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Reference Point Pricing in European M&A Transactions

Karolis Ramoška
(40007@student.hhs.se)

Abstract

This paper analyzes the existence of price reference points in the pricing of European merger and acquisition transactions, particularly the relevance of the 52-week-high price as a reference point. The results indicate a statistical relationship between the 52-week-high price and the offer price that is inconsistent with the theory of efficient pricing of mergers and acquisitions. The relationship persisted after the inclusion of transaction-specific controls and financial information on the transaction participants, as well as the inclusion of shareholder-specific characteristics. The analysis of shareholder-specific subsamples revealed significant deviations within the sample of companies controlled by corporate shareholders, which tended to exhibit much weaker relation between the 52-week-high price and the offer price, possibly due to the relevance of different price reference points for corporate shareholders. On the other hand, significant relationship between the 52-week-high price and probability of the acquisition offer being accepted could not be replicated in the data. Finally, it is discovered that other past price points exceeded the statistical significance of the 52-week-high price in explaining the variation in offer price indicating the possible existence of other price reference points of relevance to European investors.

Tutor: Laurent Bach, Stockholm School of Economics
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I. Introduction and Background

This paper aims to analyze the existence of price reference points in the pricing of European merger and acquisition ("M&A") transactions. Particularly, the paper aims to test the hypothesis that 52-week-high price is a relevant price reference point used by the shareholders of the target to "anchor" their expectations for negotiations. In addition, the paper aims for a more thorough analysis of the underlying factors behind the price anchoring by controlling the empirical research by variables specific to the shareholders of the target company according to their type and size of shareholding. This section reviews the theoretical background behind company valuation, M&A pricing, psychology of reference points, price anchoring in M&A transactions as well as provides the motivation for the work done. Section II presents the sample of European M&A transactions used for the analysis. Section III presents the empirical tests done and their results, which are concluded in Section IV.

A. Traditional View of Company Valuation

The traditional view of company valuation is proposed by Myron J. Gordon (1962) based on the previously developed neo-classical theory, with less strict assumptions about the firm's financing capacity and needs. At the core of the theory lies the by-now-simple statement that the value of a firm (and thus the share) is a variable dependent on the expected future income of the firm, taking into account its investment needs and their return, cost of capital and other parameters that may be determined or estimated from the data available. In that view, there exists a value of the company that changes as the variables influencing the value change, unknown parameters are discovered or estimations of such parameters are revised and improved.

Naturally, as the market consists of many individual actors, the numerous variables that need to be estimated in order to arrive at the true value of the company may actually be perceived differently by these actors based on the information they have access to. In that view, an investor that has factual information about the crop harvest in Western Europe may perceive the value of the companies importing the crops to the region differently from an investor that bases the value strictly on an estimate of the harvest.

This natural obstacle to arriving at a single true value of the company, however, is overcome by the proposition of the efficient market hypothesis that proposes that the financial markets are information efficient. The key tenants of the efficient markets were laid down and the empirical analysis of their performance was reviewed by Eugine F. Fama (1970). Propositions of market efficiency have subsequently been analyzed, criticized and supported by numerous studies afterwards. In its weak form, the efficient market hypothesis states that the future prices of an asset cannot be predicted by just looking at the past prices of an asset, since all the information provided by the past prices is already contained in the current market price. Semi-strong form states that, in addition, all publicly available information is reflected in the market price of an asset and new public information is reflected in the price as it becomes available. Strong form market efficiency requires that all the information affecting the value of an asset, including insider information, be reflected in the market price of an asset.

Strong form market efficiency ties in well with the traditional view of company valuation. If all the information, including inside information, is reflected in the price of an asset, then there can only be one such valuation of a company and its business. In the example above, investors with and without information on the crop harvest will have the same market valuation of the company since such information will be reflected in the share price of such a company.

Even if the strong form market efficiency is rejected, the share price would be expected to reflect all the publicly available information. Therefore, the public investors with no access to insider information will have substantially the same valuation of the company, differing perhaps only by their perception of the non-reflected insider information. Under the weak form efficiency, at least the path that the share price took to arrive at the current market price (or any particular point along that path) should have no influence over the perception of the value of the share and its future returns.

Efficient market hypothesis, however, has been challenged substantially since its introduction and, in particular, since the last decade of the 20th century both from the theoretical perspective and, even more, from empirical observations.

Dreman and Berry (1995) tested the power of publicly available information, particularly price/earnings ratios, in predicting the future returns of the shares and found a significant effect. Other publicly available factors were shown to have prediction power over the stock returns, exemplified by the phenomena, such as post-earnings-announcement drift, as documented by Bernard and Thomas (1989). These findings and the prevalence of the behavioral finance theories diminished the widespread acceptance of, at the very least, the strong and semi-strong forms of market efficiency.

The weak form market efficiency was challenged by the emergence of the momentum trading strategies (see, for example, Jegadeesh and Titman (1993 and 2001)) and related theoretical basis for the momentum phenomena (e.g., Hong and Stein, 1999). The new observations demonstrated the potential for profitable trading strategies by observing past prices (e.g., the 52-week-high price). The explanations for these strategies no longer relied on the efficiency of the markets, but instead had their basis in behavioral finance and the existence of segmented investors, with each segment trading and reacting to publicly available information differently. For the last 20 years company valuation moved towards a view that the beliefs of investors, irrational or rational but having no basis in the underlying business of the company in question, nevertheless have a significant effect on the market value of such company's stock.

B. Traditional View of M&A Pricing

In the a very limited view of company valuation, even when taking the market inefficiencies into account, the price of a target company should be fully reflected in the market price of its share. In such traditional view, any offer premium in an acquisition cannot be justified as it exceeds the value of the company.

One explanation for the substantial premium in acquisition of large stakes in the target companies has been the value of control. Subscribers to the value of control have based this value on the ability to change the management of poorly-performing companies (Damodaran, 2005), ability to overcoming the problems of non-enforceable contracts (Chari, Oumet and Tesar, 2010) or simply the ability to extract private benefits of control at the expense of minority shareholders (an example of the Chinese market for control is presented by Bai, Liu and Song (2002)). However, the latter two explanations are less efficient in explaining the large offer premiums within developed markets with substantially enforceable contracts and minority shareholder protection, such as the United States of America ("US") and Western Europe.

A more traditional explanation for the premiums observed in the acquisition transactions is based on synergies. Jovanovic and Rousseau (2002), for example, analyze empirically the presence of (1) managerial synergies (consistent with the managerial value of control, above), i.e., the premise that the replacement of the poorly-performing management of the target with the better-performing management of the bidder creates a value from the transaction. Other forms of synergies are often proposed, including (2) cost synergies – the ability to eliminate overlapping costs and/or benefit from the economies of scale in the larger combined entity, (3) income synergies through being able to combine complementary business lines and customer channels; and (4) diversification synergies, a largely rebutted premise that two largely unrelated businesses with different business cycles can benefit through the reduction of volatility in earnings.

A traditional view suggests that if there are synergies that can and will only be obtained through the acquisition process, then the acquisition results in the creation of value that can be distributed among the transacting parties. In such a view, the offer premium above the market price of the target company represents the share of the expected synergies that has been allocated to the shareholders of the target company by the way of negotiation where the target shareholders are typically represented by the management of the company in question.

The exact distribution of the real or perceived synergies between the shareholders of the target and the bidder will be governed by the relative bargaining power of the two parties, affected by the extent to which the synergies can be achieved only by the combination of these two particular companies and the alternatives available to both parties.

The view that mergers create value and the view of the offer premium as the mechanism to transfer the allocation of this surplus value between the shareholders is challenged, however, from the practical implementation and empirical perspective.

In practice, determining the price in the acquisition will be a result of a negotiation process that will substantially focus on the three variables: (1) the present value of the stand-alone company, (2) the present value of the expected synergies and (3) the allocation of such synergies relative to the bargaining power. Practically, these three variables are interrelated and cannot be easily viewed separately, as suggested by theory. The board of the target company may reject the market valuation of its shares as the true reflection of the present value of the company simply for the purpose of enhancing its bargaining power. Similarly, the valuation of synergies and, to a lesser extent, the company itself relies substantially on a number of assumptions made with respect to the economic environment, growth rates, discount rates and other factors that may depend more on the bargaining power of the parties than any economic substance.

Empirically, the concept of the offer premium representing the allocation of surplus value generated by the transaction is challenged by the analysis of the stock price returns of the bidder and the target companies in acquisitions. Dodd (1980), Jensen and Ruback (1983), among others, find that at best, the returns to the bidder's shareholders from mergers are zero or, in many cases, negative, while the returns to the target's shareholders are substantially large and significant. These empirical results imply that the creation of value from the transaction is entirely, or almost entirely, allocated to the shareholders of the target company. It is difficult to imagine, however, that the relative bargaining power of the target is so decisively larger than that of the bidder to justify such an allocation. As such, alternative views are proposed.

A theory proposed by Amihud and Lev (1981) suggests that the persistence of negative present value conglomerate mergers is driven by the diversification not on behalf of the shareholders, but on behalf of the manager who diversify in order to reduce employment risk related to highly volatile earnings. The desire of the manager to diversify away this risk may result in handing the bargaining power to the target company, resulting in highly uneven distribution of benefits from the merger. The findings of Morck, Shleifer and Vishny (1990) support this view and add that managers of the bidding companies tend to time the acquisition poorly and purchase rapidly growing companies priced very highly relative to their earnings.

Jensen (1986) expands on the view of managerial inefficiencies in takeovers by analyzing corporate takeovers in light of agency problems, discovering that the significant losses incurred by bidders when investing in projects (including acquisitions) with non-positive present value can be partly explained by free cash flow under disposal by the managers.

While these theories primarily concern themselves with inefficiencies on the bidder side of the takeover arrangement, they can be directly interpreted as enabling the target shareholders and managers to exploit these inefficiencies and increase their bargaining power. Specifically, the latter may use the reference points to anchor their price target at a relatively high level to solidify their position in light of weak incentives by bidder's managers to challenge such reference points.

C. Reference Points in Pricing

The basis for reference points may be considered to be the developments by Tversky and Kahneman (1974, 1979) and Kahneman (1992). The works introduce empirically the concepts of prospect theory – a departure from the traditional view of utility as the function of the level of endowment (goods or otherwise) and introduces reference points as key variables in the decision making process by rational individuals. Any particular point along the line of possibilities could be a reference point – wealth at the present moment, wealth last year, desired wealth for next year or even wealth of other individual agents. The seemingly irrelevant reference points nevertheless play a critical role in the decision making process.

Another key proposition by Tverky and Kahneman is substantial loss aversion. Actors dislike losses, but tend to overestimate the probability of highly risky (unlikely) positive events in making their decisions, while simultaneously underestimating the probability of similarly unlikely negative events. More particularly, the aversion seems to extend to *realization* of gains and losses, rather than gains and losses by themselves. The combination of the two implies that individual actors are more willing to risk the profits than losses, using as a reference point the realized outcomes rather than the developments since.

The implications for general pricing of assets in the market are significant. Shefrin and Statman (1985) show that investors don't like to show losses, keeping the assets that have fallen in value relative to a particular reference point and selling the assets that have risen in value (realizing gains). Odean (1998) and others demonstrate applicability of the theory to the empirical data, noting that investors tend to dispose of shares that have gained in price and holding on to the shares that have fallen in excess to what could be expected if mere adjustments for risk and portfolio composition would be considered. Such reluctance to realize losses also goes against the presumably rational behavior, since in most tax environments profits and losses are taxed when realized. As such, realizing losses early and delaying the realization of profits is the obviously tax-efficient strategy that is not pursued by the investors.

The above research deals specifically with the share acquisition price as a reference point; however, it is not a definite requirement. Tverky and Kahneman demonstrate that the reference points are adjusted according to outcomes. Again, the reference points are more easily adjusted upwards (as if the gains are realized) than downwards (similar to realizing losses). As such, the reference point can be a price that was achieved some time after the acquisition of an asset or even a price that was never achieved but for some other reason serves as a reference point (an example could be a price target published by an analyst).

Northcraft and Neale (1987) analyze the applicability of such reference points in real estate pricing. In a controlled experimental setting, professional real estate agents were asked to provide an estimate for the value of a real estate property, based on the information given to them including a randomized list price. The analysis of the results showed a very strong anchoring of the outcome to the entirely arbitrary list price; despite the fact that the participating agents denied that the list price was part of the consideration.

Reidpath and Diamond (1995) discovered the same effect by analyzing the behavior of game show participants in a real-life non-controlled environment, coming to the conclusion that participants are affected by arbitrary and fictional reference points.

The reference points as analyzed above have a strong effect on the decision making by individual actors but do not easily relate to interactions between different actors as part of, for example, negotiation process. Babcock, Wang, and Loewenstein (1996), on the other hand, analyze such interactions by looking into the wage negotiation process between teachers unions and school districts. The key outcome was that the union representatives selected the comparison group for wage negotiation purposes in a biased manner comparing their remuneration with that of more affluent districts. This comparison group was then communicated as an anchor point for wage negotiations. At its essence, the observation not only reflects a strategy of choosing high starting point in negotiations (in order to be able to make “concessions” later on), but also emphasizes the need for such reference points to be reasonable and measurable.

In the context of mergers and acquisitions, the presence of reference points used by the target in negotiations could at least partly explain the disparity in the share of benefits from the transaction derived by the target and bidder shareholders if such reference points could be accepted as credible by both parties.

D. Role of Past Prices in M&A pricing

The applicability of past prices as information points for the valuation of the company thus lies on the evidence of the propensity of managers and shareholders to view such past prices as reference points in their decision making process. Examples of such evidence are several.

Barberis and Xiong (2008) document the behavior of investors whereby they have a tendency to sell shares once they hit the 52-week-high price. Huddart, Lang and Yetman (2009) have found that on aggregate there is a significant effect on trading volumes once the price hits the 52-week-high price. As such, this particular price point could be considered as a significant variable in the decision making by investors and managers.

The application of this reference point to the particular case of mergers and acquisitions is presented in the paper by Baker, Pan and Wurgler (2009) which analyzes the effect the 52 week-high price has on the behavior of the target and the bidder in acquisition process.

The authors propose that the application of the findings of Tversky and Kahneman with respect to the loss aversion of the shareholders requires that the shareholders of the target company in an acquisition attempt would be reluctant to sell below their acquisition price (i.e. realize the losses). However, the acquisition price is unique among different investors and must be shared by a significant portion of the stockholders to act as a credible reference point. 52-week-high, on the other hand, reflects a reference point that is common to a significant part of all shareholders and can be used as a credible anchor point in negotiations. Furthermore, if we accept the premise that investors are more likely to revise their reference points upwards than downwards, the 52-week-high represents a relatively recent breaking point in this process.

In addition, Baker, Pan and Wurgler provide several additional arguments for the prevalence of 52-week-high as an anchor point: (1) high visibility of this particular price point (it is commonly reported on stock market report pages, databases and annual reports) makes it an easy reference for uninformed investor making a decision whether to accept an offer, (2) board can see the 52-week-high price as a useful anchor (high-reach) point in price negotiations even without finding it meaningful themselves; and (3) managers may fear litigation if they advocate the sale of the company for a price that many shareholders would consider too low and 52-week-high barrier represents a safe-harbor.

