



## Are there monitoring benefits to institutional ownership? Evidence from seasoned equity offerings

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### ABSTRACT

We provide new evidence on the monitoring benefits from institutional ownership by analyzing the impact of institutional ownership on stock price and operating performance following seasoned equity offerings, a setting where the effects of monitoring are likely to be especially important. We find that announcement returns are positively and significantly related to total and active institutional ownership levels and concentration. Post-issue stock returns are positively and significantly related to the contemporaneous post-issue changes in total and active institutional ownership and the concentration of their shareholdings. Operating performance improvements are also related to institutional monitoring in the one, two, and three years following the equity issue. Our results continue to hold even after accounting for the possibility that institutional investors have an informational advantage that enables them to identify and invest in subsequently better performing firms. We also empirically eliminate the possibility that our findings are driven by institutions buying past winners and selling past losers as a way to window-dress their portfolio holdings.

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### 1. Introduction

The informational advantage of institutional investors in the context of seasoned equity offerings (SEO) is documented in Gibson et al. (2004) and Chemmanur et al. (2009). Gibson et al. (2004) find that SEOs experiencing the greatest increase in institutional investment outperform their benchmark portfolios significantly, providing evidence that institutions are able to identify above average SEOs at the time of the equity issue. Using detailed, transaction level institutional trading data, Chemmanur et al. (2009) find that institutions are able to identify and obtain more allocations in SEOs with better long-run stock returns. In fact, they also find that higher institutional participation is viewed as positive news about the firm's long-term prospects and these SEOs have a lower offer price discount compared to other SEOs.<sup>1</sup>

In this paper we consider the possibility that institutional investors besides having an informational advantage have a monitoring role as well, which would also lead to a positive relation between institutional ownership characteristics and post-

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<sup>1</sup> In a related vein, Field and Lowry (2009) analyze the relation between institutional ownership and performance following Initial Public Offerings (IPO) and conclude that the performance difference between institutional and individual investors is not due to private information, but rather due to institutions' ability to better interpret publicly available information.

issue performance. We examine this monitoring role while controlling for other factors and explanations. The monitoring role of institutional investors does not contradict or substitute for their informational advantage, and may in fact, even be enhanced by it. To examine the monitoring role of institutional investors we focus on firms that engage in SEOs. While monitoring would be important for any firm at any time, it's likely to be especially discernable and measurable following SEOs given the potential free cash flow problem *a la* Jensen (1986). Equity issues represent some of the largest infusions of capital for a firm, and present the firm with resources that may be potentially misallocated – something that institutional monitoring could correct.

In fact, the misallocation of such significant resources would be similar to the manifestation of the free cash flow problem in firms that receive large windfall cash inflows from lawsuits (Blanchard et al., 1994) and from asset sales (Lang et al., 1995). These agency problems could arise even in firms where the problems didn't exist before since SEOs bring in funds that would be allocated at the manager's discretion. Further, extant evidence shows that SEOs are often associated with an increase in ownership dispersion, exhibit significant negative announcement returns and poor post-issue long-run operating and stock price performance (e.g., Loughran and Ritter, 1995, 1997; Spiess and Affleck-Graves, 1995). In fact, McLaughlin et al. (1996) show this poor long-run performance to be the result of free cash flow related agency problems. Consequently, equity issues constitute a particularly appropriate setting to analyze the incremental benefits from monitoring associated with institutional ownership.<sup>2</sup> In addition, the fact that agency problems are a primary concern for investors around SEOs may be seen from Kim and Purnanandam (2009) who show that the governance structure surrounding SEOs is the primary factor that impacts how investors perceive the productiveness of the offering proceeds.<sup>3</sup>

Several prior studies have documented the key role of institutional investors in corporate governance.<sup>4</sup> For example, Barber (2007) documents cumulative announcement period gains of over \$3 billion associated with targeting of firms by CalPERS, a large activist institutional investor. Chen et al. (2007) show that in the context of mergers, withdrawal of bad bids is more likely in firms with independent long-term institutional investors. Burns et al. (2010) report that monitoring by certain types of institutional investors reduces earnings management. McCahery et al. (2010) find in a survey of institutions in the U.S. and the Netherlands that these investors are willing to engage in different types of active monitoring, including behind-the-scenes activism. Brav et al. (2008) find similar results even for activist hedge funds, and they report that the hedge funds propose strategic, operational, and financial remedies for the targeted firms. Aggarwal et al. (forthcoming) report that firms with higher institutional ownership are more likely to terminate poorly performing CEOs.

These papers show that different types of institutions positively affect different dimensions of operations and governance in firms. Our paper builds upon these studies by integrating them into a few broad questions focused directly on firm performance and valuation. We examine whether institutional monitoring, irrespective of the type of stated or unstated monitoring, has an impact on overall operating performance and whether the change in the level of monitoring explains stock price changes, and hence, the contemporaneous stock returns.

In testing the monitoring hypothesis, we use several measures to capture the degree of monitoring by institutions. First of these is the fraction of the firm's outstanding shares owned by institutions. Second, since the incentive and ability of institutions to monitor management increases with the concentration of ownership, it can be argued that concentration measures are better proxies for monitoring than ownership levels. In fact, in their study of financial misreporting, Burns et al. (2010) report direct evidence that concentration induces greater monitoring by institutions. We, therefore, include two similar measures of concentration of institutional ownership as proxies of institutional monitoring – the fractional ownership of the five largest institutions and the Herfindahl Index of institutional ownership. Finally, Bushee (1998) argues that not all institutions have the same incentives to monitor. Institutions that make long-term, non-transient investments in firms are more active in monitoring than those that are transient owners and hence inactive in scrutinizing the firms' operations.<sup>5</sup> Following Bushee (1998), we also use a measure of active institutional ownership in our study.

According to the monitoring hypothesis, if the market believes there are monitoring benefits to institutional ownership, we would expect to see a positive relation between the ex ante different measures of institutional monitoring and the SEO announcement period returns. We further test the monitoring hypothesis by examining the link between changes in institutional ownership (and concentration) and the contemporaneous post-issue long-term stock price performance. If the market perceives tangible monitoring benefits to institutional ownership, then the stock price at any point in time would reflect the level and concentration of institutional ownership in the firm. As institutional ownership characteristics change over time, the stock price of the firm would change to reflect the change in monitoring benefits. Therefore, the monitoring hypothesis predicts that changes in post-issue total and active institutional ownership and concentration would be related to the contemporaneous post-issue stock price performance.<sup>6</sup> In addition, if institutional monitoring affects real performance, via sales or efficiency improvements, we

<sup>2</sup> Consistent with this, Lee (1997) finds that underperformance after SEOs is mostly confined to the subsample of firms where the proceeds are at the discretion of management (primary offerings), and there is much less, if any, underperformance in the subsample of firms where the proceeds go to the insiders selling the shares (secondary offerings). Therefore, if institutions are effective monitors, we would expect their impact to be visible following primary equity issues.

<sup>3</sup> In a similar vein, using a sample of SEOs for which board composition data are available, Ferreira and Laux (2010) find that firms with independent boards have higher announcement period returns.

<sup>4</sup> See Mikkelsen and Ruback (1985), Black (1992), Strickland et al. (1996), Wahal (1996), Carleton et al. (1998), Wahal and McConnell (2000), and Gillan and Starks (2000).

<sup>5</sup> Burns et al. (2010) find greater earnings management when there are more inactive, transient institutional investors, indicating less monitoring by these investors.

<sup>6</sup> It should be noted that we are *not* examining the difference in long-term performance between firms with high levels of institutional ownership and those with low institutional ownership, because that would presume that the market is slow to fully incorporate institutional ownership levels in stock prices.

would expect a positive relation between post-issue operating performance and institutional ownership measures. Perhaps most importantly, our tests control for the informational advantage of institutional investors. While the information and monitoring hypotheses are not mutually exclusive, we test the monitoring hypothesis by directly controlling for the information hypothesis in different ways, one of which is by using different measures of institutional participation in SEOs as control variables in all our analyses.

We analyze a sample of 3093 public equity issues of primary shares completed in the period 1982–2006 and document a number of results that are consistent with the monitoring hypothesis. We find that the announcement period abnormal returns are significantly less negative for firms with higher concentrations of institutional ownership and for larger institutional holdings, particularly larger active institutional ownership. Our results are robust and economically significant in a cross-sectional regression analysis, where we control for firm-size, fraction of shares issued, prior performance, and a number of other variables, including alternative monitoring mechanisms in place. Our findings suggest that although investors may be concerned about the free cash flow problem following the issue, the adverse impact on share price is substantially mitigated by the presence of certain institutional ownership characteristics.

Also consistent with the monitoring hypothesis, we find that the negative long-term abnormal returns following equity issues are confined to the subsample of firms where institutional monitoring is low. In fact, in the quartile with the highest post-issue institutional monitoring, we find significantly positive abnormal returns following equity issues, and this result is robust to different measures of institutional monitoring. In measuring long-term abnormal returns, we control for the many methodological concerns noted in the literature, and our results are also robust to the use of several different benchmarks. Consistent with the results for stock price performance, we document that changes in operating performance compared to the pre-issue levels is positively and significantly related to the degree of institutional monitoring in the one, two, and three years following the equity issue. We show that even after controlling for the degree of participation by institutional investors in the equity issues, a measure of the informational advantage of institutions, the measures of monitoring continue to explain long-term abnormal operating and stock return performance. Taken together, our evidence is consistent with the view that active and concentrated institutional ownership serve a monitoring role and improve the firm's performance. In a related vein, we also find that the monitoring benefits are unchanged pre- and post-Regulation Fair Disclosure (FD). Post-Regulation FD, institutions may have less of an informational advantage due to the "level playing field" created by the fair disclosure law. However, we find that the varying level of informational advantage of institutional investors has no impact on the monitoring benefits of institutional investors. The monitoring benefits, after controlling for all other factors, remain significant in both sub-periods, consistent with the view that these benefits are incremental to value changes attributable to the informational advantage of institutions.

Finally, we address the potential concern that the three-year abnormal stock price performance of firms may be correlated with the contemporaneous change in institutional ownership measures not because of the monitoring benefits of institutional ownership, but rather because of institutions' propensity to buy past winners and sell past losers. That is, in the 3-year post issue period, institutions may be gradually increasing their ownership in firms that have performed well and we could be incorrectly interpreting this as evidence of monitoring, i.e., evidence that these companies have done well *because* of the monitoring benefits of institutional ownership.

To examine whether the evidence supportive of monitoring in our study is just a result of such institutional trading behavior, we directly examine whether institutions increase (decrease) their holdings in the period following abnormally positive (negative) stock price performance. We find no evidence of such window-dressing-type behavior in the sample. Our tests reveal that the evidence in support of the monitoring hypothesis is *not* a spurious result arising from the propensity of institutional investors to buy past winners or sell past losers.

The remainder of the paper is organized as follows. [Section 2](#) motivates the main implications of the monitoring hypothesis. [Section 3](#) describes the data, the sample selection procedure, the different measures of institutional ownership, and the methodology for computing long-term abnormal stock price and operating performance. [Section 4](#) describes the sample characteristics and other empirical results. [Section 5](#) provides concluding comments.

