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Essays on Capital Structure and Institutional Ownership

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by

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Abstract

ESSAYS ON CAPITAL STRUCTURE AND INSTITUTIONAL OWNERSHIP

by

YUAN FENG

Adviser: Professor Armen Hovakimian

This dissertation consists of three chapters about how institutional ownership and trading affect capital structure.

Chapter 1 The literature documents that firms issue equity following periods of high stock return and such behavior only occurs in concert with high returns that coincide with large amounts of buying by new institutions. My findings suggest this is also associated with strong institutional selling, the opposite of what one would expect. This positive relationship is not driven by outflow-motivated selling, but rather by informed selling by short-term institutions.

Chapter 2 I document a strong negative relationship between institutional ownership and leverage. I find evidence that long-term institutions affect firm financing following the pecking order. They influence firms to use more internal financing, and more debt than equity when external financing is needed. While the preference of debt over equity when using external financing would lead to higher leverage, using more internal financing dominates this positive effect, resulting in lower leverage.

Chapter 3 I examine whether institutional investors have preferences for firms' leverage ratios, and if so, whether the said preference affect firms' financing decisions. I find supporting evidence for the first question but opposing evidence for the second question. The conclusions hold in both firm-level and institution-firm-level analysis.

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Chapter 1

The Other Side of Institutional Trading

1.1 Introduction

Seasoned equity offerings (SEOs), including what causes a firm to issue SEOs and the effect of issuance on firm stock price, have been widely studied. Although evidence suggests that firms issue SEOs for many reasons, including investment opportunities, optimal capital structure, and signaling, timing is the most prominent reason. The market timing hypothesis is based on the concept that firms possess private information about themselves and are better equipped, compared to investors, to identify and possibly take advantage of times when they are overvalued.

Graham and Harvey (2001), Baker and Wurgler (2002), and Huang and Ritter (2009) find direct evidence that firms tend to issue equity when their market values are high relative to book or past market values, and Asquith and Mullins (1986), Loughran and Ritter (1995), Spiess and Affleck-Graves (1995), and Loughran and Ritter (1997) interpret low post-issue stock returns as evidence of market timing. Taggart (1977), Marsh (1982), Jalilvand and

Harris (1984), Rajan and Zingales (1995), Pagano et al. (1998) and Hovakimian et al. (2001) do no fully support the market timing theory of capital structure, but document results that support that firms time equity issuance.

Altı and Sulaeman (2012) have discovered another important factor to the market timing story. They find that firms time only high returns that are supported by large institutional demand when it comes to SEOs. High institutional demand can validate a more informative price and, in doing so, can reduce adverse selection. Lower adverse selection facilitates a more receptive market for the firm so that it issues equity without substantially depressing the stock price.

In their search for proxies for market reception, they start with new institutional buying and changes in the existing institutional holdings. For each firm, new institutional buying is the number of new institutions who are buying the stocks of this firm, and changes in the existing institutional holdings is the number of existing institutions that are buying minus the number of institutions who are selling.

New institutional buying come about because new institutional buying can "significantly predict SEO announcements," and thus a good proxy for market reception. Meanwhile, changes in the existing institutional holdings is dropped because it does not play a substantial role in predicting SEO announcements.

My motivation in this chapter comes from the preliminary results of the dropped variable: changes in the existing institutional holdings. Unlike the monotonically positive relationship between new institutional buying and SEO announcement likelihood, the relationship for changes in the existing institutional holdings is not monotonic. Instead, a U-shaped variation exists: when change in existing institutional holdings is near zero, that is, the numbers of institutions buying and selling are close, the likelihood of an SEO announcement is the lowest. When changes in the existing institutional holdings is positive and increases as the number of buyers exceeds the number of sellers, the likelihood of an SEO announcement increases. When changes in the existing institutional holdings is negative and decreases as the number of sellers exceeds the number of buyers, the likelihood of an SEO announcement continues to increase.

This is surprising and interesting in two ways. To begin with, on the topic of market reception, institutions are specifically chosen in this study because of their crucial informational role in the stock market. Thus whether or not the institutional buyers are existing shareholders of the firm is inconsequential. The positive side of changes in the existing institutional holdings support this.

In addition, when changes in the existing institutional holdings is negative, the more institutions sell than buy, the more SEOs are announced. If institutional buying can facilitate a more informative price, and thus a more receptive market, institutional selling can facilitate a more informative price as well and thus a less receptive market. This should impede equity issuance, not facilitate, which is what has been preliminarily showcased in the results.

In this paper, I verify this positive relationship and highlight its origination from the institutional selling. I also attempt to address why this relationship is positive. Institutions sell for two possible reasons, one of which is based on liquidity. For example, the institution may have a large withdraw to fulfill, a higher cushion requested by regulators, etc. The other reason is based on information, such as institutions find the firm to be overvalued, or has another firm with better growth opportunities.

The tests have yielded some intriguing results. First, liquidity-driven selling has a negative impact on the likelihood of SEO announcements as the market reception story would predict. Second, decomposing the institutions by their trading frequency, short-term institutional selling plays the key role of predicting SEO announcements.

This is not too surprising as short-term institutions are usually perceived as better informed and more focused on exploiting market timing opportunities whereas long-term institutions are usually perceived as monitors and more focused on long-term development of the firm. Thus in an overvaluation situation, short-term institutions are more likely to sell the firm, whereas long-term institutions may overpass the opportunity and aim for firm growth. If firms also believe themselves to be overvalued, they may choose to issue equity. When short-term institutions sell, the firm may be in a period of overvaluation, which means a higher probability for the firm to believe that it is overvalued itself, and in this way, SEO announcements are predictable.

This chapter proceeds as follows. Section 1.2 describes the data, describes the key variable definitions, and reports the summary statistics. Section 1.3 verifies the strong positive relationship between institutional selling and SEO announcements. Section 1.4 attempts to address the factor behind the negative relationship. Section 1.5 concludes.

1.2 Data and Definitions

1.2.1 Data and Sample Construction

I obtain accounting data from Compustat Fundamentals Quarterly, excluding foreign firms, financial firms (SIC codes 6000-6999), and utility firms (SIC codes 4900-4999). I acquire stock characteristics from monthly equity CRSP stock return database and exclude all securities that do not have a share code of 10 or 11. I use data from the Securities Data Corporation (SDC) to identify SEO filing announcements dates, where spin-offs, unit offers, and rights offerings are excluded. Institutional trading data are from the Thomson Financial 13F Institutional Holdings database. Following Altı and Sulaeman (2012), I also exclude firms from the sample if they fall in one of the following criteria: firms that have had an initial public offering (IPO) and SEOs within the previous two quarters of a SEO event. The full sample includes 325,201 firm-quarter observations and 3,517 SEO announcements from 1985Q1 to 2014Q4.

1.2.2 Definitions of Institutional Trading Variables

Thomson Financial 13F reports quarterly snapshots of institutional investors' portfolios filed with the U.S. Securities and Exchange Commission (SEC). I calculate the differences between two consecutive quarters as institutions' quarterly trading volume. The shares reported in the 13F Institutional Holdings database are adjusted for stock splits that occur between reported date and filing date. To correctly calculate the quarterly change, I adjust the shares by using the CRSP's variable "Cumulative Factor to Adjust Shares Outstanding."

I use the number of shares traded by institutions as the main measure of institutional trading. Below, are the detailed definitions of the **share-based** measures, normalized by institutional ownership:

$$New\ holdings\_1_{\ i,t} = \frac{Shares\ initiated\ by\ institutions_{\ i,t}}{Total\ shares\ owned\ by\ institutional\ shareholders_{\ i,t-1,}} \tag{1.1}$$

$$Increased\ holdings\_1_{\ i,t} = \frac{Shares\ purchased\ by\ existing\ institutions_{\ i,t}}{Total\ shares\ owned\ by\ institutional\ shareholders_{\ i,t-1,}} \tag{1.2}$$

$$Decreased\ holdings\_1_{\ i,t} = \frac{Shares\ sold\ (but\ not\ liquidated)\ by\ existing\ institutions_{\ i,t}}{Total\ shares\ owned\ by\ institutional\ shareholders_{\ i,t-1,}} \tag{1.3}$$

$$Terminated\ holdings\_1_{\ i,t} = \frac{Shares\ liquidated\ by\ existing\ institutions_{\ i,t}}{Total\ shares\ owned\ by\ institutional\ shareholders_{\ i,t-1,}} \tag{1.4}$$

$$Change\ in\ existing\ holdings\_1_{\ i,t} = \frac{Shares\ (purchased - sold)\ by\ existing\ institutions_{\ i,t}}{Total\ shares\ owned\ by\ institutional\ shareholders_{\ i,t-1.}} \tag{1.5}$$

I also adopt the count-based measure that Altı and Sulaeman (2012) use in their paper as a robustness check. Sias et al. (2006) report that the number of institutions is a better proxy for institutional investor demand. The detailed variable definitions are listed below. The count-based *New holdings_2*, *Change in existing holdings_2*, and *Terminated holdings_2* have the exact same definition used in Altı and Sulaeman (2012). *Increased holdings_2* and *Decreased holdings_2* are new and are defined in a fashion similar to the former three variables.

Below, are the detailed definitions of the **count-based** measures, normalized by the number of institutional shareholders:

$$New\ holdings\_2_{\ i,t} = \frac{Number\ of\ institutions\ that\ initiated_{\ i,t}}{Total\ number\ of\ institutional\ shareholders_{\ i,t-1,}} \tag{1.6}$$

$$Increased\ holdings\_2_{\ i,t} = \frac{Number\ of\ existing\ institutions\ that\ purchased_{\ i,t}}{Total\ number\ of\ institutional\ shareholders_{\ i,t-1,}} \tag{1.7}$$

$$Decreased\ holdings\_2_{\ i,t} = \frac{Number\ of\ existing\ institutions\ that\ sold\ (but\ not\ liquidated)_{\ i,t}}{Total\ number\ of\ institutional\ shareholders_{\ i,t-1,}} \tag{1.8}$$

$$Terminated\ holdings\_2_{\ i,t} = \frac{Number\ of\ existing\ institutions\ that\ liquidated_{\ i,t}}{Total\ number\ of\ institutional\ shareholders_{\ i,t-1,}} \tag{1.9}$$

$$Change\ in\ existing\ holdings\_2_{\ i,t} = \frac{Number\ of\ existing\ institutions\ that\ (purchased_{\ i,t} - sold_{\ i,t})}{Total\ number\ of\ institutional\ shareholders_{\ i,t-1.}} \tag{1.10}$$

1.2.3 Summary Statistics

Table 1.1 reports summary statistics for all the variables used in this chapter. Panel A and B report the share-based and count-based measures for the institutional trading variables, respectively. By construction, share-based variables *New holdings_1* , *Increased holdings_1* , *Decreased holdings_1* , *Terminated holdings_1*, *Institutional buying_1*, and *Institutional selling_1* are positive, and they are all trimmed at the top 1%. *Change in existing holdings_1* can be either positive or negative and is trimmed at both the top and the bottom 1%. Among count-based variables, only *New holdings_2* and *Institutional buying_2* have extreme values and are trimmed at the top 1%.

Panel C reports other firm characteristics, among which profitability, investment, R&D

are trimmed at both the top and the bottom 1%. Market-to-book is trimmed at the top 1% and negative values are dropped. Stock return, turnover, and volatility are trimmed at the top 1%. Observations with values below 0 or above 1 for tangibility, leverage, and institutional ownership are dropped.

1.3 Institutional Selling and SEO Announcement

In this section, I present my first set of results that relate the probability of an SEO announcement to institutional selling, in comparison to buying. All the analysis are at the quarterly frequency. For ease of comparison to Altı and Sulaeman (2012) and consideration of plausible non-linear relationships, I first report the results in quintile sorts and then confirm the findings with probit regressions.

1.3.1 Bivariate Sorts between Stock Return and Institutional Trading Variables

Table 1.2 reports the likelihood of an SEO announcement. In Panel A, firms are independently sorted into quintiles based on the previous quarter's raw stock return. Time-series means of the stock return and SEO announcement probabilities are reported. Firms in higher return quintiles are much more likely to announce SEOs than the ones in lower return quintiles. The difference of SEO announcement probabilities between the highest and the lowest stock return quintile is both economically and statistically significant. Firms in the highest stock return quintile have a probability of 2.629%, or about five times the probability of the lowest stock return quintile. Panel A confirms the well-documented fact in the literature that equity issuance follows periods of high stock returns.

Next, the analysis proceeds to the effects of institutional trading on the probability of an SEO announcement along with the stock return. Panel B confirms the main finding in

Altı and Sulaeman (2012). In each quarter, firms are independently sorted into quintiles based on the previous quarter's raw stock return and *New holdings_1*. Within each of the 25 groups, I calculate the percentage of firms that announce an SEO during the quarter. Focusing on the high stock return column from Altı and Sulaeman (2012), when the firm falls in the lowest *New holdings_1* quintile, the likelihood of an SEO announcement is only 0.806% despite the high stock return. This is quite low, whereas the likelihood shoots up to 4.307% when both the stock return and *New holdings_1* are in the highest quintile.

Altı and Sulaeman (2012) have shown that this can be explained by market reception. Firms only time equity issuance in response to high returns that coincides with strong institutional investor demand, a proxy for market reception. Strong institutional investor demand can facilitate a more informative price, which reduces adverse selection and increases market reception so that firms can issue equity without depressing the stock price severely.

Altı and Sulaeman (2012) use the count-based measure *Change in existing holdings_2* and find no significant effect on the probability of an SEO announcement. The share-based measure, *Change in existing holdings_1* in Panel C has no significant effect either. *Change in existing holdings* excludes the effects of new institutions, and based on only the "High minus Low" rows of Panel B and C, one can conclude that only new institutions, not existing ones, are of importance when firms assess market reception.

However, this preliminary conclusion does not hold up to further scrutiny. On the topic of market reception, it should be irrelevant whether the institutional buyers are existing shareholders of the firm. In addition, the monotonically increasing trend observed in *new holdings* is absent across the five quintiles of *change in existing holdings*. Instead, a U-shaped variation exists: when *change in existing holdings* is in its middle quintile, the likelihood of an SEO announcement is at its lowest across all stock return columns. When *change in existing holdings* is in its highest quintile, that is, when there is much more buying than selling of existing institutions, the likelihood goes up to 3.224% in the highest stock return quintile. This percentage is high compared with the unconditional announcement likelihood of 1.081% in the full sample, or the announcement likelihood of 1.615% for the middle *change in existing holdings* quintile.

When *change in existing holdings* is in its lowest quintile, that is, when existing institutions' selling dominates their buying, the announcement likelihood reaches 3.173%, which is almost as high as the likelihood of the highest quintile. This part of the results cannot be explained by the market reception story, in fact, this is opposite of what the market reception story predicts. That institutional selling dominates buying indicates weak institutional demand and thus low market reception, which should be associated with a low likelihood of an SEO announcement. Therefore, a reason other than market reception may be driving this positive effect.

Based on the discussion above, to study the high announcement likelihood associated with the low *change in existing holdings* quintile, *Change in existing holdings_1* is decomposed into *Increased holdings_1*, *Decreased holdings_1*, and *Terminated holdings_1*.

Panel D sorts stock return and *Increased holdings_1*. In terms of market reception, high *Increased holdings_1* would mean high institutional demand. Not surprisingly, the results are consistent with what is observed in Panel B of *New holdings_1*. In later analysis, *Increased holdings_1* and *New holdings_1* exhibit no qualitative difference and are thus added up for brevity. Their sum is *Institutional buying_1*. Panel E reports the results sorted between stock return and *Institutional buying_1*, and these results are consistent with the results sorted between the stock return and *Increased holdings_1* (Panel D) or *New holdings_1* (Panel A).

Panel F sorts stock return and *Terminated holdings_1*. If market reception can also explain the selling side of institutional trading, then a lower announcement likelihood should be observed in the high *Terminated holdings_1* quintile. If there is, indeed, a reason other than market reception that affects institutional selling, then the higher announcement likelihood should be observed instead. Likelihood results in Panel F supports the latter, that is, the higher *Terminated holdings_1*, the higher likelihood of an SEO announcement: in the highest stock return quintile, the high *Terminated holdings_1* quintile has a 3.876% probability of an SEO announcement compared with 1.442% in the low quintile.

Similar results hold in Panel G for the stock return and *Decreased holdings_1* sort. In the highest stock return quintile, the high *Decreased holdings_1* quintile has a 3.585% probability of an SEO announcement compared with 1.411% in the low *Decreased holdings_1* quintile. In later analysis, *Decreased holdings_1* and *Terminated holdings_1* exhibit no qualitative difference and are thus added up for brevity. Their sum is *Institutional selling_1*, and Panel H reports results consistent with those in Panel F and G.

When one sells in the stock market, someone else must be buying. So firms that have high *institutional selling* might be the ones whose *institutional buying* is high. To address this concern, in Panel I, I sort *Institutional buying_1* and *Institutional selling_1*. Even when controlling for *Institutional buying_1*, *Institutional selling_1* is not negatively associated with SEO announcements. In the lowest and highest quintile of *Institutional selling_1*, the positive effect is present and statistically significant. In the middle three quintiles, the positive effect is still present, but not significant.

1.3.2 Multivariate Analysis

In the last section, Panels B through I are bivariate and exclude other important factors predicting equity issuance. In this section, I employ a multivariate probit analysis to control for these factors. Specifically, I estimate two specifications. In the first specification, the institutional trading measures are dummy variables. The dummy form takes into account the plausible non-linear relationship that allows for a comparison with the previous section. In the second specification, the institutional trading measures are in continuous forms, which might improve efficiency in econometrics terms.

The first model specification is detailed as follows:

$$
\begin{aligned}
\textit{Pr (SEO Ann.)}_{i,t+1} = & \textit{Probit } (\boldsymbol{\textit{High Inst. Buying, Medium Inst. Buying,}} \\
& \boldsymbol{\textit{High Inst. Selling, Medium Inst. Selling,}} \\
& \textit{Stock Return, Lagged stock return, M/B,} \\
& \textit{Firm Size Firm Age, IPO dummy, Profitability,} \\
& \textit{Tangibility, R\&D, R\&D dummy, Investment, Leverage,} \\
& \textit{Volatility, Turnover, Institutional Ownership,} \\
& \textit{Quarter and Industry Fixed Effects})_{i,t.}
\end{aligned}
\tag{1.11}
$$

Regression 1.11 estimates the probability of firm i announcing an SEO in quarter $t+1$, and the variables of interest are highlighted in bold: ***High (medium) institutional buying*** is a dummy variable that takes the value of one in quarter t if the respective *institutional buying* variable is in its highest quintile (middle three quintiles) of quarter t, and ***High (medium) institutional selling*** is set up in an identical fashion.

Lagged stock return is included to address the concern that *institutional buying* or *institutional selling* may be the result of the previous quarter's stock return. Firm characteristics that have been previously used in the literature are also present; stock characteristics are included to control for other aspects of the stock. Total institutional ownership size is also controlled for. The control variables are all measured in quarter t.

The second model specification is detailed as follows:

$$
\begin{aligned}
\textit{Pr (SEO Ann.)}_{i,t+1} = & \textit{Probit (}\textbf{\textit{Inst. Buying, Inst. Selling,}} \\
& \textit{Stock Return, Lagged stock return, M/B,} \\
& \textit{Firm Size Firm Age, IPO dummy, Profitability,} \\
& \textit{Tangibility, R\&D, R\&D dummy, Investment, Leverage,} \\
& \textit{Volatility, Turnover, Institutional Ownership,} \\
& \textit{Quarter and Industry Fixed Effects)}_{i,t.}
\end{aligned} \tag{1.12}
$$

Specification 1.12 is similar to specification 1.11, except the interest variables *institutional buying* and *institutional selling* are in continuous forms. I estimated both specifications with the share-based definitions and the count-based definitions as a robustness check.

Table 1.3 reports the estimation results of the Probit Regression 1.11. The positive marginal effects on ***High (medium) institutional selling*** confirms that after controlling for other firm and stock characteristics, as *institutional selling* increases, the probability of a firm announcing an SEO still increases. It is evident that this effect is independent of *institutional buying.*

To intuitively gauge the impact of the positive marginal effects, I calculate the average adjusted predictions of the probability of an SEO announcement based on specification 1.11 and share-based measures. Panel B of Table 1.4 reports these results. High *institutional buying* has a 1.2579% likelihood of an SEO announcement; medium has a 0.9874% likelihood and low has a 0.6734% likelihood, which is only 53% of the high variable. Comparatively, when *institutional selling* is high, the likelihood is 1.1224% compared to 1.0507% of the medium and 0.7157% of the low, respectively, the latter of which is only 64% of the likelihood for high *institutional selling.*

Table 1.4 reports estimation results of the continuous form specification 1.12. The coefficients on continuous institutional trading measures again verify the positive relationship between *institutional selling* and an SEO announcement in the presence of *institutional buying* and other firm characters.

Count-based institutional trading variables present results qualitatively similar to the share-based measures in both specifications. The pseudo R^2 is lower in Table 1.4, so the explanation power is actually higher when using dummy variables.

1.4 Why Does *Institutional Selling* Trigger SEOs?

The prediction power of *institutional selling* on SEO announcements is significantly positive. Market reception cannot be the explanation because high *institutional selling* means a less receptive market and thus predicts a lower probability of an SEO announcement.

To answer why *institutional selling* can predict SEOs, I start with why institutions sell. Briefly summarized, there are two reasons. One is for liquidity. Institutions need cash to fulfill withdraw requests, maintain their cash cushion, and so on. For example, they have a large withdraw to fulfill, or a higher cushion requested by regulators. The other one is based on information. Institutions find the firm to be overvalued, or it has another firm with better growth opportunities.

1.4.1 Liquidity-Driven Selling

In this section, I analyze liquidity-driven institutional selling. I construct *Mutual fund hypothetical outflow* (*MFHO*) following Edmans et al. (2012) and *Flow-motivated fire sales* following Coval and Stafford (2007). These variables proxy for the firm selling induced by investor outflows instead of information.

I obtain quarterly data on mutual fund holdings from CDA Spectrum/Thomson (s12), and mutual fund flows are estimated using the CRSP series of monthly total net assets

(TNA) and returns. I use WRDS MFLINK to link these two databases. Because the CRSP Mutual Fund database is monthly data at the share class level, and Thomson is quarterly data at the mutual fund level, I first convert the monthly share-class-level TNA and return to quarterly mutual-fund-level total net assets (TA) and return.

To be included, a fund must have had at least 20 holdings at some point in the past, and changes in TA cannot be too extreme:

$$-0.50 < \Delta TA_{j,t}/TA_{j,t-1} < 2.0.$$

Then the net flow of funds in dollar value to mutual fund j during quarter t is defined as:

$$Flow_{j,t} = TA_{j,t} - TA_{j,t-1} \times (1 + R_{j,t}), \tag{1.13}$$

$$Outflow_{j,t} = -Flow_{j,t}/TA_{j,t-1}, \tag{1.14}$$

where $TA_{j,t}$ is fund j's total assets at the end of quarter t and $R_{j,t}$ is the fund-level return for fund j over quarter t.

