value of zero if a firm under-invests. This over-investment dummy variable excludes non-deviation firms and only compares the influence of long-term and short-term institutional investors in firms that over-invest with respect to their influence on investment in firms that under-invest. However, to further reduce any concerns about selection issues, I exploit the observations in the entire sample and create a second over-investment dummy variable that is equal to one if a firm over-invests and equal to zero if a firm under-invests or is classified as non-deviation firm.

[17]More details about this issue can be found in the following book: J.M. Wooldridge, Econometric Analysis of Cross Section and Panel Data, Chapter 15.

Next, to allow the effect of institutional ownership to vary by type of investment problem and to directly compare long-term investors across firms with different types of investment problems, I interact the dummy capturing the firm specific investment problem with the change in long-term (short-term) ownership. In the comparison group (firms that under-invest and/or non-deviation firms) the association between the change in the stake held by long-term (short-term) investors has on *subsequent* investment is captured by the coefficient of the long-term (short-term) ownership variable alone. On the other hand, in firms that over-invest, the effect of long-term investors on investment is captured by the sum of the coefficients of the interaction between the change in the stake held by the long-term (short-term) investors with the over-investment dummy and the coefficient of the long-term (short-term) ownership variable alone.

All regressions use as dependent variable changes in investment (investment deviation) between year (t-1) and (t), while the independent variable of interest is changes in the stake held by long-term (short-term) between year (t-2) and (t-1). Errors are clustered at the firm level when the dependent variable of interest is investment and at the industry level when the independent variable is investment deviation. This is because investment is measured at the firm level, so the firm-level clustering takes into account the correlation between all observations of a firm, while investment deviation is measured as difference from the industry median, thus industry-level clustering takes into account the correlation between all firms in an industry for a given date (*t*). When using the entire sample, errors are clustered both at the firm and industry level and bootstrap technique is used to further correct for serial correlation in the error term (Betrand *et al.* (2004)).

B. Main Findings

I start by investigating the impact that long-term and short-term institutional investors have on investment and investment deviations in Table III. Panel A of Table II reports results for the entire sample and for sub-samples of firms that over-invest, firms that under-invest and non-deviation firms.

[Insert Table III here]

The estimated coefficient of the impact of long-term institutional ownership on firm's investment is positive (+3%) and statistically significant at the 1% level of confidence. Given the average stake held by long-term institutions (24%) this result suggests that for a one standard deviation increase in the ownership stake of long-term institutional investors, firm's investment on average increases by 3 percentage points. The coefficient of the change in the stake held by short-term investors has a positive sign but it is not statistically different from zero.

Column (2) shows results for firms that over-invest. As expected, only long-term institutions influence investment: An increase in the stake held by long-term investors is associated with a *subsequent* decrease in investment. The coefficient of the change in the stake held by long-term investors is -5.5% and statistically significant at the 5% level. Given the average stake held by long-term investors, a one standard deviation increase in the stake held by long-term investors is associated to a *subsequent* decrease in investment of about 5 percentage points. In firms that under-invest, shown in column (3), the coefficient of the stake held by long-term investors is 3.5% statistically significant at the 10% level, implying that long-term institutional investors also influence investment in firms that under-invest. Finally, column (4) shows results for non-deviation firms. In this sub-sample, consistent with the observation that such firms do not significantly deviate from optimal investment, long-term investors have no influence on investment. Importantly, short-term investors have no statistically significant influence on investment thus confirming that only long-term investors monitor management, have a beneficial influence on investment deviations and improve specific investment problems.[18]

The evidence presented in Table III, Panel A clearly indicates that it is only changes in long-term institutional ownership that impact subsequent investment. The results suggest that the average

[18] Control variables are not reported in the Tables, yet it is important to notice that most of the coefficients of the control variables are statistically significant. In particular, the more investment opportunities and the more cash available, the more a firm invests. Moreover, consistent with both the asymmetric information theory and the findings about the role of debt as a disciplining device, an increase in the level of debt appears to be detrimental to investment. The entire Tables are found in the internet appendix.

positive effect that long-term institutional investors have on investment in the entire sample indeed conceal some important differences. In fact, as expected, the influence of long-term investors on investment varies by type of investment problem and long-term institutional investors do not influence investment in those firms that do not suffer from sub-optimal investments. Long-term investors influence investment particularly in firms that over-invest: the coefficient of the *change* in long-term ownership is both economically and statistically larger in firms that over-invest with respect to firms that under-invest.

To better appreciate the monitoring abilities of institutional investors, I next investigate their influence directly on a firm's sub-optimal investment and study whether an increase in the stake held by long-term investors is associated with a *subsequent* decrease in sub-optimal investment. Results are reported in Panel B of Table III.

While in Panel A of Table III I use sample splits, Panel B of Table III uses the entire dataset and the methodology based on dummy variables to capture the firm investment problem as described in Section III.A. In columns (1) to (4) of Panel B of Table III, I start by showing the results obtained comparing firms that over-invest with firms that under-invest. In column (1), using the change in investment as dependent variable (ΔInvestment), the coefficient of the long-term ownership variable alone is 3.8%, statistically significant at the 10% level, while the coefficient of the interaction between the change in the stake held by long-term investors and the over-investment dummy is -8.3%, significant at the 1% level. Thus, in firms that over-invest the influence that long-term investors have on investment is -4.5% statistically significant at the 10% according to the Wald test used to check whether the sum of the coefficients is statistically different from zero. Importantly, the coefficients of the long-term investors' ownership stake remain economically and statistically significant even after including several controls which could have an indirect effect on investment through the trading activity of institutional investors.[19]

[19] Results are unchanged also controlling for returns' variability.

The results in columns (1) and (2) are also economically significant. The coefficients of the ownership variables imply that given the average stake held by long-term investors, a one standard deviation *increase* in their stake is followed by about 4 percentage points *decrease* in investment in firms that over-invest, and 3 percentage points *increase* in investment in firms that under-invest.

If long-term institutional investors successfully curb agency conflicts in investment choices, then we should observe that after an increase in the stake held by long-term investors not only investment changes in the appropriate direction, but also that investment deviations consistently decrease. To investigate this issue, I study whether the decrease/increase in investment brought about long-term institutional investors reduces a firm's investment deviations from its proxy for optimal investment.

Following Wahal and McConnell, in columns (3) and (4) of Table III, Panel B I investigate whether an increase in the stake held by long-term investors is associated with a subsequent decrease in a firm's investment deviation from its industry median (ΔIndDev). Wahal and McConnell (2000) document a positive relation between industry-adjusted investment and the fraction of shares owned by institutional investor, but they do not distinguish between firms that over-invest and under-invest. This paper extends their findings by proving specific evidence for firms that over-invest and those that under-invest.

Column (3) of Panel B shows that in firms that over-invest, an increase in the stake held by long-term investors is associated to a *subsequent* decrease in investment deviations. The interaction between the over-investment dummy variable and the change in the stake held by long-term investors is -7.3%, statistically significant at the 10% level. The economic meaning of these results is striking: Given the average stake held by long-term investors, a one standard deviation increase in the stake held by long-term investors is associated to a *subsequent* decrease in sub-optimal investment of almost 10 percentage points. However, long-term investors seem not to be as effective in firms that under-

invest. In fact, in firms that under-invest the coefficient of the change in the stake held by long-term investor has a positive sign but lacks statistical significance.

Next, I further investigate the validity of the findings presented so far by first comparing firms that over-invest with non-deviation firms and then by using the entire sample of firms. In columns (5) to (8) the over-investment dummy variable takes the value of one if a firm over-invests according to all the three proxies of sub-optimal investment used in this study and the value of zero if the proxies give contrasting results (i.e. the firms are classified as non-deviation firms). The findings in columns (5) to (8) of Panel B, confirm the results found with the sample splits methodology employed in Panel A of Table III: While long-term investors are significantly associated with changes in investment in firms that over-invest, as expected, these investors do not influence investment in non-deviation firms.

In the rest of Panel B of Table III, I use the entire dataset and show results comparing firms that over-invest with respect to both firms that under-invest and those classified as non-deviation firms. Results in columns (9) to (12) confirm the results described above: A change in the stake held by long-term investors is associated with a *subsequent* decrease in investment in firms that over-invest, while an increase in the stake held by long-term investors is associated with *subsequent* higher investment in firms that do not over-invest. Panel B of Table III also confirms that, consistent with the monitoring hypothesis, short-term investors have no influence on both firm investment and in sub-optimal investment.[20] Notably, all results are economically and statistically unchanged after including time dummies to further control for shocks that in a given year affect all firms in the sample. Moreover, results are unchanged also after controlling for returns' variability.

Finally, it is important to note that the over-investment dummy variable in Panel B of Table III always has a positive coefficient that is highly statistically significant at the 1% level. This provides significant comfort about the reliability of the proxies used to capture a firm's investment deviations from its optimal level.

[20] In column (1) their stake seems to be weakly associated with higher investment in firms that under-invest, but in column (2), after controlling for stock characteristics (Past Returns and Stock Liquidity), this result disappears. The entire Table with control variables can be found in the internet appendix.

One potential criticism of the analysis illustrated so far could be that since we do not directly observe managers' behaviour, and we have incomplete information about firms' investment choices, the proxies for investment deviations used in this study could still fail to capture sub-optimal investment. To mitigate this concern, I use Jensen's argument (1986) and, further restrict the definition of a firm that over-invests.

If managers behave like empire-builders, large availability of internal funds should enable them to over-invest and increase investment distortions, especially in the presence of low investment opportunities. Consistent with this idea, I compare each firm's investment opportunities and cash flows with those of their industry peers and, combining these two measures together with the proxies to identify firms that over-invest described above, I single out firms that over-invest, have lower investment opportunities and hold significantly more cash on hand than their industry peers. I find that more than 65% of the firms that over-invest according to the three measures used in this study also have larger cash and lower investment opportunities than the average firm in their industry. I define these firms as those that strictly over-invest. In Table IV, I study the influence of long-term investors on the investment of these firms.

