



TU-E1090 Research Assignment in Strategy and Venturing (5 cr)

The Effect of Long-term Institutional Shareholders on Acquisition Likelihood

Research report

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Submitted for feedback and guidance.

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Abstract

This paper presents a longitudinal study of large U.S. public firms to investigate the relationship between dedicated institutional shareholders and acquisition likelihood. Institutional shareholder classifications are used to distinguish dedicated from non-dedicated shareholders and evaluate the impact of dedicated shareholders specifically. An inverse relationship is discovered between dedicated institutional shareholder ownership and acquisition likelihood among the firms in the sample. The results are inline with the literature on M&A and dedicated institutional investors in that dedicated institutional investors aim to maximize the long-term financial performance of their firms and M&A have been found to erode firm value on average. However, while statistically significant, the effect of these shareholders on M&A activity is minute. As such the percentage of dedicated institutional shareholders does not make for a good predictor. This empirical work, while limited, contributes to the body of research and provides several avenues for future research.

Introduction

For the past few decades mergers and acquisitions (M&A) has aroused interest among researchers in several fields. The year 2015 set a new record for the estimated total value of M&A deals globally, roughly 5 871 billion U.S. dollars (Martin, 2016). Research around the topic has progressed a great deal over the years. Early research focused on the relationship between M&A activity and firm performance. Subsequent research has concentrated on the factors which lead M&As to failure or success. Finally later research has examined the antecedents of M&A activity. However, this literature focused on antecedents has not yet properly examined the relationship between dedicated institutional shareholders and acquisition likelihood. (Haleblian, 2009)

Porter (1992) defines institutional investors as pension funds, mutual funds and various financial managers. He points out that the importance of institutional shareholders is in their large aggregate holdings containing shares of several companies. Furthermore, he explains that a significant external attribute is the way in which company owners and their agents influence management behaviour in the firms whose shares they own.

Connelly et al. (2010) have explored the influence of dedicated institutional shareholders on companies' decisions. Their research explains the benefits of having institutional shareholders in the context of mergers and acquisitions. They claim that institutional shareholders are able to interact with each other as well as directly with the decision makers of a firm to influence strategic decisions to the specific ends. Moreover, they are also able to convince transient owners to pursue key strategic decisions such as M&A.

Also some other effects of institutional ownership have been well explored. For example Bushee (1998) claims that institutional ownership leads managers to pursue towards long-term benefits for the company. He concludes, based on the control variable, that there is an influence of institutional shareholders to company decision makers rather than vice versa. However, he also points out that there is difficulty in proving this influence due to the fact that much of the interaction relies on face-to-face meetings and other interpersonal exchanges from which no documentation is publicly available.

Motivated by the significance of institutional ownership (see Porter, 1992), the previously identified influences of institutional ownership (see f. ex. Connelly et al., 2010; Bushee, 1998), and the clear lack in the literature with respect to the influence of institutional shareholders on M&A activity, we formulate the following research question to address the research gap: How do long-term institutional shareholders affect acquisition likelihood? The theory section will describe the relevant literature on the topic in more detail and provides our hypothesis.

Theory

In this section we discuss relevant academic literature to set the grounds for the justification of a hypothesis that we define later in the section. The literature review below first examines literature on institutional ownership in general and then focuses on the literature related to the hypothesized effect on acquisition likelihood. Our definition for the term institutional shareholder is the one used by Porter (1992) and mentioned in the previous section.

Dedicated and transient shareholders. Institutional ownership.

Developing Porter's idea about institutional shareholders, Brown & Brook (1993), claim that institutional investors' trading significantly influences the change in stock prices of the firms. This way they are able to affect decision makers' will to meet the analysts' earning forecasts. Lang and McNichols (1997) argue that institutional investors in general are interested in short-term earnings, while Zhang & Gimeno (2016) claim that dedicated institutional investors are aiming for long-term performance of a company. Zhang and Gimeno also suggest that performance of a firm is important for both types of institutional owners and both are ready to exit if companies don't meet their expectation, but the performance focus horizon is different between the two categories of institutional investors.

Connelly et al. (2010) explore the effect of different shareholders on major strategic decisions such as M&A. They highlight the difference between dedicated institutional shareholders and transient owners: they claim that transient owners are more likely to pressure decision makers of a firm to support actions leading to short-term earnings while dedicated institutional shareholders will support major decisions which are more long-term oriented. They also point out the fact of communication between them, the authors claim that dedicated institutional investors have an ability to convince transient owners to support strategic decisions.

Zhang and Gimeno (2016) continue to explore the influence of dedicated institutional shareholders compared to transient owners. They point out that a firm experiences more negative impact from earning pressure when the firm has higher number of transient owners than long-term institutional shareholders. The authors propose that the differences in the investors' attitudes can also be distinguished in how they affect

managerial decisions and their horizons. They suggest that long-term-oriented institutional shareholders are more likely to support strategic decisions influencing long-term competitiveness.

The impact of institutional investors on M&A likelihood

Extant literature suggests that the most important activity for institutional investors is monitoring management (Shleifer & Vishny, 1986). As previously mentioned “through equity ownership, institutional investors can effectively acquire information, perform monitoring functions, and thereby improve corporate investment policies” (Fung & Tsai, 2012). Especially, long-term institutional investors are keenly involved with corporate governance and monitoring management activities (Koh, 2007). Gillan and Starks (1998) define corporate governance as “the system of laws, rules, and factors that control operations at a company.”