Following Edmans et al. (2012), I construct firm i's *Mutual fund hypothetical outflow* as

$$MFHO_{i,t} = \sum_{j=1}^{m} \frac{Flow_{j,t} \times s_{i,j,t-1}}{VOL_{i,t}} \tag{1.15}$$

for each stock i in quarter t, and **the summation is only over funds j for which** $Outflow_{j,t} \geq 5\%$. The term $VOL_{i,t}$ is total dollar trading volume of stock i in quarter t , and

$$s_{i,j,t} = \frac{SHARES_{i,j,t} \times PRC_{i,t}}{TA_{j,t}} \tag{1.16}$$

is the dollar value of fund j's holdings of stock i as a proportion of fund j's total assets at the end of the quarter. Substitution makes my mutual fund price pressure measure

$$MFHO_{i,t} = \sum_{j=1}^{m} \frac{Flow_{j,t} \times SHARES_{i,j,t-1} \times PRC_{i,t-1}}{TA_{j,t-1} \times VOL_{i,t}}, \tag{1.17}$$

where **the summation is only over funds j for which $Outflow_{j,t} \geq 5\%$.**

Following Coval and Stafford (2007), I construct firm i's *Flow-motivated fire sales* as:

$$PRESSURE\_1_{i,t} = \frac{\sum_j (\max(0, \Delta Holdings_{j,i,t}) | flow_{j,t} > P(90th)) - \sum_j (\max(0, -\Delta Holdings_{j,i,t}) | flow_{j,t} < P(10th))}{AvgVolume_{i,t-4:t-2,}} \tag{1.18}$$

$$PRESSURE\_2_{i,t} = \frac{\sum_j (\max(0, flow_{j,t}) \cdot \max(0, \Delta Holdings_{j,i,t})) - \sum_j (\max(0, -flow_{j,t}) \cdot \max(0, -\Delta Holdings_{j,i,t}))}{AvgVolume_{i,t-4:t-2,}} \tag{1.19}$$

$$PRESSURE\_3_{i,t} = \frac{\sum_j (\max(0, \Delta Holdings_{j,i,t}) | flow_{j,t} > P(90th)) - \sum_j (\max(0, -\Delta Holdings_{j,i,t}) | flow_{j,t} < P(10th))}{SharesOutstanding_{i,t-1.}} \tag{1.20}$$

Firms for whom *MFHO* and *PRESSURE_1 _2 _3* are calculated must be part of my full sample from earlier sections. The Thomson Financial 13F Institutional Holdings (S34) and Mutual Fund Holding (S12) database differ in their original sources and in their level of coverage, but almost every fund in the S12 set has a manager in the S34 set as well, that is, Mutual Fund Holding (S12) is a subsample of 13F Institutional Holdings (S34), so a negligible amount (6,787) of observations is lost as the result of this requirement: 170,192 firm-quarter observations before merging with 13F compare with 163,405 afterwards.

To conduct my test, firms are independently sorted into quintiles based on the previous quarter's raw stock return and *MFHO* for each quarter, and the likelihood of an SEO announcements is calculated and reported in Table 1.5. *PRESSURE_1, _2*, and *_3* are sorted into deciles and are reported in Table 1.6. The high quintile/decile refers to the group of firms that suffer the most from outflow-motivated mutual fund selling.

In Table 1.5, the high *MFHO* quintile has a significantly lower probability of an SEO announcement compared with the low quintile. In Table 1.6, high *PRESSURE_1, _2*, or *_3* is not associated with a significantly higher or lower likelihood compared with the low decile.

These two measures have their own perks and drawback, the details of which are unnecessary to expand on here. Based on the results in Tables 1.5 and 1.6, I conclude that the positive effect of *institutional selling* observed in prior sections cannot be explained by the liquidity-driven sales.

1.4.2 Information-Driven elling

In this section, I test whether information-driven selling can help explain the positive relationship. Institutions are decomposed into the long-, mid-, and short-term. Short-term institutions are usually perceived as better informed and more focused on exploiting market timing opportunities, whereas long-term institutions are usually perceived as monitors and more focused on further development of the firm. By decomposing and comparing, the kind of information that drives the positive relationship may surface.

I identify long- and short-term institutional investors based on their average portfolio turnover in the last four quarters, like in Yan and Zhang (2009). Specifically, I first calculate the aggregate purchases and sales for each institution k:

$$CR\_buy_{k,t} = \sum_{\substack{i-1 \\ S_{k,i,t} > S_{k,i,t-1}}}^{N_k} |S_{k,i,t}P_{i,t} - S_{k,i,t-1}P_{i,t-1} - S_{k,i,t-1}\Delta P_{i,t}|, \quad (1.21)$$

$$CR\_sell_{k,t} = \sum_{\substack{i-1 \\ S_{k,i,t} \leq S_{k,i,t-1}}}^{N_k} |S_{k,i,t}P_{i,t} - S_{k,i,t-1}P_{i,t-1} - S_{k,i,t-1}\Delta P_{i,t}|. \quad (1.22)$$

Here, $P_{i,t-1}$ and $P_{i,t}$ are the share prices for stock i at the end of quarters $t-1$ and t, respectively. $\Delta P_{i,t}$ is $P_{i,t} - P_{i,t-1}$. $S_{k,i,t-1}$ and $S_{k,i,t}$ are institution k's holdings of stock i at the end of quarters $t-1$ and t, respectively. $CR\_buy_{k,t}$ and $CR\_sell_{k,t}$ denote institution k's aggregate purchases and sales in quarter t. The churn rate of institution k in quarter t is then defined as

$$CR_{k,t} \equiv \frac{min(CR\_buy_{k,t}, CR\_sell_{k,t})}{\sum_{i=1}^{N_k} \frac{S_{k,i,t}P_{i,t} + S_{k,i,t-1}P_{i,t-1}}{2}}. \quad (1.23)$$

I then calculate each institution's average churn rate over the past four quarters as

$$AVG\_CR_{k,t} = \frac{1}{4} \sum_{m=0}^{3} CR_{k,t-m}. \quad (1.24)$$

Next, for each quarter, I sort all institutions into three tertile portfolios based on $AVG\_CR_{k,t}$. The institutions ranked in the top tertile have the highest turnover and are classified as short-term institutional investors, whereas those ranked in the bottom tertile have the lowest turnover and are classified as long-term institutional investors.

I then calculate long-, mid-, and short-term *institutional buying* and *Institutional selling* accordingly. To keep my model parsimonious for the analysis that follows, I only use the high *institutional buying/selling* dummy variable, and not the medium ones. *Institutional buying/selling* is defined as high and takes the value of one in quarter t if the respective variable falls in its top two quintiles. The specification is as follows:

$$
\begin{aligned}
\textit{Pr (SEO Ann.)}_{i,t+1} = & \textit{Probit (}\textbf{\textit{High Long-, Mid-, Short-term Inst. Buying,}} \\
& \textbf{\textit{High Long-, Mid-, Short-term Inst. Selling,}} \\
& \textit{Stock Return, Lagged stock return, M/B,} \\
& \textit{Firm Size Firm Age, IPO dummy, Profitability,} \\
& \textit{Tangibility, R\&D, R\&D dummy, Investment, Leverage,} \\
& \textit{Volatility, Turnover, Institutional Ownership,} \\
& \textit{Quarter and Industry Fixed Effects)}_{i,t}.
\end{aligned} \tag{1.25}
$$

Estimation results from Regression 1.25 are reported in column (2) of Table 1.7. Only short-term *institutional selling* has a positive marginal effect, whereas long- and mid-term *institutional selling* are not pertinent. I also estimate the model with continuous variables and find similar results, but, for brevity, they are not reported here.

To reiterate, the average adjusted predictions of the probability of an SEO announcement is calculated and reported in Panel B of Table 1.7. When long-term *institutional selling* is high, the probability of an SEO announcement actually drops from 1.1501% to 1.0627%. When short-term institutional selling is high, the probability increases from 1.0099% to 1.2328%, by about 22%. The economic significance of short-term *institutional selling* is plainly evident.

The different effect between long- and short-term *institutional selling* provides evidence that mispricing is the explanation for the positive relationship observed between *institutional selling* and SEO announcement. When the firm stock return is high, short-term institutions that find the firm overvalued will sell the firm. The higher the return, the more short-term institutions are likely to sell. Meanwhile, since the stock return is high, the firm is more likely to issue equity too. Thus a positive relationship observed.

I calculate the SEO announcement return to see if the SEO announcements preceded by high total and short-term *institutional selling* would perform any differently in the market. Tables 1.8, 1.9, and 1.10, respectively, report the results of raw, value-weighted, and equal-weighted, market-adjusted announcement return results. The market does not react differently to SEOs preceded by high institutional selling. I also looked into the future return in several windows (not reported here for brevity), the firms do not perform differently when sorted on total or short-term *institutional selling*.

1.5 Conclusions

The literature has provided evidence that firms tend to time their equity issuance, and that this timing is more feasible should there be more new institutions' buying of the firm. In this paper,I document that, high institutional selling, accounting for institutional buying, stock return, and other factors, positively predicts the probability of an SEO announcement.

Liquidity-driven sales cannot explain this positive relationship. In fact, the positive relationship is directed to the sales by short-term institutions. High short-term institutional selling is present because institutions assess a firm as overvalued. Short-term institutions frequently trade based on proprietary information, most of which firms possess as well. Therefore, it is very likely the firms come to the same conclusion of valuation and thus issue equity. As a result, I observe that high short-term institutional selling can positively predict SEO announcements.

Table 1.1: Summary Statistics

The table reports summary statistics of institutional trading measures and other firm characteristics. *Market-to-book* is market equity plus book debt divided by total assets. *Firm size* is logarithm of total assets. *Firm age* is logarithm of the number of months since the first appearance in CRSP. *IPO dummy* is equal to one if the firm age is less than 24 months. *Profitability* is quarterly operating income before depreciation divided by total assets. *Tangibility* is quarterly total (net) property, plant and equipment divided by total assets. *Investment* is capital expenditures divided by Total Assets. *R&D* is quarterly research and development expenditures divided by total assets. *R&D dummy* is equal to zero if R&D is missing. *Leverage* is book debt divided by total assets. *Volatility* is standard deviation of monthly stock returns measured over past three months. *Turnover* is quarterly share trading volume divided by shares outstanding. *Institutional Ownership* is fraction of shares outstanding owned by institutional investors in Thomson Financial 13F.

				Percentiles				
Name	#Obs	Mean	*Std.Dev.*	5^{th}	25^{th}	50^{th}	75^{th}	95^{th}
Panel A: ***Share-based institutional trading measure, normalized by institutional ownership***								
New holding_1	325,201	11.87	26.21	0.00	1.35	4.89	11.79	43.24
Increased holdings_1	325,201	8.29	8.66	0.00	2.17	6.38	11.36	24.10
Decreased holdings_1	325,201	6.38	6.09	0.00	1.32	5.16	9.50	18.06
Terminated holdings_1	325,201	5.80	9.66	0.00	0.40	2.44	6.81	23.44
Change in Existing Holding_1	325,201	−3.89	12.65	−24.95	−7.43	−2.08	0.72	11.60
Institutional Buying_1	325,201	20.15	28.69	0.00	6.38	13.55	23.51	59.49
Institutional Selling_1	325,201	12.18	11.66	0.00	4.03	9.64	16.69	34.07
Panel B: ***Count-based institutional trading measure, normalized by the number of institutional shareholders***								
New holding_2	325,201	19.65	18.30	0.00	9.52	16.00	25.00	50.00
Increased holdings_2	325,201	27.76	14.67	0.00	20.00	30.00	36.76	47.76
Decreased holdings_2	325,201	24.21	13.87	0.00	15.56	25.70	33.33	42.86
Terminated holdings_2	325,201	12.17	10.15	0.00	5.26	10.91	16.81	31.15
Change in Existing Holding_2	325,201	−8.62	21.21	−40.70	−20.00	−8.72	0.00	25.00
Institutional Buying_2	325,201	47.41	24.82	0.00	34.09	47.37	58.33	89.47
Institutional Selling_2	325,201	36.38	16.67	0.00	27.42	39.39	47.56	57.95

(to be continued)

Table 1.1 (continued)

Panel C: ***Firm characteristics***								
Stock Return	325,201	0.02	0.27	−0.40	−0.14	0.00	0.15	0.48
M/B	325,201	1.77	1.86	0.50	0.81	1.19	1.97	4.94
Firm size	325,201	5.23	2.07	2.11	3.74	5.06	6.59	8.93
Firm age	325,201	4.63	1.17	2.40	3.91	4.79	5.49	6.30
IPO dummy	325,201	0.12	0.32	0	0	0	0	1
Profitability	325,201	0.02	0.07	−0.10	0.01	0.03	0.05	0.08
Tangibility	325,201	0.27	0.23	0.03	0.10	0.21	0.39	0.76
Investment	325,201	0.02	0.03	0.00	0.00	0.01	0.02	0.06
R&D	325,201	0.01	0.04	0.00	0.00	0.00	0.01	0.07
R&D dummy	325,201	0.46	0.50	0	0	0	1	1
Leverage	325,201	0.21	0.20	0.00	0.02	0.18	0.34	0.60
Volatility	325,201	0.29	0.17	0.10	0.17	0.25	0.37	0.64
Turnover	325,201	0.35	0.36	0.03	0.10	0.23	0.46	1.09
Institutional Ownership	325,201	0.40	0.29	0.01	0.14	0.37	0.65	0.89

Table 1.2: Probability of SEO announcements: Bivariate sort on stock return and institutional trading

The table reports quarterly SEO announcement probabilities. In each quarter, firms are sorted independently into quintiles based on previous quarters raw stock return and different institutional trading measures. Panel A reports the announcement probability for each return group, while Panels B through I report the announcement probability for each return-institutional holding group. Announcement probabilities are calculated as time-series averages of quarterly probabilities and reported in percentage terms. My sample of potential SEO announcers consists of 356,482 firm-quarter observations from 1985:Q1 to 2015:Q4.

Panel A: Univariate sort on stock return

	Return Quintile						
	Low	2	3	4	High		
Mean Stock Return	-0.302	-0.104	0.005	0.121	0.468		
SEO announcement probability	Low	2	3	4	High	High minus Low	
All observations	0.527	0.696	0.839	1.230	2.629	2.102	(33.48)

Panel B: Bivariate sort on stock return and New holdings_1

New holdings_1	**Stock Return**						
	Low	2	3	4	High	High minus Low	
Low	0.337	0.372	0.338	0.378	0.806	0.469	(5.95)
2	0.591	0.550	0.597	0.812	1.595	1.004	(7.35)
3	0.487	0.703	0.740	0.976	1.906	1.419	(10.33)
4	0.622	0.798	1.186	1.578	2.594	1.973	(13.11)
High	0.659	1.171	1.448	2.294	4.307	3.648	(20.73)
High minus Low	0.322	0.800	1.111	1.916	3.501	3.179	
	(4.39)	(8.27)	(10.29)	(14.01)	(19.05)	(15.92)	

(to be continued)

Table 1.2 (continued)

Panel C : Bivariate sort on stock return and Change in existing holdings_1

Change in existing holdings_1	**Stock Return**						
	Low	2	3	4	High	High minus Low	
Low	0.502	0.705	0.980	1.711	3.173	2.671	(20.92)
2	0.505	0.607	0.832	1.087	2.697	2.192	(14.67)
3	0.442	0.523	0.626	0.943	1.615	1.172	(9.71)
4	0.503	0.566	0.650	1.002	1.764	1.261	(8.87)
High	0.728	1.042	1.120	1.483	3.224	2.496	(14.62)
High minus Low	0.226	0.337	0.140	-0.228	0.0508	-0.175	
	(2.68)	(3.04)	(1.09)	(-1.50)	(0.26)	(-0.84)	

Panel D: Bivariate sort on return and Increased holdings_1

Increased holdings_1	**Stock Return**						
	Low	2	3	4	High	High minus Low	
Low	0.314	0.350	0.444	0.601	1.190	0.876	(9.97)
2	0.454	0.456	0.585	0.855	1.957	1.503	(11.15)
3	0.516	0.656	0.703	1.094	2.416	1.900	(12.17)
4	0.608	0.802	0.970	1.424	2.960	2.352	(14.43)
High	0.768	1.155	1.450	2.016	3.993	3.225	(19.75)
High minus Low	0.454	0.805	1.007	1.415	2.802	2.349	
	(6.08)	(8.15)	(8.52)	(9.99)	(16.09)	(12.75)	

Panel E: Bivariate sort on stock return and Institutional buying_1

Institutional buying_1	**Stock Return**						
	Low	2	3	4	High	High minus Low	
Low	0.346	0.348	0.385	0.400	0.811	0.465	(5.57)
2	0.368	0.503	0.530	0.760	1.368	1.000	(8.64)
3	0.478	0.632	0.839	1.105	1.951	1.473	(10.54)
4	0.711	0.815	1.019	1.512	2.657	1.946	(12.95)
High	0.709	1.270	1.530	2.323	4.460	3.751	(21.91)
High minus Low	0.364	0.922	1.145	1.923	3.650	3.286	
	(4.75)	(8.98)	(9.78)	(13.33)	(18.97)	(15.97)	

(to be continued)

Table 1.2 (continued)

Panel F: Bivariate sort on return and Terminated holdings_1

Terminated holdings_1	Stock Return						
	Low	2	3	4	High	High minus Low	
Low	0.318	0.461	0.505	0.703	1.442	1.124	(12.17)
2	0.613	0.650	0.673	0.903	2.224	1.612	(7.99)
3	0.491	0.711	0.979	1.197	2.472	1.981	(11.84)
4	0.582	0.808	0.932	1.588	3.176	2.594	(16.23)
High	0.665	0.833	1.221	1.928	3.876	3.211	(22.92)
High minus Low	0.347	0.372	0.717	1.225	2.434	2.087	
	(5.15)	(4.34)	(6.88)	(9.54)	(14.57)	(12.55)	

Panel G: Bivariate sort on return and Decreased holdings_1

Decreased holdings_1	Stock Return						
	Low	2	3	4	High	High minus Low	
Low	0.395	0.506	0.512	0.635	1.411	1.015	(10.78)
2	0.610	0.630	0.874	1.035	2.342	1.732	(11.24)
3	0.512	0.701	0.831	1.230	2.602	2.089	(13.30)
4	0.497	0.812	0.813	1.333	2.868	2.371	(14.58)
High	0.642	0.809	1.168	1.729	3.585	2.943	(19.13)
High minus Low	0.246	0.303	0.656	1.094	2.174	1.928	
	(3.37)	(3.34)	(6.10)	(8.50)	(13.14)	(10.88)	

Panel H: Bivariate sort on stock return and Institutional selling_1

Institutional selling_1	Stock Return						
	Low	2	3	4	High	High minus Low	
Low	0.414	0.503	0.536	0.604	1.181	0.767	(7.84)
2	0.431	0.608	0.687	0.910	2.085	1.654	(11.07)
3	0.566	0.654	0.800	1.248	2.513	1.947	(11.67)
4	0.584	0.794	0.970	1.410	3.029	2.445	(15.28)
High	0.603	0.890	1.361	2.121	3.893	3.290	(23.70)
High minus Low	0.189	0.387	0.826	1.518	2.712	2.523	
	(2.60)	(4.05)	(7.06)	(10.77)	(15.42)	(14.18)	

(to be continued)

Table 1.2 (continued)

Panel I: Bivariate sort on Institutional buying_1 and Institutional selling_1

Institutional buying_1	***Institutional selling_1***						
	Low	2	3	4	High	High minus Low	
Low	0.361	0.480	0.649	0.529	0.527	0.167	(2.23)
2	0.686	0.590	0.673	0.706	0.928	0.242	(1.87)
3	0.695	1.100	0.989	1.032	0.847	0.152	(1.05)
4	1.063	1.575	1.553	1.311	1.310	0.247	(1.47)
High	1.175	2.014	2.429	2.671	2.698	1.523	(9.69)
High minus Low	0.814	1.534	1.780	2.141	2.170	1.356	
	(10.58)	(11.26)	(8.68)	(9.02)	(12.05)	(7.52)	

Table 1.3: Probability of SEO announcements: Multivariate Analysis

The table reports marginal effects from multivariate Probit regressions of SEO announcements in specification 1.11. The dependent variable is an SEO announcement. All specifications include previous quarter's *institutional buying*, *institutional selling*, and control variables. The interest variables enter the model as dummies. ***High (medium) institutional buying*** is a dummy variable that takes the value of one in quarter t if the respective *institutional buying* variable is in its highest quintile (middle three quintiles) of quarter t, and ***High (medium) institutional selling*** is set up in an identical fashion. All estimations include quarter and industry fixed effects and the standard errors are clustered at the firm level. Statistical significance is indicated by * for 10% level, ** for 5% level, and *** for 1% level.

	(1) Share-based		(2) Count-based	
High Inst. Buying	0.24***	(0.03)	0.37***	(0.03)
Medium Inst. Buying	0.15***	(0.03)	0.22***	(0.03)
High Inst. Selling	0.17***	(0.03)	0.14***	(0.03)
Medium Inst. Selling	0.15***	(0.03)	0.12***	(0.02)
Stock Return	0.78***	(0.03)	0.74***	(0.03)
Lagged Stock Return	0.29***	(0.02)	0.27***	(0.02)
Market to Book	0.03***	(0.00)	0.03***	(0.00)
Firm size	−0.03***	(0.01)	−0.03***	(0.01)
Firm age	−0.13***	(0.01)	−0.13***	(0.01)
IPO dummy	0.11***	(0.03)	0.10***	(0.03)
Profitability	−0.81***	(0.13)	−0.86***	(0.13)
Tangibility	0.09	(0.05)	0.09*	(0.05)
Investment	0.73***	(0.11)	0.72***	(0.11)
R&D	0.67***	(0.13)	0.69***	(0.14)
R&D dummy	0.08***	(0.02)	0.08***	(0.02)
Leverage	0.56***	(0.04)	0.56***	(0.04)
Volatility	−0.67***	(0.07)	−0.66***	(0.07)
Turnover	0.09***	(0.03)	0.11***	(0.02)
Institutional Ownership	0.25***	(0.04)	0.20***	(0.04)
Pseudo R^2	0.129		0.130	
No. of Obs.	289727		289727	
Quarter Fixed-effects	Yes		Yes	
Industry Fixed-effects	Yes		Yes	

Panel B: Average Adjusted Predictions of SEO announcements

	Institutional Buying	Institutional Selling
Low (0,0)	0.6734	0.7157
Medium (0,1)	0.9874	1.0507
High (1,0)	1.2579	1.1224
High minus Low	0.5845	0.4067

Table 1.4: Probability of SEO announcements: Multivariate Analysis

The table reports marginal effects from multivariate Probit regressions of SEO announcements. The dependent variable is an SEO announcement. All specifications include previous quarter's *institutional buying*, *institutional selling*, and control variables. All estimations include quarter and industry fixed effects and the standard errors are clustered at the firm level. Statistical significance is indicated by * for 10% level, ** for 5% level, and *** for 1% level.

	(1)		(2)	
	Share-based		Count-based	
Institutional Buying	0.05**	(0.02)	0.38***	(0.03)
Institutional Selling	0.31***	(0.07)	0.42***	(0.05)
Stock Return	0.80***	(0.03)	0.72***	(0.03)
Lagged Stock Return	0.29***	(0.02)	0.27***	(0.02)
M/B	0.03***	(0.00)	0.03***	(0.00)
Firm size	−0.02**	(0.01)	−0.03***	(0.01)
Firm age	−0.14***	(0.01)	−0.13***	(0.01)
IPO dummy	0.10***	(0.03)	0.08***	(0.03)
Profitability	−0.78***	(0.12)	−0.85***	(0.13)
Tangibility	0.08	(0.05)	0.09*	(0.05)
Investment	0.75***	(0.11)	0.72***	(0.11)
R&D	0.71***	(0.14)	0.67***	(0.14)
R&D dummy	0.08***	(0.02)	0.08***	(0.02)
Leverage	0.54***	(0.04)	0.56***	(0.04)
Volatility	−0.74***	(0.07)	−0.67***	(0.07)
Turnover	0.13***	(0.03)	0.10***	(0.02)
Institutional Ownership	0.29***	(0.04)	0.24***	(0.04)
Pseudo R^2	0.125		0.130	
No. of Obs.	289727		289727	
Quarter Fixed-effects	Yes		Yes	
Industry Fixed-effects	Yes		Yes	

Table 1.5: Probability of SEO announcements: Mutual Fund Hypothetical Outflow

The table reports quarterly SEO announcement probabilities. In each quarter, firms are sorted independently into quintiles based on previous quarters raw stock return and*Mutual Fund Hypothetical Outflow* (*MFHO*) proposed by Edmans et al. (2012). Announcement probabilities are reported in each return-*MFHO* block and calculated as time-series averages of quarterly probabilities and reported in percentage terms. Our sample of potential SEO announcers consists of 163,405 firm-quarter observations from 1985:Q1 to 2015:Q4.

MFHO	Return Quintile					High minus Low	
	Low	2	3	4	High		
Low	1.232	1.139	1.828	1.271	3.160	1.929	(6.10)
2	0.766	0.904	1.210	1.068	2.662	1.896	(6.48)
3	0.624	0.739	0.983	1.004	2.606	1.982	(6.49)
4	0.901	0.657	0.922	0.932	1.706	0.805	(2.78)
High	0.541	0.684	0.591	0.903	1.697	1.156	(3.98)
High minus Low	−0.691	−0.454	−1.236	−0.368	−1.463	−0.772	
	(−2.75)	(−2.14)	(−5.46)	(−1.65)	(−4.14)	(−1.72)	

Table 1.6: Probability of SEO announcements: Mutual fund actual trading pressure

The table reports quarterly SEO announcement probabilities. In each quarter, firms are sorted independently into quintiles based on previous quarters raw stock return and deciles based on three different measures of mutual fund flow-induced trading *PRESSURE* proposed by Coval and Stafford (2007). Announcement probabilities are reported in each return-*PRESSURE* block and calculated as time-series averages of quarterly probabilities and reported in percentage terms. Our sample of potential SEO announcers consists of 163,405 firm-quarter observations from 1985:Q1 to 2015:Q4.

