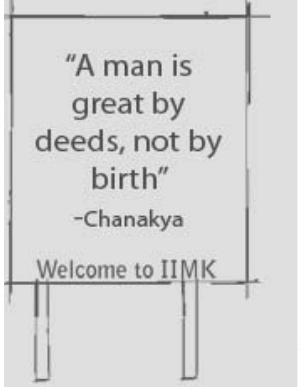

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Institutional ownership and the investment-cash flow sensitivity Evidence from India

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Institutional ownership and the investment-cash flow sensitivity

Evidence from India

Abstract

We examine whether institutional investor ownership influences the investment-cash flow sensitivity in Q model regressions. In order to empirically test this relationship, we augment the Q model of investment specification by adding an interaction term between cash flow and institutional investor ownership. If institutional investor ownership reduces investment-cash flow sensitivity, then the coefficient of the interaction term should be negative. We estimate the equation using the Arellano-Bond difference GMM method to mitigate the bias due to measurement error in Q model regressions. Our sample consists of manufacturing firms listed on the National Stock Exchange (NSE) over the period 2001-2016. The results show that institutional investor ownership reduces investment cash flow sensitivity. These reductions are observed to be more pronounced in firms with higher agency costs. We interpret this evidence as suggesting that institutional investor holdings mitigate agency issues like over-investment of free cash flow and thereby improve firm governance.

JEL classification: D21, M21, G14, G31, G32, G34, G35

Keywords: Institutional ownership; Foreign investors; Investment; Investment cash flow sensitivity; Capital market imperfections; Agency problems; Monitoring

1 Introduction

Studies in corporate finance have shown that firms do not always make optimal project choices. There can be distortions to corporate investment, with managers either rejecting good projects

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or/and accepting bad projects, and extant research has shown that these are primarily driven by agency and information problems[1]. Curative mechanisms like debt covenants (Chava & Roberts, 2008), disclosure laws (Cheng et al., 2013), cash holdings (Denis & Sibilkov, 2009) and corporate governance (Billett et al., 2011) are found to mitigate these distortions. Institutional investor ownership in the firm may also also reduce investment distortions. These investors are better informed and when they trade on that information, they are likely to reduce information asymmetry in equity (Sias, 2004; Bushee & Goodman, 2007). Further, improved monitoring by institutional investors could reduce agency costs (Easterbrook, 1984; Jensen, 1986) and minimise managerial opportunism. Considering the fact that India has an inadequate disclosure framework and weak corporate governance (Khanna & Palepu, 2000), we expect these investors to play a vital role in alleviating these distortions. In this study, our goal is to examine whether institutional investors reduce distortions to investment.

We try to answer this question by examining the sensitivity of investment to cash flows in q model regressions and examine whether the level of institutional investor ownership reduces the strength of this relationship. In the q model investment literature, 'optimal' investment should only be a function of investment opportunities. The relationship of investment to other factors, like cash flows, is considered to be indicative of sub-optimal investment. The investment-cash flow sensitivity has been the source of great debate in empirical finance and continues to be so. Though there have been multiple explanations on what could be causing this sensitivity, most researchers seem to accept that it 'reflects' distortions from the optimal investment.

Extant literature identifies three sources for the investment-cash flow sensitivity - the presence of financial constraints, agency-related over-investments and volatility of firms' cash flows. Financial constraints could make firms excessively reliant on internal cash flows and therefore increase the sensitivity of cash flows to investment. Research has tried to explain why firms face financial constraints and have come up with multiple explanations relating to asymmetric information, moral hazard, cost of contract enforcement, transaction costs and debt overhang. The agency based explanation (Jensen, 1986) argue that managers tend to opportunistically invest the internal cash flows in empire building investments and this could result in higher investment in years with higher cash flows. The third explanation, proposed by Cleary (2006), argues that current cash flows contain information about future cash flows and firms with low cash flow volatility can be expected to plan investment based on future income, creating a correlation between cash flows and investment.

Institutional investors can be expected to reduce financial constraints by minimising information asymmetry and also by monitoring the actions of the management of the firm. They are

[1]Read Stein (2003) for a review

better informed than individual investors (Lin et al., 2007) and trade to exploit mis-pricing in stock prices, improving price informativeness. Also, Institutional investor ownership in a firm increases the demand and informativeness of analyst reports (Frankel et al., 2006), improving information dissemination. Institutional investors also monitor management by improving governance quality (Aggarwal et al., 2011), resulting in lower managerial expropriation of corporate cash reserves (Harford et al., 2008). Improved monitoring by institutional investors can also urge firms' to pay out excess cash (Easterbrook, 1984; Jensen, 1986) and thereby thwart over-investments. Thus, institutional investor ownership can help mitigate financial constraints and also agency related over-investment. Therefore, we expect to find lower investment-cash flow sensitivity (and lower level of investment distortions) in firms with greater institutional investor ownership.

To examine the impact of institutional investor ownership on investment-cash flow sensitivity, we include an interaction term to cash flows in the regressions of the investment equation. A negative coefficient on the interaction term would imply that institutional investors reduce the sensitivity of investment to cash flows. However, there exist issues with regard to a direct OLS estimation of this specification. Numerous studies raise the concern that investment opportunities are imperfectly measured using Tobin's Q and that this measurement error could bias estimates (Erickson & Whited, 2000, 2006). To support this argument, Abel (2018) introduces measurement error in his model and finds closed-form expressions for the coefficients of cash flow (in the regressions of investment on q) to be positive for growth firms, even in the absence of financing frictions. Therefore, to alleviate concerns regarding biased estimates in the presence of potential measurement error in proxies of investment opportunities, we estimate the q model regressions using the Arellano-Bond 'Difference' GMM estimator. The Difference GMM, credited to Arellano & Bond (1991), involves carrying out a generalised method of moments (GMM) estimation of the first-differenced equation and uses lagged levels of the explanatory variables as instruments for the first-differenced variables. Almeida et al. (2010) assess the performance of methods dealing with measurement error in investment equations and finds that instrumental variable (IV) estimators, which includes the Arellano-Bond 'Difference' GMM estimator, tend to be more robust and efficient[2].