Controlling is often related to discrepancies which arise from conflicts of interest i.e. agency problem. When corporate decisions involve several parties (shareholders), with different goals and preferences, often people set their own preferences before others (Gillain & Starks 2003). These conflicts can also be observed in cases of M&A, where executives make harmful decision and act in their own self-interest rather than in the interest of shareholders.

Institutional shareholders, with large shares ownership, are increasingly important external control mechanism to affect management decision such as investing in a particular company (Gillain & Stark 2003). Furthermore, the share holdings of institutional investors have been slowly increasing for the last few decades resulting in large proportions of shares being held by institutional investors in the US market

(Derrien et al. 2013). This increase in power has emphasized their role in monitoring and corporate control.

There has been a lot of studies about institutional ownership relation to improved firm performance through capital expenditure decisions such as mergers and acquisitions. For example, Fung and Tsai (2012) conclude that the interaction effect between institutional ownership and capital expenditures is significantly related to firm performance. Institutional investors such as lending institutions have better inside information for monitoring and controlling companies' financing decision and thus, reduce potential agency cost of debt financing (Fama 1985).

However, better acquisition decisions do not necessarily lead to increased number of acquisitions. Halebian et al. (2009, p. 470) note that strong evidence indicates that acquisitions on average do not produce positive returns for the shareholders of the acquiring company neither in the short- nor long-term. Especially long-term institutional investors can mitigate aggressive earnings management among companies (Koh, 2007). As Bushee (1998) found out, in the absence of long-term oriented investors, investments in R&D were much more likely to be cut to maintain earnings growth than when a significant portion of the shares was owned by long-term institutional investors. As a result, long-term institutional investors' income-decreasing earnings management could be seen as a major reason for shareholders' minor effect on acquisition likelihood among their influenced companies.

Hypothesis development

Overall, the research on institutional ownership (Lang & McNichols, 1997; Connelly et al., 2010; Zhang & Gimeno, 2016) indicates that there are both short-term and

long-term institutional investors and dedicated institutional investors have a long-term investment horizon. Furthermore, dedicated institutional investors' long investment horizon alleviates the negative effects of short-term earnings pressures and, moreover, encourages the kind of strategic decision-making that maximizes long-term competitiveness.

The research discussed above in relation to the impact of institutional investors on M&A likelihood makes the following important contributions: Dedicated institutional investors are active shareholders that positively affect corporate governance practices (Shleifer & Vishny, 1986; Fung & Tsai, 2012; Koh, 2007; Gillan & Starks, 1998). Large dedicated investors and good corporate governance practices are important in that they serve as a control mechanism in protecting shareholders' interests in strategic decision-making for example in M&As which may sometimes be executed against the interest of some stakeholder groups (Gillain & Starks, 2003; Derrien et al., 2013). For example, significant dedicated institutional ownership was found to reduce myopic behavior in management and keep investing in R&D despite short-term earnings pressures (Bushee, 1998). Finally, a large body of literature on M&A indicates that on average M&As decreases rather than increases the overall financial performance of the acquiring firm on the long-term (Haleblian et al., 2009, p. 470).

Thus based on this review of current research we formulate the following hypothesis on the link between institutional investors and acquisition likelihood:

H1: *Ceteris paribus*, if a firm's shareholders include a higher proportion of long-term institutional investors, then the firm is likely to engage in fewer acquisitions.

In other words, we hypothesize based on the extant literature that M&A likelihood decreases as dedicated institutional shareholdership increases because dedicated investors have a long-term investment horizon and in the long-term horizon M&A

activity on average is more likely to erode the value of the acquiring firm than increase it.

Methods

To evaluate a potential relationship between long-term institutional shareholders and acquisition likelihood, we decided to undertake a longitudinal study of large US firms for which data in the often tricky areas of M&A deals and ownership would be most easily accessible. The time frame selected was a ten year period from 2005 to 2015, allowing the use of information which is consistent and long-term but fairly recent and applicable to the modern large-cap US market.

Sample selection

In this study, samples were derived from existing data sets that originated with three different sources - Compustat's Capital IQ data for North America including Index Constituents and Quarterly Fundamentals, Thomson Reuters' M&A and 13F institutional shareholder data, and Professor Brian Bushee's Institutional Investor Classification data. The data from these disparate sets were merged and aggregated into a single table containing quarterly measurements of all variables for each of the selected firms.

One of the challenges in sample selection is that subject firms must be chosen which have both M&A data available, sufficient M&A activity in the target period, and a high enough portion of classifiable institutional shareholders. The solution chosen in this study was to select from an especially well established and discussed subset of public US firms, the S&P100 index. While the S&P100 is relatively stable, it is a dynamic index

which can add or remove constituents at any time. To deal with the changes in the index over the target time range, we elected to include only firms which were part of the index throughout the entire period (2005-2015), leaving us with a total of 49 firms to analyze. Finally, we ignored all observations with missing data which led to losing one more firm and leaving us with a total of 48 firms and 1845 firm quarters. Otherwise no data points (incl. outliers) were removed. While the former methodological choice has the potential to introduce survivorship bias and could unintentionally lead to analysis of only the more successful firms in the time period, we have taken steps to control for any such effect with our selection of control variables.

Variables

In pursuit of the goal of identifying any relationship between long-term institutional shareholders and acquisition likelihood, the independent variable was selected as the percentage of dedicated institutional holdings in the firm (PIH). Specifically, we define PIH as the total number of shares reported on 13F statements as owned by dedicated institutional shareholders divided by the average number of shares outstanding during a given quarter.

Dedicated institutional shareholders were identified using Bushee's classification data, and while the PIH was calculated quarterly on the basis of 13F statements it was decided to lag the value by four periods (one year) to both assist in establishing direction of effect and to account for the theoretical expectation that it takes time for a shift in ownership to both influence management and then for that change in influence to translate into an observable change in acquisition behavior.