[Insert Table IV here]

In Table IV, I start by creating a "strict" over-investment dummy variable that takes the value of one if a firm strictly over-invests and the value of zero otherwise. Then, I study the influence of long (short)-term investors on changes in investment (ΔInvestment) and investment deviations from their industry median (ΔIndDev).

Results strongly support those in Panel B of Table III: An increase in the stake held by long-term institutional investors is associated to a *subsequent* decrease in investment precisely in firms that strictly over-invest. As expected, the influence that long-term institutional investors have on investment and investment deviations is both economically and statistically stronger than in the

previous analysis indicating that long-term investors seem to monitor more in firms in which the over-investment problem is more severe.

The coefficient of the interaction variable in column (1) is -13.4% (significant at the 1% level), while the coefficient of the change in the stake held by long-term investors for the rest of the sample is 6.2% (significant at the 5% level). The combined coefficient of the interaction variable and the long-term ownership variable is about -7.2% statistically significant at the 10% level, implying that a one standard deviation increase in the average stake held by institutional investors is associated to almost 7 percentage points decrease in real investment in firms that strictly over-invest. Importantly, column (3) suggests that in firms that strictly over-invest a one standard deviation increase in the average stake held by long-term investors is associated to 9 percentage points decrease in investment deviations from the industry median. Table IV clearly shows that short-term institutional investors have no influence on investment. The results reported so far are largely confirmed also in columns from (4) to (6) of Table IV which use the entire sample.

Overall, results in Table III and Table IV strongly support the hypothesis that long-term investors monitor particularly in firms that are more likely to over-invest. Yet, we expect that long-term investors will monitor management because of firm's under-performance, the correction of which will generate higher returns from which investors will benefit. I investigate this dimension next.

C. Firm Performance

Distortions in corporate investment decrease firm value; as a consequence, firms that suffer from agency costs in investment choices are more likely to under-perform their industry peers. Institutional investors are expected to be more concerned about a manager's choices when a firm under-performs.

To capture whether a firm under-performs, each year, I compare the firm's return on assets (ROA) with the average ROA in its industry. I create an under-performance dummy variable equal to one if at time (*t-1*) a firm under-performs its industry peers and zero otherwise. To identify firms that

under-perform and over- (under-) invest, I then interact the under-performance dummy with the over-investment dummy variables. To study whether institutional investors are associated with changes in investment precisely in firms that over-(under-) invest and also under-perform their industry peers, I create a triple interaction using the over-investment dummy, the under-performance dummy and the change in the stake held by long-term (short-term) investors measured between year (*t-2*) and (*t-1*). Results are described in Table V.

[Insert Table V here]

In Table V, in columns (1) to (2), the over-investment dummy is equal to one if a firm over-invests and equal to zero if it under-invests. In columns from (3) to (4), I use the entire dataset and create an over-investment dummy that takes the value of one if a firm over-invests and is equal to zero if it under-invests or is classified as non-deviation firm.

Table V shows that long-term investors are associated with investment precisely in firms that over-invest and under-perform. In column (1) (column (3)), the coefficient of the change in the stake held by long-term investors in firms that under-perform and over-invest is 14.1% (14.3%) statistically significant at the 10% (5%) level: a one standard deviation increase in the stake held by long-term investors *subsequently* is associated to a decrease of about 13 (14) percentage points in investment.

Results in column (4) suggests that in firms that under-perform and over-invest, long-term investors also lead to a substantial decrease in investment deviations. A one standard deviation increase in the stake held by long-term investors in firms that under-perform and over-invest is associated to more than 15 percentage points decrease in sub-optimal investment measured as deviation from a firm's industry median level of investment. Column (3) also shows that investment significantly decreases after an increase in the stake of long-term investors in firms that do not under-perform but still over-invest. Finally, short-term investors do not have any significant influence on investment.

While results in Table V corroborate the evidence in favor of positive association between institutional investors' ownership and reduction in firms' sub-optimal investment, we expect that this reduction in agency conflicts should be translated in better performance (Jensen and Meckling (1976)). I investigate this argument in Table VI.

[Insert Table VI here]

To study whether long-term institutional ownership is associated to better investment choices and higher performance I use stock returns. Stock returns capture the market view about a firm's investment decisions and, importantly, are not mechanically affected by changes in investment which instead may automatically affect the firm's returns on assets.

Exploiting the time series structure of the dataset, I employ a two stage regressions methodology and study whether better performance is associated with reduction in investment *subsequent* to the increase in the stake held by long-term investors.

In the first stage of the analysis, I regress changes in the stake held by long-term (short-term) investors between time *(t-2)* and *(t-1)* over *subsequent* changes in investment. Then, using the estimates from the first stage regression in column (1), I estimate a firm's *expected change* in investment. In the second stage the estimated expected change in investment is used as the independent variable while *changes* in stock market performance are the dependent variable of interest. The estimated expected changes in investment and the changes in stock market performance are contemporaneous since one would expect the market to promptly impound the new information about firms' improved investment choices in the firms' stock price.

To pinpoint the effect that the estimated expected changes in investment have on firm's stock market performance precisely in firms that suffer from sub-optimal investment, I also include as independent variable an interaction between the estimated expected changes in investment subsequent to the increase in the stake held by long-term investors and the over-investment dummy variable. The over-investment dummy variable is equal to one if a firm in year *(t)* over-invests and zero if it under-

invests. In both the first and second stage of the analysis, I control for changes in firm's size, market-to-book and firm's cash-flow. In the second stage, besides controlling for size and market-to-book, I also include past performance, stock's liquidity and stock's volatility. Results are reported in Panel B of Table VI. Results for the first stage regression are reported in column (1), while the second stage of the performance analysis is reported in columns from (2) to (4). All regressions in Panel B of Table VI are run with year dummies and robust standard errors are bootstrapped and clustered at the firm level.

While the first stage of the performance regressions yields results very similar to those discussed in the previous tables, the second stage of the analysis shows that for both firms that over-invest and under-invest *the estimated change in investment subsequent to an increase in the stake held by long-term investors results in improved performance.* The estimated change in investment interacted with the over-investment dummy variable has a negative sign and it is highly significant, while the coefficient of the estimated change in investment alone is positive and also statistically different from zero. These results suggest that in firms that over-invest a decrease in investment *subsequent* to an increase in the stake held by long-term investors is associated with improved performance, while in firms that under-invest an increase in in investment *subsequent* to an increase in the stake held by long-term investors is associated with improved performance.

It is important to notice that long-term institutional investors might not only be associated with a firm's investment choices but also other important firm's decision that have an impact on firm value. Therefore, one needs to be careful when interpreting the magnitude of the coefficients produced by the second stage of the regressions presented in Table VI. Yet, significantly for this paper, the signs of such coefficients go in the right direction.

Overall the results presented so far suggest that long-term institutional ownership is associated with higher firm performance and this improvement in performance, at least in part, occurs through changes in investment that reduce a firm's specific investment problem. In the rest of paper, I run

additional tests to further reduce concerns with endogeneity problems and provide more corroborating evidence in favor of the maintained hypothesis tested in this paper.

IV. Robustness Checks

A. IPO Sample

To further address endogeneity issues, and similar in spirit to the Baker and Wurgler (2002), I investigate the maintained hypothesis in a sub-sample of firms for which I can identify the IPO date. Knowing the IPO date allows me to examine the evolution of a firm's investment from the point when they become public, and analyse how this relates to changes in the firm's ownership structure. As existing literature shows, a firm's IPO is not only related to the firm's investment opportunities[21] (Pagano *et al.* (1998)), but also influences the type of ownership structure that the firm will have (dispersed ownership versus concentrated ownership) because of the level of monitoring required (Booth and Chua (1996), Pagano and Roell (1998)).

I identify all IPOs that occurred between 1980 and 2003 using the Securities Data Corporation (SDC) dataset. I only consider common stock offerings, and I eliminate any IPOs that are flagged as offerings, unit offerings, rights offerings, reverse LBOs, and spin-offs. Furthermore, consistent with the rest of the paper, I exclude regulated utilities (SIC codes 4900-4949) and financial institutions (SIC codes in the 6000 range) and keep only firms for which I have at least 4 years of accounting data available. These screens provide me with 1,945 IPOs, and, for each firm, I exclude from the analysis the year of the IPO, and then I follow the evolution of its investment and ownership structure for the following 10 years.[22]

[Insert Table VII here]

Using this subsample of firms, I re-run my main analysis and also add some extra controls for time trends by including time from the IPO dummies and/or calendar year dummies. Results are reported in Table VII. The first four columns of Table VII show influence of long-term investors in

[21] Firms going public are larger and usually have very high investment opportunities (Pagano *et al.* (1998)).
[22] Results are unchanged also if I include observation for up to 15 years or all observations I have for each firm.

firms that over-invest versus firms that under-invest and non-deviation firms, while the last four columns compare the firms that over-invest with firms that under-invest and non-deviation firms.

Overall results in Table VII confirm the findings in the rest of the paper but they also provide some noticeable insights that further corroborate the evidence presented so far. In particular, while using first differences one controls for both observed and un-observed firm and industry time-invariant characteristics, in Table VII results are obtained also controlling for time from the IPO and calendar year fixed effects which further control for idiosyncratic and systematic shocks that might have influenced a firm's investment and investment opportunities. This is particularly important since we observe a firm's investment and ownership but we cannot directly observe its investment opportunities.

B. Indexers and Transient Investors

Next, I consider that some long-term investors might behave as indexers, and thus have no influence on real investment. To address this concern, I proceed as follows: For each year, I combine Chen *et al.*'s measure of horizon with the investor predetermined portfolio's churn ratio (Gaspar *et al.* (2005), Cella *et al.* (2010)) which is a measure of how frequently investors rotate their positions on all of the stocks in their portfolio. Thus, a high churn ratio indicates that an investor trades often on all of the stocks in her portfolio.

Combining the number of quarters that each investor spends in a firm with her portfolio's churn ratio, I classify institutional investors into four groups: transient, quasi-indexer and long-term and short-term investors. A quasi-indexer investor is a long-term institutional investor that has a churn ratio below the median in the industry and thus should be more likely to engage in a buy-and-hold strategy consistent with an indexer. Long-term investors have churn ratio above the median churn ratio in the industry and therefore engage in trading more frequently than quasi-indexers investors. On the other hand, a transient investor is a short-term investor with a churn ratio above the median in the

industry and should therefore trade more than a short-term institutional investor with a churn ratio above the industry median.