## 2. Institutional ownership and the monitoring hypothesis

### 2.1. Literature

The comparative advantage of institutional investors such as insurance companies and pension funds in monitoring managers stems from many sources. First, because institutional investors typically control a larger block of votes, managers are more amenable to their demands.<sup>7</sup> [Allen et al. \(2000\)](#) also argue that institutional investors enjoy higher credibility with firms' directors and in the market. Consistent with these views, [Smith \(1996\)](#), [Strickland et al. \(1996\)](#), [Wahal \(1996\)](#), and [Carleton et al. \(1998\)](#) document that institutional investors induce changes in the governance structures and real activities of firms by actively pressuring companies through public targeting of firms with poor performance and through sponsorship of proxy proposals. [Brav et al. \(2008\)](#) analyze activist hedge funds and find that they play a monitoring and advising role in targeted firms. [Aggarwal et al.](#)

<sup>7</sup> [Parrino et al. \(2003\)](#) find evidence consistent with changes in institutional ownership structure influencing board decisions regarding new CEO appointments following forced CEO turnover. Around forced CEO turnover, they also find that although some institutions "vote with their feet," many institutions (over 45% of them) continue to stay with the firm and affect changes.

(forthcoming) find that changes in institutional ownership over time positively impact subsequent internal governance improvements within firms. Second, as Coffee (1991) and Gillan and Starks (2000) argue, institutional investors have greater incentives to monitor since they cannot always sell the shares of underperforming firms. This is not only because trading their large holdings could create adverse price movements and further losses, but also because many institutions index a large portion of their holdings and would be unable to “vote with their feet”.<sup>8</sup>

Further, since the cost of acquiring information about managerial effectiveness likely contains a fixed component, institutional investors can exploit the economies of scale in these costs because they often own a large number of shares. Opler and Sokobin (1998) provide evidence of these scale economies in their study of the Council of Institutional Investors (CII), which is a group of public and private pension funds that own over \$3 trillion in financial assets. The authors find that institutional investors coordinate their activism and engage in “quiet” governance characterized by relationship building and information exchange with management. In this sense, informational advantages of institutions could translate into superior monitoring incentive and ability. Finally, institutional investors also generate additional indirect monitoring of the firm’s management. For instance, O’Brien and Bhushan (1990) report that more analysts follow the stocks and monitor the operations of firms that have larger institutional interest. It is therefore not surprising that McConnell and Servaes (1990) find that in a wide cross-section of firms, equity value is positively related to the firm’s institutional shareholdings.

## 2.2. The monitoring hypothesis

The above arguments suggest that institutional investors may enhance shareholder value by preventing value dissipating activities in the firm. Consequently, the monitoring hypothesis posits that institutional ownership mitigates concerns about free cash flow problems. A number of testable predictions follow from the monitoring hypothesis. First, we would expect to see a positive relation between institutional ownership level at the time of the SEO and the announcement period returns. Second, in the post-issue period, we would expect that the stock price at any point would incorporate the institutional ownership characteristics in the firm at that time. This would imply that as institutional ownership increases, share price will rise to reflect the additional benefits associated with increased monitoring. Hence, in the context of equity issues, the monitoring hypothesis implies that post-issue changes in stock price would be positively related to the *contemporaneous* changes in total and active institutional ownership. Third, since the incentive and ability of institutions to monitor management increases with the concentration of ownership, we would expect a positive relation between post-issue performance and contemporaneous changes in ownership concentration (Burns et al., 2010).

Following Bushee (1998, 2001), and using the classification provided by him, we divide institutional ownership into different components based on the implied incentives of these investors. Bushee (1998, 2001) shows that non-transient institutional owners, i.e., institutions that don’t have a high portfolio turnover and those that don’t rely on momentum trading, serve a monitoring role and reduce pressure on managers for myopic behavior. On the other hand, transient institutional owners encourage myopic behavior, and if they are present in large numbers, cause managers to cut longer-terms investments like R&D to reverse earnings declines. We argue that active institutional investors, i.e., the ones that hold a non-transient ownership in the firm, are the ones that have an incentive to monitor and hence we should expect to see a positive relationship between their levels of ownership and the firms’ operating performance. And, since such ownership levels are publicly available, we would expect a positive relationship between changes in active institutional ownership and contemporaneous long-run stock price performance.

## 3. Data and variable definitions

We obtain data on seasoned public equity issues by publicly traded U.S. companies during the period January 1982 to December 2006 from the *Securities Data Corporation’s (SDC) Global New Issues* database. For seasoned equity offerings of common stock, the SDC database provides information on issuer profile, placement choice, issue price, issue size, filing date, issue date, and after-market pricing, among other details. We remove units, ADRs, REITS, closed-end funds, and firms in regulated industries from our sample.

For each firm, we obtain data on institutional ownership in the quarter prior to the announcement of the equity issue and in the first and the thirteenth quarters following the completion of the equity issue from the *Thomson Reuters Institutional Holdings (13F)* database. Institutional holdings are defined as shares held by registered institutions such as insurance firms, investment companies, pension funds, banks, and money managers. We also require that the issuing firms have at least some financial data on CRSP and Compustat.

The above data requirements yield a total of 3093 equity issues of primary shares over the period 1982–2006. This sample size is among the largest used in studies involving seasoned equity offerings, and more than twice the primary issues data of 1247 firms used in Spiess and Affleck-Graves (1995) and is also larger than the 1881 firms used in the Bayless and Chaplinsky (1996) study.

<sup>8</sup> For instance Carleton et al. (1998) report that CREF indexes 80% of its U.S. equity portfolio. The fact that some institutions don’t sell their holdings often is also evident from their low annual turnover in shareholdings. For example, CalPERS has an annual turnover of about 10% and New York Retirement funds have an annual turnover of just 7% (Gillan and Starks, 2000).

### 3.1. Measures of institutional ownership

Our first measure of institutional ownership is *total institutional ownership*, which is defined as the number of shares held by institutional investors divided by the total number of shares outstanding in the firm. In addition, in order to focus on the type of institutional investors that are incentivized to monitor the firm we use the classification system in Bushee (1998, 2001) to identify the class of “active” institutional investors.<sup>9</sup> Bushee (2001) classifies institutional investors into three categories based on their type. (i) Transient institutional investors are those that have a high portfolio turnover and highly diversified shareholdings. These investors' interest in a firm is confined to searching for short-term trading profits. Given their short investment horizon, they do not have an incentive to invest in any actions or information gathering that would further long-run value. In fact, the results in Bushee (1998) show that firms with a large transient institutional investor base tend to be significantly myopic in their investment behavior. (ii) Quasi-indexers are institutions that have low turnover, a long horizon, and a buy-and-hold investment strategy. (iii) Dedicated institutions are those characterized by large average investments in firms and extremely low turnover consistent with relationship investing and a commitment to providing long-term patient capital. Bushee (2001) states that quasi-indexers and dedicated institutions provide long-term stable ownership to firms because they are geared toward long-term income and capital appreciation. From a managerial and firm monitoring point of view, we classify institutions that fall in the quasi-indexers or dedicated groups as *active institutional investors*. We measure *active institutional ownership* as the number of shares held by active institutional investors divided by the total number of shares outstanding in the firm.

We also consider that the level of monitoring in a firm could be driven by how much each institution owns. Therefore, besides total and active institutional ownership, we also use C5 and Herfindahl index to capture the concentration of institutional ownership in a firm. For each firm, the concentration ratio C5 is the total proportion of shares owned by the five institutional investors with the largest holdings of the firm's shares. *Herfindahl index* is the sum of squares of the proportions of the firm's shares held by institutional investors. A high C5 or Herfindahl index suggests that institutional ownership in the firm is very concentrated, that is, a relatively small number of institutions own a large proportion of the shares. In the context of monitoring, the variables would help classify as “poorly monitored”, those firms where there are several institutions owning the firm's shares but each only holding a small fraction of the shares – essentially the ownership structure least likely to result in monitoring institutional investors (Burns et al., 2010).

We measure the change in the degree of monitoring in a firm in the post-issue period by using the *change in institutional ownership*, *change in active institutional ownership*, the *change in C5*, and the *change in Herfindahl index* from the first full quarter after the equity issue to the end of the thirteenth quarter following the equity issue. In regression analyses, we also control for the *change in the number of institutions* owning the firm's shares from the first full quarter immediately after the equity issue to the thirteenth quarter after the equity issue. If the Herfindahl index falls only because many *new* institutions are buying the firm's shares, this variable would capture this effect on performance.

### 3.2. Performance measures

We measure announcement period abnormal returns as the market adjusted returns around the announcement of equity issues. We use the CRSP value-weighted index as the proxy for market, and cumulate abnormal returns over a three-day interval centered around the event's announcement date. We use two different methods to identify the announcement date of the equity issues. The first method follows the approach in Clark et al. (2001) and Jegadeesh et al. (1993), where the filing date provided by SDC is used as the announcement date for the equity issues. However, using SDC filing dates to proxy for announcement dates may be a problem since some equity issues may have been announced to the market prior to the filing date. Therefore, as a robustness check, we also obtain the actual announcement dates from the *Wall Street Journal* (WSJ).

Obtaining announcement dates from WSJ is complicated by the fact that since 1985 the *Journal* reports only offering information (and not announcement information) in their “new security issues” column. Announcement information, for the large part, is also not available in the *Dow Jones News Retrieval Service*.<sup>10</sup> For the vast majority of firms in our sample, the WSJ announcement dates, when available, match the SDC filing dates. For 118 observations (i.e., about 4% of the sample) we find that the WSJ announcements precede the SDC filing dates. For these firms we replace the SDC filing dates with the more accurate WSJ dates. We find that all the univariate and regression results pertaining to the announcement period abnormal returns were qualitatively similar across the two methods of identifying announcement dates.

In measuring long-term abnormal returns we use different benchmarks and different tests to control for the various statistical problems recently documented in the long-term abnormal returns literature. Fama (1998) and Mitchell and Stafford (2000) argue that using the buy-and-hold abnormal returns methodology overstates test statistics since it ignores cross-sectional dependence of event firm abnormal returns that are overlapping in calendar time. They demonstrate that the monthly calendar-time regressions approach is a more accurate and robust measure of long-term abnormal returns.

<sup>9</sup> We are grateful to Brian Bushee for providing us the Institutional Investor Classification Data.

<sup>10</sup> This is perhaps the reason why in published studies on announcement period returns for public equity issues, the data stops in 1984 (e.g., Jung et al., 1996). In fact, even in Choe et al. (1993) where they analyze equity issues through 1990, the analysis of announcement period returns stops with data ending in 1984.

**Table 1**

Descriptive statistics of financial variables of firms that issued equity over the period 1982–2006. The sample contains 3093 firms that engaged in seasoned equity issues of primary shares during the period from January 1982 to December 2006, identified from the *Securities Data Corporation's (SDC) Global New Issues* database. Leverage is the ratio of total debt to total assets, measured in the year-end prior to the equity issue announcement date. Total assets are defined as the book value of total assets obtained from Compustat. Market value of equity is the product of the total number of shares outstanding and the closing price per share measured in the year-end prior to the equity issue announcement date. Tobin's  $q$  is defined as the ratio of book value of assets minus book value of equity plus market value of equity to the book value of assets. Capital expenditures are measured in the year-end prior to the equity issue announcement date. Issue fraction is the ratio of the number of new shares issued to the total number of shares outstanding prior to the equity issue. Residual variance is the variance of the market model residuals in the 90-day period ending 5 days prior to the announcement date. The CRSP equal-weighted index is used in the market model. Prior 90-day abnormal returns are measured as the difference between the buy-and-hold returns on the firm and the buy-and-hold returns on the CRSP equal-weighted index in the 90-day period ending 5 days prior to the announcement date. Announcement period CAR (cumulative abnormal returns) are the market-adjusted returns cumulated over the interval  $(-1, +1)$  around the announcement date. 3-year holding period abnormal returns are the size and book-to-market ratio adjusted abnormal returns. All the mean and median values of the variables reported below are statistically significantly different from zero at the 1% level.