The dependent variable was selected as the number of acquisitions announced by each of the target firms quarterly over the selected time period. While simplistic, we believe that the influence of long-term shareholders on management behavior regarding M&A activity must be represented in the acquisition count and that this measurement is sufficient for establishing an initial correlation.

As control variables, values covering the firm's size and performance were chosen in addition to fixed effect dummy variables controlling for the year and the firm's industry, to incorporate effects from both the overall macroeconomic environment and the relevant industry. Firm size was modeled based on each firm's total market value at the end of each quarter using the previously mentioned fundamentals data from Compustat. The performance was likewise derived from the Compustat data sets by calculating ROA, defined as net income divided by total assets, quarterly. Industry fixed effect was based on the first three digits of the firm's SIC code, its industry group.

Models and regression methodology

Basic descriptive statistics, a Pearson correlation coefficient matrix and a set of scatterplots were generated for all variables as part of initial data analysis. Then, from the proposed variables, two models were created. Model 1 contains only the control variables and the dependent variable, while Model 2 contains our suggested independent variable (PIH) as well. With each of these models, a regression was conducted using Ordinary Least Squares (OLS) to test the proposed hypothesis.

We also evaluated the relative effect or importance of the variables in describing the dependent variable using the method described in Lindemann, Merenda and Gold (1980, p. 119). The method essentially examines the contribution or effect of each

variable to the R^2 of the linear model in turn averaging the results over all orderings among the regressors to determine their relative influence.

Results

Table 1 contains the descriptive statistics and bivariate correlations between the numeric variables used in the analysis. Table 2 summarizes the results of the OLS regression for both models. Figures A1 and A2 in the appendices provide the histograms of the key variables and a visual representation of bivariate correlation.

Table 1: The descriptive statistics and bivariate correlations between the numeric variables used in the analysis. Abbreviations: MV is the market value in millions of U.S. dollars, ROA is the returns on assets of the quarter, PIHL4 is the PIH of the quarter one year ago, and AC is the acquisition count of the quarter. $N = 1845$.

	Min	Max	Mean	SD	Year	MV	ROA	PIHL4	AC
Year	2006	2015	2011	2.86	1.00	0.15	-0.12	-0.27	-0.20
MV	5488	439679	94466	69465	0.15	1.00	0.10	-0.04	0.27
ROA	-0.08	0.26	0.02	0.02	-0.12	0.10	1.00	0.09	-0.14
PIHL4	0.00	0.46	0.05	0.05	-0.27	-0.04	0.09	1.00	-0.03
AC	0.00	29.00	1.79	3.06	-0.20	0.27	-0.14	-0.03	1.00

As can be noted from the descriptive statistics table (table 1) on average the firms in the sample announced an average of 1.79 acquisitions per quarter. However, the standard deviation is almost twice the mean indicating a lot of variance across firms. The percentage of dedicated institutional holdings was at most 46% while on average it was around 5%. The standard deviation was 0.05 thus also indicating a lot of variance across firms.

From the bivariate correlation coefficients (table 1) it must be noted that acquisition count seems to correlate negatively with year and positively with the market value of the acquirer. However, the correlation with the lagged PIH is negative and very low. This negative correlation fits our hypothesis (H1). The correlation with market value was expected but the negative correlation with year suggests decreasing M&A activity in the sample over time which might be associated with some broader macroeconomic trend (see the figures A2-A6 in the appendices for more detail).

Table 2: The results of the OLS regression for both models. The table includes the beta-coefficients for the numerical control variables and model 2 also included the independent PIHL4 variable. The coefficients for each instance of the dummy variables Year and SIC3 are omitted but are available in table A1 in the appendices. The abbreviations are the same as in table 1. Note: *** p-value is < 0.001.

Variable	Model 1	Model 2
(Intercept)	1.12 ***	1.49 ***
Year	Yes	Yes
SIC3	Yes	Yes
MV	0.00 ***	0.00 ***
ROA	-2.16	-0.49
PIHL4		-5.50 ***
Observations	1845	1845
Firms	48	48
R ²	0.501	0.504

The results of the regression reported in table 2 show that, in the second model in which the independent variable was present, the beta-coefficient for PIHL4 is -5.50 which supports the hypothesis that increasing the percentage of dedicated institutional holdings decreases the number of acquisitions firms announce (the following year). In addition, the finding is statistically significant at the p-value < 0.001 level. However,

the improvement in multiple R^2 is very minimal suggesting that the independent variable has very low explanatory power for predicting the dependent variable, acquisition count, in relation to the control variables.

Our analysis of the relative importance of the variables revealed the following dominance percentages: 75% for SIC3, 11% for year, 10% for market value, 2.4% for ROA and only 0.8% for PIHL4 (figure A7 offers a visualization in the appendices). Thus it appears that the industry of the acquiring firm is by far the most predictive from among the included variables. Year and market value (our proxy for firm size) are also relatively influential variables. However, the impact of institutional ownership seems to be very mild, on average.

Discussion

This quantitative study contributes to the body of M&A research that aims to understand the antecedents of M&A activity as well as to the research on the effects of dedicated institutional investors. Prior to this work the relationship between the proportion of dedicated institutional ownership in firms and their respective acquisition likelihood has been unclear. However, this work provides a statistically significant result that confirms the hypothesis that increased dedicated institutional ownership decreases M&A activity.