A priori it is uncertain whether quasi-indexers would attempt to perform any monitoring functions, while I expect transient institutions and short-term investors not to exert effort to influence managers. On the contrary, given the long time they spend in a firm, I expect long-term investors to be better at collecting and processing information about a firm's investment choices. Nevertheless, since these investors actively engage in trading on all of the stocks in their portfolio, they could also simply decide to sell if dissatisfied with the manager. These two things combined suggest that the threat of exit that long-term investors exercise on the firm's manager is stronger than that exercised by any other investor, and this should further enhance the effectiveness of their direct monitoring activity, as Admati and Pfleiderer (2009) suggest. If this is the case, then we should find that their influence on investment is economically and statistically stronger than when considering *all* long-term investors.

Using the finer investors classification described above, in each firm I proceed by measuring the change, between time (*t-2)* and time (*t-1)*, in the stake held by each category of investors (quasi-indexers, long-term, short-term and transient) and then I interact these changes with the over-investment dummy variables used in the previous analyses. Results are reported in Table VIII.

[Insert Table VIII here]

Consistent with the monitoring hypothesis, Table VIII shows that in firms that over-invest only long-term investors have an influence on investment, while, as expected, transient investors have no effect on investment. Quasi-indexers and short-term investors are also found to have no influence. Importantly, results in Table VIII are economically stronger than those found before. This is consistent with the idea that the threat of exit exercised by the long-term investors captured in Table VIII is credible and thus enhances the effectiveness of their direct monitoring.[23]

[23] Firms in the S&P500 are more likely to attract indexers (Aghion et al. (2008)), results are run including such firms and controlling for a dummy variable that captures them. However, completely excluding these latter firms from the analysis leaves the results qualitatively unchanged. Moreover, I also include firms' investor turnover (Gaspar et al. (2005)) as an additional control variable and results remain unchanged. Results are un-tabulated for the sake of space.

C. Holdings' Size

Next, I try to better capture institutional investors' willingness to monitor management by considering the size of their original stakes. In the main analysis presented in this paper, I use the change in the stake held by *all* long-term and *all* short-term investors. However, institutions with large stakes should have the largest incentives to monitor (Chen, Harford and Li (2007) and Giannetti and Laeven (2009), among others). Thus, I complete the analysis by studying the influence of large institutional investors on investment.

In each firm, I focus on long-term and short-term investors with stakes above the median stake held by their peers, and then, to verify whether the impact increases with the size of the institutional investors' stake I also look at investors with a stake above the 95th percentile. Results are reported in Table IX.

[Insert Table IX here]

Using changes in investment as the dependent variable, results in Table IX suggest that long-term institutional investors' monitoring incentives indeed increase in the stake they own and so does their influence on managers' choices. In particular, comparing the results in Table IX with those in column (1) in Panel B of Table III, one can notice that the coefficient of the interaction between the over-investment dummy and the change in the stake held by long-term investors is much larger in magnitude than before. The coefficient of the interaction variable is almost 40% larger when focusing on long-term investors with a stake above the median stake held by their peers and 63% larger when considering the stake held by the investors in the top 95th of their peers' distribution. The coefficients of the stake held by large long-term investors is highly statistically significant and much larger in magnitude also in firms that under-invest. I find no evidence that short-term investors play any monitoring role on investment choices, not even when they have large stakes.

One crucial finding in Table IX is that the influence of long-term investors remain statistically and economically unchanged after controlling for past returns, returns' volatility and liquidity (see results in columns (2) and (4) of Table IX). This is particularly important because, if long-term investors are concerned with the overall level of risk in their portfolios, an increase in the volatility of the stocks they have a stake in could make them more willing to sell these stocks since the overall riskiness of their portfolios should increase. While including in the regressions changes in stocks volatility controls for this channel, in un-tabulated analyses, each year and in each industry, I sort all firms based on the change in their stocks returns' volatility between time (*t-3)* and (*t-2)*, and split the sample in high versus low volatility firms considering as benchmark the median change in returns' volatility in their industry. In each sub-sample, I identify firms that over-invest or under-invest and I study how the change in the stake held by long-term and short-term investors, over the period (*t-2)* to (*t-1)*, influences investment in the subsequent period. In both groups of high and low volatility firms, and using both the stake held by *all* investors or only that held by the largest ones, results are economically and statistically unchanged with respect to those reported in the previous analyses. This gives some comfort that the change in the stake held by long-term investors is not driven by concerns about levels of firms' risk.

D. Firms' Importance in the Institutional Investors' Portfolios

As a further robustness check, I also consider that institutional investors might be more willing to monitor firms that have a larger weight, and thus more importance, in their portfolios. Using investors' portfolios data, at the end of each year, I measure the importance of each firm in the investor's portfolio with respect to the largest position held by the same investor, in the following way:

$$\text{Importance}_{i,j,t} = \frac{\text{N}_{\text{i,j,t}}*\text{p}_{\text{j,t}}}{\max(\text{N}_{\text{i,j,t}}*\text{p}_{\text{j,t}})}$$

Where $P_{j,t}$ and $N_{j,i,t}$ are the price and number of shares of stock *j* held by institution *i* at quarter *t*. The value of importance can range from 0 to 1.

Distinguishing between long-term and short-term investors, I transform this measure at the firm level using a weighted average in which the weights are given by the stake that each investor has in each of the firms in my sample.

I find that in firms that over-invest the larger the change in the weight that these firms have in the portfolios of long-term investors the lower investment is. In firms that under-invest, the larger is the change in the weight of the firm in the portfolios of long-term investors the higher investment is. Notably, more important an under-investing firm becomes in the portfolio of an investor, the lower investment deviations from its industry median are. Finally, as expected, the importance that a firm has in short-term investors' portfolios doesn't matter for investment. Results are un-tabulated for the sake of space.

E. Reverse Causality and Clientele Effects

To further reduce concerns about un-observed heterogeneity, I next investigate the issue of reverse causality. Existing literature shows that capital expenditure usually has no impact on institutional investors' investment choices (Brav *et al.* (2008)). Nevertheless, I investigate whether institutional investors' decision to invest in a given firm is influenced by its investment policies. Thus, I investigate whether institutional investors' decision to invest is driven by the investment policies the firm had in the past. These tests use as the dependent variable the change in stake held by institutional investors between year *(t-1)* and *(t)*, while the change in investment between year (*t-2)* and *(t-1)* is the explanatory variable of interest.

In this analysis I include several control variables suggested by the existing literature: Stock turnover to control for liquidity, past stock returns and ROA to control for performance, stock returns' volatility to capture the risk inherent in stock ownership and information asymmetries, market-to-book to control for investment opportunities and total assets to capture firm size. Moreover, I control for a

firm's internal cash flows and leverage because institutional investors might be more attracted by firms that have more cash on hand while leverage, and the consequent agency conflicts with debt-holders, could discourage institutions from investing in a firm. Finally, I also control for managerial entrenchment and also include a dummy variable equal to one if the firm is in the S&P500 and zero otherwise. Changes in all control variables are measured between year *(t-1)* and year *(t)* and year (*t-2)* and year (*t-1)*. Results are reported in Table X.

[Insert Table X here]

I find that past changes in investment have no impact on the stake held by both long-term and short-term institutional investors. Interestingly, contrary to the argument of Bhide (1994), I find that as a stock becomes more liquid both long-term and short-term investors increase their stake.

I further address the possibility that institutional investors may still not be interested in monitoring but rather prefer to invest in firms with certain investment levels or influence investment policies in a way that is consistent with their own preferences. In particular, I consider that if institutional investors have a preference for firms with higher (lower) investment, then they would invest in companies that match their preferences, otherwise institutions may directly try to adjust capital expenditure in those firms that do not have the desired level yet. Using the methodology proposed by Sulaeman (2009), I infer long-term institutional investors' preferences for certain level of investment. I find that in firms in which investment decreases, investors had a preference for more investment than investors in firms in which investment instead increases. Hence, I conclude that institutional investors' preferences do not seem to be driving the results.

V. Discussion and Conclusions

Consistent with the claim that only long-term institutional investors have enough at stake to pay the cost of monitoring, this paper shows that while short-term investors have no effect on investment, long-term investors influence investment precisely in firms in which the managers deviate

from the interest of shareholders by investing too much or too little with respect to the firms' optimal investment strategy.

Distinguishing between firms that over-invest and under-invest, and studying the influence that both short-term and long-term investors have on investment and investment deviations from a firm's optimal investment, this paper shows that in firms that over-invest long-term investors are associated with lower investment and investment deviations, hence they effectively curb over-investment problems. On the other hand, in firms that under-invest long-term institutional investors foster investment and do not exacerbate under-investment problems.

Importantly, both in firms that over-invest and under-invest long-term investors' monitoring activities meant at reducing agency conflicts in investment choices are value enhancing for all shareholders. Moreover, the influence that long-term investors have on investment increases in the stake they own, in the importance that the firm has in their portfolio and in threat of exit that they can exercise. Finally, in firms that do not suffer a clear investment problem long-term institutional investors have no impact on investment. Since monitoring requires investors to collect information about the manager and her decisions, this latter result suggests that institutional investors collect valuable information about the firms in which they invest and only act when the managers substantially deviate from a firm optimal investment policy. Hence, long-term investors influence on investment should be driven by their monitoring activity because only investors that have the biggest incentives to monitor appear to influence investment policy and they seem to do so only when the firm suffer a clear investment problem.

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Appendix: Variable Definitions

This table provides brief definitions of the variables used in this study. For the period 1980-2008, I obtain ownership data from Thompson Reuters, monthly prices from CRSP, and accounting information from COMPUSTAT. All variables are winsorized at the 5th and 95th percentiles. Panel A describes institutional investors' portfolio characteristics, Panel B describes ownership characteristics, Panel C describes investment and other firms' characteristics, Panel D describes stock characteristics and Panel E describes the proxies used to measure a firm's optimal investment and investment deviations.

