

Selection or Influence? Institutional Investors and Acquisition Targets

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ABSTRACT

Firms with high levels of institutional ownership are more likely to be acquired. This paper shows that this positive correlation is due to ownership endogeneity. Institutional investors are better informed investors and buy acquisition targets (“selection”). After controlling for this ownership endogeneity, the presence of institutional investors reduces the probability of being acquired. Evidence also shows that mutual funds or funds with high turnover rates are more likely to benefit from selective disclosure prior to Regulation Fair Disclosure. The presence of public pension funds increases the announcement premiums that targets receive, which indicates a monitoring effect.

Introduction

It is difficult to distinguish institutional investors' selection effect from their influence effect in their portfolio firms' likelihood of being taken over. The existing literature is quite ambiguous regarding institutional investors' exact roles in this context. Shareholders of a takeover target often benefit from a huge takeover premium. Thus institutional investors have incentives to seek out potential targets. In fact, although current literature does not specifically document institutional investors' ability to select takeover targets, many researchers have shown that they have selection ability around other corporate events. For example, Brennan, Jegadeesh, and Swaminathan (1993), Hong, Lim, and Stein (2000), and others, have documented that financial analysts (hired by institutions) have expertise to process and interpret information. Furthermore, Bailey, Li, Mao, and Zhong (2003), Jorion, Liu, and Shi (2005), and many others argue that institutions have informational advantage from selective disclosures. It is plausible that institutional investors can predict targets better through their informational advantage, and adjust their holdings accordingly.

On the other hand, institutions are often believed to be able to influence a firm's likelihood of being acquired. Yet opinions on their exact roles also differ. Some (Brickley, Lease, and Smith (1988), Jarrell and Poulsen (1987), Holmstrom and Kaplan (2001), Gorton and Kahl (2006), etc.) believe that large shareholdings of institutions facilitate a takeover either through block selling or through the removal of anti-takeover measures advocated by the activist institutional investors. The implication is that higher institutional ownership may be correlated with a larger probability of being acquired. Others (Jensen and Meckling (1976), Shleifer and Vishny (1986), Admati, Pfleiderer, and Zechner (1994), etc.) believe

that institutions with substantial equity stakes can carry out a monitor’s role, and use that assumption in their theoretical models. Higher institutional ownership may substitute the function of a takeover market, which serves as a market disciplinary force. Consequently, their presence may reduce the firm’s likelihood of being acquired due to monitoring benefits.

The goal of our study is to delineate institutions’ influence effect from their selection effect in a given firm’s likelihood of being a target, and contribute to the existing literature by providing empirical support for relevant assumptions made in various theoretical models. To achieve our goal, the most direct method is to analyze the trading patterns of the institutional investors. However, this data is not available to researchers on an economy-wide scale. We only observe institutional holdings at the end of each quarter. Given that institutional ownership and corporate events such as a takeover are often jointly determined, any study trying to identify an institutional influence on corporate decisions needs to control for this ownership endogeneity. Our study relies on an instrumental variable, which borrows the concept of a “Bartik” instrument (Bartik (1991), Blanchard and Katz (1992)), to identify the exogenous variations in institutional ownership, and thus is able to identify the exact institutional influence.¹

We find that the level of institutional ownership exhibits both a positive selection effect and a negative influence effect. The selection effect overwhelms the influence effect for all types of institutions. As a result, we observe positive correlations between the levels of institutional ownership and a firm’s likelihood of being a takeover target. When we examine the role of the turnover rate of institutions, we observe a negative selection effect and a positive influence effect. It appears that institutions with high turnover rates are the group

¹The construction and the validity of this instrument will be discussed in details in section II.

that facilitates bidders' takeover effort by providing their shares.

Ex ante, there are two possible sources of institutional selection ability. Institutional investors may possess better abilities to process public information, or better accesses to firm information due to selective disclosure.

To distinguish between the two sources of selection ability, we explore the natural experiment of the adoption of Regulation Fair Disclosure (FD) by the Securities and Exchange Commission on October 13, 2000. Regulation FD prohibits public companies from giving non-public material information to favored investment professionals. It requires that companies that intentionally disclose material information to a selected group of shareholders should disclose it to the public simultaneously. If institutional investors were beneficiaries of selective disclosure prior to the adoption of Regulation FD, we would observe a discontinuity in the relation between institutional share-holdings and the likelihood of being acquired before and after the adoption of Regulation FD. Following this logic, we examine the data in the four years prior to FD (1997-2000), and in the four years post FD (2001-2004). Our results are robust to a longer time horizon prior to FD (1980-2000).

We are able to observe this discontinuity for mutual funds and for institutional investors with a high turnover rate. Before the adoption of Regulation FD, a one standard deviation increase of mutual fund holding was correlated with an increase in the target likelihood by 20 basis points. Given that the ex post probability of being acquired in the four years before the adoption of FD is 1.46%, this increase is not trivial. This positive relationship for mutual funds disappeared after the adoption of FD. The results on the turnover rate are interesting. There is a negative correlation between institutional investor's turnover rate and

the likelihood of being a target. This negative correlation is much weaker before the adoption of FD. One possible explanation is that institutions which trade frequently in general avoid to invest in potential target firms, unless the firm is a sure target in the short-run so they can profit from the short-term trading. Prior to the adoption of FD, these institutions are more likely to obtain information regarding the certainty of an upcoming takeover. Consequently, their trading activity weakens the negative correlation prior to FD. We conclude that mutual funds and funds with high turnover rates are most likely to benefit from selective disclosures.

After controlling for institutions' selection ability, we find that the direction of institutional ownership influence is mostly to reduce the likelihood of being acquired. A one standard deviation increase in the aggregate level of institutional holdings leads to a reduction of 11% to 13% in the target likelihood both before and after the adoption of FD. There is also evidence that high turnover institutional investors may facilitate a take-over effort and increase the probability of being acquired.

There are two plausible explanations for institutions' negative influence. The first is a monitoring story. The institutions are taking over the monitoring role previously played by the takeover market, thus reduce the firm's likelihood of being a target. The second is a "friendship" story. The institutional investors can be "friends" of the management, and increase the threshold for them to sell the shares in an takeover attempt, thus diminish the likelihood of a takeover by driving away some potential bidders with lower valuations.

To ascertain whether institutional investors' negative influence comes from a monitoring effect on potential targets, we examine the relation between institutional ownership and the target announcement premium. We find that public pension funds' (PPF) ownership

increases the target premium. For a one-standard-deviation increase in PPF ownership, the target announcement abnormal return increases by 2%, controlling for firm performance prior to the announcement. It seems that the market is expecting those targets to be able to negotiate a better deal at settlement, or that it is more pleasantly surprised when it happens. We also examine the relation between institutional ownerships and the speed of deal completion. The monitoring story has no prediction of the direction of this relationship. However, the “friendship” story indicates that there may be a positive relationship between the institutional ownership and the time length to completion, since it may take the bidder longer time to convince those investors to sell. We find that non-PPF institutional investors increase the time length to deal completion. Overall, our evidence indicates that PPF is the only likely monitor in our study.

The remainder of this paper is organized as follows. Section I provides a literature review. Section II describes the methodology. Section III describes the data. Section IV discusses institutional ownership impact on target likelihood and target premium. Section V concludes the paper.