We find evidence that institutional investor ownership reduces investment distortions. The interaction term between institutional investor ownership and cash flows is found to be negative

[2]Almeida et al. (2010) notes that "in the presence of individual fixed effects, under heteroscedasticity, or in the absence of high degree of skewness in the data, the Erickson-Whited (EW) estimator (Erickson & Whited, 2002) returns biased coefficients for both mismeasured and perfectly measured regressors. The EW estimator is also very inefficient. In contrast, we find that IV estimators remain fairly unbiased under those same conditions and that they are more efficient than the EW estimator"

and significant, suggesting that an increase in institutional investor ownership would reduce the sensitivity of investment to cash flows. To further ascertain whether this is due to a reduction in either financial constraints or over-investments, we estimate the equation across partitions based on 'ex-ante' measures of agency costs and also financial constraints. Though we do not find conclusive evidence with regard to reducing financial constraints, we find evidence that institutional investors reduce agency based over-investment. We find that an increase in institutional investor ownership in firms with higher agency costs results in greater reductions in investment-cash flow sensitivity compared to an increase in institutional investor ownership in firms with lower agency costs. We also find that foreign institutional investors do reduce investment-cash flow sensitivity. However, domestic institutional investors are found to reduce the sensitivity of investments to cash flows only in firms with high agency costs.

The remainder of this article proceeds as follows. In section 2, we review the literature. Section 3 discusses our data, methodology & variables. Section 4 provides our findings and discusses the results. Section 5 provides the implications and concludes the article.

2 Related literature

2.1 Theoretical predictions

Academic literature provides few explanations for expecting a relationship between investment and cash flows. The first relates to the presence of financial constraints faced by firms and how it could make them more reliant on internal cash flows for investment. Researchers have tried to explain why financial constraints exist and have come up with multiple theories, which includes asymmetric information, moral hazard, cost of contract enforcement, transaction costs, and debt overhang. Arguments based on asymmetric information posit that in the presence of information asymmetry between managers and external providers of capital, external capital becomes costlier and ultimately makes managers rely excessively on internal cash flows. The models by Myers & Majluf (1984) and Greenwald et al. (1984) argue that if investors feel that management holds superior information, they would demand a premium for new equity issues to offset adverse selection problems. Similarly, Cleary et al. (2007), using a model of debt-financed investment, also argue that information asymmetries make external funds costlier. A higher cost of funds would increase the hurdle rate required for new investments (due to a higher cost of capital). This could cause the firms to pass up 'otherwise' positive NPV investments (resulting in under-investment) and prompt managers to rely excessively on the 'cheaper' internal capital for investment. In both these models, greater the information asymmetry between the decision makers in the firm and

the external suppliers of funds, greater the cost of capital and wider the wedge.

The second explanation for investment cash flow sensitivity relates to firm governance. Governance can influence the sensitivity in two ways. Firstly, if governance is poor, agency conflicts can be rife, and it can increase financial constraints. As argued by Stulz (1990) and Shleifer & Vishny (1997), information related problems are likely to be exacerbated if there are agency conflicts between managers and providers of funds. This implies that firms with severe agency problems would face a higher cost of external funds, be more financially constrained and have higher investment cash flow sensitivity. Secondly, if governance is poor, there is very little deterrence for agency-related over-investments. Jensen (1986) predicts that managers tend to opportunistically invest the firms' free cash flows to support their empire building motives and this can increase the sensitivity of investment to cash flows. In Emerging economies, such opportunistic investments can be more severe. Here, ownership is mostly concentrated with the promoter (Dharwadkar et al., 2000). Therefore, apart from finding traditional agency problems of the principal-agent (PA) type, we can also expect to find agency conflicts of the principal-principal (PP) type, wherein the controlling shareholder may try to expropriate the minority shareholders. Here, the controlling shareholders may try to maximise their welfare and may do so by redistributing wealth from other minority shareholders (Shleifer & Vishny, 1997). Another agency problem that could explain the sensitivity of investment to cash flows is the possible difference in risk aversion between managers and shareholders. This conjuncture, put forward by Kaplan & Zingales (2000), is based on the argument by Hines & Thaler (1995), who speculates that conservative firms will be reluctant to borrow money and therefore would rely on internal cash flows for investment. Therefore, we can expect conservative firms (or firms with conservative managers) to have higher investment-cash flow sensitivity.

A third explanation for investment cash flow sensitivity has been put forward by Cleary (2006). The author comments on the possibility that investment cash flow sensitivities could be driven by cash flow volatility and provides evidence to show that firms with high cash flow volatility display lower investment cash flow sensitivity. Cleary (2006) argues that for a firm having high historical cash flow volatility, its prediction of its own future cash flows is likely to be imprecise - and therefore its planned investment outlay is not likely to depend on forecasted cash flows. This means that we can expect firms with high cash flow volatility to have lower investment cash flow sensitivity. Consistent with it, Riddick & Whited (2009) find that the marginal propensity to invest (as compared to the marginal propensity to save) is higher in firms where cash flows are more predictable.