Panel A. Investors' Portfolios Characteristics	
Churn Ratio	The churn ratio measures how frequently institutional investors rotate their positions on all the stocks of their portfolio and is constructed as in Gaspar *et al.* (2005), p. 9.
Percentage Ownership	The percentage ownership of a 13-F institutional investor in a firm.
Portfolios Size	The total value, in million of dollars, of the institutional investor's portfolio at the end of each quarter.
Stock Importance	Stock importance at the end of each year is measured as the dollar value of the stake held by the institutional investor in that given stock divided by the largest dollar value position in her portfolio.
Number of Stocks	For each quarter, the total number of stocks for which an institutional investor filed a 13F.
Panel B. Ownership Characteristics	
Long-term Institutional Ownership (LT Investors)	The percentage of the shares held by long-term institutional investors.
Short-term Institutional Ownership (ST Investors)	The percentage of the shares held by short-term institutional investors.
Number of 13Fs Filed	The total number of 13F filed for each firm by each institutional investor.
Number of Institutional Investors	The number of institutional investors in each firm.
Long-term Own. Concentration (Own. Concentration LT)	The Herfindal index of the stake held by the long-term institutional investors in the top 25^{th} percentile in each firm.
Short-term Own. Concentration (Own. Concentration ST)	The Herfindal index of the stake held by the short-term institutional investors in the top 25^{th} percentile in each firm.
Panel C. Investment and Firm Characteristics	
Investment	The sum of all outlays on capital expenditure, acquisitions and *R&D* less receipts from the sale of PP&E and investment to maintain assets in place (depreciation and amortization). Investment is normalized by expenditure in property plants and equipment. All variables are from COMPUSTAT. Capital expenditure is item 128. *R&D* expenditure is item 46. Acquisition expenditure is item 129. Cash receipts from sale of PP&E is item 107. Maintenance is construct using reported depreciation and amortization, item 125. Property, plants and equipment is item 8.
Cash-flows	Earnings before interest depreciation and amortization divided by total assets.
Leverage	The book value of debt divided by the book value of total assets.
Firm Size	The natural logarithm of total assets.
Return on Assets	Net income at time *t* divided by total assets at time *t-1*.
S&P 500	A dummy variable taking the value of 1 if the firm in a given year is included in the S&P500 index and zero otherwise.
Entrenchment Index	This index measures how entrenched a manager is (Bebchuk *et al.* (2008)). Its value ranges from zero to six, with six indicating the highest managerial entrenchment. Data has been obtained from the Lucian Bebchuk's website.

Panel D. Stock Characteristics	
Market Cap	The company's shares outstanding multiplied by current market price (in million of dollars).
Market-to-Book	The market value of equity divided by the book value of common equity.
Share Turnover	The monthly volume of shares transacted divided by the number of shares outstanding.
Past Returns	The stock returns a firm would have made by buying the stock at the end of the year t-1 and holding it until the end of the year t.
Return Variability	The standard deviation of daily stock returns over the preceding one year.
Panel E. Optimal Investment Proxies and Measures of Investment Deviations	
Optimal Investment	I measure optimal investment in three ways: 1) A firm's average investment in the previous three years (Titman *et al.* (2004), p. 8.); 2) A firm's industry median investment (Harvey *et al.* (2003)); 3) A firm's expected level of investment controlling investment opportunities, cash-flows, leverage and other firm characteristics such as size and past performance (Richardson (2006)).
Abnormal Capital Investment (CI)	The abnormal capital investment measures how much affirm invests each year with respect to its average investment in the previous three years
Industry-adjusted Investment (IndDev)	The difference between a firm actual investment and the median investment in its industry.
Abnormal Investment (AbnInv)	Abnormal investment is measured as the difference between firms' actual investment and its optimal investment.
Firms that Over-invest	Firms for which the three measures of investment deviation are positive.
Firms that Under-invest	Firms for which the three measures of investment deviation are negative.
Non-deviation Firms	Firms for which the three measures of investment deviation give contrasting outcomes.

Table I: Descriptive Statistics - Institutional Investors

This table describes all institutional investors' main portfolios features and the main characteristics of the shares they own over the period 1983-2006. Variables definitions are found in the Appendix. All variables are winsorized at the 5th and 95th percentiles.

	N	Mean	SD	P05	Median	P95
Portfolio Characteristics						
Portfolio Size (Million of $)	32,700	613	2,180	6.413	112	2,420
Percentage Ownership	32,700	0.42%	0.40%	0.03%	0.29%	1.23%
Stock Importance	32,695	25.48%	19.29%	3.79%	21.12%	61.82%
Number of Stocks	32,700	147	360	4	43	616
Stock Characteristics						
Market-to-Book	31,914	2.84	1.25	1.39	2.67	4.89
Firm Characteristics						
Investment	32,210	0.23	0.08	0.12	0.21	0.37
Percentage of Firms that Over-invest	31,118	25.16%	17.08%	0.00%	24.14%	50.00%
Cash-flow	32,104	0.14	0.07	0.03	0.15	0.21
Leverage	32,058	0.24	0.07	0.15	0.24	0.35
Total Assets (Million of $)	32,179	2,213	1,589	492	1,896	4,860
Return on Assets	32,163	4.79%	7.10%	-6.87%	6.02%	12.38%

Table II: Descriptive Statistics

This table presents descriptive statistics for the main ownership, stock, and firm characteristics for all the firms in the sample. Panel A shows descriptive statistics for the entire sample. Panel B shows descriptive statistics for firms that over-invest, under-invest and firms classified as non-deviation firms. A firm overinvests if: (1) it invests more than its average investment in the previous 3 years (Titman *et al.* (2004)), and (2) it invests too much with respect to its industry peers (Harvey *et al.* (2004), and (3) it invests too much given its growth opportunities, cash-flows, leverage, firm and industry time-invariant characteristics, and trend in investment (Richardson (2006)). Otherwise the firm under-invests. A firm is defined as a non-deviation firm when it cannot be clearly classified neither as a firm that over-invests nor as a firm that under-invests. For the period 1980-2006 we obtain ownership data from Thompson Reuters, stock information from CRSP and accounting information from COMPUSTAT. Descriptive statistics for Investment and its components span over the period 1983-2006, descriptive statistics for ownership variables and firm's and stock characteristics used in the analysis are for the period 1982-2006. All variables shown are described in the Appendix and are winsorized at the 5% level.

Panel A: Entire Sample

	N	Mean	SD	P05	Median	P95
Investment	81,678	0.23	0.22	-0.03	0.19	0.67
CAPEX	81,778	0.27	0.20	0.02	0.22	0.68
Acquisitions	81,678	0.02	0.06	0.00	0.00	0.13
R&D	81,778	0.00	0.05	0.00	0.00	0.00
Sale of PPE	81,678	0.01	0.04	0.00	0.00	0.03
Depreciation & Amortization	81,678	0.05	0.06	0.01	0.04	0.13
Ownership Characteristics						
LT Investors	83,132	23.92%	21.02%	0.70%	17.66%	65.82%
ST Investors	67,292	3.49%	4.75%	0.04%	1.71%	12.83%
Number of Consecutive 13F Filed	83,880	5	2	2	4	8
Number of Institutional Investors	83,880	41	53	2	18	154
Own. Concentration	83,880	0.15	0.23	0.02	0.06	0.83
Own. Concentration LT	81,092	0.10	0.21	0.00	0.03	0.60
Own. Concentration ST	55,117	0.02	0.12	0.00	0.00	0.03
Stock Characteristics						
Market-to-Book	70,214	2.50	2.92	0.42	1.71	7.55
Share Turnover	69,216	0.07%	0.08%	0.01%	0.05%	0.24%
Return Variability	69,216	15.36%	10.28%	5.74%	13.21%	31.48%
Past Returns	69,216	1.89%	9.43%	-14.29%	1.64%	19.10%
Firm Characteristics						
Cash-flows	75,388	0.07	0.24	-0.30	0.11	0.28
Leverage	65,373	0.25	0.19	0.01	0.23	0.62
Total Assets (Million of $)	81,508	530	1,373	8	113	2,416
Return on Assets	75,092	-0.14%	20.80%	-38.49%	3.56%	20.68%

