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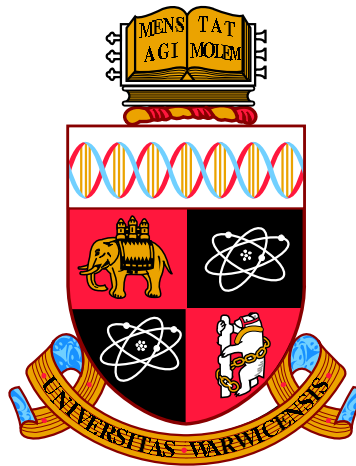
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**Three Essays on Mergers and Acquisitions:
Deal Initiation and Insider Trading**

by

Chunling Xia

Thesis

Submitted to the University of Warwick

for the degree of

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Contents

List of Tables	iv
Acknowledgments	vii
Declarations	ix
Abstract	x
Abbreviations	xi
Chapter 1 Introduction	1
Chapter 2 M&A Deal Initiation and Managerial Motivation	6
2.1 Introduction	6
2.2 Merger anticipation factors	15
2.3 Data	20
2.4 Results	28
2.4.1 Determinants of being a target in general	28
2.4.2 Determinants of target initiation	32
2.4.3 Motivating managers	36
2.5 Robustness checks	40

2.6	Conclusions	41
2.7	Appendices	43
2.7.1	Initiation coding example	43
2.7.2	Variable definitions	47

Chapter 3 Target Insiders' Trades around the Takeover Announcement Date **67**

3.1	Introduction	67
3.2	Hypotheses	73
3.2.1	Insider trading in the pre-announcement period	73
3.2.2	Insider trading in the post-announcement period	79
3.3	Data	83
3.3.1	Deals	84
3.3.2	Summary statistics for insider trading	89
3.4	Results	95
3.4.1	Results for pre-announcement insider trading	96
3.4.2	Results for post-announcement insider trading	103
3.5	Conclusions	108
3.6	Appendix	111
3.6.1	Variable definitions	111

Chapter 4 Acquirer Insiders' Trades around the Takeover Announcement Date **131**

4.1	Introduction	131
4.2	Hypotheses	136
4.2.1	Insider trading in the pre-announcement period	136
4.2.2	Insider trading in the post-announcement period	140

4.3	Data	143
4.3.1	Deal and acquirer characteristics	144
4.3.2	Summary statistics for insider trading	150
4.4	Results	157
4.4.1	Results for pre-announcement insider trading	158
4.4.2	Results for post-announcement insider trading	165
4.5	Conclusions	167
4.6	Appendix	170
4.6.1	Variable definitions	170
Chapter 5 Concluding Remarks		190

List of Tables

2.1	Selling process summary statistics	52
2.2	Summary statistics for deal (both target and bidder initiated) versus matched firms	53
2.3	Analysis of factors influencing the likelihood of a successful takeover: deal versus non-deal firms.	56
2.4	Analysis of factors influencing the likelihood of deal initiation: target versus bidder initiated deal firms.	59
2.5	Analysis of managerial incentives for target initiation.	62
2.6	Analysis of the impact of managerial stock and option grants on target initiation.	65
2.7	Analysis of factors influencing the likelihood of a successful takeover: multinomial logistic regressions.	66
3.1	Selling process summary statistics	116
3.2	Basic statistics for insider trading in target firms before the public announcement	117
3.3	Basic statistics for insider trading in target firms after the public announcement	119

3.4	Insider trading in target firms before the public announcement: deal initiation, selling mechanism, payment method and bidder type	121
3.5	Insider trading in target firms before the public announcement: reinforcing effect of selling mechanism on method of payment and bidder type	125
3.6	Insider trading in target firms after the public announcement: deal initiation, selling mechanism, payment method and bidder type	129
3.7	Insider trading in target firms after the public announcement: reinforcing effects of deal initiation and method of payment on selling mechanism	130
4.1	Selling process summary statistics	175
4.2	Basic statistics for insider trading in acquiring firms before the public announcement	177
4.3	Basic statistics for insider trading in acquiring firms after the public announcement	179
4.4	Insider trading in acquiring firms before the public announce- ment: deal initiation, selling mechanism and method of payment	181
4.5	Insider trading in acquiring firms before the public announce- ment: interaction effect of selling mechanism on method of pay- ment	185
4.6	Insider trading in acquiring firms after the public announce- ment: deal initiation, selling mechanism and method of payment	188

4.7 Insider trading in acquiring firms after the public announce- ment: reinforcing effect of payment consideration on selling mechanism	189
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Declarations

I declare that any material contained in this thesis has not been submitted for a degree to any other university. I further declare that Chapters 2 to 4 are co-authored with Dr. Jana Fidrmuc.

Chunling Xia

September 2015

Abstract

The thesis is composed of three essays on mergers and acquisitions: deal initiation and insider trading. Specifically, it tries to figure out the reasons and managers' motivation concerning M&A deal initiation as well as analyze insiders' trades in target and acquiring firms both before and after the takeover public announcement date.

Chapter 2 shows that target versus bidder initiated deals differ in two main respects. First, target initiated deals have higher insider and CEO ownership that motivates the management to engage in the sale. Second, target initiated firms are more levered and seem to have higher growth options. This suggests that an important motivation behind the board's decision to initiate a sale of their firm is to preserve growth options in a situation with potential financial distress. A complementary analysis shows larger differences between deal versus non-deal firms that remain publicly listed.

In Chapter 3, we find that target insiders stop selling during 6 months immediately before the public announcement but do not stop selling in the early pre-announcement period. Moreover, we show that target insiders are stronger net buyers before the public announcement in informal sales, cash and financial deals. Furthermore, target insiders in stock deals do not stop selling even immediately before the public announcement, which supports the bidder overvaluation hypothesis. In addition, we find that target insiders change their trading patterns after the deal public announcement. Insiders are stronger net buyers in target initiated deals, formal auctions and cash deals.

Chapter 4 shows that, overall, acquirer insiders decrease their purchases and sales to same extent during the 2 months immediately before the public announcement. Concerning deal characteristics, we show that acquirer insiders are stronger net buyers both before and after the announcement date in stock deals relatively to cash deals and in informal sales relatively to formal auctions. The two factors reinforcing each other. For informal sales, acquirer insiders are stronger net buyers in stock deals before the public announcement but change to cash deals after the public announcement.

Abbreviations

1d 1 day

1m 1 month

1y 1 year

2m 2 months

2y 1 year

4m 4 months

6m 6 months

8w 8 weeks

a. after

acq acquirer initiation

ann. announcement

b. before

bid bidder initiation (only in Tables)

coeff coefficient

Deal ch. Deal characteristics

fin financial

DP Golden Parachute

HC Hand Collected

inf informal sales

Inf.sale Informal sale

init. initiation

inst. Institutional
M&A Merger and Acquisition
Market cap. Market capitalization
obs. observations
OC Own Computations
own. ownership
prod. product
post. post-announcement
post-ann. post-announcement
pre. pre-announcement
pre-ann. pre-announcement
pri. pro length private selling process length
pub. pro length public selling process length
ret retirement
R&D Research and Development
SEC U.S. Securities and Exchange Commission
SIC Standard Industrial Classification
TIF Thomson Insider Filings
TRE Thomson Reuters Eikon

Chapter 1

Introduction

Merger and acquisition is one of the most important corporate decisions. Recently, the initiation of a takeover has been emphasized by the academic. Furthermore, insiders in both target as well as acquiring firms might trade on the private information that they possess. Therefore, the thesis is composed of three essays on M&A deals and insiders' trades. Chapter 2 is to explore why publicly listed firms actively seek to sell themselves and whether managers of the selling firms are incentivized for the sale. Chapters 3 and 4 focus on the effects of deal characteristics on insider trading before and after M&A public announcement date in target and acquiring firms, respectively.

The M&A literature so far implicitly or explicitly assumes that reasons for acquisitions are usually rooted outside of target firms. Indeed, the market for corporate control as suggested by Jensen and Ruback (1983) is built on a premise of management resistance to takeovers. Other reasons for mergers and acquisitions that consider some kind of synergies, like economies of scale or integration, complementarity of resources or diversification, also implicitly assume initiative on the side of the acquirer (Andrade et al., 2001). In contrast

to this assumption, a large fraction of takeovers are voluntarily imposed by target firms themselves. Still, evidence concerning potential reasons for target firms initiating their own sale or incentives of their managers is so far limited in the literature.

In Chapter 2, we show that target versus bidder initiated M&A deals differ in two main respects. First, target initiated deals have higher insider and CEO ownership that motivates the management to engage in the sale. Second, target initiated firms are more levered and seem to have higher growth options. This suggests that an important motivation behind the board's decision to initiate a sale of their firm is to preserve growth options in a situation with potential financial distress. A complementary analysis, comparing the group of deal firms (together target and bidder initiated firms) to other non-deal firms that remained publicly listed, shows that the differences between deal versus non-deal firms are much larger relatively to the differences within the deal firms based on deal initiation.

Insider trading on material information has always been a hotly debated topic both in popular press as well as in the academic literature. Insider trading regulation in the US is one of the most restrictive and effective around the world.

The fact that public takeover announcements are associated with a strong positive market reaction for target companies is a direct evidence of the effectiveness of insider trading restrictions before public releases of material information. In contrast, Bhattacharya et al. (2000) show no unusual returns or return volatility around takeover announcements for target companies in Mexico arguing that unrestricted insider trading causes prices to fully incorporate the material information before its public release. Acquiring firms

are, however, associated with small positive or even insignificant announcement stock abnormal returns.¹ This might rather suggest the ineffectiveness of insider trading regulations or the market's perception of low synergies.

Chapter 3 documents that target insiders stop selling during 6 months immediately before the public announcement but do not stop selling in the early pre-announcement period. Moreover, we conjecture that insider trading activity in target firms before and after the public announcement depends on deal characteristics, such as the deal initiation, the selling mechanism, method of payment and buyer type. We confirm our hypotheses using a difference in differences approach, which controls for insider trading within the same target firm outside of the treatment period and at the same time for change in insider trading in matched firms. We show that insiders are stronger net buyers before the public announcement in target firms that are sold through informal sales, in target firms that are paid for in cash and in target firms that are acquired by financial buyers. Furthermore, target insiders in stock deals do not stop selling even immediately before the public announcement, which supports the bidder overvaluation hypothesis.

Chapter 3 also shows that target insiders change their trading patterns after the deal public announcement. Their intention to stop buying is even stronger across all deals and so differences across deal characteristics stem solely due to differences in insider sales. Insiders are stronger net buyers in target initiated deals, formal auctions and cash deals suggesting that target insiders are willing to adjust their trading after the public announcement and bet on certainty of deal completion rather than increased deal value.

¹See Lorderer and Martin (1990), Moeller et al. (2004), Bradley and Sundaram (2006), Moeller et al. (2007), and Akbulut and Matsusaka (2010) for detailed results.

Chapter 4 suggests that acquirer insiders may take advantage of the information of a potential takeover and at the same time, take into account their legal jeopardy. Using a difference in differences approach, we show that, overall, insiders decrease their purchases and sales to same extent during the 2 months immediately before the public announcement and do not change their trading patterns in the early pre-announcement and the post-announcement periods. Moreover, insider trading patterns around the public announcement should reveal insiders' perception of deal benefits for the acquiring firm, and could potentially depend on the deal initiation, selling mechanism and method of payment. Informal sales are usually private value deals that are associated with higher future synergies (Gorbenko and Malenko, 2013). In contrast, full-scale auctions might be more risky and costly for acquirers as tougher bidding competition might result in higher prices and lower probability of winning. Cash deals are on average associated with higher announcement abnormal returns, but at the same time, they might be costly for acquirers as they commit to a fixed price and do not have the advantage of target insiders sharing the overpayment cost. Furthermore, acquirer insiders are often overconfident about synergies of the deals.

In Chapter 4, we show that acquirer insiders are stronger net buyers both before and after the announcement date in stock deals relatively to cash deals and when acquirers engage in buying their targets through less formal selling mechanisms rather than full-scale auctions. The two factors reinforcing each other. For informal sales, insiders are stronger net buyers in stock deals before the public announcement but change to cash deals after the public announcement. It seems that insiders are more optimistic in private value firms that exhibit higher future synergies relatively to market's perception

and at the same time are associated with lower overpayment cost.

Finally, Chapter 5 concludes the findings in the thesis and discusses future research.

Chapter 2

M&A Deal Initiation and Managerial Motivation

2.1 Introduction

The main aim of this chapter is to explore why publicly listed firms actively seek to sell themselves and whether managers of the selling firms are incentivized for the sale. The M&A literature so far implicitly or explicitly assumes that reasons for acquisitions are usually rooted outside of target firms. Indeed, the market for corporate control as suggested by Jensen and Ruback (1983) is built on a premise of management resistance to takeovers. Other reasons for mergers and acquisitions that consider some kind of synergies, like economies of scale or integration, complementarity of resources or diversification, also implicitly assume initiative on the side of the acquirer (Andrade et al., 2001). In contrast to this assumption, a large fraction of takeovers are voluntarily imposed by target firms themselves. For example, Boone and Mulherin (2007) report that 15% of the large M&A transactions in their sample are initiated

by the target company. Heitzman (2011) reports a fraction of 35%, while the fraction gets as high as 44% in our data set that covers also relatively small firms. Still, evidence concerning potential reasons for target firms initiating their own sale or incentives of their managers is so far limited in the literature.

Initiation of a takeover contest is an important corporate decision. If the board of directors decides to initiate a sale, they should do so in line with their fiduciary duties to maximize shareholder value. As organizing a company sale is complicated and expensive, alternative internal solutions that would be significantly simpler and cheaper should be considered before the company is offered for sale. Assuming that a sale is an optimal decision, the high cost of organizing it implies that deal initiation is associated with specific firm circumstances and substantial benefits for firm's shareholders.

At the same time, even though takeover offers are usually value enhancing for target shareholders, they might not be in line with the target managers' interests. As a result of a takeover, target firm CEOs may be giving up substantial expected utility from both future wages (in case they are not retained) and the lost ability to extract private benefits from the firm (Hartzell et al., 2004).¹ In line with the target CEOs' expected losses associated with a potential takeover, previous literature shows that firms with higher managerial ownership are less likely to be acquired (Mikkelsen and Partch, 1989; Hadlock et al., 1999). Also, Jenter and Lewellen (2015) show that firms with CEOs in retirement age are more likely to be taken over suggesting that target CEOs seem to resist change in control transactions. Therefore, it might be in target shareholders' interests that their CEOs are compensated for the

¹Fich et al. (2011) estimate that the average lost remuneration to CEOs due to takeovers is \$35 million.

losses suffered in takeovers and then do not resist transactions that enhance shareholder value. We conjecture that in deals where the board of directors decides for a sale, CEOs are more motivated for the deal relatively to bidder initiated deals. Insiders with the right incentives are more likely to agree with their company sale and perhaps are also more likely to actively participate in the selling process.

Previous literature, not distinguishing between target versus bidder initiated deals, shows that in the period after deal initiation target CEOs get unscheduled option grants (Fich et al., 2011) and extra cash payments in the form of merger bonuses or increased golden parachutes (Hartzell et al., 2004; Heitzman, 2011; Fich et al., 2015). These papers argue that the extra CEO remuneration and/or golden parachutes just before the public deal announcement are associated with higher probability of deal completion and compensate CEOs for their earnings and private benefits lost as a result of the acquisition. Even though these results are consistent with CEOs being motivated to actively participate in takeover negotiations, it is also possible that CEOs are only being bribed not to resist the takeover. Corporate governance consequences of the two alternatives are, however, critical. The former would suggest a positive side to golden parachutes and executive remuneration around change in control transactions versus the latter would suggest overpayment and opportunism of entrenched managers. We explore the two alternatives in the context of deal initiation with a conjecture that target initiated deals would tend to induce active CEO participation in takeover negotiations. If a firm is intending to sell, it might also want to have its managers prepared and motivated for takeover negotiations, especially in case the managers are expected to be pivotal in such negotiations. For targets that are approached

by a prospective bidder such an option is not available.²

A strong counterargument against a conjecture that firms initiate their own sale to maximize shareholder value is that, ultimately, the initiation decision does not matter. It is not a first-order question. In other words, a firm ultimately gets an offer from an interested bidder without initiating its own sale. Moreover, due to management and director fiduciary duties, the board has to seriously consider every offer. Eventually, the firm is sold regardless of initiation and so the initiation decision itself does not increase shareholder value as it would increase eventually anyway. This ‘irrelevance’ counterargument, however, assumes that (i) interested bidders are able to identify potential targets that fit their requirements and create merger synergies and (ii) no value is lost while a target is waiting for a potential bidder to become interested in buying it. Information asymmetry between bidders and potential target firms might make the searching process less effective and longer. In case value created in a takeover depends on exact timing of the deal and on firm attributes prone to be concealed from public scrutiny, active deal initiation might play a crucial role. Therefore, we conjecture that in a situation where insiders have strictly better information about suitability of their firm for sale and where the cost (potential loss) associated with waiting for a suitable bidder is high, deal initiation should matter because it marginally increases shareholder value. Private information about specific firm circumstances and appropriate timing of the deal makes a significant difference in terms of shareholder value

²We are not able to determine causality of the relationship between CEO ownership, choice of a selling mechanism and target initiation. It is also possible that a firm with high CEO ownership (or golden parachutes) is more likely to prompt a sale once a suitable situation arises. Then the firm would tend to opt for informal sale associated with higher premium as the CEO is motivated to represent shareholders’ interests in takeover negotiations.

enhancement in favor of deal initiation.

Our empirical strategy is as follows. In order to test the irrelevance hypothesis that deal initiation does not matter for a firm to be sold, we compare all firms with a successful takeover offer to other comparable firms that remain publicly listed and consider all potential reasons associated with the odds of a takeover provided in the literature. The irrelevance hypothesis predicts that the deal firms are different from other firms that remained publicly listed in a similar way and do not differ from each other based on who initiates the deal. A logistic regression estimating the factors associated with the odds of a takeover versus staying publicly listed would reveal the common characteristics of all deal firms together. As our main research question, however, we model the initiation decision to reveal those factors that do differ between target versus bidder initiated deals. Our conjecture is that even though common factors prevail, the differing factors are still important and depend on managerial motivation for the deal, information advantage of targets' insiders and right timing of the deal.

The existing literature suggests several potential candidates associated with the likelihood of a successful takeover deal. We group them into four categories. First, Jenter and Lewellen (2015) suggest that CEO age and corporate governance characteristics affect the likelihood of takeovers. Related are also ownership and takeover defence characteristics suggested by Ambrose and Megginson (1992). We also consider managerial motivation in form of higher golden parachutes and stock and option grants during negotiations that increases the odds of takeover completion (Hartzell et al., 2004; Fich et al., 2011). Second, recent literature highlights the importance of industry competition and complementarity of resources (Hoberg and Phillips, 2010;

Hoberg et al., 2014) that extends older evidence on importance of economic disturbances within industries (Mitchell and Mulherin, 1996). The third group focusses on target firm stock and operating performance and asset characteristics (Palepu, 1986; Ambrose and Megginson, 1992; Edmans et al., 2012; Bena and Li, 2014). Finally, the fourth group highlights financial constraints and debt overhang in deal firms as a special case (Erel et al., 2015; Khatami et al., 2015; Almeida et al., 2011a), though it could be considered within the third set of factors. We discuss debt overhang separately because it relates to our information advantage hypotheses that conjectures differences between target versus bidder initiated firms.