I Literature Review

There is a large literature examining institutional investors’ corporate governance activity in order to identify any potential influence. The early literature focuses on institutions’ activity in submitting proxy proposals. For example, Gillan and Starks (2000) report a positive relation between holdings by institutional investors and the aggregate votes for shareholder-sponsored governance proposals. Del Guercio and Hawkins (1999) find that

the pension funds are more successful at monitoring and promoting changes in the firms they target their activism at. Other studies examine institutions' non-proxy activity, such as their impact on compensation policy, CEO turnover, and market response to corporate event. Hartzell and Starks (2003) show that institutional ownership is positively related to the pay performance sensitivity of the executive compensation and negatively related to the level of the compensation. Parrino, Sias, and Starks (2003) find that the change in institutional ownership holdings is negatively related to the likelihood of CEO turnover, and the institutional investors voted with their feet by selling their shares in the year prior to the forced CEO turnover. Hotchkiss and Strickland (2003) find that the stock price response is more negative for firms with higher levels of ownership by momentum or aggressive growth investors, when firms reported earnings below the analyst's expectation. Other papers such as Karpoff, Malatesta, and Walkling (1996) and Wahal (1996), Song and Szewczyk (2003) show that there is very little evidence of the efficacy of shareholder activism, or that the shareholder proposals have negligible effect on the corporate performance.

Some papers are specifically related to the corporate control activity and institutional investors. Brickley, Lease, and Smith (1988) and Jarrell and Poulsen (1987) find that firms with higher levels of institutional investors are more likely to vote against the adoption of the Antitakeover Charter Amendments, or are less likely to adopt it. On the other hand, Pound (1988) shows that institutional investors act as managements' allies in proxy contests. Ambrose and Megginson (1992) find that the probability of receiving a takeover bid is negatively related to the net change of institutional holdings, while the absolute level of the institutional holding has no significant relation with receiving a takeover bid. A more

recent work by Davis and Kim (2006) finds that mutual funds with more business ties are less likely to vote against the management in general.

The difficulty in identifying the exact institutional investor influence is due to the fact that it is hard to control for ownership endogeneity, i.e., to control for the fact that the institutional investors are better investors and have better information, as documented by a large literature.

Brennan, Jegadeesh, and Swaminathan (1993) and Hong, Lim, and Stein (2000), and many others have shown that institutions have better skills than individual investors and hence can process information better. Others document that institutions' information advantage comes from better disclosure they receive from firms. Gibson, Safieddine, and Sonti (2004) document that the selection ability of the institutional investors to identify SEOs with better performance could be attributed to the benefits of selective disclosure. Bailey, Li, Mao, and Zhong (2003), Jorion, Liu, and Shi (2005), and others find support that SEC's Regulation Fair Disclosure enacted on October 13, 2000 reduces the selective disclosure to some shareholders.

II Methodology

The structural equation of interest is:

$$\text{Target}_{it} = \beta_0 + \beta_1 \text{InstOwnership}_{it-1} + \phi X_{it} + \gamma \text{Year}_t + u_i + \epsilon_{it}, \quad (1)$$

where Target_{it} , the dependent variable, is a dummy variable. It equals one for a quarter

t when there is at least one announcement of a firm i being a merger target, which was completed successfully later on. u_i is the firm-level effect. Total Institutional Ownership, Public Pension Fund Ownership, Investment Company Ownership, Other Ownership, the turnover rate of the institutional investors, which are represented by the name $InstOwnership_{it-1}$, are the variables of interest in this study. They are available at the end of the prior quarter. The X_{it} is a vector of control variables, including firm size, q ratio, cash flow ratio, capital expenditures ratio, firm prior performance in the prior quarter measured as average daily excess return, return volatility, liquidity, dividend yield, average sales growth over prior three years, and leverage ratio averaged over three years. Table I explains in detail what these variables are. The $Year_t$'s are year dummies.

Ownership endogeneity arises when institutions are able to predict future shocks to the likelihood of being acquired, and adjust their ownership accordingly, i.e., the correlation between $InstOwnership_{it-1}$ and ϵ_{it} is non-zero. Institutions could be either smarter investors who have innate selection ability, or have selective access to relevant information which is not publicly known. Thus, an endogeneity problem is likely to exist.

Our paper employs a “Bartik instrument” to identify the institutional influence. This instrument interacts the exogenous shocks to institutional investors’ portfolio sizes (at the end of the prior quarter) with the firm-level propensity of investment, which is obtained as the fixed effects from the following regression by each institutional investor j :

$$InstOwnership_{jit} = \beta_{j0} + \beta_{j1}FundSize_{jt} + \omega_{ji} + e_{jit} \quad (2)$$

ω_{ji} can be considered as j 's propensity to invest in firm i . It is not correlated with future

target likelihood shocks, which is captured by e_{jit} if the institutional ownership is correlated with this shock. ω_{ji} is firm specific, and does not vary across time. The institutional investor j 's portfolio size varies across time, but not across firm. The Bartik instrument for aggregate institutional ownership in firm i at time t is $\sum_{j=1}^J FundSize_{jt} * \omega_{ji}$. It interacts the two dimensions, and varies across both firm and time.

The underlying assumption of this approach is that a given institution's equity portfolio size is exogenous. Given our data is from 13F filings, the measure of the fund size is based on the equity portfolio of each institutional investor. There are two factors affecting these fund sizes. One factor is the net inflow of equity funds. An institution carries out an asset allocation rule, and a portion of its overall inflow goes into its equity portfolio. For example, the net inflows of pension funds are determined by generally fixed contributions of their members and their liabilities, which are most likely exogenous.² Then a portion of this exogenous inflow goes into their equity portfolios. Changes to their asset allocation rules are determined for reasons other than the idiosyncratic likelihood of one firm being taken over in the near future. Overall we consider the equity portfolio size of each institutional investor to be exogenous in our context. The second factor affecting fund sizes is the performance of the equity portfolios, which in turn is determined by the current stock price. M&A announcements are often considered surprises. There may be rumors and trading activity in the couple of days leading to an announcement. However, the general market should not be able to predict M&A activity in an average time horizon of 45 days (we look at the portfolio sizes at the end of the prior quarter). Consequently, the current stock price most

²If individual investors can predict future shocks, and can identify a particular fund as having the same predictive power, then the fund flow can become endogenous. However, it is unlikely that an ordinary individual investor possesses this ability.

likely would not incorporate the future shocks to the target likelihood. We also consider institutions' portfolio sizes with a longer lag, up to 6 months. The results remain robust.

To check whether our instrument is valid, we examined the F-statistics from the first-stage IV regressions. This F-statistics is much greater than ten, and therefore it does not suffer weak instrument problem (Staiger and Stock (1997)).

III Data

Our initial sample is the overlap between CRSP and COMPUSTAT databases from 1997 to 2004. Corporate financial information is obtained from COMPUSTAT and stock performance data is from CRSP. The sample is limited to securities identified by CRSP as ordinary common shares (with share codes 11 or 12). This excludes American Depository Receipts, closed-end-funds, primes and scores, and Real Estate Investment Trusts. Utilities, finance and insurance companies, and government agencies (2-digit SIC code 49, from 60 to 69, and above 89) are also excluded. There are a total of 8,494 firms, and a total of 157,726 firm-quarter observations.

Merger target information is obtained from the SDC domestic M&A database by Thomson Financial. To be included, a deal has to be completed with 100% of the target acquired by the bidder, and is classified by SDC as a "merger". Since we cannot obtain institutional ownership information for private firms, only deals with public bidders and public targets are included. There is a total of 1,887 announcement quarters between 1997 and 2004, about 1.2% of the total firm-quarter observations. Table II provides detailed information on this set of announcements. The majority (1861 out of the total of 1887) of the deals had dis-

closed deal values with a mean value of \$1.496 billion dollars and a median of \$233.6 million dollars. 48% of these deals were all cash deals. Tender offer deals count 28% of this sample. There is an average of 112.5 days between announcement and completion, and an average of 46.3 days between the beginning of the quarter and the announcement date. Table III shows that across the eight years of study, more targets were acquired before the adoption of Regulation FD. This is mostly likely due to events post Regulation FD, such as the bursting of the IT bubble and the tragedy on Sept. 11, 2001, which brought a climate change in the macroeconomy and slowed down the M&A market.