Panel B: Firms that Over-invest, Firms that Under-invest and Non-deviation Firms

	Firm that Over-invest				Firm that Under-invest				Non-deviation Firms			
	N	Mean	Median	SD	N	Mean	Median	SD	N	Mean	Median	SD
Investment	8,793	0.39	0.36	0.16	14,546	0.06	0.06	0.10	16,816	0.19	0.18	0.12
CAPEX	8,787	0.39	0.36	0.17	14,546	0.06	0.06	0.10	16,816	0.23	0.22	0.12
Acquisitions	8,793	0.06	0.00	0.10	14,546	0.12	0.12	0.07	16,816	0.02	0.00	0.04
R&D	8,793	0.00	0.00	0.00	14,546	0.00	0.00	0.01	16,816	0.00	0.00	0.00
Sale of PPE	8,793	0.00	0.00	0.02	14,546	0.00	0.00	0.00	16,816	0.01	0.00	0.03
Depreciation & Amortization	8,793	0.05	0.04	0.03	14,546	0.01	0.00	0.05	16,816	0.05	0.05	0.04
Investment Deviations												
Abnormal Capital Investment	8,793	1.14	0.59	1.68	14,546	-0.86	-0.65	1.04	16,816	0.23	-0.05	1.70
Industry-adjusted Investment	8,793	0.18	0.15	0.15	14,546	-0.13	-0.12	0.10	16,816	-0.002	-0.01	0.12
Abnormal Investment	8,793	0.18	0.15	0.14	14,546	-0.12	-0.10	0.11	16,816	0.003	0.01	0.11
Ownership Characteristics												
LT Investors	8,770	30.53%	26.27%	22.06%	14,471	23.85%	18.37%	19.84%	16,768	29.38%	25.47%	21.51%
ST Investors	7,531	3.91%	2.08%	5.03%	11,164	2.62%	1.21%	3.70%	14,090	3.13%	1.60%	4.24%
Number of Consecutive 13F Filed	8,793	5	5	2	14,546	5	5	2	16,816	5	5	2
Number of Institutional Investors	8,793	52	30	56	14,546	37	15	49	16,816	51	27	56
Own. Concentration	8,793	0.09	0.04	0.15	14,546	0.14	0.07	0.20	16,816	0.10	0.05	0.16
Own. Concentration LT	8,793	0.06	0.02	0.14	14,546	0.09	0.03	0.18	16,816	0.07	0.02	0.15
Own. Concentration ST	8,793	0.00	0.00	0.05	14,546	0.01	0.00	0.08	16,816	0.00	0.00	0.05
Stock Characteristics												
Market-to-Book	8,793	2.42	1.76	2.64	14,546	1.96	1.38	2.27	16,816	2.12	1.58	2.42
Share Turnover	8,793	0.08%	0.06%	0.08%	14,535	0.07%	0.04%	0.07%	16,804	0.07%	0.05%	0.08%
Return Variability	8,793	13.51%	11.82%	8.18%	14,535	13.90%	11.98%	9.48%	16,804	13.15%	11.36%	8.34%
Past Returns	8,793	1.85%	1.69%	9.55%	14,535	2.22%	1.86%	9.23%	16,804	1.88%	1.58%	9.40%
Firm Characteristics												
Cash-flows	8,793	0.11	0.13	0.15	14,546	0.09	0.11	0.13	16,816	0.11	0.13	0.16
Leverage	8,793	0.22	0.20	0.18	14,546	0.26	0.25	0.17	16,816	0.24	0.22	0.18
Total Assets (Million of $)	8,792	569	193	1,007	14,544	493	126	1,120	16,809	657	203	1,268
Return on Assets	8,769	3.38%	5.54%	15.75%	14,534	0.00	0.02	0.13	16,778	0.02	0.05	0.15

Table III: Firms' Investment and Institutional Investors Holdings

This table presents first differences OLS regressions with robust errors. Panel A shows results for the entire sample and the sub-samples of firms that over-invest, under-invest and non-deviation firms, respectively. Panel B shows results using the entire dataset and a dummy variable to capture the firm investment problem. In the first four columns of Panel B, the over-investment dummy is equal to one if a firm over-invests and zero if it under-invests. In columns from (5) till (8), the over-investment dummy is equal to one if a firm over-invests and zero if the firm is classified as non-deviation firm. The last four columns of Panel B show results for the entire sample. In this latter case then the over-investment dummy is equal to one if a firm over-invests and zero if the firm under-invests or it is classified as non-deviation firm. A firm overinvests if: (1) it invests more than its average investment in the previous 3 years (Titman *et al.* (2004)), and (2) it invests too much with respect to its industry peers (Harvey *et al.* (2004), and (3) it invests too much given its growth opportunities, cash-flows, leverage, firm and industry time-invariant characteristics, and trend in investment (Richardson (2006)). Otherwise the firm under-invests. A firm is defined as a non-deviation firm when it cannot be clearly classified neither as a firm that over-invests nor as a firm that under-invests. The dependent variables are as follows: Investment measures the change in investment and IndDev is the change in industry-adjusted investment. Changes in the dependent variable are measured between time (t-1) and time (t). The ownership variables and control variables are measured as the change between time (t-2) and time (t-1). Change in Past Returns and change in Share Turnover are measured between time (t-1) and time (t). Variables definitions are found in the Appendix. Errors are clustered at the firm level in Panel A and at the firms and/or industry level in Panel B. In the last four columns of Panel A, firm fixed effects are also included. In columns (1) to (8) of Panel B, errors are also bootstrapped. All variables are winsorized at the 5th and 95th percentiles. The following control variables are included in the analysis: Market-to-Book , Cash-flows, Leverage, Size, ROA, Share Turnover, Past Returns, S&P 500 Dummy, Entrenchment Index. The complete Table is available in the internet appendix. Regressions also include the constant term, but the coefficient is not reported. P-values are in parentheses. * indicates significance at 1% (***), 5% (**), 10% (*).

Panel A: Sample Splits

	Entire Sample	Firms that Over-invest	Firms that Under-invest	Non-deviation Firms
	(1)	(2)	(3)	(4)
LT Investors	0.039***	-0.055**	0.035*	0.017
	(0.003)	(0.040)	(0.091)	(0.272)
ST Investors	0.036	0.017	0.094	0.038
	(0.312)	(0.797)	(0.133)	(0.463)
Own. Concentration LT	-0.111*	-0.127	-0.106	0.086
	(0.066)	(0.318)	(0.364)	(0.306)
Own. Concentration ST	0.036	0.439	0.004	0.305
	(0.734)	(0.587)	(0.972)	(0.689)
Control Variables	YES	YES	YES	YES
N	13,343	2,550	3,254	4,960
R-squared	0.114	0.060	0.221	0.186

Panel B: Over-investment Dummy

	Firms that Over-invest vs Firms that Under-invest				Firms that Over-invest vs Non-deviation Firms				Firms that Over-invest vs Firms that Under-invest & Non-deviation Firms			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Investment		IndDev		Investment		IndDev		Investment		IndDev	
Over-investment	0.176***	0.176***	0.165***	0.165***	0.123***	0.122***	0.114***	0.114***	0.143***	0.143***	0.133***	0.133***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LT Investors* Over-investment	-0.083***	-0.083***	-0.073*	-0.072*	-0.062**	-0.061**	-0.061*	-0.061*	-0.079***	-0.078***	-0.075**	-0.074**
	(0.003)	(0.008)	(0.058)	(0.065)	(0.019)	(0.026)	(0.059)	(0.080)	(0.002)	(0.008)	(0.027)	(0.028)
LT Investors	0.038*	0.038**	0.023	0.023	0.016	0.015	0.010	0.010	0.029**	0.029**	0.019	0.018
	(0.078)	(0.044)	(0.323)	(0.301)	(0.369)	(0.411)	(0.537)	(0.579)	(0.038)	(0.011)	(0.263)	(0.268)
ST Investors * Over-investment	-0.114	-0.111	-0.066	-0.063	-0.028	-0.030	0.013	0.011	-0.057	-0.058	-0.014	-0.014
	(0.175)	(0.184)	(0.383)	(0.470)	(0.766)	(0.694)	(0.876)	(0.929)	(0.465)	(0.366)	(0.863)	(0.861)
ST Investors	0.110*	0.105	0.073	0.068	0.041	0.040	0.002	0.003	0.046	0.044	0.009	0.008
	(0.089)	(0.124)	(0.124)	(0.182)	(0.452)	(0.470)	(0.970)	(0.968)	(0.310)	(0.296)	(0.856)	(0.877)
Own. Concentration LT	-0.116	-0.115	-0.169**	-0.169**	0.013	0.013	-0.047	-0.045	-0.059	-0.058	-0.109*	-0.108*
	(0.220)	(0.242)	(0.041)	(0.029)	(0.859)	(0.818)	(0.546)	(0.485)	(0.387)	(0.384)	(0.055)	(0.055)
Own. Concentration ST	0.031	0.030	0.113	0.112	0.252	0.303	0.172	0.209	0.032	0.033	0.112	0.113
	(0.933)	(0.936)	(0.320)	(0.637)	(0.726)	(0.595)	(0.848)	(0.804)	(0.868)	(0.827)	(0.267)	(0.258)
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES				
Cluster at the Firm Level	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO
Cluster at the Industry Level	NO	NO	YES	YES	NO	NO	YES	YES	YES	YES	YES	YES
Observations	5,804	5,803	5,804	5,803	7,510	7,510	7,510	7,510	10,764	10,763	10,764	10,763
R-squared	0.430	0.431	0.361	0.362	0.302	0.303	0.238	0.238	0.325	0.326	0.257	0.257

Table IV: Strict Over-investment

This table presents first difference OLS regressions with robust errors. A firm overinvests if: (1) it invests more than its average investment in the previous 3 years (Titman *et al.* (2004)), and (2) it invests too much with respect to its industry peers (Harvey *et al.* (2004), and (3) it invests too much given its growth opportunities, cash-flows, leverage, firm and industry time-invariant characteristics, and trend in investment (Richardson (2006)). Otherwise the firm under-invests. A firm is defined as a non-deviation firm when it cannot be clearly classified neither as a firm that over-invests nor as a firm that under-invests. A firm strictly over-invests when it is classified by the proxies above as a firm that over-invests, but it also has low investment opportunities and high levels of cash-flow than its industry peers. The dependent variables are as follows: Investment measures the change in investment and IndDev is the change in industry-adjusted investment. Changes in the dependent variable are measured between time (t-1) and time (t). The ownership variables and control variables are measured as the change between time (t-2) and time (t-1). Change in Past Returns and change in Share Turnover are measured between time (t-1) and time (t). Variables definitions are found in the Appendix. All variables are winsorized at the 5th and 95th percentiles. The following control variables are included in the analysis: Market-to-Book , Cash-flows, Leverage, Size, ROA, Share Turnover, Past Returns, S&P 500 Dummy, Entrenchment Index. The complete Table is available in the internet appendix. Regressions also include the constant term, but the coefficient is not reported. P-values are in parentheses. * indicates significance at 1% (***), 5% (**), 10% (*).