This finding is inline with earlier research on M&A and institutional investors. Evidence from earlier studies on the effects of M&A activity on the financial performance of firms has concluded that on average M&As tend to erode firm value more often than improve it (Haleblian et al., 2009). The research on institutional investors has highlighted the positive effects of institutional investors on corporate

governance and the long-term performance of firms. (Shleifer & Vishny, 1986; Fung & Tsai, 2012; Koh, 2007; Gillan & Starks, 1998). Dedicated investors tend to reduce myopia and protect shareholders' interests in strategic decision-making (Gillain & Starks, 2003; Derrien et al., 2013; Bushee, 1998). Dedicated investors tend to have a long investment horizon according to which they seek to maximize the long-term competitiveness of the firms they invest in (Lang & McNichols, 1997; Connelly et al., 2010; Zhang & Gimeno, 2016). Thus our empirical findings indeed concur with earlier research.

However, as noted earlier, the presence of dedicated institutional ownership does not effectively determine acquisition likelihood. Instead, the effect is very mild and indeed other variables such as industry and firm size are more significant as predictors of M&A activity.

Limitations

Limitations in this study come mostly from the challenges of finding complete data on all of the information needed to establish both institutional holdings and M&A activities. One limitation derived directly from this challenge is that we only addressed the behavior of the largest public US firms over the time range, and it is entirely possible that the results are not applicable to non-US firms, smaller firms, or privately held firms. Further, we found that despite using the most comprehensive M&A data set available, many deals do not include basic information such as the transaction amount because this information was never disclosed publicly.

Additionally, the use of institutional investor classifications leads to potential limitations in the broad applicability of the results. While Brian Bushee's classification data is excellent, it cannot possibly classify every investor. In cases where no

classification was available, we ignored the investor's ownership, which most likely means that our PIH values are primarily representative of larger and older institutional investors, who probably translate their ownership into influence in a different way than the smaller or newer investors who may not yet be classified.

Finally, our data analysis might well benefit from supplementary analyses and additional rigor. For example, no real effort was exerted to deal with potential issues with heteroskedasticity, multicollinearity or autocorrelation. Also, additional sensitivity analysis and robustness checks could have been performed. Several other models could have also been generated to examine how sensitive the beta-coefficient estimates are for the presence of other regressors. Similarly, the effects of using different lag durations for PIH were unexamined. For example, it might be that a two year lag would have shown a stronger effect because even strong shareholders cannot easily drive significant improvements in corporate governance and changes in management culture and M&A strategy in very short intervals. However, such a long lag would have also further reduced our dataset. Lastly, some subset of the dataset could have been reserved for out-of-sample evaluation to perform cross-validation of the models.

Future research

Opportunities abound for future research expanding upon these results. One such topic could be to investigate whether the impact of institutional shareholders varies significantly across industries. We did use simplified industry values but only as dummy variables and did not investigate any effect magnitudes in detail. These details could help to build upon the theory of how shareholders influence management decisions.

Furthermore, a more detailed look could be taken at the specific types of dedicated institutional shareholders and whether different types of institutions influence managers differently. For example, traditional banks, asset management firms, and pension funds might all be categorized as dedicated shareholders but probably have some differences in how they exert influence. Some dedicated shareholders may well be much more active in enforcing improvements in corporate governance and a lot more demanding when it comes to M&A related decision-making.

Finally, there is a large opportunity to study these types of effects in markets outside of the US. It has been suggested in past literature that institutional investors in other countries such as Germany and Japan have a significantly greater long-term orientation than their US counterparts (Porter, 1992). It is thus an open question whether these differences would be visible in an analysis of acquisition likelihood and, if so, whether the differences are attributable to managerial culture, regulatory environment, or other factors.

References

Bushee, B. J. (1998). The influence of institutional investors on myopic R&D investment behavior, *Accounting review*, pp. 305-333.

Compustat North America - Fundamentals Quarterly. (2005-2015). Available: Standard & Poor's/Compustat [25 February 2018], Retrieved from Wharton Research Data Services.

Connelly, B. L., Tihanyi, L., Certo, S. T., & Hitt, M. A. (2010). Marching to the beat of different drummers: The influence of institutional owners on competitive actions, *Academy of Management Journal*, 53(4), pp. 723-742.

Derrien, F., Kecskés, A., Thesmar, D. (2013). Investor horizons and corporate policies, *Journal of Financial and Quantitative Analysis* 48(6), pp. 1755–1780.

Fama, E. (1985). What's Different about Banks? *Journal of Monetary Economics* 15(1), pp. 29-39.

Fung, S., & Tsai, S. C. (2012). Institutional ownership and corporate investment performance, *Canadian Journal of Administrative Sciences*, 29(4), pp. 348-365.

Gillan, S., & Starks, L. (2003). Corporate governance, corporate ownership, and the role of institutional investors: A global perspective.

Gillan, S.L. & L.T. Starks. (1998). A Survey of Shareholder Activism: Motivation and Empirical Evidence, *Contemporary Finance Digest* 2 (3), pp. 10-34.

Haleblian, J., Devers, C. E., McNamara, G., Carpenter, M. A., & Davison, R. B. (2009). Taking stock of what we know about mergers and acquisitions: A review and research agenda, *Journal of Management*, 35(3), pp. 469-502.

Institutional Investor Classification Data. (1981-2015). Available: Brian Bushee Faculty Web Page [25 February 2018]. Retrieved from <http://acct.wharton.upenn.edu/faculty/bushee/Iclass.html>.

Koh, P. S. (2007). Institutional investor type, earnings management and benchmark beaters, *Journal of Accounting and Public Policy*, 26(3), pp. 267-299.

Lindeman, R. H., Merenda, P. F., & Ruth, Z. G. (1980). *Introduction to Bivariate and Multivariate Analysis*. Scott Foresman, Glenview, IL, USA.