Institutional investor ownership can be argued to reduce investment cash flow sensitivity as they are capable of reducing information asymmetries and agency issues. Institutional investors

are better informed than individual investors (Lin et al., 2007) and they trade to exploit mispricing in stock prices (Campbell et al., 2009), thereby reducing information asymmetry between the firm and capital markets. Institutional investor ownership is also associated with larger analyst following (Brennan & Subrahmanyam, 1995; Frankel et al., 2006) and this further improves information dissemination[3]. Consistent with these arguments, Boehmer & Kelley (2009) and Ljungqvist et al. (2007) find that stocks with higher levels of institutional investor ownership are priced more efficiently[4], after controlling for liquidity and other firm characteristics. Lower information asymmetry would, therefore, entail a lower cost of external capital and thereby reduce the wedge between internal and external capital. Consistent with these arguments, Bhojraj & Sengupta (2003) finds that firms with institutional investors and stronger outside board control obtained lower bond yields and higher ratings on new bond issues[5]. Similarly, Attig et al. (2013) also finds that cost of equity declines in the presence of long term institutional investors

With regard to agency issues, monitoring by institutional investors can limit the self-serving behaviour of managers (McConnell & Servaes, 1990; Nesbitt, 1994; Smith, 1996; Del Guercio & Hawkins, 1999; McCahery et al., 2016). Institutional investors, by virtue of their larger holdings, tend to have greater incentives to monitor the firms (Shleifer & Vishny, 1986). Improved monitoring by institutional investors could thus improve governance quality (Aggarwal et al., 2011) and therefore lower managerial expropriation of corporate cash reserves (Harford et al., 2008). Improved monitoring by large blockholders, like institutional investors, is argued to urge firms' to pay out excess cash (Easterbrook, 1984; Jensen, 1986) and thereby thwart empire-building tendencies and opportunistic investments by both promoters or managers.

Considering the impact of institutional investor ownership on price informativeness and on improving governance, we argue that firms with institutional investor ownership would likely have a lower cost of capital and lesser over-investments. Hence, we can expect firms with higher institutional investor ownership to be less reliant on internal cash flows for investment. Therefore, investment-cash flow sensitivities of firms with greater institutional investor ownership can be expected to be lesser than those with lower institutional investor ownership.

[3]Market intermediaries like financial analysts and rating agencies are valuable to markets as they engage in private information production to reveal managers superior information (Healy & Palepu, 2001; Brennan & Subrahmanyam, 1995)

[4]Ljungqvist et al. (2007) finds that analysts are less likely to succumb to investment banking or brokerage pressure in stocks highly visible to institutional investors

[5]However, an adverse effect on bond yields and ratings was observed if the institutional ownership is concentrated

2.2 Empirical evidence

Empirical evidence on the role of institutional investors in mergers and aquisitions is relatively better studied. For example, Andriosopoulos & Yang (2015), using a comprehensive sample of M&As in the UK, find that the presence of long-term institutional investors encourages larger M&As. Ferreira et al. (2009), studying cross-border M&A activity worldwide, finds that foreign institutional investor ownership increases the probability that a deal is cross-border and successful, and that they improve merger gains. By contrast, the evidence is less clear for investments built via capital expenditures. Only a handful of studies have looked at institutional investor ownership and their effect on the investment cashflow sensitivity, our indicator for sub-optimal investment. Goergen & Renneboog (2001) studies 250 companies listed in the UK and finds that high levels of institutional ownership reduces the sensitivity of investment to cash flows. Agca & Mozumdar (2017) studies investment cash flow sensitivity of manufacturing firms in the US and finds that the sensitivity decreases with increasing institutional ownership. A relatively recent study by Attig et al. (2012) studies firms in the US and finds that the presence of institutional investors with long-term investment horizons decreases the investment cash flow sensitivity. Overall, the empirical evidence shows that an increase in institutional ownership results in a decrease in the investment cash flow sensitivity.

3 Research design

3.1 Data

Our sample consists of all manufacturing firms listed on the National Stock Exchange (NSE)[6] during the period 2001 to 2016. The dataset for our analysis is drawn from the CMIE ProwessIQ database, which provides firm-level data on Indian firms. The database provides detailed information about the firms compiled from their balance sheets, P&L accounts, ownership structure and stock price data.

Firms operating in the manufacturing sector are identified based on the NIC 2008 classification[7] and includes firms with the NIC 2008 codes from 10100 to 33200. If the firm is present in more than one sector, the sector from which the firm derives more than 30% of its revenue is considered as its primary sector, and the NIC code of that sector is used for the classification.

[6]The National Stock Exchange (NSE) is the largest stock exchange in India in terms of total and average daily turnover for equity shares every year since 1995, based on annual reports of SEBI. According to the World Federation of Exchanges (WFE), it was the fourth largest in the world by equity trading volume in 2015

[7]Govt of India, Ministry of Statistics and Programme Implementation - National Industry Classification - http://www.mospi.gov.in/classification/national-industrial-classification

To select our final sample, we adopt the following criteria. Firstly, we remove mining, and electricity firms from the sample as these are highly regulated in India. Secondly, we remove government-owned firms as priorities of government firms may not always be profit maximisation. We define government-owned firms as those in which the central or state governments have more than 50 per cent direct ownership stake any time during the sample period. Thirdly, to remove the bias due to extremely small firms in the sample, we exclude firms that have less than Rs.10 million in total assets[8]. Fourthly, we keep only those firm-year observations which have non-missing data for the main variables of interest. Fifthly, to remove the effect of distressed firms, we remove firms with negative net worth[9].