The institutional ownership data is obtained from Thomson Financial.³ We identify public pension funds by their names in the Thomson database. In total there were 15 public pension funds:⁴ California public employees retirement system (CalPERS), California state teachers retirement system, Colorado public employees retirement association, Florida state board of administration, Kentucky teachers retirement system, Michigan state treasury, Montana board of investment, New Mexico educational retirement board, New York state common retirement fund, New York state teachers retirement system, Ohio public employees retirement system, Ohio school employees retirement system, Ohio state teachers retirement system, Virginia retirement system, and State of Wisconsin investment board. At the end of June 2000, the average size of equity assets under management is \$25.17 billion, and the median is \$24.65 billion (the largest fund is CalPERS [\$63.53 billion], the smallest is

³Under the Securities Exchange Act of 1934 (Rule 13f), institutional investment managers who exercise investment discretion over accounts with publicly traded securities (section 13(f) securities) and who hold equity portfolios exceeding \$100 million are required to file Form 13f within 45 days after the last day of each quarter. Investment managers must report all holdings in excess of 10,000 shares and/or with a market value over \$200,000.

⁴Not all state and local pension fund holdings are available, because either they are too small and do not file 13f, or their assets are reported by outside money managers.

New Mexico educational retirement board [\$1.51 billion]). The results remain the same if CalPERS, the most visible activist fund, is excluded. About 2% of the observations have zero PPF ownership. The mutual fund ownership is what Thomson classified as investment company ownership. The rest are classified as other institutional ownership. The aggregate holdings by each category are used to measure institutional ownerships.

Table IV shows the summary statistics of the dataset. The median market capitalization is \$137.03 million and the mean is \$1,963.59 million. Thus this dataset is not dominated by large firms. Out of the total of 157,726 firm-quarter observations, 1.20% are target firm-quarter ones. A total of 5,427 (3.4%) observations have zero institutional ownerships, and 1.03% of those are target firm-quarter observations.

Figure 1 and Figure 2 plot the yearly correlation between institutional investor ownerships and the (ex post) likelihood of being a target. The two figures demonstrate two different patterns between public pension funds and mutual funds. Figure 1 shows that mutual fund holdings are positively correlated with target likelihood from 1997 to 2000, and negatively correlated or not correlated with target likelihood from 2001 to 2004. Regulation FD was adopted on October 2000, this switch happened right after the adoption. On the other hand, the correlation between public pension fund holdings and target likelihood remained positive in 2001 and 2002, and the magnitude actually increased from 2000 to 2001. These figures already suggest that mutual funds are the most likely to benefit from selective disclosure prior to FD. Of course these simple plots can not tell us anything regarding selection vs. influence. In the next section, we will rely on more rigorous regression methods to find out if institutional investors have better abilities to predict targets or simply benefit from selective

disclosure.

IV Empirical Results

Table V examines the relation between institutional holdings and the likelihood of being acquired. Apart from looking at the overall institutional ownership, we also break it down into different types of institutional investors. The literature in law and economics (Black (1990), Roe (1994), etc.) has argued that there is substantial heterogeneity among different types of institutional investors regarding monitoring incentives and activities. The most interesting classifications may be public pension funds and mutual funds. Many researchers (Black (1990), Gillan and Starks (2000), Qiu (2006), etc.) have argued that public pension funds are the most likely monitors of corporate governance. On the other hand, Davis and Kim (2006) find that mutual funds with more business ties are more likely to vote with the management, using the recently available mutual fund proxy voting records. Thus, we break the overall institutional ownership into three types: public pension funds, mutual funds, and all others.

Equations (1) through (6) in Table V are fixed effect regressions, and (7) through (12) are fixed effect IV regressions. Institutional ownership is positively associated with firms' likelihood of being acquired throughout the sample. One standard deviation increase in the overall institutional ownership (27%) is correlated with an increase of 0.3% in the likelihood of being taken over. However, after controlling for ownership endogeneity, i.e., the tendency for institutions to hold more of the likely targets, we find the direction of the institutional influence to be negative on the likelihood of being acquired, and the economic magnitude is

also large. One standard deviation increase in the overall institutional ownership leads to a reduction of 11% of the target likelihood. Comparing to the overall 1.2% ex post target likelihood, this reduction is very significant. The bias in the fixed effect estimation is hugely positive to mask this negative influence, and to lead to a small positive correlation. Thus to control for ownership endogeneity is crucial to understand the real role that institutions play in the takeover market.

The rest of the regressions analyze the roles taken on by different types of institutions. In the regressions, the FD dummy equals one for quarters before the adoption of FD. The interaction term between institutional ownership and the FD dummy is analogous to the “difference-in-difference”. It compares the difference in the correlations before and after Regulation FD for firms with high institutional ownership with the difference in the correlation for those with low institutional ownership. It tells us the extra “effect” a particular type of institutional ownership has prior to the adoption of FD in Oct. 2000.

Regressions (3) and (4) show that a one standard deviation increase in the mutual fund ownership before the adoption of Regulation FD is correlated with an increase of 14 to 20 basis points in the probability of being acquired. Since the ex post target likelihood in that period is 1.46% (1.46% of the observations in this period are target observations), this absolute increase translates into a 10% to 14% relative reduction. Post Regulation FD, this correlation switches to insignificant or even negative. This switch clearly indicates that the “extra” positive correlation between mutual fund holdings and target likelihood before Oct. 2000 comes from selective disclosure the funds received. Post FD, this informational advantage is eliminated, thus the positive correlation is diminished.

A similar pattern is also found for institutional investors with high turnover rates (regression (5) and (6)). Although the turnover rate is negatively correlated with the target likelihood both before and after the adoption of FD, this correlation is much less negative prior to the adoption of FD. We conclude that mutual funds and institutions which trade frequently are the most likely candidates to have benefited from the selective disclosure prior to Regulation FD.

In contrast, public pension fund holdings are positively correlated with the target likelihood both before and after the FD regulation (regression (3) and (4)). Before FD, a one standard deviation increase in the public pension fund ownership is correlated with an increase of 20 to 23 basis points in the target likelihood. Post FD, the same increase is associated with an increase of 17 to 18 basis points in the likelihood. The magnitude of the correlation is reduced by 5 basis points maximum post FD, but remains significant. This fact suggests that the benefit the public pension funds received from selective disclosure prior to FD is quite small if any, and it does not drive the positive correlation between the public pension fund holdings and the target likelihood. Other institutions do not correlate with the target likelihood prior to FD, and are positively correlated with the probability post FD (regression (3) and (4)). Again this suggests that they are not likely beneficiaries of selective disclosure prior to the regulation.