Variables	Mean	Median
Leverage	0.497	0.497
Total assets (\$ million)	5504.68	337.50
Market value of equity (\$ million)	1904.99	356.97
Age (years)	8.20	6.00
Tobin's $q$	2.512	1.504
Capital expenditures/total assets	0.080	0.047
Issue fraction	0.220	0.168
Residual variance $\times 100$	0.139	0.083
Prior 90-day abnormal return (%)	23.542	11.616
Announcement period CAR (%)	-1.391	-1.502
3-year holding period abnormal returns (%)	-21.96	-39.26
3-year size adjusted return (%)	-29.64	-46.18
3-year BM adjusted return (%)	-18.70	-36.29
3-year Fama–French intercept (%)	-2.28	-1.16

Following Fama and French (1993), Barber and Lyon (1997), and Mitchell and Stafford (2000) we compute the post-issue long-term stock price performance of equity issuing firms on a risk-adjusted basis using calendar-time regressions, and also including the Carhart (1997) momentum factor. Note that controlling for momentum while computing abnormal returns is important when testing the monitoring hypothesis. Suppose that in each period institutional investors invest in past winners either because they are using a momentum strategy or because they are “window-dressing”, then we could find a positive correlation between the abnormal returns in each period and the change in institutional ownership in that period, even if there are no monitoring benefits.<sup>11</sup> Using the momentum-adjusted abnormal returns therefore controls for this problem. In fact, we also directly test for this trading behavior, to examine whether our results pertaining to the monitoring hypothesis are driven by this phenomenon.

As a robustness check we also compute the long-term abnormal *buy-and-hold* returns using size matched, book-to-market ratio matched, and size and book-to-market ratio matched control portfolios following the methodology in Barber and Lyon (1997), Brav and Gompers (1997), and Lyon et al. (1999). The long-term abnormal returns based on these control portfolios yield similar results and conclusions as the FF-based abnormal returns.

Finally, we measure improvement in operating performance over the 3-year period around the equity issue using four different metrics borrowed from Kaplan (1989), Barber and Lyon (1996), and Healy et al. (1997). These metrics are Operating income-to-Assets, Operating income-to-Sales, Operating cash flow-to-Assets, and Operating cash flow-to-Sales. Operating income is defined as income before depreciation (COMPUSTAT data item OIBDP) and Operating cash flow is income before depreciation (OIBDP) minus increase in accounts receivable (RECT) minus increase in inventory (INVT) plus increase in accounts payable (AP) plus increase in other current liabilities (LCO) minus increase in other current assets (ACO). Abnormal performance is the operating income (cash flow) in the 3rd year-end after the issue (i.e., year-end + 2) minus the operating income (cash flow) in the year-end immediately before the issue (i.e., year-end - 1) minus the expected change in operating income or cash flow over this period, standardized by year-end - 1 assets (sales). Year 0 is the year-end immediately following the equity issue. Expected change in operating income (cash flow) is defined as 3 times the growth in operating income (cash flow) over the year - 2 to year - 1 period.

#### 4. Empirical results

Table 1 presents descriptive statistics for the sample of 3093 equity issues. The sample exhibits considerable variation in firm size and market value of equity. The mean book value of total assets is about \$5.5 billion while the median value of total assets is

<sup>11</sup> Window-dressing is a phenomenon in which portfolio managers buy past winners and sell past losers (especially near calendar year-end) in order to present respectable year-end portfolio holdings (Sias and Starks, 1997).

only about \$338 million, which suggests that the sample contains many small firms as well. A somewhat similar distribution is true for the market value of equity. Table 1 also presents information on the equity issues. For each equity offering, we compute issue fraction, which is the ratio of the number of shares issued to the number of shares outstanding before the issue, and find that consistent with previous studies, the mean issue fraction is 22% while the median is 16.8% of the outstanding equity.

The average abnormal announcement return for the sample is  $-1.39\%$ , which is largely consistent with abnormal returns reported in Kim and Purnanandam (2009), Clark et al. (2001), and Jegadeesh et al. (1993). Table 1 also reports that the market-adjusted abnormal holding period returns in the 90 days immediately prior to the announcement of the equity issue is significantly positive (23.54%). This is consistent with the findings of Teoh et al. (1998) that firms issue equity primarily when there is a recent run-up in their stock price. The post issue performance, on the other hand, is significantly negative for the sample of equity issuing firms. We find that the mean size and book-to-market ratio adjusted three-year holding period abnormal returns are  $-21.96\%$ . The mean 3-year abnormal returns adjusted individually for the size and book-to-market ratio are  $-29.64\%$  and  $-18.70\%$ , respectively. These results are consistent with the findings in Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995) and suggest that firms issue equity when the market is overly optimistic about their future prospects, and on average, the firms disappoint investors following the equity issues. The average of the Fama–French regression intercepts also indicates underperformance in the sample of equity issuing firms.

Table 2 presents information on institutional ownership among equity issuing firms. The total institutional ownership in a typical equity issuing firm before the equity issue is 41.3% and increases to about 50% when the issue is completed. The mean number of institutions owning the firm's shares increases by about 19% from about 77 institutions to nearly 92 institutions. The mean active institutional ownership increases from 27% to 31.5%, C5 increases from 0.204 to 0.224, while Herfindahl index increases from 0.019 to 0.021. The increases in the ownership measures are all statistically significant at the 1% level of significance. The results indicate that while the total institutional ownership increases by 21%, the concentration measures increase by only about 10%, and the active institutional ownership increases by about 16.6%. Taken together, these initial results suggest that a typical seasoned issue is subscribed to by many institutional investors who do not already own a large fraction of the firm's shares, some of whom are transient institutions.

#### 4.1. Announcement period returns and institutional ownership

We initially investigate the role of institutional investors in the context of seasoned equity offerings by examining the relation between institutional ownership levels and announcement period abnormal returns. If concerns about agency problems affect the announcement period stock price reaction, then we would expect the presence of potential monitors such as institutional shareholders to mitigate the negative reaction. We use regression analysis to examine the marginal impact of institutional ownership on the announcement period abnormal returns. In the OLS regressions in Table 3, we use the issue-fraction, prior 90-

**Table 2**

Descriptive statistics of institutional ownership variables of firms that issued equity over the period 1982–2006. The sample contains 3093 firms that engaged in seasoned equity issues of primary shares during the period from January 1982 to December 2006, identified from the *Securities Data Corporation's (SDC) Global New Issues* database. For each firm, Total institutional ownership-Prior (Post) is the ratio of the number of shares held by institutional investors to the total number of shares outstanding as of the quarter immediately prior to the equity issue announcement date (quarter immediately following the issue date). Active institutional ownership-Prior (Post) is the ratio of the number of shares held by institutional investors, which are classified as dedicated or quasi-indexer, to the total number of shares outstanding as of the quarter immediately prior to the equity issue announcement date (quarter immediately following the issue date). C5-Prior (Post) is the total proportion of shares owned by the five institutional investors with the largest holdings of the firm's shares as of the quarter immediately prior to the equity issue announcement date (quarter immediately following the issue date). Herfindahl index-Prior (Post) is the sum of squares of the proportions of the firm's shares held by institutional investors as of the quarter immediately prior to the equity issue announcement date (quarter immediately following the issue date). Number of institutional owners-Prior (Post) is the total number of institutional investors owning the firm's shares as of the quarter immediately prior to the equity issue announcement date (quarter immediately following the issue date). Participation is the difference in institutional ownership from the quarter before the announcement to the quarter after the equity issue. The mean and median of all the prior–post differences are statistically significantly different from zero at the 1% level of significance.

Variables	Mean	Median
Total institutional ownership-Prior	0.413	0.384
Total institutional ownership-Post	0.500	0.499
Active institutional ownership-Prior	0.272	0.243
Active institutional ownership-Post	0.315	0.296
C5-Prior	0.204	0.195
C5-Post	0.224	0.213
Herfindahl index-Prior	0.019	0.012
Herfindahl index-Post	0.021	0.015
Number of institutional owners-Prior	77.161	45.000
Number of institutional owners-Post	91.897	61.000
Participation	0.086	0.069

**Table 3**

Regressions relating announcement period abnormal returns to institutional ownership characteristics prior to equity offerings. The dependent variable in the regressions is the three-day cumulative abnormal returns measured as the market-adjusted returns cumulated over the interval  $(-1, +1)$  around the equity issue announcement date.  $INST_{(Q-1)}$  is the ratio of the number of shares held by institutional investors to the total number of shares outstanding as of the quarter immediately prior to the equity issue announcement date. Active  $INST_{(Q-1)}$  is the ratio of the number of shares held by institutional investors, which are classified as dedicated or quasi-indexer, to the total number of shares outstanding as of the quarter immediately prior to the equity issue announcement date.  $C5_{(Q-1)}$  is the total proportion of shares owned by the five institutional investors with the largest holdings of the firm's shares as of the quarter immediately prior to the equity issue announcement date.  $HERF_{(Q-1)}$  is the sum of squares of the proportions of the firm's shares held by institutional investors as of the quarter immediately prior to the equity issue announcement date. Firm size is the natural logarithm of the book-value of total assets in the year-end prior to the equity issue announcement date. Issue fraction is the ratio of the number of new shares issued to the total number of shares outstanding prior to the equity issue. Prior 90-day abnormal returns are measured as the difference between the buy-and-hold returns on the firm and the buy-and-hold returns on the CRSP equal-weighted index in the 90-day period ending 5 days prior to the announcement date. Residual variance is the variance of the market model residuals in the 90-day period ending 5 days prior to the announcement date. The CRSP equal-weighted index is used as the market portfolio in the market model. Age is the equity issue announcement-year minus the initial listing-year on CRSP monthly tapes. Tobin's  $q$  is defined as the ratio of book value of assets minus book value of equity plus market value of equity to the book value of assets. Leverage is the ratio of total debt to total assets, measured in the year-end prior to the equity issue announcement date. White-adjusted  $p$ -values are in parentheses. Results for median regressions are reported in Panel B.