Further, to make sure our results are not driven by firms with dramatic changes to their business fundamentals, we remove firms with Q greater than 10 or whose annual sales growth or capital stock appreciation is greater than 100 per cent. Also, to control for the influence of outliers, we winsorise all variables at the 1% and 99% levels. Table 1 provides details regarding the sample selection criteria. After applying all sample restrictions, we are left with a final sample of 9,927 firm-year observations, from 787 firms across the sample period.

[Insert Table 1 here]

3.2 Methodology

To examine the impact of institutional investor ownership on the investment-cash flow sensitivity, we augment the standard q model of investment regression (Cleary, 1999; Kaplan & Zingales, 1997) with an interaction term between institutional investor ownership and contemporaneous cash flows. The specification we use is as follows -

$$\begin{aligned}(I/K)_{it+1} = {} & \alpha + \beta Q_{it} + \gamma(CF/K)_{it+1} \\ & + \rho * Ownership_{it} + \varphi[Ownership_{it} * (CF/K)_{it+1}] + \lambda Z_{it} + \epsilon_{it+1}\end{aligned} \tag{1}$$

where I stands for investment, Q is a proxy for average Tobin's q, K is total assets measured at the beginning of the year, and CF is the contemporaneous cash flow to the firm. *Ownership* denotes the percentage of institutional investor ownership in the firm. We use lagged ownership as institutional investors may take time to influence managerial decisions, and thereby have a

[8]The Micro, Small and Medium Enterprises (MSME), as classified by the Indian Ministry of Industry, are those with gross fixed assets less than Rs.100 million (about US$ 1.5 million)

[9]As per the Sick Industrial Companies Act (SICA) 1985, all firms with negative net worth are considered to be financially distressed and are required to be registered with Board for Industrial and Financial Reconstruction (BIFR)

slower impact on investment decisions[10]. Z is a vector of control variables, which includes firm characteristics (log-of-sales, leverage, the age of the firm) and time dummies. ϵ is the stochastic error term.

Estimating this equation using OLS will provide us with biased estimates if Q is a poor proxy for marginal q. Therefore, to mitigate endogeneity due to measurement error in Q, we use the Arellano-Bond 'Difference' GMM estimator[11]. The Difference GMM, credited to Arellano & Bond (1991), involves carrying out a GMM estimation of the first-differenced equation and uses lagged levels of the explanatory variables as instruments for the first-differenced variables. The estimation technique improves the OLS or fixed effects estimates in at least one of the three ways. Firstly, it allows us to obtain measurement error consistent estimates[12]. Secondly, we can include firm fixed effects to account for unobserved (fixed) heterogeneity. Thirdly, it allows us to use some variables from the firms history (i.e. past values of explanatory variables themselves) as instruments for the endogenous variables, thereby correcting for endogeneity.

$$\begin{aligned} D.(I/K)_{it+1} = {} & \beta D.Q_{it} + \gamma D.(CF/K)_{it+1} \\ & + \rho * D.Ownership_{it} + \varphi D.[Ownership_{it} * (CF/K)_{it+1}] + \lambda D.Z_{it} + \epsilon^*_{it+1} \end{aligned} \tag{2}$$

The Difference GMM estimation procedure involves first differencing the equation (1). This eliminates the firm fixed effects and replaces the original set of time dummies with their first differences. Equation (2) represents equation (1) in the first-differenced form, where $D.$ is the first difference operator. The lags of the variables in levels are then used as instruments for the first-differenced variables, and the equation is estimated using GMM. In our estimations, all explanatory variables, except the logarithm of age and time dummies, are considered endogeneous and are instrumented. However, for these instruments to be valid, they should meet two criteria. Firstly, they should provide a source of variation for the current explanatory variables. We expect this to be true in our estimations as we have taken lags only from the recent years (i.e. lags from *t-2* to *t-6*) to instrument the first-differenced explanatory variables. Secondly, the instruments should be uncorrelated with the error term in equation(2). Arellano & Bond (1991) proposes two tests to check whether this assumption is valid. The first is a test for serial correlation in residuals in second differences, i.e. AR(2) and the second is a Hansen test of over-identification. In the first test, if we cannot reject the null of no auto-correlation, it means that lags used are exogenous and

[10]Similar arguments were made by Cornett et al. (2007) and Grinstein & Michaely (2005) for using lagged ownership while studying the role of institutional investors on firm decisions

[11]Blundell et al. (1992) have used this estimator while estimating q model investment regressions

[12]Agca & Mozumdar (2017) finds that instrumental-variables type GMM estimators, with longer lags of instruments, yield empirically well-specified models for testing investment-cash flow sensitivity

can be used as instruments. The Hansen test of over-identification provides us with a J statistic, which is distributed chi-square and failure to reject it implies that we cannot reject the hypothesis that our instruments are valid.

3.3 Variable definitions

Our estimation requires data on investment, cash flow, institutional investor ownership and other control variables. *Investment (I)* is defined as the change in gross fixed assets[13] from the previous year. *K* represents the book value of total assets measured at the beginning of the year. *Q* is a proxy for Tobin's average *q* and is defined as the market value of equity plus the book value of total debt, scaled by book value of total assets[14]. *Cash flow (CF)* is profit after tax, adjusted for non-cash deductions like depreciation and amortisation. Dividends are not subtracted from cash flow.