	Firms that Strict Over-invest vs Firms that Under-investment			Firms that Strictly Over-invest vs Firms that Under-invest & Non-deviation Firms		
	(1)	(2)	(3)	(4)	(5)	(6)
	Investment		IndDev	Investment		IndDev
Strict Over-investment	0.129***	0.129***	0.120***	0.125***	0.125***	0.116***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LT Investors* Strict Over-investment	-0.134***	-0.131***	-0.128**	-0.093**	-0.091**	-0.092*
	(0.003)	(0.002)	(0.018)	(0.019)	(0.022)	(0.058)
LT Investors	0.062**	0.060**	0.048*	0.035**	0.034**	0.025
	(0.033)	(0.041)	(0.086)	(0.039)	(0.045)	(0.193)
ST Investors * Strict Over-investment	-0.052	-0.038	-0.061	-0.011	-0.006	-0.009
	(0.595)	(0.709)	(0.596)	(0.908)	(0.956)	(0.933)
ST Investors	0.045	0.035	0.038	0.031	0.027	0.006
	(0.509)	(0.605)	(0.540)	(0.535)	(0.594)	(0.898)
Own. Concentration LT	-0.191*	-0.189*	-0.240**	-0.084	-0.083	-0.133*
	(0.051)	(0.053)	(0.015)	(0.203)	(0.204)	(0.054)
Own. Concentration ST	0.188*	0.183*	0.263**	0.085	0.085	0.162
	(0.075)	(0.082)	(0.017)	(0.319)	(0.311)	(0.106)
Control Variables	YES	YES	YES	YES	YES	YES
Cluster at the Firm Level	YES	YES	NO	YES	YES	NO
Cluster at the Industry Level	YES	YES	YES	YES	YES	YES
Observations	5,801	5,800	5,801	10,760	10,759	10,760
R-squared	0.234	0.238	0.186	0.221	0.223	0.166

Table V: Over-investment, Under-investment in Firms that Underperform

This table presents first difference OLS regressions with robust errors. A firm overinvests if: (1) it invests more than its average investment in the previous 3 years (Titman *et al.* (2004)), and (2) it invests too much with respect to its industry peers (Harvey *et al.* (2004), and (3) it invests too much given its growth opportunities, cash-flows, leverage, firm and industry time-invariant characteristics, and trend in investment (Richardson (2006)). Otherwise the firm under-invests. A firm is defined as a non-deviation firm when it cannot be clearly classified neither as a firm that over-invests nor as a firm that under-invests. A firm under-performs when its return on assets (ROA) is below the average ROA in its industry. The dependent variables are as follows: Investment measures the change in investment and IndDev is the change in industry-adjusted investment. Changes in the dependent variable are measured between time (t-1) and time (t). The ownership variables and control variables are measured as the change between time (t-2) and time (t-1). Variables definitions are found in the Appendix. The following control variables are included in the analysis: Market-to-Book , Cash-flows, Leverage, Size, ROA, Share Turnover, Past Returns, S&P 500 Dummy, Entrenchment Index. The complete Table is available in the internet appendix. All variables are winsorized at the 5th and 95th percentiles. Regressions also include the constant term, but the coefficient is not reported. P-values are in parentheses. * indicates significance at 1% (***), 5% (**), 10% (*).

	Firms that Over-invest vs Firms that Under-invest		Firms that Over-invest vs Firms that Under-invest & Non-deviation Firms	
	(1) Investment	(2) IndDev	(3) Investment	(4) IndDev
LT Investors* Over-investment* Underperformance	-0.141*	-0.117	-0.217**	-0.162*
	(0.052)	(0.113)	(0.027)	(0.055)
LT Investors* Over-investment	-0.056	-0.048	-0.074***	-0.045
	(0.128)	(0.301)	(0.003)	(0.106)
LT Investors* Underperformance	0.011	0.032	-0.005	0.009
	(0.822)	(0.511)	(0.884)	(0.771)
LT Investors	0.036	0.014	0.026	0.008
	(0.201)	(0.639)	(0.105)	(0.654)
ST Investors * Over-investment* Underperformance	-0.115	-0.280	0.104	0.217
	(0.565)	(0.189)	(0.429)	(0.113)
ST Investors * Over-investment	-0.081	0.026	-0.114	-0.073
	(0.425)	(0.796)	(0.241)	(0.440)
ST Investors * Underperformance	0.116	0.280**	0.079	0.108
	(0.343)	(0.038)	(0.289)	(0.228)
ST Investors	0.070	-0.025	0.005	-0.032
	(0.275)	(0.731)	(0.901)	(0.555)
Over-investment	0.177***	0.167***	0.139***	0.131***
	(0.000)	(0.000)	(0.000)	(0.000)
Underperformance	0.010	0.002	0.002	-0.005
	(0.124)	(0.661)	(0.384)	(0.123)
Over-investment* Underperformance	-0.003	-0.007	0.001	-0.006
	(0.861)	(0.615)	(0.952)	(0.474)
Own. Concentration LT	-0.115	-0.167**	-0.003	-0.030
	(0.173)	(0.043)	(0.967)	(0.699)
Own. Concentration ST	0.039	0.111	-0.488**	-0.651***
	(0.718)	(0.340)	(0.012)	(0.003)
Control Variables	YES	YES	YES	YES
Cluster at the Firm Level	YES	NO	YES	NO
Cluster at the Industry Level	YES	YES	YES	YES
Observations	5,801	5,801	8,872	8,872
R-squared	0.431	0.362	0.336	0.268

Table VI: Over-investment, Under-investment and Firm's Performance

This table presents results for a two stage analysis with robust errors clustered at the firm level. A firm overinvests if: (1) it invests more than its average investment in the previous 3 years (Titman *et al.* (2004)), and (2) it invests too much with respect to its industry peers (Harvey *et al.* (2004), and (3) it invests too much given its growth opportunities, cash-flows, leverage, firm and industry time-invariant characteristics, and trend in investment (Richardson (2006)). Otherwise the firm under-invests. A firm is defined as a non-deviation firm when it cannot be clearly classified neither as a firm that over-invests nor as a firm that under-invests. The Table presents results for a two stage analysis where at the first stage changes in investment between time (t-1) and (t) are regressed over changes in the ownership variables and control variables captured between time (t-2) and time (t-1). Then, in the second stage stock returns between time (t-1) and time (t) are regressed over changes in investment estimated using the model in stage one and the interaction between estimated investment and the over-investment dummy variable which takes the value of one if a firm over-invests and the value of zero if a firm under-invests. In the second stage, changes in the control variables are measured between time (t-1) and time (t), with the exception of changes in past returns which is measured over the period (t-2), (t-1). All regressions are run including year dummies. In all regressions in errors are corrected using bootstrapping. Variables definitions are found in the Appendix. Regressions also include the constant term, but the coefficient is not reported. P-values are in parentheses. * indicates significance at 1% (***), 5% (**), 10% (*).

	First Stage	Second Stage		
	Investment	Stock Market Returns		
	(1)	(2)	(3)	(4)
Estimated Change in Investment* Over-investment		-0.650**	-0.654***	-0.652**
		(0.013)	(0.009)	(0.039)
Estimated Change in Investment		0.621***	0.615***	0.596***
		(0.001)	(0.001)	(0.003)
Over-investment	0.181***	-0.026	-0.028	-0.022
	(0.000)	(0.391)	(0.255)	(0.456)
LT Investors* Over-investment	-0.075***			
	(0.004)			
LT Investors	0.051**			
	(0.012)			
ST Investors * Over-investment	-0.099			
	(0.265)			
ST Investors	0.108			
	(0.123)			
Own. Concentration LT	-0.197**			
	(0.025)			
Own. Concentration ST	0.142			
	(0.773)			
Control Variables	YES	YES	YES	YES
Cluster at the Firm Level	YES	YES	YES	YES
Observations	5,933	5,739	5,738	5,738
R-squared	0.422	0.376	0.382	0.388

Table VII: IPO Sample

This table presents first difference OLS regressions with robust errors. In Panel A, a firm overinvests if: (1) it invests more than its average investment in the previous 3 years (Titman *et al.* (2004)), and (2) it invests too much with respect to its industry peers (Harvey *et al.* (2004), and (3) it invests too much given its growth opportunities, cash-flows, leverage, firm and industry time-invariant characteristics, and trend in investment (Richardson (2006)). Otherwise the firm under-invests. A firm is defined as a non-deviation firm when it cannot be clearly classified neither as a firm that over-invests nor as a firm that under-invests. The dependent variable is Investment which measures the change in investment between time (t-1) and time (t). The ownership variables and control variables are measured as the change between time (t-2) and time (t-1). Change in Past Returns, change in Share Turnover and change in Returns' Volatility are measured between time (t-1) and time (t). Variables definitions are found in the Appendix. All variables are winsorized at the 5th and 95th percentiles. The following control variables are included in the analysis: Market-to-Book , Cash-flows, Leverage, Size, ROA, Share Turnover, Past Returns, S&P 500 Dummy, Entrenchment Index. The complete Table is available in the internet appendix. Regressions also include the constant term, but the coefficient is not reported. P-values are in parentheses. * indicates significance at 1% (***), 5% (**), 10% (*).

	Firms that Over-invest vs Firms that Under-invest				Firms that Over-invest vs Firms that Under-invest & Non-deviation Firms			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Over-investment	0.224***	0.224***	0.225***	0.225***	0.183***	0.183***	0.184***	0.184***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LT Investors* Over-investment	-0.176**	-0.176**	-0.163*	-0.164*	-0.154**	-0.155**	-0.154**	-0.156**
	(0.038)	(0.038)	(0.059)	(0.058)	(0.042)	(0.046)	(0.039)	(0.041)
LT Investors	0.072	0.071	0.061	0.059	0.062**	0.061**	0.063*	0.060*
	(0.195)	(0.202)	(0.278)	(0.299)	(0.031)	(0.035)	(0.059)	(0.077)
ST Investors * Over-investment	0.051	0.044	0.067	0.062	-0.062	-0.076	-0.032	-0.042
	(0.753)	(0.784)	(0.675)	(0.700)	(0.493)	(0.408)	(0.728)	(0.650)
ST Investors	-0.071	-0.068	-0.073	-0.068	0.067	0.078	0.059	0.071
	(0.554)	(0.576)	(0.549)	(0.578)	(0.317)	(0.256)	(0.395)	(0.318)
Own. Concentration LT	0.006	0.003	0.008	0.003	0.053	0.051	0.059	0.057
	(0.930)	(0.968)	(0.908)	(0.968)	(0.493)	(0.501)	(0.456)	(0.463)
Own. Concentration ST	-0.006	-0.007	0.001	0.005	-0.111	-0.109	-0.102	-0.098
	(0.929)	(0.926)	(0.994)	(0.942)	(0.443)	(0.434)	(0.500)	(0.508)
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES
Cluster at the Firm Level	YES	YES	NO	YES	YES	YES	NO	YES
Cluster at the Industry Level	NO	NO	YES	NO	YES	YES	YES	NO
Year From IPO Dummies	YES	YES	YES	YES	YES	YES	YES	YES
Year Dummies	NO	NO	YES	YES	NO	NO	YES	YES
Observations	1,576	1,576	1,576	1,576	2,845	2,845	2,845	2,845
R-squared	0.401	0.402	0.408	0.410	0.285	0.288	0.290	0.294