Panel A: Bivariate sort on stock return and PRESSURE_1

	Low (inflow-driven purchases)	2	3	4	5	6	7	8	9	High (fire sale)	High-Low	
Low	0.900	1.001	0.835	0.655	0.476	0.987	0.976	0.979	0.685	0.893	-0.00676	(−0.02)
2	0.911	0.944	0.824	0.951	0.817	0.383	1.029	0.681	0.789	0.710	-0.201	(−0.77)
3	0.808	0.977	0.726	0.718	0.903	0.782	0.971	0.936	0.971	1.155	0.347	(1.32)
4	1.640	0.911	0.858	0.670	1.119	1.188	0.801	1.047	0.731	1.172	-0.469	(−1.59)
High	3.218	2.499	2.581	2.172	1.770	2.095	1.465	1.963	2.121	2.563	-0.655	(−1.50)
High-Low	2.319	1.498	1.746	1.517	1.293	1.108	0.489	0.984	1.436	1.670	-0.648	
	(5.45)	(3.80)	(4.41)	(4.16)	(4.05)	(3.09)	(1.56)	(2.80)	(3.76)	(3.74)	(-1.05)	

Panel B: Bivariate sort on stock return and PRESSURE_2

	Low (inflow-driven purchases)	2	3	4	5	6	7	8	9	High (fire sale)	High-Low	
Low	0.992	1.003	0.846	0.845	0.510	0.673	0.791	1.049	0.728	0.992	0.000398	(0.00)
2	1.047	0.916	0.444	0.798	0.692	0.555	1.025	0.833	0.790	0.967	-0.0805	(−0.29)
3	1.277	0.875	1.047	0.402	0.723	0.756	1.114	0.880	0.644	1.217	-0.0605	(−0.20)
4	1.537	1.268	1.312	0.559	1.149	0.906	0.688	0.795	0.935	1.095	-0.443	(−1.49)
High	3.029	2.617	2.242	1.968	2.031	1.979	2.222	1.530	1.960	2.809	-0.220	(−0.49)
High-Low	2.038	1.613	1.396	1.123	1.521	1.306	1.431	0.481	1.232	1.817	-0.221	
	(4.79)	(4.05)	(3.71)	(3.13)	(4.36)	(3.78)	(3.84)	(1.41)	(3.56)	(4.49)	(-0.38)	

Panel C: Bivariate sort on stock return and PRESSURE_3

	Low (inflow-driven purchases)	2	3	4	5	6	7	8	9	High (fire sale)	High-Low	
Low	0.970	1.127	0.590	0.780	0.745	1.067	0.907	0.934	0.751	0.927	-0.0436	(−0.14)
2	1.003	1.117	1.047	0.794	0.856	0.453	0.921	0.750	0.906	0.887	-0.116	(−0.41)
3	1.161	1.092	0.798	0.678	0.921	1.085	0.889	1.017	1.310	1.207	0.0462	(0.15)
4	1.833	1.209	1.042	0.841	1.192	1.371	0.825	1.010	0.853	1.268	-0.565	(−1.77)
High	3.673	2.801	2.315	2.682	2.372	2.295	1.594	2.388	1.851	2.907	-0.765	(−1.67)
High-Low	2.702	1.675	1.726	1.902	1.627	1.228	0.688	1.454	1.100	1.981	-0.722	
	(6.58)	(4.20)	(4.89)	(4.82)	(4.42)	(3.30)	(2.16)	(3.92)	(2.99)	(4.29)	(-1.17)	

Table 1.7: Probability of SEO announcements: Multivariate analysis with long-, mid- and short-term institutional trading

The table reports multivariate analyses of SEO announcement probabilities. Panel A presents marginal effects from multivariate Probit regression of SEO announcements. The dependent variable is an SEO announcement. All specifications include previous quarter's *institutional buying*, *institutional selling*, and control variables. Long-/ mid-/ short-term *institutional buying/selling* is measured by the aggregate number of stock i shares purchased/sold by long-/ mid- / short-term) institutions in quarter t scaled by the aggregate number of stock i shares held by all institutions at the beginning of quarter t in column (1). In column (2), long-/ mid-/ short-term *institutional buying/selling* is measured by the aggregate number of long-/ mid- / short-term institutions who purchased/sold stock i in quarter t scaled by the aggregate number of institutions stock i has at the beginning of quarter t. High *institutional buying/selling* dummy variable takes the value of one in quarter t if the respective *institutional buying/selling* variable falls in its top two quintiles of quarter t. All estimations include quarter and industry fixed effects and the standard errors are clustered at the firm level. Statistical significance is indicated by * for 10% level, ** for 5% level, and *** for 1% level.

(to be continued)

Table 1.7 (continued)

Panel A: Probit regressions with quarter and industry fixed effects

	(1) Share-based		(2) Count-based	
High Long-term Inst. Buying	−0.01	(0.02)	0.02	(0.02)
High Mid-term Inst. Buying	0.04**	(0.02)	0.06***	(0.02)
High Short-term Inst. Buying	0.15***	(0.02)	0.17***	(0.02)
High Long-term Inst. Selling	−0.03	(0.02)	−0.03	(0.02)
High Mid-term Inst. Selling	0.01	(0.02)	0.00	(0.02)
High Short-term Inst. Selling	0.08***	(0.02)	0.08***	(0.02)
Stock Return	0.77***	(0.03)	0.74***	(0.03)
Lagged Stock Return	0.29***	(0.02)	0.28***	(0.02)
Market to Book	0.03***	(0.00)	0.03***	(0.00)
Firm size	−0.04***	(0.01)	−0.03***	(0.01)
Firm age	−0.12***	(0.01)	−0.11***	(0.01)
IPO dummy	0.12***	(0.03)	0.12***	(0.03)
Profitability	−0.83***	(0.15)	−0.88***	(0.15)
Tangibility	0.09*	(0.06)	0.12**	(0.06)
Investment	0.92***	(0.16)	0.82***	(0.15)
R&D	0.72***	(0.16)	0.74***	(0.16)
R&D dummy	0.08***	(0.02)	0.08***	(0.02)
Leverage	0.61***	(0.04)	0.60***	(0.04)
Volatility	−0.61***	(0.08)	−0.63***	(0.08)
Turnover	0.05*	(0.03)	0.07***	(0.03)
Institutional Ownership	0.22***	(0.04)	0.16***	(0.04)
Pseudo R^2	0.128		0.129	
No. of Obs.	255690		257863	
Quarter Fixed-effects	Yes		Yes	
Industry Fixed-effects	Yes		Yes	

(to be continued)

Table 1.7 (continued)

Panel B: Average Adjusted Predictions of SEO probabilities (%)

	Long-term	**Mid-term**	**Short-term**
Low Inst. Selling	1.1501	1.1034	1.0099
High Inst. Selling	1.0627	1.1287	1.2328
High - Low	−0.0874	0.0253	0.2229
z-stat	−2.05	0.57	4.73
$P > z$	0.040	0.567	0.000

Table 1.8: SEO Announcement Raw Return (0,1)

The table reports SEO announcement Raw Return(0,1) sorted on stock return and institutional trading. In each quarter, firms are sorted independently into quintiles based on previous quarters raw stock return and different institutional trading measures.

Panel A: Bi-sort on stock return and *Institutional Selling_1*

	Return Quintile						
	Low	2	3	4	High	High minus Low	
Low	-2.929	-2.365	-2.735	0.106	-2.538	0.390	(0.34)
2	-2.858	-1.945	-1.341	-3.107	-1.704	1.154	(1.05)
3	-1.923	-0.665	-1.544	-1.225	-1.307	0.615	(0.59)
4	-1.801	-2.295	-1.939	-2.186	-2.757	-0.956	(-1.25)
High	-2.677	-1.626	-2.219	-2.721	-2.189	0.487	(0.62)
High minus low	0.252	0.739	0.516	-2.827	0.349	0.0968	
	(0.18)	(0.70)	(0.51)	(-2.84)	(0.50)	(0.07)	

Panel B: Bi-sort on stock return and short-term *Institutional Selling_1*

	Return Quintile						
	Low	2	3	4	High	High minus Low	
Low	-1.470	-1.332	-2.979	-1.824	-1.828	-0.358	(-0.30)
2	-2.338	-3.088	-1.023	-2.114	-2.045	0.293	(0.25)
3	-4.128	-0.993	-1.930	-2.364	-2.202	1.926	(1.95)
4	-2.927	-2.057	-2.120	-1.587	-1.966	0.961	(1.22)
High	-1.570	-1.323	-1.580	-2.392	-2.271	-0.701	(-0.88)
High minus low	-0.100	0.00947	1.399	-0.568	-0.443	-0.342	
	(-0.07)	(0.01)	(1.37)	(-0.76)	(-0.67)	(-0.23)	

Table 1.9: SEO Market-adjusted (Value-weighted) Announcement Return (0,1)

The table reports SEO Market-adjusted (Value-weighted) Announcement Return (0,1) sorted on stock return and institutional trading. In each quarter, firms are sorted independently into quintiles based on previous quarters raw stock return and different institutional trading measures.

Panel A: Bi-sort on stock return and *Institutional Selling_1*

	Return Quintile					High minus Low	
	Low	2	3	4	High		
Low	-2.904	-2.647	-2.844	-0.311	-2.672	0.232	(0.22)
2	-2.697	-1.992	-1.625	-3.113	-1.761	0.937	(0.89)
3	-1.918	-0.762	-1.513	-1.501	-1.450	0.469	(0.48)
4	-1.719	-2.354	-1.879	-2.270	-2.826	-1.107	(-1.51)
High	-2.746	-1.580	-2.204	-2.824	-2.251	0.496	(0.65)
High minus low	0.158	1.067	0.641	-2.513	0.421	0.264	
	(0.12)	(1.02)	(0.64)	(-2.56)	(0.63)	(0.20)	

Panel B: Bi-sort on stock return and short-term *Institutional Selling_1*

	Return Quintile					High minus Low	
	Low	2	3	4	High		
Low	-1.749	-1.360	-3.070	-2.205	-1.930	-0.180	(-0.16)
2	-2.291	-3.025	-1.054	-2.236	-2.141	0.150	(0.13)
3	-3.689	-0.997	-1.917	-2.533	-2.324	1.365	(1.50)
4	-2.894	-2.187	-2.266	-1.675	-2.053	0.841	(1.11)
High	-1.617	-1.480	-1.567	-2.549	-2.299	-0.682	(-0.89)
High minus low	0.133	-0.120	1.503	-0.344	-0.369	-0.502	
	(0.10)	(-0.11)	(1.53)	(-0.47)	(-0.58)	(-0.35)	

Table 1.10: SEO Market-adjusted (Equal-weighted) Announcement Return (0,1)

The table reports SEO Market-adjusted (Equal-weighted) Announcement Return (0,1) sorted on stock return and institutional trading. In each quarter, firms are sorted independently into quintiles based on previous quarters raw stock return and different institutional trading measures.

Panel A: Bi-sort on stock return and *Institutional Selling_1*

	Return Quintile						
	Low	2	3	4	High	High minus Low	
Low	-2.921	-2.669	-3.040	-0.389	-2.887	0.0338	(0.03)
2	-2.895	-2.266	-1.716	-3.174	-1.867	1.028	(0.98)
3	-2.024	-0.774	-1.655	-1.559	-1.604	0.420	(0.43)
4	-1.946	-2.438	-2.047	-2.333	-2.971	-1.025	(-1.41)
High	-2.859	-1.770	-2.344	-2.950	-2.379	0.480	(0.64)
High minus low	0.0616	0.899	0.695	-2.562	0.508	0.447	
	(0.05)	(0.85)	(0.70)	(-2.64)	(0.76)	(0.34)	

Panel B: Bi-sort on stock return and short-term *Institutional Selling_1*

	Return Quintile						
	Low	2	3	4	High	High minus Low	
Low	-1.827	-1.456	-3.177	-2.271	-2.086	-0.258	(-0.23)
2	-2.382	-3.259	-1.206	-2.264	-2.263	0.119	(0.11)
3	-3.837	-1.193	-2.123	-2.574	-2.460	1.377	(1.51)
4	-3.001	-2.203	-2.342	-1.779	-2.184	0.817	(1.08)
High	-1.830	-1.593	-1.740	-2.652	-2.472	-0.642	(-0.84)
High minus low	-0.00241	-0.138	1.437	-0.381	-0.386	-0.384	
	(-0.00)	(-0.13)	(1.48)	(-0.53)	(-0.61)	(-0.27)	

Chapter 2

How Do Institutions Affect Capital Structure?

2.1 Introduction

McCahery et al. (2016) surveyed institutional investors about engagement triggers. Three factors are related to capital structure: "large equity issuance"; "suboptimal capital structure"; and "low payments to shareholders despite high cash holdings." On a 5-point scale, all factors are scored statistically higher than 3 out 5, evidence that institutions would intervene in capital structure decisions.

In this chapter, I empirically test whether institutions intervene with firm capital structure decisions directly. Prior research on institutions has been focused on how institutions monitor and influence corporate investments and their effectiveness in doing so. Institutional influence on corporate financing polices is less explored.

It is relevant to study institutions' role in the financing decisions as the literature documents that institutions can improve the information environment (Utama and Cready (1997), El-Gazzar (1998)) and reduce information asymmetry (Collins et al. (2003), Chakravarty

(2001), Piotroski and Roulstone (2004), Altı and Sulaeman (2012), Boone and White (2015)).

The institutional governance literature details three channels through which institutions affect firms: (1) direct intervention (”voice” in public (Shleifer and Vishny (1986), Hirschman (1970), Kahn and Winton (1998), Gillan and Starks (2000) or ”behind the scenes” (Carleton et al. (1998), Becht et al. (2010), Dimson et al. (2015), McCahery et al. (2016)), (2) leaving the firm (”exiting” or ”voting with their feet”)(Hirschman (1970), Admati and Pfleiderer (2009), Parrino et al. (2003), Leuz et al. (2010)), or (3) the ”threat of exit” (Edmans (2009), Edmans and Manso (2011), Bharath et al. (2013)).

Long-term institutions also have been shown to improve corporate governance and reduce agency problems between managers and shareholders (Shleifer and Vishny (1986), Shleifer and Vishny (1997), Gillan and Starks (2000)).

I find that long-term institutions appear to induce firms to adhere to the pecking order of financing, leading to a strong negative relationship between long-term institutional ownership and the firm's leverage ratio. Long-term institutional ownership is associated with more internal financing and more debt than equity when external financing is needed. Although the preference for debt over equity when using external financing should lead to higher leverage, the preference for more internal financing dominates. Thus a negative relationship between long-term institutional ownership and leverage is observed.

In contrast, short-term institutional ownership is associated with more reliance on external capital and more equity than debt. Since short-term institutions trade quite often by definition, it is unlikely that they directly influence firm governance. Yet if a firm maintains a certain level of short-term institutional ownership, this implies a certain frequency of short-term institutional trading. Combining this with the documented results in Chapter 1, which explains the high reliance on equity.

There is a tremendous amount of literature on pecking order. Myers and Majluf (1984) posit that firms would entirely consume internal finance before seeking external finance as internal capital would be cheaper because of information asymmetry between managers and investors. Thus when seeking external financing, debt is the primary choice because of its relation to lower information costs and because equity will be issued only when debt financing has been fully exploited. Shyam-Sunder and Myers (1999) acknowledge strong support for this prediction through testing whether the slope coefficient of one is observed regressing net debt issues on the financing deficit.

Frank and Goyal (2003) extend the sample with regards to the time series and the cross-section, and find several pieces of evidence, including extensively used external finance, equity financing not dominated by debt financing, and net equity issues tracked by competent financing deficit, all of which challenge the validity of the pecking order theory. Moreover, they show a time trend of the increased use of equity and the declining support for the pecking order theory, which is also reported in Fama and French (2005). Meanwhile, Frank and Goyal (2003) conclude that large firms closely align to pecking order, whereas Fama and French (2005) put forth that the pecking order actually describes the financing activity of small firms more adequately.

Jung et al. (1996) argue that firms with higher information asymmetry would issue equity, while also being able to issue debt, something that pecking order fails to explain. On the other hand, Bharath et al. (2009) adopt a new measure of information asymmetry and conclude that firms with lower information asymmetry are the ones failing to following pecking order.

Other factors, except for information asymmetry, also have been established to generate similar pecking order behavior: transactions costs(Altınkılıç and Hansen (2000)); corporate taxes (Stiglitz (1973)); and incentive conflicts (Myers (2003), Jensen and Meckling (1976)). Leary and Roberts (2010) compare these four different factors that simulate pecking order behavior and find support for incentive conflicts.

Chirinko and Singha (2000) show that the Shyam-Sunder and Myers (1999) method is not able to discriminate among optimal leverage ratio hypothesis nor can it accept the null of pecking order when firms are following it but still end up using larger proportions of equity. Lastly, the methodology does not indicate that equity is the bottom of the financial hierarchy. The order of debt and equity is not tested in Shyam-Sunder and Myers (1999), rather just the proportion.

In brief, there has been little agreement about pecking order. The results I find in this chapter also may be a starting point from which to factor institutions into this study and provide new potential methods on testing pecking order.

This chapter proceeds as follows. Section 2.2 describes the data and reports the summary statistics. Section 2.3 presents the strong negative relationship between long-term institutional ownership and leverage. Section 2.4 shows that the negative relationship is not a result of lower target leverage of long-term institutions. Section 2.5 decomposes the change in leverage, and Section 2.6 tests the pecking order preference of long-term institutions. Section 2.7 concludes.

2.2 Data

I acquire firm-level data from the annual COMPUSTAT database and the monthly equity CRSP stock return database. Following the literature, firm in the financial sector (SIC codes 6000-6999) and in the utility sector (SIC codes 4900-4999) are not included in the sample because their capital structures are likely to be significantly different from those of firms in other sectors. The balance sheet and cash flow statement variables as a percentage of total assets or sales are trimmed to remove the most extreme 1% in either tail of the distribution if the variable can be negative, or in the right tail only if the variable is positive by definition. Only ordinary common shares, share codes 10 and 11 in CRSP, are kept in the sample.

The Thomson Financial 13F Institutional Holdings database is merged with the annual

COMPUSTAT database to access institutional ownership data. As Thomson provides the institutions' holdings on a quarterly base, the firm's fiscal-year-end quarter in COMPUSTAT is used to merge with the latest institutional holdings data available before the fiscal end month; for example, if the firm fiscal end month is March, April, or May, it will match to the institution's first quarter report. Following this pattern going forward for firms' fiscal end months, June, July, and August will match to the second quarter report of institutions; September, October, and November will match to the third quarter; December will match to the same year's fourth quarter holdings report; and January and February will match to the previous years fourth quarter holdings data for institutions.

This is necessary to minimize the reporting lag between firms and institutions, while being able to validate that institutions were holding the firm for, at the very least, part of the fiscal year. For robustness, I also attempt to match the institutional holdings data to the same quarter with the fiscal end quarter or to match the institutional holdings data using the fourth quarter only. Neither affects my results qualitatively.

Because Thomson Financial 13F Institutional Holdings database only keeps records from 1980 and onwards, the final sample is limited to the 1980-2014 period. Only firms who have at one point been held by an institutional investor are retained in the sample. Summary statistics are reported in Tables 2.1 and 2.2. As documented in the literature, such as by Aghion et al. (2013), there is a highly noticeable, increasing institutional ownership trend, while book leverage is rather stable over time.

2.3 Determinants of Leverage

In this section, I present the strong negative relationship between institutional ownership and leverage, while controlling for size, profitability, tangibility, growth opportunity, research and development (R&D), sales expense, tangibility, depreciation, and one-year stock return, which have been shown to be important determinants of leverage. (Rajan and Zingales (1995), Hovakimian et al. (2001), Flannery and Rangan (2006), Fama and French (2002), among others) Table 2.3 reports the results for the following model:

$$Leverage_{i,t+1} = \alpha + \kappa TotalIO_{i,t} + X_{i,t}\beta + \epsilon_{i,t+1}. \tag{2.1}$$

The literature has used various econometric methods for equation 2.1 for different considerations: column (1) uses ordinary least squares (OLS); column (2) estimates the model in a panel with firm fixed effects; column (3) presents Fama and MacBeth (1973) estimates; and column (4) presents Fama and MacBeth (1973) estimates with all the variables demeaned; that is, all variables are defined as the differences from three-digit SIC industry means for a given year. As presented in Table 2.2, there is a vivid, increasing trend in institutional ownership over time. Although book leverage is quite stable, on average, one might doubt that this time trend drives the negative relationship. Columns (3) and (4), however, should eliminate this concern.

The coefficient estimates in all four columns of all the control variables are consistent with what the literature has documented. And institutional ownership is negative when related to leverage no matter which econometrics estimation procedure is adopted.

I then divide the total institutional ownership in equation 2.1 into long-term, mid-term, and short-term following Yan and Zhang (2009) and based on their average portfolio turnover in the last four quarters. This part is calculated first in the 13F database before merging with the annual COMPUSTAT to cooperate with the calculation method that is based on quarterly data. Specifically, I first calculate the aggregate purchases and sales for each institution k during each quarter t:

$$CR\_buy_{k,t} = \sum_{\substack{i-1 \\ S_{k,i,t}>S_{k,i,t-1}}}^{N_k} |S_{k,i,t}P_{i,t} - S_{k,i,t-1}P_{i,t-1} - S_{k,i,t-1}\Delta P_{i,t}|, \tag{2.2}$$

$$CR\_sell_{k,t} = \sum_{\substack{i-1 \\ S_{k,i,t}\leq S_{k,i,t-1}}}^{N_k} |S_{k,i,t}P_{i,t} - S_{k,i,t-1}P_{i,t-1} - S_{k,i,t-1}\Delta P_{i,t}|. \tag{2.3}$$

Here, $P_{i,t-1}$ and $P_{i,t}$ are the share prices for stock i at the end of quarters $t-1$ and t, respectively. $\Delta P_{i,t}$ is $P_{i,t} - P_{i,t-1}$. $S_{k,i,t-1}$ and $S_{k,i,t}$ are institution k's holdings of stock i at the end of quarters $t-1$ and t, respectively. $CR\_buy_{k,t}$ and $CR\_sell_{k,t}$ denote institution k's aggregate purchases and sales in quarter t. The churn rate of institution k in quarter t is then defined as

$$CR_{k,t} \equiv \frac{min(CR\_buy_{k,t}, CR\_sell_{k,t})}{\sum_{i=1}^{N_k} \frac{S_{k,i,t}P_{i,t}+S_{k,i,t-1}P_{i,t-1}}{2}}. \tag{2.4}$$

I then calculate each institution's average churn rate over the past four quarters as

$$AVG\_CR_{k,t} = \frac{1}{4}\sum_{m=0}^{3} CR_{k,t-m}. \tag{2.5}$$

Next, for each quarter, all institutions are sorted into three tertile portfolios based on $AVG\_CR_{k,t}$. The institutions ranked in the top tertile have the highest turnover and are classified as short-term institutional investors, whereas those ranked in the bottom tertile have the lowest turnover and are classified as long-term institutional investors.

After decomposing the total institutional ownership in equation 2.1 into long-term, mid-term, and short-term, I estimate the following model:

$$Leverage_{i,t+1} = \alpha + \kappa_1 Long\text{-}termIO_{i,t} + \kappa_2 Mid\text{-}termIO_{i,t} + + \kappa_3 Short\text{-}termIO_{i,t} + X_{i,t}\beta + \epsilon_{i,t+1}. \tag{2.6}$$

Table 2.4 reports the estimation results of equation 2.6. Long-term institutional ownership develops negatively related to leverage in all columns, whereas short-term institutional ownership remains only negative when estimated in panel with firm fixed effects. In addition, when using Fama-MacBeth, the coefficients are positively significant.