We work with a sample of 1098 US publicly listed targets over the period from 2005 to 2011 from which 487 are target initiated and 611 are bidder initiated. The acquiring firms are both public and private. To form a counterfactual, we match all deal firms with publicly listed firms that remain publicly listed based on industry, year and size (total assets).³ Our results show that, in general, target and bidder initiated deal firms are quite alike. They differ in similar ways to other firms that remain publicly listed. They have CEOs that are more likely to be in the retirement age, they have large monitoring blockholders and are younger. They also have less independent and larger boards. They operate in industries with higher takeover liquidity, higher competition and are less likely to be similar to other firms in their

³We decide for matching rather than including all publicly listed firms due to our analysis relying on hand-collected data concerning CEO and corporate governance characteristics that are not available in usual electronic data sets for smaller firms. As the initiation decision concerns smaller firms, we consider as essential to hand collect the key variables and keep the smaller firms in the sample. Palepu (1986) argues that any analysis based on matched samples should result in the right relative ranking of firms in terms of their acquisition probabilities. As we are not per se interested in forecasting the odds of takeovers out of sample, our conclusions based on relative ranks of the outcomes should not lead to erroneous inferences even when based on matched counterfactuals.

industry. They are also more likely to acquire other firms and divest assets in the recent past. In terms of firm performance and asset structure, stock performance decreases the odds of becoming a successful takeover target while operating performance increases the odds. It seems that the takeover targets are undervalued, but still have growth options and suffer lower free cash flow.

In contrast to all these significant differences between deal firms as a group relatively to other firms that remain publicly listed, our results show that the only factors that significantly differentiate target from bidder initiated deals are associated with leverage and managerial motivation for the deal. Target initiated deals suffer higher leverage and, at the same time, exhibit higher growth options. This suggests that deal initiation is associated with higher possible future financial distress and due to preserved growth options it is optimal for the firm to be sold as a going concern. This situation involves private information on the side of the target firm management concerning the growth options, which are not easily identified by outside bidders. Exact and prompt timing is also very important as growth options might lose value over time. These results are in line with our asymmetric advantage hypothesis and suggest that the decision to initiate a sale improves shareholders' value and is not a second-order issue. By initiating, the board prevents potential financial distress and associated destruction of growth options.

The second important difference between target versus bidder initiated deal firms stems from incentives for the deal. In line with our incentive hypothesis we show that target firms that initiate their sale themselves exhibit higher executive and insider ownership, which is complemented by golden parachutes in case CEO ownership is low. In order to distinguish managerial motivation for a deal in form of active participation in deal negotiations versus plain brib-

ing for low deal resistance, we exploit procedural differences between formal full-scale auctions versus less formal sales. In particular, full-scale auctions represent a way to sell firms that is very formalized, pre-determined and fixed and does not allow much scope for influencing sale outcomes (Hansen, 2001). In contrast, private negotiations and controlled sales are less structured and more ad hoc with takeover negotiations being at the core of the process and having huge impact on deal outcomes. Skilful and motivated negotiators probably have significant effect on the deal success and takeover premium. Therefore, we argue that firms opting for formal full-scale auctions would not profit much from higher managerial incentives, while higher CEO ownership and golden parachutes might be quite important in motivating active participation in deal negotiations that would eventually lead to better deal outcomes in case firms are sold in private negotiations or controlled sales. Alternatively, higher CEO ownership in controlled auctions would suggest wasting high remuneration in a situation when the outcome is already determined and cannot be much changed. Our results show that the odds of target initiation are higher for firms with higher CEO ownership or golden parachutes exactly only in informal sales. In formal full-scale auctions, CEO ownership or golden parachutes do not differ between target versus bidder initiated deals. Our results seem to suggest alignment between CEO incentives and active participation in negotiations in target initiated deals.

Our analysis extends the recent empirical literature that shows that deal initiation is an important aspect of the takeover process affecting the deal premium, selling procedure and also deal success probability (Masulis and Simsir, 2015; Xie, 2010; Aktas et al., 2010; DeBodt et al., 2014; Fidrmuc et al., 2012b). Masulis and Simsir (2015) show that target deal initiation is associated

with lower announcement abnormal returns and link this finding to information asymmetries concerning the quality of target firms. Xie (2010) in turn argues that deal initiation reveals both selling firm bargaining power but also bidder valuations and thus buyer initiated deals result in higher premiums. Xie (2010) also shows that target initiated deals are more often organized as auctions whereas bidder initiated deals are most likely privately negotiated. Fidrmuc et al. (2012b) confirm that target initiation together with high profitability is an important determinant of whether firms are sold in auctions or private negotiations. DeBodt et al. (2014) confirm that a higher willingness to sell, measured by target initiation, is associated with lower premium and at the same time also increases deal success probability.

Masulis and Simsir (2015) are the closest to our analysis but with a different focus. Their aim to find an explanation for the differences in premium between target versus bidder initiated deals. They argue that acquirers pay lower premium for target initiated deals to be compensated for adverse selection. Good quality target firms generally have strong incentives to avoid selling themselves for discounted prices and so acquirers infer that target firms initiating deals are more likely to be overvalued. As part of modeling the takeover premium, Masulis and Simsir (2015) treat the initiation choice as the first stage of the model and hypothesize that target firms with financial or competitive weaknesses, with financial constraints and firms in recession are more likely to initiate their sale and then receive a smaller premium.

In contrast to Masulis and Simsir (2015), we are interested in the initiation decision itself and in managerial incentives associated with the decision. We also compare both the target and bidder initiated deal firms with other comparable firms that remained publicly listed. Comparing the deal versus

non-deal firms, we are able to highlight that target versus bidder initiated deals are more alike than different. Nevertheless, deal firms that initiate their sale are different from bidder initiated deal firms in important ways: they are highly levered, maintain growth options and exhibit different CEO incentives for a takeover deal. Our approach to initiation highlights the information advantage on the side of target firm insiders who could enhance shareholder value by optimally timing their firm sale. Given their high share ownership, they are motivated to execute the sale.⁴

The remainder of the chapter is organized as follows. Section 2.2 explains in more detail the factors associated with successful merger offers. Section 2.3 introduces the data, explains the coding process and provides basic statistics. Section 2.4 shows and discusses the regression results, Section 2.5 presents the robustness tests and Section 2.6 concludes.

2.2 Merger anticipation factors

Jenter and Lewellen (2015) show that CEOs in retirement age are more willing to accept takeover offers probably because their personal costs of losing their jobs are diminished once they are in socially acceptable retirement age. Moreover, the retirement age effect is significantly weaker among better governed firms. This points towards agency conflicts between shareholders and target CEOs as the explanation for the retirement effect. In line with these hypotheses, our merger anticipation regression includes a CEO retirement age dummy and corporate governance variables, such as insider ownership, insti-

⁴Smaller bargaining power of firms that initiate their sale (stemming from eagerness to preserve growth options from potential financial distress) might eventually be associated with smaller premium. Deals where timing is not a concern can enjoy the luxury of waiting for a better offer. Premium analysis is, however, not the aim of this chapter.

tutional ownership, golden parachutes, board size, board independence and CEO/chairman duality.

Ambrose and Megginson (1992) conjecture that the likelihood of receiving a takeover bid is inversely related to the level of insider ownership. Managers who own large equity stakes in their firms manage their firm more in line with the outside shareholders' interests relatively to non-shareholder insiders (Jensen and Meckling, 1976). This should make the firm less vulnerable to a takeover, since an acquirer would be less able to recoup his investment in the acquisition by improving target firm performance. Also, insiders with high insider ownership enjoy comfortable protection from outside bids. Therefore, the probability of a takeover bid should decrease as bidders need to offer premiums large enough to overcome insider resistance. However, in case a sale of the firm is a good strategic alternative for the future of the firm, the board of directors might be forced to initiate the sale (Gorbenko and Malenko, 2013). In such a case high managerial ownership would help to mitigate managerial resistance to the deal.

In line with the entrenchment hypothesis of Ambrose and Megginson (1992), also lower board independence, higher anti-takeover defenses and larger board size might entrench current management and so decrease the odds of takeovers. Alternatively, low board independence and a large board size might be associated with poor management and so increase the odds of takeovers as bidder payoffs from takeovers increase with target firm inefficiencies. Institutional investors might also contribute to better governance as they seem to provide effective corporate monitoring (Gillan and Starks, 2003; Chen et al., 2007). At the same time, institutional investors increase the odds of takeover bids through targeting firms with higher chances to become takeover targets

but also through active promotion of takeovers in their portfolio firms (Gaspar et al., 2005; Greenwood and Schor, 2009).

Takeover activity is to a large extent industry driven and, therefore, other takeovers in the same industry are closely related to economic fundamentals in the industry and might increase the odds of future takeover activity (Mitchell and Mulherin, 1996). Higher product fluidity⁵ and product competition create more unstable environment with industry peers competing fiercely in many respects (Hoberg et al., 2014). In highly competitive industries, takeovers could help to differentiate acquirers' products relatively to their competitors (Hoberg and Phillips, 2010). Therefore, we conjecture that product fluidity and industry competition increase takeover anticipation for target firms. In contrast, Cornett et al. (2011) (mainly referring to Gort (1969)) argue that industry concentration (low industry competition) might increase the odds of takeovers in the industry because takeovers represent means of survival in industries with large players or because the large players might engage in takeovers to reduce further already high competition. In addition to industry competition, similarity of products within a firm industry may also affect the odds of takeovers. When a firm is similar to its local rivals and so relative crowding of rivals around the firm is high, potential bidders have many similar firms to choose from. Therefore, the industry product similarity should decrease the odds of takeovers for target firms (Hoberg and Phillips, 2010).

Palepu (1986) and Ambrose and Megginson (1992) are important early references in terms of target firm characteristics and firm asset structures af-

⁵Product fluidity measures the changes in firm's rivals' products relative to the firm's own products and so measures the firm's competitive product threats (Hoberg et al., 2014)

affecting the odds of takeovers for target firms. They suggest management inefficiencies and market undervaluation as important factors affecting the odds of takeovers. Acquirers can profit from taking over firms whose market values are low relative to their peers, due to either mispricing or mismanagement, and restore it back to its potential (Edmans et al., 2012). Jensen (1986) suggests that firms with high free cash flow and no growth options have higher agency problems and exhibit mismatch between their financing resources and growth options. This increases their odds of being taken over. The LBO literature explores this hypothesis quite extensively (Lehn and Poulsen, 1989).

Synergies, asset complementarities and pursuit of technological innovations are also important drivers of M&As recognized in the more recent literature (Hoberg and Phillips, 2010; Rhodes-Kropf and Robinson, 2008; Bena and Li, 2014). Bena and Li (2014) show that small firms with high ratio of innovations, measured both through patents and R&D expenditure, are more likely to become takeover targets. In contrast, the inefficient management hypothesis suggests that firms with high growth options should have lower odds of becoming a takeover target as high growth options suggest good rather than poor managerial skills (Palepu, 1986; Ambrose and Megginson, 1992). Another argument is that growth opportunities rely heavily on the human capital of current managers and therefore firms with significant future growth opportunities are poor takeover candidates as outside bidders might not have a comparative advantage in managing the growth options. In contrast, the most optimal use of fixed assets is open to interpretation. Thus, firms with a high proportion of fixed assets represent opportunities for outside bidders to shift current asset utilization (Ambrose and Megginson, 1992).

Recent literature highlights financial constraints as an important addi-

tional reason for takeovers (Erel et al., 2015; Khatami et al., 2015). The main argument is that takeovers could potentially mitigate financial constraints for firms that would otherwise have to forgo valuable investment opportunities. Acquirers with internally generated cash flow or ability to raise capital externally can enable their targets to undertake an increased number of positive net present value investments and create value.

Higher odds of future financial distress may be considered as a special case of financial constraints with important extra features (Almeida et al., 2011a). A target that is constrained but not distressed does not necessarily face the choice between liquidation and company sale. A financially constrained target has the option to withstand a liquidity shock by investing less than what would be optimal in the absence of the shock and wait for the access to external capital to improve. Targets with high reallocation costs due to their specific assets might have even higher motivation to withstand a liquidity shock rather than decide to sell. Also, the value of taking time and waiting longer for a suitable bidder with a good match for a firm with specific assets is high. In contrast, a firm with high leverage, which as a result of a liquidity shock experiences increased probability of financial distress but still has growth options, faces different trade-offs (Shrieves and Stevens, 1979). In this case, waiting to withstand a liquidity shock might lead to a financial distress with associated punitive costs. Once in financial distress, the firm would liquidate its distressed assets at the value that can be captured by industry outsiders (sell for scrap). A timely sale of the assets as a going concern might be optimal, given the alternative. A suitable buyer would be able to operate the specific assets closer to their best/optimal value relatively to their scrap value and so a timely sale should preserve the firm's growth options while

potential liquidation would not.⁶ It might also be the case that a private equity investor would provide new fund infusion and extra monitoring and the existing management would continue running the firm and realize the value of growth options. Almeida et al. (2011b) argue that when future projects are valuable and capital markets are imperfect, factors related to a firm's ability to smooth the financing of investment over time become valuable. For a firm with high leverage and high growth options, prompt action minimizes the impact of future financial distress. Firms could initially reduce their leverage, but this would come at a cost as they can then finance smaller amount of projects.

2.3 Data

Our sample includes US M&A deals that were announced between January 2005 and December 2011 and are covered by the Security Database Corporation (SDC) in Thomson ONE Banker. We apply the following 3 selection criteria: (i) both the acquirers and targets are US companies; (ii) all targets are publicly listed firms before the deal while acquirers could be publicly listed or private firms; (iii) the acquirers own 100% of targets' shares after the deal. We use COMPUSTAT and CRSP to collect accounting and stock price data. Institutional ownership data come from FactSet, insider ownership and stock and stock option grants data come from Thomson Insider Filings. Corporate governance data and CEO characteristics come from a combination of ExecuComp and ISS Governance Services, formerly Risk-Metrics, (for large firms) and Thomson Reuters Eikon and hand collection from SEC EDGAR company filings. Industry composition data are collected from the Hoberg-Phillips Data

⁶This is despite the fact that some value might be lost because a bidder has to be found relatively fast.

Library.⁷

We also hand collect and code information concerning the selling process from the ‘background of the deal’ section of DEFM14A, PREM14A, SC14D9, or S-4 filings, which we recover from the EGDAR filing collection provided by the SEC. We hand collect information concerning initiation, initiation date, selling mechanism, number of bidders contacted and the number of bidders signing a confidentiality agreement. Appendix 2.7.1 illustrates our coding system on examples of a target (between Applebees International Inc, the target, and IHOP Corp, the acquirer) and bidder initiated deal (between AirTran Holdings Inc., the target, and Southwest Airlines Co., the acquirer).

The selling process is usually initiated either by the board of the selling company deciding that they want to be sold or by a prospective bidder proposing to take over the firm. We code the initiation decision based on target’s or bidders’ actions as described in the SEC filings. Usually if a target firm plans to sell, the board considers various ‘strategic alternatives’ that include a possible sale of the company and they hire a financial advisor to evaluate these strategic alternatives. We classify a deal as target initiated if the target firm firmly decides for a sale or at least hires a financial advisor to identify and contact potential bidders. We classify a deal as bidder initiated, when a buyer approaches the target firm with a takeover proposal, the board considers the proposal and responds to the bidder. The target firm could then negotiate with the first bidder or contact other potential bidders to open wider competition. Whether the deal is initiated by the final acquirer or by another bidder, we define the deal as bidder initiated. Over the period 2005-2011, out of 2003

⁷Appendix 2.7.2 provides detailed information on data sources for each particular variable.

deals identified in SDC we are able to find SEC filings on EDGAR for 1260 deals. For 103 deals, we are not able to classify the initiator and we are not able to get data from Compustat or CRSP for 59 targets. All together, the hand collection results in a sample of 1098 deals, from which 487 are target initiated and 611 are bidder initiated.

Table 2.1 shows selling process summary statistics for target versus bidder initiated deals. Variable definitions are provided in Appendix 2.7.2. We test for differences in means using the t -test allowing for unequal variances and for differences in medians using the Mann-Whitney-Wilcoxon rank sum test. The first variable shows that target initiated deals are significantly smaller (USD1.4 billion) relatively to bidder initiated deals (USD2.2 billion). In line with the literature (Masulis and Simsir, 2015; Fidrmuc et al., 2012b) we find that target initiated deals earn smaller premium (27% versus 39%). Out of all deals initiated by a potential bidder, 39% are eventually acquired by a different bidder.

- insert Table 2.1 about here -

Firms could be sold in full scale auctions, controlled sales or private negotiations (Boone and Mulherin, 2009). A full scale auction is a very structured process that follows multiple designed rounds and accommodates relatively large number of bidders (Hansen, 2001). Controlled sales involve competitive bidding but from a limited number of bidders. In controlled sales, target firms discretely canvass interest from a chosen number of bidders who then counter-bid each other (Boone and Mulherin, 2009). Private negotiations involve only one bidder. Target initiated deals are more frequently sold in auctions (50% versus 20%) and less often sold in private negotiations (14% versus

42%). These statistics are consistent with Xie (2010).

Initiation date is the date when a target firm starts considering a potential sale of its business (Boone and Mulherin, 2007). For target initiated deals, it is usually the date when the board of directors decides that they want to explore strategic alternatives. For bidder initiated deals, the initiation date is established by a potential buyer directly expressing interest in buying the target firm. Table 2.1 shows that target initiated deals take on average longer from the initiation date to completion (595 versus 441 days) even though they take fewer days between the public announcement to the completion. This is the case regardless of the selling mechanism.⁸ It seems that companies need more time to organize the sale when they are not prompted by a potential (eager) buyer. Due to the fact that the private selling process is relatively lengthy and also due to the difference in length between target versus bidder initiated deal firms it is important to measure all firm characteristics affecting the initiation decision properly before the initiation date. Measuring the firm characteristics relatively to the announcement date might result in significant biases.⁹

We also code the number of potential bidders that a target firm contacts during the selling process and the number of bidders that a target firm signs a confidentiality agreement with. The average number of bidders contacted (30 versus 9) and signing a confidentiality agreement (11 versus 4) is significantly higher for target initiated deals. This is the case again also when we control for the selling process. 26% of target initiated and 23% of bidder initiated deals are eventually bought by a private equity buyer while 35% and 29% of

⁸These statistics are not reported, but are available on request.

⁹Masulis and Simsir (2015) measure their firm characteristics relatively to the SDC announcement date and so might be subject to this bias.

target and bidder initiated deals end up with a buyer that is not a publicly listed company. The payment consideration is not different for the 2 groups of deals. We see that majority of deals (68% and 71%) is paid for in cash while only 12% and 10% by stock.

The main aim of the chapter is to analyze determinants of the initiation decision. However, for comparison reasons, we are also interested in determinants of successful takeovers in general - that is, of both target and bidder initiated deals. We want to compare all the deal firms to other similar publicly listed firms that at the moment are not involved in any takeover deal and remain publicly listed. As Table 2.1 shows, target deal initiation is tilted towards smaller firms. In order to avoid any unnecessary biases, it is important that we keep as many small firms in the data set as possible. This, however, means that we have to hand collect data for several of the determinants for merger anticipation because CEO and corporate governance characteristics are not available in electronic data sets for smaller firms.¹⁰ To avoid time consuming hand-collecting of data, we decide to create our counterfactual by matching each deal firm based on target industry, year and size (total assets) just before the deal initiation. Palepu (1986) argues that any analysis based on matched samples should result in the right relative ranking of firms in terms of their acquisition probabilities. As we are not per se interested in forecasting the odds of takeovers out of sample, our conclusions based on relative ranks of the outcomes should not lead to erroneous inferences even when based on matched counterfactuals as opposed to a random sample.

Size is a very important matching requirement because it strongly af-

¹⁰ISS Governance Services (formerly Risk-Metrics) covers only S&P 1500 firms, which means that only around 15% of our target and matched firms would be covered. For smaller firms, we hand collect data from Thomson Reuters Eikon and SEC EDGAR filings.

fects the odds of becoming a takeover target. Small firms are more likely to be taken over (Palepu, 1986; Ambrose and Megginson, 1992; Cornett et al., 2011). Both the cost of absorbing a large firm into the acquirer's business and that of a hostile takeover of a large firm are prohibitive. Moreover, size is usually correlated with other determinants, like corporate governance, insider ownership and innovation and so it is important to compare small target firms to similarly small firms that remained publicly listed.