Regressions (7) to (12) in Table V are fixed effect IV regressions. They serve two purposes. First, we can give their coefficients a clearer interpretation in terms of the direction of causality. Second, by comparing their results to those from regressions (1) through (6), we are able to tell the direction of the selection bias, which provides evidence on whether

institutions have the ability to select targets. Contrary to the theoretical hypothesis that higher institutional ownership facilitates takeovers and thus increases the probability of being acquired, the regressions show that a higher level of aggregate institutional ownership leads to a smaller likelihood of being taken over, after controlling for firm characteristics, the firm fixed effects and the year fixed effects. When we break down the overall institutional ownership into different types, the results are similar. What is particular interesting is the pattern for public pension fund ownerships. Before FD, a one standard deviation increase in their ownership reduces the target likelihood by 2.4% to 2.5%. After FD, the same increase in the public pension fund holdings reduces the target likelihood by 1.4come from the monitoring effect of the public pension funds, this change indicates that somehow the monitoring effect is weakened post FD. It is possible that the greater emphasis on corporate governance in the years after the Enron scandal strengthens other governance mechanisms, thus their effects substitute some of those coming from the public pension funds.

We can glean more information by comparing the results from the IV regressions to those from plain fixed effect regressions. Let's look at the results for mutual funds. The IV regressions in (9) and (10) tell us that mutual fund holdings reduce the likelihood of being taken over both before and after FD, and the magnitude of that effect does not change much post FD. A one standard deviation increase in the mutual fund holdings reduces the takeover probability by 2.9% to 4.8%. By comparing to the results from regressions (3) and (4), we can see that the biases in the fixed effect regressions are positive, and the magnitude of the biases are about the same before and after FD. The fixed effect regressions show that the positive correlation between mutual fund holdings and target likelihood is reduced post

FD. Given that the mutual funds' selection bias does not change in magnitude, we are more confident that this reduction is likely due to the loss of selective information disclosure.

The results for the public pension funds are different. They exhibit positive selection biases both before and after the adoption of FD. The magnitude is stronger before the adoption of FD. The fixed effect regressions in (3) and (4) indicate that their correlations with the target likelihood remains the same before and after FD. The overall evidence supports the argument that the public pension funds did not benefit from selective disclosure prior to FD.

Regression (11) and (12) examine the rolls taken over by institutions with high turnover rates. We do find that a higher average turnover rate of a given firm's institutional investors leads to a larger probability of that firm being acquired. This facilitation effect is much stronger post FD. This result suggests that the role of facilitating takeover efforts is mostly taken by institutions who trade frequently.

We also control for relevant firm characteristics in the regressions following existing literature. Palepu (1986) and Jensen and Ruback (1983) conclude that it is difficult to predict targets. We confirm their finding that few variables are significant. Furthermore, the firm characteristics variables can be endogenous themselves. There can be a confounding factor which influences both variables like firm size and q ratio, etc., and the shocks to the likelihood of being acquired. Because these variables are not the main interest of our paper, we leave the task of finding the causality between firm characteristics and target likelihood for future research.

One variable that is a main interest of our paper is the Before Regulation FD dummy.

It is equal to one for years 1997 to 2000, which is prior to the adoption of the regulation. The last quarter of 2000 is in fact post the adoption (October 2000). Because we are looking into the institutional ownership at the end of the prior quarter, i.e., at the end of September 2000, we classify this quarter as before FD. The first quarter of 2001 could be problematic, because the change in the institutional ownership in the prior quarter could happen before the adoption of the regulation. Whether we classify this as before FD or after FD, or drop it from the sample, does not make any material changes. This FD dummy is significantly negative across all specifications. Although the actual number of target announcement is fewer in the second half of the sample, 612 announcements from 2001 to 2004 comparing to 1,275 announcements from 1997 to 2000, in the counter-factual, if we could hold all other variables, such as firm characteristics, constant between the two sub-samples, there would be more target announcements in the second half. This suggests that the barrier to acquire or getting acquired actually was lower post FD, even though the absolute number of acquisition announcements was much smaller.

The negative effect of institutional ownership on the likelihood of being acquired can be due to two different mechanisms. The first one is a monitoring mechanism. Institutions as large share holders can exercise a monitor's role, and lead to better firm performance and reduce the probability of firms falling prey of a bidder. The second one is a "friendship" mechanism. It is possible that institutional investors side with the management and use their shareholdings to help the management fend off potential takeover bids. This mechanism may not lead to better firm values.

Although it is hard to distinguish between the two mechanisms using our current data,

we perform two indirect tests to shed some light on which mechanism is more plausible. The first test is to see whether the institutional investors are representing shareholder interest. Table VI examines the relation between institutional ownership and the target announcement premium. After controlling for the ownership endogeneity, deal characteristics, firm characteristics, and year fixed effects, we find that only public pension fund ownership leads to higher target announcement abnormal returns. A one standard deviation increase in PPF ownership leads to an increase of 2% in the announcement premium. It suggests that the market expects those firms to be able to negotiate a better deal. This positive effect does not exist for other types of institutions.

The second test is to see whether institutional holdings have any effect on the time required to complete a deal. If the institutions are playing the monitor's role, there should be no reason to believe that they would influence the time to completion one way or the other. If they are siding with the management and thus reducing the likelihood of the firm being taken over, then they may also prolong the time length required to complete the take-over for those successful ones. Table VII shows that after controlling for the ownership endogeneity, we do observe a positive impact of the mutual funds and other types of the institutions on the length to completion. A one standard deviation increase in the mutual fund holdings prolongs the process by about 18 days. On the other hand, high turnover institutions facilitate this process by reducing the number of days required to complete a deal.

These two tests indicate that if there is any monitoring effect coming from the institutional investors, it is most likely to come from the public pension funds. Since these tests

are indirect, we still need to find a better method to provide conclusive results.

V Conclusions

The role of institutional investors in the market for takeover targets is much debated. We explore the discontinuity created by the adoption of Regulation Fair Disclosure to identify the source of institutional investors' selection ability. We find that while institutions do exhibit selection bias, mutual funds and institutions who trade more were most likely to benefit from selective disclosure prior to the adoption of the regulation. We are also able to identify the direction of institutional investor influence by using an IV technique. Institutional investors are found to reduce the probability of firms' being acquired. Among them, public pension funds are able to increase the target announcement premium.

However, there are also many issues left for further research. First, firm characteristics are used as control variables in this study. They can very well be endogenous. It is interesting to find the direction of causality for this set of variables if there is any. Second, the exact mechanism via which institutions are able to reduce the target probability is worth exploring. Third, target announcement abnormal returns can also be interpreted as the market expectation of the value improvement through a takeover. If so, why the value improvement is larger for firms with higher public pension funds? Is it because these firms are able to find a better bidder and can realize more synergy, or is it because these firms have more potential for improvements?

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Table 1: Data Sources and Definitions

Aggregate institutional holdings	Thomson Financial	aggregate institutional ownership by each category, in percent, at the end of each quarter
Target dummy	SDC	1=there is an announcement of 100% of the firm being acquired, in the current quarter, and the deal was successful; 0=no announcement
Total assets	COMPUSTAT	item[6]
Size	COMPUSTAT	$\ln(\text{item}[6])$
Market capitalization	CRSP	market capitalization at the end of prior quarter
q ratio	COMPUSTAT	$(\text{item}[6] + \text{market cap} - (\text{item}[60] + \text{item}[35] - \text{item}[336])) / \text{item}[6]$
Cash flow ratio	COMPUSTAT	$(\text{item}[18] + \text{item}[14]) / \text{item}[6]$
Capital expenditures ratio	COMPUSTAT	item[128]/item[6]
Prior daily excess return	CRSP	average daily excess return using Fama-French 3-factor model, over the prior quarter
Return volatility	CRSP	standard deviation of monthly stock return over the prior 24 months
Liquidity	CRSP	average monthly share turnover over the prior quarter
Dividend yield	COMPUSTAT	(common stock dividends (item[21]), when available, or cash dividends (item[127]))/year end market cap, lagged one year
Sales growth	COMPUSTAT	$(\text{item}[12] - 1) / \text{item}[12]$, average over prior 3 years
Leverage ratio	COMPUSTAT	item[9]/item[60], average over prior 3 years
Turnover	Thomson Financial	$\sum_{i=1}^I W_{k,i,t} (\frac{1}{4} \sum_{r=1}^4 CR_{i,t-r+1})$, where $CR_{i,t}$ is the churn rate for institutional investor i at quarter t : $CR_{i,t} = \frac{\sum_{k=1}^S N_{k,i,t} P_{k,t} - N_{k,i,t-1} P_{k,t-1} }{\sum_{k=1}^S \frac{N_{k,i,t} P_{k,t} + N_{k,i,t-1} P_{k,t-1}}{2}}$