From the perspective of the bidder, the 52-week-high reference point may be useful by the management in convincing their own stakeholders (shareholders and bankers, for example) of the value that could be realized if the target is "returned to the right way of management". 52-week-high price may also enter the discussion as the management of the bidder wants to find the price that they think would be acceptable to the target's shareholders (Bradley, Desai and Kim (1983), for example, find negative returns to acquirer in case of failed tender offers, suggesting that the failure of the takeover attempts could be considered as a bad market signal) and if the shareholders are successful in communicating this anchor point, it might be seen by the bidder's management as the acceptable compromise.

E. Empirical results in M&A pricing

Baker, Pan and Wurgler analyze their hypotheses over the prevalence of the 52-week high price as a reference point that has a significant effect on the offer price of the acquisition transaction in a sample of over 7000 acquisitions within the US over the period from January 1, 1984 to December 31, 2007. Using OLS and piecewise linear specifications they found:

Result 1: a statistically significant relationship between the offer price and the 52-week-high price of the target company. They found that for the cases where the 52-week-high price was no more than 25% higher than the prevalent market price before the acquisition, each 3% difference in the 52-week-high price (normalized by the prevalent price) brought about a corresponding positively correlated 1% (varying somewhat depending on the specification) difference in the offer price.

Result 2: the effect persisted across specification with control variables (transaction-specific controls, target-specific controls and bidder-specific controls), sub-samples and time-different sub-periods.

Result 3: the effect of the 52-week-high price as a reference point was unique among other tested past price points.

Result 4: the paper finds real effects of the 52-week-high as the reference point in merger and acquisition pricing by observing a discontinuous increase in the probability of success of the deal once the offer price exceeds that of the 52-week-high, thus constituting an actual transfer of wealth between the shareholders of the target and the bidder.

The work of Baker, Pan and Wurgler represent a unique approach to evaluating the prevalence of price reference points in the corporate acquisition environment. However, the paper includes the limitation of an approach that has not been tested in a different sample of transactions or in a substantially different market environment. In addition, while Baker, Pan and Wurgler effectively look at how the outcomes of the decisions of shareholders and the management are affected by the 52-week-high price, no attempt is made in trying to differentiate this effect across different types of shareholders.

The shareholders of the target company may play an important role in the takeover and the related price anchoring process. Grossman and Hart (1986) relate that where ownership is widely dispersed, no individual shareholder has the incentive to monitor the manager. Similarly, Shleifer and Vishny (1986) argue that ownership concentration enhances the functioning of a takeover market. As such, it is expect that the companies with a higher concentration of ownership shall have a closer link between 52-week-high price as the reference point and the offer price, as the anchor point of the investors is likely to be better represented by the management.

In addition, for the purpose of the paper, there is a tangible expectation that the individual shareholders may be more susceptible to anchoring points and the relation between 52-week-high price as the reference point and the offer price is expected to be stronger where the ownership by individual investors is higher. The reason behind such an expectation is that the individual shareholders are typically expected to be less informed and may have to rely on the 52-week-high price as the reference point in evaluating whether the offer is fair. In addition, insofar as the behavioral effect of the reference points can be regarded as inefficiency, it should be expected that financial shareholders may be more sensible in their decision making, trying to exploit the resulting arbitrage opportunities.

Finally, with respect to corporate shareholding, the expectation is that the significant corporate shareholding will result in a weaker relationship between the between 52-week-high price as the reference point and the offer price. Direct corporate shareholdings are not very common as an investment mechanism for residual funds. Instead, corporate shareholdings usually represent strategic investments and/or form a part of the broader business strategy. Therefore, other reference points, such as investment cost and the effects of the remaining business could be expected to be more important to corporate shareholders.

Overall, the European sample could be expected to produce similar results to the four main results obtained in the American sample, after the differences for shareholder characteristics, particularly the larger shareholdings by corporate and individual investors have been accounted for. Other differences could be a result of lower level of integration in the market (which in either case has been increasing significantly, see Coeurdacier et al., 2009); however, such effects are not expected to affect the psychology of reference points in a significant manner.

As such, the approach used by Baker, Pan and Wurgler shall be employed in this paper in order to verify the findings on 52-week-high price and an anchor price across a sample of European mergers and acquisitions, critically assessing the suitability of the chosen approach. In addition, an enhancement of the analysis by including shareholder-specific controls and sub-samples shall be employed to verify the finding across different shareholder groups.

II. Data

A. Offer Data and Stock Price Data

The sample of acquisition transactions has been obtained from the SDC Platinum database containing information on US and international acquisitions. The sample was limited in terms of geographical scope, the timing of the announcement of the mergers and acquisitions that took place, deal type and target company type.

Geographically the sample was limited to acquisitions in the 17 European countries (in terms of the location of the target company): Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Luxemburg, Netherlands, Norway, Portugal, Republic of Ireland, Spain, Sweden, Switzerland and the United Kingdom. The choice of countries was centered on the EU-15 countries, constituting the majority of the European economy and the most significant part of the merger and acquisition activity in the continent. As part of the European Union, the countries face a relatively similar economic and regulatory environment and have been exposed to similar regulatory developments, such as the adoption of the European Takeover Directive in 2004. In addition 12 of the countries were members of the Euro area. Norway and Switzerland were also added as countries significantly integrated into the economy of the European Union and having had relatively similar regulatory environment during the period through their membership of the European Economic Area and their adoption of the EU legislation in the areas of free movement of people, goods and capital. Expanding the selection to other European countries was considered but would have necessitated some control over regulatory environment without adding a significant number of additional observations.

The time frame for the sample was from January 1, 2000 to December 31, 2010. 2010 was chosen as the last year for the observations in order to have a full picture of the time period, since some of the information in the databases (such as deal outcome, as well as shareholder information) is updated some time after the announcement date.

Finally, the selection criteria were added to limit the sample to observations where the target was a publicly listed company, for the obvious reason of being able to obtain share price information, and the bidder acquired (or aimed to acquire) at least 50% of the target's shares, thus constituting an actual acquisition attempt, as opposed to what could be considered an "investment".

The selection criteria limited the data to 4249 bids for which the information about the offer price was available. Offer price was quoted as the amount offered per share of the common stock in the target company's currency. The number of observations per country and year is provided in Exhibit I.

The stock price data was acquired from Thompson Reuters based on the target Datastream codes acquired from SDC. The starting point for the share price data was the share price 30-days before the acquisition in order to eliminate, or at least reduce, the effect of rumors that tend to adjust the stock price some time before the proposed acquisition is announced (among others, Jarrell and Poulsen, 1989). Price data was acquired for the entire 365 day period preceding the 30 days before the acquisition in order to calculate 52-week-high price, share price percentiles, return and volatility data. Complete share price data was acquired for 3208 observations.

Exhibit I: Country Distribution

Country	Companies
Austria	37
Belgium	87
Denmark	75
Finland	47
France	523
Germany	270
Greece	69
Republic of Ireland	30
Italy	152
Luxembourg	13
Netherlands	134
Norway	185
Portugal	53
Spain	94
Sweden	196
Switzerland	79
United Kingdom	1164

The stock price selection introduced the problems of working in a multi-country, multi-currency environment. The share price was data was adjusted for the purposes of calculating the offer premium to account for: (1) cross-border listings (whereby the target company's share price was quoted in a different currency from that of its country of origin), mostly prevalent due to industry specific (e.g. oil companies listing in Norway) and size considerations (European, particularly Irish, companies listing in the UK and, to a lesser extent, the US and Canada); (2) changes in currency (whereby share prices were retroactively quoted by Thompson Reuters in Euro and acquisition prices by SDC in the original currency during the transitional period before 2002) and (3) quoting differences (where Thompson Reuters quoted the prices in pennies and SDC in pounds for the UK targets). The currency exchange data, where necessary, was acquired from Thompson Reuters and acquisition price adjustments were applied manually.

From the transaction and stock price data, offer premium was calculated as the offer price per share of the common stock less the share price 30 days before the acquisition announcement date. 52-week-high premium was calculated as the highest price over the 365 calendar day period ending 30 days before the acquisition announcement date less the share price 30 days before the acquisition announcement date. Both premiums are normalized by dividing by the share price 30 days before the acquisition announcement date.

The information on the outcome of the offer (completed, withdrawn or other/unknown), whether the offer was hostile or not and the payment type offered (cash, stock or a combination) were also acquired from SDC for the majority of the transactions. It is worth noting that the sample includes individual bids and thus track the success of each individual bid, not the eventual outcome of the subsequent bidding process. In addition, information was acquired to highlight a financial buyer (primarily to identify private equity companies).

Finally, information was taken from SDC and Thompson Reuters, where the information was missing on the SDC, on the financial indicators of the target company and the buyer, including the underlying data necessary to calculate ratios such as return on assets, return on shareholder equity, book to market ratio, earning to price ratio and market capitalization.

Notably, however, the financial information was much more scarcely available than the share price information for the sample. The entire information on the fundamentals of the target company was acquired for 2044 transactions. Some of the information on the bidder (return on assets and return on equity) was acquired for 1059 companies. Significantly lower number of bidding companies had market-related information (market capitalization, E/P and B/M ratios available) due to the fact that no requirement was put on the bidder being a listed company. Due to this fact, the control variables used in the analysis will not include bidder market-specific variables as the inclusion of such variables would limit the sample size to an unreasonable extent.

Return on equity was defined as net income divided by common equity. Return on assets was defined as EBIT divided by total assets. Book-to-market was defined as the common equity divided by the multiple of a number of shares and the stock price 30 days before the acquisition. Earnings over price ratio was calculated as earnings per share divided by the stock price 30 days before the acquisition. All the profit and loss statement items were calculated for the latest 12 month period available at the time of the announcement of the offer. All the balance sheet items were calculated for the last date available before the announcement of the offer.

In the observed sample of 3208 offers for acquisition, the average normal acquisition premium was 38.8%. The average 52-week-high premium was 90.2%, indicating that for an average company the stock price had fallen by nearly half from its 52-week-high price at the time the offer was announced. The median of the 52-week-high premium was much lower, at 18.8%, indicating significant outliers in the sample. To reduce the effect of the outliers, the 52-week-high premium was winsorized at 1% and 99%

Of the offers in the observed sample, 71.1% resulted in an acquisition. Nearly 7% of the deals were hostile and 63% were tender offers. 64% of the deals were financed with cash, while only 16% were financed with stock. In only 1.5% of the deals the bidder was a financial company. While such a low result can be expected to some extent, given that that the European private equity market has not been as active as the US, private equity activity has been extremely high in general prior to 2008. One potential explanation is that the deals done by private equity companies are under-reported. Alternatively, private equity acquisitions of listed companies, while very public, might not be that significant in number, compared to their investments in already private companies. The average target company had a ROE of 15.9 percent, while the bidder had 16.8 percent. Return on assets was 6.2 and 6.1 percent for target and bidder, respectively. More interestingly, the respective numbers are 16.6 and 16.8 percent ROE and 6.1 and 5.6 percent ROA if only those companies where both bidder and target results are available are included. The ROA figure runs somewhat counter to the traditional view (Lang and Stulz, 1984) that the acquirers tend to perform better than the targets and the companies become targets when they're poorly managed.

Of the offers where the share price was available, 31.6 were attempted cross-border mergers. The portion of cross-border mergers remained relatively static in the data (30.6% and

32.7% for the first and second half of the sample period, respectively), despite several measures to increase the cross-border capital flows within the EU. Finally, 42.9% of the attempted mergers were horizontal mergers (i.e. within companies of the same industry group). The low portion can probably be explained by the rather strict definition of industry group (same industry code), rather than any tendencies for vertical or diversifying mergers in the market.

Summary statistics are provided in Table 11.

B. Shareholder Data

The data on shareholder ownership of the target company was the most complicated in terms of availability and access of information. The source of the information was Bureau van Dijk Orbis database, containing independently collected information on approximately 50 million European companies. In addition to general and financial information, Orbis contains information about the subsidiaries and shareholders of the companies in the database, as well as certain shareholder characteristics. The information on the database is primarily recorded from disclosure of large block holdings, public disclosures, stock exchange fillings, annual reports and disclosures to the public authorities. The composition of the database is important in the sense that Orbis tends to report on the shareholders of large companies and large block holders within other large companies much better than for dispersed shareholders. Another feature of the database is that the width (companies included) and the depth (information available on each company) of the database have been increasing rapidly, with more information available for relatively recent transactions.

The common identifier used for Orbis was the name of the target company within SDC and the name of the company (or previous name of the company) within Orbis.

The information obtained from Orbis included shareholder name, shareholder type (as classified in the database and share held (in percent) for the date of the announcement of the offer. Notably, with respect to shareholder information, Orbis accumulates and aggregates the data and does not perform stringent quality checks on the information included. As such, the data available has been quality assessed and manually reviewed to: (1) eliminate instances where the company was reported as holding its own stock, (2) eliminate instances where the same shareholder is reported twice under slightly different names, (3) fix the classification of the shareholder where the shares are held by the holding company of an industrial group. Particular attention was paid to situations where two or more shareholders were reported to hold majority share blocks that are obviously mutually exclusive. These instances were reviewed manually to identify a potential relationship between the shareholders that might have led to the duplication, as well as a potential sale. If no additional information could be found, the date of the information on shareholdings being added to Orbis was taken into account the latest information used for the future analysis.

For the purpose of analyzing the data in a combined manner, shareholder classification groups used by Orbis were replaced by four categories: private individuals (including managers of the company), corporate non-financial companies, financial companies (banks, where the bank represents its clients, private equity and venture capital companies, insurance companies, investment and pension funds, sovereign wealth funds and other financial institutions) and other shareholders (state and municipal governments, research institutes, non-profit organizations).

Shareholder information was obtained for 798 companies, of which 685 had share price available and were thus included in the final sample. Within this smaller sample, the average target company had information available on 68.6% of the total shares, with the average largest shareholder holding 30.6% of the total.

The most common type of largest shareholder was financial shareholder (in 462 cases of the 685). A corporate shareholder was the largest in 223 instances. Private individuals controlled the largest single shareholding in 85 target companies, while in the remaining 15 instances a different type of shareholder had the control.

Financial shareholders cumulative owned an average of 39.1 percent of the shares of the target; individuals controlled 7.1% of the shares (of which management controlled 0.4%), while corporate shareholders controlled a 20.2% share.

C. Main Sample

As noted above, the observed sample included 3208 offers for an acquisition, while the average normal acquisition premium was 38.8%. However, the premium offered varied substantially within the sample. Of particular note, however, was the lowest side of the offer premium range, with the lowest offer premium as low as -99.9%, with the 5th percentile at -51%. Such high portion of highly negative offer premium is (1) inconsistent with data in the previous empirical research, (2) raises concerns about the reliability of the data reported in the databases and (3) if the quality of data within the databases is not thrown into doubt, considering the rigorous corrections applied to account for currency exchange and other differences, the highly negative offer premiums could mean the presence in the sample of highly distressed companies, where the target is acquired for a fraction of its market worth a short time before the acquisition. Since the analysis of distressed companies is not the purpose of this report and including such companies in the sample could substantially interfere with the analysis of the remaining traditional bid offers, such companies were excluded from the main analysis. For this purpose, distressed companies were considered to be those with an offer premium being negative and larger than 10% of the market price of the share 30 days before the acquisition announcement date.