Our matching procedure is as follows. From the pool of all potential matching firms with available accounting and stock price data, we pick the firm that is in the same Fama-French 30 industry and comes the closest in terms of total assets in the same fiscal year using a $\pm 25\%$ range. In case we fail to find a matching firm, we repeat the process for the corresponding Fama-French 12 industry. If we still do not have a match, we apply the 4-digit SIC code industry and then the 3-digit, 2-digit and finally 1-digit SIC code industry. We also require that the same publicly listed firm is not matched repeatedly to different target firms and that target firms that dropped out from our data set due to unavailable SEC filing data are not included as matched firms.¹¹

Firm characteristics are reported in Table 2.2. We show means separately for matched versus deal firms (target and bidder initiated deal firms together) in columns 2 and 3, respectively. Column 4 shows their difference in means and its significance. Further, Columns 5 and 7 report the averages for target and bidder initiated deal firms, respectively, while Columns 6 and 8 show the difference in means relatively to their respective matched firms and their significance. Finally, Column 9 shows the difference in means between

¹¹All together, 889 target firms are matched based on FF30 industry, 162 based on FF12, 28 based on 4-digit SIC, 2 based on 3-digit SIC, 7 based on 2-digit SIC and finally 10 targets based on 1-digit SIC.

target versus bidder initiated deal firms. All variables are measured just before the initiation date and are winsorized at 1% and 99%, except for all dummy variables.

- insert Table 2.2 about here -

We see that due to our matching procedure deal versus non-deal firms do not differ in total assets or total sales. The deal firms, however seem to be less valuable – their market capitalization is significantly smaller. They are younger, but are followed by more analysts. The target and bidder initiated deal firms are similar in size to their matched non-deal firms, but target initiated deal firms are smaller relatively to bidder initiated deal firms. They are also less valuable and followed by fewer analysts.

The first set of characteristics that are conjectured to be associated with deal prediction concern ownership structure, corporate governance and CEO age. We see that deal firms have significantly higher insider, non-executive and institutional ownership and at the same time higher stock and stock option grants to their CEOs before and after deal initiation. Deal firms have also larger and less independent board of directors. Their CEOs are older and more likely to be in the retirement age. Table 2.2 suggests that the insider ownership differences are mostly due to target rather than bidder initiated deal firms having higher insider ownership. Institutional ownership is higher for both types of deal firms relatively to their matched firms, but is still significantly higher for bidder initiated deal firms. Target initiated deal firms grant their CEOs slightly more stocks and stock options from 2 years before the initiation to the public announcement. Board independence is significantly lower in target initiated deal firms.

Industry characteristics suggest large differences between deal versus non-deal firms, but virtually no differences within the group of deal firms. Deal firms operate in an environment with higher product fluidity and lower industry concentration. More deals over the year before initiation (M&A liquidity) also increase the odds while industry similarity decreases the odds of being a target. Moreover, deal firms more often participate in asset sales and acquire other firms.

Asset characteristics confirm again a similar pattern: the only significant differences between target versus bidder initiated deals stem from higher R&D, and lower profitability of target initiated deals. On the other hand, the deal firms together are quite different from non-deal firms: they have poorer stock performance and lower market to book ratio, have lower asset tangibility and higher R&D ratio and at the same time higher EBITDA growth and smaller cash flow.

The last group of characteristics focusses on leverage and financial constraints. We see significant differences between both deal versus non-deal but also target versus bidder initiated deal firms. Target initiated deal firms are more levered with smaller interest coverage ratio. They have also significantly higher SA index, which indicates higher financial constraints. Moreover, they are also more likely to fall to the financial distress category with low Z -score. They issue more equity. The following section tests for the differences in a multinomial setting.

2.4 Results

Tables 2.3 and 2.4 report our results for logistic regressions determining the odds of being successfully taken over in general and of a target firm initiating its own sale, respectively. In other words, Table 2.3 compares all our deal firms to their matched firms that remain publicly listed while Table 2.4 compares target versus bidder initiated deals. In both tables, we first report results separately by the four groups of takeover determinants discussed in Section 2.2 and then pool all the explanatory variables together. We report Hubert/White robust standard errors in parentheses. All regressions include time and industry dummies, but we do not report them in the tables to preserve space. Browsing the 2 tables, it is apparent that several factors significantly determine the odds of becoming a takeover target in Table 2.3 while only a few variables are significant in Table 2.4 that predicts the odds of initiation. This shows that all the deal firms are quite alike when comparing target versus bidder initiated deals, but together they differ quite significantly and in important ways from other non-acquired firms. To some extent, the irrelevance hypothesis holds.

2.4.1 Determinants of being a target in general

Even though we are not directly interested in the determinants of merger anticipation in general, a logistic regression determining the odds of becoming an M&A target relatively to staying publicly listed is useful for our purposes because it highlights that both target and bidder initiated deals are indeed very different from other non-deal firms. Table 2.3 reports the results. Column 1 explores the effect of corporate governance and ownership characteristics on the probability of a takeover. It shows that target firms have significantly higher

insider and institutional ownership. The change in institutional ownership over the year just before deal initiation is not significant indicating that institutional owners do not increase their ownership to force through a change in control.

- insert Table 2.3 about here -

Board size and board independence are both significant at the 1-percent level. Both coefficients indicate that poor governance is associated with higher odds of takeovers. This is in line with the inefficient management hypothesis suggesting that poorer governance allows space for poorer management and attracts potential bidders who could improve the firm's management and so earn profit on the transaction (Palepu, 1986; Ambrose and Megginson, 1992). Nevertheless, we explore the inter-relation between insider and institutional ownership on the one hand and board independence on the other hand. We find that less independent boards have higher board and officer ownership for target initiated deal firms and higher institutional ownership for bidder initiated deal firms. This indicates a substitution effect between ownership concentration and board independence: the deal firms might exhibit poorer governance in form of lower board independence, however, they have concentrated owners who should monitor their management and so substitute for board independence. As a result, we would have support for the entrenchment rather than inefficient management hypothesis: firms with lower ownership concentration and therefore poorer governance have lower odds of takeovers while firms with higher ownership concentration and better governance have increased chances of successfully completing an M&A deal. High ownership concentration encourages takeover offers. It is also interesting to note that the explanatory power of the model in Column 1 is unusually high.

In Column 2, we include a dummy for one person covering both positions of the CEO and the chairman of the board. It is not significant. Further, we also include a dummy for the CEO being in the retirement age. In line with Jenter and Lewellen (2015), we see that CEOs in retirement age increase significantly the odds of takeovers. Insider ownership becomes insignificant, but this is due to significant drop in the number of observations rather than inclusion of the 2 extra explanatory variables. The explanatory power of the model remains high.

We explore the impact of industry characteristics in Column 3. In line with our conjecture, high product market fluidity and industry competition increase the odds of takeovers. Higher rivals' change in their products, that is higher industry fluidity, and higher competition in the industry are associated with higher odds of takeovers. In contrast, industry similarity decreases the odds as more similar industry peers pose a crowding effect and mean that similar peers might be taken over instead (Hoberg and Phillips, 2010). The M&A liquidity dummy, based on Schlingemann et al. (2002), measures the frequency of deals in the industry over the past year and is not significant in Column 3 because it is highly correlated with similarity. M&A liquidity becomes significantly positive at the 1-percent level when included without the other industry variables.

The last two variables in Column 3 measure alternative strategic options firms might explore before considering being sold. First, a firm might consider partial asset sale(s) to focus its activities and improve its financial position (Bates, 2005). Indeed, the dummy for asset sales over the last 3 years before the current deal is positive and significant at the 1-percent level. The deal firms actively sell significantly more of their assets before they are taken

over relatively to comparable firms that remain publicly listed. The acquirer dummy is also positive and significant at the 1-percent level. It shows that deal firms are also more likely to get involved in takeovers of other firms relatively to non-deal firms. Industry fluidity and concentration are highly correlated with firm age and so we do not include firm age as a control variable in this column. It seems quite natural that younger firms operate in more fluid and more competitive industries.

Columns 4 to 7 explore the effect of stock and asset characteristics. In Column 4, we include the abnormal return over the last year before deal initiation and the market to book ratio. The past return is significantly negative suggesting that deal firms suffer poor stock performance. In Column 5, we replace the market to book ratio with its 3 components due to Rhodes-Kropf et al. (2005): firm-specific error, sector error and long-run market to book. We see that the market to book ratio in Column 4 is probably insignificant because 2 of its components have opposing effects that might cancel out and result in an insignificant overall effect. The 3 components in Column 5 suggest that deal firms are underpriced in the short-term relatively to their industry peers (the firm-specific error is significantly negative), but at the same time, they exhibit higher growth options (the long-run market to book is significantly positive). Past performance becomes insignificant, probably because the firm-specific error picks up the low performance effect. The R&D ratio in Column 6 is not significant. Column 7 includes the 3 market to book components together with profitability, cash flow and stock-trading liquidity. The market to book components remain significant. The negative coefficient for cash flow contradicts the free cash flow hypothesis by Jensen (1986) that firms with very high free cash flow are prone to agency problems and therefore should be more

prone to takeovers. We see that deal firms suffer low rather than high cash flow.

Column 8 explores leverage and financial constraints as determinants of takeovers. The SA index is significant and positive suggesting that deal firms do suffer higher financial constraints confirming recent empirical evidence (Khatami et al., 2015). Leverage is not significant, it is rather financial constraints that matter. The 2 Altman's Z-score dummies measure financial distress. The dummy for low Z-score is set to 1 in case the Z-score is lower than 1.81 and 0 otherwise and indicates a high immediate risk of financial distress. The dummy for high Z-score is set to 1 in case the Z-score is higher than 2.99 and 0 otherwise and, so, indicates financially solidly healthy firms. The 2 Altman's Z-score dummies show that financial distress is not associated with target merger anticipation. The debt and equity issue dummies are both positive and significant at the 1-percent level: deal firms, relatively to non-deal firms, engage more in raising new financing. Interestingly, they are still financially constrained.

The last 2 columns in Table 2.3 show that most of the explanatory variables remain significant also when we include them all together. Overall, the results show large differences between deal firms versus firms that remain publicly listed. Interestingly, the highest explanatory power comes from the corporate governance measures.

2.4.2 Determinants of target initiation

Table 2.4 shows that, in contrast to a multitude of differences between deal versus non-deal firms, target versus bidder initiated firms are different only in

2 important respects. First, even though these two sets of firms do not differ in terms of board size, board independence or CEO/chairman duality, their ownership structure is different. Columns 1 and 2 show that target initiated deal firms have significantly higher insider ownership, which is mostly due to high ownership by executives and their CEOs. In contrast, bidder initiated deal firms tend to have higher institutional ownership (significant at the 10-percent level). Higher insider ownership is a robust predictor of the odds of target initiation, as the coefficient remains significant at the 1-percent level also when including all other explanatory variables in the last 3 columns of Table 2.4.¹²

- insert Table 2.4 about here -

The second set of significant factors concerns leverage together with growth options. Columns 4 and 5 show that target initiated deals have higher growth options. In particular, Column 4 includes the 3 components of the market to book decomposition due to Rhodes-Kropf et al. (2005). The first 2 components representing the short-term firm undervaluation (firm-specific error) and the long-term industry undervaluation (sector error) are not statistically significant. However, the long-run value to book component that measures the long-run growth prospects of the target firm is positive and significant at the 10-percent level. Also, the R&D ratio in Column 5 is positive and significant at the 1-percent level. Column 6 further indicates that due to high negative correlation of long-run value to book with earnings (high growth firms have negative earnings), the long-run value to book coefficient becomes

¹²Unreported specifications show that a dummy for firm incorporation in states with strong anti-takeover defense laws is not a significant factor influencing the odds of target initiation.

insignificant when we control for EBITDA. The R&D ratio remains significant even when controlling for earnings.¹³

At the same time, target initiated firms exhibit higher leverage. Columns 7 to 11 show that leverage is highly significant regardless of other control variables. Interestingly, the SA index measuring financial constraints (Hadlock and Pierce, 2010) does not diminish significance of leverage and by itself is not significant (Column 7). This suggests that it is high leverage per se rather than financial constraints per se that increases the odds of target deal initiation: a firm must face increased prospects of financial distress to be motivated to organize its own sale. A financing shock that increases financial constraints but leads only to postponement of investment rather than decrease in value of growth options and potential financial distress does not push firms into deal initiation.

Column 8 controls for imminent financial distress as it includes 2 dummy variables for low and high Altman's Z-score (Altman, 1968). Both of the Z-score dummies are insignificant, suggesting that the target initiated firms are neither financially distressed nor very healthy. This is quite important for our hypothesis because it shows that even though high leverage is associated with an increased possibility of financial distress, the financial distress is not yet imminent and, so, the firm's growth options still keep their value. In other words, selling for scrap is not yet an issue. Naturally, inclusion of the two Z-score dummies decreases the significance of the leverage coefficient and shows that leverage is closely linked with financial distress.

Column 8 includes also dummies for debt and equity issues over the last 3 years before the deal initiation. The debt issue dummy is not significant,

¹³This regression is not reported.

but the positive and significant coefficient for equity issues shows that target initiated firms do try to decrease their leverage before they organize the acquisition. Related to equity issues, we also check for alternative strategies that could help to avoid the firm sale, like asset sales or acquisitions of other firms. Column 3 with all the industry activity variables shows that neither the asset sale nor acquirer dummy variables are significant. It is perhaps important to note that both the target and bidder initiated deal firms are indeed actively participating in asset sales and/or acquisitions over the last 3 years before the initiation of the current deal (see Table 2.3). Still, Column 9 does not show significant differences between target versus bidder initiated deal firms.

Altogether, the results are consistent with the conjecture that the board of directors decides to offer its firm for sale in a situation with high leverage but still valuable growth options. Financial distress is likely, but is not imminent yet. It seems optimal to start actively looking for a suitable bidder who would be able to preserve current growth options. Waiting for a bidder to overcome his information disadvantage on his own is inferior as, with time and closer to financial distress, growth options would drastically lose in value. In this situation, it is up to the board to exercise its put option (to sell) as potential bidders might not want to exercise their call options (to buy). Bargaining power of the board that initiates its sale is lower as it wants to sell, which naturally might result in lower takeover premium. Still, given the situation, the board seems to act optimally to maximize its shareholders' value.

2.4.3 Motivating managers

Table 2.4 shows that higher insider and executive ownership are important determinants of the odds of firms initiating their own sale. In this section, we explore further whether higher CEO ownership just increases CEOs' willingness to accept deal initiation or it is also associated with active participation of CEOs in the negotiation process. Panel A in Table 2.5 explores first the effect of CEO golden parachutes that are in place before deal initiation. Column 1 confirms that CEO ownership is associated with higher odds of deal initiation. We also see that golden parachutes do not change the odds. However, Column 2 with an interaction term between the golden parachute dummy and CEO ownership dummy shows that golden parachutes do not matter for deal initiation in firms with higher CEO ownership, but significantly increase the odds of deal initiation in firms without CEO ownership. The golden parachute dummy is significantly positive, but the interaction term is significantly negative. The overall effect of golden parachutes in firms with CEO ownership (golden parachutes plus the interaction term) is insignificant. These results suggest that golden parachutes and CEO ownership are substitutes. CEOs get golden parachutes when they do not own shares to motivate them positively for deal initiation.

- insert Table 2.5 about here -

Columns 3 and 4 partition the sample conditional on the selling mechanism. Comparing Column 3 for formal auctions versus Column 4 for private negotiations and controlled sales, we see large differences. CEO ownership and golden parachutes do not matter for deal initiation in formal auctions, while they are significant in informal sales. These results are in line with managerial

motivation for active participation. Once incentives are in place, selling firms opt for deal initiation and sell their firms through less formal selling mechanisms with important impact of takeover negotiations on the overall outcome. We see evidence for managerial motivation for active participation rather than for bribery to accept takeovers.

Panel B in Table 2.5 explores a quasi-experiment considering board independence. A board with majority of independent directors is widely considered as a good corporate governance practice and so we use it to evaluate the effect of CEO ownership and golden parachutes on deal initiation. We conjecture that if CEO ownership and golden parachutes serve to motivate active CEO participation in their firm sale, it should be more so in firms with independent boards. Our results in Panel B indeed confirm this conjecture. Even though board independence does not affect the odds of target initiation in Column 1, Column 2 shows that board independence significantly increases the effect of CEO ownership on target initiation. The interaction term for board independence and the CEO ownership dummy is significantly positive. The interaction term for board independence and golden parachutes is also positive, but not significant. Columns 3 and 4 again partition the sample into formal auctions and informal sales and show that the positive effect of independent boards is present only in informal sales (private negotiations and controlled sales) when active negotiation of the CEO is more vital. These results confirm our results from Panel A supporting motivation for CEOs' active participation in sale negotiations.

The second quasi-experiment takes advantage of CEO retirement age. Jenter and Lewellen (2015) show that firms with CEOs in retirement age are more likely to be taken over. They also show that this effect is present only

in firms with weak corporate governance arguing that retirement age should not matter in well govern firms. CEOs should not resist takeovers unless they are in retirement age. Following this argument, we use ‘no effect of retirement age’ as an indicator of good corporate governance. Table 2.4 in section 2.4.2 shows that the retirement age dummy is not significant for deal initiation. In Panel C of Table 2.5, we include retirement age also in interaction terms with the CEO ownership and golden parachutes dummies. In Column 1, retirement age is significantly positive, but the interaction term with CEO ownership is negative. Even though the interaction term is not significant, the overall effect of retirement age on target initiation in firms with CEO ownership (retirement age + retirement age x CEO ownership) is not significant. Thus, retirement increases the odds of target initiation only in firms without CEO ownership. CEO ownership mitigates the effect of retirement age on target initiation and, therefore, again shows a positive corporate governance role.

Column 2 in Panel C shows a positive coefficient for the interaction term between retirement age and golden parachutes. Golden parachutes are significantly increasing the odds of target initiation if the CEO is in retirement age. The joint effect is significant at the 5-percent level. Golden parachutes reinforce the effect of retirement age rather than mitigate it, which is an indication of weak corporate governance and misuse of golden parachutes in case when it is not necessary. Columns 3 and 4, where we partition the sample into formal auctions and informal sales, reconcile the issue. Golden parachutes mitigate a positive effect of retirement age in formal auctions when active participation in negotiations is not important. The interaction term for retirement age with golden parachutes is negative and significant and the overall effect of retirement age in firms with golden parachutes is insignificant. This is a positive

result for golden parachutes as they serve as a positive corporate governance tool. When golden parachutes are granted retirement age does not matter for deal initiation. In column 4 with private negotiations and controlled sales, the interaction term is positive and significant. Golden parachutes increase the odds of target initiation in firms with CEOs in retirement age. However, it is in a situation when active participation of CEOs might be valuable. Perhaps CEOs in retirement age would not care much about outcomes of takeover negotiations and so are given extra incentives in form of golden parachutes to negotiate harder.

As a last step, Table 2.6 explores grants of stocks and stock options to CEOs over the period from 2 years before the initiation up to deal completion. In this context, we conjecture that in case a board of directors perceives a future takeover deal more likely, it would grant its CEO extra stocks and/or options to align the CEO's with the shareholders' interests. Moreover, we expect that the board might grant its CEO more options and stocks not only after deal negotiations have commenced, but even before the deal initiation, especially for target initiated deals. If the board expects a deal likely, it might make sense to incentivize its CEO before he/she starts negotiating.

- insert Table 2.6 about here -

Table 2.6 explores this idea. Column 1 shows that all equity grants together (stock and stock options from 2 year before the initiation up to deal completion) are significantly higher in target initiated deals. In Column 2, we partition all equity grants into (i) equity grants 2 years before the deal initiation, (ii) equity grants from initiation up to the deal announcement, and (iii) equity grants after the public announcement up to deal completion.