Porter, M. E. (1992). Capital choices: Changing the way America invests in industry, *Journal of Applied Corporate Finance*, 5(2), pp. 4-16.

SDC Platinum M&A Data. (2005-2015). Available: Thomson Reuters [25 February 2018]. Provided by course staff.

Thomson Reuters Institutional (13f) Holdings - s34 (2005-2015). Available: Thomson Reuters [25 February 2018]. Retrieved from Wharton Research Data Services.

Zhang, Y., & Gimeno, J. (2016). Earnings pressure and long-term corporate governance: Can long-term-oriented investors and managers reduce the quarterly earnings obsession? *Organization Science*, 27(2), pp. 354-372.

Appendices

Additional tables and figures

This section offers additional tables and figures that we generated during our data analysis process.

Table A1: The full results of the OLS regression for both models split into two columns. The table includes the beta-coefficients for each of the variables, including for each year and SIC3 dummy instance. Note that only model 2 included the independent PIHL4 variable. The abbreviations are the same as in table 1. Note: p-values marked as follows:

*** <0.001, ** <0.01, * <0.05, . <0.1.

Variable	Model 1	Model 2	Variable	Model 1	Model 2
(Intercept)	1.12 ***	1.49 ***	SIC401*	-0.40	-0.63
Year2007	0.21	0.24	SIC451*	-0.15	-0.01
Year2008	0.09	0.29	SIC481*	-0.84 *	-0.97 **
Year2009	-0.81 ***	-0.95 ***	SIC488*	0.72 .	0.72 .
Year2010	-0.96 ***	-1.11 ***	SIC491*	-0.24	-0.31
Year2011	-0.87 ***	-1.03 ***	SIC521*	-0.55	-0.76 .
Year2012	-0.98 ***	-1.12 ***	SIC581*	-0.90 *	-1.09 *
Year2013	-1.57 ***	-1.71 ***	SIC602*	1.38 ***	1.41 ***
Year2014	-1.76 ***	-1.90 ***	SIC614*	-0.52	-0.01
Year2015	-2.12 ***	-2.26 ***	SIC619*	1.50 *	1.37 *
SIC208*	0.12	0.18	SIC621*	7.57 ***	7.42 ***
SIC211*	-0.86 *	-1.00 *	SIC633*	-0.38	-0.58
SIC282*	0.39	0.34	SIC737*	0.79 *	0.69 *
SIC283*	-0.58 .	-0.64 *	SIC999*	5.73 ***	5.57 ***
SIC284*	-1.13 **	-1.30 ***	MV	0.00 ***	0.00 ***
SIC357*	1.03 **	0.96 **	ROA	-2.16	-0.49
SIC367*	0.39	0.32	PIHL4		-5.50 ***
SIC371*	-0.21	-0.25	N	1845	1845
SIC372*	0.80 *	0.92 **	Firms	48	48
SIC381*	0.08	0.07	R^2	0.501	0.504
SIC382*	0.36	0.20			

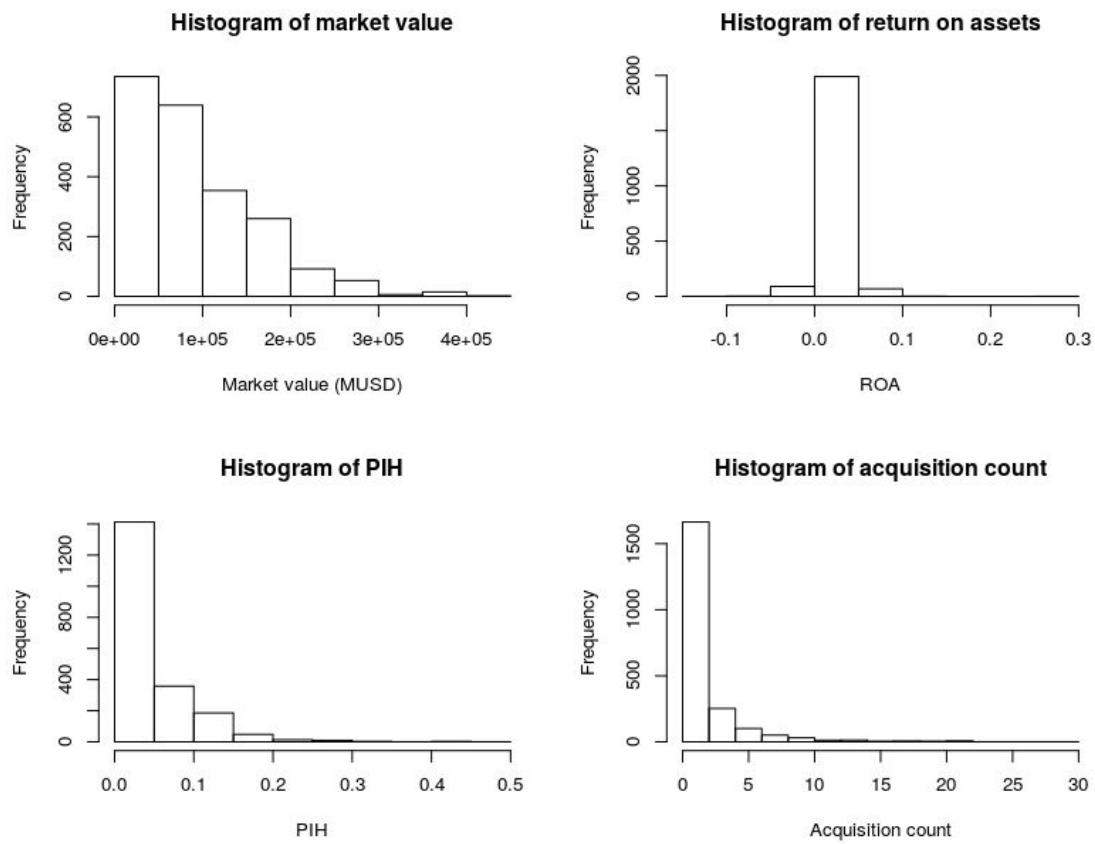


Figure A1: Histograms of key numerical variables. Notable is that most firms in the sample had low PIH (<5%) and made few acquisitions per quarter (less than 3).