III. **Results**

A. Basic results and robustness

The analysis starts by testing the relationship between the 52-week-high prices and the offer prices of subsequent acquisition attempts. Figure 1 plots the 52-week-high premium over the offer premium. While the results do not provide for a conclusive relationship, the linear prediction does at least suggest a level of correlation between the two variables. The more surprising observation for the proponent of efficient pricing in mergers and acquisitions can be made from Figure 2, which plots the difference between the 52-week-high premium and the offer premium. The difference is centered around zero, with the most common difference being zero itself. This suggests that the most common offer price made by the bidder has been exactly the 52-week-high price, to some extent substantiating the role this price reference point plays in the bidding process. Furthermore, the difference between the 52-week-high premium and the offer premium is somewhat skewed to the right in the entire sample reviewed, indicating that more often than not the bid price exceeded the 52-week-high point.

A simple look at the relation between the two variables is also presented by a set of OLS regressions of the form (the full specification of this and other regressions are in the appendix):

$$\frac{Offer\ Price_i}{Price_{i,t-30}} = a + b\left(\frac{52WeekHighPrice_{i,t-30}}{Price_{i,t-30}}\right) + e_i \qquad (1)$$

The above and all the subsequent regressions control for the inverse of the 30-day market price to control for the colinearity that might be introduced by deriving both the pricing indicators using the same 30-day market price.

The OLS regression is first run over three sub-samples that will not play an important role in the further analysis: (1) the full sample for which information about the offer price and the market prices has been available, including the observations with the extreme negative values of offer premium, (2) a sample consisting only of the observations with positive offer premiums and (3) a sample consisting only of the observations with negative offer premiums. The results of these regressions are shown in the Table 1. Curiously, the relation between the offer premium and the 52-week-high premium has been shown to be statistically significant in the full sample and the sample consisting of only positive offer premiums (at 1% significance level), as well as the sample consisting of the negative offer premiums (at 10% significance level). The lower significance of the third sample is not surprising given the much lower number of observations for that sub-sample. More surprising, however, is the negative coefficient for the relationship between the 52-week-high price and the offer price in this particular sub-sample, indicating a discount for the difference between these two prices, inconsistently with the other sub-samples and the previous empirical observations. This may hint towards a peculiar relation between the two variables for clearly distressed companies that may warrant its own analysis, however, such analysis is beyond the scope of this paper and is not easily conceivable using the current data set, as the number such companies is hardly sufficient for rigorous statistical analysis.

The results of the OLS regression of the form shown in equation (1) over the main sample, consisting of the observations with the bid premium larger than negative 10%, are also presented in Table 1. The relationship between the 52-week-high premium and offer premium is positive and significant. Interpreting it linearly, it shows that for each 10% of difference between the 52-high-price and the current price, the price offered by the bidder increases by just over 1%. While statistically and economically significant by itself, the result may not reveal the full effect of the price reference point. Specifically, it does not account for any non-linear features that the relationship may exhibit.

A simple quadratic prediction, presented in the Figure 3 hints towards a non-linear relation between the 52-week-high and the offer premium. Furthermore, a non-linear relation

Table 1 (Extract) 52-Week-High Premium in OLS Regressions

Column	1	2	3	4
Number of Observations	3208	2743	431	2950
b	0.0795***	0.1184***	-0.021*	0.1196***
	4.26	9.85	-1.7	9.98
Inverse Price	0.003	0.0294***	-0.012	0.0284***
	0.23	3.67	-1.6	3.65

Full table can be found in the appendix

between the two variables is intuitively valid: if we accept, for the purpose of company valuation (offer price in an attempted acquisition), the relevance of price reference points as the information not fully represented in the current market price, it is also viable that these price "anchors" have more weight in those instances where such an anchor is relatively close to the current observed price level. In other words, 52-week-high price may be more likely to be argued for as a fair valuation of the company by its shareholders and more easily accepted by the prospective bidder if such 52-week-high price is relatively close to the current market price of the share. Where the difference between these two prices is very high, it may serve as an indication of more substantial changes in the business of the target company that may make it difficult to present the 52-week price as a valid benchmark price.

For the purpose of accounting for the non-linearity of the relation between 52-week-high premium and the offer premium, a piecewise linear regression is used of the form:

$$\frac{Offer\ Price_i}{Price_{i,t-30}} - 1 = a + b_1 PW_1 + b_2 PW_2 + b_3 PW_3 + e_i \qquad (2)$$

$Where$

$$PW_1 = \min\left(\left(\frac{52WeekHighPrice_{i,t-30}}{Price_{i,t-30}} - 1\right), 0.25\right)$$

$$PW_2 = max\left(min\left(\left(\frac{52WeekHighPrice_{i,t-30}}{Price_{i,t-30}} - 1.25\right), 0.5\right), 0\right)$$

$$PW_3 = max\left(\left(\frac{52WeekHighPrice_{i,t-30}}{Price_{i,t-30}} - 1.75\right), 0.25\right)$$

This specification allows accounting for the non-linearity of the relation between the two key variables, while maintaining the simplicity of linear specification and the intuitiveness of its results. Coefficient b_1 shows the relation between the offer premium and the 52-week-high premium lower than 25%, coefficient b_2 shows the *marginal* relation between the offer premium and the part of the 52-week-high premium between 25% and 75%, while coefficient b_3 shows the marginal relation between the offer premium and the part of the 52-week-high premium in excess of 75%. In effect, the significance of either of the coefficients would signal a relationship between the offer premium and the 52-week-high premium, albeit with different implications for its form.

In its simple form, the regression as specified in the equation (2) shows a significant marginal effect of 52-week-high premium across all three levels of the indicator. Notably, as predicted by the Figure 3, the effect is non-linear, with the first 25% of the 52-week-high premium having a stronger effect and leveling of thereafter, although the difference is not very significant. The results and relevant statistics for the regression are presented in the column (1) of the Table 2.

Notably, column (1) also provides the equivalent OLS regression as specified in equation (1). It can be seen from the results that while the different coefficients were by themselves significant, the prediction power of the model, as measured by R-squared did not exhibit a substantial increase, in fact dropping slightly below the OLS specification, while at the same time introducing the problems with a larger number of variables. Due to this, both OLS and piecewise linear specifications shall be used for the further tests in the analysis.

At its essence the 52-week high premium (expressed as a percentage of the 30-day market price) represents simply a return of the underlying share over a period of time that is specific for each case but not exceeding 12 months. As such, it might be speculated that the observed effect of the 52-week-premium is merely a manifestation of a return over a specific period before the acquisition that is of particular relevance for the investors and/or the bidder. For that reason, the regression (2) in the Table 2 includes as controlled variables the returns of the shares of the target company over the different 1-month periods before the 30-days prior to the acquisition. The periods range from 1 to 12 months before the cut-off date. The inclusion of the returns as control variables did not have a significant effect on the relation between the 52-week high premium and the offer premium.

Further regressions in Table 2 expand on the robustness test for the analysis of the 52-week high price by including a number of control variables in analysis. The control variables are introduced in several stages to more accurately assess their impact and the implications for their inclusion. Regression (3) includes the transaction-specific control variables for (a) cash offers, (b) stock offers, (c) hostile approaches, (d) tender offers and (e) approaches by a financial buyer. Regression (4) includes target-specific control variables: (a) return on assets, (b) book-to-market ratio, (c) market capitalization, (d) volatility of target returns. The inclusion of these variables results in a sub-sample of 2044 offers (down from 2932). Regression (5) includes the bidder specific variable: return on assets. The inclusion of the bidder variable reduces the size of this particular sub-sample to just 1059 observations. Finally, all the control variables from regressions (3), (4) and (5) are used together in the regression (6). The inclusion of the highly restrictive target and bidder-specific control variables limits the size of the sample to just 778 observations, potentially impacting the significance of any results observed.

The main result from the base piece-wise linear and OLS regressions was not significantly affected by the inclusion of the transaction-specific control variables. Of those, only the hostility of the offer had by itself a significant positive effect on the offer price, although the effect is much smaller than in the US market, potentially explained by the limited market for hostile takeovers in Europe due to much higher prevalence of entrenchment and acquisition defenses (Cantrijn, Jeunink, Kabir, 1997).

The inclusion of the target-specific control variables also did not have a very significant effect on the prevalence of the 52-week high, with the exception of the effects in the range of the 52-week-high premium exceeding 75%.

Bidder specific variable, on the other hand had a major effect on the significance of the effect of the 52-week-high price, although not to the point of eliminating the statistical significance. Results suggest that better performing bidders (i.e. having higher return on assets) bid higher and/or have at least some tendency for shares that have performed poorly (supported by Mitchell and Lehn (1990)), thus explaining away a part of the effect of the 52-week-high price. It is difficult, however, to attribute the differences to such speculation, as opposed to a much-reduced sample size without much broader analysis.

The overall results of the analysis up to this point indicate a relationship between the 52-week-high price and the offer price that is inconsistent with the theory of efficient pricing of mergers and acquisitions. The analysis supports the findings from the empirical research on the American mergers. On the other hand, the reported coefficients for this relation in the European market have been consistently lower than those estimated for the US which does not affect the statistical significance of the results, but indicates a lower economic significance.

B. Shareholder-Specific Controls

The purpose of including the shareholder characteristics in the analysis is two-fold. Firstly, the introduction of the various parameters indicating the ownership of the target companies allows for improving the robustness of the base tests by eliminating the potential shareholder-related explanations to the relationship between 52-week-high price and the offer price. Secondly, analyzing the sub-samples of companies according to their shareholder characteristics allows to test whether the 52-week-high effect, if existent, differs depending on the target's shareholders. The second aspect of the shareholder characteristics is analyzed in the section D below.

The shareholder-specific controls are applied across two samples. The first sample consists of the transactions for which information on target company's shareholders has been obtained, as specified in the description of the data set, and encompasses a total of 619 companies. The control within this sample has a relatively high degree of reliability, although the sample size itself might make it a challenge to compare the results with the corresponding results in the whole sample, due to its limited size.

The large sample includes all the transactions for which other key and control variables (including price and return controls) are available, including those transactions where the shareholder characteristics are unknown. In such case, the control variable for a particular shareholder characteristic controls for transactions exhibiting that shareholder characteristic relative to transactions that do not exhibit that shareholder characteristic *and* all transactions where such shareholder characteristic is unknown. The use of the large sample allows for expanding the number of observations and makes the results more comparable to the previous analysis at the expense of introducing noise to the analysis and diminishing the role of the shareholder-specific control variables since the shareholder characteristics where they have not been observed may vary significantly. On the other hand, this effect may be diminished by the fact that the shareholder-specific control variables used in the analysis focus on large block holdings and the data source for shareholder-specific information, Orbis database, bases its information largely on reports of large block holdings. Therefore, where information about shareholders within Orbis has not been available, the prevalence of large block holders could be expected to be less likely. Nevertheless, the results obtained from the large sample should be treated with appropriate caution.

Table 3 presents the results of the tests on the small sample of transactions. Regression (1) shows the base regression (regression (1) from Table 2) within the small sample. Even in this small sample, 52-week-high price shows significant (at 1%) effect on the offer price in the largest 52-week-high premium range and also a positive relationship in the lowest 52-week-high premium range under a much more generous level of significance of 15%.

Regressions (2)-(4) show the tests including individual control variables for the largest disclosed shareholder (private, corporate or financial) regardless of the size of the stake owned. Of the control variables, neither significantly affected the relationship between the 52-week-high premium and the offer premium and only corporate ownership indictor had a significant and negative relation with the offer premium by itself. This observation is interesting as some of the corporate (and to a much lesser extent other types) owners in the sample are the eventual bidders in the transactions and could thus be in a position to offer relatively lower premiums in a situation of a squeeze-out. Controlling for such instances, however, is hardly possible due to non-transparent nature of the data on shareholder ownership.

Regression (5) shows the results of including all three of the controlling variables. The 52-week high effect remains persistent in the sub-sample. Inclusion of the standard transaction-specific controls does not alter the outcome.

Regressions in Table 4 represent the tests including controls for more significant cumulative shareholder stakes. Specifically, the regression (1) includes a control whether the cumulative shareholding of all corporate shareholders exceeds 50%. Regressions (2) and (3) do the same for the cumulative shareholdings of the financial and individual shareholders, respectively. Regressions (4) and (5) include all three of the above controls without and with transaction specific-controls respectively. The 50% threshold has been chosen as the level of shareholding that is typically associated with total control of the company (with the exception of certain decisions) and thus represents a situation where the control of the company cannot be seized without the consent or complacency of one or more of constituent shareholders, even though a lower level of shareholding may be sufficient to block a complete takeover of the target. Cumulative analysis of the shareholders also assumes a level of uniformity in decision making within a certain shareholder group. This level of uniformity is particularly realistic for individual shareholdings, where there are typically a small number of significant and related shareholders (e.g. family members or business partners), as well as for corporate shareholders, where there is typically a single significant corporate shareholder or a group of related (e.g., a parent company and an off-shore holding company) corporate shareholders.

The results of the regressions (1)-(5) show that large ownership blocks do not explain away the relationship between the 52-week-high premium and the offer premium. The corresponding coefficients and standard errors remained relatively consistent across the tests within the small sample.

A more curious result, on the other hand shows a statistically strong and persistent relationship between the offer premium and large share ownership by corporate and private shareholders. Companies with cumulative corporate or individual shareholdings in excess of 50% receive on average around 7% lower acquisition premium on the share price. The source of this underpricing, be it the bidder being under the same corporate control, or the bidder placing a lower valuation due to concerns over private insider information, is unclear and any analysis beyond mere identification of this phenomena in the sample analyzed is outside the scope of this paper.

Table 5 represents the results of the corresponding tests over the large sample. Regressions (1)-(5) represent the equivalents of the regressions in Table 3. Regressions (6)-(10) represent the equivalents to the regressions in Table 4. The results of the tests over the large sample have been entirely consistent with the results within the smaller sample, albeit with the higher significance for the relation between the 52-week-high premium and offer premium, consistent with the expectations of reduced standard errors due to the larger sample size.

C. Sub-Samples

While the analysis so far has indicated a persistence of the relation between 52-week-high price and the offer price in the presence of a number of transaction-specific, target-specific, bidder-specific and shareholder-specific control variables, little has been observed about impact these variables have on the strength of the relationship. For that purpose, the relation between the offer premium and the 52-week-high premium is analyzed across a number of sub-samples using the specification:

$$\frac{Offer\ Price_i}{Price_{i,t-30}} - 1 = a + b_1 PW_1 + b_2 PW_2 + b_3 PW_3 + b_{S1} PW_{S1} + b_{S2} PW_{S2} + b_{S3} PW_{S3} + e_i \qquad (3)$$

Where

PW_1, PW_2, PW_3 are the same as in equation (2)

$PW_{SX} = PW_X \times Control_X$

The standard controls used to divide the sample into sub-samples have been: (1) tender offer, (2) hostile offer, (3) successful offer, (4) stock offer, represented in the corresponding segments of Table 6. The first regression indicates a somewhat smaller impact of the 52-week-high premium in direct tender offers. This result, specific to the European sample, is counter-intuitive to the perception that shareholders demand an acquisition premium with a reference to 52-week-high price, since the tender offers are aimed at target's shareholders directly. In fact, the result suggests that the source of the relation may be the decision making by the management which, in European mergers and acquisitions plays a more important role.