Variable	(1)	(2)	(3)	(4)
<i>Panel A (OLS regressions)</i>				
Intercept	-2.252** (0.021)	-2.163** (0.025)	-2.522*** (0.010)	-2.190** (0.023)
$INST_{(Q-1)}$	1.370*** (0.007)			
Active $INST_{(Q-1)}$		1.929*** (0.004)		
$C5_{(Q-1)}$			2.345** (0.025)	
$HERF_{(Q-1)}$				4.805** (0.012)
G-Index	0.005 (0.944)	0.000 (0.996)	0.006 (0.935)	0.002 (0.979)
Firm size	-0.041 (0.654)	-0.035 (0.690)	0.033 (0.685)	0.067 (0.399)
Issue fraction	-1.144* (0.069)	-1.217** (0.049)	-1.247** (0.042)	-1.230** (0.047)
Prior 90-day abnormal return	-0.300 (0.350)	-0.280 (0.382)	-0.310 (0.333)	-0.293 (0.359)
Residual variance ( $\times 100$ )	2.211** (0.040)	2.254** (0.038)	2.209** (0.039)	2.134** (0.043)
Age (/100)	0.172 (0.911)	-0.064 (0.966)	0.241 (0.875)	0.267 (0.861)
Tobin's $q$	0.047 (0.402)	0.052 (0.346)	0.057 (0.297)	0.057 (0.289)
Leverage	-0.392 (0.475)	-0.404 (0.456)	-0.459 (0.393)	-0.592 (0.274)
Industry fixed effects	Yes	Yes	Yes	Yes
Adjusted $R^2$	1.41	1.35	1.28	1.42
$p(F)$	(0.001)	(0.001)	(0.001)	(0.001)
$n$	2,906	2,929	2,932	2,932
<i>Panel B (median regressions)</i>				
Intercept	-6.9764** (0.0200)	-6.6464** (0.0223)	-6.9234** (0.0188)	-6.8870** (0.0138)
$INST_{(Q-1)}$	0.8758* (0.0784)			
Active $INST_{(Q-1)}$		1.7931*** (0.0024)		
$C5_{(Q-1)}$			1.5185* (0.0573)	
$HERF_{(Q-1)}$				5.0543** (0.0224)
G-Index	0.0323 (0.6682)	0.0094 (0.9005)	0.0109 (0.8814)	0.0275 (0.7077)
Firm size	-0.1029 (0.2288)	-0.1461** (0.0439)	-0.0595 (0.3304)	-0.0287 (0.6784)
Issue fraction	-1.4313** (0.0365)	-1.8697** (0.0105)	-1.6979*** (0.0071)	-1.5820** (0.0456)
Prior 90-day abnormal return	-0.2191 (0.5068)	-0.3851 (0.2752)	-0.3324 (0.2893)	-0.3180 (0.2786)
Residual variance ( $\times 100$ )	1.1399 (0.3308)	1.8328* (0.0813)	1.4913 (0.1333)	1.5659 (0.1324)
Age (/100)	2.8052** (0.0258)	2.3405* (0.0756)	2.4445** (0.0345)	2.6654** (0.0273)

Table 3 (continued)

Variable	(1)	(2)	(3)	(4)
<i>Panel B (median regressions)</i>				
Tobin's q	0.0284 (0.6285)	0.0313 (0.6447)	0.0245 (0.6544)	0.0267 (0.6667)
Leverage	0.1968 (0.6996)	0.5418 (0.2886)	0.2729 (0.5384)	0.1238 (0.7955)
Industry fixed effects	Yes	Yes	Yes	Yes
Pseudo R <sup>2</sup>	7.46	6.86	6.72	6.72
n	2,906	2,929	2,932	2,932

\*\*\* Represents significance at the 1% level.

\*\* Represents significance at the 5% level.

\* Represents significance at the 10% level.

day abnormal returns, and residual variance to control for issue-size, prior performance, and the level of information asymmetry about the firm.<sup>12</sup> We also control for firm size and firm age in the regressions.<sup>13</sup> The regressions further control for other monitoring mechanisms in place in the firm. Following Gompers et al. (2003), we use the *G-Index*, which is a composite measure of 24 governance factors from the corporate charter provisions within the firm, which are counter to the interests of the shareholders.<sup>14</sup> We also use *leverage*, which has been shown in prior research to limit managerial discretion and the free cash flow problem.

The regression results indicate that all measures of institutional monitoring at the time of the issue announcement, total, active, and concentration of institutional ownership, are positively related to the abnormal returns. In regression 1, the coefficient of the level of total institutional ownership at the time of the issue is 1.370, which is statistically significant at the 1% level. This is large in economic terms as well. For a one standard deviation increase in average institutional ownership, the mean announcement period returns increase by 0.36 percentage points, a change of over 25% (from  $-1.39\%$  to  $-1.03\%$ ). Regression 2 indicates that ownership level of active institutions is also positively and significantly related to the announcement period returns at the 1% level. In an unreported regression we find that the coefficient of transient institutional ownership is insignificant, as predicted by the monitoring hypothesis. From regressions 3 and 4, it may be seen that the concentration measures, C5 and Herfindahl index, are significantly positively related to the abnormal returns. Among the control variables, issue fraction and residual variance are statistically significant in explaining the announcement period returns. The results in Table 3 are qualitatively unchanged when we use the announcement period abnormal returns obtained using the alternative specification of the announcement dates.<sup>15</sup> As a robustness check, we estimate median regressions with the same specifications as in Table 3 Panel A. The median regressions are robust regressions that impose less stringent distributional requirements on the regression error term than do standard OLS regressions, and more importantly reduce the impact of outliers in the variables on the regression estimates and inferences. The results are reported in Table 3 Panel B, and they reconfirm the results in Panel A.

In untabulated regressions, we examine *secondary offerings*, issues where the free cash flow problem is less likely to be a concern because the proceeds from the offering accrues to the insiders owning the shares and not to the firm. We find that in the regressions with just secondary offerings, none of the institutional ownership variables are significant. These results are consistent with the view that monitoring by institutional investors is a significant factor for announcement reaction only when the free cash flow problem is likely to be a significant concern.

#### 4.2. Long-term equity performance and institutional ownership

The three-year stock price performance computed as the buy-and-hold abnormal returns adjusted for size-, book-to-market-, and size- and book-to-market-matched benchmarks for the sample of equity issuing firms as well as the intercept term from the Fama–French four-factor time-series regressions presented in Table 1 are all significantly negative. The finding that equity issuing

<sup>12</sup> Residual variance is the variance of the market model residuals in the 90-day period ending 5 days prior to the filing date. The CRSP equal-weighted index is used in the market model. Following Dierkens (1991) and Krishnaswami and Subramaniam (1999) we use this variable to proxy for the level of information asymmetry about a firm. If the investors and the firm's insiders are equally informed about macroeconomic factors affecting equity value, then residual variance in stock returns is caused by the incorporation of firm-specific information in stock prices. So if some of this information was known to the insiders but not to the other investors, then these variable proxies for the level of information asymmetry about a firm.

<sup>13</sup> Additionally, we control for the possibility of partial anticipation in our regressions in Table 3 using the prior 90-day abnormal returns variable. If the equity issuance event is partially anticipated then the pre-event returns would incorporate this effect. Since the equity issues are met with a negative reaction for the typical firm, we would expect the prior 90-day abnormal returns control variable to be less positive (or more negative) for firms where equity issues are more anticipated. We also use the 6-month and the 1-year returns prior to the announcement of the equity issue as alternate specifications for stock price run-up.

<sup>14</sup> G-Index is not available for a vast majority of our sample firms, and as we elaborate in Section 4.7 the subsample for which it is available is not a representative sample of all SEOs. Therefore, to avoid any skewed sample bias we substitute in the average G-Index when the G-Index is missing.

<sup>15</sup> We control for the finding in Bayless and Chaplinsky (1996) that the level of asymmetric information, and hence, announcement period returns, have changed over time. If the average level of information asymmetry in the pool of all equity issuers decreased over time, then it is possible that the relation between announcement period abnormal returns and institutional ownership may change over time as well. To control for this possibility, we add dummy variables that denote various sub-periods in our sample. However, none of the time-dummies is statistically significant and our other results remain virtually unchanged.

firms exhibit poor post-issue performance is not new. In this paper, our emphasis is not on the performance per se, but on the relation between performance and change in institutional ownership. In Table 4, we examine the implications of the monitoring hypothesis that predicts that the post-issue abnormal returns should be positively related to the post-issue changes in institutional ownership. Because we analyze the three year abnormal returns following equity issues, we examine the contemporaneous

**Table 4**

Relation between post-issue changes in institutional ownership and post-issue stock price performance for firms that issued equity over the period 1982–2006. Post-issue change in institutional ownership is the difference in total institutional ownership between the thirteenth and the first quarters immediately following the equity issue. For each firm, total institutional ownership in a quarter is the ratio of the number of shares held by institutional investors to the total number of shares outstanding as of that quarter. The sample is divided into quartiles based on the change in institutional ownership. Quartile 1 contains firms with the largest change in institutional ownership and quartile 4 contains firms with the smallest change. Panel A presents the mean and median change in total institutional ownership in the four quartiles. Panel B presents the long-term abnormal returns for the firms in the four quartiles sorted based on the change in total institutional ownership. Panel C presents the mean and median change in Active institutional ownership in the four quartiles. Panel D presents the long-term abnormal returns for the firms in the four quartiles sorted based on the change in Active institutional ownership. The Fama–French model intercept is the average monthly abnormal return over the three-year period starting from the first quarter end after the equity issue. The returns are computed on risk-adjusted basis using calendar-time regressions. The regressions adjust for the market (MKT), the size (SMB), book-to-market ratio (HML), and momentum (UMD) factors. We obtain the factor returns, MKT, SMB, HML, and UMD from Kenneth French's website. The Size-adjusted, BM-adjusted, and Size and BM-adjusted returns are the average three-year size, book-to-market ratio, and size and book-to-market ratio adjusted holding period abnormal returns, respectively. These abnormal returns are computed using the methodology in Barber and Lyon (1997) and Brav and Gompers (1997). The number of observations in each quartile is in the square parentheses.

Panel A: summary statistics of post-issue changes in total institutional ownership in the four quartiles sorted based on the change in total institutional ownership					
	Quartile 1	Quartile 2	Quartile 3	Quartile 4	p-value for difference between Q1 and Q4
Mean	0.256	0.070	−0.017	−0.199	<.0001
Median	0.217	0.071	−0.014	−0.160	<.0001
Panel B: average long-term abnormal returns following equity issues in the four quartiles sorted based on the change in total institutional ownership					
	Quartile 1 (Large Change)	Quartile 2	Quartile 3	Quartile 4 (Small Change)	p-value for difference between Q1 and Q4
Fama–French model intercept	0.477*** (0.313)*** [618]	0.039 (0.025) [618]	−0.109*** (−0.092)*** [618]	−0.238*** (−0.217)*** [619]	<.0001 <.0001
Size adjusted	0.089 (−0.221)*** [591]	−0.273*** (−0.396)*** [601]	−0.415*** (−0.520)*** [589]	−0.685*** (−0.870)*** [600]	<.0001 <.0001
Book-to-market adjusted	0.213*** (−0.101) [597]	−0.136*** (−0.280)*** [602]	−0.311*** (−0.392)*** [595]	−0.577*** (−0.712)*** [606]	<.0001 <.0001
Size and book-to-market adjusted	0.162*** (−0.125)** [597]	−0.206*** (−0.326)*** [602]	−0.360*** (−0.474)*** [595]	−0.592*** (−0.716)*** [606]	<.0001 <.0001
Panel C: summary statistics of post-issue changes in Active institutional ownership in the four quartiles sorted based on the change in Active institutional ownership					
	Quartile 1	Quartile 2	Quartile 3	Quartile 4	p-value for difference between Q1 and Q4
Mean	0.284	0.090	−0.002	−0.207	<.0001
Median	0.244	0.086	−0.001	−0.149	<.0001
Panel D: average long-term abnormal returns following equity issues in the four quartiles sorted based on the change in Active institutional ownership					
	Quartile 1 (Large Change)	Quartile 2	Quartile 3	Quartile 4 (Small Change)	p-value for difference between Q1 and Q4
Fama–French model intercept	0.183*** (0.128)*** [617]	0.088*** (0.018)* [619]	−0.040 (−0.051)** [618]	−0.154*** (−0.135)*** [619]	<.0001 <.0001
Size adjusted	−0.190*** (−0.372)*** [599]	−0.212*** (−0.418)*** [590]	−0.379*** (−0.588)*** [597]	−0.507*** (−0.653)*** [595]	<.0001 <.0001
Book-to-market adjusted	−0.075 (−0.270)*** [602]	−0.074 (−0.281)*** [593]	−0.254*** (−0.474)*** [600]	−0.411*** (−0.530)*** [605]	<.0001 <.0001
Size and book-to-market adjusted	−0.111** (−0.292)*** [602]	−0.138*** (−0.336)*** [593]	−0.308*** (−0.514)*** [600]	−0.441*** (−0.557)*** [605]	<.0001 <.0001

\*\*\* Represents significance at the 1% level.