[Insert Table 2 here]

Ownership data provides information on the shares held by investor categories as a percentage of the total number of shares outstanding at the end of the year. The Institutional Ownership as on year t is defined as the total institutional investor ownership as of March 31st of that year. If the holding data is found missing in the last quarter of each year, the missing value is replaced by a non-missing value in any of the four quarters preceding that quarter.

If the data is found missing even after such a correction, the firm-year data is removed from the analysis. The further classification of the Institutional investor ownership into domestic and foreign is based on the following Domestic institutional investor ownership is the sum of holding held by (a) mutual funds and Unit Trust of India and (b) Banks, financial institutions and insurance companies whereas foreign institutional investor ownership comprises of shares held by foreign portfolio investors[15], which includes university funds, endowments, foundations, charitable trusts and charitable societies which have a track record of 5 years and which are registered with a statutory authority in their country of incorporation or establishment.

Consistent with prior research, we include firm-specific control variables in our estimations.

[13] Asker et al. (2014) notes that since depreciation schedules can be somewhat arbitrary, gross investment better captures firms' investment decisions compared to others

[14] A standard *q* investment model implies that investments are determined solely by the shadow price of capital or marginal *q*. Empirically, marginal *q* is typically approximated using Tobin's average *q* which is the ratio of market valuation of assets to its replacement value. Though average *q* is observable, measuring the market value of debt or the replacement value of assets (especially intangible assets) is difficult in practice. Therefore, we use a proxy for Tobin's average *q*, measured as the market value of equity plus the book value of total debt, scaled by book value of total assets

[15] SEBI (Foreign Institutional Investors) Regulations - http://www.sebi.gov.in/cms/sebi_data/commondocs/pt1b5_h.html

We control for firm size using the logarithm of total sales. We control for age of the firm, calculated as the logarithm of the firms' age since incorporation. We include age and size in the regressions as recent evidence by Hadlock & Pierce (2010) find these to be better indicators of financial constraints. We also control for firm leverage. Similar controls were used in investment regressions by Francis et al. (2013), George et al. (2011), Bhabra et al. (2016), among many others. Table 2 provides the definitions of all the variables used in this paper.

[Insert Table 3 here]

Table 3 reports the summary statistics for the full sample of Indian manufacturing firms and for the sub-sample of large firms. Firms are classified as large firms if they are larger than the median firm when sorted on market capitalisation. The mean value of *Investment* is at 6% while the mean *Cash flow* is 8.5% of total assets. These values are much higher for large firms at 7% and 12% respectively. The average Tobins' q is at 1.47 across the full sample and 1.88 across large firms in the sample. The Tobins' q for the bottom quartile of all firms has a maximum value of 0.87, indicating that approximately 25% of the manufacturing firms have a Tobins' q of less than 1. *Institutional Ownership* across all firms average 12% and is concentrated mainly in large firms, where the average is close to 17%. The ownership by domestic and foreign institutional investors also show a similar pattern, with greater ownership in large firms. Table 5.2 shows the correlation matrix between all the variables.

4 Results & discussion

Results of the GMM estimation of equation (2) are shown in Table 4. The first two columns provide the results of the estimation across all firms while the last two columns show the results from the estimation in a sub-sample of large firms. We find *Q* and *(CF/K)* to be significant predictors of investment across all samples. Interestingly the coefficient of Institutional investor ownership is significantly positive, indicating that firms with higher institutional investor ownership make greater investments. Our variable of interest, the interaction term between institutional investor ownership and *CF/K*, is negative and statistically significant at the 1% level (β=-0.0113, t=-3.72) across all firms. This is consistent with our hypothesis that institutional investors reduce firms' sensitivity of investment to cash flows. The results are also similar for the subset of large firms, with the interaction term between institutional investor ownership and cash flows being negative and significant (β=-0.00857, t=-2.44). The table also provides estimates of the impact of institutional investor categories on investment-cash flow sensitivity. The results show that only foreign institutional investor ownership has a significant impact on the sensitivity of investment to cash flows. This result is significant across all firms and also for the subset of large firms.

[Insert Table 4 here]

We also report the results of the specification tests in each of the estimations. The second-order serial correlation test, i.e. AR(2), yields a p-value greater than 0.58 across the regressions, implying that we cannot reject the null hypothesis of no second-order serial correlation. The Hansen J test of over-identifying restrictions reveals a p-value higher than 0.44 across all firms and for the size partitions. Therefore, we cannot reject the hypothesis that our instruments are valid. The results show that changes in institutional investor ownership would result in a decrease in the sensitivity of investment to cash flows.

4.1 Do institutional investor ownership correct for agency-related investment distortions?

To understand whether the decrease in the investment-cash flow sensitivity is due to improvement in governance (due to monitoring by institutional investors), we partition firms on the basis of expected agency costs and then estimate the equation (2) across these partitions. Following Chang et al. (2016), we proxy for agency costs faced by a firm by considering its level of cash flows and available investment opportunities. Firms with positive cash flow and poor investment

opportunities are considered to have higher agency costs than firms with positive cash flows and high investment opportunities. Thus we have two sub-samples - one of the firms with positive free cash flow and Tobin's q less than median value and another of firms with positive free cash flow and Tobin's q greater than or equal to median value. We use Q as a measure of investment opportunities and define firms with poor investment opportunities as those with Q less than the median value. We estimate the investment regression separately on these sub-samples and the results are shown in columns (1) to (4) of Table 5. We find that the interaction term between cash flow and institutional investor ownership is negative and significant only in firms with high agency costs. This shows that an increase in institutional investor ownership in firms with higher agency costs results in greater reductions in investment-cash flow sensitivity compared to firms with lower agency costs. We interpret this evidence as suggesting that an increase in institutional investor ownership leads to a decrease in agency issues, especially in firms with high agency costs.