Coefficients for all three equity grant variables are positive, but only the second one for stock and stock option grants after deal initiation but before public announcement is significant. Target initiated firms do not grant their CEOs more stocks and stock options before the deal initiation in target initiated deal firms, but they do grant them more equity based compensation after the deal initiation. Equity grants in target initiated deal firms are higher both for formal auctions (Column 3) and informal sales (Column 4) and the difference between formal versus informal sales is not statistically significant. However, Columns 5 and 6 show that target initiated deal firms grant their CEOs significantly more equity compensation after initiation only in informal sales. This is in line with increased motivation for CEOs when their active participation in negotiations would be more valuable.

2.5 Robustness checks

As a robustness check and an alternative to the 2 sets of logistic regressions, we estimate a multinomial logit regression that compares the target and bidder initiated deal firms to their matched firms in one model. Table 2.7 reports results for a representative specification from Tables 2.4 and 2.3.¹⁴ The dependent variable is a categorical variable equal to 0 for all matched firms, 1 for target initiated deal firms and 2 for bidder initiated deal firms. We choose the the matched firms to be the reference category and so we report 2 sets of results: for the target and bidder initiated deal firms. The coefficients should be interpreted relatively to the reference category of matched firms. For com-

¹⁴We are not able to include specifications from section 2.4.3 as deal characteristics concerning the selling process are not available for non-deal firms. Also, we have golden parachute data only for the deal firms.

pleteness, the last column in Table 2.7 shows the coefficient differences between target versus bidder initiated deal firms and their significance.

- insert Table 2.7 about here -

Table 2.7 confirms all our conclusions. The last column shows that target versus bidder initiated deal firms differ significantly in insider and institutional ownership and leverage and growth options. We use R&D expenses to measure growth options and the coefficient difference between target versus bidder initiated deals is positive and significant at the 5-percent level. If we replace the R&D ratio with the set of market to book components, the effect of the long-run market to book is not significantly different for target versus bidder initiated firms. This is because the long-run market to book is correlated with leverage. In an unreported specification corresponding to Column 4 in Table 2.4, the coefficient for long-run market to book is positive and significant at the 10-percent level.

Many of the coefficients for target and bidder initiated deals versus the matched firms are significant and they both have the same sign. This shows that the variables affect the odds of target and bidder initiated deal firms in the same way with no significant differences between the 2 types of deal firms. This confirms the results in Table 2.3.

2.6 Conclusions

The main aim of the chapter is to explore empirically the reasons for why a board of directors might decide to sell its firm and how the board incentivizes its managers for the sale. On a sample of 1098 US publicly listed target firms,

we show that even though target versus bidder initiated deal firms are quite alike and together much more different from non-deal firms, they still differ in two important ways. First, target initiated firms have higher alignment between board members (CEO) and shareholders in the form of higher ownership stakes relatively to bidder initiated firms. In case CEO ownership is low, it is substituted by golden parachutes. Further analysis shows that CEO ownership and golden parachutes increase the odds of target initiation only in informal sales and not in formal auctions. Thus, managerial incentives are higher in informal sales where their active participation in takeover negotiations is more valuable and might improve deal outcomes, while they do not matter in controlled sales with less scope for negotiations to influence outcomes. Two quasi-experiments involving board independence and CEO retirement age further confirm our conjecture that CEOs in target versus bidder initiated deals are more motivated for active participation in takeover negotiations.

The second important difference is that target initiated deal firms are more levered but still seem to keep growth options. It suggests that the firm intends to avoid possible future financial distress that would largely destroy firm value associated with valuable growth options.

2.7 Appendices

2.7.1 Initiation coding example

This appendix illustrates our coding. We use 2 examples that correspond to a target initiated deal (between Applebees International Inc and IHOP Corp.) and a bidder initiated deal (between AirTran Holdings Inc and Southwest Airlines Co).

Applebees International: a target initiated deal

The following paragraph extracted from the SEC filing of Applebees International Inc describes the initial decision and helps us to code the deal initiator and the initiation date when the private selling process started: "*Our Board held its annual strategic retreat on August 23-25, 2006. . . . The strategic alternatives discussion focused on two potential alternatives: (1) a leveraged recapitalization involving an expanded share repurchase program that would involve increasing the total debt to EBITDA leverage ratio to approximately three times and (2) a confidential market test for a possible sale of the company.*"

The text shows that Applebees took initiative and started considering a potential sale as a way forward for the company, so we code the deal as target initiated. Applebees also retained financial advisors to solicit potential merger candidates. We code August 23, 2006 as the initiation date when the whole selling process started.

The following section of the filing indicates that the number of bidders contacted is 35 and the number of bidders with confidentiality agreements

is 26. *”During the next several weeks and in accordance with the Committee’s instructions, Citi and Banc of America Securities contacted 35 potential purchasers of Applebee’s. . . . Twenty-six potential purchasers executed a confidentiality agreement and received an offering memorandum with non-public information during the week of March 18, 2007.”*

Applebee’s was sold in an auction, as documented in the following text:
”On April 14, 2007, Citi and Banc of America Securities informed the Committee that we received four preliminary indications of interest in purchasing our company. . . . Five other potential bidders asked for additional time to submit an indication of interest . . . As is typical, these indications of interest were non-binding and contained numerous conditions, including due diligence conditions. . . . After reviewing the initial indications of interest with Citi’s assistance, the Committee decided to allow these four bidders, including IHOP, to continue to the next phase of the sale process which involved more detailed due diligence, including access to a data room and participation in multi-day management presentations. . . . This conclusion was driven in large part by the fact that at that point in time the contemplated deadline for final submission of bids was shortly before the date of Applebee’s annual meeting . . . During April and May, all four remaining potential bidders continued their due diligence activities. In addition, all four received a draft merger agreement and were asked to submit final, definitive offers, including a proposed contract, by June 11.”

AirTran Holdings: a bidder initiated deal

In this case, we code the initiation based on the following section from the SEC filing of AirTran Holdings Inc: *”On April 21, 2010, Gary Kelly, Southwest’s*

Chairman of the Board, President and Chief Executive Officer, telephoned Robert L. Fornaro, AirTran's Chairman, President and Chief Executive Officer, and asked Mr. Fornaro if he would meet with him in person to discuss a potential business matter, without indicating the specific nature of the matter. On May 6, 2010, Mr. Kelly and Mr. Fornaro met in a suburb of Dallas, Texas, and Mr. Kelly asked Mr. Fornaro if AirTran would be open to discussions regarding an acquisition by Southwest. Mr. Fornaro replied that he believed that management of AirTran had a duty to consider any adequately priced and financed acquisition offer and should such an offer be forthcoming from Southwest, management of AirTran would so consider it." Since it is Southwest's Chairman to solicit potential merger candidate for the company, we define this deal as a bidder initiated deal. The initiation date is May 6, 2010.

AirTran was sold in a private negotiation, which can be implied from the following lengthy process: *"Following Southwest's and its advisors' evaluation of AirTran, Southwest determined to propose to AirTran that Southwest commence a preliminary due diligence investigation of AirTran. . . . AirTran directed its counsel to establish an electronic data room for various documents to be made available to Southwest in connection with this due diligence. . . . During the next three weeks, Southwest conducted its preliminary due diligence investigation of AirTran, including accessing the electronic data room that AirTran established. . . . On July 31, 2010, AirTran's senior management held a conference call with Morgan Stanley and Smith Gambrell to review and discuss the proposal received from Southwest and related matters. . . . On August 13, 2010, Vinson & Elkins distributed an initial draft of a merger agreement to AirTran and its representatives. . . . On August 27, 2010, Vinson*

Elkins distributed a revised draft of the merger agreement to AirTran and its representatives, which draft reflected Southwest's responses to the AirTran comments received on August 21, 2010. . . . On September 4, 2010, Vinson & Elkins distributed a revised draft of the merger agreement in response to the discussions between the parties subsequent to the August 27, 2010 distribution. . . . Also on September 23, 2010, Vinson & Elkins sent a revised draft of the merger agreement to AirTran and its representatives reflecting all discussions between the parties on open items up to that date. . . . The merger agreement was executed on behalf of Southwest and AirTran shortly after conclusion of the respective September 26, 2010 meetings of the AirTran and Southwest boards of directors. The merger was publicly announced in the early morning of September 27, 2010." In a private negotiation, the number of bidders contacted and with confidentiality agreements are both 1.

2.7.2 Variable definitions

Variable	Definition	Source
Acquirer	Dummy variable equal to 1 in case the firm acquires another firm within 3 years before the initiation date.	SDC, OC
Altman's Z-score	$1.2 * (\text{working capital} / \text{total assets}) + 1.4 * (\text{retained earnings} / \text{total assets}) + 3.3 * (\text{EBIT} / \text{total assets}) + 0.6 * (\text{market value of equity} / \text{book value of debt}) + 0.999 * (\text{total sales} / \text{total assets})$. Based on Altman (1968).	COMPUSTAT, OC
Analyst following	Number of analysts following the firm in December of the calendar year before the initiation date. In the analysis, we use $(1 + \text{analyst following})$.	IBES
Asset sale	Dummy variable equal to 1 in case the firm sells a part of its assets within 3 years before the initiation date.	SDC, OC
Asset tangibility	Net plant and property divided by total assets one fiscal year before the initiation date.	COMPUSTAT
Auction	Dummy variable equal to 1 in case the company is sold in a highly organized auction with pre-set rules and 0 otherwise. Based on Hansen (2001).	HC
Bidders contacted	Total number of bidders that the target firm contacts during the selling process.	HC
Bidder initiated deal	Deal for which, at the beginning of the selling process, a potential buyer approaches the target firm and proposes an M&A transaction.	HC
Bidders with confid. agreement	Total number of bidders that the target firm signs confidentiality agreement with during the selling process.	HC
Board independence	Total number of independent board members over the total number of board members. In some regressions used as a dummy that is set to one in case at least 50% of board members are independent directors and zero otherwise.	ExecuComp, TRE, HC
Board size	Total number of board members.	ExecuComp, TRE, HC
Cash	Cash and marketable securities over total assets in the accounting year just before the initiation date.	COMPUSTAT
Cash flow	Cash flow over total assets. Based on Erel et al (2015).	COMPUSTAT
Cash offer	Dummy variable equal to 1 in case the acquirer offers cash as the payment consideration and 0 otherwise.	SDC
CEO age	The age of CEO at the private year.	ExecuComp, TRE, HC
CEO/chair duality	Dummy variable equals to 1 in case CEO of a firm is also chairman of the firm.	ExecuComp, TRE, HC

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Variable	Definition	Source
CEO ownership	The total fraction of shares outstanding owned by the CEO just before the initiation date. In some regression used as a dummy variable that is set to one in case CEO ownership is positive and zero otherwise.	TIF, OC
CEO retirement	Dummy variable equal to 1 in case CEO's age is larger than 64 and 0 otherwise. Based on Jenter and Lewellen (2015).	ExecuComp, TRE, HC
Controlled sale	Dummy variable equal to 1 in case the target company decides to discreetly canvass a limited number of bidders that target management believes to have a serious interest in acquiring the company and 0 otherwise. Based on Boone and Mulherin (2007).	HC
Debt issue	Dummy variable equal to 1 in case a firm issues debt within 3 years before the private date and 0 otherwise.	SDC
EBITDA	Earnings before interest, tax, depreciation and amortization over total assets in the accounting year just before the initiation date.	COMPUSTAT
EBITDA growth	3 year average change in EBITDA over total assets before the initiation date.	COMPUSTAT, OC
Equity grants	The total number of shares granted in options and stock to the CEO as a fraction of ordinary shares outstanding over the period from 2 years before the initiation date to the completion date.	TIF; OC
Equity grants before initiation	The total number of shares granted in options and stock to the CEO as a fraction of ordinary shares outstanding over the period from 2 years before the initiation date to the initiation date.	TIF; OC
Equity grants after initiation	The total number of shares granted in options and stock to the CEO as a fraction of ordinary shares outstanding over the period from the initiation date to the SDC announcement date. Based on Heitzman (2011).	TIF; OC
Equity grants after public	The total number of shares granted in options and stock to the CEO as a fraction of ordinary shares outstanding over the period from the SDC announcement date to the resolution date. Based on Heitzman (2011).	TIF; OC
Equity issue	Dummy variable equal to 1 in case a firm issues equity within 3 years before the private date and 0 otherwise.	SDC
Executive ownership	The total fraction of shares outstanding owned by firms' executives just before the initiation date.	TIF, OC
Firm age	The number of years from first appearance in CRSP. Based on Edmans et al. (2012).	CRSP, OC

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Variable	Definition	Source
Firm-specific error	The first component of the decomposition by Rhodes-Kropf et al. (2005) based on Model 1 with FF12 industries; it estimates the deviation of the firm specific pricing from short-run industry pricing.	OC
Golden parachute	Dummy variable equal to 1 in case the CEO is paid with severance pay and cash bonuses due to the termination of his/her employment after the takeover, 0 otherwise.	HC
High Altman's Z-score	Dummy variable equal to 1 in case Altman's Z-score is larger than 2.99 and 0 otherwise. Indicator of high financial health of the firm.	COMPUSTAT, OC
Industry concentration	Herfindahl-Hirschman index based on TNIC-3 (10-K based Network) industry. Based on Hoberg and Phillips (2014).	Hoberg-Phillips Data Library
Industry similarity	Cumulative firm-by-firm pairwise similarity score for all peers for the firm's TNIC-3 industry using the 10-K firm product words. In analysis, we use the score scaled by 1000. Based on Hoberg and Phillips (2014).	Hoberg-Phillips Data Library
Initiation date	The date on which the target firm starts to consider a potential sale of the firm. Based on Boone and Mulherin (2007).	HC
Insider ownership	The total fraction of shares outstanding owned by the board members and other officers just before the Initiation date.	TIF, OC
Inst. ownership	The total fraction of shares outstanding owned by institutional blockholders just before the initiation date.	Factset
Inst. ownership change	The change in institutional ownership over the year before the initiation date.	Factset
Interest coverage	EBIT over interest payment due in the accounting year just before the initiation date.	COMPUSTAT
Interest coverage growth	3 year average change in interest coverage ratio before the initiation date	COMPUSTAT, OC
Leverage	Long term debt over total assets in the accounting year just before the initiation date.	COMPUSTAT
Leverage growth	3 year average change in long term debt over total assets before the initiation date	COMPUSTAT, OC
Long-run value to book	The third component of the decomposition by Rhodes-Kropf et al (2005) based on Model 1 with FF12 industries; it measures the deviation of the long-run pricing of the industry from the book value of the firm and so measures the long-run growth prospects of the firm.	OC

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Variable	Definition	Source
Low Altman's Z-score	Dummy variable equal to 1 in case Altman's Z-score is smaller than 1.81 and 0 otherwise. Indicator of financial distress	COMPUSTAT, OC
Low interest coverage	Dummy variable equal to 1 in case the interest coverage ratio (EBIT over yearly debt interest payment in the accounting year just before the initiation date) is smaller than 2 and 0 otherwise.	COMPUSTAT
M&A liquidity	The total number of targets in the same first three-digit SIC code as the sample firm over the year just before the initiation date expressed as a fraction of the total number of firms in the same first three-digit SIC code in COMPUSTAT. Based on Schlingemann et al. (2002).	COMPUSTAT, SDC, OC
Market to book ratio	Market capitalization over the book value of equity in the accounting year just before the initiation date.	COMPUSTAT
Market capitalization	Market capitalization (stock price times shares outstanding) on the initiation date, in the analysis used as a natural log.	CRSP
Mixed payment	Dummy variable equal to 1 in case the acquirer offers both cash and merged firm's stock as payment consideration and 0 otherwise.	SDC
Net income	Net income to total assets in the accounting year just before the initiation date.	COMPUSTAT
Net income growth	3 year average change in net income over total assets before the initiation date	COMPUSTAT, OC
Non-ex. ownership	The total fraction of shares outstanding owned by independent directors just before the initiation date. In some regressions used as a dummy variable that is set to one in case non-executive ownership is positive and zero otherwise.	TIF, OC
Past abnormal return	Raw stock return over 1 year before the initiation date adjusted by the equally weighted market return over the same period.	CRSP, OC
Past return	Raw stock return over 1 year before the initiation date.	CRSP
Premium	The final offer price relative to the stock price 4 weeks before the SDC announcement date in percentage points.	SDC
Private equity acquirer	Dummy variable equal to 1 in case the target firm is acquired by a firm that is majority owned by a private equity investor and 0 otherwise. Based on Fidrmuc et al. (2012).	SDC
Private negotiation	Dummy variable equal to 1 in case the company is sold in a privately negotiated sale and 0 otherwise. Based on Boone and Mulherin (2009).	HC

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Variable	Definition	Source
Private selling process length	Length in days from the initiation date to the SDC announcement date.	HC
Prod. market fluidity	A measure of a firm's competitive product threats, it shows changes in rivals' products relative to the firm. Based on Hoberg et al. (2014).	Hoberg-Phillips Data Library
Public acquirer	Dummy variable equal to 1 in case the company is acquired by a public firm and 0 otherwise.	SDC
Public selling process length	Length in days from the SDC announcement date to the resolution date.	HC
R&D ratio	Research and development expenses divided by total assets.	COMPUSTAT
SA index	$-0.737*(size) + 0.043*(size^2) - 0.04*(age)$, where size is the natural log of inflation adjusted (to USD 2004) book value of total assets; age is the number of years the firm has been on COMPUSTAT with a non-missing stock price. We winsorize size from the top at ln4500 and age at 37. Based on Hadlock and Pierce (2010).	COMPUSTAT, OC
Sector error	The second component of the decomposition by Rhodes-Kropf et al. (2005) based on Model 1 with FF12 industries; it estimates the deviation between the short-run versus long-run pricing of the firm's industry.	OC
Selling process length	The length in days from the initiation date to the resolution date.	HC
Stock offer	Dummy variable equal to 1 in case the acquirer offers merged firm's shares as the payment consideration and 0 otherwise.	SDC
Target initiated deal	The board of the target firm decides to sell the company and consequently contacts potential buyers.	HC
Third party initiated	Bidder initiated deal that ends up with a buyer that is not the primary initiator of the deal.	HC
Total assets	Book value of total assets in USD millions; in the analysis used as a natural log.	COMPUSTAT
Total sales	Total amount collected for providing goods and services in USD millions.	COMPUSTAT
Trade liquidity	Total number of shares traded in the year just before the initiation date over the total number of shares outstanding on the initiation date	COMPUSTAT
Transaction value	Total value paid by the acquirer less fees and expenses in USD millions.	SDC

Table 2.1: Selling process summary statistics

This table presents summary statistics for the hand collected target (487) and bidder (611) initiated deals. All variables are defined in Appendix 2.7.2. All variables are winsorized at the 1st and 99th percentiles except all dummy variables. We test for difference in means using the *t*-test and in medians using the Mann-Whitney-Wilcoxon rank sum test. The significance of differences in means and medians between target versus bidder initiated deals is denoted in the mean and median columns for bidder initiated deals. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

	Target initiated deals			Bidder initiated deals		
	Mean	Median	St. dev	Mean	Median	St.dev
Transaction value(million USD)	1,409	286	3,973	2,165 ^a	509 ^a	4,992
Premium	26.6%	27.0%	58.2%	39.0% ^a	34.0% ^a	45.2%
Third party initiated	0	0	0	0.39	0	0.49
Auction	0.50	1	0.50	0.20 ^a	0 ^a	0.40
Controlled sale	0.36	0	0.48	0.38	0	0.49
Private negotiation	0.14	0	0.34	0.42 ^a	0 ^a	0.49
Private selling process length	478	342	409	314 ^a	220 ^a	333
Public selling process length	117	103	67	127 ^b	104	83
Selling process length	595	464	407	441 ^a	350 ^a	342
Bidders contacted	30	14	43	9 ^a	2 ^a	18
Bidders with confid. agreement	11	4	17	4 ^a	1 ^a	8
Private equity acquirer	0.26	0	0.44	0.23	0	0.42
Public acquirer	0.65	1	0.48	0.71 ^b	1 ^b	0.46
Cash offer	0.68	1	0.47	0.71	1	0.45
Stock offer	0.12	0	0.32	0.10	0	0.30
Mixed payment	0.21	0	0.40	0.19	0	0.39