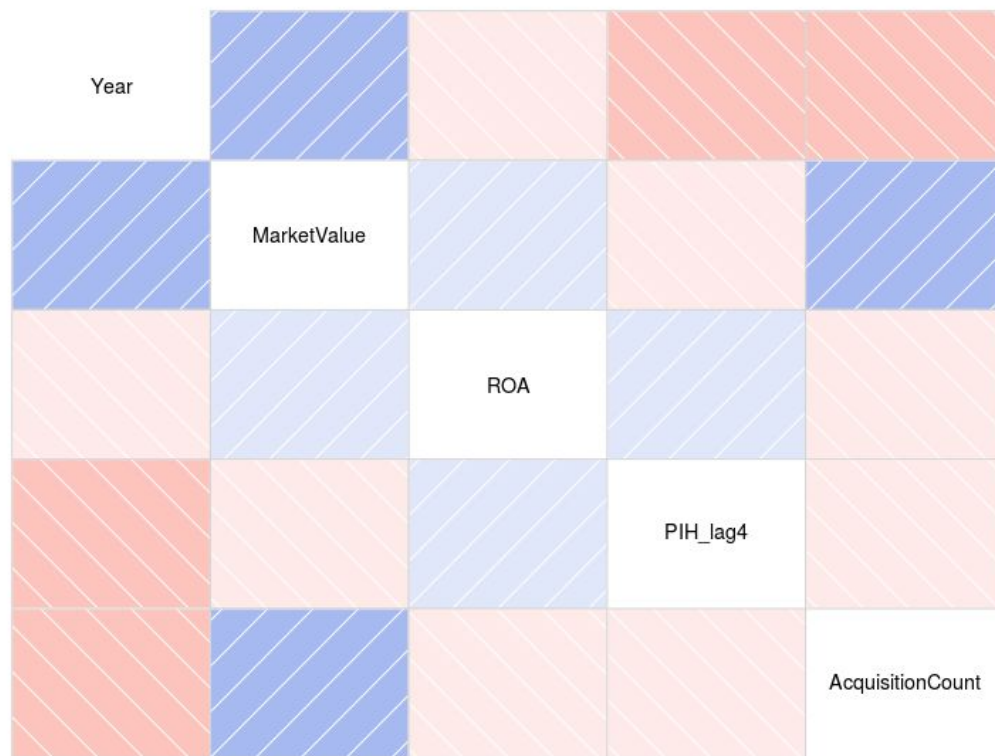


Figure A2: Visual representation of correlation between the numerical variables. This information was already offered in numerical format and discussed in the results section.

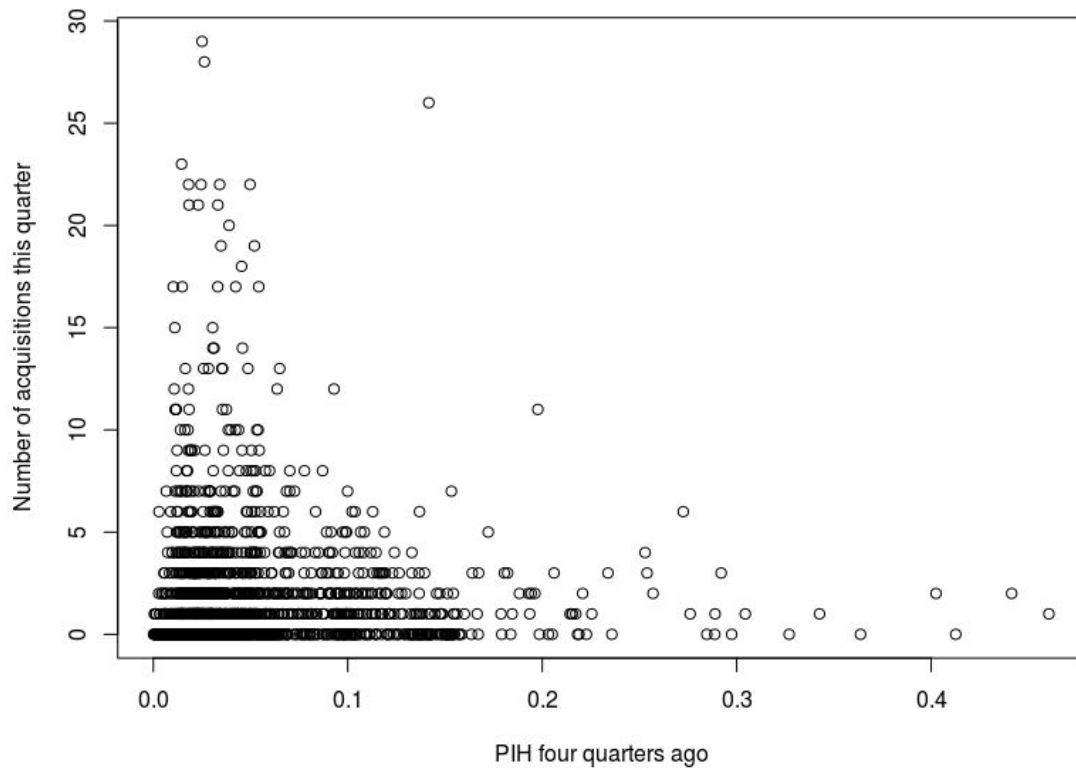


Figure A3: A simple plot of the number of acquisitions versus PIH of the preceding year. This graph suggests that increasing PIH value decreases the rate of acquisitions. It seems that the greatest amount of acquisitions have been made by companies with which the lagged PIH ratio is less than 7%.