However, it is not supported by the fact that similar differences are not observed in the sub-sample of hostile approaches.

Successful offers exhibit a larger positive relationship between the offer price and the 52-week-high price where the 52-week-high premium is between 25 and 75 percent but reverses for extremely large values. A more suitable relation between the success of the offer and the 52-week-high price, however, is presented in the probability analysis below.

Finally, the sub-sample of transactions where the offer consists mostly of stock has exhibited a significantly smaller effect of the 52-week-high price compared to largely-cash transactions. An explanation has been proposed that the 52-week-high represents a significant reference point in cash transactions where this reference point may be used in communication with an external financer, although there is no possibility to test this proposed explanation with the data available.

Another different sub-sample has been tested based on the transaction initiation date, with transactions initiated during 2008-2010 forming a sub-sample affected by the late-2000s financial crisis and its aftermath. This period has been characterized by significant fluctuations in the stock markets and the price reference points could be expected to be of lesser significance in such market environment. However, no significant difference in the relation between the 52-week-high premium and offer premium has been observed, suggesting a continued relevance of the price reference points even in a turbulent and otherwise highly peculiar market.

Finally, two country-specific sub-samples have been tested. In the first sub-sample, transactions where the target is located the United Kingdom was tested against the rest of the European sample. Separating the analysis for the United Kingdom could add additional robustness to the analysis due to the structural differences between the UK and the remainder of the sample. Moerland (1995) classifies the United Kingdom as a market-oriented system much closer to that of the US, as opposed to largely network oriented systems in the rest of Europe, particularly countries like Germany. In addition, the United Kingdom is the country with the most observations in the sample. The results for the United Kingdom indicate a much stronger effect of the 52-week-high price on the offer price in the country, at least in instances where the deviation from the 52-week-high price was not very large. In fact, the overall results for the UK-based targets were significantly closer to the results observed in the US market.

France was another country separately analyzed due to a relatively large number of transactions observed. The results for the sub-sample of the French companies, have not been that straightforward, with the stronger effect of the 52-week high in the mid-range and a smaller effect of the 52-week-high price in the range of largest differences between the 52-week-high price and the prevalent market price.

D. Shareholder-Specific Sub-Samples

The approach defined in section C above is used for creating sub-samples based on shareholder characteristics. The sub-samples tested are: companies with the largest shareholder being (1) corporate, (2) financial and (3) private individual(s), companies where more than 50% of shares are cumulatively held by (4) corporate shareholders, (5) financial shareholders and (6) private individuals. The sub-sample is compared to the small sample and the large sample, as defined in the section B above. The results are presented in Tables 7 and 8 for the small sample and large sample, respectively.

Regressions (1) and (4) bring about the most interesting results of the section. Compared to the small sample, the sub-sample consisting of the companies with a corporate entity as the largest shareholder exhibited statistically and economically significant difference in the relation between the 52-week high and the offer price within the 52-week-high premium range up to 25% (which contains by far the largest number of observations). This observation persisted within the control-specific sub-sample (4), as well as the comparison with the large sample in Table 8. Moreover, the same finding was observed in the corresponding OLS specification. The implication of this finding is that the bidders for targets with significant corporate shareholding/control exhibit a much weaker reference to the 52-week-high price. Taking into account that European companies tend to include significant and concentrated corporate shareholders relative their American counterparts (Moerland, 1995), this observation could go a long way towards explaining the different smaller size of coefficients observed in Section A. Excluding the companies with *known* corporate shareholders from the full sample brings the coefficients of the regressions from Section A some way closer to those observed in the US sample.

Interpretation of the results related to shareholdings by personal individuals is much less straightforward. While the corresponding regressions (2) and (5) comparing the sub-sample to both large and small samples produce a smaller coefficient for the relation between 52-week-high premium and the offer premium within the mid-range (25% to 75%) of observations of the former, the observations across other ranges were less consistent. Specifically, the sub-sample of companies with an individual as the largest shareholder exhibited a stronger relation between the 52-week high and the offer price within the 52-week-high premium range up to 25%, but the significance of this difference disappears when considering individual shareholders controlling more than 50% of the shares. The interpretation could be that the presence of a large individual shareholder does push the bidder to offer a bid price closer to the 52-week high price, but the same effect is not present when a number of significant individual shareholders have significant stakes, potentially indicating the obstacles to the coordination between the individual shareholders. This is, however, not observed in the range of 52-week-high premium exceeding 75%, as the targets with majority individual ownership demonstrating a relatively stronger relation between the 52-week-high premium and the offer premium.

No similar significant differences from the overall small and large samples are observed in the sub-sample of companies with large and controlling financial shareholders.

E. Probability of Deal Success

Most of the tests in the previous analysis deal with the offers for acquisition and thus do not by themselves measure an economic transfer due to the persistence of 52-week-high. Only looking at the strictly successful deals allows for an estimation of the actual economic impact of the 52-week-high price. In addition, while the offer price may be a reflection of the expectations of the shareholders and managers of the target company, it only *directly* measures the decision of the shareholders or, more precisely, the management of the bidding company and their estimation of the offer price that would be required by the target's stakeholders. Whether the offer is ultimately successful, however, depends directly on whether the price offered to the shareholders of the target reflects their perception of its value. Therefore, looking at the outcome of the offer allows for estimating directly whether the 52-week-high has a measurable effect on their decision making.

Looking at the data by itself suggests a potential relationship between the outcome of the deal and the 52-week-high price. The overall sample has an offer success rate of 70.7% (offers with unknown outcome are excluded). At the same time, the acquisition attempts where the offer price matched or exceeded the 52-week-high price had a success rate of 72.4% and those where the offer price was lower than the 52-week-high price had a success rate of 69.2%. To estimate the significance of this difference Probit regression is run of the form:

$$Pr(S) = a + b\left(\frac{Offer\ Price_i}{Price_{i,t-30}}\right) + c(H52W) + e_i \quad (4)$$

Where $S = 1$ if offer is successful and 0 otherwise

Where $H52W$ equals 1 if the offer price exceeds $52WeekHighPrice_{i,t-30}$ and 0 otherwise

Table 10 shows the results of the Probit analysis. Column (1) indicates the test in its simplest form. Column (2) adds return-specific control variables; column (3) adds transaction-specific control variables.

The above tests indicate a significantly higher probability for deal success if the offer price exceeds the 52-week-high price. The statistical significance of the deal disappears, however, once target-specific control variables (specifically, B/M ratio) are included in column (4).

Of the other variables, hostile takeovers, as could be expected, results in a much lower probability of success, whereas tender offers demonstrate a higher probability. The form of payment has no noticeable effect on the outcome.

Most curiously, however, the offer premium shows a negative (significant prior to the inclusion of the inclusion of target-specific control variables) relation with the probability of the success of the deal. A direct interpretation would be that the shareholders become less likely to accept the deal with the increase in offer premium. This interpretation is highly counter-intuitive and cannot be justified by economic theory. An alternative explanation can be derived from Boone and Mulherin (2007) who demonstrate that a large number of companies are sold in a competitive auction process that takes place prior to the first public offer. Therefore, the offer that is observed in the sample, including the offer price, is an outcome of a non-transparent price negotiation process and thus the offer price by the time the offer is made already reflects the price that is likely to be accepted by the shareholders. Such an explanation is supported by the extremely lower probability of deal success in case of hostile offers, as hostile offers do not benefit from such a negotiation process or, at least, the benefit is a lot less tangible.

As a result, the probability analysis might be a useful tool in demonstrating how the bid-side effect of the 52-week-high price translates into the decision making by the target's shareholders, but the probability analysis of the observable outcomes cannot be considered meaningful without observing the price-setting process and the negotiations that led to the offer price.

F. Alternative price reference points

A key proposition for the reference point theory in merger and acquisition pricing is the prevalence of specific price reference points, namely 52-week-high. 52-week-high is primarily attractive because of its standing as a highly publicized price reference point. As such, it could be argued that the 52-week-high price matters above and beyond the exact path the market price has taken up to the point or any particular (random) point along that path.

To test this proposition, 52-week-high is fared against the other levels of past pricing, specifically the 80th, 90th, 95th and 99th percentile in the regression of the form:

$$\frac{Offer\ Price_i}{Price_{i,t-30}} - 1 = a + b_1 PW_1 + b_2 PW_2 + b_3 PW_3 + c_{XPCT1} PW_{XPCT1} + c_{XPCT2} PW_{XPCT2} + c_{XPCT3} PW_{XPCT3} + e_i \qquad (5)$$

Where

PW_1, PW_2, PW_3 are the same as in equation (2)

$PW_{XPCT1}, PW_{XPCT2}, PW_{XPCT3} =$ equivalent breakdown of the Xth percentile price premium

Where the specifications for the coefficients b_1, b_2, b_3 are exactly the same as in equation (2). The coefficients c_1, c_2, c_3 represent the corresponding piecewise estimators for the 80th, 90th, 95th and 99th percentiles in, respectively, the regressions (1), (2), (3) and (4) in the Table 9. Inverse 30-day price, monthly returns and transaction characteristics are included to support the robustness of the tests. Target and bidder-specific characteristics are excluded in order to maintain the sample size comparable to previous tests and prior research.

The results of the tests are somewhat unexpected. While the inclusion of different and highly correlated alternative price reference points did not eliminate the significance of the 52-week high price, the performance of the alternative price reference points themselves was better than suggested by the results of the US sample. In fact, the alternative price reference points exhibited stronger relation to the offer price in the range of observation with the smallest deviations from the reference point. Since this range includes the largest number of observations, the results make it difficult to claim the supremacy of the 52-week-high price over the alternatives proposed. In particular, all the alternative price reference points exhibited significantly higher significance in the OLS specification, largely explaining away the effect of the 52-week-premium.

On the other hand, the alternative percentile reference points do not exhibit a similar high visibility of the 52-week-high price and are known (and of little practical interest) only to the people willing to perform technical analysis of the past prices. It is therefore little or no room for such indicators to serve as “anchors” in the context of reference point theory Kahneman (1992). What it could, however, indicate is the presence of an alternative, as of yet unclear, price reference point, such as acquisition price of shares, which correlates with the observed indicators.

IV. Conclusions

The results of the analysis have indicated a relationship between the 52-week-high price and the offer price that is inconsistent with the theory of efficient pricing of mergers and acquisitions. The relationship persisted in the sample after inclusion of transaction-specific controls and financial information on the transactions participants, as well as the inclusion of shareholder-specific characteristics. The analysis supports the findings from the empirical research on the American mergers. On the other hand, the economic significance of this relation in the European market is consistently lower than that estimated for the US.

The analysis of subsamples of data revealed no particularly significant variation of the effect of the 52-week-high price on the offer premium, except for the sub-sample consisting of the UK-based companies. Consistently with the view of the UK as the closest country in Europe to the US in terms of market structure, the strength of price references in the UK was much closer to that of the US.

The analysis of shareholder-specific subsamples revealed significant deviations within the sample of companies controlled by corporate shareholders. Such companies tended to exhibit much weaker relation between the 52-week-high price and the offer price. The difference is likely to be explained by the relevance of different price reference points for corporate shareholders. Similar, but much less conclusive effects are observed for companies in the sample with significant private ownership. Further research in this area is highly desirable and could be accommodated in the coming years by much-improving information on the shareholdings of European companies.

On the other hand, several observations from the American sample could not be replicated in the European data. Probability analysis suggests some relationship between the 52-week-high price and the acquisition offer being accepted, however, the effect disappears once financial variables of the target are controlled for. It is speculated that the reason behind such results is the tendency for the bid offers to reflect a result of non-observable price negotiations and the price reference points are likely to be sufficiently represented in the eventual offer.

While the findings in general support the view of the reference point theory of M&A pricing in the European market, the 52-week-high as the particularly significant reference point cannot be conclusively accepted. Other past price points exceeded the statistical significance of the 52-week-high price. While not serving as useful price-reference points themselves, these price points may indicate a different, highly correlated price reference point of relevance to European investors. Identification of such a reference point could be of primary interest for future studies.

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VI. Appendix

Tables in this appendix present regression analysis of the following specification:

Table 1: Linear relation between 52-week-high premium and offer premium

OLS specification: same as in equation (1). All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.

Table 2: Linear and non-linear relation between 52-week-high premium and offer premium with control variables

OLS specification: same as in equation (1). Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.
Piecewise linear specification: Same as in equation (2). Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.

Table 3: Shareholder-specific controls in the small sample

OLS specification: same as in equation (1). Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.
Piecewise linear specification: Same as in equation (2). Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.

Table 4: Additional shareholder-specific controls in the small sample

OLS specification: same as in equation (1). Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.
Piecewise linear specification: Same as in equation (2). Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.

Table 5: Shareholder-specific controls in the large sample

OLS specification: same as in equation (1). Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.
Piecewise linear specification: Same as in equation (2). Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.

Table 6: Analysis of general sub-samples

OLS specification:

$$\frac{Offer\ Price_i}{Price_{i,t-30}} = a + b\left(\frac{52WeekHighPrice_{i,t-30}}{Price_{i,t-30}}\right) + b_{Sub}(52WHSubsample) + e_i \qquad (6)$$

Where

b is the same as in equation (1)

$PW_{SX} = \ PW_X \times Control_X$

Control variable is equal to 1 in the selected sub-sample and 0 otherwise. Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.
Piecewise linear specification: Same as in equation (3). Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.

Table 7: Shareholder-specific sub-samples – small sample

OLS specification: same as in equation (6). Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.
Piecewise linear specification: Same as in equation (3). Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.

Table 8: Shareholder-specific sub-samples – small sample

OLS specification: same as in equation (6). Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.
Piecewise linear specification: Same as in equation (3). Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.

Table 9: Analysis of alternative price-reference points

OLS specification:

$$\frac{Offer\ Price_i}{Price_{i,t-30}} = a + b\left(\frac{52WeekHighPrice_{i,t-30}}{Price_{i,t-30}}\right) + b_{X-Percentile}\left(\frac{52WeekPriceXPercentile_{i,t-30}}{Price_{i,t-30}}\right) + e_i \qquad (7)$$

Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.
Piecewise linear specification: Same as in equation (4). Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.

Table 10: Probability analysis of deal success

Probit specification: same as in equation (5). Control variables are added. Returns are monthly log returns. All ratios expressed in log terms. Robust t-statistics are provided below the coefficient.