Table VIII: Over-investment, Under-investment, Quasi-indexers and Transient Investors

This table presents first difference OLS regressions with robust errors. A firm overinvests if: (1) it invests more than its average investment in the previous 3 years (Titman *et al.* (2004)), and (2) it invests too much with respect to its industry peers (Harvey *et al.* (2004), and (3) it invests too much given its growth opportunities, cash-flows, leverage, firm and industry time-invariant characteristics, and trend in investment (Richardson (2006)). Otherwise the firm under-invests. A firm is defined as a non-deviation firm when it cannot be clearly classified neither as a firm that over-invests nor as a firm that under-invests. The dependent variables are as follows: Investment measures the change in investment and IndDev is the change in industry-adjusted investment. Changes in the dependent variables are measured between time (t-1) and time (t). The ownership variables and control variables are measured as the change between time (t-2) and time (t-1). Variables definitions are found in the Appendix. All variables are winsorized at the 5th and 95th percentiles. The following control variables are included in the analysis: Market-to-Book , Cash-flows, Leverage, Size, ROA, Share Turnover, Past Returns, S&P 500 Dummy, Entrenchment Index. The complete Table is available in the internet appendix. Results are shown excluding all firms in the S&P500 index. Regressions also include the constant term, but the coefficient is not reported. P-values are in parentheses. * indicates significance at 1% (***), 5% (**), 10% (*).

	Firms that Over-invest vs Firms that Under-invest		Firms that Over-invest vs Firms that Under-invest & Non-deviation Firms	
	(1)	(2)	(3)	(4)
	Investment	IndDev	Investment	IndDev
Over-investment	0.175***	0.164***	0.141***	0.131***
	(0.000)	(0.000)	(0.000)	(0.000)
LT Investors * Over-investment	-0.126***	-0.100**	-0.125***	-0.109**
	(0.001)	(0.040)	(0.001)	(0.017)
LT Investors	0.067**	0.037	0.056***	0.035
	(0.012)	(0.222)	(0.008)	(0.166)
ST Investors * Over-investment	-0.217	-0.141	-0.073	0.000
	(0.262)	(0.510)	(0.722)	(0.999)
ST Investors	0.119	0.097	-0.031	-0.053
	(0.127)	(0.250)	(0.680)	(0.424)
Quasi Indexers * Over-investment	-0.024	-0.038	0.003	-0.012
	(0.568)	(0.484)	(0.941)	(0.812)
Quasi Indexers	0.023	0.027	-0.006	0.001
	(0.251)	(0.308)	(0.717)	(0.974)
Transient Investors* Over-investment	-0.134	-0.089	-0.099	-0.071
	(0.198)	(0.409)	(0.355)	(0.503)
Transient Investors	0.143**	0.090	0.095	0.056
	(0.041)	(0.190)	(0.119)	(0.376)
Own. Concentration LT	-0.051	-0.104	-0.025	-0.067
	(0.567)	(0.251)	(0.682)	(0.299)
Own. Concentration ST	-0.030	0.050	-0.016	0.033
	(0.780)	(0.680)	(0.851)	(0.748)
Control Variables	YES	YES	YES	YES
Cluster at the Firm Level	YES	NO	YES	NO
Cluster at the Industry Level	YES	YES	YES	YES
Observations	5,377	5,377	10,046	10,046
R-squared	0.428	0.357	0.321	0.252

Table IX: Over-investment, Under-investment and Investors' Holdings Size

This table presents first difference OLS regressions with robust errors. In Panel A, a firm overinvests if: (1) it invests more than its average investment in the previous 3 years (Titman *et al.* (2004)), and (2) it invests too much with respect to its industry peers (Harvey *et al.* (2004), and (3) it invests too much given its growth opportunities, cash-flows, leverage, firm and industry time-invariant characteristics, and trend in investment (Richardson (2006)). Otherwise the firm under-invests. A firm is defined as a non-deviation firm when it cannot be clearly classified neither as a firm that over-invests nor as a firm that under-invests. The dependent variable is Investment which measures the change in investment between time (t-1) and time (t). The ownership variables and control variables are measured as the change between time (t-2) and time (t-1). Change in Past Returns, change in Share Turnover and change in Returns' Volatility are measured between time (t-1) and time (t). Variables definitions are found in the Appendix. All variables are winsorized at the 5th and 95th percentiles. The following control variables are included in the analysis: Market-to-Book , Cash-flows, Leverage, Size, ROA, Share Turnover, Past Returns, S&P 500 Dummy, Entrenchment Index. The complete Table is available in the internet appendix. Regressions also include the constant term, but the coefficient is not reported. P-values are in parentheses. * indicates significance at 1% (***), 5% (**), 10% (*).

	Firms that Over-invest vs Firms that Under-invest				Firms that Over-invest vs Firms that Under-invest & Non-deviation Firms			
	Stake Above Median		Stake Above 95th Percentile		Stake Above Median		Stake Above 95th Percentile	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Over-investment	0.176***	0.175***	0.176***	0.176***	0.143***	0.143***	0.144***	0.143***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LT Investors* Over-investment	-0.115***	-0.114***	-0.302***	-0.304***	-0.116***	-0.116**	-0.340***	-0.341***
	(0.004)	(0.008)	(0.010)	(0.003)	(0.010)	(0.011)	(0.000)	(0.000)
LT Investors	0.079***	0.076**	0.209***	0.207***	0.071***	0.068***	0.208***	0.204***
	(0.001)	(0.012)	(0.008)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
ST Investors * Over-investment	-0.222	-0.214	-0.380	-0.368	-0.156	-0.152	-0.259	-0.252
	(0.118)	(0.102)	(0.129)	(0.131)	(0.154)	(0.168)	(0.226)	(0.246)
ST Investors	0.123	0.120	0.135	0.128	0.054	0.052	0.014	0.010
	(0.117)	(0.159)	(0.333)	(0.443)	(0.243)	(0.258)	(0.903)	(0.929)
Own. Concentration LT	-0.111	-0.113	-0.140	-0.142*	-0.046	-0.046	-0.083	-0.081
	(0.168)	(0.146)	(0.164)	(0.088)	(0.379)	(0.377)	(0.128)	(0.131)
Own. Concentration ST	0.034	0.034	0.062	0.061	0.028	0.028	0.062	0.062
	(0.878)	(0.937)	(0.848)	(0.858)	(0.719)	(0.707)	(0.414)	(0.405)
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES
Cluster at the Firm Level	YES	YES	NO	YES	YES	YES	NO	YES
Cluster at the Industry Level	NO	NO	YES	NO	YES	YES	YES	NO
Observations	5,820	5,819	5,820	5,819	10,806	10,805	10,806	10,805
R-squared	0.430	0.432	0.430	0.431	0.326	0.327	0.325	0.327

Table X: Investment and Institutional Investors Holdings - Reverse Causality

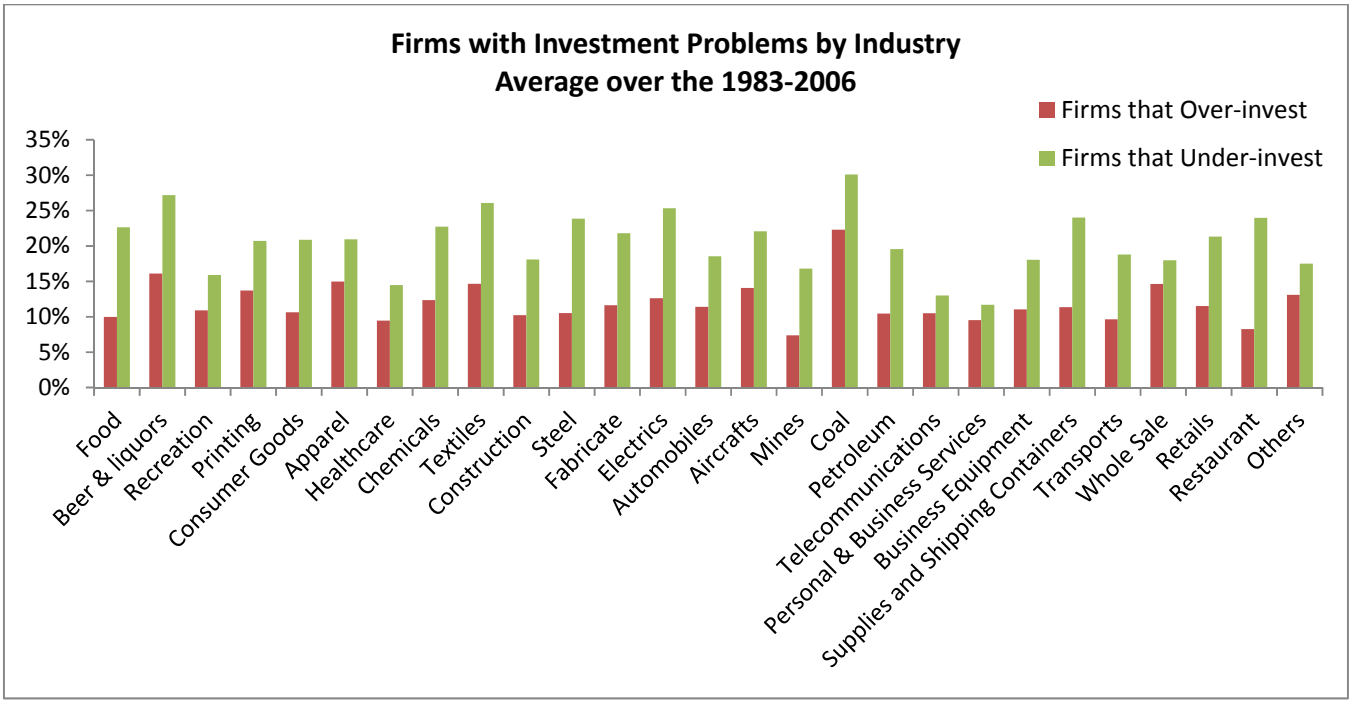
This table presents OLS first differences regressions with error clustered at the firm level for sub-samples of firms that over-invest, under-invest and non-deviation firms respectively. A firm overinvests if: (1) it invests more than its average investment in the previous 3 years (Titman et al. (2004)), and (2) it invests too much with respect to its industry peers (Harvey et al. (2004), and (3) it invests too much given its growth opportunities, cash-flows, leverage, firm and industry time-invariant characteristics, and trend in investment (Richardson (2006)). Otherwise the firm under-invests. A firm is defined as a non-deviation firm when it cannot be clearly classified neither as a firm that over-invests nor as a firm that under-invests. The dependent variable is change in firms' long-term (short-term) institutional ownership between time (t-1) and time (t). The change in investment is measured between time (t-2), while the control variables are measured between time (t-1) and time (t) and between time (t-2) and time (t-1). Variables definitions are found in the Appendix. All variables are winsorized at the 5th and 95th percentiles. All regressions include the constant term, but the coefficient is not reported. P-values are in parentheses. * indicates significance at 1% (***), 5% (**), 10% (*).