Table II: Deal characteristics

This table presents mean and median (in parentheses) of deal characteristics for the targets included in our sample. The targets are recorded in the SDC mergers and acquisitions database (1997-2004). To be included, each deal satisfy the following criteria: 1) domestic mergers; 2) deal status is completed; 3) classified as mergers by SDC. self-tender offer, repurchase and rumored deals are excluded; 4) acquirers and targets both are public firms; 5) 100% of the target is acquired. For each company involved in the event, we request that they also have information in CRSP and Compustat database. If we drop the fifth criterion, results are similar.

	100% being acquired		over 50% less than 100% being acquired	
	disclosed value	undisclosed value	disclosed value	undisclosed value
Number of obs.	1861	26	102	0
Deal value (million \$)	1,496.874 (233.6)	n/a	552.77 (142.67)	n/a
Days between announcement and completion	112.50 (96)	153.27 (170.5)	131.91 (125)	n/a
Days between the beginning of the quarter and announcement	46.33 (46)	47.23 (50.50)	45.65 (43)	n/a
Hostile dummy	0.01 (0)	0 (0)	0.03 (0)	n/a
Tender offer dummy	0.28 (0)	0 (0)	0.51 (1)	n/a
All cash deal dummy	0.48 (0)	0 (0)	0.86 (1)	n/a

Table III: Deal distribution

This table presents the deal distribution for our sample years 1997-2004. This sample consists of CRSP and COMPUSTAT firms issuing ordinary common shares, excluding utilities, finance and insurance companies and government agencies. The total number of observations is reported in the second column. The number of firm-quarter observations with M&A announcements for a public target is reported in the third column.

Year	# of observations	% of target firm-quarters
1997	22,431	1.23
1998	22,773	1.55
1999	21,407	1.61
2000	20,651	1.46
2001	20,002	1.07
2002	18,174	0.71
2003	16,623	0.81
2004	15,665	0.86

Table IV: Descriptive Statistics

The sample consists of CRSP and COMPUSTAT firms (1997 – 2004) issuing ordinary common shares, excluding utilities, finance and insurance companies and government agencies. The “Bartik” instrument is the summation of the interactions between an institutional investor’s propensity to invest in each firm and its portfolio size. Each institutional investor j ’s propensity to invest in a firm i is measured as u_i , the firm-level fixed effect, from the following estimation by each institutional investor: $InstOwnership_{it} = \alpha + \beta FundSize_t + u_i + e_{it}$.

	Mean	Median	Std Dev	Min	Max
Target Probability					
Target dummy	0.01	0.00	0.11	0.00	1.00
Institutional Ownership					
Aggregate public pension fund holdings	0.01	0.00	0.02	0.00	0.23
Aggregate investment company holdings	0.08	0.05	0.10	0.00	1.00
Aggregate other institutional holdings	0.24	0.21	0.19	0.00	1.00
Aggregate all institutional holdings	0.34	0.29	0.27	0.00	1.00
Bartik Instrument					
Aggregate PPF	106.57	0.00	278.47	-546.37	4,904.75
Aggregate investment co.	4853.01	0.00	11,664.32	-16,035	113,963.30
Aggregate others	2,803.17	127.92	6,445.85	-8,665.05	94,251.52
Firm Characteristics					
Total assets (millions)	1,543.82	133.44	10,795.24	0.00	647,483.00
Market capitalization (millions)	1,963.59	137.03	12,566.20	0.00	602,432.90
q ratio	2.55	1.48	5.28	0.00	485.57
Cash flow ratio	-0.06	0.06	0.92	-182.66	3.05
Capital expenditures ratio	0.07	0.04	0.10	-0.31	8.88
Leverage ratio	2.15	0.21	197.89	-804.88	25,187.39
Sales growth	0.70	0.11	28.24	-2.34	2,947.51
Dividend yield	0.01	0.00	0.62	-4.42	121.41
Prior daily excess return	0.00	0.00	0.01	-0.34	0.71
Return volatility	0.20	0.17	0.13	0.00	2.64
Liquidity	0.14	0.08	0.34	0.00	74.24