\*\* Represents significance at the 5% level.

\* Represents significance at the 10% level.

change in institutional ownership, i.e., the change in institutional ownership from the first full quarter after the equity issue to the thirteenth quarter following the issue. In Panels A and B of Table 4, we sort the firms into quartiles based on the change in institutional ownership in the post-issue period. Quartile 1 contains firms with the largest increase in institutional ownership in the three-year period following the issue and quartile 4 contains firms with the smallest increase or the largest decrease in ownership.

Panel A of Table 4 shows that the mean and median changes in institutional ownership among quartile 1 firms are much larger than the corresponding numbers among the quartile 4 firms, showing a substantial variation in this variable across firms. The difference in means (and medians) between the two quartiles is statistically significant at the 1% level. Panel B of Table 4 reports the average long-term abnormal returns across the quartiles. The Fama–French intercepts presented in the first row show that quartile 1 firms *outperform* their benchmarks by about 48% over the three years following the equity issue, while the quartile 4 firms *underperform* their benchmarks by about 24% over the three year period. The difference between the two quartiles is statistically significant at the 1% level. Similar results may also be seen in the size-adjusted, book-to-market adjusted, and size- and book-to-market adjusted abnormal returns. For instance, the mean size and book-to-market ratio adjusted abnormal 3-year holding period return in quartile 1 is a significantly positive 16% while the corresponding abnormal return in the fourth quartile is –59%. Again, consistent with the implications of the monitoring hypothesis, the difference is significant at the 1% level.

Similar analysis using only the ownership of active institutions is presented in Panels C and D of Table 4. The results reiterate the patterns found in Panels A and B. Firms with the largest increase in active institutional ownership had higher abnormal returns than firms with the lowest change in active institutional ownership. This holds for all four measures of abnormal returns, and the quartile 1 versus 4 differences are all significant at the 1% level.

#### 4.3. Long-term operating performance and institutional ownership

In this section we study the relation between the post-issue average levels of institutional ownership characteristics and the post-issue improvement in operating performance. We analyze *average* levels of institutional ownership characteristics as opposed to *changes* because unlike stock price which would incorporate the information contained in ownership levels immediately, operating performance changes only over time. That is, unlike stock price, the operating performance metric does not incorporate *anticipated* benefits from institutional monitoring. These results are presented in Table 5 and the evidence is consistent with the monitoring hypothesis. In Table 5 Panel A, we sort firms into quartiles based on their average total institutional

**Table 5**

Relation between post-issue changes in institutional ownership and post-issue improvement in operating performance for firms that issued equity over the period 1982–2006. Post-issue change in institutional ownership is the difference in total (Active) institutional ownership between the thirteenth and the first quarters following the equity issue. For each firm, total institutional ownership in a quarter is the ratio of the number of shares held by institutional investors to the total number of shares outstanding as of that quarter. Active institutional ownership in a quarter is the ratio of the number of shares held by institutional investors, which are classified as dedicated or quasi-indexer, to the total number of shares outstanding as of that quarter. The sample is divided into quartiles based on the change in total and active institutional ownership in Panels A and B respectively. Quartile 1 contains firms with the largest change in institutional ownership and quartile 4 contains firms with the smallest change. OPINC is operating income before depreciation (COMPUSTAT data item OIBDP). OCF is operating income before depreciation (OIBDP) plus decrease in accounts receivable (RECT) plus decrease in inventory (INVT) plus increase in accounts payable (AP) plus increase in other current liabilities (LCO) plus decrease in other current assets (ACO). Operating performance is defined as OPINC or OCF. Improvement in operating performance around the equity issue is defined as the operating performance in year + 2 minus the operating performance in year – 1 minus the expected change in operating performance over this period, standardized by year – 1 assets (sales). Year 0 is the year of the equity issue. Expected change in operating performance is defined as 3 times the growth in operating performance over the year – 2 to year – 1. The number of observations in each group is in the square brackets. The last column gives the *p*-values for the difference in the median improvement in operating performance between quartiles 1 and 4.

Improvement in operating performance	Quartile 1	Quartile 2	Quartile 3	Quartile 4	<i>p</i> -values for difference in medians between Q1 and Q4
<i>Panel A (quartiles based on change in total institutional ownership)</i>					
OPINC/assets	5.51 <sup>***</sup> [499]	2.78 <sup>***</sup> [499]	–0.04 [499]	0.76 [499]	<.0001
OPINC/sales	8.76 <sup>***</sup> [499]	4.18 <sup>***</sup> [499]	–0.06 [499]	2.14 <sup>*</sup> [499]	<.0001
OCF/assets	8.15 <sup>***</sup> [447]	6.27 <sup>***</sup> [416]	–0.49 [394]	–2.34 [379]	<.0001
OCF/sales	9.58 <sup>***</sup> [446]	7.37 <sup>***</sup> [410]	–0.79 [397]	–3.06 [382]	<.0001
<i>Panel B (quartiles based on change in active institutional ownership)</i>					
OPINC/assets	4.62 <sup>***</sup> [503]	2.15 <sup>***</sup> [503]	0.92 [503]	0.52 [504]	<.0001
OPINC/sales	7.35 <sup>***</sup> [503]	3.76 <sup>***</sup> [503]	1.98 [503]	1.41 [504]	<.0001
OCF/assets	6.99 <sup>***</sup> [433]	5.98 <sup>***</sup> [418]	0.04 [408]	–1.89 [390]	<.0001
OCF/sales	7.90 <sup>***</sup> [428]	5.48 <sup>***</sup> [415]	–0.08 [412]	–2.77 [394]	<.0001

\*\*\* Represents significance at the 1% level.

\*\* Represents significance at the 5% level.

\* Represents significance at the 10% level.

ownership over the first four quarters immediately following the equity issue. Quartile 1 contains the firms with the highest institutional ownership and quartile 4 contains the firms with the lowest institutional ownership in this period. Consistent with the view that institutional investors are effective monitors of the firms' management the results indicate that firms in quartile 1 exhibit the highest improvement in each of our four measures of operating performance, while firms in quartile 4 exhibit the lowest. The difference in improvement between the first and fourth quarters is statistically significant at the 1% level consistently.

In Panel B of Table 5 we repeat this analysis by classifying the average ownership of active institutions over the first year following the equity issue into quartiles. Again the results indicate that firms with the largest levels of active institutional ownership had higher operating performance improvements than firms with the lowest levels of active institutional ownership. This holds for all four measures of improvement in operating performance, and the quartile 1 versus 4 differences are all significant at the 1% level. Again, quartile 1 firms show significant improvement in operating performance in all four metrics while quartile 4 firms show no significant improvement in any of the metrics.

#### 4.4. Monitoring benefits and informational advantages of institutional ownership

The information hypothesis as suggested by Gibson et al. (2004) and Chemmanur et al. (2009) posits that institutional investors have an informational advantage in evaluating the future prospects of a firm. Institutions may be more willing to incur the fixed cost in estimating the value and future cash flows of a firm since they can amortize this cost over their larger holdings. Further, since institutions typically invest in a large number of different stocks, they are able to exploit the economies of scope in evaluating firm quality. Finally, as Field and Lowry (2009) find in their study of IPOs, institutions may also be better at interpreting publicly available information.

Our finding of a relation between post-issue ownership changes and performance may thus be driven by the fact that institutions have better information and our empirical finding may be a result of institutions' foreknowledge of firms' performance. However, if institutions are indeed better informed than other investors or are better at interpreting public information, they should avoid the equity issues of overvalued firms and firms with poor future operating performance. We would therefore expect that when institutional investors purchase more shares in an equity issue or when more institutions buy shares in the issue, the subsequent stock price performance would be non-negative.

To control for this information effect we add measures of institutional participation in the equity issues to our model specifications. Following Gibson et al. (2004), for each firm, we measure the net *participation* by institutions as the difference in institutional ownership from the quarter before the announcement to the quarter after the equity issue. Besides direct purchases from the firm in the SEO, this participation measure also incorporates purchases and sales undertaken by institutional investors in the open market upon the equity issue announcement.

However, the above measure of participation may not always fully capture the amount of institutional interest in an equity issue in situations where there are restrictions on the amount of ownership each institution may have in a single firm. For instance, Comptroller regulations restrict bank trust funds from owning more than 10% of their assets in any one company, the 1940 Investment Company Act places restrictions on the extent of mutual fund ownership in any one stock, and the New York Insurance Law requires that insurers operating in New York invest no more than 2% of their assets in any single stock. Similarly, ERISA requires "sensible" diversification by pension funds, which indirectly restricts ownership in any one stock. We therefore use another measure of participation, *institutional interest*, which is the number of institutions subscribing to the equity issue, as an alternative way to capture the sentiment of institutional investors about an equity issue. Institutional interest is computed as the number of institutions in the quarter immediately after the equity issue minus the number in the quarter immediately prior to the equity issue divided by the number of institutions in the quarter prior to the equity issue. This variable better represents institutional participation in equity issues when regulations become binding on institutions' ownership of individual stocks.

#### 4.5. Multivariate analysis

We examine the monitoring hypothesis in a multivariate framework using OLS and median regressions that control for firm-size, issue-fraction, past performance, announcement period reaction, firm-age, and institutional participation. Besides these, following the work of Berger and Ofek (1999) we also use two variables, *takeover pressure* and *change in debt level*, to control for the impact of other monitoring mechanisms on long-term firm performance. We capture takeover pressure using a dummy variable that is one if the firm was targeted by a bidder in the one year period before the equity issue to three years after the equity issue, and zero otherwise. Change in debt level is measured as the ratio of long-term debt in year-end +2 minus the long-term debt in year-end -1 to the total assets of the firm at year-end -1. Assuming that attempted takeovers and the increase in debt level proxy for the level of external monitoring pressure and the disciplining role of debt, respectively, we expect a positive relation between these two variables and contemporaneous stock price performance. The dependent variable in the regressions in Table 6 Panels A and B is the 3-year abnormal return measured using the Fama–French intercepts.<sup>16</sup>

We examine the implications of the monitoring hypothesis by analyzing the impact of the changes in institutional ownership and changes in the concentration measures of ownership on abnormal returns. Since, we measure changes in ownership

<sup>16</sup> We also use the abnormal holding period returns measured against the size-matched, the book-to-market ratio matched, and size and book-to-market ratio matched control portfolios as the dependent variable in the regressions. Since the results are qualitatively similar to the ones in Table 6, we do not report them here.

**Table 6**

Regressions relating post-issue stock price performance to institutional investor participation and post-issue changes in institutional ownership.