Table 2.2: Summary statistics for deal (both target and bidder initiated) versus matched firms

The table shows mean values across matched publicly listed firms (column 2), deal target firms (column 3), 487 target initiated (column 5) and 611 bidder initiated deal firms (column 7). Means of all deal firms, target initiated deal firms and bidder initiated deal firms are compared to their matches in columns 4, 6 and 8, respectively. Column 9 shows the difference in means between target and bidder initiated firms. All variables are defined in Appendix 2.7.2. We test for differences in means using the *t*-test allowing for unequal variances. All variables are winsorized at the 1st and 99th percentiles, except for all dummy variables. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

Variable	(1) # obs	(2) Match firms	(3) Deal firms	(4) Deal vs match	(5) Target initiated	(6) Target vs match	(7) Bidder initiated	(8) Bidder vs match	(9) Target vs bidder
Total assets (USD million)	2196	1870	1763	-107	1473	-142	1995	-79	-522 ^c
Ln total assets	2196	5.799	5.868	0.069	5.689	0.043	6.011	0.090	-0.322 ^a
Total sales (USD million)	2196	1054	935	-119	715	-139	1111	-103	-396 ^a
Market cap (USD million)	2196	1477	1140	-337 ^b	921	-341 ^c	1315	-333	-394 ^b
Firm age	2190	22	17	-6 ^a	16	-6 ^a	17	-6 ^a	-1
Analyst following	2196	4.847	5.414	0.567 ^b	4.376	-0.154	6.242	1.142 ^a	-1.866 ^a
Insider ownership	2196	0.053	0.067	0.014 ^a	0.083	0.019 ^b	0.053	0.009	0.030 ^a
Executive ownership	2196	0.031	0.035	0.005	0.047	0.008	0.026	0.002	0.021 ^b
Non-executive ownership	2196	0.023	0.031	0.008 ^a	0.037	0.011 ^b	0.026	0.006	0.011 ^b
CEO ownership	2196	0.015	0.016	0.001	0.022	0.003	0.011	0.000	0.011 ^a
Inst. ownership	1999	0.413	0.521	0.108 ^a	0.456	0.055 ^b	0.572	0.150 ^a	-0.117 ^a
Inst. ownership change	1999	-0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.001
Golden parachutes	1098	n.a.	0.579	n.a.	0.575	n.a.	0.583	n.a.	-0.008
Equity grants b. initiation (%)	2196	0.505	0.837	0.331 ^a	0.922	0.333 ^a	0.768	0.329 ^a	0.154 ^c
Equity grants a. initiation (%)	2196	0.218	0.333	0.115 ^a	0.441	0.149 ^a	0.247	0.088 ^a	0.193 ^a
Equity grants a. public (%)	2196	0.049	0.068	0.019 ^c	0.065	0.018	0.071	0.020	-0.005

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Variable	(1) # obs	(2) Match firms	(3) Deal firms	(4) Deal vs match	(5) Target initiated	(6) Target vs match	(7) Bidder initiated	(8) Bidder vs match	(9) Target vs bidder
Board size	1969	6	8	2 ^a	8	2 ^a	8	2 ^a	0
Board independence	1969	0.546	0.258	-0.288 ^a	0.217	-0.314 ^a	0.290	-0.269 ^a	-0.073 ^a
CEO/chair duality	1795	0.412	0.417	0.005	0.413	0.010	0.420	0.000	-0.007
CEO retirement	1786	0.101	0.156	0.055 ^a	0.180	0.082 ^a	0.137	0.033	0.044 ^c
CEO age	1786	53	56	3 ^a	57	3 ^a	56	2 ^a	1 ^c
Prod. market fluidity	1772	7.830	8.311	0.480 ^b	8.355	0.797 ^a	8.276	0.218	0.079
Industry concentration	1730	0.199	0.167	-0.032 ^a	0.171	-0.038 ^b	0.165	-0.026 ^c	0.006
Industry similarity	1730	1074	827	-248 ^a	898	-120	772	-349 ^a	126
M&A liquidity	2196	0.727	0.817	0.089 ^b	0.781	0.061	0.845	0.112 ^b	-0.064
Acquirer	2196	0.005	0.068	0.063 ^a	0.078	0.070 ^a	0.061	0.057 ^a	0.017
Asset sale	2196	0.131	0.255	0.124 ^a	0.255	0.150 ^a	0.255	0.103 ^a	-0.001
Past abnormal return	2088	0.024	-0.035	-0.059 ^b	-0.021	-0.029	-0.046	-0.083 ^b	0.025
Past return	2088	0.035	-0.010	-0.046 ^b	-0.007	-0.035	-0.013	-0.055 ^b	0.006
Market/book ratio	2181	3.110	2.775	-0.335 ^c	2.915	0.035	2.661	-0.632 ^b	0.254
Firm-specific error	2092	0.064	-0.027	-0.091 ^a	-0.036	-0.058	-0.020	-0.118 ^a	-0.016
Sector error	2092	0.072	0.064	-0.008	0.072	-0.006	0.058	-0.009	0.014
Long-run value/book	2092	0.661	0.681	0.020	0.689	0.022	0.675	0.018	0.014
Asset tangibility	2195	0.219	0.181	-0.038 ^a	0.172	-0.040 ^a	0.188	-0.036 ^b	-0.016
R&D ratio	2195	0.052	0.062	0.010 ^b	0.071	0.020 ^b	0.054	0.002	0.017 ^b
EBITDA	2196	0.041	0.043	0.001	0.020	-0.016	0.061	0.016	-0.041 ^a
EBITDA growth	2184	0.141	0.193	0.052 ^a	0.185	0.048 ^c	0.200	0.055 ^b	-0.016
Net income	2196	-0.035	-0.037	-0.003	-0.067	-0.027 ^c	-0.013	0.016	-0.054 ^a
Net income growth	2174	-0.116	-0.136	-0.020	-0.160	-0.057	-0.117	0.008	-0.044

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Variable	(1) # obs	(2) Match firms	(3) Deal firms	(4) Deal vs match	(5) Target initiated	(6) Target vs match	(7) Bidder initiated	(8) Bidder vs match	(9) Target vs bidder
Cash flow	2195	0.021	0.007	-0.014 ^a	0.006	-0.011	0.009	-0.016 ^b	-0.003
Cash	2196	0.142	0.141	-0.001	0.138	0.005	0.143	-0.006	-0.005
Trade liquidity	1849	0.007	0.007	0.001 ^c	0.007	0.001	0.007	0.001	0.000
Leverage	2196	0.149	0.173	0.024 ^a	0.188	0.040 ^a	0.160	0.011	0.028 ^b
Leverage growth	2192	0.128	0.228	0.100 ^a	0.214	0.087 ^a	0.238	0.110 ^a	-0.024
Low interest coverage	2196	0.274	0.330	0.056 ^a	0.376	0.099 ^a	0.293	0.021	0.083 ^a
SA index	2185	-3.530	-3.358	0.173 ^a	-3.300	0.194 ^a	-3.404	0.155 ^a	0.104 ^a
Altman's Z-score	2187	4.105	2.747	-1.358 ^a	2.051	-1.868 ^a	3.306	-0.946 ^a	-1.255 ^a
Low Altman's Z-score	2187	0.397	0.447	0.050 ^b	0.512	0.098 ^a	0.395	0.012	0.117 ^a
High Altman's Z-score	2187	0.450	0.379	-0.070 ^a	0.319	-0.126 ^a	0.428	-0.025	-0.109 ^a
Debt issue	2196	0.004	0.005	0.002	0.008	0.004	0.003	0.000	0.005
Equity issue	2196	0.142	0.422	0.280 ^a	0.452	0.316 ^a	0.398	0.250 ^a	0.054 ^c

Table 2.3: Analysis of factors influencing the likelihood of a successful takeover: deal versus non-deal firms.

This table reports estimation results for logistic models. The dependent variable is a categorical variable that equals 1 for all deal/target firms and 0 for all matched firms. The data covers 487 target initiated deals, 611 bidder initiated deals and 1098 matching firms. We report Hubert/White robust standard errors in brackets. All variables are defined in Appendix 2.7.2 and are winsorized at the 1st and 99th percentiles, except for all dummy variables. Both year and industry dummies are included in the regressions but are not reported. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	0.225 (0.455)	0.178 (0.465)	-0.243 (0.424)	-0.200 (0.342)	-1.866 ^a (0.682)	-0.233 (0.331)	-1.602 ^b (0.774)	1.743 ^a (0.533)	0.480 (1.543)	1.611 (1.035)
Insider ownership	1.097 ^b (0.554)	0.435 (0.594)							-0.614 (0.787)	-1.164 (0.729)
Inst. ownership	3.272 ^a (0.294)	2.718 ^a (0.326)							2.298 ^a (0.447)	1.860 ^a (0.414)
Inst. ownership change	-0.495 (0.846)	0.008 (0.985)							1.416 (1.488)	1.059 (1.446)
Board size	0.383 ^a (0.029)	0.393 ^a (0.032)							0.409 ^a (0.041)	0.406 ^a (0.039)
Board independence	-4.052 ^a (0.247)	-3.835 ^a (0.265)							-3.572 ^a (0.296)	-3.697 ^a (0.295)
CEO/chair duality		0.076 (0.142)							-0.187 (0.173)	-0.192 (0.168)
CEO retirement		0.883 ^a (0.222)							0.811 ^a (0.255)	0.850 ^a (0.245)
Prod. market fluidity			0.055 ^a (0.017)						0.022 (0.032)	0.019 (0.030)
Industry concentration			-0.868 ^a (0.272)						-1.209 ^a (0.418)	-1.046 ^a (0.405)
Industry similarity			-0.186 ^a (0.045)						-0.132 (0.093)	-0.144 ^c (0.087)
M&A liquidity			0.106 (0.071)						0.082 (0.103)	0.074 (0.100)

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Acquirer			2.158 ^a (0.439)						1.409 ^a (0.527)	1.491 ^a (0.544)
Asset sale			0.699 ^a (0.131)						1.047 ^a (0.229)	0.990 ^a (0.218)
Past abnormal return				-0.215 ^b (0.089)	-0.137 (0.098)		0.007 (0.118)		0.033 (0.181)	-0.109 (0.170)
Market/book ratio				-0.017 (0.012)						
Firm-specific error					-0.237 ^a (0.072)		-0.378 ^a (0.084)		-0.641 ^a (0.143)	
Sector error					0.171 (0.558)		0.184 (0.625)		-0.352 (1.014)	
Long-run value/book					1.402 ^b (0.606)		1.437 ^b (0.728)		1.070 (1.256)	
R&D ratio						0.418 (0.482)				-0.813 (1.254)
EBITDA							0.531 (0.337)		2.657 ^a (0.612)	2.598 ^a (0.721)
EBITDA growth							0.190 (0.147)		-0.140 (0.221)	-0.152 (0.215)
Cash flow							-1.720 ^a (0.504)		-1.699 ^b (0.798)	-1.591 ^b (0.784)
Trade liquidity							9.355 (9.920)			
Leverage								-0.214 (0.283)	-0.426 (0.709)	-0.235 (0.539)
SA index								1.031 ^a (0.239)	0.427 (0.450)	0.236 (0.422)

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Low Altman's Z-score								-0.000 (0.156)	-0.288 (0.306)	-0.223 (0.295)
High Altman's Z-score								-0.133 (0.149)	-0.332 (0.263)	-0.467 ^c (0.250)
Debt issue								1.255 ^a (0.145)	0.486 ^b (0.238)	0.421 ^c (0.226)
Equity issue								1.289 ^a (0.116)	1.135 ^a (0.202)	1.092 ^a (0.196)
Firm age	-0.044 ^a (0.006)	-0.051 ^a (0.006)		-0.051 ^a (0.005)	-0.052 ^a (0.005)	-0.051 ^a (0.005)	-0.057 ^a (0.006)	-0.028 ^a (0.008)	-0.050 ^a (0.014)	-0.050 ^a (0.013)
Total assets	-0.313 ^a (0.053)	-0.279 ^a (0.058)	-0.038 (0.034)	0.126 ^a (0.030)	0.251 ^a (0.054)	0.129 ^a (0.030)	0.236 ^a (0.061)	0.251 ^a (0.064)	-0.267 ^c (0.157)	-0.378 ^a (0.120)
# observations	1,812	1,488	1,721	2,079	2,009	2,190	1,707	2,182	1,227	1,264
χ^2	451.90 ^a	383.30 ^a	108.30 ^a	121.14 ^a	126.78 ^a	122.19 ^a	148.10 ^a	282.68 ^a	382.60 ^a	373.60 ^a
Pseudo R ²	35.35%	33.95%	5.68%	5.76%	6.42%	5.65%	8.46%	15.07%	40.70%	39.20%

Table 2.4: Analysis of factors influencing the likelihood of deal initiation: target versus bidder initiated deal firms.

This table reports estimation results for logistic models. The dependent variable is a categorical variable that equals 1 for target initiated deal firms and 0 for bidder initiated deal firms. The data covers 487 target initiated deals and 611 bidder initiated deals. We report Hubert/White robust standard errors in brackets. All variables are defined in Appendix 2.7.2 and are winsorized at the 1st and 99th percentiles, except for all dummy variables. Both year and industry dummies are included in the regressions but are not reported. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Constant	-1.305 ^b (0.604)	-1.247 ^b (0.606)	-0.667 (0.588)	-2.729 ^a (0.997)	-1.189 ^b (0.546)	-2.611 ^b (1.100)	-0.883 (0.725)	-1.076 (0.751)	-2.384 ^c (1.227)	-2.333 ^b (1.013)	-2.523 ^a (0.889)
Insider ownership	1.738 ^a (0.640)								2.172 ^a (0.838)	2.519 ^a (0.757)	2.384 ^a (0.690)
Executive ownership		3.579 ^a (1.141)									
Non-exec. ownership		0.213 (1.026)									
Inst. ownership	-0.564 (0.343)	-0.570 ^c (0.342)							-0.557 (0.435)	-0.624 (0.391)	-0.752 ^b (0.317)
Inst. ownership change	0.625 (1.111)	0.613 (1.124)							-0.092 (1.586)		
Board size	0.006 (0.029)	0.008 (0.029)							0.025 (0.035)	0.017 (0.033)	
Board independence	0.060 (0.276)	0.026 (0.277)							0.126 (0.300)	0.103 (0.287)	
CEO/chair duality	-0.120 (0.159)	-0.144 (0.161)							-0.304 ^c (0.182)	-0.216 (0.172)	
CEO retirement	0.290 (0.205)	0.302 (0.203)							0.257 (0.225)	0.336 (0.215)	
Prod. market fluidity			0.024 (0.022)						0.013 (0.029)		
Industry concentration			0.108 (0.375)						0.070 (0.479)		

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Industry similarity			0.024 (0.063)						-0.048 (0.086)		
M&A liquidity			-0.009 (0.096)						-0.034 (0.116)		
Acquirer			0.144 (0.274)						0.088 (0.325)	0.120 (0.306)	0.161 (0.275)
Asset sale			0.234 (0.160)						0.054 (0.197)	0.033 (0.188)	0.085 (0.169)
Past abnormal return				-0.166 (0.147)	-0.073 (0.128)	-0.178 (0.162)			-0.257 (0.172)	-0.257 (0.161)	-0.169 (0.139)
Firm-specific error				-0.035 (0.106)		-0.021 (0.117)					
Sector error				0.136 (0.801)		0.168 (0.851)					
Long-run value/book				1.719 ^c (0.889)		1.512 (0.993)					
R&D ratio					2.009 ^a (0.742)				2.211 ^b (1.051)	2.471 ^a (0.897)	2.114 ^a (0.801)
EBITDA						-1.162 ^b (0.519)					
EBITDA growth						-0.086 (0.195)					
Cash flow						0.166 (0.698)					
Trade liquidity						0.270 (12.551)					
Leverage							1.034 ^a (0.333)	0.609 ^c (0.364)	1.426 ^b (0.554)	1.424 ^a (0.471)	1.612 ^a (0.413)

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
SA index							-0.058 (0.318)	-0.189 (0.333)	-0.498 (0.489)	-0.262 (0.422)	-0.412 (0.382)
Low Altman's Z-score								0.204 (0.199)	-0.146 (0.280)		
High Altman's Z-score								-0.282 (0.198)	-0.169 (0.256)		
Debt issue								-0.035 (0.171)	-0.005 (0.232)	-0.008 (0.219)	-0.103 (0.193)
Equity issue								0.316 ^b (0.138)	0.269 (0.184)	0.331 ^c (0.174)	0.291 ^c (0.155)
Firm age	0.008 (0.007)	0.007 (0.007)		0.003 (0.006)	0.004 (0.006)	0.006 (0.007)	0.002 (0.011)	0.001 (0.011)	-0.007 (0.017)	-0.001 (0.014)	-0.007 (0.013)
Total assets	-0.113 ^c (0.068)	-0.108 (0.068)	-0.183 ^a (0.050)	-0.026 (0.076)	-0.116 ^a (0.045)	-0.028 (0.084)	-0.199 ^b (0.084)	-0.228 ^a (0.087)	-0.232 ^c (0.132)	-0.157 (0.115)	-0.165 ^c (0.098)
# observations	821	821	959	981	1,031	928	1,091	1,090	720	784	952
χ^2	78.19 ^a	77.81 ^a	68.57 ^a	74.50 ^a	77.51 ^a	78.81 ^a	78.92 ^a	87.68 ^a	89.22 ^a	99.39 ^a	113.70 ^a
Pseudo R ²	7.50%	8.00%	5.59%	5.84%	5.91%	6.58%	5.62%	6.52%	10.40%	11.00%	10.10%

Table 2.5: Analysis of managerial incentives for target initiation.