Figure 1: Correlation between mutual fund holding and target likelihood

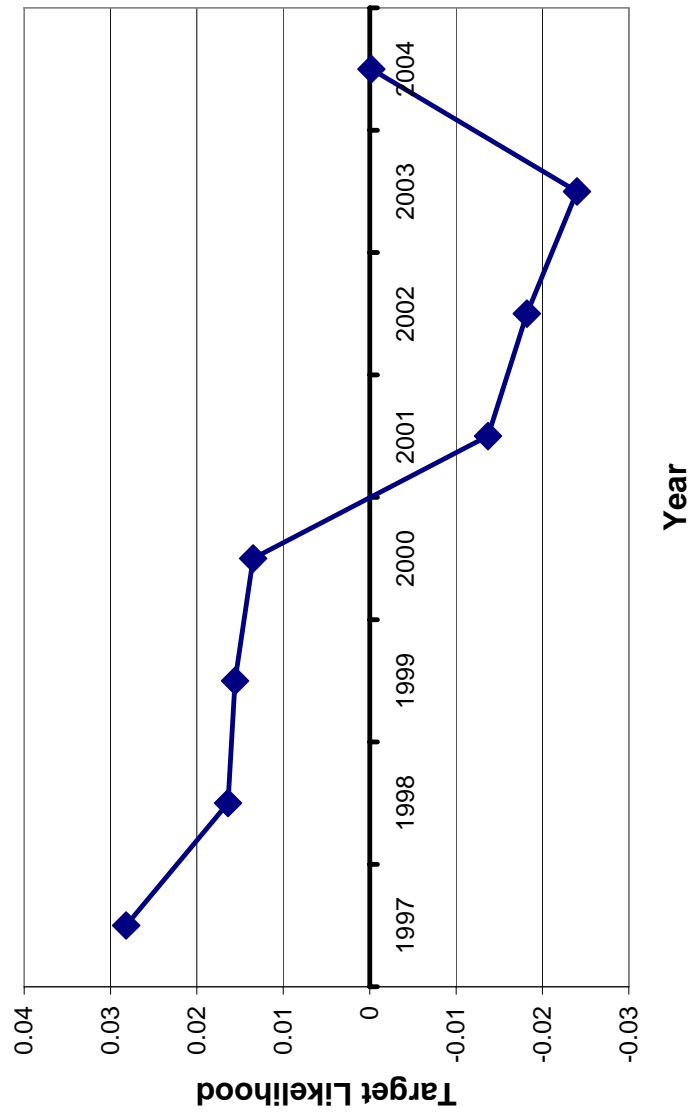


Figure 2: Correlation between public pension fund holding and target likelihood

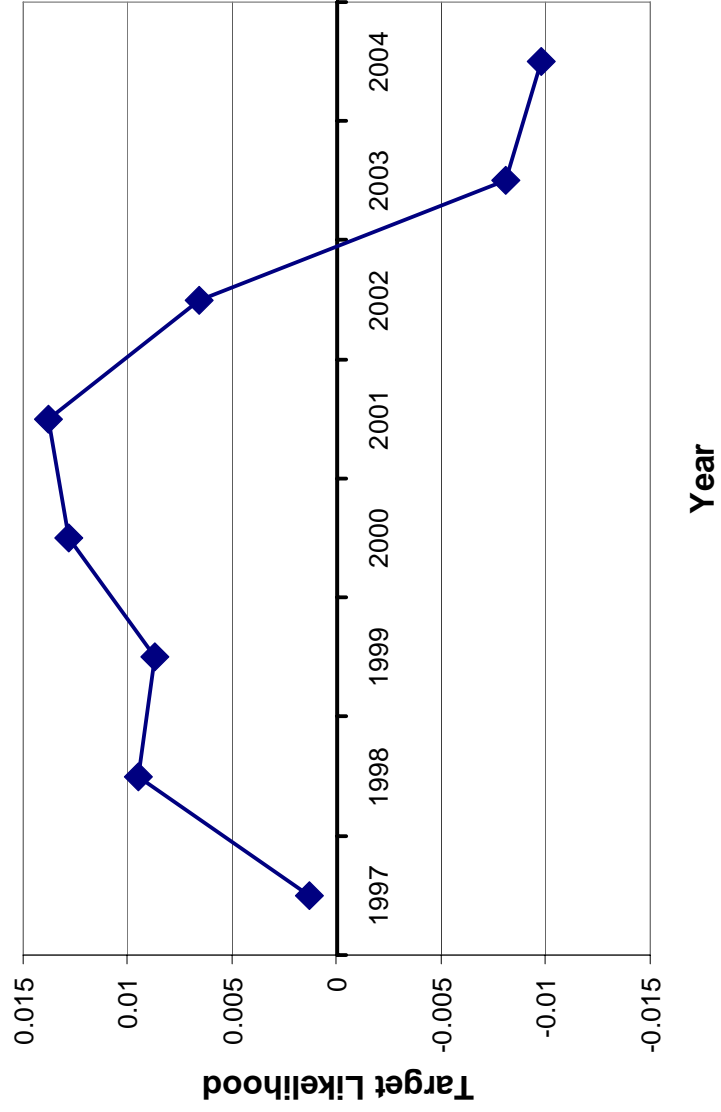


Table V: Likelihood of Being Acquired and Institutional Ownership

We report the coefficients and standard errors from the fixed effect regressions, and the fixed effect IV regressions. There are a total of 157,726 firm-quarters in the sample, out of which 1.2% are target firm-quarters. There are a total of 8,494 firms in the sample. Overall is the aggregate level of institutional ownership. FD is a dummy which equals one for observations before the adoption of FD regulation. Public pension is the aggregate level of public pension fund ownership. Investment co. is the aggregate level of ownership by investment companies, mostly mutual funds. Turnover is the weighted average turnover rate by all institutional investors.

	Dependent variable — 1=target(1.20%); 0=not a target											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Fixed Effect			Fixed Effect IV								
Institutional Ownership												
Overall	0.013*** (0.003)	0.012*** (0.004)					-0.405*** (0.028)	-0.493*** (0.042)				
FD*Overall	0.007*** (0.002)	0.003 (0.002)					-0.011** (0.005)	0.018*** (0.005)				
Public Pension			0.092*** (0.035)	0.086** (0.042)					-0.854*** (0.090)	-0.698*** (0.104)		
Investment Co.			-0.009 (0.006)	-0.013* (0.007)					-0.292*** (0.030)	-0.478*** (0.043)		
Other			0.019*** (0.004)	0.018*** (0.005)					-0.739*** (0.055)	-0.686*** (0.062)		
FD*PPF			0.009 (0.039)	-0.022 (0.047)					-0.330*** (0.070)	-0.555*** (0.092)		
FD*Investment			0.021*** (0.007)	0.014* (0.008)					-0.036* (0.020)	0.008 (0.020)		
FD*Other			0.001 (0.004)	-0.001 (0.005)					0.045*** (0.013)	0.083*** (0.016)		
Turnover					-0.505*** (0.136)	-0.385** (0.174)					21.491*** (3.767)	18.305*** (4.346)
FD*Turnover					0.420*** (0.136)	0.312* (0.173)					-20.931*** (3.753)	17.807*** (4.341)

* significant at 10 %; ** significant at 5%; *** significant at 1%

Table V: Likelihood of Being Acquired and Institutional Ownership: continued

	Dependent variable — 1=target(1.20%); 0=not a target											
	Fixed Effect			Fixed Effect IV						Fixed Effect IV		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Controls												
FD	-0.031*** (0.001)	-0.031*** (0.002)	-0.030*** (0.001)	-0.031*** (0.002)	-0.025*** (0.001)	-0.026*** (0.002)	-0.047*** (0.003)	-0.073*** (0.004)	-0.080*** (0.005)	-0.093*** (0.006)	-0.001 (0.002)	-0.060*** (0.003)
Size	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	0.027*** (0.003)	0.027*** (0.003)	0.035*** (0.003)	0.035*** (0.003)	-0.003*** (0.001)
q ratio	-0.000** (0.000)	-0.000** (0.000)	-0.000** (0.000)	-0.000** (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	-0.000** (0.000)
Cash Flow	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	-0.000 (0.001)
Capital Expenditure	-0.004 (0.004)	-0.004 (0.004)	-0.004 (0.004)	-0.004 (0.004)	-0.004 (0.004)	-0.003 (0.004)	-0.002 (0.007)	-0.005 (0.007)	-0.001 (0.007)	-0.001 (0.007)	-0.001 (0.007)	-0.009 (0.006)
Dividend Yield	-0.004* (0.003)	-0.004* (0.003)	-0.004* (0.003)	-0.004* (0.003)	-0.004* (0.003)	-0.004 (0.003)	-0.004 (0.003)	-0.005 (0.005)	-0.005 (0.005)	-0.005 (0.005)	-0.005 (0.005)	-0.007 (0.005)
Sales growth	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Leverage	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000* (0.000)
Prior excess Return	-0.063 (0.053)	-0.063 (0.053)	-0.062 (0.053)	-0.062 (0.053)	-0.062 (0.053)	-0.064 (0.053)	-0.064 (0.053)	-0.329*** (0.064)	-0.329*** (0.064)	-0.392*** (0.069)	-0.392*** (0.069)	-0.096* (0.057)
Return Volatility	-0.006* (0.003)	-0.006* (0.003)	-0.006* (0.003)	-0.006* (0.003)	-0.006* (0.003)	-0.007** (0.003)	-0.007** (0.003)	-0.051*** (0.006)	-0.051*** (0.006)	-0.062*** (0.007)	-0.062*** (0.007)	-0.002 (0.005)
Liquidity	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	0.013*** (0.002)	0.013*** (0.002)	0.017*** (0.003)	0.017*** (0.003)	-0.004** (0.002)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
First Stage F-stats												
Overall							1,037.61	469.33				
FD*Overall							39,800.09	494.09				
Public Pension Investment Co.									4,132.08	2,626.56		
Others									1,901.19	1,196.94		
FD*PPF									185.77	245.24		
FD*Investment Co.									16,735.69	12,715.67		
FD*Others									14,454.03	12,254.23		
Turnover									11,962.14	9,712.22		
FD*Turnover									12,886.73	12,981.58		
									9,763.11	9,792.90		

* significant at 10 %; ** significant at 5%; *** significant at 1%

Table VI: Institutional Ownership and Target Announcement Premium

We report the coefficients and robust standard errors from OLS regressions, and IV regressions. Target announcement premium is the abnormal return during the (-1,1) three-day window. It is measured using a market model. The market beta is measured during the (-260, -60) window. We control for all control variables in Table V, and also the tender offer dummy and the all cash dummy which are relevant.