Table 1: Linear relation between 52-week-high premium and offer premium				
Specification	OLS	OLS	OLS	OLS
Column	1	2	3	4
Number of Observations	3208	2743	431	2950
R2	0.0101	0.0955	0.008	0.0887
Constant	0.149***	0.2171***	-0.315***	0.197***
	18.1	40.2	-8.3	37.3
b	0.0795***	0.1184***	-0.021*	0.1196***
	4.26	9.85	-1.7	9.98
Inverse Price	0.003	0.0294***	-0.012	0.0284***
	0.23	3.67	-1.6	3.65

Table 2: Linear and non-linear relation between 52-week-high premium and offer premium with control variables												
Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4		5		6	
N	2950	2950	2949	2949	2932	2932	2044	2044	1059	1059	778	778
R2	0.0887	0.0884	0.0937	0.0933	0.0984	0.098	0.208	0.2108	0.0707	0.0706	0.2217	0.2296
Constant	0.197***	0.1909***	0.1993***	0.1951***	0.2087***	0.2042***	0.3034***	0.2982***	0.2792***	0.2732***	0.2746***	0.2634***
	37.3	22.4	36.4	21.8	5.6	5.51	11.1	10.3	12.4	10.6	4.25	4.12
b	0.1196***		0.1168***		0.1175***		0.1116***		0.1085***		0.0637*	
	9.98		9.48		9.53		5.61		4.56		1.86	
B1		0.1755***		0.1537***		0.1618***		0.1485***		0.156		0.2345**
		2.85		2.42		2.55		2.34		1.45		2.14
B2		0.0853**		0.0891**		0.082**		0.1708***		0.0954		0.1062
		2.13		2.21		2.02		3.24		1.25		1.26
B3		0.0839***		0.0826***		0.0848***		0.0235		0.0687**		-0.036
		4.94		4.82		4.91		0.82		2.07		-0.6
InvPrice	0.0284***	0.0286***	0.0282***	0.0284***	0.0283***	0.0284***	0.0336***	0.0357***	0.039	0.039	0.1008***	0.1033***
	3.65	3.61	3.63	3.58	3.66	3.61	3.9	3.81	1.1	1.09	3.31	3.47
Return(t-1)			-0.324**	-0.315**	-0.322**	-0.313**	-0.139	-0.115	-0.217	-0.193	-0.121	-0.12
			-2.2	-2.1	-2.2	-2.1	-0.7	-0.6	-0.7	-0.7	-0.4	-0.4
Return(t-2)			0.0306	0.0344	0.0261	0.0304	-0.209	-0.195	0.3222	0.3316	0.2872	0.3768
			0.16	0.18	0.14	0.16	-0.9	-0.9	0.97	1	0.84	1.12
Return(t-3)			0.1323	0.1337	0.1104	0.1127	0.078	0.0795	0.0207	0.0286	-0.227	-0.187
			0.75	0.75	0.62	0.63	0.39	0.4	0.07	0.09	-0.6	-0.5
Return(t-4)			-0.211	-0.197	-0.213	-0.2	0.1719	0.1923	0.1404	0.1544	0.8165***	0.7974***
			-1	-1	-1.1	-1	0.73	0.82	0.44	0.49	2.48	2.42
Return(t-5)			-0.112	-0.11	-0.105	-0.104	0.0293	0.0587	0.1915	0.1833	0.4079	0.4023
			-0.6	-0.6	-0.6	-0.6	0.16	0.32	0.65	0.61	1.24	1.24
Return(t-6)			-0.04	-0.042	-0.036	-0.037	-0.078	-0.056	-0.019	-0.027	0.0544	0.083
			-0.2	-0.2	-0.2	-0.2	-0.4	-0.3	0	-0.1	0.18	0.28
Return(t-7)			-0.232	-0.234	-0.245	-0.245	0.1166	0.1537	-0.317	-0.302	0.4437	0.5165*

Table 2: Linear and non-linear relation between 52-week-high premium and offer premium with control variables												
Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4		5		6	
			-1.3	-1.3	-1.4	-1.4	0.58	0.76	-0.9	-0.9	1.44	1.69
Return(t-8)			0.2062	0.2091	0.2353	0.239	-0.08	-0.076	0.1637	0.166	-0.383	-0.36
			1.16	1.17	1.31	1.33	-0.4	-0.4	0.51	0.51	-1.2	-1.2
Return(t-9)			-0.186	-0.182	-0.19	-0.186	-0.239	-0.222	-0.521	-0.511	-0.532	-0.528
			-1	-1	-1	-1	-1.1	-1	-1.4	-1.3	-1.3	-1.3
Return(t-10)			-0.261	-0.259	-0.278*	-0.275	-0.206	-0.208	-0.354	-0.352	-0.885***	-0.869***
			-1.5	-1.5	-1.6	-1.5	-1	-1	-1	-1	-2.8	-2.8
Return(t-11)			-0.15	-0.146	-0.13	-0.125	-0.108	-0.116	-0.018	-0.016	-0.061	-0.061
			-0.9	-0.9	-0.8	-0.7	-0.5	-0.6	0	0	-0.2	-0.2
Return(t-12)			0.1022	0.107	0.0983	0.1032	0.4189**	0.4339**	0.1604	0.1666	-0.044	0.0523
			0.59	0.62	0.56	0.59	2.21	2.31	0.52	0.53	-0.1	0.16
Cash					0.0186	0.0191					0.0282	0.0269
					1	1.03					1.01	0.99
Stock					-0.038	-0.039					-0.012	-0.017
					-1.1	-1.2					-0.4	-0.5
Hostile					0.0478***	0.0478***					0.0576***	0.06***
					2.6	2.6					2.4	2.45
Tender					0.0102	0.0102					0.0394***	0.0396***
					1.15	1.15					2.45	2.46
Financial					0.0485	0.049					0.11	0.1048
					1.13	1.14					1.11	1.05
Target ROA							0.0169***	0.0168***			0.0108	0.0096
							3.67	3.64			1.34	1.2
Target B/M							0.0965***	0.097***			0.0878***	0.0892***
							9.48	9.54			5.48	5.6
Target (log) Capitalization							0	0			0.0007	0.0007
							0	0			0.43	0.4

Table 2: Linear and non-linear relation between 52-week-high premium and offer premium with control variables												
Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4		5		6	
Target volatility							-0.425	-0.521			0.8303	0.7198
							-0.7	-0.9			0.86	0.77
Bidder ROA									0.0205***	0.0205***	0.0163**	0.0179**
									3.41	3.41	2.16	2.34

Table 3: Shareholder-specific controls in the small sample

Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4		5		6	
N	619	619	619	619	619	619	619	619	619	619	615	615
R2	0.1479	0.1531	0.1514	0.1567	0.153	0.158	0.1479	0.1531	0.1536	0.1587	0.1799	0.1849
Constant	0.1799***	0.18***	0.1648***	0.1636***	0.1908***	0.1913***	0.1798***	0.18***	0.2239***	0.223***	0.1106*	0.1009*
	16	9.84	10.5	7.23	16.2	10.7	15.2	9.71	4.44	4.24	1.85	1.68
b	0.1303***		0.1309***		0.1302***		0.1303***		0.1304***		0.126***	
	5.36		5.4		5.34		5.37		5.36		5.34	
B1		0.2063		0.2184*		0.1981		0.2067*		0.2025		0.2182*
		1.6		1.67		1.56		1.61		1.58		1.69
B2		-0.051		-0.054		-0.046		-0.051		-0.048		-0.056
		-0.5		-0.5		-0.5		-0.5		-0.5		-0.6
B3		0.1462***		0.1463***		0.1456***		0.1462***		0.1458***		0.1414***
		4.2		4.19		4.18		4.2		4.17		4.04
InvPrice	0.0898**	0.0905***	0.0911**	0.0919***	0.0917**	0.0924***	0.0898**	0.0905***	0.0918**	0.0925***	0.0923***	0.093***
	2.33	2.4	2.33	2.4	2.34	2.41	2.33	2.4	2.34	2.41	2.39	2.46
Return(t-1)	-0.169	-0.21	-0.154	-0.193	-0.14	-0.182	-0.169	-0.211	-0.138	-0.18	-0.219	-0.253
	-0.5	-0.6	-0.4	-0.5	-0.4	-0.5	-0.5	-0.6	-0.4	-0.5	-0.6	-0.7
Return(t-2)	-0.397	-0.44	-0.414	-0.455	-0.451	-0.493	-0.398	-0.439	-0.43	-0.471	-0.356	-0.392
	-1.1	-1.2	-1.2	-1.2	-1.3	-1.4	-1.1	-1.2	-1.2	-1.3	-1	-1.1
Return(t-3)	0.4617	0.5086	0.4783	0.5256	0.4877	0.5331	0.4619	0.5085	0.4855	0.531	0.4685	0.5159
	1.26	1.4	1.31	1.46	1.34	1.48	1.26	1.4	1.33	1.48	1.3	1.45
Return(t-4)	0.0325	0.0671	0.0017	0.0366	-0.016	0.019	0.0322	0.0674	-0.011	0.0232	-0.061	-0.021
	0.09	0.2	0.01	0.11	0	0.06	0.09	0.2	0	0.07	-0.1	0

Table 3: Shareholder-specific controls in the small sample

Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4		5		6	
Return(t-5)	0.4881	0.4913	0.4771	0.4819	0.4743	0.4766	0.4883	0.4912	0.4664	0.4692	0.4332	0.4426
	1.24	1.27	1.22	1.25	1.22	1.24	1.24	1.27	1.19	1.22	1.18	1.22
Return(t-6)	0.4162	0.5	0.3926	0.4772	0.3775	0.4598	0.4161	0.5002	0.3762	0.4591	0.3822	0.47
	1.12	1.33	1.06	1.27	1.02	1.23	1.12	1.32	1.02	1.23	1.04	1.26
Return(t-7)	0.1068	0.0814	0.1025	0.0793	0.0956	0.0698	0.1068	0.0815	0.089	0.064	0.1037	0.0782
	0.29	0.22	0.28	0.22	0.26	0.19	0.29	0.22	0.24	0.18	0.29	0.22
Return(t-8)	0.4328	0.4825	0.4218	0.4718	0.4327	0.4812	0.4332	0.4822	0.4262	0.4745	0.3616	0.4096
	1.42	1.6	1.38	1.56	1.41	1.58	1.42	1.6	1.39	1.56	1.2	1.37
Return(t-9)	-0.108	-0.061	-0.082	-0.034	-0.067	-0.022	-0.108	-0.061	-0.056	-0.01	0.0017	0.0448
	-0.2	-0.1	-0.1	0	-0.1	0	-0.2	-0.1	-0.1	0	0	0.1
Return(t-10)	-0.61**	-0.639**	-0.607**	-0.635**	-0.593**	-0.623**	-0.61**	-0.639**	-0.586**	-0.616**	-0.547*	-0.573**
	-2	-2.1	-2	-2.1	-1.9	-2.1	-2	-2.1	-1.9	-2	-1.8	-1.9
Return(t-11)	0.2919	0.3129	0.3024	0.3231	0.2938	0.3147	0.2913	0.3134	0.3142	0.3355	0.2759	0.2949
	0.9	0.96	0.95	1.01	0.91	0.97	0.9	0.96	0.97	1.04	0.85	0.91
Return(t-12)	-0.08	-0.142	-0.07	-0.13	-0.056	-0.118	-0.079	-0.142	-0.062	-0.124	-0.151	-0.205
	-0.2	-0.4	-0.2	-0.4	-0.1	-0.3	-0.2	-0.4	-0.2	-0.4	-0.5	-0.6
Cash											0.0134	0.0173
											0.46	0.59
Stock											0.045*	0.0486*
											1.65	1.83
Hostile											0.0728***	0.0715***
											2.65	2.6
Tender											0.0643***	0.0635***
											3.67	3.6

Table 3: Shareholder-specific controls in the small sample												
Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4		5		6	
Largest Shareholder Financial			0.0272	0.0275					-0.031	-0.03	-0.016	-0.014
			1.56	1.57					-0.6	-0.6	-0.3	-0.3
Largest Shareholder Corporate					-0.035*	-0.034*			-0.068	-0.066	-0.053	-0.051
					-1.7	-1.7			-1.2	-1.2	-1.1	-1.1
Largest Shareholder Individual							0.0008	0	-0.043	-0.043	-0.029	-0.029
							0.04	0	-0.8	-0.8	-0.5	-0.6

Table 4: Additional shareholder-specific controls in the small sample

Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4		5	
N	619	619	619	619	619	619	619	619	615	615
R2	0.1519	0.1573	0.1608	0.1661	0.1514	0.1572	0.1662	0.1723	0.1899	0.196
Constant	0.1704***	0.1702***	0.1922***	0.1922***	0.1832***	0.1826***	0.1913***	0.1903***	0.0941**	0.0842**
	14.2	9.56	16.3	10.3	15.9	9.94	14.4	10.4	2.31	2.06
b	0.1249***		0.1273***		0.129***		0.1235***		0.1192***	
	4.97		5.24		5.28		4.9		4.84	
B1		0.2025		0.2052*		0.2195*		0.2176*		0.2316*
		1.56		1.6		1.7		1.69		1.78
B2		-0.058		-0.054		-0.064		-0.072		-0.081
		-0.6		-0.5		-0.6		-0.7		-0.8
B3		0.143***		0.144***		0.1476***		0.144***		0.1403***
		4.1		4.14		4.23		4.13		4.03
InvPrice	0.0913***	0.0922***	0.0898***	0.0906***	0.0901***	0.091***	0.0909***	0.0918***	0.0911***	0.092***
	2.35	2.43	2.34	2.42	2.35	2.43	2.37	2.46	2.4	2.49
Return(t-1)	-0.141	-0.182	-0.091	-0.132	-0.168	-0.21	-0.078	-0.118	-0.164	-0.197
	-0.4	-0.5	-0.2	-0.4	-0.5	-0.6	-0.2	-0.3	-0.4	-0.5
Return(t-2)	-0.421	-0.465	-0.453	-0.496	-0.39	-0.434	-0.456	-0.5	-0.375	-0.416
	-1.2	-1.3	-1.3	-1.4	-1.1	-1.2	-1.3	-1.4	-1.1	-1.2
Return(t-3)	0.4666	0.5153	0.4152	0.4625	0.4317	0.4795	0.3858	0.435	0.3657	0.416
	1.28	1.43	1.13	1.28	1.18	1.33	1.05	1.21	1.01	1.17
Return(t-4)	0.0178	0.0513	-0.056	-0.022	0.0087	0.042	-0.088	-0.055	-0.117	-0.08
	0.05	0.15	-0.1	0	0.03	0.12	-0.2	-0.1	-0.3	-0.2
Return(t-5)	0.4984	0.5021	0.4539	0.4573	0.4502	0.4518	0.4184	0.4207	0.39	0.3985
	1.28	1.31	1.17	1.2	1.13	1.15	1.06	1.09	1.04	1.08
Return(t-6)	0.4053	0.491	0.3227	0.4071	0.4754	0.5708	0.382	0.4791	0.3945	0.4973
	1.09	1.3	0.88	1.09	1.28	1.51	1.04	1.28	1.07	1.32