	Long-term Investors Stake			Short-term Investors Stake		
	Firms that Over-invest	Firms that Under-invest	Non-deviation Firms	Firms that Over-invest	Firms that Under-invest	Non-deviation Firms
	(1)	(2)	(3)	(5)	(6)	(7)
Investment$_{(t-2;t-1)}$	0.007	0.004	-0.013	-0.002	-0.001	-0.008
	(0.624)	(0.715)	(0.211)	(0.822)	(0.801)	(0.109)
Changes in Firm and Stock Characteristics$_{(t-1;t)}$						
Share Turnover	**6.982***	**13.436*****	**5.094***	**8.506*****	**7.686*****	**5.402*****
	(0.098)	(0.001)	(0.078)	(0.000)	(0.000)	(0.000)
Return Variability	**-0.098*****	**-0.058****	**-0.137*****	0.001	0.004	-0.004
	(0.004)	(0.026)	(0.000)	(0.938)	(0.461)	(0.615)
Past Returns	-0.022	**-0.048*****	**-0.033*****	0.000	**-0.009***	-0.006
	(0.165)	(0.000)	(0.005)	(0.966)	(0.082)	(0.221)
Market-to-Book	**0.006*****	**0.005*****	**0.008*****	**0.002*****	**0.002*****	**0.002*****
	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.000)
Size	**0.075*****	**0.042*****	**0.067*****	**0.029*****	**0.018*****	**0.031*****
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Cash-flows	**0.071****	**0.065****	**0.117*****	**0.045***	**0.053*****	**0.056*****
	(0.039)	(0.048)	(0.000)	(0.075)	(0.001)	(0.000)
Leverage	**-0.128*****	**-0.118*****	**-0.116*****	**-0.051*****	**-0.037*****	**-0.047*****
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.013	**0.049****	**0.063*****	-0.017	0.015	0.001
	(0.575)	(0.049)	(0.004)	(0.240)	(0.172)	(0.885)
Changes in Firm and Stock Characteristics$_{(t-2;t-1)}$						
Share Turnover	-2.566	2.394	1.534	-2.423	1.776	1.382
	(0.509)	(0.492)	(0.624)	(0.269)	(0.257)	(0.318)
Return Variability	-0.039	-0.025	**-0.073*****	-0.002	0.002	0.000
	(0.252)	(0.253)	(0.000)	(0.886)	(0.753)	(0.990)
Past Returns	**0.035****	**0.028****	**0.034*****	**0.014***	**0.009***	**0.010****
	(0.030)	(0.026)	(0.003)	(0.075)	(0.088)	(0.036)
Market-to-Book	-0.000	0.002	0.001	-0.001	-0.000	0.000
	(0.912)	(0.127)	(0.432)	(0.367)	(0.452)	(0.557)
Size	0.005	0.010	**-0.020*****	**-0.018*****	**-0.016*****	**-0.013*****
	(0.628)	(0.302)	(0.007)	(0.002)	(0.000)	(0.001)
Cash-flows	-0.033	-0.017	-0.041	-0.008	-0.000	-0.016
	(0.368)	(0.534)	(0.165)	(0.687)	(0.993)	(0.232)
Leverage	-0.014	**-0.042****	0.004	0.019	0.017	**0.017***
	(0.541)	(0.043)	(0.827)	(0.139)	(0.127)	(0.058)
ROA	0.022	0.029	0.022	0.003	0.013	0.002
	(0.389)	(0.164)	(0.211)	(0.850)	(0.178)	(0.802)
Other Control Variables						
S&P 500	**-0.010***	0.000	**-0.011*****	-0.002	-0.000	**-0.002****
	(0.060)	(0.938)	(0.000)	(0.261)	(0.751)	(0.028)
Entrenchment Index	0.001	0.001	-0.001	0.000	-0.000	0.000
	(0.316)	(0.119)	(0.396)	(0.560)	(0.547)	(0.725)
Observations	3,098	4,187	6,035	2,867	3,713	5,485
R-squared	0.061	0.059	0.079	0.060	0.061	0.059

Figure 1: Time-series Cross-sectional Average Number of Firms with Investment Problems by Industry, 1983 – 2006

For each industry in the Fama and French 30 industries classification represented in the dataset, this figure shows the time-series cross-section average of the proportion of firms that over-invest or under-invest (Panel A) and the average ownership stake held by long-term and short-term investors (Panel B). A firm overinvests if: (1) it invests more than its average investment in the previous 3 years (Titman *et al.* (2004)), and (2) it invests too much with respect to its industry peers (Harvey *et al.* (2004), and (3) it invests too much given its growth opportunities, cash-flows, leverage, firm and industry time-invariant characteristics, and trend in investment (Richardson (2006)). Otherwise the firm under-invests. A firm is defined as a non-deviation firm when it cannot be clearly classified neither as a firm that over-invests nor as a firm that under-invests.

Panel A:



Panel B:

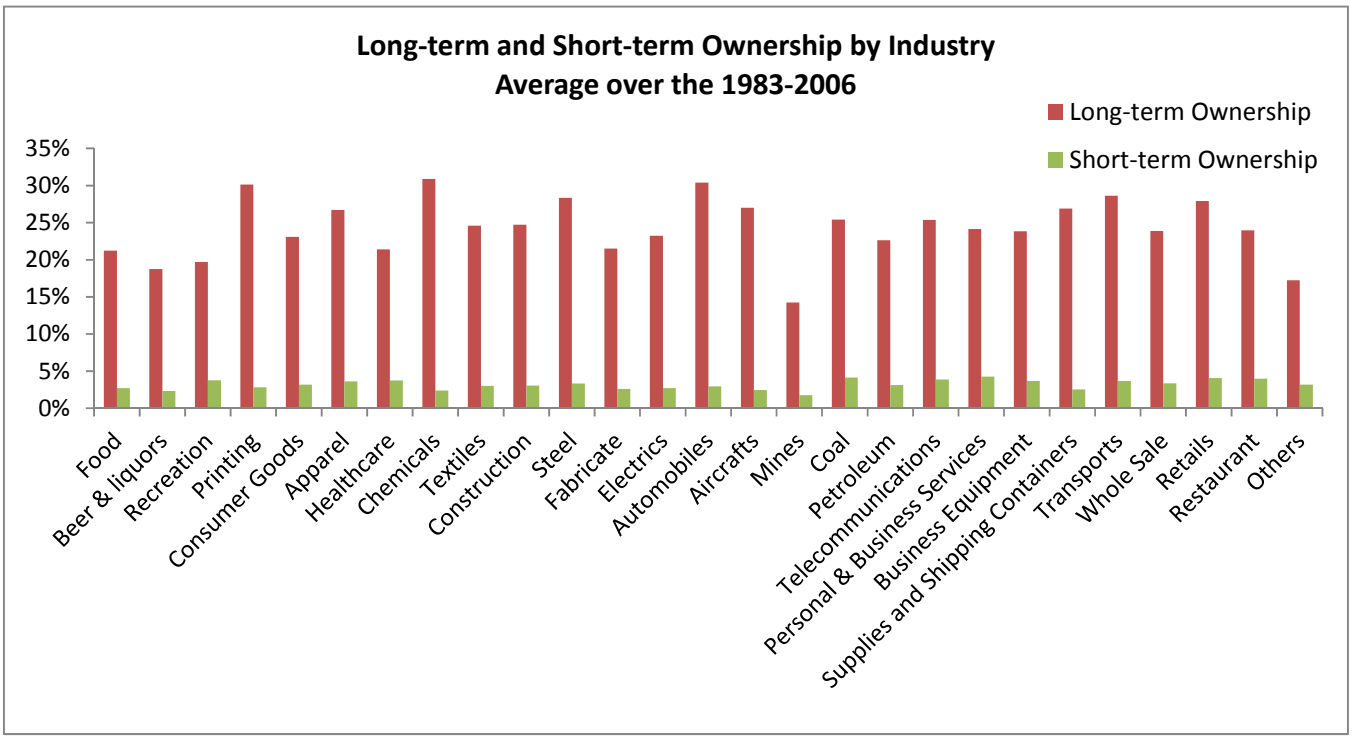


Figure 2: Median Investment by Type of Investment Problem, 1983 – 2006

Each year, this figure shows the median investment for firms that over-invest, under-invest, non-deviation firms and the entire sample. A firm overinvests if: (1) it invests more than its average investment in the previous 3 years (Titman *et al.* (2004)), and (2) it invests too much with respect to its industry peers (Harvey *et al.* (2004), and (3) it invests too much given its growth opportunities, cash-flows, leverage, firm and industry time-invariant characteristics, and trend in investment (Richardson (2006)). Otherwise the firm under-invests. A firm is defined as a non-deviation firm when it cannot be clearly classified neither as a firm that over-invests nor as a firm that under-invests.