	Dependent variable — Target Premium					
	(1)	OLS (2)	(3)	(4)	IV (5)	(6)
Institutional Ownership						
Overall	0.059** (0.027)			-0.093 (0.119)		
Public Pension		0.018 (0.192)			1.046*** (0.357)	
Investment Co.		0.034 (0.060)			-0.070 (0.148)	
Other		0.068** (0.031)			-0.175 (0.196)	
Turnover			-0.336* (0.199)			0.836 (1.042)
Controls						
FD	0.001 (0.019)	0.002 (0.019)	-0.004 (0.018)	-0.014 (0.021)	-0.023 (0.024)	-0.006 (0.018)
Tender offer dummy	0.032* (0.018)	0.032* (0.019)	0.029 (0.018)	0.032* (0.018)	0.028 (0.018)	0.038* (0.020)
All cash dummy	-0.021 (0.016)	-0.022 (0.017)	-0.024 (0.017)	-0.024 (0.016)	-0.017 (0.017)	-0.018 (0.017)
Size	0.005 (0.004)	0.005 (0.004)	0.011*** (0.004)	0.018* (0.011)	0.015 (0.012)	0.006 (0.006)
<i>q</i> ratio	0.011** (0.005)	0.011** (0.005)	0.012** (0.005)	0.012** (0.005)	0.013** (0.006)	0.011** (0.005)
Cash flow	0.065** (0.030)	0.066** (0.030)	0.067** (0.031)	0.069** (0.032)	0.075** (0.033)	0.065** (0.030)
Capital expenditure	-0.076 (0.074)	-0.076 (0.074)	-0.076 (0.073)	-0.092 (0.074)	-0.080 (0.074)	-0.096 (0.074)
Prior excess return	49.195*** (2.886)	49.190*** (2.905)	49.052*** (2.875)	48.861*** (2.861)	48.571*** (2.899)	49.101*** (2.892)
Return volatility	-0.083 (0.081)	-0.081 (0.081)	-0.108 (0.080)	-0.141 (0.092)	-0.169 (0.104)	-0.099 (0.080)
Liquidity	0.071 (0.063)	0.071 (0.063)	0.083 (0.060)	0.105 (0.066)	0.108 (0.066)	0.086 (0.060)
Dividend yield	0.080 (0.247)	0.077 (0.246)	0.030 (0.244)	0.008 (0.247)	0.049 (0.251)	0.106 (0.252)
Sales growth	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)
Leverage	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
# of Obs	1,322	1,322	1,322	1,322	1,322	1,322
R-squared	0.672	0.672	0.671	0.665	0.656	0.664

* significantly different from zero at 10%; ** significantly different from zero at 5%; *** significantly different from zero at 1%

Table VII: Institutional Ownership and Time to Completion

The table reports the relationship between institutional investor holdings and the time to completion. We report the coefficients and robust standard errors from OLS regressions, and IV regressions. The time to completion is measured as the length (number of days) between the announcement date and the completion date. The control variables are the same as those in Table VI.

	Dependent variable — Time to Completion					
	(1)	OLS (2)	(3)	(4)	IV (5)	(6)
Institutional Ownership						
Overall	-47.606*** (-10.186)			261.760*** (-82.515)		
Public Pension		55.089 (-52.718)			367.938 (-262.087)	
Investment Co.		-61.265** (-25.461)			180.595* (-103.094)	
Other		-48.380*** (-13.146)			374.588** (-146.462)	
Turnover			-50.474 (-81.257)			-2,343.761*** (-658.036)
Controls						
FD	-3.809 (-7.987)	-4.313 (-8.011)	1.106 (-7.968)	27.549** (-13.821)	36.102** (-18.096)	5.17 (-8.063)
Tendor offer dummy	-43.690*** (-5.128)	-44.084*** (-5.147)	-44.091*** (-5.327)	-43.975*** (-6.266)	-44.251*** (-6.94)	-60.334*** (-7.894)
All cash dummy	-15.831*** (-4.826)	-15.361*** (-4.924)	-15.237*** (-4.78)	-10.304 (-6.395)	-10.814 (-7.262)	-26.874*** (-6.526)
Size	15.556*** (-2.012)	15.467*** (-2.051)	11.760*** (-1.794)	-10.482 (-6.943)	-14.298* (-8.255)	21.327*** (-3.546)
<i>q</i> ratio	0.48 (-0.708)	0.577 (-0.713)	0.09 (-0.75)	-2.223 (-1.519)	-2.335 (-1.71)	1.268 (-0.833)
Cash flow	-5.212 (-6.819)	-4.423 (-6.823)	-6.202 (-7.162)	-12.331 (-11.973)	-11.394 (-13.485)	-1.404 (-10.237)
Capital Expenditure	53.248 (-32.682)	54.203* (-32.649)	59.188* (-32.754)	86.502** (-41.49)	92.644** (-45.678)	96.584** (-43.466)
Prior excess return	196.698 (-309.406)	164.602 (-311.213)	299.079 (-314.677)	875.798* (-466.555)	928.776* (-535.764)	202.754 (-388.372)
Return volatility	-8.154 (-26.831)	-9.535 (-26.911)	9.644 (-27.167)	109.995** (-49.932)	141.578** (-64.455)	-7.749 (-30.032)
Liquidity	-6.212 (-13.471)	-5.569 (-13.412)	-17.166 (-13.885)	-76.485*** (-26.413)	-88.012*** (-31.707)	-23.554 (-16.477)
Dividend yield	-118.709 (-139.105)	-115.883 (-139.561)	-99.323 (-138.931)	28.412 (-152.030)	51.427 (-167.243)	-247.117 (-171.231)
Sales growth	-0.327 (-1.053)	-0.289 (-1.065)	-0.069 (-1.025)	1.215 (-0.983)	1.824 (-1.18)	0.879 (-1.552)
Leverage	-0.026 (-0.045)	-0.032 (-0.046)	-0.028 (-0.051)	-0.04 (-0.095)	-0.077 (-0.105)	-0.027 (-0.046)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
# of Obs	1,322	1,322	1,322	1,322	1,322	1,322
R-squared	0.198	0.2	0.184	0.589	0.494	0.593

* significantly different from zero at 10%; ** significantly different from zero at 5%; *** significantly different from zero at 1%

Table VIII: For referee: First stage regressions
This table reports the first stage regression results for Table V. Coefficients and standard errors are reported.