[Insert Table 5 here]

We further partition the firms with high agency costs (i.e. firms with positive cash flows and poor investment opportunities) into sub-samples based on the level of promoter ownership. We estimate the equation (2) across these sub-samples, and the results are given in columns (5) to (8) of Table 5. We find that the interaction term between cash flow and institutional investor ownership is negative and significant only in firms with low promoter ownership. This means that an increase in institutional investor ownership in firms with lower promoter ownership results in greater reductions in investment-cash flow sensitivity than a similar increase in institutional investor ownership in firms with high promoter ownership.

If we can assume that a promoter, holding less than 50% ownership in a firm, is less aligned with the interests of other shareholders and the firm, then this evidence can be interpreted as suggesting that an increase in institutional investor ownership leads to a decrease in agency issues especially in firms with higher agency costs.

4.2 Do institutional investor ownership reduce financial constraints?

To examine whether the decrease in the investment-cash flow sensitivity is due to a reduction in financial constraints, we estimate the equation (2) across partitions based on ex-ante predictors of financial constraints. We proxy for financial constraints using firm age, size, dividend payout and group-affiliation. We select firm age and size as Hadlock & Pierce (2010), using qualitative

information from financial filings, find them to be useful predictors of financial constraint. Here, small firms (firms in the lowest quartile, when sorted on total assets) are considered to be more financially constrained than large firms (firms in the highest quartile, when sorted on total assets). Similarly, young firms (firms with age less than the median firm age) are considered to be more constrained than old firms (firms with age greater than the median firm age). With regard to dividend payouts, if we can assume that dividends are paid from free cash flows, then dividend-paying firms can be considered to be less constrained than non-paying firms. Further, we use group affiliation as a predictor of constraints. As firms belonging to business groups can use internal capital markets and have better access to financial resources (Deloof, 1998; Lensink et al., 2003), we expect group affiliated firms to be less financially constrained than standalone firms.

[Insert Table 6 here]

The results are reported in Table 6. Columns 3 and 4 provide the results of the estimation for partitions based on firm age. We find that investment-cash flow sensitivity is higher and significant for younger firms. The interaction term between cash flow and institutional investor ownership is found to be negative and significant for young firms. This means that an increase in institutional investor ownership in younger firms would result in greater reductions in investment-cash flow sensitivity than a similar increase in institutional investor ownership in older firms. Columns 3 and 4 provide the results of the estimation for partitions based on firm size. Contrary to expectations, we find that investment-cash flow sensitivity is higher and significant for larger firms. Also, we find that the interaction term between cash flow and institutional investor ownership is negative and significant for both small and large firms. This means that an increase in institutional investor ownership in larger firms results in marginally greater reductions in investment-cash flow sensitivity than a similar increase in institutional investor ownership in smaller firms.

Columns 5 and 6 of Table 6 provide the results of the estimation for partitions based on dividend payouts. Contrary to expectations, we find that investment-cash flow sensitivity is higher and significant for dividend-paying firms. Also, the interaction term between cash flow and institutional investor ownership is found to be insignificant for both dividend paying and non-paying firms. This means that we find no evidence for greater reductions in investment cash flow sensitivity in either dividend paying or non-paying groups. Columns 7 and 8 provide the results of the estimation for partitions based on business group affiliation. Contrary to expectations, we find that investment-cash flow sensitivity is higher and significant for group affiliated firms. This means that an increase in institutional investor ownership in group affiliated firms results

in greater reductions in investment-cash flow sensitivity than a similar increase in institutional investor ownership in stand-alone firms. To summarize, except for young firms, we do not find evidence to show that institutional investor ownership reduces investment cash flow sensitivity in financially constrained groups.

5 Conclusion

This paper investigates whether institutional investor ownership reduces distortions to investment. To do so, we use the sensitivity of investment to cash flows as an indicator of distortions to investment and examine whether institutional investors influence this relationship. Investment-cash flow sensitivity can be expected to be driven by either information asymmetry between firms and the providers of capital, managerial over-investment of free cash flow or cash flow volatility. Since institutional investors reduce information asymmetry and improve governance, we expect them to decrease the sensitivity.

We find evidence that institutional investors reduce the sensitivity of investment to cash flows. Across investor categories, we find that foreign institutional investor (FII) ownership have a significant effect on this relationship. To further understand whether this reduction in sensitivity to cash flows is due to reductions in financial constraints or due to reductions in over-investment, we partition firms on ex-ante measures of agency costs and also financial constraints. We do not find conclusive evidence to show that institutional investors reduce financial constraints. However, we find evidence that institutional investors reduce agency costs. We find that an increase in institutional investor ownership in firms with higher agency costs shows greater reductions in investment-cash flow sensitivity compared to an increase in institutional investor ownership in firms with lower agency costs. Across investor categories, we observe that this relationship is stronger for domestic institutional investors (DIIs). Our results highlight the importance of institutional investors in corporate governance and in reducing distortions to investment.

This paper adds to the literature in highlighting the governance role played by institutional investors. The results are consistent with Attig et al. (2012), who finds that institutional investor ownership stability decreases investment cash flow sensitivity in the US. Importantly, this paper also documents the role played by domestic institutional investors in reducing agency costs.