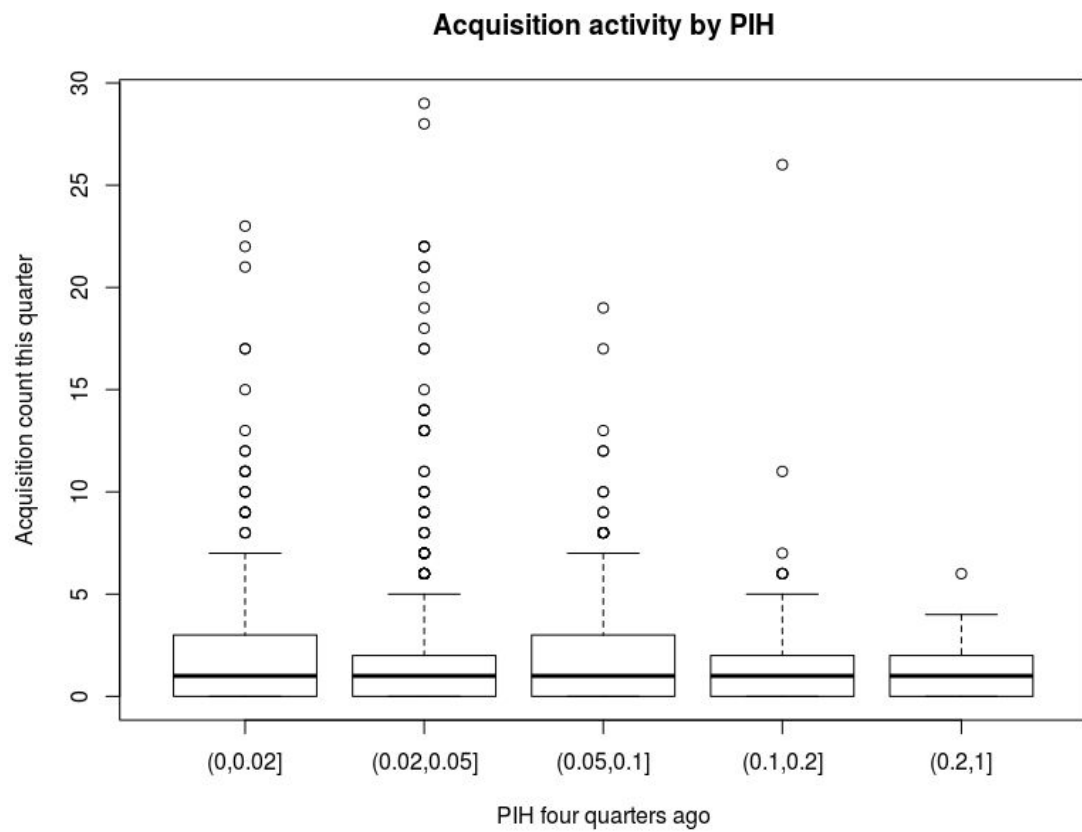


Figure A4: A boxplot of acquisition activity by lagged PIH. This boxplot gives an additional view to how M&A activity seems to decrease as a function of the lagged PIH.