	Dependent Variable									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Overall	Overall	FD*Overall	FD*Overall	PPF	PPF	FD*PPF	FD*PPF	Investment	Investment
Instruments										
Overall IV	0.026*** (0.001)	0.017*** (0.001)	-0.061*** (0.001)	-0.058*** (0.001)	0.431*** (0.003)	0.377*** (0.003)	-0.041*** (0.002)	-0.050*** (0.003)	-0.158*** (0.012)	-0.087*** (0.013)
FD*Overall IV	-0.005*** (0.000)	0.001*** (0.000)	0.095*** (0.000)	0.091*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	0.036*** (0.000)	0.031*** (0.000)
PPF IV					-0.006*** (0.000)	-0.005*** (0.000)	-0.004*** (0.000)	-0.004*** (0.000)	-0.007*** (0.001)	-0.007*** (0.001)
Investment Co. IV					-0.094*** (0.002)	-0.061*** (0.003)	0.471*** (0.002)	0.472*** (0.002)	-0.018* (0.010)	-0.075*** (0.011)
Other IV					0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	-0.008*** (0.000)	-0.006*** (0.000)
FD*PPF IV					0.001*** (0.000)	0.000*** (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
FD*Investment Co. IV										
FD*Other IV										

* significantly different from zero at 10%; ** significantly different from zero at 5%; *** significantly different from zero at 1%

Table IX: For referee: First stage regressions: continued

	Dependent Variable									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Controls										
FD	Overall -0.091*** (0.001)	Overall -0.060*** (0.001)	FD*Overall 0.228*** (0.001)	FD*Overall 0.246*** (0.002)	PPF -0.004*** (0.000)	PPF -0.002*** (0.000)	FD*PPF 0.003*** (0.000)	FD*PPF 0.004*** (0.000)	Investment -0.014*** (0.001)	Investment -0.004*** (0.001)
size		0.059*** (0.001)		0.002** (0.001)	0.003*** (0.000)	0.003*** (0.000)		0.001*** (0.000)		0.017*** (0.000)
q ratio		0.004*** (0.000)		0.002*** (0.000)	0.000*** (0.000)	0.000*** (0.000)		0.000* (0.000)		0.001*** (0.000)
Cash Flow		0.003*** (0.000)		0.002*** (0.001)	-0.000*** (0.000)	-0.000*** (0.000)		-0.000 (0.000)		0.001*** (0.000)
Capital Expenditure		0.006 (0.006)		0.019*** (0.006)	-0.000 (0.001)	0.000 (0.001)		0.000 (0.000)		0.005** (0.003)
Prior Excess Return		-0.537*** (0.049)		-0.092* (0.053)	-0.028*** (0.006)	-0.028*** (0.006)		-0.002 (0.004)		-0.168*** (0.023)
Return Volatility		-0.089*** (0.004)		-0.043*** (0.004)	-0.001** (0.000)	-0.001** (0.000)		-0.002*** (0.000)		-0.026*** (0.002)
Liquidity		0.033*** (0.001)		-0.005*** (0.002)	-0.001*** (0.000)	-0.001*** (0.000)		-0.001*** (0.000)		0.010*** (0.001)
Dividend Yield		-0.001 (0.004)		-0.000 (0.004)	-0.000 (0.000)	-0.000 (0.000)		0.000 (0.000)		0.000 (0.002)
Sales Growth		0.000 (0.000)		0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)		-0.000 (0.000)		0.000 (0.000)
Leverage		-0.000 (0.000)		-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)		0.000 (0.000)		-0.000 (0.000)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	157,726	110,108	157,726	110,108	157,726	110,108	157,726	110,108	157,726	110,108
# of firms	8,494	6,398	8,494	6,398	8,494	6,398	8,494	6,398	8,494	6,398
R-squared	0.090	0.158	0.721	0.770	0.167	0.157	0.497	0.546	0.089	0.123

* significantly different from zero at 10%; ** significantly different from zero at 5%; *** significantly different from zero at 1%

Table X: For referee: First stage regressions: continued
This table reports the first stage regression results for Table V. Coefficients and standard errors are reported.

Instruments	Dependent Variable									
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Overall IV	FD*Investment	FD*Investment	Other	Other	FD*Other	FD*Other	Turnover	Turnover	FD*Turnover	FD*Turnover
FD*Overall IV							-0.019*** (0.000)	-0.018*** (0.000)	-0.019*** (0.000)	-0.018*** (0.000)
PPF IV	-0.403*** (0.010)	-0.350*** (0.011)	-0.209*** (0.023)	-0.113*** (0.024)	-1.023*** (0.020)	-0.981*** (0.023)				
Investment Co. IV	-0.012*** (0.000)	-0.012*** (0.000)	-0.006*** (0.001)	-0.014*** (0.001)	-0.018*** (0.001)	-0.016*** (0.001)				
Other IV	-0.018*** (0.001)	-0.016*** (0.001)	0.033*** (0.001)	0.030*** (0.001)	-0.057*** (0.001)	-0.048*** (0.001)				
FD*PPF IV	0.350*** (0.009)	0.425*** (0.009)	-0.080*** (0.019)	-0.161*** (0.020)	1.119*** (0.017)	1.273*** (0.019)				
FD*Investment Co. IV	0.038*** (0.000)	0.037*** (0.000)	0.001 (0.000)	0.004*** (0.000)	0.012*** (0.000)	0.009*** (0.000)				
FD*Other IV	0.027*** (0.000)	0.026*** (0.000)	0.009*** (0.001)	0.016*** (0.001)	0.127*** (0.001)	0.118*** (0.001)				
							(0.000)	(0.000)	(0.000)	(0.001)

* significantly different from zero at 10%; ** significantly different from zero at 5%; *** significantly different from zero at 1%

Table XI: For referee: First stage regressions: continued

	Dependent Variable									
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Controls	FD*Investment	FD*Investment	Other	Other	FD*Other	FD*Other	Turnover	Turnover	FD*Turnover	FD*Turnover
FD	0.037*** (0.000)	0.040*** (0.001)	-0.076*** (0.001)	-0.052*** (0.001)	0.153*** (0.001)	0.175*** (0.001)	0.049*** (0.000)	0.051*** (0.000)	0.050*** (0.000)	0.052*** (0.000)
Size		-0.004*** (0.000)		0.039*** (0.001)		0.002*** (0.001)		-0.003*** (0.000)		-0.003*** (0.000)
<i>q</i> ratio		0.001*** (0.000)		0.003*** (0.000)		0.001*** (0.000)		0.000*** (0.000)		0.000*** (0.000)
Cash Flow		0.001*** (0.000)		0.002*** (0.000)		0.001** (0.000)		0.000*** (0.000)		0.000*** (0.000)
Capital Expenditure		0.005** (0.002)		0.003 (0.005)		0.009** (0.004)		0.008*** (0.001)		0.008*** (0.001)
Prior Excess Return		-0.028 (0.020)		-0.339*** (0.042)		-0.052 (0.039)		0.094*** (0.011)		0.095*** (0.011)
Volatility		-0.012*** (0.002)		-0.061*** (0.004)		-0.030*** (0.003)		-0.004*** (0.001)		-0.004*** (0.001)
Liquidity		-0.000 (0.001)		0.025*** (0.001)		-0.002 (0.001)		-0.000 (0.000)		-0.001 (0.000)
Dividend Yield		-0.001 (0.002)		-0.001 (0.003)		0.001 (0.003)		0.002* (0.001)		0.001 (0.001)
Sales Growth		0.000 (0.000)		0.000 (0.000)		0.000 (0.000)		-0.000 (0.000)		-0.000 (0.000)
Leverage		-0.000 (0.000)		-0.000 (0.000)		-0.000** (0.000)		-0.000** (0.000)		-0.000** (0.000)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	157,726	110,108	157,726	110,108	157,726	110,108	157,726	110,108	157,726	110,108
# of firms	8,494	6,398	8,494	6,398	8,494	6,398	8,494	6,398	8,494	6,398
R-squared	0.595	0.657	0.070	0.112	0.703	0.756	0.605	0.652	0.607	0.654

* significantly different from zero at 10%; ** significantly different from zero at 5%; *** significantly different from zero at 1%