Table 1: Sample selection criteria

Criteria	Firm year observations
Initial sample - Manufacturing firms listed on NSE	11,035
Less: government-owned firms	(241)
Less: firms with less than 100 million in Total Assets	(04)
Less: firms with missing ownership data	(362)
Less: firms with missing financial and control variables data	(150)
(*Removing firms with large changes to their fundamentals*)	
Less: firms with sales growth greater than 100 percent	(180)
Less: firms with asset growth greater than 100 percent	(125)
Less: firms with Q greater than or equal to 10	(46)
Total firm-year observations for analysis	9,927

Table 2: Variable definitions

Name	Definition
Investment (I)	Change in gross fixed assets
Q	Market value of the firm divided by the book value of total assets, where market value of the firm is measured as book value of assets minus net worth plus the market value of equity
Cashflow (CF)	Profit after tax (PAT) adjusted for the effect of non-cash transactions
Total Assets (K)	Book value of total assets, measured at the beginning-of-period
All Inst Ownership	The percentage of shares held by Institutional Investors
DII Ownership	The percentage of shares held by Domestic Institutional Investors
FII Ownership	The percentage of shares held by Foreign Institutional Investors
Log–of–Sales	Logarithm of total annual sales
Leverage	Book value of total assets minus net worth, divided by book value of total assets
Log–of–Age	Natural logarithm of the age of the firm, where age is defined as the number of years since incorporation of the firm

All stock variables, except 'Total assets', are measured as of the end of the period i.e. at the end of the financial year, as on March 31st

Table 3: Summary statistics

This table reports the summary statistics for the main variables used in our study for the period 2001-2016. *Investment (I)* is defined as the change in gross fixed assets. *All Inst Ownership* is the percentage of shares held by Institutional Investors. *DII Ownership* is the percentage of shares held by Domestic Institutional Investors and *FII Ownership* is the percentage of shares held by Domestic Institutional Investors. *Q* is defined as the market value of the firm divided by the book value of total assets, where market value of the firm is measured as book value of assets minus net worth plus the market value of equity. *Cashflow (CF)* is measured as profit after tax (PAT) adjusted for the effect of non-cash transactions. *K* is the book value of total assets, measured at the beginning-of-period. *Log–of–Sales* is the logarithm of total annual sales. *Leverage* is the book value of total assets minus net worth, divided by book value of total assets. *Log–of–Age* is the natural logarithm of the age of the firm, where age is defined as the number of years since incorporation of the firm. *Large firms* are those with market capitalisation greater than the median firm for the respective year. *P25* and *P75* stand for the value at the 25th and 75th percentile respectively. *S.D.* denotes standard deviation.

	All Firms						Large Firms					
	N	Mean	P25	Median	P75	S.D.	N	Mean	P25	Median	P75	S.D
I/K	9927	0.060	0.007	0.031	0.082	0.095	4969	0.070	0.015	0.044	0.094	0.092
Q	9927	1.476	0.875	1.070	1.580	1.100	4969	1.881	1.004	1.355	2.282	1.316
CF/K	9927	0.085	0.035	0.083	0.139	0.095	4969	0.124	0.068	0.115	0.170	0.084
All Inst Ownership	9927	11.54	1.32	8.03	18.08	11.95	4969	17.09	7.12	15.14	25.61	12.44
DII Ownership	9927	6.84	0.24	4.14	10.61	8.03	4969	9.33	2.50	7.66	14.02	8.20
FII Ownership	9927	4.44	0.00	0.38	6.15	7.40	4969	7.42	0.39	4.20	11.85	8.70
Sales	9927	18668.9	1995.3	4923.3	12462.1	98864.9	4969	33442.9	5374.9	11101.0	24078.6	138060.9
Log(Sales)	9927	8.516	7.597	8.496	9.423	1.457	4969	9.378	8.581	9.308	10.084	1.185
Leverage	9927	0.653	0.484	0.630	0.759	0.310	4969	0.570	0.449	0.580	0.696	0.182
Log(Age)	9927	3.402	3.045	3.367	3.850	0.596	4969	3.505	3.135	3.466	3.989	0.602

Table 4: GMM estimates of the Investment-Cash flow (CF) sensitivity

The table reports the results of the GMM estimation. The dependent variable is *(I/K)* in the year *t+1* and the explanatory variables are *Q, CF/K, Institutional Ownership*, interaction term between Institutional ownership and *CF/K*, and other firm characteristics in the year *t*. The sample consists of all NSE listed firms for the years 2001–2016, excluding mining, utility and financial firms. Variable definitions are provided in Table 2. Standard errors are corrected for heteroskedasticity and firm-level clustering. *t* statistics are given in parentheses. * $p < 0.05$, ** $p < 0.01$

Dependent variable - $(I/K)_{t+1}$	All firms	All firms	Large firms	Large firms
	(1)	(2)	(3)	(4)
Q_t	0.00779*	0.00654	0.00715*	0.00844*
	(2.23)	(1.88)	(2.08)	(2.30)
CF_{t+1}	0.245**	0.158**	0.360**	0.282**
	(4.36)	(2.96)	(4.27)	(3.04)
All Inst Ownership$_t$	0.00155**		0.00121*	
	(3.47)		(2.05)	
CF_{t+1} X All Inst Ownership$_t$	-0.0113**		-0.00857*	
	(-3.72)		(-2.44)	
FII Ownership$_t$		0.00276**		0.00192*
		(4.10)		(2.17)
CF_{t+1} X FII Ownership$_t$		-0.0101*		-0.00873*
		(-2.36)		(-1.99)
DII Ownership$_t$		0.0000209		-0.000661
		(0.03)		(-0.81)
CF_{t+1} X DII Ownership$_t$		-0.00549		-0.00259
		(-1.25)		(-0.48)
Controls	Yes	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes
Observations	7361	7361	3810	3810
AR(1) test (p-value)	0.000	0.000	0.000	0.000
AR(2) test (p-value)	0.535	0.542	0.764	0.657
Hansen test of over-identification (p-value)	0.111	0.272	0.568	0.514
Instruments	430	545	430	545