This table reports estimation results for logistic models predicting target initiation. The dependent variable is a categorical variable that equals 1 for all target initiated deals and 0 for bidder initiated deals. The data covers only the deal firms (487 target initiated deals, 611 bidder initiated deals). We report Hubert/White robust standard errors in brackets. All variables are defined in Appendix 2.7.2 and are winsorized at the 1st and 99th percentiles, except for all dummy variables. Both year and industry dummies are included in the regressions but are not reported. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

	(1) All obs.	(2) All obs.	(3) Auction	(4) Inf.sale
<i>Panel A: Golden parachutes</i>				
Constant	-1.226 ^b (0.544)	-1.365 ^b (0.544)	-1.789 ^b (0.870)	-1.617 ^b (0.696)
CEO ownership	0.287 ^b (0.142)	0.609 ^a (0.215)	-0.236 (0.427)	0.842 ^a (0.282)
Golden parachute	0.086 (0.140)	0.387 ^c (0.205)	0.189 (0.426)	0.545 ^b (0.264)
GP x CEO ownership		-0.555 ^b (0.277)	-0.493 (0.556)	-0.666 ^c (0.362)
Non-executive own.	0.972 (0.916)	0.898 (0.923)	2.590 (2.128)	0.555 (1.100)
Institutional own.	-0.797 ^a (0.284)	-0.788 ^a (0.283)	-1.516 ^a (0.573)	-0.738 ^c (0.385)
Inst. own. change	0.593 (0.941)	0.690 (0.938)	1.826 (1.805)	0.414 (1.168)
Firm age	0.004 (0.006)	0.004 (0.006)	0.014 (0.013)	0.007 (0.008)
Total assets	-0.098 ^c (0.057)	-0.104 ^c (0.057)	0.229 ^c (0.124)	-0.120 (0.073)
# observations	1,004	1,004	331	673
χ^2	83.59 ^a	84.50 ^a	39.28 ^a	77.73 ^a
Pseudo R ²	6.61%	6.91%	11.60%	10.10%

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	(1)	(2)	(3)	(4)
	All obs.	All obs.	Auction	Inf.sale
<i>Panel B: Independent boards</i>				
Constant	-1.285 ^b (0.561)	-1.208 ^b (0.572)	-1.664 ^c (0.961)	-1.665 ^b (0.722)
Board independence	0.019 (0.192)	-0.594 (0.382)	1.369 (0.857)	-0.771 (0.537)
Board ind.x CEO own.		0.649 ^c (0.351)	-0.795 (0.805)	0.930 ^b (0.455)
Board ind.x GP		0.265 (0.347)	-0.709 (0.702)	0.485 (0.463)
CEO ownership	0.712 ^a (0.235)	0.607 ^b (0.253)	-0.041 (0.502)	0.742 ^b (0.341)
Golden parachute	0.466 ^b (0.222)	0.463 ^b (0.235)	0.249 (0.468)	0.61 ^b (0.309)
GP x CEO ownership	-0.684 ^b (0.299)	-0.792 ^b (0.311)	-0.648 (0.621)	-0.872 ^b (0.419)
Non-executive own.	0.689 (0.945)	0.716 (0.946)	1.563 (2.488)	0.868 (1.082)
Institutional own.	-0.633 ^c (0.326)	-0.604 ^c (0.325)	-0.944 (0.626)	-0.708 (0.445)
Inst. own. change	0.496 (1.030)	0.554 (1.025)	0.688 (2.018)	0.023 (1.294)
Firm age	0.008 (0.007)	0.008 (0.007)	0.021 (0.015)	0.008 (0.009)
Total assets	-0.131 ^b (0.062)	-0.131 ^b (0.062)	0.103 (0.131)	-0.124 (0.078)
# observations	877	877	283	594
χ^2	75.48 ^a	77.85 ^a	34.05 ^a	71.44 ^a
Pseudo R ²	6.95%	7.31%	11.80%	10.80%

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	(1) All obs.	(2) All obs.	(3) Auction	(4) Inf.sale
<i>Panel C: CEO retirement</i>				
Constant	-1.217 ^b (0.586)	-1.363 ^b (0.588)	-1.627 ^c (0.942)	-1.429 ^b (0.718)
CEO retirement	0.564 ^c (0.341)	0.226 (0.405)	14.571 ^a (0.538)	-0.164 (0.427)
CEO ret x CEO own.	-0.439 (0.470)	-0.464 (0.469)		
CEO ret x GP		0.654 (0.469)	-14.710 ^a (0.834)	1.472 ^b (0.587)
CEO ownership	0.375 ^b (0.157)	0.667 ^a (0.236)	-0.422 (0.490)	0.889 ^a (0.300)
Golden parachute		0.342 (0.225)	0.224 (0.466)	0.398 (0.293)
GP x CEO ownership		-0.502 ^c (0.294)	-0.262 (0.610)	-0.549 (0.386)
Non-executive own.	1.085 (0.993)	1.041 (0.997)	2.424 (2.154)	0.648 (1.140)
Institutional own.	-0.776 ^a (0.297)	-0.812 ^a (0.301)	-1.450 ^b (0.613)	-0.979 ^b (0.413)
Inst. own. change	0.504 (1.061)	0.565 (1.052)	0.179 (2.245)	0.500 (1.295)
Firm age	0.008 (0.007)	0.008 (0.007)	0.018 (0.015)	0.011 (0.008)
Total assets	-0.115 ^c (0.059)	-0.118 ^b (0.060)	0.182 (0.134)	-0.104 (0.076)
# observations	915	915	297	618
χ^2	83.13 ^a	85.14 ^a	1095 ^a	80.99 ^a
Pseudo R ²	7.31%	7.78%	13.40%	12.00%

Table 2.6: Analysis of the impact of managerial stock and option grants on target initiation.

This table reports estimation results for logistic models predicting target initiation. The dependent variable is a categorical variable that equals 1 for all target initiated deals and 0 for bidder initiated deals. The data covers only the deal firms (487 target initiated deals, 611 bidder initiated deals). We report Hubert/White robust standard errors in brackets. All variables are defined in Appendix 2.7.2 and are winsorized at the 1st and 99th percentiles, except for all dummy variables. Both year and industry dummies are included in the regressions but are not reported. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

	(1) All obs.	(2) All obs.	(3) Auction	(4) Inf.sale	(5) Auction	(6) Inf.sale
Constant	-1.381 ^a (0.489)	-1.614 ^a (0.550)	-2.277 ^b (0.917)	-1.896 ^a (0.731)	-2.1 ^b (0.909)	-1.964 ^a (0.704)
Equity grants	9.106 ^a (3.103)		12.543 ^b (5.692)	7.423 ^c (4.307)		
EG bef.initiation		3.847 (5.065)			7.276 (9.768)	4.728 (6.599)
EG after initiation		34.186 ^a (11.904)			18.225 (16.872)	44.453 ^a (16.707)
EG after pub.ann.		0.184 (24.820)			24.760 (43.421)	-18.585 (39.743)
CEO ownership	0.572 ^a (0.216)	0.525 ^b (0.217)	-0.337 (0.432)	0.817 ^a (0.284)	-0.320 (0.429)	0.748 ^a (0.289)
Golden parachute	0.408 ^b (0.207)	0.361 ^c (0.207)	0.209 (0.425)	0.566 ^b (0.267)	0.171 (0.426)	0.542 ^b (0.266)
GP x CEO ownership	-0.563 ^b (0.278)	-0.531 ^c (0.279)	-0.469 (0.557)	-0.693 ^c (0.365)	-0.450 (0.554)	-0.696 ^c (0.366)
Non-executive own.	0.742 (0.897)	0.649 (0.902)	2.592 (2.214)	0.503 (1.084)	2.572 (2.165)	0.247 (1.077)
Institutional own.	-0.777 ^a (0.285)	-0.806 ^a (0.287)	-1.354 ^b (0.595)	-0.721 ^c (0.387)	-1.442 ^b (0.587)	-0.784 ^b (0.394)
Inst. own. change	0.675 (0.932)	0.777 (0.948)	1.794 (1.850)	0.406 (1.160)	1.859 (1.875)	0.519 (1.184)
Firm age	0.005 (0.006)	0.006 (0.006)	0.018 (0.014)	0.008 (0.008)	0.017 (0.014)	0.009 (0.008)
Total assets	-0.081 (0.058)	-0.082 (0.058)	0.255 ^b (0.127)	-0.101 (0.074)	0.243 ^c (0.128)	-0.081 (0.076)
# observations	1,004	1,004	331	673	331	673
χ^2	88.09 ^a	86.27 ^a	46.04 ^a	77.10 ^a	43.29 ^a	77.53 ^a
Pseudo R ²	7.33%	7.76%	12.80%	10.40%	12.10%	11.30%

Table 2.7: Analysis of factors influencing the likelihood of a successful takeover: multinomial logistic regressions.

This table reports estimation results for multinomial logistic models. The dependent variable is a categorical variable that equals 0 for all matched firms, 1 for target initiated deal firms and 2 for bidder initiated deal firms. The data covers 487 target initiated deals, 611 bidder initiated deals and 1098 matching firms. We report Hubert/White robust standard errors in brackets. All variables are defined in Appendix 2.7.2 and are winsorized at the 1st and 99th percentiles, except for all dummy variables. Both year and industry dummies are included in the regressions but are not reported. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

	Target initiated		Bidder initiated		Coefficient difference
	coeff	s.e.	coeff	s.e.	
<i>Panel A</i>					
Constant	-0.974	1.336	1.611	1.086	-2.585 ^b
Insider ownership	-0.055	0.767	-1.755 ^b	0.859	1.700 ^b
Inst. ownership	1.599 ^a	0.469	2.286 ^a	0.442	-0.687 ^c
Inst. ownership change	0.927	1.574	0.772	1.534	0.155
Board size	0.409 ^a	0.042	0.394 ^a	0.042	0.014
Board independence	-3.701 ^a	0.352	-3.691 ^a	0.312	-0.010
CEO / chair duality	-0.346 ^c	0.201	-0.055	0.178	-0.292 ^c
CEO retirement	1.021 ^a	0.274	0.703 ^a	0.263	0.318
Prod. market fluidity	0.023	0.035	0.016	0.031	0.007
Industry concentration	-0.835 ^c	0.482	-1.073 ^b	0.460	0.238
Industry similarity	-0.164	0.102	-0.131	0.091	-0.033
M&A liquidity	0.099	0.120	0.087	0.107	0.013
Acquirer	1.593 ^a	0.538	1.491 ^a	0.526	0.102
Asset sale	1.001 ^a	0.248	0.921 ^a	0.225	0.079
Past abnormal return	-0.181	0.188	0.010	0.174	-0.191
R&D ratio	-2.030 ^c	1.101	-4.253 ^a	1.042	2.224 ^b
Leverage	0.533	0.625	-0.788	0.643	1.321 ^b
SA index	-0.287	0.513	0.289	0.451	-0.576
Low Altman's Z-score	-0.532	0.337	-0.336	0.311	-0.196
High Altman's Z-score	-0.559 ^c	0.293	-0.379	0.267	-0.180
Debt issue	0.359	0.262	0.448 ^c	0.237	-0.089
Equity issue	1.096 ^a	0.215	0.879 ^a	0.198	0.217
Firm age	-0.060 ^a	0.016	-0.050 ^a	0.014	-0.010
Total assets	-0.498 ^a	0.146	-0.316 ^b	0.124	-0.182
# observations	1269				
χ^2	972.71 ^a				
Pseudo R ²	28.20%				

Chapter 3

Target Insiders' Trades around the Takeover Announcement Date

3.1 Introduction

Insider trading on material information has always been a hotly debated topic both in popular press as well as in the academic literature. Insider trading regulation in the US is one of the most restrictive and effective around the world.¹ The fact that public takeover announcements are associated with a strong positive market reaction for target companies is a direct evidence of the effectiveness of insider trading restrictions before public releases of ma-

¹Insider trading is regulated by the Securities Exchange Act of 1934. Insider trading on material, non-public information is not allowed by Section 10b and SEC rule 10b-5 and Section 16a requires corporate insiders to report their trades to the SEC. Further, Section 16b of the Securities Exchange Act of 1934 limits round-trip trades within six-month. According to this rule, any profits earned by insiders on a round trip within any six-month period are required to be paid back to the firm. Corporate insiders are defined as officers, directors and blockholders owning at least 10% of a firm's stock.

terial information. In contrast, Bhattacharya et al. (2000) show no unusual returns or return volatility around takeover announcements for target companies in Mexico arguing that unrestricted insider trading causes prices to fully incorporate the material information before its public release.

Despite high legal jeopardy concerning insider trading before public announcements of takeover deals, target insiders are still able to profit on their material information. They decrease their purchases (Harlow and Howe, 1993; Agrawal and Jaffe, 1995; Agrawal and Nasser, 2012), but because they also decrease their sales they are able to profit on the information without violating insider trading regulation. Agrawal and Nasser (2012) show that insiders stop selling to such an extent that, despite the restrictions on their purchases, they increase their net purchases over one year before the takeover announcement. We contribute to this literature by showing that insiders are willing to stop selling and thus to postpone satisfying their diversification and/or liquidity needs only closer to the public announcement even though they are often aware of takeover negotiations more than one year in advance. It seems that insiders are confident about their own estimation of the takeover premium only closer to the deal announcement. More importantly, we show that insiders use their material information in a selective way. They trade depending on the differing information that they possess about the future deal during the negotiation process, which suggests that they consider some types of deals as more profitable than others. Insiders of target firms keep trading strategically also after the public announcement.

Insiders learn about their firm being ‘in play’ no later than around the initiation date, be it target or bidder initiated deal. Target insiders might then adjust their trading in the company stock depending on their own expectation

concerning the takeover premium, which is the difference between the expected final offer price and the stock price at the moment. The expected final offer price is however uncertain and subjective and most likely is affected by takeover deal characteristics. Therefore, we conjecture that insider trading decisions depend on the deal initiation, selling mechanism, method of payment and bidder type.

An intuitive conjecture is that insiders have a very good feeling for the future offer price and so their trading is closely linked to the actual realized premium. This then implies that insider trading differs across deal characteristics in line with the realized takeover premium as documented in the literature: the realized takeover premium is higher in bidder versus target initiated deals (Xie, 2010; Masulis and Simsir, 2015), informal sales versus formal full-scale auctions (Fidrmuc et al., 2012b), deals paid for in cash versus stock (Huang and Walking, 1987; Eckbo and Langohr, 1989; Hayn, 1989) and strategic versus financial deals (Bargeron et al., 2008; Officer et al., 2010; Dittmar et al., 2012). Still, when trading insiders might consider also the probability of deal success and their ownership interests after deal completion.

As an additional contribution, we extend our analysis beyond the public announcement and conjecture that insider trading decisions after the public announcement also differ depending on deal characteristics. The main driving factor for insider trading after the deal public announcement is the difference between the stock price and the initial offer price, often referred to as merger arbitrage spread (Jetley and Ji, 2010). Insiders take into account their assessment of deal failure risk and possible offer improvement. Moreover, they might also be affected by their ownership interests after deal completion.

We analyze open market stock transactions by insiders in 1098 publicly

listed US target firms over the period from 2005 to 2011. Similarly to Agrawal and Nasser (2012), we use the difference in differences approach relatively to a control period and matched firms but do not only examine insider trading before but also after the takeover public announcement. Our analysis of the pre-announcement period results in four main findings. First, the most interesting result is that insiders in stock deals do not stop selling regardless of how distant is the public announcement. Target insiders in stock deals do not stop selling even immediately before the announcement. On the one hand, this evidence strongly supports the bidder overvaluation hypothesis. Travlos (1987), Schlingemann (2004) and many others argue that acquirers in stock deals suffer negative announcement abnormal returns because of their stock overvaluation. Discounting the overvaluation and taking into account higher deal value volatility, the expected takeover premium is low and insiders prefer to sell. On the other hand, this result rejects the information asymmetry theory predictions when information asymmetry concerns target firms. Undervalued targets should prefer stock payment as it allows them to share in the realization of synergies once the firms merge and thus mitigate cost associated with information asymmetry (Hansen, 1987).

Second, in line with higher realized premium insiders are stronger net buyers in firms sold through informal sales versus formal auctions and in firms paid for by cash versus stock. Third, insiders in financial deals increase their net purchases despite lower realized takeover premium. It seems that they are interested in keeping their ownership stake and in participating in value improvement after deal completion. However, further analysis shows that the higher net purchases for financial deals are mostly due to very high net purchases in financial deals sold in informal sales that do exhibit high realized

takeover premium. Fourth, despite differences in realized premium we do not find difference in net insider purchases for bidder versus target initiated deals. We believe this due to higher probability of deal success for target initiated deals that stems from higher determination to sell (Xie, 2010).

Our results show that insiders in all deals reduce their purchases to a larger extent in the post-announcement period relatively to the pre-announcement period. We believe this is a manifestation of the restrictive short-swing rule closely linked to the fact that target insiders are forced to sell their shares to the buyer at the completion and that takeovers take on average less than six months from the public announcement to completion.² Target insiders also decrease their sales during the post-announcement period suggesting that they expect to profit on positive arbitrage spread and/or improved offers.

Interestingly, insiders change their behavior from the pre-announcement period to the post-announcement period with respect to deal characteristics. First, they are stronger net buyers in firms that initiate a deal and are sold in formal auctions. Second, insiders in both financial and strategic deals do not change their net purchases relatively to the control period. Finally, we show that deal initiation, selling mechanism and payment consideration have an reinforcing effect on each other. Target insiders are stronger net buyers in formal auctions that are target initiated and in formal auctions that are paid in cash. In contrast, they are net sellers in firms sold in informal sales that are bidder initiated and in informal sales paid in stock.

Overall, our findings on insiders' trades after the public announcement suggest that insiders increase their net purchases in firms with higher prob-

²Moeller et al. (2004) and Betton et al. (2008) report an average length of 82 and 105 days, respectively. Our average is 122 days.

ability of deal completion rather than increased deal value as these firms are associated with smaller arbitrage spread, smaller realized offer improvement and shorter public selling process. These results contribute to the literature on merger arbitrage.³ Insiders reveal their opinion concerning stock price developments in the period between the announcement and completion.

This chapter is closely related to Agrawal and Nasser (2012) who examine insider trading in M&A target firms before the public announcement. They use the difference in differences approach relatively to matched firms and a control period and show that before the public announcement target insiders decrease their purchases but decrease their sales even more, resulting in positive net purchases. Relatively to Agrawal and Nasser (2012), our definition of the pre-announcement and control periods is more precise. We carefully code initiation date of each deal and so we capture exact timing of insiders' acquisition of information concerning a possible takeover deal. Due to the fact that the private selling process is relatively lengthy and varies widely for different deals, it is important to measure insider trading from the initiation date. Moreover, exact information concerning the timing of the selling process allows us to explore whether insiders trade on their material information since early in the selling process or only later as their information concerning negotiation outcomes become more reliable.

The remainder of the chapter is organized as follows. Section 3.2 builds the hypotheses concerning both the pre- and post-announcement periods. Section 3.3 introduces the data, explains the coding and the matching process and provides basic statistics. Section 3.4 shows and discusses the regression results

³See Larcker and Lys (1987), Mitchell and Pulvino (2001), Baker and Savasoglu (2002) and Jindra and Walking (2004).

and Section 3.5 concludes.

3.2 Hypotheses

3.2.1 Insider trading in the pre-announcement period

The initiation date, when a target firm contacts interested bidders or is approached by a bidder, starts off the selling process (Boone and Mulherin, 2011) and, inevitably, target insiders become aware of the possible future takeover. Target insiders then estimate the expected takeover premium, the difference between their expected final offer price and the stock price at the moment, and decide to trade or not to trade on the basis of this estimated expected takeover premium. The expected final offer price plays a key role in the estimation because of its uncertainty and subjectivity. It is affected by the number of possible future states of nature, offer prices at each state of nature, probabilities of each state and, as a result, the variation between the possible states. These components vary widely and usually would differ also depending on takeover deal characteristics. Therefore, our main conjecture is that insider trading decisions also depend on deal characteristics, which insiders are aware of early in the bidding process. In particular, we consider the deal initiation, selling mechanism, method of payment and bidder type.

Agrawal and Nasser (2012) show that target insiders increase their net purchases just before the takeover announcement due to larger reduction of sales relatively to purchases over one year before the public announcement. During the private selling process before the public announcement, target insiders can profit from increasing their purchases due to the expectation of rel-

atively high realized takeover premium.⁴ However, insider trading on material information is illegal. Moreover, the short-swing rule, which limits round-trip trades within six months, should further decrease insider purchases, especially in cash deals where insiders have to sell their shares at completion. Strict insider trading regulation implies that target insiders are highly motivated to reduce rather than increase their purchases. In contrast, insiders can strategically choose to postpone their sales until the public announcement or even until the completion date without violating any insider trading regulation and still profit on their private information. One should, however, note that insiders who receive a large part of their remuneration package in form of their firm's stocks and options have often high diversification and liquidity needs that predict a consistent stream of insider sales (Lakonishok and Lee, 2001; Fidrmuc et al., 2006).

Even though the realized takeover premium is, on average, large and overwhelmingly positive relative to the stock price 8 weeks before the announcement, the insiders' expected takeover premium might be considerably smaller at the beginning of the takeover process. It might be lower due to higher uncertainty that increases with time and relatively high stock prices at the moment. For some takeover targets, stock prices might be falling before they recover again during the run-up period. As a consequence of relatively low expected takeover premium and high diversification and liquidity needs, target insiders might not change their sales patterns early in the selling process but they might stop selling only once the stock price is low and it is not worth selling any more (even given their liquidity and diversification motives).

⁴See Betton et al. (2008) for evidence of high significant realized takeover premium for a large recent sample of US takeovers.

In contrast to Agrawal and Nasser (2012), we take into account the information on differing lengths of the selling process by establishing the initiation date for each deal. Our first hypothesis then differentiates insider trading decisions early versus later in the private selling process:

HYPOTHESIS 1: (a) As a result of insider trading regulation target insiders decrease their purchases immediately after the deal initiation. Due to more imminent legal jeopardy, target insiders stop buying even more as the public announcement of the deal becomes more imminent.

(b) Target insiders do not stop selling in the early stages of the private selling process but stop selling close to the announcement when they can better estimate the expected takeover premium and the stock price is relatively low.