The negative coefficient in column (2) for short-term institutional ownership may be a result of the increasing time trend of institutional ownership and stable leverage over time in Table 2.2. When focusing on the year by year cross-sectional relationship in columns (3) and (4), short-term institutional ownership is positively related to leverage. It is plausible that short-term institutions do not actually attempt to affect firm's capital structure. They may just trade instead. The changing coefficient may be the result of them trading on information related to future investment opportunists, which can lead to more financing demand. Firms may finance differently for the demand: internal, debt, or equity. Different choices would lead to different directions of changes in leverage and thus the different estimation results.

Long-term and short-term institutions have been established by the literature to behave strategically different. The evidence presented thus far showcases this variable behavior, which is present in relation to the firm's capital structure as well. Throughout this chapter, while still controlling for short-term institutional ownership in all my analysis, my principal discussion is to explain the negative relationship between long-term institutional ownership and leverage.

The negative relationship between institutional ownership and leverage is the combined effect of long-, mid-, and short-term institutional ownership. As long-term and short-term institutional ownership have different effects on leverage, it is also necessary and essential, from this perspective, to focus on the long-term institutional ownership instead of total institutional ownership. However, for analysis and discussion, I report total institutional ownership, which can provide additional insight into which scenarios long-term institutional ownership predominates.

2.4 Institutions and leverage targets

The negative relationship between long-term institutional ownership and leverage might be interpreted as evidence that long-term institutions prefer lower targets in the spirit of the trade-off theory. In the trade-off story, the preferences of short-term institutions are still not clear, which is evidenced by the mixed results that have been reported in the previous section. In this section, I study whether long-term institutions have lower targets and what preferences if any, short-term institutions have for leverage.

2.4.1 Debt-Equity Choice

The previous section suggests that long-term institutional ownership tends to reduce the firm leverage ratio, but these results do not indicate whether institutional preferences affect firm financing choices when firms raise new funds or retire/repurchase existing capital. To study institutions' role in firm financing choices, I employ the following models:

$$Debt_{i,t+1} = \alpha + \psi TotalIO_{i,t} + X_{i,t}\beta + \lambda Leverage_{i,t} + \eta_{i,t+1}, \tag{2.7}$$

$$\begin{aligned} Debt_{i,t+1} = & \alpha + \psi_1 Long\text{-}termIO_{i,t} + \psi_2 Mid\text{-}termIO_{i,t} + \psi_3 Short\text{-}termIO_{i,t} \\ & + X_{i,t}\beta + \lambda Leverage_{i,t} + \eta_{i,t+1}. \end{aligned} \tag{2.8}$$

This is a logit regression that predicts a firm's financing choice between debt and equity in a given year. Following other studies, such as Hovakimian et al. (2001), Hovakimian (2006), Korajczyk and Levy (2003), and Leary and Roberts (2010), $Debt_{i,t+1}$ is identified as the relative changes in debt and equity above a given size threshold.

I estimate two versions of this model: one for raising new capital and one for retiring existing capital. In detail, a debt issuance (reduction) is defined as a net increase (decrease) in total book debt from year $t-1$ to t, in excess of 5% of total assets in year t; an equity issuance (repurchase) is defined as the sale of common and preferred stock, net of repurchases during year t normalized by total assets in year t larger than 5% (smaller than -5%). $Debt_{i,t+1}$ is a dummy variable equal to 1 when a firm issues (retires) debt and 0 when a firm issues (retires) equity.

If institutions prefer lower targets, they would favor issuing new equity over debt in the issuance regression and would favor reducing debt over repurchasing equity in the reduction/repurchase regression.

Table 2.5 reports the estimation results. Total institutional ownership has no effect on issuance choice between debt and equity, while leading to more equity reduction than debt and resulting in higher leverage. Long- and mid-term institutional ownership leads to more significant debt issue than equity issue and more significant equity repurchase than debt reduction, resulting in higher leverage. Short-term institutional ownership has no effect on retiring choice between debt and equity, but leads to more equity issuance than debt and results in lower leverage.

This presents a contradiction to the previous section. In the determinants model, total, long-, and mid-term institutions are negatively related to leverage, but are positively related to leverage in the debt-equity choice model.

However, there is a nontrivial difference between the debt-equity choice model and the determinants model: the debt-equity choice model solely examines when firms raise or retire significant external financing. It leaves out the times when firms make no significant external financing changes, which is more than half of the time in my sample. During these times, firms may take internal financing actions that can also affect leverage ratios, and excluding them could be a drawback of using the debt-equity choice model in this particular analysis.

2.4.2 Multinomial Logit Regression comparing Significant External Financing Actions to None

To address the concern with traditional debt-equity choice model, I adopt the following multinomial logit models:

$$Fin_{i,t+1} = \alpha + \psi TotalIO_{i,t} + X_{i,t}\beta + \lambda Leverage_{i,t} + \eta_{i,t+1}, \tag{2.9}$$

$$\begin{aligned} Fin_{i,t+1} = &\alpha + \psi_1 Long\text{-}termIO_{i,t} + \psi_2 Mid\text{-}termIO_{i,t} + \psi_3 Short\text{-}termIO_{i,t} \\ &+ X_{i,t}\beta + \lambda Leverage_{i,t} + \eta_{i,t+1}. \end{aligned} \tag{2.10}$$

$Fin_{i,t+1}$ is defined the same as $Debt_{i,t+1}$ in the previous section. In addition to equity/debt issuance or reduction, $Fin_{i,t+1}$ has a third value that refers to situations in which no significant changes of equity or debt happens. This is also the base scenario in all estimations. Similarly, I estimate two versions for each specification: one for raising new capital and one for retiring existing capital.

Table 2.6 reports estimation results. Panel A reports both versions of specification 2.9. Total institutional ownership does not lead to more issuance of either debt or equity, but it is related to more equity reduction and less debt reduction, meaning a higher leverage ratio.

Panel B reports both versions of specification 2.10. Long-term institutional ownership is associated with less issuance of both equity and debt, more reduction of equity, and no effect on debt reduction. Mid-term institutional ownership is associated with less issuance of equity, more reduction of equity, and no effect on debt issuance or reduction. Short-term institutional ownership is associated with more issuance of both equity and debt and less reduction of both equity and debt. The effect of mid-term institutional ownership on the leverage ratio is positive, yet the effect of long- and short-term institutional ownership on the leverage ratio depends on the size of the issuance and reduction.

A multinomial logit regression also presents a rather unclear picture about the relationship between institutional ownership and leverage.

2.4.3 Partial Adjustment: Speed of Adjustment

In this section, I attempt to analyze the relationship between institutional ownership and leverage from a different perspective. Assuming institutions do follow the trade-off theory, in the sense that they have a leverage target, I test whether institutions accelerate firms' speed of adjustment. To calculate the speed of adjustment, I adopt the partial adjustment model.

I divide firms into two groups based on their institutional ownership level and estimate equations 2.11 and 2.12 and report the results in Table 2.7.

$$\begin{aligned} Leverage_{i,t} =& \alpha TotalIO_{i,t-1} + X_{i,t-1}\beta + (1-\lambda_1)Leverage_{i,t-1} \\ &+ (1-\lambda_2)Leverage_{i,t-1} * Dummy_{HighTotalIO} + \delta_{i,t}, \end{aligned} \tag{2.11}$$

$$\begin{aligned} Leverage_{i,t} =& \alpha + \kappa_1 Long\text{-}termIO_{i,t} + +\kappa_2 Mid\text{-}termIO_{i,t} + +\kappa_3 Short\text{-}termIO_{i,t} \\ &+ (1-\lambda_2)Leverage_{i,t-1} * Dummy_{HighLong\text{-}termIO} \\ &+ (1-\lambda_3)Leverage_{i,t-1} * Dummy_{HighMid\text{-}termIO} \\ &+ (1-\lambda_4)Leverage_{i,t-1} * Dummy_{HighShort\text{-}termIO} \\ &+ X_{i,t-1}\beta + (1-\lambda_1)Leverage_{i,t-1} + \delta_{i,t}. \end{aligned} \tag{2.12}$$

In equation 2.11, the speed of adjustment is λ_1 for the firms with low total institutional ownership and $\lambda_1 + \lambda_2$ for the firms with high total institutional ownership. Similarly, in equation 2.12, the speed of adjustment is λ_1 for the firms with low long-, mid-, and short-term institutional ownership, and add $\lambda_2/\lambda_3/\lambda_4$, respectively, to λ_1 for the firms with high long-, mid-, and short-term institutional ownership.

The results in Table 2.7 are estimated using OLS, but are qualitatively similar using the panel data with firm fixed effects or the Fama-Macbeth method. In column (1), the speed for firms with low total institutional ownership is 0.132, which means it takes these firms, on average, more than 7 years to reach their target. While for firms with high total institutional ownership, the speed is 0.113, which means close to 9 years for firms to reach targets. So high total institutional ownership actually has a negative effect on the speed of adjustment. In column (2), high mid- and short-term institutional ownership have a negative effect on the speed of adjustment too, whereas long-term institutional ownership does not affect it.

Another result is noticeable in the partial adjustment model results: total, long-, and mid-term institutional ownership is still negatively related to leverage. This result is the same as that in the determinants model.

Since high institutional ownership has a negative or no effect on firms' speed to get to their target, combined with the other results presented in Section 2.4, it is plausible that institutions do not set a lower target. Instead, there may be something else driving this. The debt-equity choice model and the multinomial logit model are focused on debt and equity changes and ignore another critical part in capital structure: changes in retained earnings.

2.5 Components of Change in Leverage

Baker and Wurgler (2002) decomposed the change in leverage into: net equity issues (e_t), changes in retained earnings (ΔRE_t), and growth in assets. Based on their decomposition, I further decompose growth in assets into net debt issue (ΔD_t) and residual change in leverage. All three components are scaled by total assets of period t:

$$\Delta D_{i,t} = \alpha + \kappa_D TotalIO_{i,t-1} + X_{i,t-1}\beta_D + \lambda_D Leverage_{i,t-1} + \sigma_{i,t}, \qquad (2.13)$$

$$\begin{aligned}\Delta D_{i,t} =&\alpha + \kappa_{D1} Long\text{-}termIO_{i,t-1} + \kappa_{D2} Mid\text{-}termIO_{i,t-1} + \kappa_{D3} Short\text{-}termIO_{i,t-1} \\ &+ X_{i,t-1}\beta_D + \lambda_D Leverage_{i,t-1} + \sigma_{i,t},\end{aligned} \tag{2.14}$$

$$e_{i,t} = \alpha + \kappa_e TotalIO_{i,t-1} + X_{i,t-1}\beta_e + \lambda_e Leverage_{i,t-1} + \sigma_{i,t}, \tag{2.15}$$

$$\begin{aligned}e_{i,t} =&\alpha + \kappa_{e1} Long\text{-}termIO_{i,t-1} + \kappa_{e2} Mid\text{-}termIO_{i,t-1} + \kappa_{e3} Short\text{-}termIO_{i,t-1} \\ &+ X_{i,t-1}\beta_e + \lambda_e Leverage_{i,t-1} + \sigma_{i,t},\end{aligned} \tag{2.16}$$

$$\Delta RE_{i,t} = \alpha + \kappa_{RE} TotalIO_{i,t-1} + X_{i,t-1}\beta_{RE} + \lambda_{RE} Leverage_{i,t-1} + \sigma_{i,t}, \tag{2.17}$$

$$\begin{aligned}\Delta RE_{i,t} =&\alpha + \kappa_{RE1} Long\text{-}termIO_{i,t-1} + \kappa_{RE2} Mid\text{-}termIO_{i,t-1} + \kappa_{RE3} Short\text{-}termIO_{i,t-1} \\ &+ X_{i,t-1}\beta_{RE} + \lambda_{RE} Leverage_{i,t-1} + \sigma_{i,t}.\end{aligned} \tag{2.18}$$

In Table 2.8, I regress each of these three components of changes in leverage on institutional ownership and other independent variables. In column (2), long-term (short-term) institutional ownership has a negative (positive) effect on net debt issues (ΔD_t), which adds up to the nonsignificant effect of total institutional ownership on net debt issues (ΔD_t) in column (1). This, again, calls for the necessity of decomposing institutional ownership because of its different attributes documented in the literature. Column (4) shows that long-term (short-term) institutional ownership also has a negative (positive) effect on net equity issue (e_t). In columns (5) and (6), all institutional ownership is positively related to changes in retained earnings (ΔRE_t).

The negative coefficient of long-term institutional ownership on net debt issues (ΔD_t) appears to contradict what is reported in Table 2.5, where firms issue more debt than equity and are less likely to reduce debt compared with equity. This is not the case. Table 2.5 only looks at circumstances in which firms already need external finance and compares debt to equity relatively, whereas Table 2.8 studies the absolute change. This also explains why short-term institutional ownership is associated with more equity issue compared with debt, but still has a positive effect on debt in the debt-equity choice model.

Changes in retained earnings (ΔRE_t) is the missing piece in the long-term institutional ownership and leverage puzzle presented in the previous sections. The increase in changes in retained earnings (ΔRE_t) and the decrease in net debt issues (ΔD_t) both indicate a negative change in leverage, and they predominate the positive effect of decrease in net equity issue (e_t) and thus the negative effect on leverage.

There are four scenarios with possible relevance to this case. First, assuming a firm's financing need is constant, if firms use more retained earnings, their financing deficit would be smaller. Thus the sum of debt and equity issued would decrease. Second, if firms' financing needs decrease, and their changes in retained earnings (ΔRE_t) increase, their sum of debt and equity issued would still decrease. Third, if firms' financing needs increase, and they use more internal capital to satisfy the extra financing need, they will still experience continual decreases in external finance. Fourth, if firms' financing needs increases, they can use more internal capital, while simultaneously using more external capital. In this case, whether internal capital is proportionally used remains unclear.

Based on the evidence within this section, it is probable that long-term institutional ownership is associated with one of the first three scenarios, whereas short-term institutional ownership is related to the fourth scenario.

2.6 Pecking order test

2.6.1 Financing Deficit

Decomposing change in leverage and the debt-equity choice implicitly indicates that long-term institutions prefer and govern firms, following the pecking order test. In this section, I directly test this hypothesis. A strict pecking order behavior would not allow for any savings, and therefore the hypothesis here is closer to the concept of "modified pecking order" in Myers (1984) and Myers and Majluf (1984).

The literature calculates the financing deficit as follows:

$$DEF_t = DIV_t + I_t + \Delta W_t - CF_t = \Delta D_t + e_t, \tag{2.19}$$

where DEF_t is the financing deficit in year t, DIV_t is the cash dividends in year t, I_t is the net investment in year t, ΔW_t is the change in working capital in year t, CF_t is the cash flow after interest and taxes, ΔD_t is the net debt issue in year t, and e_t is the net equity issue in year t defined like in previous sections. All variables are scaled by total assets at the end of year t. I include the change in current debt as part of the net debt issue ΔD_t, so that it is directly comparable to the net debt issue in previous sections. This choice is bias against the pecking order. Nevertheless, for the purpose of a robustness check, I also excluded the change in current debt following Frank and Goyal (2003), and my conclusions are not affected.

The empirical specification is as follows:

$$\Delta D_{i,t} = \alpha + \beta_{PO} DEF_{i,t} + \lambda DEF_{i,t} * HighTotalIO_{i,t} + \theta HighTotalIO_{i,t} + \zeta i, t, \tag{2.20}$$

$$\begin{aligned}\Delta D_{i,t} = &\alpha + \beta_{PO} DEF_{i,t} \\ &+ \lambda_1 DEF_{i,t} * HighLIO_{i,t} + \lambda_2 DEF_{i,t} * HighMIO_{i,t} + \lambda_3 DEF_{i,t} * HighSIO_{i,t} \\ &+ \theta_1 HighLIO_{i,t} + \theta_2 HighMIO_{i,t} + \theta_3 HighSIO_{i,t} + \zeta i, t,\end{aligned} \tag{2.21}$$

where $HighTotalIO_{i,t}$, $HighLIO_{i,t}$, $HighMIO_{i,t}$, and $HighSIO_{i,t}$ are dummy variables equal to 1 when firm i's respective ownership is higher than the median of year t, and otherwise 0.

Based on my hypothesis, which is that long-term institutions incentivize firms to adhere more closely to the pecking order, I expect to see $\lambda_1 > 0$. The estimation results are in column (3) in Table 2.9. λ_1 is estimated as 0.236, is statistically positive, and its economic significance is nontrivial. Compared with base firms that finance 39.9% of their deficit with debt, a 23.6% difference is more than half. The positive effect of long-term institutional ownership dominates the negative effect of short-term institutional ownership, which results in a positive λ in high total institutional ownership in column (2).

Institutional ownership has a high correlation with size, and size has been shown in Frank and Goyal (2003) to be positively related to pecking order behavior. So to ensure that my observations are not driven by the positive correlation between institutional ownership and size, I estimate the following model:

$$\begin{aligned}\Delta D_{i,t} =& \alpha + \beta_{PO} DEF_{i,t} \\ &+ \lambda DEF_{i,t} * HighTotalIO_{i,t} + \theta HighTotalIO_{i,t} \\ &+ \gamma DEF_{i,t} * Size_{i,t} + \phi Size_{i,t} + \upsilon_{i,t},\end{aligned} \tag{2.22}$$

$$\begin{aligned}\Delta D_{i,t} =& \alpha + \beta_{PO} DEF_{i,t} \\ &+ \lambda_1 DEF_{i,t} * HighLIO_{i,t} + \lambda_2 DEF_{i,t} * HighMIO_{i,t} + \lambda_3 DEF_{i,t} * HighSIO_{i,t} \\ &+ \theta_1 HighLIO_{i,t} + \theta_2 HighMIO_{i,t} + \theta_3 HighSIO_{i,t} \\ &+ \gamma DEF_{i,t} * Size_{i,t} + \phi Size_{i,t} + \upsilon_{i,t}.\end{aligned} \tag{2.23}$$

Table 2.10 reports the estimation results. The magnitude of λ_1 is even larger now: a 69.9% increase compared with that of the base firms. For a robustness check, I also estimate the model with size quintile dummies instead. Doing so does not alter my results qualitatively.

2.6.2 Financing Demand

To test whether firms use more internal capital under the influence of institutional investors, I consider not only the deficit amount but also how much internal financing accounts for the financing demand. Thus, I rewrite equation 2.19 as

$$FinD_t^{(CF-DIV)} = I_t + \Delta W_t = \Delta D_t + e_t + (CF_t - DIV_t), \tag{2.24}$$

where $(CF_t - DIV_t)$ is the internal financing component.

For the aggregated form of accounting cash flow identity purpose, equation 2.24 is the appropriate form to examine internal capital's role. From a basic financing point of view, financing demand should be equal to financing supply, and financing supply only comes from retained earnings and debt and equity issue, so the equation should be as follows:

$$FinD_t^{RE} = \Delta D_t + e_t + \Delta RE_t, \tag{2.25}$$

where ΔRE_t is the internal financing component. It is difficult and unnecessary to simply declare one approach is superior over another. For the purpose of this paper, changes in retained earnings, ΔRE_t, is directly related to other sections of discussion. I will focus my discussion on the $FinD_t^{RE}$ definition, but I will report results for $FinD_t^{(CF-DIV)}$ as a robustness check. To test whether institutions prefer internal capital, the model is as follows:

$$\Delta RE_{i,t} = \alpha + \beta FinD_{i,t}^{RE} + \lambda FinD_{i,t}^{RE} * HighTotalIO + \theta HighTotalIO_{i,t} + \tau_{i,t}, \tag{2.26}$$

$$\begin{aligned} \Delta RE_{i,t} =& \alpha + \beta FinD_{i,t}^{RE} + \lambda_1 FinD_{i,t}^{RE} * HighLIO_{i,t} \\ &+ \lambda_2 FinD_{i,t}^{RE} * HighMIO_{i,t} + \lambda_3 FinD_{i,t}^{RE} * HighSIO_{i,t} \\ &+ \theta_1 HighLIO_{i,t} + \theta_2 HighMIO_{i,t} + \theta_3 HighSIO_{i,t} + \tau_{i,t}, \end{aligned} \tag{2.27}$$

or

$$(CF-DIV)_{i,t} = \alpha+\beta FinD_{i,t}^{(CF-DIV)}+\lambda FinD_{i,t}^{(CF-DIV)}*HighTotalIO+\theta HighTotalIO_{i,t}+\tau_{i,t}, \tag{2.28}$$

$$\begin{aligned}(CF-DIV)_{i,t} =& \alpha + \beta FinD_{i,t}^{(CF-DIV)} + \lambda_1 FinD_{i,t}^{(CF-DIV)} * HighLIO_{i,t} \\ &+ \lambda_2 FinD_{i,t}^{(CF-DIV)} * HighMIO_{i,t} + \lambda_3 FinD_{i,t}^{(CF-DIV)} * HighSIO_{i,t} \\ &+ \theta_1 HighLIO_{i,t} + \theta_2 HighMIO_{i,t} + \theta_3 HighSIO_{i,t} + \tau_{i,t}.\end{aligned} \tag{2.29}$$

The estimation results are reported in Panels A and B in Table 2.11. For the $FinD^{RE}$ measure, λ_1 is statistically significantly positive with a coefficient of 0.031 compared with 0.560, which is a 5.5% increase. When using the $FinD^{(CF-DIV)}$ measure, λ_1 is only marginally significant, and the economic significance is smaller: 0.016 compared with 0.421, a 3.8% increase.

Controlling for firm size, the regression results for $\Delta RE_{i,t}/(CF-DIV)_{i,t}$ on $FinD_{i,t}^{RE}/FinD_{i,t}^{(CF-DIV)}$ are reported in Table 2.12. Long-term institutional ownership still leads to more internal finance no matter which approach used. The magnitude increases for both: high long-term institutional ownership leads to a 7.6% increased use of $\Delta RE_{i,t}$ and a 12.3% increased use of $(CF-DIV)_{i,t}$ compared with the base model.

2.7 Conclusions

This chapter documents a strong negative relationship observed for institutional ownership, specifically long-term institutional ownership and leverage. I show that this is not a reflection of long-term institutions targeting lower leverage in the context of the trade-off theory of capital structure. Instead, this is a result of long-term institutions' apparent preference for the pecking order of financing. Consequently, firms with higher long-term institutional ownership have a higher fraction of internal versus external financing. Under the circumstance in which external capital needs to be raised, such firms show preferences for debt over equity.

The relationship between short-term institutional ownership is rather mixed. Short-term institutions trade often and do not stay with one firm for long, so there may be no motivation, or possibility for them, to interfere with firms' financing policies.

I have not addressed why long-term institutional ownership would prefer the pecking order in this chapter, but since institutional ownership has been shown to be extensively negatively related to information asymmetry, I conjecture that the reason lies with the incentive conflicts in the spirit of Jensen et al. (1986), which generates the pecking order behavior as illustrated by Myers (2003). These questions can be addressed in future research.