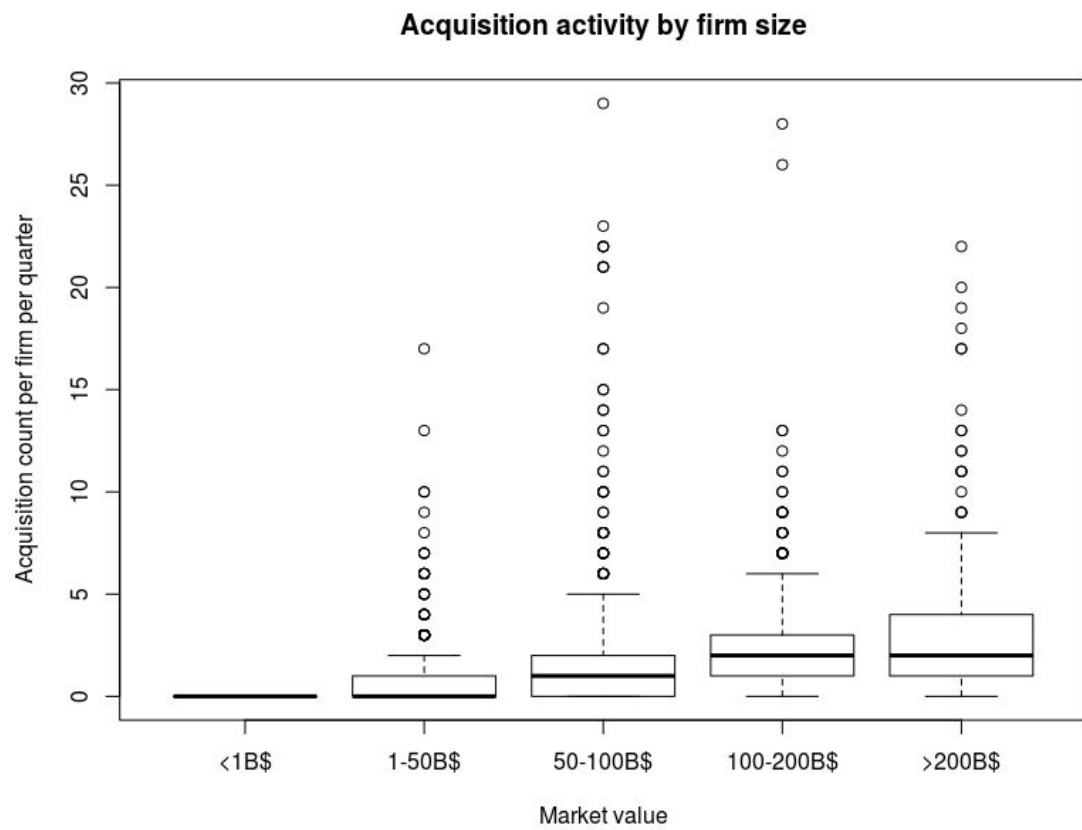


Figure A5: A boxplot of acquisition activity by firm size. This boxplot makes it clear that M&A activity is higher in larger firms.

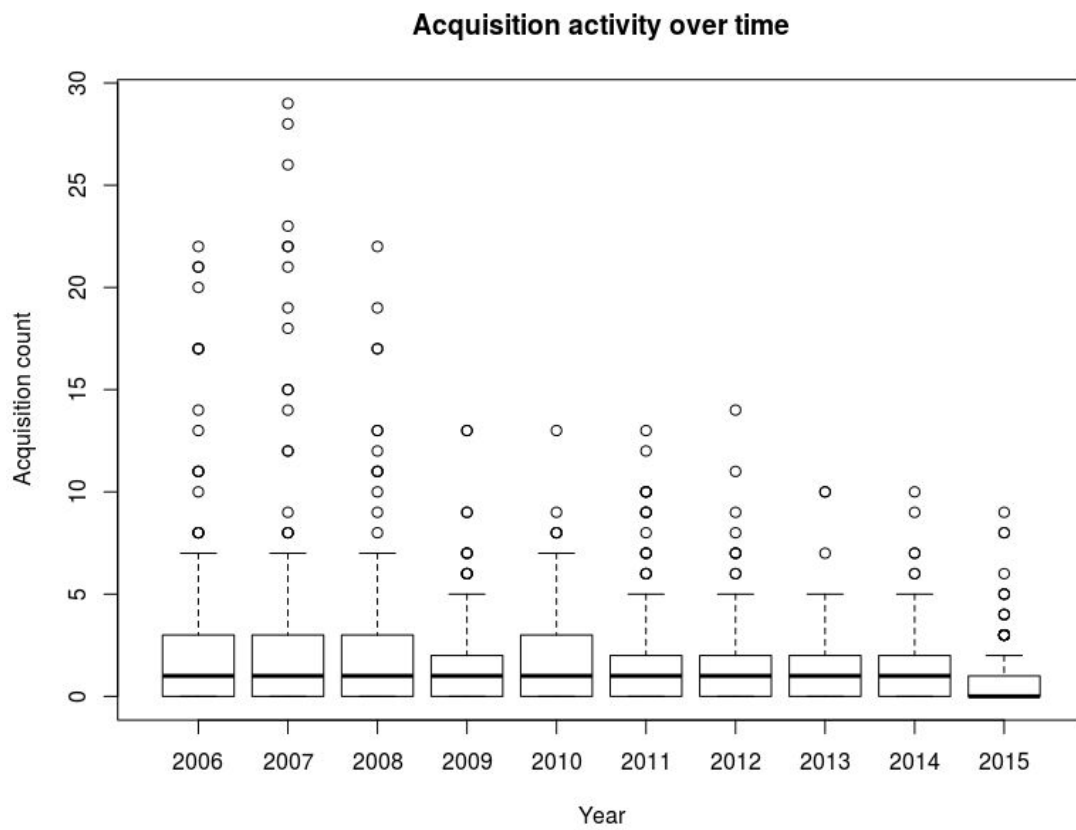


Figure A6: A boxplot of acquisition activity by year. Based on this boxplot, it seems as if M&A activity has started to somewhat reduce after 2008. Perhaps the financial crisis of 2008 had a part to play in this slightly decreased M&A enthusiasm.

The relative importance of the variables

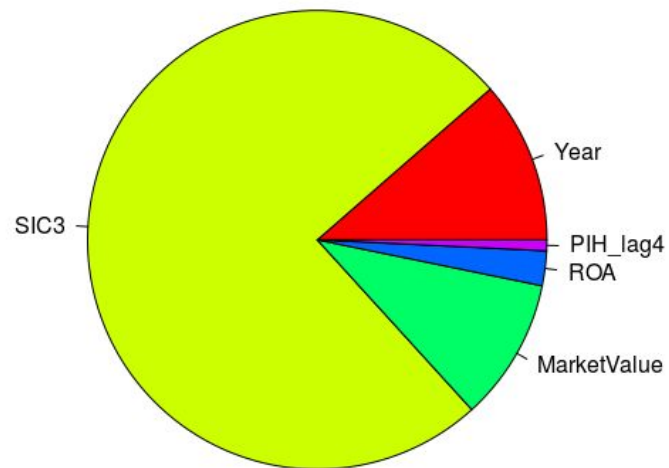


Figure A7: The relative importance of the regressors. The relative importances of the variables were 75% for SIC3, 11% for year, 10% for market value, 2.4% for ROA and only 0.8% for PIHL4.