(c) As a result, insiders are more significant net buyers of their stock only closer to the public announcement of the takeover deal.

The realized takeover premium is on average positive and highly significant (Betton et al., 2008). It is the main factor that could affect insiders' expected takeover premium early in the takeover process and, in fact, extensive literature shows that the realized takeover premium does differ depending on deal characteristics.⁵ However, insiders might not always trade in line with the realized premium and, thus, we build alternative hypotheses taking into account other important considerations that could affect insiders' decisions. In the following text, we first highlight the particular side of the deal characteristic that is associated with higher realized premium and then provide arguments for an alternative relationship. As each deal characteristic is asso-

⁵See further text for exact references concerning each deal characteristic.

ciated with two alternative hypotheses, we do not state them explicitly. Our underlying hypothesis is as follows:

HYPOTHESIS 2: Insider net purchases from deal initiation up to the deal announcement differ depending on the deal initiation, selling mechanism, payment consideration and buyer type.

Initiation. The selling process is usually initiated either by a prospective bidder proposing to take over the firm or by the board of the selling company deciding that they want to consider all alternative strategic options for the future of the company and eventually they offer the firm for sale. Bidder initiated deals are usually associated with higher realized takeover premium. The literature argues that it is due to higher bidder valuations of targets and higher target firm bargaining power in bidder initiated deals (Xie, 2010; Masulis and Simsir, 2015). In contrast, target initiation results in lower realized takeover premium due to target firms' higher willingness to sell (Aktas et al., 2010; DeBodt et al., 2014). Target insiders in bidder initiated deals might thus expect higher takeover premium and, therefore, be motivated to increase their net purchases. At the same time, however, higher willingness to sell in target initiated deals also increases deal success probability and thus could be associated with higher probability of gaining a positive premium (DeBodt et al., 2014). This argument then suggests that it is the target rather than bidder initiated firms whose insiders who might be motivated to increase their net purchases.

Selling mechanism. Target firms could be sold in full-scale auctions, controlled sales or private negotiations (Boone and Mulherin, 2009). We classify selling mechanisms along the dimension of formality and full pre-

determination of the process into formal full-scale auctions and informal sales, which include controlled sales and private negotiations.⁶ A formal full-scale auction is associated with a very structured process that follows multiple designed rounds and accommodates relatively large number of bidders (Hansen, 2001). Controlled sales and private negotiations follow a less formally structured process and involve a smaller number of bidders. In controlled sales, target firms discretely canvass interest from a chosen and a limited number of bidders who then counter-bid each other, while private negotiations involve only one bidder (Boone and Mulherin, 2009). On average, informal sales exhibit higher realized takeover premium relatively to formal full-scale auctions even though they involve a smaller number of bidders (Fidrmuc et al., 2012b; Fidrmuc and Moeller, 2015). Furthermore, informal sales take fewer days from the initiation date to the public announcement, which could further increase the expected premium. Therefore, target insiders in deals organized as informal sales might expect higher takeover premium and be motivated to increase their net purchases. Alternatively, however, the formal selling process of full-scale auctions is fixed and pre-determined and once a selling firm starts the process, it is very likely to end up with a winning bidder committed to the deal. Informal sales, in contrast, are more ad hoc and therefore more uncertain in terms of outcomes. Moreover, target firms sold in formal full-scale auctions are smaller (Fidrmuc et al., 2012b) and smaller deals are usually less complex, easier to negotiate and, therefore, more likely to end up in a public deal announcement. Due to the higher associated certainty of deal announcements, it might be the insiders of firms sold in full-scale auctions who are motivated

⁶Note that our classification differs from the classification in Boone and Mulherin (2007) who contrast private negotiations against ‘auctions,’ which include controlled sales and full-scale auctions.

to increase their net purchases.

Payment consideration. Deals paid for in cash are associated with higher realized takeover premium (Huang and Walking, 1987; Eckbo and Langohr, 1989; Hayn, 1989). Also, final offer price in cash deals is more certain and fixed, while in stock deals the expected final offer price changes with the acquirer stock price. Acquirers in stock deals usually suffer negative announcement abnormal returns because of possible stock overvaluation before the deal announcement, further reducing the expected takeover premium to target insiders (Shleifer and Vishny, 2003; Rhodes-Kropf et al., 2005). Therefore, we conjecture that insiders in cash deals are more motivated to increase net purchases relatively to stock deals. Alternatively, Hansen (1987) provides a strong theoretical argument for why insiders in firms paid for by stock might not want to sell their shares. If target insiders believe that their firm is undervalued, they prefer stock payment that allows them to share in the long-term value improvement of the merged firm and long-term synergies created in the deal (Hansen, 1987; Bradley et al., 1988). As a result, insiders in deals paid for in stock might be motivated to increase their net purchases.

Buyer type. Target firms usually have a clear preference for the type of buyer they aim for already early after deal initiation (Fidrmuc et al., 2012b). Targets acquired by strategic buyers versus financial bidders usually exhibit higher realized takeover premium (Bargeron et al., 2008; Officer et al., 2010; Dittmar et al., 2012) and so also their insiders might expect higher takeover premium. Therefore, target insiders in strategic deals might be motivated to increase their net purchases. Alternatively, buyers in financial deals aim at undervalued firms that have high potential of generating high cash flows and high revenue growth after going private (Dittmar et al., 2012; Gorbenko and

Malenko, 2014; Baker et al., 2015). Moreover, private equity firms often keep the target management on board after the buyout (Fidrmuc et al., 2012a). Insiders are usually motivated to increase their ownership in the deal to profit on the value improvement once the firm is private. At the same time, private equity firms support higher insider ownership to align insiders' interests with their own (Wruck, 2008). Therefore, target insiders in financial rather than strategic deals might be motivated to increase their net purchases.

3.2.2 Insider trading in the post-announcement period

Information concerning a takeover deal together with deal characteristics is released at the public announcement of the deal. After the public announcement, target insiders could be relatively more free to trade as most of the material information about the takeover is released in the public announcement. However, insider trades in target firms are still restricted by the short-swing rule because target insiders are forced to sell their shares to the bidder at the completion date. As deals take on average less than six months from the public announcement to completion (Moeller et al., 2004; Betton et al., 2008), insider purchases within a six-month period before completion would violate the short-swing rule. An exception should apply for insider purchases in stock deals, where insiders swap their stock with acquirer's stock at the completion date and, so, do not actually sell their shares to the acquirer. In contrast to purchases, target insider sales are not restricted by regulation in the post-announcement period.

The main driving factor for (speculative) trading after takeover deal announcements in general is a positive arbitrage spread, that is the difference

between the initial offer price announced and the stock price immediately after the deal announcement (Jetley and Ji, 2010). The main reason for why the stock price after a takeover does not climb as high as the offer price is the market's assessment of uncertainty associated with a successful deal completion.⁷ Higher spread is associated with higher odds of announced deals not going through. Target insiders might be better at assessing the risks of deal failures and so could profit from reducing their sales (increasing their net purchases) during the post-announcement period. Furthermore, insiders might have more intuition concerning possible improved offers and they might also have reasons to retain ownership after the deal is completed. In case the insiders' estimation of risks of deal failure is high or in case they expect the final offer price not to increase or they do not have any reason to retain ownership in the firm, target insiders might choose to sell immediately after the public announcement and satisfy their liquidity and diversification needs. Therefore, our basis hypothesis concerning the post-announcement period is as follows:

- HYPOTHESIS 3: *(a) As a result of insider trading regulation, target insiders decrease their purchases also after the public announcement.*
- (b) As a result of positive merger arbitrage spread and insiders' assessment of completion risks, final offer value and their ownership considerations, target insiders decrease their sales after the public announcement.*
- (c) Altogether, insider net purchases increase after the public announcement.*

Further, we conjecture that also insider trading decisions in the post-

⁷One should also take into account the time value of money (estimated time to completion) and the odds of deal value changes.

announcement period differ depending on deal characteristics. As we argue above, insider trading decisions take advantage of a positive arbitrage spread and depend on insiders' assessment of risks of deal failure, their expected deal value changes and ownership interests after the deal completion. All of these factors might depend on deal characteristics, in particular the deal initiation, selling mechanism, payment consideration and buyer type. As in section 3.2.1, for each deal characteristic, we argue for two alternative hypotheses. Our underlying hypothesis is the following:

HYPOTHESIS 4: *Insider net purchases after the deal public announcement differ depending on the deal initiation, selling mechanism, payment consideration and buyer type.*

Initiation. Firms that initiate their deal express high willingness to sell and thus are associated with smaller risk of deal failure (DeBodt et al., 2014). In contrast, targets of bidder initiated deals are less desperate/eager to sell and so they are quite determined to sell only in case of an attractive offer and they do not mind to continue their pre-deal operations if the deal is not successful. This means that insiders might assess target initiated deals as more certain and be more willing to increase net purchases given the arbitrage spread is positive. Alternatively, bidder initiation usually represents higher buyers' willingness to acquire and, at the same time, might be associated with increased bids and/or more competition (e.g., white knights) after the public announcement. If target insiders believe their firm is of a high quality, they would expect larger improvement in the final bid price relatively to initial offer at the announcement. Therefore, target insiders in bidder initiated deals might be motivated to increase their net purchases.

Selling mechanism. The deterministic process of selling firms in full-scale auctions is probably associated with well-defined and relatively certain outcomes that are rarely changed during the public selling process after the deal announcement. Deals negotiated through informal sales might involve higher risks of failure. If insiders perceive the different risks of failure, target insiders in formal full-scale auctions might be more motivated to increase their net purchases. Alternatively, firms sold through informal sales might face higher probability of competition after the public announcement as they limit the number of bidders during the private selling process. More competition after the public announcement might be associated with a higher final deal value and bid increase and thus could motivate target insiders to increase their net purchases.

Payment consideration. Cash deals offer a fixed price and are also less volatile in the odds of completion. Deal value of stock deals, in contrast, varies with acquirer's stock price. Acquirer stock might be overvalued and target insiders might not be willing to participate in overpayment cost (Eckbo et al., 1990). Therefore, in case the arbitrage spread is positive, we conjecture that target insiders in cash deals are more motivated to increase their net purchases after the public announcement relatively to stock deals. Alternatively, target insiders in stock deals, who are paid fully or partially by stock of the acquirer and so are not forced to sell their shares on completion, face fewer restrictions to buy additional shares because restrictions on round-trip trades are not binding. Moreover, Hansen (1987) argues that with information asymmetry high value target firms might prefer stock consideration because with stock payment they share in the value improvement after the takeover. Consequently, target insiders in stock deals might be motivated to increase

their net purchases.

Buyer type. Target firms are usually associated with improved performance after selling to a private equity firm and at the same time their top management is usually retained. Therefore, target insiders are more likely to accept financial buyers' offer and are more certain about the odds of deal completion. Deals sold to strategic buyers usually involve higher growth options and intangible assets (Fidrmuc et al., 2012b; Gorbenko and Malenko, 2014) and might involve more severe anti-competition issues, all leading to more complicated negotiations and less certain outcomes. Therefore, target insiders of firms eventually bought by financial buyers might want to increase their net purchases more after the public announcement. Alternatively, strategic deals due to their targets' higher asset specificity and lower inclination to use full-scale auctions (Gorbenko and Malenko, 2014) might attract improved offer bids after the public announcement. Then, target insiders in strategic deals might be motivated to increase their net purchases more.

3.3 Data

Our main aim is to analyze insider trading in target firms before and after M&A public announcement date depending on deal characteristics, including deal initiation, selling mechanism, method of payment and bidder type. The selling process is usually initiated either by a prospective bidder proposing to take over the firm or by the board of the selling company deciding that they want to offer the firm for sale. A selling mechanism could involve a formal full-scale auction or, alternatively, an informal sale, including a controlled sale or a private negotiation. Controlled sales and private negotiations follow less

formal procedures and involve less bidding competition (Boone and Mulherin, 2007, 2009). Deals can be paid for by cash or stock. We classify partial stock and pure stock payments together in one category. The final bidder could be a financial (a private equity firm or a consortium of private equity firms) or a strategic buyer. We require that data on these characteristics are available for all deals in our data set.

3.3.1 Deals

The sample includes US M&A deals that were announced between January 2005 and December 2011 and are covered by the Security Database Corporation (SDC) in Thomson ONE Banker. We apply the following 4 selection criteria: (i) both the acquirers and targets are US companies; (ii) all targets are publicly listed firms before the deal while acquirers could be publicly listed or private firms; (iii) the acquirers own 100% of targets' shares after the deal; (iv) targets have data in COMPUSTAT and CRSP concerning accounting and stock price data. We hand collect and code information concerning the selling process from the 'background of the deal' section of DEFM14A, PREM14A, SC14D9, or S-4 filings, which we recover from the EDGAR filing collection provided by the SEC. We hand collect information concerning the initiation type, initiation date and selling mechanism. Out of 2003 deals identified in SDC we are able to find SEC filings on EDGAR for 1260 deals. For further 103 deals, we are not able to classify the initiator. Finally, we are not able to get data from Compustat or CRSP for 59 targets. All together, the data collection results in a sample of 1098 deal targets.

Table 3.1 reports selling process summary statistics. Column 2 shows

means for all deals. Further, we show means separately for bidder versus target initiated deals in columns 3 and 4, respectively, and report the significance of the difference in means in column 4. Columns 5 and 6 display means for deals sold through informal sales versus formal full-scale auctions with the significance of the differences shown in column 6. Means for cash versus stock deals are reported in columns 7 and 8, while for strategic versus financial deals in columns 9 and 10. Variable definitions are provided in Appendix 3.6.1. We test for differences in means using the t-test allowing for unequal variances.

- insert Table 3.1 about here -

Column 2 shows that the final realized premium, relatively to the price 8 weeks before the public announcement, is positive (34%) for the full sample. The premium drops slightly to 32%, when we consider the initial offer instead of the final offer. We also report initial premium relatively to the stock price at the initiation date and find that it is considerably larger relatively to the initial premium relatively to the stock price 8 weeks before the announcement date. Offer improvement (1%) shows that, on average, bidders slightly increase their final offer relatively to the initial offer at the announcement. Table 3.1 further shows abnormal stock returns over different windows from the initiation date up to the public announcement. We see negative stock returns from the initiation date up to 1 month before the announcement, but the final month run-up results in an overall positive return from initiation until 1 day before the announcement. The announcement effect measured as a 3 days abnormal return around the announcement date is large and positive (26%). The merger arbitrage spread is also positive (12%) and indicates large average risks of deal failure. The mean private, public and whole selling process lengths are 387,

122 and 509 calendar days, respectively. 24% of firms are acquired by financial buyers and 70% of deals are paid for in cash. 33% of deals are sold in full-scale auctions, 37% in controlled sales and 30% in private negotiations. Finally, column 2 documents that 44% of deals are initiated by target firms.

We classify a deal as bidder initiated, when a buyer approaches the target firm with a takeover proposal, the board considers the proposal and responds to the bidder. We classify a deal as target initiated if the target firm firmly decides for a sale or at least hires a financial advisor to identify and contact potential bidders. Columns 3 and 4 show that bidder initiated deals are significantly larger (USD2.2 billion) relatively to target initiated deals (USD1.4 billion). In line with the literature, we see that bidder initiated deals earn significantly higher premium: 39% versus 27%, respectively (Xie, 2010; Fidrmuc et al., 2012b; Masulis and Simsir, 2015). The initial premium, both relatively to the stock price 8 weeks before the announcement and on the initiation date, is also significantly higher in bidder versus target initiated deals (37% versus 26% and 47% versus 34%, respectively). We also see that bidder initiated deals are associated with a larger offer improvement relatively to target initiated deals (1.6% versus 0.5%) and exhibit significantly larger abnormal returns during the private selling process and a larger announcement effect (28% versus 24%). The merger arbitrage spread is also larger for bidder initiated deals (12.8% versus 10.9%).

Moreover, columns 3 and 4 show that bidder initiated deals take on average fewer calendar days from the initiation date to completion (441 versus 595 days) even though they take longer from the public announcement to completion (127 versus 117 days). They have a significantly lower number of bidders contacted (9 versus 30) and signing a confidentiality agreement (4

versus 11) and are more frequently sold in private negotiations (42% versus 14%) but less frequently using formal auctions (20% versus 50%).

Columns 5 and 6 show that deals sold through informal sales are significantly larger (USD2.2 billion) relatively to formal auctions (USD1.0 billion). They earn higher premium (37% versus 28%), higher initial premium (35% versus 27% and 46% versus 33% relatively to the stock price 8 weeks before the announcement date and to the stock price on the initiation date, respectively), consistent with Fidrmuc et al. (2012b) and Fidrmuc and Moeller (2015). Target abnormal returns during the private selling process are significantly larger in deals sold using informal sales. In fact, they are all negative for formal auctions. Deals sold in less formal sales exhibit higher announcement stock abnormal returns (28% versus 22%) and merger arbitrage spread, indicating higher deal completion risks. They take on average shorter from the initiation date to the public announcement (346 versus 468 days) and to the completion (477 versus 573 days) but longer from the public announcement to completion (131 versus 105 days). The average number of bidders contacted (5 versus 46) and signing a confidentiality agreement (2 versus 18) is significantly lower for informal sales. Deals sold using informal sales end up less often in the hands of financial firms (18% versus 38%) and are less frequently target initiated (33% versus 67%).

Deals could be paid in stock (including partial stock payment) or pure cash. The first variable in columns 7 and 8 shows that cash deals are significantly smaller (USD1.3 billion) relatively to stock deals (USD3.0 billion). In line with the literature, we find that the realized premium is larger in cash takeovers (36% versus 29%) (Hazelkorn et al., 2004; Ling and Petrova, 2008). The two other premium measures show similar differences. Target stock per-

formance during the private selling process is not different for the 2 groups of deals but the announcement effect is higher for cash deals (28% versus 22%). The merger arbitrage spread is narrower in cash deals (11% versus 14%) and implies smaller risk of deal failure.

In terms of deal characteristics, cash deals stay fewer days in the public selling process relatively to stock deals (108 versus 157 days) but their private or whole selling processes is not different. The number of bidders contacted and signing a confidentiality agreement are significantly larger for cash deals (22 versus 11 and 9 versus 4, respectively). We see that 1% of stock deals are sold to financial buyers, which seems quite unusual. In a detailed investigation, we find that a small number of deals involves financial firms paying for with stock of the private buying vehicle company. Cash deals are more often sold in full-scale auctions (40% versus 18%), but less often in controlled sales (36% versus 41%) or private negotiations (25% versus 41%).

Columns 9 and 10 show that statistical versus financial buyers acquire targets of similar size, but the bidding premium is significantly larger for strategic deals (35% versus 29%). These statistics are consistent with the literature (Bargeron et al., 2008; Officer et al., 2010; Dittmar et al., 2012). The improvement from initial to final offer and stock performance during the private selling process are not different between the 2 groups. Strategic deals exhibit larger announcement abnormal returns relatively to financial deals (27% versus 24%). They have also larger merger arbitrage spread (13% versus 9%), indicating more risks of deal failure. Concerning deal characteristics, we see that strategic deals take on average fewer days from the initiation to the public announcement (368 versus 443 days) and to completion (492 versus 560 days). The number of bidders contacted and signing a confidentiality agreement are

significantly smaller for strategic deals (15 versus 29 and 6 versus 12, respectively). We find that almost all financial deals are paid for in cash, while only 61% of strategic deals. Strategic deals are less frequently sold in auctions (27% versus 52%) and more often in controlled sales (40% versus 29%) and in private negotiations (33% versus 19%).

3.3.2 Summary statistics for insider trading

The insider trading data is from Thomson Financial Insider Filings Data, Table 1, which contains corporate insider non-derivative transactions required to be reported via Form 4 by Section 16 of the Securities Exchange Act of 1934. We have information on the transaction date, transaction price, number of shares traded, person ID, firm ID, company name, resulting shares held and transaction code (purchase or sale). We exclude inaccurate or unreasonable filings ⁸ and transactions labeled as amendments of previous insider transactions ⁹ (Agrawal and Nasser, 2012). If a transaction price is missing, we replace it with the CRSP closing price on the transaction date. We merge multiple purchases (sales) by the same insider on the same transaction date in the same company. We are interested in analyzing insider purchases and sales separately and, therefore, we keep both purchases and sales transacted on the same day separately. We also compute insider net purchases as purchases minus sales by the same insider on the same transaction date in the same firm (Agrawal and Nasser, 2012).