Table 2.1: Summary Statistics

The table reports summary statistics of firm characteristics. *Institutional Ownership* is fraction of shares outstanding owned by institutional investors in Thomson Financial 13F. Long-, Mid- and Short Institutional Ownership are defined in detail in the context. *Book Leverage* is book debt divided by total assets. *Market-to-book* is market equity plus book debt divided by total assets. *Firm age* is the number of years since the first appearance in Compustat. *Profitability* is annual operating income before depreciation divided by total assets. *Tangibility* is quarterly total (net) property, plant and equipment divided by total assets. *R&D* is quarterly research and development expenditures divided by total assets. *R&D dummy* is equal to zero if R&D is missing.

	count	mean	p5	p25	p50	p75	p95
Total IO	125,988	0.339	0.000	0.076	0.279	0.568	0.860
Long-term IO	125,988	0.093	0.000	0.015	0.064	0.141	0.283
Mid-term IO	125,988	0.154	0.000	0.015	0.105	0.251	0.466
Short-term IO	125,988	0.107	0.000	0.009	0.074	0.168	0.337
Book Leverage	125,988	0.225	0.000	0.038	0.192	0.352	0.615
Profitability	119,890	0.112	−0.223	0.049	0.129	0.205	0.360
M/B	124,733	1.849	0.763	1.045	1.397	2.117	4.614
Tangibility	125,849	0.281	0.029	0.104	0.222	0.400	0.751
Total Assets	125,988	1649.111	6.069	32.322	124.533	581.242	5795.043
One-year Stock Return	112,776	0.122	−0.623	−0.246	0.043	0.368	1.193
R&D	123,718	0.056	0.000	0.000	0.000	0.048	0.255
R&D dummy	125,988	0.640	0.000	0.000	1.000	1.000	1.000
Depreciation/Total Assets	120,929	0.052	0.013	0.029	0.045	0.065	0.118

Table 2.2: Summary Statistics: institutional ownership over time

Fiscal Year	Total IO	Long-term IO	Mid-term IO	Short-term IO	Book Leverage
1980	0.136	0.023	0.041	0.039	0.257
1981	0.140	0.034	0.053	0.053	0.247
1982	0.153	0.034	0.060	0.060	0.256
1983	0.176	0.038	0.064	0.074	0.237
1984	0.182	0.048	0.066	0.068	0.248
1985	0.205	0.051	0.084	0.070	0.255
1986	0.214	0.065	0.075	0.074	0.262
1987	0.214	0.064	0.079	0.071	0.267
1988	0.224	0.080	0.079	0.065	0.269
1989	0.233	0.082	0.079	0.072	0.273
1990	0.243	0.088	0.081	0.075	0.268
1991	0.264	0.084	0.089	0.091	0.243
1992	0.282	0.072	0.106	0.106	0.225
1993	0.282	0.086	0.093	0.104	0.214
1994	0.299	0.080	0.111	0.108	0.219
1995	0.313	0.078	0.121	0.115	0.219
1996	0.307	0.068	0.132	0.109	0.212
1997	0.327	0.068	0.138	0.124	0.223
1998	0.343	0.073	0.160	0.113	0.238
1999	0.339	0.062	0.164	0.120	0.230
2000	0.347	0.060	0.184	0.108	0.217
2001	0.386	0.106	0.172	0.113	0.215
2002	0.419	0.099	0.220	0.110	0.206
2003	0.448	0.089	0.241	0.134	0.193
2004	0.495	0.118	0.265	0.149	0.180
2005	0.504	0.146	0.264	0.150	0.179
2006	0.509	0.151	0.285	0.163	0.185
2007	0.500	0.149	0.300	0.181	0.192
2008	0.526	0.185	0.267	0.140	0.213
2009	0.536	0.164	0.286	0.139	0.191
2010	0.545	0.189	0.266	0.140	0.182
2011	0.559	0.198	0.282	0.126	0.192
2012	0.565	0.209	0.264	0.131	0.199
2013	0.554	0.158	0.248	0.162	0.210
2014	0.528	0.160	0.232	0.145	0.232

Table 2.3: Determinants of Book Leverage: lagged model with total IO

Regression results of specification 2.1: $Leverage_{i,t+1} = \alpha TotalIO_{i,t} + X_{i,t}\beta + \epsilon_{i,t+1}$. All variables are defined in detail in the appendix. Column (1) reports the estimations results of OLS, column (2) estimates the model in panel with firm fixed effect, column (3) and (4) estimate with Fama-Macbeth, and all variables are defined as differences from three-digit SIC industry means for a given year in column (4). Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level in Column (1) and (2). Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	OLS	Firm FE Panel	Fama-Macbeth	Fama-Macbeth Demeaned
Institutional	−0.087***	−0.048***	−0.105***	−0.101***
Ownership	(0.006)	(0.005)	(0.012)	(0.013)
Log of Sales/CPI	0.017***	0.020***	0.021***	0.020***
	(0.001)	(0.002)	(0.001)	(0.001)
M/B	−0.010***	−0.002**	−0.011***	−0.010***
	(0.001)	(0.001)	(0.001)	(0.001)
Tangibility	0.186***	0.119***	0.188***	0.160***
	(0.010)	(0.014)	(0.008)	(0.008)
R&D/Sales	−0.165***	−0.041**	−0.188***	−0.151***
	(0.023)	(0.019)	(0.026)	(0.025)
R&D dummy	−0.043***	−0.011**	−0.042***	−0.022***
	(0.004)	(0.005)	(0.002)	(0.001)
Expense/Sales	−0.060***	−0.032***	−0.032***	−0.043***
	(0.010)	(0.011)	(0.007)	(0.006)
Profitability	−0.221***	−0.155***	−0.226***	−0.219***
	(0.009)	(0.008)	(0.013)	(0.014)
Depreciation/Total	0.156***	0.451***	0.167***	0.353***
Assets	(0.056)	(0.047)	(0.052)	(0.062)
One-year Stock	−0.008***	−0.011***	−0.004	−0.006**
Return	(0.001)	(0.001)	(0.003)	(0.003)
R^2	0.159	0.129	0.181	0.109
No. of Obs.	92717	92717	92717	92717

Table 2.4: Determinants of Book Leverage: lagged model with long-, mid- and short-term Institutional Ownership

Regression results of specification 2.6: $Leverage_{i,t+1} = \alpha_1 Long\text{-}termIO_{i,t} + \alpha_2 Mid\text{-}termIO_{i,t} + \alpha_3 Short\text{-}termIO_{i,t} + X_{i,t}\beta + \epsilon_{i,t+1}$. All variables are defined in detail in the appendix. Column (1) reports the estimations results of OLS, column (2) estimates the model in panel with firm fixed effect, column (3) and (4) estimate with Fama-Macbeth, and all variables are defined as differences from three-digit SIC industry means for a given year in column (4). Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level in Column (1) and (2). Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) OLS	(2) Firm FE Panel	(3) Fama-Macbeth	(4) Fama-Macbeth Demeaned
Long-term	−0.157***	−0.057***	−0.184***	−0.200***
Institutional Ownership	(0.016)	(0.011)	(0.018)	(0.017)
Mid-term	−0.092***	−0.066***	−0.160***	−0.146***
Institutional Ownership	(0.010)	(0.009)	(0.021)	(0.020)
Short-term	0.018	−0.040***	0.043**	0.046***
Institutional Ownership	(0.013)	(0.010)	(0.016)	(0.016)
Log of Sales/CPI	0.018***	0.022***	0.022***	0.021***
	(0.001)	(0.002)	(0.001)	(0.001)
M/B	−0.011***	−0.002**	−0.012***	−0.011***
	(0.001)	(0.001)	(0.001)	(0.001)
Tangibility	0.186***	0.116***	0.192***	0.166***
	(0.010)	(0.014)	(0.007)	(0.008)
R&D/Sales	−0.175***	−0.042**	−0.200***	−0.162***
	(0.024)	(0.019)	(0.026)	(0.025)
R&D dummy	−0.043***	−0.011**	−0.041***	−0.021***
	(0.004)	(0.005)	(0.002)	(0.001)
Expense/Sales	−0.060***	−0.030***	−0.033***	−0.042***
	(0.010)	(0.011)	(0.006)	(0.006)
Profitability	−0.229***	−0.158***	−0.231***	−0.225***
	(0.009)	(0.008)	(0.014)	(0.014)
Depreciation/Total	0.127**	0.441***	0.126**	0.319***
Assets	(0.056)	(0.047)	(0.049)	(0.059)
One-year Stock	−0.011***	−0.011***	−0.008**	−0.010***
Return	(0.001)	(0.001)	(0.003)	(0.003)
R^2	0.160	0.126	0.186	0.115
No. of Obs.	92717	92717	92717	92717

Table 2.5: Debt-Equity Choice

Column (1) and (3) report the Logit regression results of specification 2.7: $Debt_{i,t+1} = \alpha + \psi TotalIO_{i,t} + X_{i,t}\beta + \lambda Leverage_{i,t} + \eta_{i,t+1}$ and column (2) and (4) report the Logit regression results of specification 2.8: $Debt_{i,t+1} = \alpha + \psi_1 Long\text{-}termIO_{i,t} + \psi_2 Mid\text{-}termIO_{i,t} + \psi_3 Short\text{-}termIO_{i,t} + X_{i,t}\beta + \lambda Leverage_{i,t} + \eta_{i,t+1}$. Firms are defined as issuing(retiring) a security when the net amount issued(retired) from year $t-1$ to t divided by total assets in year t exceeds 5%. Cases where firms issued (retired) both debt and equity in a given fiscal year are omitted. $Debt_{i,t+1}$ is a dummy variable equal to 1 when firm issues(retires) debt and 0 when firm issues(retires) equity. All independent variables are defined in detail in the appendix. All columns are estimated with year and industry fixed effects. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level. Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(to be continued)

Table 2.5 (continued)

	(1)	(2)	(3)	(4)
	Debt(1) vs. Equity(0) Issue		Debt(1) vs. Equity(0) Reduction	
Total IO	−0.012		−0.742***	
	(0.101)		(0.130)	
Long-term IO		1.167***		−1.821***
		(0.344)		(0.362)
Mid-term IO		1.200***		−0.985***
		(0.201)		(0.236)
Short-term IO		−1.529***		−0.215
		(0.187)		(0.287)
Firm Size(Log of	0.196***	0.163***	−0.332***	−0.306***
Sales/CPI)	(0.016)	(0.017)	(0.022)	(0.023)
M/B	−0.335***	−0.330***	−0.290***	−0.284***
	(0.020)	(0.020)	(0.037)	(0.037)
Tangibility	0.648***	0.587***	−1.046***	−1.000***
	(0.133)	(0.133)	(0.253)	(0.255)
R&D	−2.672***	−2.685***	−0.415	−0.389
	(0.373)	(0.375)	(0.570)	(0.570)
R&D dummy	−0.021	−0.035	−0.005	−0.011
	(0.050)	(0.050)	(0.076)	(0.076)
Expense/Sales	−0.252*	−0.248*	−1.638***	−1.623***
	(0.129)	(0.129)	(0.239)	(0.239)
Profitability	1.857***	1.875***	−6.096***	−6.068***
	(0.159)	(0.157)	(0.308)	(0.309)
Depreciation/Total	−4.262***	−3.876***	15.832***	15.681***
Assets	(0.702)	(0.701)	(1.561)	(1.568)
One-year Stock	−0.259***	−0.217***	0.162***	0.137 * *
Return	(0.033)	(0.033)	(0.054)	(0.055)
Book Leverage	−1.530***	−1.506***	9.065***	9.067***
	(0.109)	(0.109)	(0.314)	(0.313)
Pseudo R^2	0.187	0.192	0.465	0.467
No. of Obs.	22611	22611	17900	17900
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes

Table 2.6: Multinomial Logit Comparison of Debt/Equity to No Issuance/Reduction

Panel A reports the Multinomial Logit regression results of specification 2.9: $Fin_{i,t+1} = \alpha + \psi TotalIO_{i,t} + X_{i,t}\beta + \lambda Leverage_{i,t} + \eta_{i,t+1}$ and Panel B reports the Multinomial Logit regression results of specification 2.10: $Fin_{i,t+1} = \alpha + \psi_1 Long\text{-}termIO_{i,t} + \psi_2 Mid\text{-}termIO_{i,t} + \psi_3 Short\text{-}termIO_{i,t} + X_{i,t}\beta + \lambda Leverage_{i,t} + \eta_{i,t+1}$. The base situation is when firms have no issuance or reduction actions. Column (1)/(2)/(3)/(4) in both Panels respectively compare equity issuance /debt issuance /equity reduction /debt reduction to no actions. Column (1) and (2) are results of the same Multinomial Logit regression, (3) and (4) are of another. Firms are defined as issuing(retiring) a security when the net amount issued(retired) from year $t-1$ to t divided by total assets in year t exceeds 5%. Cases where firms issued (retired) both debt and equity in a given fiscal year are omitted. All independent variables are defined in detail in the appendix. All columns are estimated with year and industry fixed effects. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level. Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(to be continued)

Table 2.6 (continued)

Panel A: Multinomial Logit on Total Institutional Ownership

	(1) Equity Issue	(2) Debt Issue	(3) Equity Reduction	(4) Debt Reduction
Total IO	−0.073	0.057	0.628***	−0.229***
	(0.094)	(0.052)	(0.086)	(0.060)
Firm Size(Log of	−0.236***	−0.064***	0.276***	−0.048***
Sales/CPI)	(0.015)	(0.008)	(0.015)	(0.009)
M/B	0.312***	0.027**	−0.002	−0.189***
	(0.014)	(0.013)	(0.021)	(0.017)
Tangibility	−0.269**	0.370***	−0.211	−1.009***
	(0.129)	(0.075)	(0.177)	(0.083)
R&D	0.488**	−1.883***	−0.965***	−1.250***
	(0.205)	(0.275)	(0.362)	(0.235)
R&D dummy	−0.116**	−0.148***	0.078	0.056*
	(0.047)	(0.026)	(0.057)	(0.030)
Expense/Sales	0.070	−0.252***	1.279***	−0.427***
	(0.112)	(0.092)	(0.167)	(0.090)
Profitability	−1.806***	0.357***	4.280***	−0.915***
	(0.132)	(0.103)	(0.188)	(0.101)
Depreciation/Total	6.253***	1.319***	−8.171***	4.668***
Assets	(0.591)	(0.437)	(1.049)	(0.443)
One-year Stock	0.456***	0.241***	−0.151***	−0.071***
Return	(0.027)	(0.019)	(0.034)	(0.022)
Book Leverage	1.907***	0.586***	−2.356***	3.493***
	(0.092)	(0.062)	(0.169)	(0.060)
Pseudo R^2	0.071		0.122	
No. of Obs.	84604		99111	
Year Fixed Effects	Yes		Yes	
Industry Fixed Effects	Yes		Yes	

(to be continued)

Table 2.6 (continued)

Panel B: Multinomial Logit on Long-/ Mid-/ Short-term Institutional Ownership				
	(1)	(2)	(3)	(4)
	Equity Issue	Debt Issue	Equity Reduction	Debt Reduction
Long-term IO	−2.447∗∗∗	−1.010∗∗∗	1.773∗∗∗	0.107
	(0.332)	(0.152)	(0.215)	(0.160)
Mid-term IO	−1.013∗∗∗	0.144	1.312∗∗∗	0.095
	(0.186)	(0.093)	(0.149)	(0.106)
Short-term IO	1.783∗∗∗	0.655∗∗∗	−0.464 ∗ ∗	−0.741∗∗∗
	(0.165)	(0.105)	(0.188)	(0.128)
Firm Size(Log of	−0.195∗∗∗	−0.054∗∗∗	0.240∗∗∗	−0.056∗∗∗
Sales/CPI)	(0.015)	(0.008)	(0.016)	(0.010)
M/B	0.302∗∗∗	0.021	−0.005	−0.187∗∗∗
	(0.014)	(0.013)	(0.021)	(0.016)
Tangibility	−0.173	0.404∗∗∗	−0.303∗	−1.030∗∗∗
	(0.128)	(0.075)	(0.178)	(0.083)
R&D	0.428 ∗ ∗	−1.975∗∗∗	−0.879 ∗ ∗	−1.215∗∗∗
	(0.203)	(0.275)	(0.365)	(0.234)
R&D dummy	−0.099 ∗ ∗	−0.142∗∗∗	0.075	0.052∗
	(0.047)	(0.026)	(0.057)	(0.030)
Expense/Sales	0.070	−0.237∗∗∗	1.269∗∗∗	−0.432∗∗∗
	(0.110)	(0.091)	(0.169)	(0.091)
Profitability	−1.877∗∗∗	0.302∗∗∗	4.350∗∗∗	−0.903∗∗∗
	(0.130)	(0.103)	(0.193)	(0.101)
Depreciation/Total	5.747∗∗∗	1.165∗∗∗	−7.797∗∗∗	4.777∗∗∗
Assets	(0.585)	(0.434)	(1.054)	(0.444)
One-year Stock	0.407∗∗∗	0.226∗∗∗	−0.086 ∗ ∗	−0.059∗∗∗
Return	(0.027)	(0.019)	(0.034)	(0.022)
Book Leverage	1.851∗∗∗	0.559∗∗∗	−2.325∗∗∗	3.517∗∗∗
	(0.091)	(0.062)	(0.169)	(0.060)
Pseudo R^2	0.073		0.123	
No. of Obs.	84604		99111	
Year Fixed Effects	Yes		Yes	
Industry Fixed Effects	Yes		Yes	

Table 2.7: Partial Adjustment Model: Speed of Adjustment

Regression results of specification 2.11: $Leverage_{i,t} = \alpha TotalIO_{i,t-1} + X_{i,t-1}\beta + (1-\lambda_1)Leverage_{i,t-1} + (1-\lambda_2)Leverage_{i,t-1} * Dummy_{HighTotalIO} + \delta_{i,t}$; and specification 2.12: $Leverage_{i,t} = \alpha + \kappa_1 Long\text{-}termIO_{i,t} + +\kappa_2 Mid\text{-}termIO_{i,t} + +\kappa_3 Short\text{-}termIO_{i,t} + (1-\lambda_2)Leverage_{i,t-1} * Dummy_{HighLong\text{-}termIO} + (1-\lambda_3)Leverage_{i,t-1} * Dummy_{HighMid\text{-}termIO} + (1-\lambda_4)Leverage_{i,t-1} * Dummy_{HighShort\text{-}termIO} + X_{i,t-1}\beta + (1-\lambda_1)Leverage_{i,t-1} + \delta_{i,t}$. All variables are defined in detail in the appendix. Column (1) reports the estimations results of specification 2.11, column (2) estimates specification 2.12. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level. Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)		(2)	
Dummy for High IO × Book Leverage	0.019***	(0.004)		
Total Institutional Ownership	−0.007***	(0.002)		
Dummy for High LIO × Book Leverage			0.004	(0.004)
Dummy for High MIO × Book Leverage			0.011***	(0.004)
Dummy for High SIO × Book Leverage			0.008**	(0.004)
Long-term Institutional Ownership			−0.018***	(0.004)
Mid-term Institutional Ownership			−0.012***	(0.003)
Short-term Institutional Ownership			0.013***	(0.004)
Log of Sales/CPI	0.001***	(0.000)	0.001***	(0.000)
M/B	0.001**	(0.000)	0.001*	(0.000)
Tangibility	0.020***	(0.002)	0.020***	(0.002)
R&D/Sales	−0.045***	(0.006)	−0.047***	(0.006)
R&D dummy	−0.008***	(0.001)	−0.008***	(0.001)
Expense/Sales	0.003	(0.003)	0.003	(0.003)
Profitability	−0.027***	(0.004)	−0.029***	(0.004)
Depreciation/Total Assets	0.046***	(0.015)	0.041***	(0.015)
One-year Stock Return	−0.004***	(0.001)	−0.005***	(0.001)
Book Leverage	0.868***	(0.003)	0.866***	(0.004)
R^2	0.753		0.753	
No. of Obs.	92717		92717	

Table 2.8: Components of Change in Leverage

Column (1)-(6) respectively reports Fama-Macbeth regression results of specification 2.13 through specification 2.18. Fama-MacBeth standard errors are reported in parentheses. Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Net Debt Issue ($\Delta D_t/A_t$)		Net Equity Issue (e_t/A_t)		($\Delta RE_t/A_t$)	
Total IO	0.005		−0.004***		0.024***	
	(0.003)		(0.002)		(0.003)	
Long-term IO		−0.035***		−0.034***		0.026***
		(0.007)		(0.004)		(0.006)
Mid-term IO		−0.002		−0.015***		0.038***
		(0.005)		(0.002)		(0.005)
Short-term IO		0.039***		0.020***		0.014***
		(0.005)		(0.004)		(0.005)
Log of Sales/CPI	−0.000	0.000	−0.005***	−0.005***	0.001	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
M/B	0.003***	0.003***	0.016***	0.016***	−0.005***	−0.005***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Tangibility	0.036***	0.037***	−0.004	−0.002	0.029***	0.029***
	(0.005)	(0.004)	(0.002)	(0.002)	(0.008)	(0.007)
R&D/Sales	−0.034***	−0.037***	0.068***	0.067***	−0.020	−0.021
	(0.011)	(0.011)	(0.015)	(0.015)	(0.018)	(0.018)
R&D dummy	−0.008***	−0.008***	−0.003***	−0.003***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Expense/Sales	0.008 **	0.008***	−0.007***	−0.007***	−0.057***	−0.057***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.006)	(0.006)
Profitability	0.027***	0.025***	−0.144***	−0.145***	0.490***	0.489***
	(0.006)	(0.006)	(0.013)	(0.012)	(0.014)	(0.014)
Depreciation/Total	−0.028	−0.038*	0.256***	0.249***	−0.694***	−0.690***
Assets	(0.020)	(0.019)	(0.017)	(0.017)	(0.044)	(0.044)
One-year Stock	0.015***	0.014***	0.012***	0.011***	0.029***	0.030***
Return	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.003)
Book Leverage	−0.080***	−0.081***	0.040***	0.039***	−0.048***	−0.048***
	(0.007)	(0.007)	(0.002)	(0.002)	(0.004)	(0.004)
R^2	0.054	0.057	0.191	0.193	0.292	0.293
No. of Obs.	81981	81981	81981	81981	81981	81981

Table 2.9: Pecking order tests: Financing Deficit

This tests pecking order by regressing debt issue or reduction on Financing Deficit. Specifically, column (1) reports estimation results of $\Delta D_{i,t} = \alpha + \beta_{PO} DEF_{i,t} + \zeta i, t$; Column (2) reports estimation results of specification 2.20 and Column (3) reports estimation results of specification 2.21 . Financing Deficit is defined in 2.19. High IO/LIO/MIO/SIO is defined as above cross-sectional median in a given year. The dependent variable is net debt issue in Panel A, and gross long-term debt issue/reduction in Panel B/C. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level. Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)		(2)		(3)	
			Net Debt Issue ($\Delta D_t/A_t$)			
Financing Deficit	0.416***	(0.005)	0.389***	(0.006)	0.399***	(0.007)
Dummy for High IO			0.007***	(0.001)		
Dummy for High IO × Financing Deficit			0.076***	(0.009)		
Dummy for High LIO × Financing Deficit					0.236***	(0.010)
Dummy for High MIO × Financing Deficit					0.076***	(0.010)
Dummy for High SIO × Financing Deficit					−0.158***	(0.009)
Dummy for High LIO					0.009***	(0.001)
Dummy for High MIO					0.007***	(0.001)
Dummy for High SIO					−0.002***	(0.001)
R^2	0.332		0.339		0.376	
No. of Obs.	96552		96552		96552	

Table 2.10: Pecking order test: Financing Deficit, controlling for firm size

This tests pecking order by regressing debt issue or reduction on Financing Deficit while controlling for the size effect. Specifically, column (1) reports estimation results of $\Delta D_{i,t} = \alpha + \beta_{PO} DEF_{i,t} + \zeta i, t$; Column (2) reports estimation results of specification 2.22 and Column (3) reports estimation results of specification 2.23. Financing Deficit is defined in 2.19. High IO/LIO/MIO/SIO is defined as above cross-sectional median in a given year. The dependent variable is net debt issue in Panel A, and gross long-term debt issue/reduction in Panel B/C. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level. Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)		(2)		(3)	
			Net Debt Issue ($\Delta D_t/A_t$)			
Financing Deficit	0.362***	(0.006)	0.090***	(0.008)	0.136***	(0.008)
Dummy for High IO × Financing Deficit			−0.114***	(0.008)		
Dummy for High IO			0.004***	(0.001)		
Dummy for High LIO × Financing Deficit					0.095***	(0.009)
Dummy for High MIO × Financing Deficit					−0.020 **	(0.008)
Dummy for High SIO × Financing Deficit					−0.229***	(0.008)
Dummy for High LIO					0.008***	(0.001)
Dummy for High MIO					0.005***	(0.001)
Dummy for High SIO					−0.005***	(0.001)
Financing Deficit × Firm size			0.112***	(0.002)	0.113***	(0.002)
Firm size	0.011***	(0.000)	0.008***	(0.000)	0.007***	(0.000)
R^2	0.371		0.433		0.460	
No. of Obs.	95165		96552		96552	

Table 2.11: Pecking Order Test: $(\Delta RE_t/A_t)$ / $(CF - DIV)_t/A_t$

This tests pecking order by estimating $\Delta RE_{i,t} = \alpha + \beta FinD^{RE}_{i,t} + \tau_{i,t}$ in column (1) Panel A and$(CF - DIV)_{i,t} = \alpha + \beta FinD^{(CF-DIV)}_{i,t} + \tau_{i,t}$ in column (1) Panel B. Column (2) reports estimation results of specification 2.26 in Panel A and specification 2.28 in panel B.Column (3) reports estimation results of specification 2.27 in Panel A and specification 2.29 in Panel B. Financing Demand is defined in equation 2.24 and equation 2.25. High IO/LIO/MIO/SIO is defined as above cross-sectional median in a given year. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level. Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Financing Demand_RE						
	(1)		(2)		(3)	
	Change in Retained Earnings ($\Delta RE_t/A_t$)					
Financing Demand	0.492***	(0.004)	0.534***	(0.005)	0.560***	(0.005)
Dummy for High IO × Financing Demand			−0.133***	(0.008)		
Dummy for High IO			0.032***	(0.001)		
Dummy for High LIO × Financing Demand					0.031***	(0.008)
Dummy for High MIO × Financing Demand					−0.067***	(0.009)
Dummy for High SIO × Financing Demand					−0.140***	(0.009)
Dummy for High LIO					0.019***	(0.001)
Dummy for High MIO					0.021***	(0.001)
Dummy for High SIO					0.014***	(0.001)
No. of Obs.	94844		94844		94844	