Table 4: Additional shareholder-specific controls in the small sample

Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4		5	
Return(t-7)	0.0857	0.0591	0.0864	0.0611	0.0922	0.0656	0.0614	0.0342	0.0722	0.0427
	0.23	0.16	0.23	0.17	0.25	0.18	0.17	0.1	0.2	0.12
Return(t-8)	0.4025	0.4526	0.4307	0.4807*	0.4497	0.5044*	0.4349	0.4902*	0.3777	0.4335
	1.32	1.5	1.43	1.61	1.48	1.67	1.44	1.64	1.27	1.47
Return(t-9)	-0.057	-0.008	-0.081	-0.033	-0.105	-0.055	-0.055	-0.003	-0.008	0.0396
	-0.1	0	-0.1	0	-0.2	-0.1	-0.1	0	0	0.09
Return(t-10)	-0.589**	-0.618**	-0.614**	-0.643**	-0.614**	-0.644**	-0.608**	-0.638**	-0.57**	-0.598**
	-1.9	-2	-2	-2.1	-2	-2.1	-2	-2.1	-1.9	-2
Return(t-11)	0.289	0.3099	0.284	0.3048	0.2806	0.3011	0.2708	0.2911	0.2448	0.2627
	0.89	0.95	0.88	0.94	0.87	0.93	0.84	0.89	0.76	0.81
Return(t-12)	-0.096	-0.159	-0.101	-0.163	-0.096	-0.161	-0.126	-0.192	-0.205	-0.265
	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5	-0.4	-0.6	-0.6	-0.8
Cash									0.0176	0.0222
									0.6	0.76
Stock									0.0415	0.0454*
									1.5	1.69
Hostile									0.0636**	0.0621**
									2.28	2.23
Tender									0.0633***	0.0624***
									3.68	3.6
Financials larger than 50%	0.0305	0.0314					0.0139	0.0144	0.0102	0.0108
	1.53	1.58					0.69	0.71	0.5	0.52
Corporates larger than 50%			-0.071***	-0.071***			-0.07***	-0.07***	-0.066***	-0.067***
			-3.2	-3.3			-3.2	-3.2	-2.9	-3
Individuals larger than 50%					-0.065**	-0.071***	-0.069**	-0.075***	-0.068**	-0.074***
					-2	-2.4	-2.1	-2.5	-2	-2.3

Table 5 (Columns 1-5): Shareholder-specific controls in the large sample

Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4		5	
N	2949	2949	2949	2949	2949	2949	2949	2949	2932	2932
R2	0.0939	0.0935	0.0943	0.0939	0.0937	0.0933	0.0944	0.094	0.0984	0.0981
Constant	0.1981***	0.1938***	0.2008***	0.1966***	0.1994***	0.1951***	0.1998***	0.1956***	0.2085***	0.2041***
	34.5	21	36.3	22.1	36	21.7	33.9	21.2	5.43	5.33
b	0.1169***		0.1168***		0.1168***		0.1169***		0.1172***	
	9.49		9.46		9.48		9.47		9.49	
B1		0.155***		0.152***		0.1541***		0.1537***		0.1609***
		2.44		2.4		2.43		2.43		2.54
B2		0.0885**		0.0904**		0.089**		0.0897**		0.082**
		2.19		2.25		2.21		2.23		2.03
B3		0.0827***		0.0822***		0.0826***		0.0824***		0.0846***
		4.83		4.8		4.82		4.81		4.9
InvPrice	0.0283***	0.0284***	0.0283***	0.0284***	0.0282***	0.0284***	0.0283***	0.0285***	0.0283***	0.0285***
	3.63	3.59	3.63	3.58	3.62	3.58	3.63	3.58	3.65	3.61
Return(t-1)	-0.324**	-0.314**	-0.32**	-0.31**	-0.324**	-0.315**	-0.32**	-0.31**	-0.319**	-0.309**
	-2.2	-2.1	-2.2	-2.1	-2.2	-2.1	-2.2	-2.1	-2.1	-2.1
Return(t-2)	0.0328	0.0367	0.0208	0.0244	0.0312	0.0351	0.0237	0.0276	0.0189	0.0233
	0.17	0.19	0.11	0.13	0.16	0.18	0.12	0.15	0.1	0.12
Return(t-3)	0.1332	0.1348	0.1353	0.1364	0.1321	0.1336	0.1357	0.1371	0.1084	0.1105
	0.75	0.76	0.76	0.77	0.74	0.75	0.77	0.77	0.6	0.62
Return(t-4)	-0.215	-0.201	-0.215	-0.201	-0.21	-0.196	-0.218	-0.204	-0.212	-0.199
	-1.1	-1	-1.1	-1	-1	-1	-1.1	-1	-1	-1
Return(t-5)	-0.112	-0.11	-0.114	-0.112	-0.112	-0.111	-0.114	-0.112	-0.109	-0.107
	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
Return(t-6)	-0.044	-0.046	-0.041	-0.043	-0.04	-0.042	-0.044	-0.046	-0.038	-0.039
	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
Return(t-7)	-0.232	-0.234	-0.236	-0.238	-0.232	-0.234	-0.236	-0.238	-0.249	-0.25

Table 5 (Columns 1-5): Shareholder-specific controls in the large sample

Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4		5	
	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.4	-1.4
Return(t-8)	0.2075	0.2105	0.2051	0.2079	0.2057	0.2086	0.2057	0.2086	0.2289	0.2324
	1.16	1.18	1.15	1.17	1.15	1.17	1.15	1.17	1.27	1.29
Return(t-9)	-0.182	-0.178	-0.184	-0.18	-0.186	-0.182	-0.181	-0.177	-0.183	-0.178
	-1	-0.9	-1	-1	-1	-1	-1	-0.9	-1	-0.9
Return(t-10)	-0.262	-0.26	-0.257	-0.255	-0.261	-0.258	-0.259	-0.256	-0.274	-0.27
	-1.5	-1.5	-1.5	-1.4	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5
Return(t-11)	-0.15	-0.147	-0.147	-0.144	-0.149	-0.145	-0.147	-0.144	-0.142	-0.137
	-0.9	-0.9	-0.9	-0.8	-0.9	-0.9	-0.9	-0.8	-0.8	-0.8
Return(t-12)	0.1029	0.1077	0.1039	0.1086	0.102	0.1068	0.1041	0.109	0.1004	0.1053
	0.6	0.62	0.6	0.63	0.59	0.62	0.61	0.63	0.58	0.6
Cash									0.0201	0.0207
									1.09	1.12
Stock									-0.038	-0.038
									-1.1	-1.1
Hostile									0.0481***	0.0481***
									2.61	2.61
Tender									0.0094	0.0093
									1.05	1.04
Largest Shareholder	0.0099	0.0101					0.0082	0.0084	0.0062	0.0065
Financial	0.85	0.87					0.7	0.72	0.52	0.54
Largest Shareholder			-0.021	-0.021			-0.02	-0.02	-0.021	-0.021
Corporate			-1.1	-1.1			-1.1	-1.1	-1.1	-1.1
Largest Shareholder					-0.003	-0.004	-0.003	-0.004	-0.004	-0.005
Individual					-0.1	-0.1	-0.1	-0.2	-0.1	-0.2
Financials larger than 50%										
Corporates larger than 50%										

Table 5 (Columns 1-5): Shareholder-specific controls in the large sample										
Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4		5	
than 50%										

Table 5 (Columns 6-10): Shareholder-specific controls in the large sample										
Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
	6		7		8		9		10	
N	2949	2949	2949	2949	2949	2949	2949	2949	2932	2932
R2	0.0941	0.0936	0.0962	0.0958	0.0944	0.094	0.0972	0.0968	0.101	0.1006
Constant	0.1983***	0.194***	0.2016***	0.1974***	0.2***	0.1956***	0.2012***	0.1968***	0.2107***	0.206***
	35.8	21.7	36.4	22	36.3	21.8	35.8	21.9	5.6	5.51
b	0.1164***		0.1163***		0.1166***		0.1155***		0.1159***	
	9.43		9.43		9.44		9.34		9.37	
B1		0.1537***		0.1528***		0.1557***		0.1549***		0.1628***
		2.42		2.41		2.46		2.44		2.57
B2		0.0879**		0.0891**		0.0871**		0.0859**		0.0779**
		2.18		2.22		2.16		2.13		1.92
B3		0.0825***		0.082***		0.0827***		0.082***		0.0843***
		4.81		4.78		4.82		4.78		4.88
InvPrice	0.0283***	0.0285***	0.0283***	0.0284***	0.0282***	0.0284***	0.0284***	0.0285***	0.0284***	0.0285***
	3.63	3.59	3.63	3.59	3.63	3.59	3.65	3.6	3.67	3.63
Return(t-1)	-0.322**	-0.313**	-0.311**	-0.302**	-0.324**	-0.315**	-0.309**	-0.3**	-0.309**	-0.299**
	-2.2	-2.1	-2.1	-2	-2.2	-2.1	-2.1	-2	-2.1	-2
Return(t-2)	0.0318	0.0356	0.0168	0.0205	0.0291	0.0329	0.0164	0.0202	0.0125	0.0169
	0.17	0.19	0.09	0.11	0.15	0.17	0.09	0.11	0.07	0.09
Return(t-3)	0.1331	0.1346	0.1245	0.1258	0.1275	0.1293	0.1205	0.1223	0.0926	0.0953
	0.75	0.76	0.7	0.71	0.72	0.73	0.68	0.69	0.52	0.53
Return(t-4)	-0.215	-0.201	-0.224	-0.21	-0.216	-0.202	-0.233	-0.22	-0.225	-0.212
	-1.1	-1	-1.1	-1	-1.1	-1	-1.2	-1.1	-1.1	-1

Table 5 (Columns 6-10): Shareholder-specific controls in the large sample

Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
	6		7		8		9		10	
Return(t-5)	-0.11	-0.108	-0.117	-0.116	-0.12	-0.118	-0.122	-0.121	-0.118	-0.117
	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
Return(t-6)	-0.043	-0.045	-0.05	-0.052	-0.029	-0.031	-0.042	-0.044	-0.036	-0.037
	-0.2	-0.2	-0.3	-0.3	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2
Return(t-7)	-0.233	-0.235	-0.239	-0.241	-0.233	-0.235	-0.241	-0.243	-0.254	-0.254
	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.4	-1.4	-1.4	-1.4
Return(t-8)	0.207	0.2099	0.2061	0.2091	0.2091	0.2122	0.2099	0.213	0.2329	0.2366
	1.16	1.18	1.16	1.18	1.17	1.19	1.18	1.2	1.3	1.32
Return(t-9)	-0.179	-0.175	-0.183	-0.179	-0.184	-0.18	-0.174	-0.17	-0.178	-0.173
	-1	-0.9	-1	-1	-1	-1	-0.9	-0.9	-1	-0.9
Return(t-10)	-0.262	-0.259	-0.261	-0.259	-0.261	-0.258	-0.262	-0.26	-0.278*	-0.273
	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	-1.6	-1.5
Return(t-11)	-0.151	-0.148	-0.144	-0.141	-0.15	-0.146	-0.146	-0.142	-0.141	-0.135
	-0.9	-0.9	-0.8	-0.8	-0.9	-0.9	-0.9	-0.8	-0.8	-0.8
Return(t-12)	0.101	0.1057	0.0963	0.1011	0.0975	0.1024	0.0904	0.0953	0.088	0.0929
	0.59	0.61	0.56	0.59	0.57	0.59	0.53	0.55	0.51	0.53
Cash									0.0213	0.022
									1.15	1.19
Stock									-0.039	-0.04
									-1.2	-1.2
Hostile									0.0459***	0.046***
									2.49	2.49
Tender									0.0089	0.0088
									1	0.99
Largest Shareholder Financial										
Largest Shareholder Corporate										

Table 5 (Columns 6-10): Shareholder-specific controls in the large sample										
Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
	6		7		8		9		10	
Individual										
Financials larger than 50%	0.0156	0.0156					0.0162	0.0162	0.0129	0.0129
	0.95	0.95					1	1	0.78	0.78
Corporates larger than 50%			-0.063***	-0.063***			-0.064***	-0.064***	-0.062***	-0.063***
			-3.1	-3.1			-3.1	-3.1	-3	-3
Individuals larger than 50%					-0.063**	-0.063**	-0.061**	-0.061**	-0.062**	-0.062**
					-2	-2	-2	-2	-2	-2

Table 6: Analysis of general sub-samples														
Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
	1		2		3		4		5		6		7	
N	2932	2932	2949	2949	2910	2910	2949	2949	2949	2949	2949	2949	2949	2949
R2	0.0941	0.0958	0.0938	0.0937	0.0946	0.0969	0.0937	0.096	0.0938	0.094	0.0963	0.0964	0.0938	0.0991
Constant	0.1997***	0.1959***	0.1994***	0.195***	0.1998***	0.1951***	0.1993***	0.1949***	0.1991***	0.1948***	0.201***	0.1956***	0.1992***	0.1952***
	36.3	21.8	36.4	21.8	36.2	21.6	36.3	21.7	36.2	21.7	36.6	21.8	36.3	21.8
b	0.126***		0.1171***		0.135***		0.1246		0.1199***		0.0915***		0.1162***	
	6.35		9.34		6.85		1.27		8.24		5.83		9.21	
B1		0.0937		0.1454**		0.2002**		0.7313***		0.1692***		0.1037		0.1722***
		1.08		2.26		2.2		2.38		2.49		1.48		2.66
B2		0.0677		0.0939**		-0.029		0.1685		0.1049**		0.0952**		0.0362
		0.93		2.24		-0.3		0.4		2.04		1.89		0.87
B3		0.125***		0.0838***		0.1457***		-0.074		0.0739***		0.0607***		0.0995***
		3.94		4.76		4.53		-0.7		3.31		2.59		5.61
Beta (Sub-sample - Sample)	-0.014		-0.006		-0.024		-0.007		-0.007		0.0437***		0.0081	
	-0.7		-0.2		-1.1		0		-0.4		2.37		0.27	
B1 (Sub-sample - Sample)		0.0904		0.1226		-0.064		-0.585**		-0.074		0.1259**		-0.133
		1.17		0.88		-0.7		-1.9		-1		1.93		-1.3
B2 (Sub-sample - Sample)		0.0302		-0.05		0.1819**		-0.081		-0.016		-0.012		0.4364***
		0.36		-0.3		2.01		-0.1		-0.2		-0.1		3.43
B3 (Sub-sample - Sample)		-0.063*		-0.047		-0.093***		0.1601		0.0207		0.0308		-0.181***
		-1.7		-0.8		-2.5		1.52		0.62		0.93		-3.7
InvPrice	0.0282***	0.0284***	0.0282***	0.0283***	0.0278***	0.0275***	0.0282***	0.0283***	0.0283***	0.0287***	0.0295***	0.0298***	0.0283***	0.0282***
	3.58	3.51	3.62	3.57	3.6	3.62	3.62	3.58	3.66	3.6	3.69	3.65	3.63	3.64
Return(t-1)	-0.327**	-0.303**	-0.324**	-0.313**	-0.278**	-0.258*	-0.324**	-0.31**	-0.321**	-0.316**	-0.326**	-0.319**	-0.322**	-0.301**
	-2.2	-2.1	-2.2	-2.1	-1.9	-1.7	-2.2	-2.1	-2.2	-2.1	-2.2	-2.2	-2.2	-2
Return(t-2)	0.0312	0.037	0.0309	0.0358	0.0435	0.054	0.0296	0.0399	0.0269	0.0259	0.0116	0.0131	0.0268	0.0507
	0.17	0.2	0.16	0.19	0.23	0.28	0.16	0.21	0.14	0.14	0.06	0.07	0.14	0.27
Return(t-3)	0.1259	0.1179	0.1337	0.1429	0.1172	0.1093	0.131	0.1306	0.131	0.1364	0.1248	0.121	0.1317	0.1542