Table 5: Investment-CF sensitivity across firms with low and high agency costs

The table reports the results of the GMM estimations performed over sample partitions based on the level of Agency costs. Firms with positive *CF/K* and *Q* lower than that of the median firm are classified as *High Agency Cost* firms while those with positive *CF/K* and *Q* higher than that of the median firm are classified as *Low Agency Cost* firms. The *High Agency Cost* firms are further partitioned on the basis of promoter ownership. Coloumns (5) & (6) provides the results for firms with *high agency costs* and *low promoter ownership* (i.e. less than or equal to 50% ownership) whereas coloumns (7) & (8) provide results for firms with *high agency costs* and *high promoter ownership* (i.e. greater than 50% ownership). The dependent variable is *I/K* in the year *t+1*. Standard errors are corrected for heteroskedasticity and firm-level clustering. *t* statistics are given in parentheses. * $p < 0.05$, ** $p < 0.01$

Dependent variable - $(I/K)_{t+1}$	Agency partitions				High agency partitions			
	Low	Low	High	High	High-Low	High-Low	High-High	High-High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Q_t	0.00907*	0.00895*	0.0137	0.00403	0.0288*	0.0219	0.0185	0.0160
	(2.42)	(2.48)	(1.26)	(0.42)	(2.05)	(1.49)	(1.39)	(1.23)
CF_{t+1}	0.0555	0.0159	0.339**	0.331**	0.279	0.223	0.244	0.249
	(0.93)	(0.24)	(3.30)	(3.09)	(1.71)	(1.87)	(1.68)	(1.71)
All Inst Ownership$_t$	0.000339		0.00125		0.000323		0.000273	
	(0.53)		(1.89)		(0.52)		(0.28)	
CF_{t+1} X All Inst Ownership$_t$	-0.00149		-0.0194**		-0.0179**		-0.0149	
	(-0.43)		(-3.23)		(-2.81)		(-1.28)	
FII Ownership$_t$		0.000373		0.000688		0.000218		0.000819
		(0.43)		(0.68)		(0.23)		(0.43)
CF_{t+1} X FII Ownership$_t$		-0.00328		-0.000359		-0.00204		-0.00100
		(-0.76)		(-0.04)		(-0.21)		(-0.07)
DII Ownership$_t$		-0.00188		0.000725		-0.000119		0.000692
		(-1.77)		(1.03)		(-0.18)		(0.42)
CF_{t+1} X DII Ownership$_t$		0.00525		-0.0221**		-0.0209**		-0.0169
		(0.97)		(-3.40)		(-3.47)		(-0.95)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3158	3158	3174	3174	1324	1324	1850	1850
AR(1) test (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR(2) test (p-value)	0.845	0.887	0.435	0.355	0.228	0.265	0.152	0.162
Hansen test of over-identification (p-value)	0.401	0.434	0.209	0.488	1.000	1.000	0.528	1.000

Table 6: Investment-CF sensitivity across Constrained and Unconstrained firms

The table reports the results of the GMM estimations performed over sample partitions based on ex-ante measures of financial constraints - Age and Size. Firms which are younger than the median firm in the sample, when sorted on the age of the firm, are classified as *Young* firms whereas others are classified as *Old* firms. Firms in the lowest quartile, when sorted on total assets, are classified as *Small* firms whereas firms in the highest quartile are classified as *Large* firms. The dependent variable is *I/K* in the year *t+1*. Standard errors are corrected for heteroskedasticity and firm-level clustering. *t* statistics are given in parentheses. * $p < 0.05$, ** $p < 0.01$

Dependent variable - $(I/K)_{t+1}$	Age	Size	Payout		Group Affiliation			
	Young	Old	Small	Large	Non-payers	Payers	Non-BG	BG
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Q_t	0.00841	0.0135**	0.0151*	0.00670	0.00577	0.00559	0.00183	0.00825
	(1.59)	(2.83)	(2.08)	(1.07)	(0.69)	(1.55)	(0.41)	(1.93)
CF_{t+1}	0.272**	0.0610	0.0672	0.495**	0.0714	0.359**	0.163*	0.205**
	(3.77)	(0.78)	(1.12)	(3.66)	(1.11)	(4.33)	(2.05)	(2.65)
All Inst Ownership$_t$	0.00208**	0.000199	0.000615	0.00158*	0.00112	0.000969	0.00118*	0.000887
	(3.43)	(0.32)	(1.23)	(2.14)	(1.77)	(1.22)	(2.15)	(1.54)
CF_{t+1} X All Inst Ownership$_t$	-0.0143**	-0.00303	-0.00872*	-0.0119*	-0.00415	-0.00807	-0.00172	-0.00886**
	(-3.47)	(-0.89)	(-2.03)	(-2.59)	(-1.16)	(-1.87)	(-0.48)	(-2.65)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3470	3891	1671	1990	2496	4865	2613	4704
AR(1) test (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR(2) test (p-value)	0.410	0.939	0.574	0.838	0.108	0.708	0.946	0.504
Hansen test of over-identification (p-value)	0.325	0.528	1.000	1.000	0.630	0.617	0.978	0.278

* $p < 0.05$, ** $p < 0.01$

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