Model	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A (OLS regressions)</i>						
Intercept	−3.549*** (0.0006)	−3.066*** (0.0056)	−3.307*** (0.0058)	−2.835** (0.0195)	−2.940** (0.0110)	−2.962*** (0.0095)
INST <sub>(Q+1)</sub>	0.951*** (0.0002)	0.500** (0.0436)				
Δ INST <sub>(Q+13, Q+1)</sub>	5.012*** (<.0001)	3.269*** (<.0001)				
Active INST <sub>(Q+1)</sub>			0.307 (0.3641)	−0.194 (0.5381)		
Δ Active INST <sub>(Q+13, Q+1)</sub>			2.386*** (<.0001)	1.234*** (<.0001)		
C5 <sub>(Q+1)</sub>					0.018 (0.9719)	
Δ C5 <sub>(Q+13, Q+1)</sub>					1.374** (0.0264)	
HERF <sub>(Q+1)</sub>						1.062 (0.2625)
Δ HERF <sub>(Q+13, Q+1)</sub>						7.818*** (0.0030)
Δ Number of institutions <sub>(Q+13, Q+1)</sub>		0.015*** <.0001		0.018*** <.0001	0.019*** <.0001	0.019*** <.0001
Firm size	−0.031 (0.4005)	−0.094** (0.0177)	−0.001 (0.9739)	−0.086** (0.0292)	−0.092** (0.0133)	−0.093** (0.0118)
Issue fraction	0.150 (0.4437)	0.213 (0.2434)	0.121 (0.5414)	0.209 (0.2490)	0.188 (0.3118)	0.185 (0.3135)
Prior 90-day abnormal return	0.048 (0.6738)	0.120 (0.3091)	0.059 (0.5980)	0.144 (0.2102)	0.164 (0.1573)	0.164 (0.1535)
Announcement period abnormal returns	1.034 (0.2549)	1.459 (0.1022)	1.066 (0.2486)	1.523* (0.0859)	1.467 (0.1014)	1.455 (0.1036)
Participation	1.563*** (0.0010)	1.231*** (0.0059)	1.361*** (0.0044)	0.974** (0.0245)	0.990** (0.0215)	0.963** (0.0251)
Age	−0.016*** (0.0073)	−0.017*** (0.0015)	−0.016*** (0.0067)	−0.016*** (0.0029)	−0.017*** (0.0027)	−0.017*** (0.0025)
Takeover pressure	0.036 (0.7269)	0.067 (0.4858)	−0.006 (0.9534)	0.050 (0.6027)	0.048 (0.6152)	0.048 (0.6213)
Change in debt	0.295*** (0.0032)	0.198** (0.0217)	0.398*** (0.0003)	0.236*** (0.0065)	0.226*** (0.0092)	0.232*** (0.0074)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup> (%)	13.85	22.06	5.31	19.32	18.82	18.86
p(F)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
n	2,141	2,141	2,210	2,210	2,213	2,213
<i>Panel B (median regressions)</i>						
Intercept	−5.233** (0.0178)	−0.635 (0.7613)	−1.190 (0.5957)	−4.623** (0.0395)	−4.526** (0.0347)	−4.526** (0.0383)
INST <sub>(Q+1)</sub>	0.499** (0.0331)	0.234 (0.2750)				
Δ INST <sub>(Q+13, Q+1)</sub>	4.307*** (<.0001)	2.534*** (<.0001)				
Active INST <sub>(Q+1)</sub>			0.390 (0.2108)	−0.171 (0.4776)		
Δ Active INST <sub>(Q+13, Q+1)</sub>			1.996*** (<.0001)	1.198*** (<.0001)		
C5 <sub>(Q+1)</sub>					0.160 (0.6984)	
Δ C5 <sub>(Q+13, Q+1)</sub>					1.620*** (0.0029)	
HERF <sub>(Q+1)</sub>						0.552 (0.7137)
Δ HERF <sub>(Q+13, Q+1)</sub>						7.730*** (0.0065)
Δ Number of institutions <sub>(Q+13, Q+1)</sub>		0.016*** (<.0001)		0.019*** (<.0001)	0.021*** (<.0001)	0.021*** (<.0001)
Firm size	0.012 (0.7606)	−0.081** (0.0259)	0.000 (0.9939)	−0.122*** (0.0006)	−0.138*** (<.0001)	−0.136*** (<.0001)
Issue fraction	0.070 (0.7422)	0.159 (0.4159)	0.074 (0.6763)	0.107 (0.5395)	0.107 (0.4956)	0.088 (0.6201)

(continued on next page)

Table 6 (continued)

Model	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel B (median regressions)</i>						
Prior 90-day abnormal return	−0.003 (0.9835)	0.046 (0.6607)	−0.047 (0.6621)	0.006 (0.9586)	0.085 (0.4448)	0.056 (0.6269)
Announcement period abnormal returns	1.681* (0.0551)	1.576*** (0.0053)	1.196 (0.1358)	0.818 (0.2167)	0.802 (0.2877)	1.039 (0.1356)
Participation	1.563*** (0.0024)	1.093** (0.0214)	0.884* (0.0778)	0.782* (0.0757)	0.652 (0.1204)	0.746 (0.1131)
Age	−0.010 (0.1405)	−0.012** (0.0278)	−0.011 (0.1105)	−0.008 (0.1848)	−0.008 (0.2523)	−0.009 (0.1803)
Takeover pressure	−0.026 (0.8030)	0.088 (0.3492)	−0.083 (0.4593)	0.060 (0.5073)	0.043 (0.6507)	0.024 (0.7819)
Change in debt	0.185* (0.0914)	0.133* (0.0969)	0.289*** (0.0210)	0.147** (0.0460)	0.146* (0.0857)	0.144 (0.1310)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R <sup>2</sup> (%)	13.69	19.65	7.12	15.93	15.47	15.42
n	2,141	2,141	2,210	2,210	2,213	2,213

The dependent variable in the regressions in Table 6 is the Fama–French model intercept, which is the average monthly abnormal return for each firm over the three-year period starting from the first quarter end after the equity issue. These returns are computed on a risk-adjusted basis using calendar-time regressions. The regressions adjust for the market (MKT), size (SMB), book-to-market ratio (HML), and momentum (UMD) factors. We obtain the factor returns, MKT, SMB, HML, and UMD from Kenneth French's website. The dependent variable in the regressions in Table 7 is the improvement in operating performance of the firms following the equity issues. Operating performance is operating income before depreciation (COMPUSTAT data item OIBDP). For each firm, improvement in operating performance is defined as the operating income in year +2 minus the operating income in year −1 minus the expected change in operating income over this period, standardized by year −1 assets. Year 0 is the year of the equity issue. Expected change in operating income is defined as 3 times the growth in operating income over the year −2 to year −1. The independent variables are defined as follows.  $INST_{(Q+1)}$  is the ratio of the number of shares held by institutional investors to the total number of shares outstanding as of the quarter immediately after the equity issue date.  $Active\ INST_{(Q+1)}$  is the ratio of the number of shares held by institutional investors, which are classified as dedicated or quasi-indexer, to the total number of shares outstanding as of the quarter immediately after the equity issue date.  $C5_{(Q+1)}$  is the total proportion of shares owned by the five institutional investors with the largest holdings of the firm's shares as of the quarter immediately following the equity issue date.  $HERF_{(Q+1)}$  is the sum of squares of the proportions of the firm's shares held by institutional investors as of the quarter immediately following the equity issue date.  $\Delta\ INST_{(Q+13, Q+1)}$  is the difference in total institutional ownership between the thirteenth and the first quarters following the equity issue.  $\Delta\ Active\ INST_{(Q+13, Q+1)}$  is the difference in Active institutional ownership between the thirteenth and the first quarters following the equity issue.  $\Delta\ C5_{(Q+13, Q+1)}$  is the difference in C5 between the thirteenth and the first quarters following the equity issue.  $\Delta\ HERF_{(Q+13, Q+1)}$  is the difference in Herfindahl index of institutional ownership between the thirteenth and the first quarters following the equity issue.  $\Delta\ Number\ of\ Institutions_{(Q+13, Q+1)}$  is the difference in the number of institutions holding the firm's shares in the thirteenth and the first quarters following the equity issue.  $INST\ Average$  is the mean  $INST$  over the four quarters following the equity issue.  $Active\ INST\ Average$  is the mean  $Active\ INST$  over the four quarters following the equity issue.  $C5\ Average$  is the mean  $C5$  over the four quarters following the equity issue.  $HERF\ Average$  is the mean  $HERF$  over the four quarters following the equity issue.  $Firm\ size$  is the natural logarithm of the book-value of total assets in the year-end prior to the equity issue.  $Issue\ fraction$  is the ratio of the number of new shares issued to the total number of shares outstanding prior to the equity issue. Prior 90-day abnormal returns are measured as the difference between the buy-and-hold returns on the firm and the buy-and-hold returns on the CRSP equal-weighted index in the 90-day period ending 5 days prior to the announcement date. Announcement period abnormal returns are the three-day cumulative abnormal returns measured as the market-adjusted returns cumulated over the interval  $(-1, +1)$  around the announcement date. Participation is the difference in institutional ownership from the quarter before the announcement to the quarter after the equity issue. Institutional interest is the number of institutions in the quarter immediately after the equity issue minus the number of institutions in the quarter immediately prior to the equity issue announcement divided by the number of institutions in the quarter immediately prior to the equity issue announcement. Age is the equity issue announcement-year minus the initial listing-year on CRSP monthly tapes. Takeover pressure is a dummy variable that is one if the firm was targeted by a bidder in the period one year before the equity issue to three years after the equity issue, and zero otherwise. Change in debt level is measured as the ratio of long-term debt in year +3 minus the long-term debt in year 0 to the total assets of the firm in year 0. White-adjusted  $p$ -values are in parentheses.

\*\*\* Represents significance at the 1% level.

\*\* Represents significance at the 5% level.

\* Represents significance at the 10% level.

beginning from the quarter immediately following the equity issue, we use the level of ownership in quarter 1 as a control variable. If changes in ownership levels are smaller for firms with larger quarter 1 ownership levels, then including the quarter 1 ownership level controls for this effect. Panel B of Table 6 contains results from median regressions, but with the same set of variables as in Panel A.<sup>17</sup>

Consistent with the conclusions of previous studies we find evidence supporting the informational advantage of institutional investors. The coefficient of participation is statistically significant in all the regressions in Panel A, and in all but the last two median regressions in Panel B, a finding that is similar to the results in Gibson et al. (2004) and Chemmanur et al. (2009). Our results, which are on a broader dataset and in a wider time period than in prior studies, are consistent with the view that institutional investors are better able to identify firms about whom the market is overly optimistic. The results are also consistent with the findings in Field and Lowry (2009) in their study of IPOs.

Nevertheless, even after controlling for the information role, the results in Panels A and B of Table 6 indicate that monitoring by institutions significantly explains long-term stock performance. We find that changes in post-issue institutional ownership, changes in active institutional ownership, and the changes in concentration of ownership are significantly positively related to the

<sup>17</sup> We re-estimate all the same regressions but with *participation* being replaced with *institutional interest*, an alternative proxy for institutional participation. However, since the results were all qualitatively similar to the ones in Table 6, we do not report them in the tables.

contemporaneous long-term abnormal returns. In the first and second regressions in Panel A, the coefficient of the change in total institutional ownership is 5.012 and 3.269, respectively, which are both significantly different from zero at the 1% level. The results imply that an increase of one standard deviation in the change in institutional ownership from quarter 1 to quarter 13 results in at least a 25% increase in long-run risk-adjusted returns over the same time-interval. From regressions 3 and 4 it may be seen that change in the active institutional ownership is also significantly positively related to the long-term abnormal returns. Those coefficients are 2.386 and 1.234, respectively, and are also significant at the 1% level. In addition, regressions 2, 4, 5, and 6 show that the change in the number of institutions owning the firms' shares is also positively and significantly related to long-term abnormal returns. Further, the change in C5 and Herfindahl index are both positively and significantly related to the abnormal returns. These results clearly support the view that institutional monitoring plays a clear incremental role in explaining performance.