Panel B: Financing Demand_(CF-DIV)						
	(1)		(2)		(3)	
	$(CF - DIV)_t/A_t$					
Financing Demand	0.345***	(0.005)	0.393***	(0.006)	0.421***	(0.007)
Dummy for High IO × Financing Demand			−0.140***	(0.008)		
Dummy for High IO			0.041***	(0.002)		
Dummy for High LIO × Financing Demand					0.016*	(0.008)
Dummy for High MIO × Financing Demand					−0.059***	(0.009)
Dummy for High SIO × Financing Demand					−0.139***	(0.009)
Dummy for High LIO					0.016***	(0.001)
Dummy for High MIO					0.022***	(0.001)
Dummy for High SIO					0.026***	(0.001)
No. of Obs.	94313		94313		94313	

Table 2.12: Pecking Order Test: $(\Delta RE_t/A_t)$ / $(CF - DIV)_t/A_t$

This table does the same test as Table 2.11 while controlling for size and its interaction with Financing Demand. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level. Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Financing Demand_RE						
	(1)		(2)		(3)	
	Change in Retained Earnings $(\Delta RE_t/A_t)$					
Financing Demand	0.578***	(0.008)	0.571***	(0.008)	0.588***	(0.008)
Dummy for High IO × Financing Demand			−0.090***	(0.009)		
Dummy for High IO			0.011***	(0.001)		
Dummy for High LIO × Financing Demand					0.045***	(0.009)
Dummy for High MIO × Financing Demand					−0.045***	(0.009)
Dummy for High SIO × Financing Demand					−0.118***	(0.009)
Dummy for High LIO					0.004***	(0.001)
Dummy for High MIO					0.007***	(0.001)
Dummy for High SIO					0.007***	(0.001)
Financing Demand × Firm Size	−0.025***	(0.002)	−0.014***	(0.002)	−0.014***	(0.002)
Firm Size	0.032***	(0.001)	0.031***	(0.001)	0.029***	(0.001)
No. of Obs.	94844		94844		94844	

Panel B: Financing Demand_(CF-DIV)						
	(1)		(2)		(3)	
	$(CF - DIV)_t/A_t$					
Financing Demand	0.472***	(0.010)	0.466***	(0.010)	0.482***	(0.010)
Dummy for High IO × Financing Demand			−0.079***	(0.008)		
Dummy for High IO			0.017***	(0.001)		
Dummy for High LIO × Financing Demand					0.042***	(0.008)
Dummy for High MIO × Financing Demand					−0.029***	(0.008)
Dummy for High SIO × Financing Demand					−0.107***	(0.009)
Dummy for High LIO					−0.001	(0.001)
Dummy for High MIO					0.007***	(0.001)
Dummy for High SIO					0.018***	(0.001)
Financing Demand × Firm Size	−0.036***	(0.002)	−0.026***	(0.003)	−0.026***	(0.003)
Firm Size	0.031***	(0.001)	0.029***	(0.001)	0.028***	(0.001)
No. of Obs.	94313		94313		94313	

Chapter 3

Institutional Preferences for Leverage

3.1 Introduction

It is well documented that institutional investors prefer to invest in firms with certain characteristics. Falkenstein (1996) find that share price level, volatility, liquidity, news coverage, firm age, firm size, and idiosyncratic volatility are all related to mutual fund investment decisions. Bennett et al. (2003) show that the aggregate institutional preferences are caused by the changing preferences of each class of institutional investor, not by the changing proportions of different classes. Badrinath et al. (1996) find that insurance companies' preferences are different from other institutional investors. Del Guercio (1996) reports that banks prefer prudent stocks,whereas mutual funds do not. Gompers and Metrick (2001) find that institutions prefer large, liquid stocks with low past returns.

In this chapter, I study whether institutional investors have preferences for specific leverage ratios and whether their preferences affect firm capital structure decisions. I adopt the measure used in Sulaeman (2010): firm-level aggregated preferred leverage of institutions. I extend the measure by excluding the firm itself to remove mechanical endogeneity and by separately calculating it for *new, staying, and liquidating* institutions.

Consistent with Sulaeman (2010), I find that aggregated preferred leverage of *all* institutions with holdings in the firm is positively related to its leverage ratio.

This finding is consistent with two interpretations. First, it is possible that the firm leverage ratio is affected by the institutional preferences. Second, it is possible that institutions simply invest in firms with certain capital structure policies.

To specifically test the second hypothesis I investigate the relation between the preferred leverage of new institutional investors and the firms leverage. I find that aggregated preferred leverage of *new* institutions is also strongly related to the firm leverage ratio. Since *new* institutions have only recently become shareholders, this result can only be consistent with the second scenario. This result differs from that of Sulaeman (2010), who interprets his results as consistent with the first interpretation.

I use the one-step and the two-step partial adjustment model to examine if institutional preferred leverage affects changes in firm leverage. Aggregated preferred leverage of *new* institutions' has a positive relationship to the change of firm leverage ratio. Since the institutions are new, it is unlikely for them to affect the firm's capital structure choice.

In contrast, the relation between aggregated preferred leverage of *liquidating* institutions and the change of firm leverage ratio is much weaker and is insignificant in some specifications of the one-step model and in the two-step model. Since firms cannot foresee an institution's exit, it is unlikely they can choose to be affected by only the *staying* institutions. Hence, it is likely that institutions sell the shares when the firm's capital structure policies deviate from the institution's preference. This result is further confirmed in institution-firm-pair-level data, where the individual liquidating choice is studied. The more the firm's leverage ratio deviates from the institution's preferred leverage ratio, the more likely the institution will liquidate its holdings.

I also examine the relationship between the aggregated preferred leverage of the institutions and the firms' financing decisions. The aggregated preferred leverage of *new* institutions is positively related to the likelihood of issuing debt rather than equity and the likelihood of repurchasing equity rather than debt. The aggregated preferred leverage of the *liquidating* institutions is related to none of these financing choices, consistent with my prior results and conclusions.

The rest of this chapter is structured as follows. Section 3.2 describes the data, describes the variable definitions of the aggregated preferred leverage, and reports the summary statistics. Section 3.3 presents the firm-level empirical results on the relationship between aggregated preferred leverage and firm capital structure decisions. Section 3.4 checks institution-firm-level data and directly studies institution's liquidation decisions. Section 3.5 concludes.

3.2 Data and Definitions

3.2.1 Data

I acquire firm-level data from the annual COMPUSTAT database and the monthly equity CRSP stock return database. Following the literature, firms in the financial sector (SIC codes 6000-6999) and the utility sector (SIC codes 4900-4999) are not included in the sample because their capital structures are likely significantly different from those of firms in other sectors. The balance sheet variables as a percentage of total assets or sales are trimmed to remove the most extreme 1% in either tail of the distribution if the variable can be negative or in the right tail only if the variable is positive by definition. Only ordinary common shares, share codes 10 and 11 in CRSP, are kept in the sample.

The Thomson Financial 13F Institutional Holdings database is merged with the annual COMPUSTAT database to access institutional ownership data. As Thomson provides the institutions' holdings on a quarterly base, the firm fiscal-year-end quarter in COMPUSTAT is used to merge the data with the latest institutional holdings data from the same quarter.

Because the Thomson Financial 13F Institutional Holdings database only keeps records from 1980 and onwards, the final sample is limited to the 1980-2014 period. Only firms who have at one point been held by an institutional investor are retained in the sample.

3.2.2 Institutional Preferred Leverage

Most institutions have an extensively diversified portfolio, and, as my sample shows, more than 95% of the institutions hold greater than 10 firms in each quarter with the median number of firms held as 110. I use the dollar-value-weighted average of the leverages of all the firms in institution's portfolio as a proxy for its preferred leverage ratio. For my studies' point of interest, I exclude the firm itself when I calculate the preferred leverage ratio of an institution for that specific firm, that is for institution k at year t, its preferred leverage ratio observed by firm i is

$$\overline{Lev\_preferred}^{i}_{k,t} = \sum_{i,f \in F_{k,t}; f \neq i} [(Value^{i}_{k,t} / \sum_{i,f \in F_{k,t}; f \neq i} Value^{i}_{k,t}) \cdot Lev^{i}_{t}], \tag{3.1}$$

where $F_{k,t}$ is the set of all stocks held by institution k at the end of year t , $Value^{i}_{k,t}$ is the dollar amount allocated to firm i by institution k at the end of year t, and f is any firm other than firm i held by institution k at the end of year t .

Because firms have different fiscal-year-end quarters, I apply the fiscal-year-end leverage to the following three quarters before the next fiscal year end, as this would most likely be the observed leverage by institutions and by other firms. Most firms in my sample have more than one institutional investor, more than 83% of firms have no less than 5 during each quarter. To measure the aggregated institutional preferred leverage ratio that is observed by, and possibly affects the firm's capital structure, I use a share-weighted average of $\overline{Lev}^{j}_{i,t}$, that is, for firm i, at year t the aggregated preferred leverage ratio of all its institutions is

$$\overline{\overline{Lev}}_{i,t}^{k} = \sum_{k \in F_{i,t}} \frac{Shares_{k,t}^{i} \cdot \overline{Lev\_preferred}_{k,t}^{i}}{\sum\limits_{k \in F_{i,t}} Shares_{k,t}^{i}} \tag{3.2}$$

The above definition is similar in spirit to that of Sulaeman (2010). However, the main difference is that I exclude the firm itself when I compute the preferred leverage of its institutions. The advantage of my measure is that it ensures that the aggregated preferred leverage ratio ($\overline{\overline{Lev}}_{i,t}^{k}$) is not affected by the firm's own leverage.

I also define the aggregated preferred leverage ratio of new, staying, and liquidating institutions as below. The rationale to also analyze the influence of new and liquidating institutions is to help distinguish the effects between institutions choosing leverages ex ante or affecting firm capital structure ex post.

$$\overline{\overline{Lev}}_{i,t}^{k_{New}} = \sum_{k \in F_{i,t}, k \notin F_{i,t-1}} \frac{Shares_{k,t}^{i} \cdot \overline{Lev\_preferred}_{k,t}^{i}}{\sum\limits_{k \in F_{i,t}, k \notin F_{i,t-1}} Shares_{k,t}^{i}} \tag{3.3}$$

$$\overline{\overline{Lev}}_{i,t}^{k_{Staying}} = \sum_{k \in F_{i,t}, k \in F_{i,t-1}} \frac{Shares_{k,t}^{i} \cdot \overline{Lev\_preferred}_{k,t}^{i}}{\sum\limits_{k \in F_{i,t}, k \in F_{i,t-1}} Shares_{k,t}^{i}} \tag{3.4}$$

$$\overline{\overline{Lev}}_{i,t}^{k_{Liquidating}} = \sum_{k \notin F_{i,t}, k \in F_{i,t-1}} \frac{Shares_{k,t-1}^{i} \cdot \overline{Lev\_preferred}_{k,t}^{i}}{\sum\limits_{k \notin F_{i,t}, k \in F_{i,t-1}} Shares_{k,t-1}^{i}} \tag{3.5}$$

Institutions are defined as new if they are the shareholders at the current fiscal year end, but not the previous fiscal year end; defined as staying if they are shareholders at both the current and the previous fiscal year end; and defined as liquidating if they are shareholders at the previous fiscal year end, but not going forward. Because liquidating institutions have sold the shares of the firms, it is impossible to calculate the share-weighted average using the current year's weights. Thus I use the previous year's holdings instead.

3.2.3 Summary Statistics

Table 3.1 reports the descriptive statistics of the firms characteristics used in this chapter. Table 3.2 presents the descriptive statistics of all aggregated preferred leverage at the firm-level and estimated firm target leverage bases on the COMPUSTAT sample. As expected, the aggregated preferred leverage has much less variation than the firm leverage or the estimated firm target leverage. The aggregated preferred leverage of liquidating institutions has fewer observations because, in the sample period, firms tend to be held by more and more institutions over time, as indicated in Table 3.5.

Table 3.3 presents the correlation between all the leverage-based variables in Table 3.2. Firm leverage is highly correlated to the estimated target leverage compared with the aggregated preferred leverage, and this is not surprising as target leverage is estimated based on the actual observed firm leverage. Compared with the aggregated preferred leverage of liquidating institutions, firm leverage is more related to the new and staying leverages.

Table 3.4 presents the number of firms each institution hold over time. There is an obvious trend of increasing institutions, but not a general trend for how many firms institutions hold. Some become more concentrated over time, whereas others become more diversified.

3.3 Institutional Ownership and Leverage Ratio

3.3.1 Determinants of Book Leverage

In this section, I study whether or not the aggregated institutional preferred leverage ratio ($\overline{\overline{Lev}}_{i,t}^{k}$) affects the firm leverage ratio. Book leverage, defined as the sum of the current liabilities and long-term debt divided by total assets, is used throughout my study. Institutional trading affects not only institutional holdings but also market leverage by affecting stock price and market equity.

I examine this by regressing observed book leverage ratio on the aggregated institutional preferred leverage ratio ($\overline{\overline{Lev}}_{i,t}^{k}$) and a vector of conventional explanatory variables Xs, that have been used in past studies of capital structure:

$$Lev_{i,t} = \alpha + \beta \overline{\overline{Lev}}_{i,t}^{k} + X_{i,t} \cdot \Gamma + \sigma_{i,t}, \tag{3.6}$$

$$Lev_{i,t+1} = \alpha + \beta \overline{\overline{Lev}}_{i,t}^{k} + X_{i,t} \cdot \Gamma + \sigma_{i,t+1}, \tag{3.7}$$

where Xs include profitability, tangibility, market-to-book ratio, firm size, one-year stock return, R&D expenditures/sales, an R&D dummy that indicates whether R&D information is reported, selling expenses, and depreciation.

Table 3.6 reports the estimation results for the aggregated preferred leverage of all institutions ($\overline{\overline{Lev}}_{i,t}^{k}$); Table 3.7 for new institutions ($\overline{\overline{Lev}}_{i,t}^{k_{New}}$); Table 3.8 for staying institutions ($\overline{\overline{Lev}}_{i,t}^{k_{Staying}}$) and Table 3.9 for liquidating institutions ($\overline{\overline{Lev}}_{i,t}^{k_{Liquidating}}$). Columns (1) and (2) in these four tables report results using pooled OLS; and columns (3) and (4) report results using panel regression with firm fixed effect; and columns (5) and (6) report results using the Fama-Macbeth method. In columns (1), (3), and (5), the dependent variable and independent variables are contemporaneous,that is, specification 3.6, and in column (2), (4), and (6), the independent variables are lagged one period from the dependent variable, that is, specification 3.7.

No matter which model I adopt, the aggregated preferred leverage of all, new, staying, and liquidating institutions are positively related to firm-level leverage. Since my interest variable is also a form of leverage ratio, the results presented here may be spurious. In the following sections, my focus will be on whether the aggregated preferred leverage affects firms' financing decisions.

3.3.2 Partial Adjustment

The previous section shows that the aggregated institutional preferred leverage ratio is not only statistically significant but also economically significant to the level of firm book leverage. In this section, I study if it is relevant to the change of leverage ratio. In the literature, the partial adjustment model is implemented to study what lengths the firm adjusts its current leverage towards the target ratio by regressing the change in leverage ratio from $t-1$ to t on the distance from the firm's leverage ratio at the end of $t-1$ to its target ratio of period t. I adopt the partial adjustment model:

$$Lev_{i,t} = \alpha + X_{i,t} \cdot \Gamma + \rho Lev_{i,t-1} + \eta_{i,t}, \tag{3.8}$$

$$Lev_{i,t} = \alpha + \beta \overline{\overline{Lev}}^{k}_{i,t} + X_{i,t} \cdot \Gamma + \rho Lev_{i,t-1} + \eta_{i,t}, \tag{3.9}$$

Again, I estimate models 3.8 and 3.9 for all, new, staying, and liquidating institutions and report the results Tables 3.10, 3.11, 3.12, and 3.13. respectively Columns (1) and (2) in these four tables report results using pooled OLS; and columns (3) and (4) report results using panel regression with firm fixed effect and columns (5) and (6) report results using Fama-Macbeth. In columns (1), (3), and (5), the independent variables exclude $\overline{\overline{Lev}}^{k}_{i,t}$, that is, specification 3.8, and in columns (2), (4), and (6), the independent variables include $\overline{\overline{Lev}}^{k}_{i,t}$, that is, specification 3.9.

Hovakimian and Li (2011) report that the Fama-MacBeth t-statistics are most conservative for partial adjustment model. This is also observed in my estimation results. While for all, new, and staying institutions have a positive effect on the change in leverage ratio regardless of which estimation method is used, this is not the case for liquidating institutions. The Fama-MacBeth method suggests that preferences of liquidating institutions ($\overline{\overline{Lev}}^{k_{Liquidating}}_{i,t}$) do not significantly affect firm's year-by-year change in leverage ratio.

Models 3.8 and 3.9 are lagged models. I have also estimated the contemporaneous models, and the results, which are not reported here for brevity, are qualitatively similar.

Equations 3.8 and 3.9 are a one-step approach that have been previously used in the literature. However, because of the fact that my interest variables are leverage ratios, doubts may arise that the results in Tables 3.10 through 3.13 are observed because the aggregated preferred leverage ratios of institutions are proxies for firms' target leverage ratio under the trade-off theory. To address this, I adopt the two-step model of partial adjustment model:

$$Lev_{i,t} - Lev_{i,t-1} = \alpha + \beta \overline{\overline{Lev}}^{k}_{i,t} + \phi Lev^{*}_{i,t} + \lambda Lev_{i,t-1} + \tau_{i,t}, \tag{3.10}$$

where

$$Lev^{*}_{i,t} = X_{i,t} \cdot \widehat{\Gamma}. \tag{3.11}$$

The Xs here are the same as those used in specifications 3.6 to 3.9. The yearly 49 Fama-French industry medians are also included in the target leverage ratio estimation model.

I strictly estimate $Lev^{*}_{i,t}$ following what Hovakimian and Li (2011)'s suggestion to "essentially eliminate the bias in favor of the target-adjustment hypothesis." The historical fixed effects component is used instead of the full-sample fixed effects component. The target leverage $Lev^{*}_{i,t}$ and the lagged leverage $Lev_{i,t}$ enter the model 3.10 separately, which is critical in this case as $\overline{\overline{Lev}}^{k}_{i,t}$ is also a leverage ratio. If I use the deviation of firm leverage from the firm target leverage $(Lev^{*}_{i,t} - Lev_{i,t-1})$ and from the aggregated leverage of institutions $(\overline{\overline{Lev}}^{k}_{i,t} - Lev_{i,t-1})$ respectively, $(\overline{\overline{Lev}}^{k}_{i,t} - Lev_{i,t-1})$ may be significant simply because of the strong relationship between $(Lev_{i,t} - Lev_{i,t-1})$ and $Lev_{i,t-1}$.

The sample to estimate the target leverage $Lev^{*}_{i,t}$ is fully COMPUSTAT. To estimate targets for the merged sample from 1980-2014, I estimate the target firm's leverage using the COMPUSTAT sample from 1970 and on ward to make sure that the historical fixed effects component is based on relatively longer periods for the earlier years (early 1980s) in my merged sample. For brevity,the target leverage estimation results (equation 3.11) are not reported.

Table 3.14 reports the results of second step (equation 3.10). To be conservative and brief, I only estimate and report Fama-Macbeth estimation results. Column (1) suggests that the aggregated preferred leverage of all institutions is positively related to the change of firm leverage ratio, yet the significance level is only at 10%. Column (2) suggests that the aggregated preferred leverage of new institutions positively "affects" firms' leverage change. As discussed earlier, since it is not feasible for new institutions to influence the firm, this result is actually evidence of institutions' heterogeneous preferences for leverage. Columns (3) and (4) show that the aggregated preferred leverage of staying or liquidating institutions is not relevant to the change of firm leverage ratio when controlling for the target firm's leverage.

3.3.3 Debt-Equity Choice

The preceding partial adjustment section uses continuous study. One may argue that this can arise regardless of firms actively taking into account the aggregated preferred leverage of institutions. So in this section I intend to test whether aggregated preferences of institutions matter when firms solely pay attention to firms that have taken financial actions that lead to significant changes in their leverage ratio.

I define significant changes following the literature on the threshold of 5%; that is if firms raises common equity, borrows straight debt, repurchases common equity, or retires straight debt from year $t-1$ to t in an amount that exceeds 5% of their total assets at the end of t.

Similar to the partial adjustment model, the debt-equity choice model also can be solved in one step or two steps. For brevity and for the special attributes of my interest variable, I adopt and report results for the two-step approach, though using the one-step approach does not alter the results qualitatively. The two-step model is as follows:

$$D_{i,t} = \alpha + \beta \overline{\overline{Lev}}^{k}_{i,t} + \lambda Lev_{i,t-1} + X_{i,t-1} \cdot \widehat{\Gamma} + \zeta_{i,t} \tag{3.12}$$

, where $Lev^{*}_{i,t} = X_{i,t-1} \cdot \widehat{\Gamma}$, is the same as indicated in equation 3.11, and Ws is a vector of variables in Hovakimian et al. (2001)'s second-stage regression, including net operating loss carry-forwards (NOLC), a dummy for missing NOLC, profitability, market-to-book ratios, a dummy for M/B>1, a dilution dummy. I also estimate the model by excluding all Ws as a robustness check, and the results are not affected either.

I estimate both the issuance and the reduction side of the model. Specifically, in the issuance regression, I compare equity issuance with debt issuance, both of which are aimed at raising money. $D_{i,t}$ is a dummy variable equal to 1 if firms issue debt, and 0 if firms issue equity; in the reduction regression, $D_{i,t}$ is a dummy variable equal to 1 if firms retire debt, and 0 if firms repurchase equity.

The essential difference to my interest is that equity issuance (debt reduction) will lead to a decrease in leverage, whereas debt issuance (equity repurchase) will lead to an increase in leverage. So if a firm concerns itself with the aggregated institutional preferred leverage ratio ($\overline{\overline{Lev}}^{k}_{i,t-1}$), when its leverage is lower than $\overline{\overline{Lev}}^{k}_{i,t-1}$, that is, the gap is positive, the firm should lean towards debt issuance over equity issuance to increase its leverage. In doing so, the firm reduces the gap when it needs funding, and choose a equity repurchase over debt reduction to increase its leverage in order to reduce the gap when it reduces external capital.

The target firm's leverage is estimated in the same way as in the partial adjustment section, and the same as the two-step approach in the partial adjustment model. The target firm's leverage, the aggregated preferred leverage of institutions, and book leverage enter the model separately. Year fixed effects and industry fixed effects are also included.

Tables 3.17 and 3.18 report the results for the issuance and reduction decisions,respectively.

Surprisingly, only the higher aggregated preferred leverage of the staying institutions leads to significantly more equity repurchase rather than debt reduction when firms reduce external capital. The aggregated preferred leverage of all, new, and liquidating institutions does not affect the debt-equity choice.

This seems quite unlikely at first glance as the aggregated preferred leverage is positively related to the continuous change in leverage. However, considering what I have found in Chapter 2, this actually may be driven by the fact that long- and mid-term institutions do not pay close attention to the level of leverage ratios, so their "preferred" leverage is an average of leverage ratios that are the results of their pecking order preference, not their preferred leverage. Thus looking into the aggregated preferred leverage of long-, mid-, and short-term institutions may help determine whether or not this is the reason.

Another surprise in this set of results is that, when controlling for other firm characteristics that may affect the debt-equity reduction choice, the target firm's leverage ($Lev^*_{i,t}$) is no longer relevant to the decision either. On the other side, if I use the deviation of firm leverage from target leverage ($Lev^*_{i,t} - Lev_{i,t-1}$), the deviation always will be significantly negative, which indicates that the significance of the deviation term comes from the book leverage itself, not the estimated target leverage. Although not the focus of my study, this proves what Hovakimian and Li (2011) documents: we can avoid getting spuriously significant estimates by separately entering the target leverage and the actual leverage into the model.