Table 6: Analysis of general sub-samples

Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
	1		2		3		4		5		6		7	
	0.7	0.66	0.75	0.8	0.65	0.61	0.74	0.73	0.74	0.77	0.71	0.68	0.74	0.88
Return(t-4)	-0.197	-0.191	-0.211	-0.198	-0.17	-0.137	-0.212	-0.207	-0.212	-0.195	-0.235	-0.218	-0.209	-0.202
	-1	-0.9	-1	-1	-0.8	-0.7	-1.1	-1	-1.1	-1	-1.2	-1.1	-1	-1
Return(t-5)	-0.097	-0.113	-0.112	-0.111	-0.067	-0.054	-0.112	-0.118	-0.113	-0.117	-0.16	-0.154	-0.109	-0.122
	-0.5	-0.6	-0.6	-0.6	-0.4	-0.3	-0.6	-0.7	-0.6	-0.7	-0.9	-0.9	-0.6	-0.7
Return(t-6)	-0.034	-0.038	-0.039	-0.036	-0.057	-0.058	-0.04	-0.057	-0.039	-0.042	-0.05	-0.05	-0.04	-0.039
	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.2	-0.3	-0.2	-0.2	-0.3	-0.3	-0.2	-0.2
Return(t-7)	-0.253	-0.262	-0.232	-0.231	-0.261	-0.26	-0.231	-0.251	-0.231	-0.224	-0.251	-0.255	-0.229	-0.217
	-1.4	-1.5	-1.3	-1.3	-1.5	-1.4	-1.3	-1.4	-1.3	-1.2	-1.4	-1.4	-1.3	-1.2
Return(t-8)	0.2208	0.2044	0.2049	0.2051	0.2538	0.2343	0.207	0.1889	0.2078	0.2215	0.1916	0.1977	0.2043	0.2291
	1.23	1.14	1.15	1.15	1.42	1.31	1.18	1.07	1.17	1.25	1.08	1.11	1.15	1.3
Return(t-9)	-0.203	-0.207	-0.187	-0.186	-0.158	-0.142	-0.185	-0.214	-0.186	-0.179	-0.159	-0.159	-0.185	-0.188
	-1.1	-1.1	-1	-1	-0.8	-0.7	-1	-1.2	-1	-1	-0.8	-0.8	-1	-1
Return(t-10)	-0.258	-0.241	-0.26	-0.262	-0.279*	-0.267	-0.262	-0.247	-0.259	-0.261	-0.296*	-0.3*	-0.258	-0.253
	-1.5	-1.4	-1.5	-1.5	-1.6	-1.5	-1.5	-1.4	-1.5	-1.5	-1.7	-1.7	-1.5	-1.4
Return(t-11)	-0.159	-0.143	-0.15	-0.148	-0.174	-0.177	-0.148	-0.151	-0.148	-0.138	-0.163	-0.16	-0.149	-0.155
	-0.9	-0.9	-0.9	-0.9	-1	-1.1	-0.9	-0.9	-0.9	-0.8	-1	-1	-0.9	-0.9
Return(t-12)	0.103	0.1053	0.1019	0.1062	0.0573	0.0638	0.1015	0.1119	0.1014	0.0985	0.0681	0.0784	0.103	0.0701
	0.6	0.61	0.59	0.62	0.33	0.37	0.59	0.65	0.59	0.57	0.39	0.46	0.6	0.42

Table 7: Shareholder-specific sub-samples – small sample

Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4		5		6	
N	619	619	619	619	619	619	619	619	619	619	619	619
R2	0.1528	0.168	0.1523	0.1597	0.1481	0.1589	0.1559	0.1707	0.1485	0.1548	0.1479	0.1606
Constant	0.18***	0.1809***	0.1797***	0.1788***	0.1798***	0.182***	0.1819***	0.1807***	0.1806***	0.1802***	0.1799***	0.1793***
	16	9.86	16	9.73	16	9.91	16	9.86	16.2	9.81	16	9.75
b	0.1513***		0.0992***		0.1331***		0.1427***		0.1182***		0.1308***	
	5.79		3.04		5.2		5.8		3.66		5.35	
B1		0.3514***		0.1299		0.1197		0.2819**		0.142		0.2138*
		2.58		0.91		0.89		2.13		0.98		1.61
B2		-0.102		-0.095		0.0205		-0.042		0.0002		-0.033
		-1.1		-0.5		0.2		-0.4		0		-0.3
B3		0.1482***		0.1524***		0.1423***		0.1354***		0.1291***		0.1366***
		3.89		2.75		3.72		3.78		2.61		3.81
b (Sub-sample - Sample)	-0.067*		0.0595*		-0.017		-0.119**		0.0216		-0.016	
	-1.6		1.63		-0.3		-1.9		0.58		-0.1	
B1 (Sub-sample - Sample)		-0.534***		0.1686		0.3892***		-0.474***		0.1808		0
		-3.6		1.22		2.42		-2.8		1.22		0
B2 (Sub-sample - Sample)		0.2171		0.0733		-0.407**		-0.113		-0.136		-0.777***
		0.93		0.39		-1.9		-0.5		-0.7		-4
B3 (Sub-sample - Sample)		-0.013		-0.01		0.024		0.0701		0.0302		0.2931***
		-0.1		-0.1		0.27		0.71		0.47		6.52
InvPrice	0.092***	0.0912***	0.0912***	0.0918***	0.0896**	0.0897***	0.0901**	0.0909***	0.0901**	0.0915***	0.0898**	0.092***
	2.38	2.4	2.35	2.41	2.32	2.35	2.34	2.41	2.33	2.44	2.33	2.44
Return(t-1)	-0.145	-0.168	-0.114	-0.176	-0.161	-0.162	-0.121	-0.124	-0.163	-0.2	-0.17	-0.236
	-0.4	-0.5	-0.3	-0.5	-0.4	-0.4	-0.3	-0.3	-0.5	-0.6	-0.5	-0.7
Return(t-2)	-0.422	-0.516	-0.382	-0.468	-0.382	-0.474	-0.413	-0.534	-0.409	-0.454	-0.397	-0.46
	-1.2	-1.4	-1.1	-1.2	-1	-1.3	-1.2	-1.5	-1.1	-1.2	-1.1	-1.3
Return(t-3)	0.4027	0.5671	0.4188	0.4841	0.4643	0.5761	0.2992	0.427	0.458	0.4958	0.4607	0.4694
	1.11	1.57	1.15	1.35	1.27	1.58	0.82	1.16	1.25	1.37	1.26	1.28

Table 7: Shareholder-specific sub-samples – small sample												
Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4		5		6	
Return(t-4)	-0.092	-0.004	-0.045	0.0167	0.0426	0.0897	-0.132	-0.055	0.0031	0.0254	0.033	0.1011
	-0.2	0	-0.1	0.05	0.12	0.26	-0.3	-0.1	0.01	0.07	0.1	0.3
Return(t-5)	0.4996	0.4519	0.4998	0.4775	0.4901	0.4434	0.4668	0.4617	0.5066	0.5106	0.4878	0.4754
	1.29	1.17	1.28	1.22	1.25	1.15	1.21	1.2	1.28	1.31	1.24	1.22
Return(t-6)	0.3789	0.4849	0.4069	0.4943	0.4238	0.5213	0.3055	0.4249	0.4196	0.5065	0.4206	0.5413
	1.03	1.3	1.1	1.32	1.14	1.38	0.83	1.14	1.13	1.33	1.13	1.43
Return(t-7)	0.119	0.0745	0.1408	0.0867	0.1128	0.0745	0.0404	0.0589	0.0945	0.0689	0.1058	0.1102
	0.32	0.2	0.39	0.24	0.31	0.21	0.11	0.16	0.26	0.19	0.29	0.3
Return(t-8)	0.4748	0.4477	0.4522	0.4878*	0.4262	0.4435	0.4412	0.5156*	0.4348	0.4635	0.4347	0.4794
	1.54	1.47	1.48	1.61	1.4	1.48	1.47	1.69	1.43	1.53	1.42	1.58
Return(t-9)	-0.084	-0.007	-0.114	-0.046	-0.111	-0.073	-0.091	0.0068	-0.084	-0.041	-0.107	-0.03
	-0.1	0	-0.2	-0.1	-0.2	-0.1	-0.2	0.01	-0.1	0	-0.2	0
Return(t-10)	-0.603**	-0.611**	-0.647**	-0.63**	-0.619**	-0.638**	-0.642**	-0.633**	-0.61**	-0.641**	-0.612**	-0.637**
	-2	-2	-2.1	-2.1	-2	-2.1	-2.1	-2.1	-2	-2.1	-2	-2.1
Return(t-11)	0.3108	0.3295	0.3624	0.331	0.3116	0.3176	0.2815	0.3203	0.3082	0.2974	0.2913	0.2958
	0.97	1.01	1.16	1.03	0.96	0.97	0.88	0.98	0.95	0.9	0.9	0.92
Return(t-12)	-0.068	-0.076	-0.035	-0.113	-0.07	-0.084	-0.122	-0.171	-0.078	-0.135	-0.079	-0.117
	-0.2	-0.2	-0.1	-0.3	-0.2	-0.2	-0.4	-0.5	-0.2	-0.4	-0.2	-0.3

Table 8: Shareholder-specific sub-samples – large sample

Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4		5		6	
N	2949	2949	2949	2949	2949	2949	2949	2949	2949	2949	2949	2949
R2	0.094	0.0959	0.0942	0.094	0.0938	0.0947	0.0952	0.0967	0.0938	0.094	0.0937	0.0949
Constant	0.1994***	0.1952***	0.1992***	0.1949***	0.1993***	0.1955***	0.1997***	0.1952***	0.1994***	0.1952***	0.1993***	0.195***
	36.4	21.8	36.3	21.7	36.3	21.8	36.4	21.8	36.3	21.8	36.3	21.7
b	0.1186***		0.1137***		0.1171***		0.1189***		0.1157***		0.1168***	
	9.4		8.9		9.36		9.59		9.02		9.46	
B1		0.1767***		0.1436**		0.1372**		0.1656***		0.1436**		0.1537***
		2.76		2.23		2.14		2.6		2.22		2.41
B2		0.084**		0.0944**		0.1058***		0.0939**		0.105***		0.0939**
		2.11		2.17		2.57		2.3		2.46		2.31
B3		0.0798***		0.0789***		0.08***		0.0799***		0.0764***		0.0803***
		4.53		4.31		4.56		4.61		4.18		4.66
B (Sub-sample - Sample)	-0.029		0.0317		-0.008		-0.102*		0.0109		-0.003	
	-0.8		1.15		-0.1		-1.7		0.38		0	
B1 (Sub-sample - Sample)		-0.407***		0.107		0.3436***		-0.394***		0.1157		0.0611
		-3.3		1.03		2.44		-2.6		0.93		0.28
B2 (Sub-sample - Sample)		0.1217		-0.05		-0.46***		-0.145		-0.168		-0.796***
		0.58		-0.4		-2.4		-0.7		-1.4		-4.1
B3 (Sub-sample - Sample)		0.0401		0.0369		0.08		0.0741		0.0568		0.3129***
		0.59		0.74		1.04		0.76		1.14		10.1
InvPrice	0.0282***	0.0284***	0.0284***	0.0286***	0.0282***	0.0284***	0.0282***	0.0284***	0.0283***	0.0286***	0.0282***	0.0285***
	3.63	3.58	3.64	3.59	3.62	3.57	3.63	3.59	3.63	3.59	3.62	3.58
Return(t-1)	-0.322**	-0.312**	-0.317**	-0.308**	-0.323**	-0.311**	-0.319**	-0.304**	-0.323**	-0.315**	-0.324**	-0.322**
	-2.2	-2.1	-2.1	-2.1	-2.2	-2.1	-2.2	-2	-2.2	-2.1	-2.2	-2.2
Return(t-2)	0.0262	0.0094	0.0377	0.0431	0.0321	0.0238	0.0248	0.0061	0.0308	0.0253	0.0306	0.0256
	0.14	0.05	0.2	0.23	0.17	0.12	0.13	0.03	0.16	0.13	0.16	0.13
Return(t-3)	0.1268	0.1487	0.1292	0.1321	0.1323	0.1469	0.1053	0.1214	0.1324	0.1328	0.1323	0.1287
	0.71	0.84	0.73	0.75	0.75	0.83	0.59	0.68	0.75	0.75	0.75	0.72

Table 8: Shareholder-specific sub-samples – large sample												
Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4		5		6	
Return(t-4)	-0.223	-0.188	-0.223	-0.209	-0.209	-0.189	-0.241	-0.216	-0.215	-0.212	-0.211	-0.187
	-1.1	-0.9	-1.1	-1	-1	-0.9	-1.2	-1.1	-1.1	-1	-1	-0.9
Return(t-5)	-0.111	-0.119	-0.107	-0.102	-0.112	-0.119	-0.116	-0.114	-0.109	-0.101	-0.112	-0.114
	-0.6	-0.7	-0.6	-0.6	-0.6	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6	-0.6
Return(t-6)	-0.042	-0.033	-0.041	-0.042	-0.039	-0.037	-0.058	-0.047	-0.039	-0.033	-0.04	-0.034
	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.2	-0.2	-0.2	-0.2
Return(t-7)	-0.235	-0.24	-0.223	-0.225	-0.232	-0.242	-0.249	-0.246	-0.231	-0.236	-0.232	-0.23
	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3	-1.4	-1.4	-1.3	-1.3	-1.3	-1.3
Return(t-8)	0.2069	0.2041	0.214	0.2174	0.2048	0.2042	0.2058	0.221	0.2091	0.2173	0.2062	0.2094
	1.16	1.15	1.2	1.22	1.15	1.14	1.16	1.24	1.17	1.22	1.16	1.18
Return(t-9)	-0.184	-0.18	-0.179	-0.172	-0.186	-0.184	-0.181	-0.167	-0.181	-0.174	-0.186	-0.178
	-1	-1	-1	-0.9	-1	-1	-1	-0.9	-1	-0.9	-1	-1
Return(t-10)	-0.256	-0.255	-0.274*	-0.274*	-0.261	-0.253	-0.262	-0.259	-0.264	-0.272	-0.261	-0.26
	-1.5	-1.4	-1.6	-1.6	-1.5	-1.4	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5
Return(t-11)	-0.144	-0.142	-0.148	-0.143	-0.148	-0.156	-0.139	-0.134	-0.15	-0.151	-0.15	-0.15
	-0.8	-0.8	-0.9	-0.8	-0.9	-0.9	-0.8	-0.8	-0.9	-0.9	-0.9	-0.9
Return(t-12)	0.1002	0.1141	0.1094	0.1116	0.1032	0.108	0.09	0.0895	0.1029	0.1046	0.1022	0.1096
	0.58	0.66	0.63	0.65	0.6	0.62	0.53	0.52	0.6	0.6	0.59	0.63