Further, the results indicate the relation between changes in institutional ownership measures and the contemporaneous stock price performance obtains even after controlling for takeover pressure and change in debt level, the proxies for alternative monitoring mechanisms. In addition, we control for firm size, issue fraction, announcement period abnormal returns, and firm age, all of which are statistically significantly related to long-term performance in most regressions. The coefficient of firm size is significant and negative indicating that among equity issuing firms, larger firms perform more poorly compared to the underperformance among other firms.<sup>18</sup> The regressions also indicate that the prior 90-day abnormal return is not significantly related to long-term abnormal returns. It is not surprising that past performance is not significant since our abnormal returns measure explicitly controls for momentum in the calendar-time regressions.

Table 7 provides further evidence on the monitoring hypothesis in explaining the link between institutional ownership and firm performance. If there are tangible monitoring related benefits from institutional ownership, we expect to see a positive relation between post-issue institutional ownership and improvement in operating performance. In Table 7 we use standard OLS and median regressions to examine the incremental impact of institutional ownership characteristics on improvement in operating performance after controlling for other variables. In particular, we examine whether average institutional ownership in the first year after the equity issue affects operating income.<sup>19</sup> The dependent variable is the abnormal improvement in operating income from the year-end right before the equity issue to the third year-end after the issue. The other independent variables include firm size, issue fraction, institutional participation, firm age, takeover pressure, and change in debt level, all of which are control variables. The regression results indicate that firms with a greater post-issue average total institutional ownership show a higher improvement in operating performance. More importantly, the improvement in operating performance is also statistically and significantly positively related to the average level of active institutional investor ownership and the average concentration measures of ownership, C5 and Herfindahl. In terms of economic impact, for example, holding everything else constant, a one standard deviation increase in the average active institutional ownership is associated with a 3.30 percentage point increase in abnormal operating performance. These results are consistent with the monitoring hypothesis that institutional investors do improve the operating performance of the firms.

As with long-term abnormal returns, the evidence obtains even after controlling for the informational advantage of institutional investors. The regression results indicate that the coefficient of participation is statistically significant in all the regressions in Table 7.<sup>20</sup> The results are also robust to controlling for the alternative monitoring mechanisms, takeover pressure and change in debt, the coefficient of the latter being positive and statistically significant consistent with the extant literature. In regressions 5 and 6 of Table 7, we estimate median regressions using the same variable specifications as in the first two regression models of the table and find that the inferences from the results are unchanged.

Field and Lowry (2009) consider whether monitoring explains the performance differences between institutions and individuals in IPO firms, and they conclude that it is institutions' ability to better interpret publicly available information rather than monitoring that explains the performance differences following IPOs. Although our results support the monitoring hypothesis they do not necessarily contradict the findings in Field and Lowry (2009). First they analyze a sample of IPOs, firms that have very limited histories especially in the public eye. So, information available to the market is more likely to be unreliable in their sample of firms than in our sample of more mature firms conducting SEOs. Thus, it is not surprising that the information hypothesis plays a more important role in their sample. Second, the agency problem of free cash flow is more likely to be important for seasoned firms (our sample) than in their sample of IPOs, i.e., a sample that's typically made up of young firms with good growth opportunities. Therefore, the monitoring role is predictably more important in the sample of SEO firms.

#### 4.6. Monitoring or window dressing?

Sias and Starks (1997) argue that "since institutional investors are evaluated in relation to their peers, just prior to the calendar year-end, they may buy winners and sell losers in order to present respectable year-end portfolio holdings". Although window-dressing is normally a year-end effect, a similar, but, event-time effect of window-dressing may affect the inferences in our study. In our context, it is possible that the three-year abnormal stock price (and operating) performance of firms are correlated with the contemporaneous change in institutional ownership (and the average institutional ownership) measures not because of the

<sup>18</sup> We also replaced firm size with the natural logarithm of market value of equity and obtained similar results. This coefficient was negative and significant, while the other results remained qualitatively unchanged.

<sup>19</sup> In addition to the average institutional ownership level in the first year after the equity, we also examined the impact of the average ownership over the first two and three years after the issue. The inferences were unchanged, so we report the results of only the first year average ownership in the tables.

<sup>20</sup> As with the results in Table 6, none of the inferences change when we use institutional interest in the place of participation.

Table 7

Regressions relating the improvement in operating performance to institutional investor participation and post-issue changes in institutional ownership.

Regression type	OLS	OLS	OLS	OLS	Median	Median
Model	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	−26.118 (0.0384)	−26.903 (0.0314)	−31.378 (0.0139)	−29.875 (0.0183)	−8.838 (0.5258)	−4.001 (0.7917)
INST Average	16.883*** (0.0075)				6.835*** (0.0003)	
Active INST average		18.271** (0.0174)				7.050*** (0.0038)
C5 average			22.810* (0.0988)			
HERF average				78.821** (0.0447)		
Firm size	0.378 (0.7672)	0.788 (0.5348)	1.475 (0.2014)	1.641 (0.1654)	0.086 (0.7628)	0.315 (0.2729)
Issue fraction	0.712 (0.8936)	0.179 (0.9730)	−0.131 (0.9797)	0.153 (0.9766)	−2.139 (0.4039)	−1.736 (0.5247)
Prior 90-day abnormal return	−9.358*** (0.0041)	−8.874*** (0.0062)	−9.243*** (0.0044)	−9.291*** (0.0042)	−4.240** (0.0192)	−4.519*** (0.0104)
Announcement period abnormal returns	−17.129 (0.5393)	−15.918 (0.5674)	−16.005 (0.5664)	−15.931 (0.5684)	3.088 (0.7637)	5.936 (0.5557)
Participation	31.053** (0.0315)	36.142*** (0.0097)	35.867** (0.0106)	37.873*** (0.0088)	7.168* (0.0999)	9.980*** (0.0190)
Age	0.284* (0.0515)	0.257* (0.0755)	0.280* (0.0540)	0.279* (0.0543)	0.036 (0.4247)	0.025 (0.6076)
Takeover pressure	1.192 (0.6820)	1.053 (0.7147)	0.929 (0.7476)	1.027 (0.7217)	−0.775 (0.3298)	−1.081 (0.1578)
Change in debt	14.573* (0.0559)	14.742* (0.0508)	14.979** (0.0466)	15.064** (0.0439)	9.370*** (0.0001)	9.953*** (<.0001)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R <sup>2</sup> (%)	3.53	3.40	3.38	3.48	10.56	9.94
p(F)	(0.001)	(0.001)	(0.001)	(0.001)		
n	2,116	2,136	2,136	2,136	2,120	2,140

The R<sup>2</sup> is Psuedo R<sup>2</sup> in the case of median regressions, i.e., in regression models (5) and (6).

The dependent variable in the regressions in Table 6 is the Fama–French model intercept, which is the average monthly abnormal return for each firm over the three-year period starting from the first quarter end after the equity issue. These returns are computed on a risk-adjusted basis using calendar-time regressions. The regressions adjust for the market (MKT), size (SMB), book-to-market ratio (HML), and momentum (UMD) factors. The dependent variable in the regressions in Table 7 is the improvement in operating performance of the firms following the equity issues. Operating performance is operating income before depreciation (COMPUSTAT data item OIBDP). For each firm, improvement in operating performance is defined as the operating income in year + 2 minus the operating income in year − 1 minus the expected change in operating income over this period, standardized by year − 1 assets. Year 0 is the year of the equity issue. Expected change in operating income is defined as 3 times the growth in operating income over the year − 2 to year − 1. The independent variables are defined as follows. INST<sub>(Q+1)</sub> is the ratio of the number of shares held by institutional investors to the total number of shares outstanding as of the quarter immediately after the equity issue date. Active INST<sub>(Q+1)</sub> is the ratio of the number of shares held by institutional investors, which are classified as dedicated or quasi-indexer, to the total number of shares outstanding as of the quarter immediately after the equity issue date. C5<sub>(Q+1)</sub> is the total proportion of shares owned by the five institutional investors with the largest holdings of the firm's shares as of the quarter immediately following the equity issue date. HERF<sub>(Q+1)</sub> is the sum of squares of the proportions of the firm's shares held by institutional investors as of the quarter immediately following the equity issue date. Δ INST<sub>(Q+13, Q+1)</sub> is the difference in total institutional ownership between the thirteenth and the first quarters following the equity issue. Δ Active INST<sub>(Q+13, Q+1)</sub> is the difference in Active institutional ownership between the thirteenth and the first quarters following the equity issue. Δ C5<sub>(Q+13, Q+1)</sub> is the difference in C5 between the thirteenth and the first quarters following the equity issue. Δ HERF<sub>(Q+13, Q+1)</sub> is the difference in Herfindahl index of institutional ownership between the thirteenth and the first quarters following the equity issue. Δ Number of Institutions<sub>(Q+13, Q+1)</sub> is the difference in the number of institutions holding the firm's shares in the thirteenth and the first quarters following the equity issue. INST Average is the mean INST over the four quarters following the equity issue. Active INST Average is the mean Active INST over the four quarters following the equity issue. C5 Average is the mean C5 over the four quarters following the equity issue. HERF Average is the mean HERF over the four quarters following the equity issue. Firm size is the natural logarithm of the book-value of total assets in the year-end prior to the equity issue. Issue fraction is the ratio of the number of new shares issued to the total number of shares outstanding prior to the equity issue. Prior 90-day abnormal returns are measured as the difference between the buy-and-hold returns on the firm and the buy-and-hold returns on the CRSP equal-weighted index in the 90-day period ending 5 days prior to the announcement date. Announcement period abnormal returns are the three-day cumulative abnormal returns measured as the market-adjusted returns cumulated over the interval (−1, +1) around the announcement date. Participation is the difference in institutional ownership from the quarter before the announcement to the quarter after the equity issue. Institutional interest is the number of institutions in the quarter immediately after the equity issue minus the number of institutions in the quarter immediately prior to the equity issue announcement divided by the number of institutions in the quarter immediately prior to the equity issue announcement. Age is the equity issue announcement-year minus the initial listing-year on CRSP monthly tapes. Takeover pressure is a dummy variable that is one if the firm was targeted by a bidder in the period one year before the equity issue to three years after the equity issue, and zero otherwise. Change in debt level is measured as the ratio of long-term debt in year + 3 minus the long-term debt in year 0 to the total assets of the firm in year 0. White-adjusted p-values are in parentheses.

\*\*\* Represents significance at the 1% level.

\*\* Represents significance at the 5% level.

\* Represents significance at the 10% level.

monitoring benefits of institutional ownership, but rather because of institutions' propensity to buy past winners and sell past losers. In the 3-year post issue period, institutions may be regularly increasing their ownership in firms that have performed well and we could be incorrectly interpreting this as evidence of monitoring, i.e., evidence that these companies have done well *because* of the monitoring benefits of institutional ownership.