3.4 Institutions' Liquidation Choice

In this section, I study the institution-firm level instead of the firm level. This allows me to study whether the difference between an individual institution's preference and firm leverage would lead to higher probability of the institution's liquidation using the following logit model:

$$D_{Liq}{}^{i}_{k,t+1} = \alpha + \beta|\overline{Lev\_preferred}^{i}_{k,t} - Lev_{i,t}| + W_{i,t} \cdot \Theta + \epsilon^{i}_{k,t+1}. \quad (3.13)$$

Based on the model used in Yan and Zhang (2009) and Gompers and Metrick (2001), Ws include the following nine firm characteristics::

Market Capitalization : share price times total shares outstanding at the fiscal year end

Firm Age : the number of years since firm's first appearance in COMPUSTAT

Dividend Yield : cash dividend divided by share price at the end of the fiscal year

Market-to-Book : the sum of book value of debt and market capitalization, divided by total assets at the end of the fiscal year end

Price : fiscal-year-end price

Turnover : annual turnover calculated from CRSP daily stock return data

Volatility : standard deviation of daily returns over the previous year

One-year stock return : annual stock return calculated from the CRSP daily stock return

S&P 500: a dummy variable equal to one if the firm is included in the S&P 500, zero otherwise

Among these nine variables, market capitalization, firm age, price, and turnover come in the model in natural log forms since ownership is measured as a percentage. It is helpful to have other variables as percentages or in natural logs (Gompers and Metrick (2001)). Those nine firm characteristics can be roughly cut into three sets: first, to proxy for prudence, firm size, age, dividend yield, and stock volatility are used (Del Guercio (1996)). Second, to control for liquidity and transactions costs, firm size, share price, and stock turnover are used (Falkenstein (1996); Bennett et al. (2003)). Lastly, to control for future stock returns, past returns, market-to-book, and firm size are used (Fama and French (1992); Jegadeesh and Titman (1993)).

Table 3.19 reports the estimation results. Column(1) is the base model. Gompers and Metrick (2001) documents that institutions prefer firms with larger firms, higher price, and low past return. All these hold in Table 3.19 too, and these firms have lower probability of being liquidated.

Column (2) includes my interest variable, $|\overline{Lev\_preferred}^{i}_{k,t} - Lev_{i,t}|$, whose coefficient is positive. This means the larger difference, positive or negative, the more likely the firm is going to be liquidated. This is another piece of evidence that institutions have a heterogeneous preference for leverage ratio.

3.5 Conclusion

Institutions have heterogeneous preferences for leverage ratios. They invest in firms who match their preferences instead of requiring that firms adhere to their preferences.

I have presented several pieces of evidence. First, the aggregated preferred leverage of *new* institutions is positively related to the firm's leverage level, continuous change in leverage ratios, and significant change in leverage ratios in the *concurrent* year. Since it is impossible for the *new* institutions to affect the firm, the positive relationship only can be explained by institutions' choice of firms following in line with their preferences.

Second, the aggregated preferred leverage of *liquidating* institutions is not significantly related to the firm's continuous and significant change in leverage ratios in the concurrent year, whereas the aggregated preferred leverage of *staying* institutions is. Since firms are not able to fully predict which institutions are *staying* and which are *liquidating*, they cannot choose *staying* institutions only. Based on the results, institutions exit when a firm's financing decisions deviate from their preference.

Third, institution-firm-level data directly test institution's liquidation choices, and I find that institutions are more likely to liquidate a firm whose leverage is too far from the institutions' preferred leverage.

The measures used in this paper allow for a larger sample than those used in other institutional investor governance study and also can be extended to firm characteristics other than leverage to study the role of institutional investors in other corporate finance questions.

Table 3.1: Summary statistics of firm characteristics

The table reports summary statistics of firm characteristics. *Institutional Ownership* is fraction of shares outstanding owned by institutional investors in Thomson Financial 13F. Long-, Mid- and Short Institutional Ownership are defined in detail in the context. *Book Leverage* is book debt divided by total assets. *Market-to-book* is market equity plus book debt divided by total assets. *Firm age* is the number of years since the first appearance in Compustat. *Profitability* is annual operating income before depreciation divided by total assets. *Tangibility* is quarterly total (net) property, plant and equipment divided by total assets. *R&D* is quarterly research and development expenditures divided by total assets. *R&D dummy* is equal to zero if R&D is missing. NOLC is the net operating loss carryforwards scaled by the book value of assets. NOLC dummy is equla to zero if NOLC is missing. The dilution dummy is set to one when one minus the assumed tax rate times yield on Moody's Baa rated debt was less than a firm's after tax earning-price ratios.

	count	*mean*	*p5*	*p25*	*p50*	*p75*	*p95*
Total IO	114,637	0.368	0.011	0.114	0.320	0.594	0.868
Profitability	109,534	0.114	−0.220	0.053	0.131	0.207	0.361
M/B	113,470	1.857	0.770	1.051	1.405	2.127	4.616
Dummy for M/B>1	114,637	0.798	0.000	1.000	1.000	1.000	1.000
Tangibility	114,504	0.281	0.029	0.104	0.222	0.401	0.751
Firm Size	114,637	4.656	1.316	3.216	4.584	6.015	8.234
One-year Stock Return	103,249	0.127	−0.618	−0.239	0.048	0.371	1.195
R&D	112,413	0.058	0.000	0.000	0.000	0.051	0.262
R&D dummy	114,637	0.645	0.000	0.000	1.000	1.000	1.000
Firm age	114,637	16.246	2.000	6.000	12.000	23.000	44.000
Market Capitalization	114,549	1954.504	6.600	33.565	133.230	621.372	6411.501
Dividend Yield	113,274	0.008	0.000	0.000	0.000	0.010	0.041
Annual Turnover	101,754	13.042	1.429	4.210	8.578	17.278	40.859
Annual Volatility of Daily Return	104,925	0.581	0.221	0.350	0.504	0.728	1.224
NOLC	114,637	0.190	0.000	0.000	0.000	0.044	1.104
NOLC dummy	114,637	0.739	0.000	0.000	1.000	1.000	1.000
Dilution Dummy	113,490	0.389	0.000	0.000	0.000	1.000	1.000
Selling Expenses	104,089	0.309	0.055	0.139	0.239	0.384	0.794
Depreciation	110,550	0.052	0.013	0.030	0.045	0.065	0.117

Table 3.2: Summary statistics of firm-level aggregated preferred leverage

This table reports the descriptive statistics of leverage related variables used in this chapter. Detailed definitions are in the context in equations 3.2 through 3.5.

	count	mean	p5	p25	p50	p75	p95
$\overline{\overline{Lev}}^{k}_{i,t}$	98,491	0.215	0.171	0.195	0.214	0.233	0.260
$\overline{\overline{Lev}}^{k_{New}}_{i,t-1}$	92,561	0.215	0.167	0.194	0.214	0.235	0.266
$\overline{\overline{Lev}}^{k_{Liquidating}}_{i,t-1}$	58,475	0.214	0.156	0.191	0.211	0.234	0.278
$\overline{\overline{Lev}}^{k_{Staying}}_{i,t-1}$	87,601	0.215	0.170	0.195	0.214	0.233	0.260
$\overline{\overline{Lev}}^{k_{LIO}}_{i,t-1}$	90,347	0.215	0.170	0.195	0.216	0.235	0.260
$\overline{\overline{Lev}}^{k_{MIO}}_{i,t-1}$	90,759	0.212	0.165	0.191	0.211	0.231	0.262
$\overline{\overline{Lev}}^{k_{SIO}}_{i,t-1}$	85,853	0.217	0.167	0.196	0.215	0.235	0.272
$Lev_{i,t}$	98,682	0.223	0.000	0.043	0.193	0.344	0.600
$Lev^{*}_{i,t}$	90,119	0.234	0.008	0.100	0.217	0.333	0.542

Table 3.3: Correlations between firm-level aggregated preferred leverage

This table reports the correlations between leverage and firm-level aggregated preferred leverage variables used in this chapter. Detailed definitions are in the context in equations 3.2 through 3.5.

	$\overline{\overline{Lev}}_{i,t}^{k}$	$\overline{\overline{Lev}}_{i,t}^{k_{New}}$	$\overline{\overline{Lev}}_{i,t}^{k_{Liquidating}}$	$\overline{\overline{Lev}}_{i,t}^{k_{Sta}}$	$Lev_{i,t}$	$Lev_{i,t}^{*}$
$\overline{\overline{Lev}}_{i,t}^{k}$	1.0000					
$\overline{\overline{Lev}}_{i,t}^{k_{New}}$	0.7554	1.0000				
$\overline{\overline{Lev}}_{i,t}^{k_{Liquidating}}$	0.4638	0.3892	1.0000			
$\overline{\overline{Lev}}_{i,t}^{k_{Staying}}$	0.9605	0.5952	0.4579	1.0000		
$Lev_{i,t}$	0.2632	0.2490	0.1500	0.2459	1.0000	
$Lev_{i,t}^{*}$	0.2404	0.2184	0.1340	0.2271	0.7770	1.0000

Table 3.4: Summary statistics on the number of firms held by institutions over time

	count	mean	p5	p25	p50	p75	p95
1980	461	136	23	59	98	166	379
1981	487	138	21	58	98	165	402
1982	508	145	18	59.5	98.5	181	424
1983	565	155	18	58	101	191	467
1984	613	152	16	55	98	186	465
1985	676	155	14	51	96	180	487
1986	706	153	12	46	90.5	183	484
1987	754	165	15	50	95	201	503
1988	762	166	15	50	94.5	189	531
1989	802	164	12	48	94	185	532
1990	841	161	10	46	86	181	525
1991	864	171	13	47	90	197	554
1992	953	178	17	51	89	195	599
1993	903	191	14	52	92	194	642
1994	989	193	16	49	90	193	672
1995	1,126	197	15	48	89	190	718
1996	1,125	199	15	49	90	194	757
1997	1,257	202	12	47	90	179	794
1998	1,410	197	10	46	85	173	803
1999	1,473	207	9	45	86	188	880
2000	1,647	200	7	41	78	171	815
2001	1,520	207	9.5	42	77	173	924
2002	1,466	204	8	40	76	170	927
2003	1,402	221	10	43	80.5	191	1,062
2004	1,588	216	7	38	76	175	1,133
2005	1,797	196	7	34	70	162	893
2006	2,041	185	5	29	62	146	838
2007	2,306	171	4	26	59	138	748
2008	2,298	163	3	22	54.5	131	741
2009	2,248	167	4	26	59	139	717
2010	2,420	159	3.5	25	57	133	691
2011	2,565	150	3	23	53	126	657
2012	2,561	150	2	20	52	126	646
2013	2,980	148	2	21	53	128	632
2014	2,894	113	2	18	43	99	486

Table 3.5: Summary statistics on the number of institutions a firm is held by over time

	count	mean	p5	p25	p50	p75	p95
1980	1,096	44.9	1	5	18	55	195
1981	1,607	35.6	1	3	11	39	161
1982	1,760	36	1	4	12	39	166
1983	2,097	36.3	1	5	13	38	165
1984	2,118	38.2	1	5	13	40	172
1985	2,158	42.7	1	6	16	44	195
1986	2,302	41.1	1	6	16	42	187
1987	2,437	45.1	2	6	16	45	208
1988	2,298	47.2	2	7	17	48	221
1989	2,368	50.3	1	7	20	52	225
1990	2,257	52.5	2	8	21	57	223
1991	2,480	52.1	2	9	22	56	218
1992	2,660	55.4	2	10	23	59	229
1993	3,219	50.1	2	9	22	53	202
1994	3,246	52.4	2	10	23	58	205
1995	3,360	58.3	3	11	27	64	217
1996	3,917	52.8	2	9	24	57	203
1997	3,895	58.6	2	10	27	67	214
1998	3,723	66.8	3	11	31	79	234
1999	3,599	76.2	3	13	38	92	272
2000	3,514	86.4	4	16	45	104	302
2001	3,078	93.6	4	18	55	116	319
2002	2,842	96.9	5	20	62	119	321
2003	2,761	101	4	22	70	128	319
2004	2,759	109	6	27	76	138	345
2005	2,701	113	6	27	74	143	365
2006	2,527	125	8	31	82	156	408
2007	2,385	134	8	29	81	162	453
2008	2,419	136	8	35	89	163	439
2009	2,320	141	8	38.5	93.5	168	451
2010	2,274	150	9	45	97	176	488
2011	2,145	160	10	46	99	189	513
2012	2,115	161	9	49	103	191	519
2013	2,263	182	11	58	117	211	584
2014	1,976	180	12	52	113	201	609

Table 3.6: Determinants of Book Leverage: $\overline{\overline{Lev}}_{i,t}^{k}$

Regression results of specification 3.6 and 3.7 for aggregated preferred leverage of all institutions($\overline{\overline{Lev}}_{i,t}^{k}$). Column (1) and (2) report results using pooled OLS, and column (3) and (4) report results using panel regression with firm fixed effect and column (5) and (6) report results using Fama-Macbeth. In column (1), (3) and (5), the dependent variable and independent variables are contemporaneous, i.e. specification 3.6, in column (2), (4) and (6), the independent variables are lagged one period of the dependent variable, i.e. specification 3.7. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level in Column (1) to (4). Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Pooled OLS		Panel with Firm FE		Fama-Macbeth	
Book Leverage	$Lev_{i,t}$	$Lev_{i,t+1}$	$Lev_{i,t}$	$Lev_{i,t+1}$	$Lev_{i,t}$	$Lev_{i,t+1}$
$\overline{\overline{Lev}}_{i,t}^{k}$	0.983***	0.936***	0.511***	0.471***	1.013***	0.964***
	(0.019)	(0.021)	(0.028)	(0.030)	(0.061)	(0.070)
Firm Size	0.011***	0.011***	0.015***	0.015***	0.012***	0.012***
	(0.000)	(0.000)	(0.002)	(0.002)	(0.002)	(0.002)
M/B	−0.012***	−0.011***	−0.005***	−0.003***	−0.011***	−0.011***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tangibility	0.190***	0.184***	0.140***	0.116***	0.186***	0.178***
	(0.003)	(0.004)	(0.014)	(0.014)	(0.009)	(0.008)
R&D	−0.163***	−0.169***	−0.041**	−0.041**	−0.199***	−0.206***
	(0.008)	(0.009)	(0.018)	(0.019)	(0.026)	(0.026)
R&D dummy	−0.039***	−0.040***	−0.012**	−0.013**	−0.038***	−0.039***
	(0.001)	(0.001)	(0.005)	(0.005)	(0.002)	(0.002)
Selling Expenses	−0.066***	−0.057***	−0.050***	−0.032***	−0.046***	−0.037***
	(0.004)	(0.004)	(0.011)	(0.011)	(0.007)	(0.007)
Profitability	−0.232***	−0.209***	−0.190***	−0.138***	−0.248***	−0.231***
	(0.005)	(0.005)	(0.008)	(0.008)	(0.015)	(0.015)
Depreciation/Total	0.157***	0.134***	0.546***	0.426***	0.189***	0.193***
Assets	(0.023)	(0.024)	(0.046)	(0.048)	(0.050)	(0.052)
One-year Stock	−0.006***	−0.007***	−0.009***	−0.011***	−0.006	−0.005
Return	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.003)
R^2	0.194	0.175	0.170	0.148	0.208	0.191
No. of Obs.	91315	85808	91315	85808	91315	85808

Table 3.7: Determinants of Book Leverage: $\overline{\overline{Lev}}_{i,t}^{k_{New}}$

Regression results of specification 3.6 and 3.7 for aggregated preferred leverage of new institutions ($\overline{\overline{Lev}}_{i,t}^{k_{New}}$). Column (1) and (2) report results using pooled OLS, and column (3) and (4) report results using panel regression with firm fixed effect and column (5) and (6) report results using Fama-Macbeth. In column (1), (3) and (5), the dependent variable and independent variables are contemporaneous, i.e. specification 3.6, in column (2), (4) and (6), the independent variables are lagged one period of the dependent variable, i.e. specification 3.7. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level in Column (1) to (4). Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Pooled OLS		Panel with Firm FE		Fama-Macbeth	
Book Leverage	$Lev_{i,t}$	$Lev_{i,t+1}$	$Lev_{i,t}$	$Lev_{i,t+1}$	$Lev_{i,t}$	$Lev_{i,t+1}$
$\overline{\overline{Lev}}_{i,t}^{k_{New}}$	0.738***	0.721***	0.334***	0.323***	0.652***	0.632***
	(0.018)	(0.019)	(0.018)	(0.019)	(0.047)	(0.053)
Firm Size	0.012***	0.011***	0.014***	0.015***	0.013***	0.012***
	(0.000)	(0.000)	(0.002)	(0.002)	(0.002)	(0.002)
M/B	−0.013***	−0.012***	−0.006***	−0.003***	−0.012***	−0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tangibility	0.188***	0.184***	0.129***	0.110***	0.186***	0.179***
	(0.003)	(0.004)	(0.014)	(0.014)	(0.008)	(0.007)
R&D	−0.159***	−0.166***	−0.032*	−0.038**	−0.198***	−0.208***
	(0.009)	(0.009)	(0.019)	(0.020)	(0.027)	(0.026)
R&D dummy	−0.042***	−0.043***	−0.012**	−0.013**	−0.040***	−0.042***
	(0.001)	(0.001)	(0.005)	(0.005)	(0.002)	(0.002)
Selling Expenses	−0.061***	−0.052***	−0.052***	−0.031***	−0.040***	−0.030***
	(0.004)	(0.004)	(0.011)	(0.012)	(0.006)	(0.007)
Profitability	−0.232***	−0.207***	−0.189***	−0.137***	−0.253***	−0.233***
	(0.005)	(0.006)	(0.008)	(0.009)	(0.016)	(0.016)
Depreciation/Total	0.179***	0.146***	0.563***	0.437***	0.198***	0.192***
Assets	(0.023)	(0.025)	(0.048)	(0.049)	(0.051)	(0.053)
One-year Stock	−0.002**	−0.003***	−0.008***	−0.010***	−0.002	−0.001
Return	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.003)
R^2	0.191	0.174	0.168	0.147	0.205	0.190
No. of Obs.	85518	80469	85518	80469	85518	80469

Table 3.8: Determinants of Book Leverage: $\overline{\overline{Lev}}_{i,t}^{k_{Staying}}$

Regression results of specification 3.6 and 3.7 for aggregated preferred leverage of new institutions ($\overline{\overline{Lev}}_{i,t}^{k_{Staying}}$). Column (1) and (2) report results using pooled OLS, and column (3) and (4) report results using panel regression with firm fixed effect and column (5) and (6) report results using Fama-Macbeth. In column (1), (3) and (5), the dependent variable and independent variables are contemporaneous, i.e. specification 3.6, in column (2), (4) and (6), the independent variables are lagged one period of the dependent variable, i.e. specification 3.7. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level in Column (1) to (4). Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Pooled OLS		Panel with Firm FE		Fama-Macbeth	
Book Leverage	$Lev_{i,t}$	$Lev_{i,t+1}$	$Lev_{i,t}$	$Lev_{i,t+1}$	$Lev_{i,t}$	$Lev_{i,t+1}$
$\overline{\overline{Lev}}_{i,t}^{k_{Staying}}$	0.913***	0.865***	0.462***	0.427***	0.913***	0.857***
	(0.019)	(0.020)	(0.027)	(0.029)	(0.052)	(0.058)
Firm Size	0.013***	0.013***	0.015***	0.015***	0.014***	0.013***
	(0.000)	(0.000)	(0.002)	(0.002)	(0.002)	(0.002)
M/B	−0.013***	−0.012***	−0.005***	−0.003***	−0.011***	−0.011***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tangibility	0.186***	0.180***	0.129***	0.103***	0.185***	0.177***
	(0.003)	(0.004)	(0.015)	(0.015)	(0.008)	(0.007)
R&D	−0.157***	−0.162***	−0.037**	−0.043**	−0.208***	−0.212***
	(0.009)	(0.009)	(0.019)	(0.020)	(0.027)	(0.026)
R&D dummy	−0.041***	−0.042***	−0.012**	−0.013**	−0.039***	−0.039***
	(0.001)	(0.001)	(0.005)	(0.005)	(0.002)	(0.002)
Selling Expenses	−0.060***	−0.053***	−0.048***	−0.030**	−0.039***	−0.033***
	(0.004)	(0.004)	(0.011)	(0.012)	(0.007)	(0.007)
Profitability	−0.232***	−0.209***	−0.190***	−0.138***	−0.256***	−0.237***
	(0.005)	(0.006)	(0.008)	(0.009)	(0.018)	(0.016)
Depreciation/Total	0.181***	0.164***	0.557***	0.434***	0.208***	0.215***
Assets	(0.023)	(0.025)	(0.048)	(0.049)	(0.049)	(0.050)
One-year Stock	−0.008***	−0.009***	−0.010***	−0.011***	−0.007*	−0.006*
Return	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.003)
R^2	0.196	0.177	0.174	0.153	0.208	0.192
No. of Obs.	85666	80552	85666	80552	85666	80552

Table 3.9: Determinants of Book Leverage: $\overline{\overline{Lev}}_{i,t}^{k_{Liquidating}}$

Regression results of specification 3.6 and 3.7 for aggregated preferred leverage of new institutions ($\overline{\overline{Lev}}_{i,t}^{k_{Liquidating}}$). Column (1) and (2) report results using pooled OLS, and column (3) and (4) report results using panel regression with firm fixed effect and column (5) and (6) report results using Fama-Macbeth. In column (1), (3) and (5), the dependent variable and independent variables are contemporaneous, i.e. specification 3.6, in column (2), (4) and (6), the independent variables are lagged one period of the dependent variable, i.e. specification 3.7. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level in Column (1) to (4). Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Pooled OLS		Panel with Firm FE		Fama-Macbeth	
Book Leverage	$Lev_{i,t}$	$Lev_{i,t+1}$	$Lev_{i,t}$	$Lev_{i,t+1}$	$Lev_{i,t}$	$Lev_{i,t+1}$
$\overline{\overline{Lev}}_{i,t}^{k_{Liquidating}}$	0.400***	0.369***	0.184***	0.159***	0.275***	0.257***
	(0.018)	(0.019)	(0.015)	(0.016)	(0.041)	(0.033)
Firm Size	0.017***	0.016***	0.014***	0.015***	0.015***	0.015***
	(0.000)	(0.000)	(0.002)	(0.002)	(0.002)	(0.002)
M/B	−0.015***	−0.014***	−0.007***	−0.004***	−0.015***	−0.015***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Tangibility	0.179***	0.178***	0.063***	0.055***	0.186***	0.182***
	(0.004)	(0.004)	(0.017)	(0.017)	(0.010)	(0.008)
R&D	−0.140***	−0.140***	−0.017	−0.040*	−0.248***	−0.252***
	(0.010)	(0.011)	(0.023)	(0.024)	(0.043)	(0.046)
R&D dummy	−0.048***	−0.049***	−0.006	−0.006	−0.042***	−0.043***
	(0.002)	(0.002)	(0.006)	(0.006)	(0.003)	(0.003)
Selling Expenses	−0.041***	−0.034***	−0.058***	−0.024*	−0.013	−0.008
	(0.005)	(0.005)	(0.014)	(0.014)	(0.008)	(0.008)
Profitability	−0.232***	−0.203***	−0.194***	−0.130***	−0.264***	−0.233***
	(0.007)	(0.007)	(0.011)	(0.011)	(0.018)	(0.016)
Depreciation/Total	0.242***	0.202***	0.598***	0.427***	0.252***	0.220***
Assets	(0.029)	(0.030)	(0.061)	(0.062)	(0.050)	(0.055)
One-year Stock	−0.008***	−0.009***	−0.011***	−0.014***	−0.005	−0.005
Return	(0.002)	(0.002)	(0.001)	(0.001)	(0.005)	(0.004)
R^2	0.196	0.178	0.168	0.146	0.219	0.200
No. of Obs.	57312	54059	57312	54059	57312	54059