Table 9: Analysis of alternative price-reference points								
Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4	
X=	80%		90%		95%		99%	
N	2932	2932	2932	2932	2932	2932	2932	2932
R2	0.1033	0.1037	0.1035	0.1018	0.1014	0.1005	0.0999	0.1006
Constant	0.2189***	0.2278***	0.2187***	0.2233***	0.2171***	0.2194***	0.2133***	0.2163***
	5.86	6.05	5.86	5.92	5.8	5.8	5.71	5.78
b	0.0007		-0.06		-0.079		-0.206	
	0.02		-1.3		-1.1		-1.3	
B1		-0.068		-0.101		-0.141		-0.635**
		-0.7		-0.8		-0.9		-2.2
B2		0.0251		0.035		0.0456		0.0513
		0.6		0.83		1.08		1.24
B3		0.0819***		0.0841***		0.085***		0.0847***
		4.44		4.53		4.54		4.52
	0.14***		0.1962***		0.2079***		0.3294**	
Beta (X-Percentile)	3.77		4.08		3.05		2.06	
		0.2224***		0.2589***		0.3006***		0.7904***
B1 (X-Percentile)		4.25		3.47		2.69		3.1
		0.0423		0.0019		-0.004		0.0084
B2 (X-Percentile)		0.39		0.02		0		0.08
		0.0025		0.0127		0.0107		0.0045
B3 (X-Percentile)		0.05		0.28		0.24		0.11
InvPrice	0.0282***	0.0267**	0.0286***	0.0258**	0.0288***	0.0264**	0.0288***	0.0274**
	3.68	2.19	3.74	2.13	3.78	2.2	3.75	2.3
Return(t-1)	-0.309**	-0.302**	-0.309**	-0.293**	-0.308**	-0.286**	-0.319**	-0.284**
	-2.1	-2	-2.1	-1.9	-2.1	-1.9	-2.1	-1.9
Return(t-2)	0.0554	0.0623	0.0368	0.0533	0.0308	0.0515	0.0317	0.058
	0.29	0.33	0.2	0.28	0.16	0.27	0.17	0.31
Return(t-3)	0.1578	0.1483	0.1597	0.1508	0.1414	0.1442	0.1163	0.13

Table 9: Analysis of alternative price-reference points								
Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4	
X=	80%		90%		95%		99%	
	0.89	0.83	0.9	0.85	0.8	0.81	0.66	0.74
Return(t-4)	-0.204	-0.155	-0.189	-0.152	-0.193	-0.153	-0.21	-0.178
	-1	-0.8	-0.9	-0.7	-1	-0.8	-1	-0.9
Return(t-5)	-0.075	-0.041	-0.086	-0.056	-0.101	-0.066	-0.104	-0.086
	-0.4	-0.2	-0.5	-0.3	-0.6	-0.3	-0.6	-0.5
Return(t-6)	-0.003	-0.001	-0.008	-0.009	-0.009	-0.009	-0.039	-0.046
	0	0	0	0	0	0	-0.2	-0.2
Return(t-7)	-0.21	-0.17	-0.207	-0.17	-0.218	-0.179	-0.24	-0.215
	-1.2	-0.9	-1.1	-0.9	-1.2	-1	-1.3	-1.2
Return(t-8)	0.2626	0.2626	0.2518	0.2682	0.2355	0.2607	0.2102	0.2281
	1.45	1.45	1.4	1.49	1.32	1.45	1.17	1.27
Return(t-9)	-0.137	-0.115	-0.13	-0.117	-0.148	-0.139	-0.189	-0.175
	-0.7	-0.6	-0.7	-0.6	-0.8	-0.7	-1	-0.9
Return(t-10)	-0.217	-0.208	-0.202	-0.209	-0.221	-0.227	-0.262	-0.266
	-1.2	-1.1	-1.1	-1.1	-1.2	-1.2	-1.5	-1.5
Return(t-11)	-0.113	-0.087	-0.113	-0.079	-0.122	-0.089	-0.127	-0.115
	-0.6	-0.5	-0.6	-0.4	-0.7	-0.5	-0.7	-0.7
Return(t-12)	0.1197	0.1262	0.1333	0.1296	0.125	0.1203	0.107	0.1023
	0.69	0.72	0.77	0.74	0.72	0.69	0.61	0.58
Cash	0.0196	0.0181	0.0197	0.0178	0.019	0.0183	0.0187	0.0191
	1.05	0.98	1.05	0.96	1.02	0.99	1.01	1.03
Stock	-0.035	-0.036	-0.036	-0.038	-0.038	-0.04	-0.038	-0.04
	-1	-1.1	-1.1	-1.1	-1.1	-1.2	-1.1	-1.2
Hostile	0.0459***	0.0469***	0.0468***	0.0473***	0.0471***	0.0471***	0.0474***	0.0474***
	2.51	2.56	2.56	2.58	2.57	2.56	2.59	2.59
Tender	0.0105	0.0108	0.0104	0.0105	0.01	0.0102	0.0103	0.0108

Table 9: Analysis of alternative price-reference points								
Specification	OLS	PWL	OLS	PWL	OLS	PWL	OLS	PWL
Column	1		2		3		4	
X=	80%		90%		95%		99%	
	1.19	1.22	1.18	1.18	1.13	1.15	1.17	1.22
Financial	0.0461	0.0478	0.0483	0.049	0.0487	0.0486	0.0482	0.047
	1.08	1.12	1.13	1.15	1.14	1.14	1.13	1.1

Table 10: Probability analysis of deal success				
Specification	Probit	Probit	Probit	Probit
Column	1	2	3	4
N	2911	2910	2893	773
R2	0.003	0.007	0.082	0.112
Constant	0.5482***	0.5518***	0.4054*	0.9127**
	13.1	13.1	1.68	2.02
b	-0.25**	-0.28**	-0.26**	-0.64**
	-2.29	-2.42	-2.20	-2.38
c	0.126**	0.135***	0.010*	0.092
	2.46	2.58	1.83	0.78
InvPrice	-0.008	-0.002	-0.001	0.2142**
	-0.4	-0.1	0	2.03
Return(t-1)		1.221	1.185	0.4564
		1.3	1.21	0.21
Return(t-2)		0.9555	1.404	2.154
		0.98	1.33	0.98
Return(t-3)		0.5893	0.5046	-2.63
		0.61	0.5	-1.1
Return(t-4)		0.7139	0.5633	0.117
		0.69	0.53	0.05
Return(t-5)		-1.78*	-2.3**	-1.87
		-1.8	-2.2	-0.8
Return(t-6)		0.244	0.7157	-0.545
		0.24	0.68	-0.2
Return(t-7)		-0.279	-0.074	1.262
		-0.2	0	0.62
Return(t-8)		-0.179	-0.295	0.3849
		-0.1	-0.3	0.16
Return(t-9)		-0.795	-0.92	-0.42

Table 10: Probability analysis of deal success				
Specification	Probit	Probit	Probit	Probit
Column	1	2	3	4
		-0.8	-0.8	-0.1
Return(t-10)		-1.77*	-1.81*	-1.77
		-1.8	-1.8	-0.8
Return(t-11)		-1.74*	-1.73*	-0.843
		-1.7	-1.6	-0.4
Return(t-12)		-1.58*	-1.79*	-1.14
		-1.6	-1.8	-0.5
Cash			-0.175	-0.095
			-1.1	-0.4
Stock			-0.065	-0.157
			-0.3	-0.6
Hostile			-0.697***	-0.93***
			-7.6	-5.5
Tender			0.7487***	0.7382***
			14.3	7.04
Target B/M				-0.087
				-1
Target (log) Capitalization				-0.015
				-1.2
Bidder ROA				0.006
				0.12

Table 11: Summary Statistics							
Variable	Mean	St. dev.	5%	Median	95%	Winsorized	Definition
Price information							
Offer Premium	17.62%	37%	-21%	18.16%	62.36%	No	Ln(Offer price/Share Price$_{t-30}$)
52-week-high premium	33.14%	45%	0%	16.31%	133.62%	Yes	Ln(52-week-high price/Share Price$_{t-30}$)
Transaction and Financial Information							
Completed	71.11%	45%				No	=1 if completed =0 if withdrawn =empty otherwise
Hostile	6.92%	25%				No	=1 if hostile =0 if friendly =empty if unknown
Financial buyer	1.50%	12%				No	=1 if LBO =0 otherwise = empty if unkown
Tender	63.20%	48%				No	=1 if a tender offer =0 if otherwise =empty if unknown
Cash	63.65%	48%				No	=1 if cash consideration at least 50% = 0 otherwise = empty if unknown
Stock	16.27%	37%				No	=1 if stock consideration at least 50% = 0 otherwise = empty if unknown
Target ROE	15.95%	16%	1.80%	12.07%	44.00%	Yes	= Net income/Shareholder Equity
Target ROA	6.18%	6%	0.45%	4.68%	17.26%	Yes	= EBIT / Total Assets
Target B/M	99.44%	121%	10.31%	69.67%	281.18%	Yes	= Common equity / (number of common stock * Share Price$_{t-30}$)
Target E/P	9.40%	11%	1.09%	6.39%	27.21%	Yes	= EPS / (number of common stock * Share Price$_{t-30}$)
Target LN(MarkCap)	7.94	4.55	1.17	6.91	15.42	Yes	
Bidder ROE	16.88%	13%	2.79%	14.30%	41.36%	Yes	= Net income/Shareholder Equity
Bidder ROA	6.07%	6%	0.41%	4.48%	18.13%	Yes	= EBIT / Total Assets
Daily return	0.14%	3%	-3.36%	0%	4.42%	Yes	= average log change in price
Volatility	2.80%	1.90%	0.90%	2.30%	6.50%	Yes	= average volatility of returns
Days since 52-week-high	187.00		2.00	194.00	364.00	No	= time, in calendar days, since last observable instance of the 52-week-high price, measured from t-30
Shareholder Information							
Owned by corporates	20.24%	28%	0.00%	5.83%	83.28%	No	
Owned by individuals	6.69%	15%	0.00%	0.00%	44.97%	No	
Owned by management	0.37%	3%	0.00%	0.00%	0.92%	No	
Owned by financial	39.08%	36%	0.00%	30.83%	105.76%	No	
Owned by the largest holder	30.58%	26%	4.40%	20.90%	88.00%	No	

Figure 1. Scatter plot of 52-week high premium (horizontal axis) and offer premium (vertical axis).

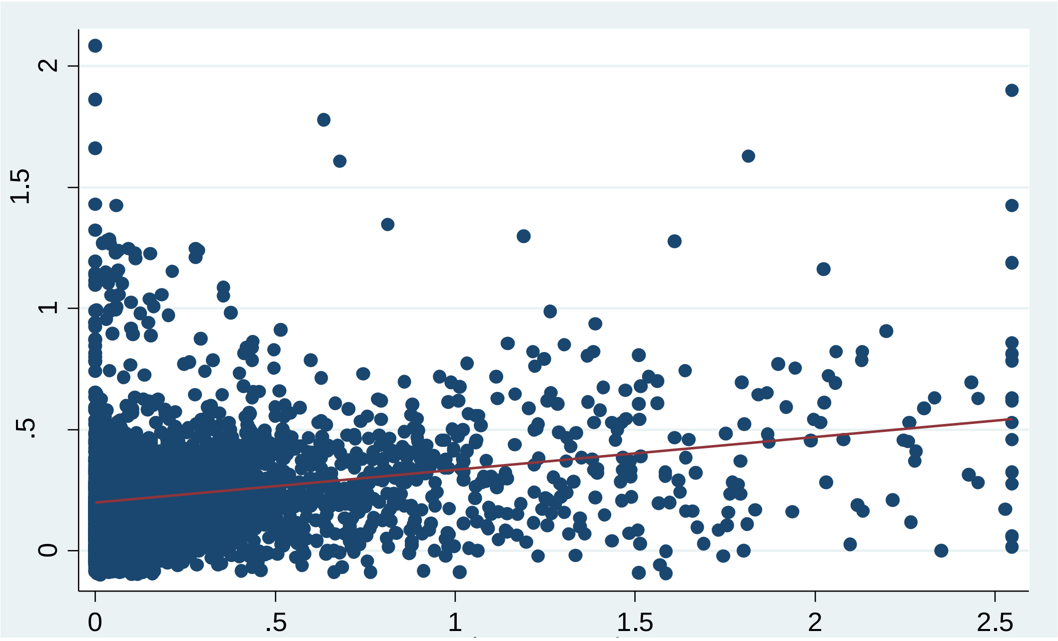

Figure 2. Histogram of difference between 52-week-high premium and offer premium

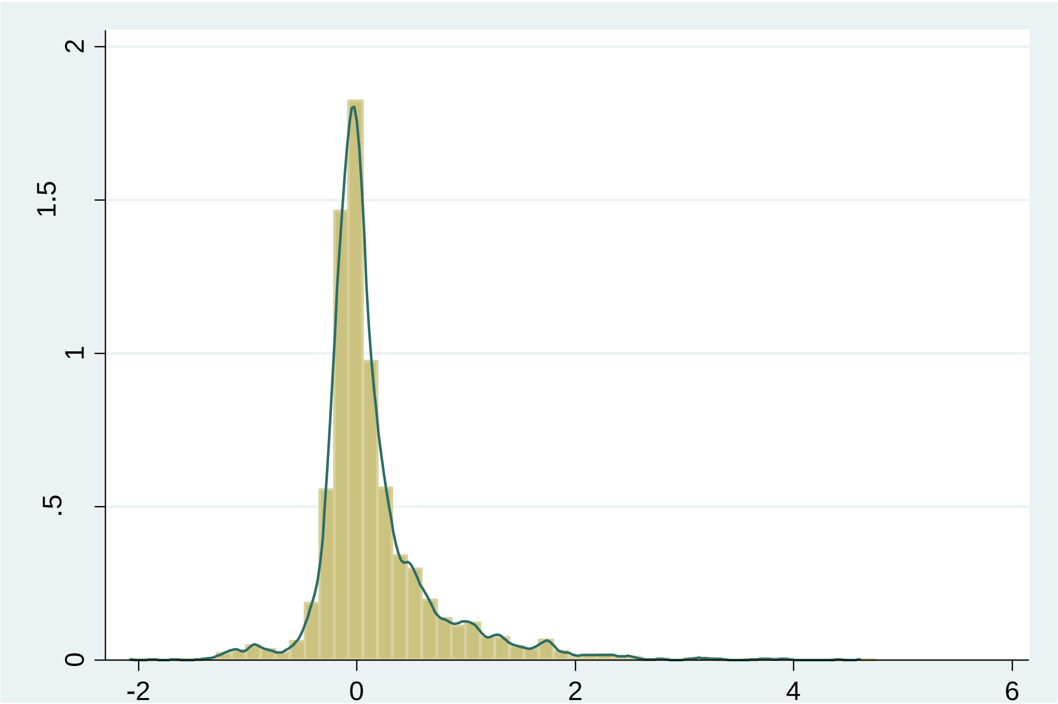

Figure 3. Quadratic prediction of offer premium.