While we to some extent control for this possibility by using momentum-adjusted abnormal returns, it might not fully address the problem if institutions buy stocks deemed winners not based on just past raw returns, but rather based on momentum-adjusted abnormal returns. To address this issue, we examine whether institutions increase (decrease) their holdings in the period following abnormally positive (negative) one-year stock price performance. To perform this robustness test, for each firm and in each year following the equity issue, we regress the percentage change in institutional holdings in that year on the abnormal returns (i.e., the alpha from the FF regressions) in the twelve months prior to the start of that year. In particular, we estimate a pooled time-series, cross-sectional regression where for each firm, the dependent variable is  $\Delta \text{INST}_{(t+4,t)}$  where  $t = \{1, 5, 9\}$ , i.e., the change in institutional ownership from quarter  $t$  to  $t+4$  following the equity issue, and the independent variable is the abnormal returns as measured by the intercept of the FF-regressions over the twelve months immediately prior to the end of quarter  $t$ .<sup>21</sup> If institutions buy past winners and sell past losers based on momentum-adjusted abnormal returns, the coefficient of the abnormal returns variable should be significantly positive.

While not reported in tables, we find that the coefficient of FF-alpha in the above regression is not statistically significant. The coefficient in the pooled time-series cross-section regression is 0.023 with a  $p$ -value of 0.28. Thus, there is no evidence of window dressing-type behavior in the sample. This is despite the fact that the pooled time-series, cross-sectional regression overstates  $t$ -statistics and biases the result in favor of finding a significant coefficient, since the standard OLS assumption of independent errors is unlikely to be satisfied here. Nevertheless, we also use a firm and year fixed effects regression specification to address the problem of serially correlated errors. In the fixed effects regression, the coefficient is neither positive nor statistically significant (coefficient of  $-0.128$ , and  $p$ -value of 0.313). Overall, the tests reveal that the evidence in support of the monitoring hypothesis is not a spurious result arising from the propensity of institutional investors to window dress their holdings by selling past losers and buying past winners.

#### 4.7. Other robustness tests

In our tests we control for alternate governance mechanisms. In addition to the *leverage* and *takeover pressure* variables, which proxy for the alternative monitoring mechanisms that may affect stock price and operating performance, we also use the *G-index*. However, unlike leverage and takeover pressure, this variable is not widely available and the subsample for which it is available may be fundamentally different in nature from a regular sample of SEOs. Our sample of 3093 is reduced by about 80% once we impose the requirement that this alternate governance variable be available. This results in a sample that is more similar to the sample of SEOs analyzed by Ferreira and Laux (2010) where they study the monitoring role of independent boards in firms that engage in SEOs. The sample size for their analysis falls to just 410 observations (a 90% drop from their original set of SEOs) because board and governance data are not readily available for a vast majority of the firms (see Section 3, paragraph 2 of Ferreira and Laux, 2010), especially for smaller, younger firms. Consistent with this sample restriction, the median firm size and firm age in Ferreira and Laux (2010) is more than twice as large as our comprehensive sample, suggesting that their sample is more likely to represent the more mature and bigger firms. In addition, while over one-third of the median firm in our sample is owned by institutional investors, the corresponding figure in Ferreira and Laux is 0%. In other words, the sample used in their analysis, i.e., the sample of SEOs with the requirement that governance and board data be available, is fundamentally different in size, age, and institutional ownership characteristics compared to a random sample of SEOs.<sup>22</sup>

In order to avoid using a small and fundamentally different subsample for our regressions which include the G-Index in the robustness tests, we substitute the mean G-Index whenever G-Index is missing. That is, we use G-Index without biasing the sample to be made up of a skewed subsample of SEOs. In results not reported in Tables 6 and 7, we find that the G-Index is not statistically significant in any of the model specifications, while all the ownership variables in Tables 3, 6 A & B, and 7 continue to be statistically significant. This indicates that even after controlling for other governance factors about a firm, the level of monitoring (i) affects stock price reaction to the equity issue announcement and explains the future operating performance, and (ii) changes in monitoring affects the long-term stock price performance of the firm. Also, in order to ensure our findings are not driven by outliers we reconfirm all the results by estimating median regressions (see Tables 3B, 6B, and the last two regressions in Table 7).

Furthermore, as a learning exercise and to indirectly highlight the importance of using a comprehensive sample of SEOs, we re-estimate our regressions from Table 3, but this time using only the 20% of firms for whom we could find the G-Index. Not surprisingly, using this restricted data set, we find results more similar to the ones in Ferreira and Laux (2010). However, while indeed most institutional ownership measures, except total institutional ownership, lose significance in these restricted regressions, both the magnitude of the coefficients and their respective  $p$ -values are highly similar whether the G-Index is included or not. The latter result indicates that it's not the inclusion of G-Index in the regression, rather the nature of the subsample itself that affects the results.

<sup>21</sup> As an example, when  $t = 1$ , that is, when we examine the change in institutional ownership over the 4 quarters immediately following the equity issue, the explanatory variable is the stock price performance of the firm over the months  $(-8, +3)$  where month 0 is the month of the equity issue.

<sup>22</sup> This difference in sample characteristics may also be why Ferreira and Laux (2010) find that independent boards have a positive impact while institutional ownership measures have no significant marginal impact on their sample of SEO announcement returns. They conclude that board independence is an important monitoring mechanism, and dominates other governance characteristics. However, given that institutions do not have any ownership stake in more than half their sample, substitute corporate governance mechanisms such as an independent board could play an important monitoring role. In fact, Gillan et al. (2007) analyze the G-Index and document a similar substitution in monitoring mechanisms where they show that board independence and the market for corporate control are substitutes. Overall, it's unclear from the announcement period regressions in Ferreira and Laux (2010) whether the insignificant coefficient on institutional ownership is due to their including the board independence variable or because of the restricted sample they use.

Regulation Fair Disclosure (Reg FD), which came into effect in late 2000, dictates that when companies disclose material, non-public information to any investor, they must disclose this information to the entire public simultaneously. It also requires that even unintentional selective disclosure must be promptly followed by public disclosure of that information. In other words, the regulation prohibits the pervasive past practice of revealing information selectively, often to institutional investors. This regulation levels the informational playing field between institutional investors and the smaller, retail investors. So, if institutional investors had a greater informational advantage prior to the passage of Reg FD due to selective disclosure, that should disappear following Reg FD. Monitoring-related benefits, however, should be unchanged both pre- and post-Reg FD. We construct a dummy variable that's 1 if the time period is after October 2000 and 0 otherwise. In all the models in regressions 6 and 7, we then include an interaction variable that's the product of the institutional ownership variables and the Reg FD dummy. This is intended to capture the incremental impact of monitoring in the post-Reg FD period. If our monitoring variables are unadulterated by factors that capture the informational advantage of institutional investors, we would expect the interaction variables to be insignificant. In untabulated results, we find that to be the case for all of the models in Tables 6 and 7. This shows that the monitoring benefits are unchanged pre- and post-Regulation FD, consistent with the view that these benefits are incremental to the observed value changes attributable to the informational advantage of institutions.

As an alternative control for the informational advantage of institutional investors, we use another measure of institutional participation in equity issues that corrects a potential bias in the original measure. In our original measure of participation, we measure the change in institutional holdings as the difference in ownership from the quarter before the announcement to the quarter after the equity issue. However, that measure would understate (overstate) true participation in firms with high (low) prior levels of total institutional ownership.<sup>23</sup> To correct for this, we define *net participation by institutions* as the number of shares held by institutional investors in the quarter after the issue date minus the number held by the institutional investors in the quarter before the announcement date divided by the difference between the total number of shares outstanding in the two quarters. When we use this new measure of participation in the regressions in Tables 6 and 7, our metrics for monitoring by institutional investors continues to be statistically and economically significant in all the regressions. Thus, we find the relation between monitoring and stock price and operating performance to be robust to controlling for the informational advantage of institutional investors.

Finally, we also examine whether our results are affected by (i) low-priced stocks and (ii) companies with multiple classes of shares. If internal corporate governance is weaker in these companies, then institutional monitoring may have a disproportionately positive impact on performance in these companies and possibly overstate the performance impact of institutional ownership on the average firm. However, we find this to not be the case. We find that our results are unchanged (i) when we exclude these firms, and (ii) when we include these firms and also include interaction terms that interact institutional ownership variables with dummy variables that are set to 1 to identify these firms (i.e., firms with stock price less than \$5, and firms with multiple classes of shares) in the regressions. The interaction terms are statistically insignificant, and none of the other results are affected by the inclusion of these terms. In a similar vein, we also identify firms that engage in multiple SEOs within a 3-year window, and find that our results are unaffected by the exclusion of these firms from the sample.

## 5. Conclusion

Prior literature reports that the post-issue performance of equity issuing firms is significantly lower compared to benchmarks. In this paper we study the monitoring role of institutional investors in this setting, where the effects of monitoring are likely to be easily discernable. The monitoring hypothesis argues that by monitoring managers, institutional investors have the ability to prevent value dissipating activities within a firm. Therefore, following equity issues, firms in which institutions hold relatively large positions may not exhibit inferior performance. If monitoring by institutional investors affects performance then the post-issue performance should be positively related to the contemporaneous post-issue changes in total and active institutional ownership and the changes in concentration of institutional shareholdings.

Using a sample of 3093 firms that engage in seasoned public equity offerings of primary shares, we find evidence consistent with the monitoring hypothesis. The contemporaneous stock price performance is significantly negative among firms in the lowest quartile of post-issue change in total institutional ownership and is significantly positive among the firms in the highest quartile. Regression results show that there is a positive relation between post-issue changes in institutional ownership characteristics and long-term stock price performance even after controlling for firm size, issue fraction, past performance, firm age, and alternative monitoring mechanisms such as takeover pressure and change in debt level. In addition, we find greater improvement in operating performance among firms that have higher average total and active institutional ownership and concentration of ownership. Both the stock price and the operating performance results hold even after controlling for any informational advantages of institutional investors (in their ability to identify firms with better future performance).

<sup>23</sup> For example, consider two firms A and B, each having a total of 100,000 shares before an equity issue. Suppose that each firm issues 50,000 new shares, and the institutions as a group buy 25,000 shares in each equity issue – i.e., a participation of 50% in the new issue. Let firm A's prior level of institutional ownership be 5% while that of B be 40%. Then the post-issue fraction of institutional ownership in firm A is  $(5000 + 25,000)/150,000 = 0.20$ , and that of B is  $(40,000 + 25,000)/150,000 = 0.433$ . Thus, the change in the fraction of institutional ownership from before the issue to after the issue for firm A is  $0.20 - 0.05 = 0.15$  while that of firm B is  $0.433 - 0.40 = 0.033$  – even though the true participation by the institutions in the new issue in both firms was identical. On the other hand, the participation measure described above would be  $(30,000 - 5000)/(150,000 - 100,000) = 50\%$  for firm A, and would be  $(65,000 - 40,000)/(150,000 - 100,000) = 50\%$  for firm B.

Most importantly, we address the possible reverse-causality between performance and institutional ownership. It's possible that in the 3-year post-issue period, institutions may be increasing their ownership in firms that have performed well either because of momentum-based trading practices or because they want to window-dress their holdings with winners. We could be incorrectly interpreting this behavior as evidence of monitoring, i.e., evidence that these companies have done well because of the monitoring benefits of institutional ownership. To examine whether the evidence supportive of monitoring in our study is just a result of such institutional behavior, we directly examine whether institutions increase (decrease) their holdings in the period following abnormally positive (negative) stock price performance. We find no evidence of such institutional trading in the sample, and the evidence is robust to different windows and different measures of performance. The tests reveal that the evidence in support of the monitoring hypothesis is not a spurious result arising from the propensity of institutional investors to sell past losers and buy past winners. Overall, the results consistent with the monitoring hypothesis are economically significant, robust to various model specifications, and robust to a number of alternative explanations.

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