Table 3.10: Partial Adjustment Model: $\overline{\overline{Lev}}^{k}_{i,t}$

Regression results of specification 3.8 and 3.9 for aggregated preferred leverage of all institutions($\overline{\overline{Lev}}^{k}_{i,t}$). Column (1) and (2) report results using pooled OLS, and column (3) and (4) report results using panel regression with firm fixed effect and column (5) and (6) report results using Fama-Macbeth. In column (1), (3) and (5), the independent variables exclude $\overline{\overline{Lev}}^{k}_{i,t}$, i.e. specification 3.8, in column (2), (4) and (6), the independent variables include $\overline{\overline{Lev}}^{k}_{i,t}$, i.e. specification 3.9. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level in Column (1) to (4). Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Pooled OLS		Panel with Firm FE		Fama-Macbeth	
$\overline{\overline{Lev}}^{k}_{i,t}$		0.087***		0.129***		0.074***
		(0.011)		(0.016)		(0.021)
$Lev_{i,t-1}$	0.881***	0.879***	0.667***	0.663***	0.880***	0.878***
	(0.002)	(0.002)	(0.005)	(0.005)	(0.006)	(0.006)
Firm Size	0.001***	0.001***	0.005***	0.006***	0.001**	0.001**
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
M/B	0.001*	0.001**	0.001**	0.001**	−0.000	−0.000
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
Tangibility	0.020***	0.020***	0.026***	0.026***	0.019***	0.019***
	(0.002)	(0.002)	(0.007)	(0.007)	(0.003)	(0.003)
R&D	−0.042***	−0.039***	−0.024**	−0.023*	−0.043***	−0.042***
	(0.005)	(0.005)	(0.012)	(0.012)	(0.010)	(0.009)
R&D dummy	−0.008***	−0.008***	−0.005**	−0.005**	−0.007***	−0.007***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Selling Expenses	0.004	0.004	0.006	0.006	0.005	0.005
	(0.002)	(0.002)	(0.007)	(0.007)	(0.003)	(0.003)
Profitability	−0.024***	−0.022***	−0.022***	−0.020***	−0.032***	−0.031***
	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)
Depreciation	0.037***	0.036***	0.084***	0.078***	0.051**	0.051**
	(0.013)	(0.013)	(0.028)	(0.028)	(0.021)	(0.020)
One-year Stock	−0.004***	−0.004***	−0.006***	−0.006***	−0.002**	−0.002**
Return	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
R^2	0.761	0.762	0.757	0.757	0.767	0.767
No. of Obs.	85957	85808	85957	85808	85957	85808

Table 3.11: Partial Adjustment Model: $\overline{\overline{Lev}}_{i,t}^{k_{New}}$

Regression results of specification 3.8 and 3.9 for aggregated preferred leverage of new institutions ($\overline{\overline{Lev}}_{i,t}^{k_{New}}$). Column (1) and (2) report results using pooled OLS, and column (3) and (4) report results using panel regression with firm fixed effect and column (5) and (6) report results using Fama-Macbeth. In column (1), (3) and (5), the independent variables exclude $\overline{\overline{Lev}}_{i,t}^{k}$, i.e. specification 3.8, in column (2), (4) and (6), the independent variables include $\overline{\overline{Lev}}_{i,t}^{k}$, i.e. specification 3.9. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level in Column (1) to (4). Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Pooled OLS		Panel with Firm FE		Fama-Macbeth	
$\overline{\overline{Lev}}_{i,t}^{k_{New}}$		0.080***		0.096***		0.055***
		(0.010)		(0.012)		(0.017)
$Lev_{i,t-1}$	0.881***	0.880***	0.667***	0.668***	0.880***	0.879***
	(0.002)	(0.002)	(0.005)	(0.006)	(0.006)	(0.006)
Firm Size	0.001***	0.001***	0.005***	0.006***	0.001**	0.001**
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
M/B	0.001*	0.001*	0.001**	0.001**	−0.000	−0.000
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
Tangibility	0.020***	0.021***	0.026***	0.026***	0.019***	0.019***
	(0.002)	(0.002)	(0.007)	(0.007)	(0.003)	(0.003)
R&D	−0.042***	−0.041***	−0.024**	−0.026**	−0.043***	−0.044***
	(0.005)	(0.005)	(0.012)	(0.012)	(0.010)	(0.009)
R&D dummy	−0.008***	−0.008***	−0.005**	−0.005**	−0.007***	−0.008***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Selling Expenses	0.004	0.005**	0.006	0.009	0.005	0.007*
	(0.002)	(0.002)	(0.007)	(0.007)	(0.003)	(0.004)
Profitability	−0.024***	−0.021***	−0.022***	−0.018***	−0.032***	−0.030***
	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)
Depreciation	0.037***	0.033**	0.084***	0.077***	0.051**	0.046**
	(0.013)	(0.013)	(0.028)	(0.028)	(0.021)	(0.021)
One-year Stock	−0.004***	−0.004***	−0.006***	−0.006***	−0.002**	−0.002*
Return	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
R^2	0.761	0.765	0.757	0.761	0.767	0.769
No. of Obs.	85957	80469	85957	80469	85957	80469

Table 3.12: Partial Adjustment Model: $\overline{\overline{Lev}}_{i,t}^{k_{Staying}}$

Regression results of specification 3.8 and 3.9 for aggregated preferred leverage of new institutions ($\overline{\overline{Lev}}_{i,t}^{k_{Staying}}$). Column (1) and (2) report results using pooled OLS, and column (3) and (4) report results using panel regression with firm fixed effect and column (5) and (6) report results using Fama-Macbeth. In column (1), (3) and (5), the independent variables exclude $\overline{\overline{Lev}}_{i,t}^{k}$, i.e. specification 3.8, in column (2), (4) and (6), the independent variables include $\overline{\overline{Lev}}_{i,t}^{k}$, i.e. specification 3.9. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level in Column (1) to (4). Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Pooled OLS		Panel with Firm FE		Fama-Macbeth	
$\overline{\overline{Lev}}_{i,t}^{k_{Staying}}$		0.080***		0.121***		0.066***
		(0.011)		(0.016)		(0.016)
$Lev_{i,t-1}$	0.881***	0.879***	0.667***	0.664***	0.880***	0.878***
	(0.002)	(0.002)	(0.005)	(0.006)	(0.006)	(0.006)
Firm Size	0.001***	0.001***	0.005***	0.006***	0.001**	0.001***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
M/B	0.001*	0.001**	0.001**	0.001**	−0.000	−0.000
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)
Tangibility	0.020***	0.019***	0.026***	0.020***	0.019***	0.018***
	(0.002)	(0.002)	(0.007)	(0.007)	(0.003)	(0.003)
R&D	−0.042***	−0.037***	−0.024**	−0.026**	−0.043***	−0.041***
	(0.005)	(0.005)	(0.012)	(0.012)	(0.010)	(0.010)
R&D dummy	−0.008***	−0.008***	−0.005**	−0.005**	−0.007***	−0.007***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Selling Expenses	0.004	0.003	0.006	0.007	0.005	0.003
	(0.002)	(0.002)	(0.007)	(0.007)	(0.003)	(0.004)
Profitability	−0.024***	−0.022***	−0.022***	−0.020***	−0.032***	−0.030***
	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)
Depreciation	0.037***	0.047***	0.084***	0.079***	0.051**	0.062***
	(0.013)	(0.013)	(0.028)	(0.029)	(0.021)	(0.020)
One-year Stock	−0.004***	−0.004***	−0.006***	−0.006***	−0.002**	−0.003**
Return	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
R^2	0.761	0.765	0.757	0.761	0.767	0.770
No. of Obs.	85957	80552	85957	80552	85957	80552

Table 3.13: Partial Adjustment Model: $\overline{\overline{Lev}}_{i,t}^{k_{Liquidating}}$

Regression results of specification 3.8 and 3.9 for aggregated preferred leverage of new institutions ($\overline{\overline{Lev}}_{i,t}^{k_{Liquidating}}$). Column (1) and (2) report results using pooled OLS, and column (3) and (4) report results using panel regression with firm fixed effect and column (5) and (6) report results using Fama-Macbeth. In column (1), (3) and (5), the independent variables exclude $\overline{\overline{Lev}}_{i,t}^{k}$, i.e. specification 3.8, in column (2), (4) and (6), the independent variables include $\overline{\overline{Lev}}_{i,t}^{k}$, i.e. specification 3.9. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level in Column (1) to (4). Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Pooled OLS		Panel with Firm FE		Fama-Macbeth	
$\overline{\overline{Lev}}_{i,t}^{k_{Liquidating}}$		0.023**		0.033***		0.013
		(0.010)		(0.011)		(0.015)
$Lev_{i,t-1}$	0.881***	0.889***	0.667***	0.685***	0.880***	0.883***
	(0.002)	(0.002)	(0.005)	(0.006)	(0.006)	(0.007)
Firm Size	0.001***	0.001***	0.005***	0.006***	0.001**	0.001**
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
M/B	0.001*	0.001*	0.001**	0.001	−0.000	−0.000
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)
Tangibility	0.020***	0.020***	0.026***	0.017**	0.019***	0.018***
	(0.002)	(0.002)	(0.007)	(0.008)	(0.003)	(0.003)
R&D	−0.042***	−0.031***	−0.024**	−0.030*	−0.043***	−0.048***
	(0.005)	(0.006)	(0.012)	(0.016)	(0.010)	(0.014)
R&D dummy	−0.008***	−0.008***	−0.005**	−0.002	−0.007***	−0.006***
	(0.001)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)
Selling Expenses	0.004	0.004	0.006	0.014*	0.005	0.004
	(0.002)	(0.003)	(0.007)	(0.008)	(0.003)	(0.004)
Profitability	−0.024***	−0.015***	−0.022***	−0.006	−0.032***	−0.019***
	(0.003)	(0.004)	(0.005)	(0.007)	(0.005)	(0.005)
Depreciation	0.037***	0.048***	0.084***	0.034	0.051**	0.045*
	(0.013)	(0.016)	(0.028)	(0.036)	(0.021)	(0.026)
One-year Stock	−0.004***	−0.005***	−0.006***	−0.008***	−0.002**	−0.004**
Return	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
R^2	0.761	0.779	0.757	0.775	0.767	0.778
No. of Obs.	85957	54059	85957	54059	85957	54059

Table 3.14: Partial Adjustment Model: 2nd stage

Regression results of specification 3.10, 2nd stage of partial adjustment model, for aggregated preferred leverage of all, new, staying and liquidating institutions. All columns are estimated using Fama-Macbeth. Standard errors are reported in parentheses. Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Dep. Var.		$Lev_{i,t} - Lev_{i,t-1}$		
$\overline{\overline{Lev}}^{k}_{i,t}$	0.102***			
	(0.017)			
$\overline{\overline{Lev}}^{k_{New}}_{i,t}$		0.114***		
		(0.016)		
$\overline{\overline{Lev}}^{k_{Staying}}_{i,t}$			0.074***	
			(0.016)	
$\overline{\overline{Lev}}^{k_{Liquidating}}_{i,t}$				0.009
				(0.014)
$Lev^{*}_{i,t}$	0.378***	0.373***	0.359***	0.326***
	(0.020)	(0.019)	(0.019)	(0.019)
$Lev_{i,t-1}$	−0.381***	−0.378***	−0.362***	−0.332***
	(0.018)	(0.017)	(0.017)	(0.016)
R^2	0.188	0.187	0.173	0.157
No. of Obs.	89736	84067	83946	56237

Table 3.15: Partial Adjustment Model: 2nd stage, sort on the Difference between Firm Target and Institutional Preferred Leverage

Regression results of specification 3.10, 2nd stage of partial adjustment model, for aggregated preferred leverage of all, new, staying and liquidating institutions. I calculate ($Lev^*_{i,t} - \overline{\overline{Lev}}^k_{i,t-1}$/ $\overline{\overline{Lev}}^{k_{New}}_{i,t-1}$/ $\overline{\overline{Lev}}^{k_{Staying}}_{i,t-1}$ / $\overline{\overline{Lev}}^{k_{Liquidating}}_{i,t-1}$), sort them into two groups within both negative and positive values. Column (1)/(2)/(3)/(4) in order reports from the group with the most negative difference to the group with the most positive difference. All columns are estimated using Fama-Macbeth. Standard errors are reported in parentheses. Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Dep. Var.		$Lev_{i,t} - Lev_{i,t-1}$		
Panel A: Preferred Leverage Calculated using All Institutions				
$\overline{\overline{Lev}}^k_{i,t}$	0.041*	0.146***	0.178***	0.106***
	(0.023)	(0.037)	(0.047)	(0.029)
$Lev^*_{i,t}$	0.500***	0.305***	0.291***	0.465***
	(0.022)	(0.028)	(0.028)	(0.025)
$Lev_{i,t-1}$	−0.468***	−0.342***	−0.329***	−0.429***
	(0.019)	(0.017)	(0.018)	(0.022)
R^2	0.240	0.159	0.159	0.228
No. of Obs.	22296	22301	22619	22520
Panel B: Preferred Leverage Calculated using New Institutions				
$\overline{\overline{Lev}}^{k_{New}}_{i,t}$	0.052***	0.161***	0.174***	0.096**
	(0.016)	(0.028)	(0.031)	(0.038)
$Lev^*_{i,t}$	0.495***	0.307***	0.263***	0.463***
	(0.019)	(0.022)	(0.026)	(0.023)
$Lev_{i,t-1}$	−0.452***	−0.354***	−0.320***	−0.427***
	(0.020)	(0.018)	(0.018)	(0.021)
R^2	0.231	0.166	0.152	0.229
No. of Obs.	21141	21145	20937	20844

(to be continued)

Table 3.15 (continued)

	(1)	(2)	(3)	(4)
Dep. Var.		$Lev_{i,t} - Lev_{i,t-1}$		
Panel C: Preferred Leverage Calculated using Staying Institutions				
$\overline{\overline{Lev}}_{i,t}^{k_{Staying}}$	0.004	0.128***	0.119**	0.104***
	(0.028)	(0.037)	(0.047)	(0.030)
$Lev^*_{i,t}$	0.473***	0.298***	0.256***	0.440***
	(0.024)	(0.032)	(0.034)	(0.024)
$Lev_{i,t-1}$	−0.442***	−0.331***	−0.310***	−0.408***
	(0.018)	(0.018)	(0.018)	(0.021)
R^2	0.217	0.153	0.149	0.212
No. of Obs.	21176	21165	20843	20762
Panel D: Preferred Leverage Calculated using Liquidating Institutions				
$\overline{\overline{Lev}}_{i,t}^{k_{Liquidating}}$	0.019	0.010	0.008	0.023
	(0.027)	(0.030)	(0.035)	(0.031)
$Lev^*_{i,t}$	0.421***	0.273***	0.249***	0.408***
	(0.024)	(0.029)	(0.034)	(0.026)
$Lev_{i,t-1}$	−0.371***	−0.302***	−0.284***	−0.384***
	(0.021)	(0.017)	(0.017)	(0.020)
R^2	0.181	0.137	0.137	0.200
No. of Obs.	14486	14487	13654	13610

Table 3.16: Partial Adjustment Model: 2nd stage,in the presence of disagreement between Firm Target and Institutional Preferred Leverage

Regression results of specification 3.10, 2nd stage of partial adjustment model, for aggregated preferred leverage of all, new, staying and liquidating institutions. Column (1)/(2)/(3)/(4) respectively only include the firms whose leverage ratio is between $\overline{\overline{Lev}}^{k}_{i,t-1}$/ $\overline{\overline{Lev}}^{k_{New}}_{i,t-1}$/ $\overline{\overline{Lev}}^{k_{Staying}}_{i,t-1}$/ $\overline{\overline{Lev}}^{k_{Liquidating}}_{i,t-1}$ and $Lev^*_{i,t}$. All columns are estimated using Fama-Macbeth. Standard errors are reported in parentheses. Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Dep. Var.		$Lev_{i,t} - Lev_{i,t-1}$		
$\overline{\overline{Lev}}^{k}_{i,t}$	−0.005			
	(0.028)			
$\overline{\overline{Lev}}^{k_{New}}_{i,t}$		0.018		
		(0.021)		
$\overline{\overline{Lev}}^{k_{Staying}}_{i,t}$			−0.019	
			(0.033)	
$\overline{\overline{Lev}}^{k_{Liquidating}}_{i,t}$				−0.009
				(0.023)
$Lev^*_{i,t}$	0.420***	0.413***	0.353***	0.305***
	(0.028)	(0.028)	(0.025)	(0.023)
$Lev_{i,t-1}$	−0.417***	−0.411***	−0.351***	−0.302***
	(0.029)	(0.029)	(0.026)	(0.024)
R^2	0.138	0.137	0.099	0.083
No. of Obs.	24184	22846	21107	13979

Table 3.17: Debt-Equity Issuance Choice

Logit regression results of specification 3.12. Dependent variable is $DI_{i,t}$, a dummy variable equal to 1 if firms issue debt, and 0 if firms issue equity. Column (1), (2), (3) and (4) report results respectively with aggregated preferred leverage of all, new, staying and liquidating institutions. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level. Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(to be continued)

Table 3.17 (continued)

	(1)	(2)	(3)	(4)
	$DI_{i,t}$; Debt (1) vs. Equity (0) Issuance			
$\overline{\overline{Lev}}_{i,t}^{k}$	5.323∗∗∗			
	(0.918)			
$\overline{\overline{Lev}}_{i,t}^{k_{New}}$		5.144∗∗∗		
		(0.781)		
$\overline{\overline{Lev}}_{i,t}^{k_{Staying}}$			2.190∗∗∗	
			(0.820)	
$\overline{\overline{Lev}}_{i,t}^{k_{Liquidating}}$				1.111
				(0.756)
Firm Size	0.190∗∗∗	0.228∗∗∗	0.195∗∗∗	0.271∗∗∗
	(0.015)	(0.016)	(0.015)	(0.020)
M/B	−0.264∗∗∗	−0.261∗∗∗	−0.275∗∗∗	−0.241∗∗∗
	(0.023)	(0.025)	(0.024)	(0.030)
Tangibility	0.632∗∗∗	0.662∗∗∗	0.636∗∗∗	0.781∗∗∗
	(0.146)	(0.151)	(0.149)	(0.198)
R&D	−2.548∗∗∗	−2.509∗∗∗	−2.622∗∗∗	−2.610∗∗∗
	(0.405)	(0.412)	(0.417)	(0.528)
R&D dummy	0.002	−0.011	−0.010	−0.064
	(0.055)	(0.057)	(0.056)	(0.075)
Selling Expenses	−0.370 ∗ ∗	−0.293∗	−0.324 ∗ ∗	−0.118
	(0.148)	(0.152)	(0.150)	(0.192)
Profitability	1.263∗∗∗	1.293∗∗∗	1.344∗∗∗	1.299∗∗∗
	(0.187)	(0.197)	(0.194)	(0.266)
Depreciation/Total Assets	−2.990∗∗∗	−2.766∗∗∗	−3.239∗∗∗	−3.166∗∗∗
	(0.796)	(0.828)	(0.812)	(1.062)
One-year Stock Return	−0.289∗∗∗	−0.291∗∗∗	−0.296∗∗∗	−0.390∗∗∗
	(0.037)	(0.038)	(0.038)	(0.050)
Book Leverage	−1.729∗∗∗	−1.709∗∗∗	−1.676∗∗∗	−1.683∗∗∗
	(0.125)	(0.129)	(0.126)	(0.166)
Dummy for M/B>1	−0.179∗∗∗	−0.136 ∗ ∗	−0.182∗∗∗	0.157∗
	(0.065)	(0.068)	(0.066)	(0.090)
Dilution Dummy	0.534∗∗∗	0.539∗∗∗	0.542∗∗∗	0.648∗∗∗
	(0.050)	(0.051)	(0.051)	(0.067)
NOLC	−0.238∗∗∗	−0.238∗∗∗	−0.224∗∗∗	−0.222∗∗∗
	(0.042)	(0.046)	(0.043)	(0.061)
NOLC dummy	0.108 ∗ ∗	0.104 ∗ ∗	0.111 ∗ ∗	0.095
	(0.049)	(0.051)	(0.050)	(0.065)
Pseudo R^2	0.213	0.222	0.213	0.237
No. of Obs.	18936	17672	18429	11712

Table 3.18: Debt-Equity Reduction Choice

Logit regression results of specification 3.12. Dependent variable is $DR_{i,t}$, a dummy variable equal to 1 if firms retire debt, and 0 if firms repurchase equity. Column (1), (2), (3) and (4) report results respectively with aggregated preferred leverage of all, new, staying and liquidating institutions. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level. Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(to be continued)

Table 3.18 (continued)

	(1)	(2)	(3)	(4)
	$DR_{i,t}$; Debt (1) vs. Equity (0) Reduction			
$\overline{\overline{Lev}}_{i,t}^{k}$	−5.246***			
	(1.434)			
$\overline{\overline{Lev}}_{i,t}^{k_{New}}$		−4.440***		
		(1.099)		
$\overline{\overline{Lev}}_{i,t}^{k_{Staying}}$			−3.507**	
			(1.377)	
$\overline{\overline{Lev}}_{i,t}^{k_{Liquidating}}$				−0.842
				(0.870)
Firm Size	−0.369***	−0.375***	−0.368***	−0.393***
	(0.021)	(0.022)	(0.021)	(0.026)
M/B	−0.402***	−0.406***	−0.404***	−0.482***
	(0.041)	(0.043)	(0.042)	(0.054)
Tangibility	−1.143***	−1.181***	−1.141***	−1.191***
	(0.290)	(0.294)	(0.291)	(0.341)
R&D	−0.346	−0.339	−0.371	−0.105
	(0.607)	(0.619)	(0.618)	(0.734)
R&D dummy	0.045	0.048	0.044	0.117
	(0.085)	(0.087)	(0.086)	(0.101)
Selling Expenses	−1.621***	−1.592***	−1.599***	−1.506***
	(0.258)	(0.262)	(0.265)	(0.311)
Profitability	−4.352***	−4.249***	−4.290***	−3.871***
	(0.355)	(0.359)	(0.358)	(0.457)
Depreciation/Total	13.777***	13.372***	13.678***	14.433***
Assets	(1.721)	(1.740)	(1.726)	(2.070)
One-year Stock	0.296***	0.293***	0.284***	0.338***
Return	(0.060)	(0.062)	(0.061)	(0.073)
Book Leverage	9.863***	9.695***	9.800***	9.429***
	(0.366)	(0.367)	(0.366)	(0.402)
Dummy for M/B>1	−0.506***	−0.509***	−0.506***	−0.664***
	(0.089)	(0.091)	(0.089)	(0.112)
Dilution Dummy	−0.732***	−0.708***	−0.739***	−0.807***
	(0.065)	(0.066)	(0.065)	(0.075)
NOLC	0.243*	0.269*	0.240*	0.226
	(0.130)	(0.138)	(0.128)	(0.165)
NOLC dummy	−0.042	−0.054	−0.042	−0.071
	(0.077)	(0.078)	(0.077)	(0.087)
Pseudo R^2	0.468	0.460	0.466	0.458
No. of Obs.	14545	13390	14250	9356

Table 3.19: Institutions' Liquidation Choice

Logit regression results of specification 3.13. This regression is on institution-firm pair level. Dependent variable is $D_{Liq}{}_{k,t+1}^{i}$, a dummy variable equal to 1 if the institution liquidates the firm, and 0 if the institution stays as shareholders of the firm. Standard errors are reported in parentheses, and have been adjusted for heteroscedasticity and clustering at the firm level. Asterisks ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)		(2)	
Dep. Var.	Liquidate$^{i}_{k,t+1}$(1) vs. Stay$^{i}_{k,t+1}$(0)			
$\lvert \overline{Lev\_preferred}^{i}_{k,t} - Lev_{i,t} \rvert$			0.181∗∗∗	(0.042)
Log of Market Capitalization	−0.096∗∗∗	(0.007)	−0.095∗∗∗	(0.008)
Log of Firm age	−0.063∗∗∗	(0.007)	−0.062∗∗∗	(0.007)
Dividend Yield	−1.741∗∗∗	(0.383)	−1.760∗∗∗	(0.379)
M/B	−0.012∗∗∗	(0.004)	−0.014∗∗∗	(0.004)
Log of Fiscal Ending Price	−0.036∗∗∗	(0.010)	−0.032∗∗∗	(0.010)
Log of Annual Turnover	0.297∗∗∗	(0.009)	0.294∗∗∗	(0.009)
Annual Volatility of Daily Return	−0.023	(0.030)	−0.024	(0.030)
S&P 500	−0.147∗∗∗	(0.015)	−0.146∗∗∗	(0.015)
One-year Stock Return	0.065∗∗∗	(0.008)	0.065∗∗∗	(0.008)
Pseudo R^2	0.020		0.020	
No. of Obs.	4660284		4659217	

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