For the purposes of our analysis, it is very important to compare insider purchases and sales in the pre- and post-announcement period to a non-event

⁸They are indicated by the Cleanse Indicator as "A" or "S".

⁹They are indicated by the Amendment Indicator as "A".

period within the same firm. Concerning insider trading during the private selling process before the public announcement, we define the pre-announcement and the control periods and take the initiation date as the cut-off point. The pre-announcement period is precisely defined from the deal initiation date to the public announcement date instead of a uniform one-year period before the announcement across all firms as in Agrawal and Nasser (2012). Because insider trading depends on the length of the private selling process and also varies within a year, we define the control period as a one-year period before deal initiation in case the private selling process takes one year or longer. In case the private selling process is shorter than one year, the control period is matched in length and the time of year, e.g. it is from one year before the initiation date to one year before the announcement date. In terms of insider trading after the public announcement, the post-announcement period is the time from the public announcement date up to the resolution of the deal. The corresponding control period is a one-year period before the initiation date in case the post-announcement period takes one year or longer and is a period of the same length as the post-announcement period ending at the initiation date in case the public selling process length is shorter than one year.

Then we compare the change in insider trading in target firms relatively to change in insider trading in matched firms that do not experience any takeover and remain publicly listed. This is in order to adjust the overall change/difference in target insider trading for the ‘normal’ outcome, that is the change/difference in insider trading in firms that do not experience any information shock but are similar to the treatment (target) firms and operate over the same period of time. The change/difference in insider trading from the control period to the event period for the matched firms then measures

the ‘normal’ effect. We use it to adjust the overall target firms’ effect to get a clean treatment effect that is free of any time trends. This is the essence of the difference in differences approach.

We match based on the industry and total assets just before the initiation date (Shrieves and Stevens, 1979; Agrawal and Nasser, 2012). Our matching procedure is as follows. From the pool of all potential matching firms with available accounting, stock price and insider trading data, we pick the firm that is in the same Fama-French 30 industry and comes the closest in terms of total assets in the same fiscal year using a $\pm 25\%$ range. In case we fail to find a matching firm, we repeat the process for the corresponding Fama-French 12 industry. If we still do not have a match, we apply the 4-digit SIC code industry and then the 3-digit, 2-digit and finally 1-digit SIC code industry. We also require that the same publicly listed firm is not matched repeatedly to different target firms. The targets that are dropped out from our data set due to unavailable SEC filing data are not included as matched firms.¹⁰

We focus on trading by top executives and independent directors. Top executives are the most familiar with the day to day operations of their firms and therefore should have the most accurate information concerning its value and prospects (Seyhun, 1986; Fidrmuc et al., 2006). Independent directors should also be informed about the prospects of their firms and they should be quite pivotal in takeover decisions. Combining the 2 types of insiders creates a well informed and relatively well populated group for our tests. We use two proxies to measure insider trading: \$ shares traded (dollar value of shares

¹⁰All together, 880 target firms are matched based on FF30 industry, 185 based on FF12, 20 based on 4-digit SIC, 2 based on 3-digit SIC, 5 based on 2-digit SIC and finally 6 targets based on 1-digit SIC.

traded in USD millions) and % equity traded (number of shares traded as a fraction of shares outstanding in base points). For all the 4 studied periods, we aggregate all shares bought (sold) by the top executives and independent directors over the whole period and then divide them by the length of the period in months. We do this re-scaling on a monthly basis because the length of the pre- and post-announcement periods and their corresponding control periods varies from deal to deal.

Table 3.2 reports insider purchases and sales for the pre-announcement period. Columns 1 and 2 show means for the pre-announcement versus the control period. Means for matched firms for the corresponding two periods are reported in Columns 3 and 4. The last four columns report differences in means and their significance, including the difference in differences in the last column. We show results for all deals and then by the four deal characteristics: bidder versus target initiated deals, deals sold through informal sale versus formal auction, cash versus stock deals and strategic versus financial deals. The two insider trading measures are reported on monthly basis and are winsorized at 1% and 99%.

- insert Table 3.2 about here -

For all deals, we see that target insiders significantly decrease their purchases (Panel A) and sales (Panel B) during the pre-announcement period relatively to the control period and matched firms. Insider purchases and sales in matched firms do not change in the pre-announcement versus the control period. The difference in differences is however only significant for insider purchases. Reduction of insider purchases in target firms before their public announcement is consistent with insider trading regulation. However, target

insiders can still profit on the private information through reducing their sales.

Concerning deal characteristics, we see in Panel A that target insiders in all partitions, except financial deals, significantly lower their purchases during pre-announcement period relatively to the control period. Also, target insiders in all partitions significantly reduce their purchases before the announcement relatively to the matched firms. The last column shows that the difference in differences is significant for all partitions except for target initiated and financial deals. The results for sales in Panel B are less significant. Insiders stop selling in the pre-announcement period significantly more in bidder initiated deals, deals sold through informal sales, cash and financial deals. Comparing to matched firms, insider sales drop in all 8 partitions. The difference in differences is significant only for financial deals.

Table 3.3 reports target insider purchases and sales during the post-announcement period. Similarly to Table 3.2, we show insider trading averages for target and matched firms, but now on top of the post-announcement and control periods, for comparison, we report also the pre-announcement period trading. With respect to differences in means, we report the differences for target firms over the post-announcement period relatively to both the control and pre-announcement period and also to the matched firms. The difference in post-announcement period relatively to the control and pre-announcement periods is repeated also for the matched firms. The last column shows the difference in differences between target versus matched firms. We again report insider trading for all deals and for the 8 partitions by deal characteristics. Both measures of insider trading are on monthly basis and are winsorized at 1% and 99%.

- insert Table 3.3 about here -

Panel A with purchases shows that target insiders in all deals together decrease their purchases during the post-announcement period relatively to the control and pre-announcement period and to matched firms, though they are significant only for the percentage of equity measure. Insider purchases in matched firms are significantly reduced during the post-announcement period relatively to the pre-announcement period. The difference in differences indicates a drop in insider buying but is significant again only for the percentage of equity measure. For the deal characteristics, target insider purchases decrease significantly during the post-announcement period relatively to the control period except in financial deals, but they decrease significantly to the matched firms for all 8 partitions. The difference to pre-announcement period is negative but insignificant except for formal auctions. The difference in differences is significant for bidder initiated, informal selling mechanisms, cash and strategic deals.

Panel B reveals that insider sales in all target firms during the post-announcement period are not different relatively to the control and the pre-announcement periods but are significantly smaller relatively to matched firms over the same period. In terms of the partitions, insiders do not tend to stop selling in the post-announcement period relatively to neither control nor pre-announcement periods except in target initiated deals. The difference relatively to matched firms is negative and significant for target initiated, formal auctions and cash deals. In contrast to the target firms, insiders in the matched firms do stop selling relatively to both the control and pre-announcement periods in bidder initiated, informal sales and stock deals, which then re-

sults in positive and significant difference in differences. This result indicates that insiders in these types of deals are more eager to sell during the post-announcement period and do not want to take advantage of the positive merger arbitrage spread.

3.4 Results

Tables 3.4 to 3.7 report our results for insider trading patterns in target firms before and after the public announcement of the takeover depending on the deal initiation, selling mechanism, method of payment and buyer type. For each table, insider purchases, sales and net purchases by top executives and independent directors are measured as a fraction of common equity in base points and all are re-adjusted on a monthly basis. We believe that scaling the number of shares traded by all shares outstanding provides the best insider trading measure as it incorporates both the trading volume as well as firm size. All regressions include the following control variables: natural log of market capitalization, book to market ratio, volatility of daily stock returns, change in volatility of daily stock returns, market-adjusted average daily abnormal returns lagged 1, 2, 3 and 4 quarters relatively to the studied period, insider ownership, R&D over total sales, liquidity, time and industry dummies.¹¹ Insider purchase and sale regressions are estimated using a left-censored Tobit model while net purchase regressions are estimated using OLS. We report Hubert/White robust standard errors in brackets.

¹¹Coefficients for control variables are not reported in the tables to preserve space, but are available on request. The estimated values are consistent with the literature (Seyhun, 1986; Aboody and Lev, 2000; Lakonishok and Lee, 2001; Agrawal and Nasser, 2012).

3.4.1 Results for pre-announcement insider trading

Table 3.4 shows the results for insider trading before the takeover announcement. To test HYPOTHESIS 1, we partition the pre-announcement period into the 6-month period immediately before the public announcement and the early pre-announcement period and report the results for these two subperiods in Panel A and Panel B, respectively. Panel C reports results for the whole pre-announcement period, starting at the initiation date. We include two additional control variables that are not considered in the literature so far: the abnormal stock return during the pre-announcement period and the period length. Insider purchases are reported in columns 1 to 5, insider sales in columns 6 to 10 and insider net purchases in columns 11 to 15.

Column 1 in Panel A replicates the results for insider purchases as in Agrawal and Nasser (2012) but only for the last 6 months just before the public announcement. The interaction term ‘target x pre-announcement’ shows the clean difference in differences effect.¹² It is negative and significant at the 1-percent level showing that insider purchases drop during the last 6 months before the public announcement. In line with HYPOTHESIS 1a, the reduction in purchases is likely due to strict legal restrictions in the post-SOX environment. At the same time, the interaction term in Column 6 for insider sales shows that target insiders decrease significantly also their sales, which supports HYPOTHESIS 1b. It seems that insiders are during the last 6 months before the public announcement quite confident in estimating the expected takeover premium with satisfying precision and stop selling. Overall, target insiders

¹²The interaction term shows the difference in differences effect as ‘target’ stands for a dummy variable for targets versus matched firms and ‘pre-announcement’ is the dummy variable for pre-announcement versus control period.

do not change their net purchases: the interaction term in column 11 is not significantly different from zero, which is inconsistent with HYPOTHESIS 1c. Insiders reduce their purchases and sales to the same extent and, so, overall do not profit on private information they possess before the public announcement of the deal. This is mostly due to large drop in purchases.

Columns 2 to 5 explore the effect of the deal characteristics on insider purchases immediately before the public announcement. In order to show differing effects of insider trading depending on individual deal characteristics in the difference in differences approach, we have to include a set of additional interaction terms. Ultimately, we are interested in the triple interaction term ‘deal characteristic x target x pre-announcement’ and its sum with the plain interaction term ‘target x pre-announcement’ that is reported at the bottom of the panel under the heading ‘total effect by deal characteristic.’

Column 2 explores the effect of bidder initiation. The plain interaction term is significantly negative, while the triple interaction term is not significant suggesting that insiders decrease their purchases significantly in target initiated deal firms and this decrease is not significantly different relative to bidder initiated deal firms. The total effect, which in this case reflects the overall insider purchase change in bidder initiated deals, is significantly negative: insiders decrease their purchases significantly also in bidder initiated deal firms. Columns 4 and 5 show similar results for cash and financial deals, respectively. The only deal characteristic that exhibits significantly different change for insider purchases is the selling process in Column 3. The plain interaction term is negative, significant and very large in absolute terms: insiders in formal auctions stop buying by quite a large margin. The triple interaction term is significantly positive and the total effect is significantly neg-

ative suggesting that insiders in firms sold in informal sales still decrease their purchases, but the drop is significantly smaller relatively to formal auctions.

Columns 7 to 10 show changes in insider sales by the four deal characteristics. The plain interaction terms show that insiders stop selling in target initiated deals, formal auctions and strategic deals, but do not stop selling in stock deals. The payment method and buyer type do exhibit significant differences in insider selling: both the triple interaction terms are significantly negative in Columns 9 and 10. The overall effect is negative and significant for all four deal characteristics: insiders in bidder initiated, informal sales, cash and financial deals drop their sales significantly immediately before the deal announcement. Only target insiders in stock deals do not stop selling. It seems their expectations concerning the future deal are not positive enough to outweigh their diversification and liquidity needs.

- insert Table 3.4 about here -

The effect for net purchases is reported in Columns 12 to 15. Partitioning by deal characteristics gains some interesting results. First of all, we see that in support of HYPOTHESIS 2 the deal characteristics, except deal initiation, do matter for insider net purchases. The triple interaction term is significantly positive for the selling mechanism, payment consideration as well as buyer type. Insider trading patterns are significantly different by these deal characteristics suggesting that the deal characteristics affect insiders' estimation of expected premium and other deal benefits. The second interesting result is that insider trading patterns are in line with the realized takeover premium for informal sales (versus formal auctions) and cash (versus stock) deals, but not for financial (versus strategic) deals. Insiders' net purchases

are larger in firms acquired by financial rather than strategic buyers, despite the lower realized premium. It must be that insiders aim to increase their ownership and participate in value improvement after their firms are taken private (Fidrmuc et al., 2012a). Net insider purchases are not different only for target versus bidder initiated deal firms even though the realized premium is larger for bidder initiated deal firms. It seems that the higher determination to sell for target initiated deals associated with higher probability of deal success (Xie, 2010) evens out the higher premium for bidder initiated deals.

Thirdly, the plain interaction term for the payment method (Column 14) is significantly negative: insiders in stock deals increase their net sales rather than purchases. Even though they stop buying, they do not stop selling at all and so the overall effect is increased net sales. Insiders are not interested in profiting from takeover premium in stock deals, perhaps because their estimation of the profits is very low. This result is in contrast to predictions of theories that assume asymmetric information on the side of the target firm and predict that undervalued target firms prefer stock payment as they like to profit on value improvements after the takeover that are hard to prove during takeover negotiations due to information asymmetry. The result rather suggests that target insiders are worried about overvaluation of their bidders. Finally, net purchases are significantly positive only in financial deals. This effect is mostly due to a very large decrease in sales in Column 10. Despite low realized takeover premium, insiders seem to be eager to keep a high ownership stake.

Panel B reports results for insider trading during the early pre-announcement period, that is from the initiation date up to 6 months before the public announcement. For insider purchases, we see in Column 1 that overall target

insiders reduce their purchases significantly even early in the selling process but, in line with HYPOTHESIS 1a, the reduction is smaller relatively to purchases closer to the public announcement. Deal characteristics still matter. In Columns 2 to 5, even though the triple interaction term is significant only for informal sales, insiders significantly reduce their purchases only in bidder initiated deals, formal auctions, stock deals and strategic deals while in target initiated, informal sales, cash and financial deals, the negative coefficient is insignificant indicating that they do not stop buying. Insiders seem to be more inclined to follow rules in some types of deals while be more lenient with rules in other types. We do not find any unifying reason for this result. Nothing is significant for insider sales in Columns 6 to 10. In line with HYPOTHESIS 1b, insiders do not stop selling when it is still far to deal announcement. At this point in time, insiders still seem to be uncertain about their expected premium and their diversification and liquidity needs prevail. Finally, for net purchases in Columns 11 to 15 only the coefficient for strategic deals is significant. The coefficient is negative, suggesting that insiders in strategic deals increase their net sales significantly during the early pre-announcement period. Panel C shows insider trading over the whole private selling process. The results are similar relatively to Panel A, but due to the weaker effect in the early pre-announcement period (Panel B), the overall effect over the whole private selling process is a bit weaker.

Table 3.5 further explores possible reinforcing effects across different deal characteristics. In particular, we separately tabulate insider trading effects depending on the method of payment and bidder type in firms sold in less formal sales in Columns 1 to 6 versus in firms sold in formal auctions in Columns 7 to 12. The choice for a particular selling mechanism is determined

by target firms shortly after the initiation date. Usually, formal auctions are more often associated with financial and cash deals, while informal sales with strategic buyers and stock deals (Fidrmuc et al., 2012b).¹³ Panels A to C again report results for the period immediately before the public announcement, early pre-announcement and whole pre-announcement period, respectively.

- insert Table 3.5 about here -

Panel A reports results immediately before the public announcement. We see that formal auctions are more restrictive in terms of insiders stopping their purchases independent of the method of payment or the type of buyer. For informal sales, insiders stop buying markedly less, especially in cash and financial deals. The total coefficient for insider purchases is insignificant for informal sales eventually sold to financial buyers: insiders do not stop buying within 6 months before the public announcement. Furthermore, the drop in sales is markedly larger for informal sales. Together, the two effects result in significant increase in net purchases for both cash and financial deals sold through informal sales. The overall effect in formal auctions is negative and insignificant. If anything, insiders tend to decrease rather than increase net purchases in formal auctions. It is the informal sales that are associated with higher net purchases by their insiders, but only in cash and financial deals. The effect is not present for stock and strategic deals. The effect of informal sales for financial buyers indicates that realized takeover premium might still motivate even financial deals as financial buyers tend to pay relatively high premium in case they participate in informal sales (Fidrmuc et al., 2012a).

¹³Other combinations of deal characteristics would also be possible, but they do not lead to any interesting results.

Panel B shows that the significant and large effects are not present at all in the early period after deal initiation. Uncertainty concerning deal outcomes affects not only insider sales that have more scope for opportunism and profiteering, but it affects also insider purchases. It seems that insiders are not restricted by the regulation and do not stop buying even in formal auctions when it is quite sure that a deal is inevitable. As expected, results in Panel C for the whole private selling process show similar but a bit weaker results relatively to Panel A.

To summarize our results for insider trading in target firms before the public announcement, we would like to highlight four points. First, in line with HYPOTHESIS 1a insiders tend to reduce their purchases more as the public announcement of the deal becomes more imminent. The imminent takeover announcement and subsequent deal completion represent increased legal jeopardy and motivate insiders to stop buying even though a positive expected premium might tempt them to profit on their private information and increase their purchases. Still, for some types of deals (especially for informal sales to financial buyers or paid in cash), insiders decrease their purchases significantly less despite the high legal jeopardy even close to the public announcement. Second, as regulation is less restrictive concerning insider sales, insiders take advantage of the option to stop selling to profit on their material information. But again, this effect is present only closer to the deal announcement when insiders' information concerning the future deal becomes more precise and reliable. Third, insider net purchases measure the combined effect of insiders stopping buying as well stopping selling their shares shortly before the public announcement. For all firms together, the combined effect is insignificantly different from zero. Strict regulation forces insiders to stop

buying, but they adjust their sales accordingly and offset the negative effect of purchases. In line with the results for sales, net purchases are significantly negative for stock deals and significantly positive for financial deals.

Finally, even during 6 months immediately before the public announcement, two types of deal firms step out. Insiders in stock deals do not stop selling. This contradicts predictions of the asymmetric information on the side of the target firm theory, which suggests that undervalued targets prefer stock payment that allows them to participate in value improvements following the deal and reveal their firms' true high value. The fact that insiders do not stop selling in stock deals rather supports the overvaluation of bidders hypothesis. With a stock payment, the range of possible values for the takeover premium depends on bidder stock valuations and is therefore quite wide. Due to high risks involved, the estimated takeover premium is low. Insiders are then not willing to stop selling. On the other side of the spectrum, insiders in firms eventually sold to financial buyers do stop selling the most. They seem to intend to keep their ownership stake and participate in firm operations after the deal completion. However, we also show that most of the large negative effect on insider sales comes from financial deals that are sold in informal sales that include private negotiations and controlled sales. These types of sales exhibit high realized takeover premium, which represents an alternative reason for the large drop in insider sales.

3.4.2 Results for post-announcement insider trading

Table 3.6 shows patterns of insider trading in takeover targets after the public announcement up to deal completion. The results are reported in a similar

fashion to Table 3.4, but we replace the pre-announcement dummy with a post-announcement dummy to reflect the change of the studied period. Again we are interested in the plain interaction term ‘target x post-announcement,’ the triple interaction term ‘deal characteristic x target x post-announcement’ and the total effect for a given deal characteristic ‘target x post-announcement + deal characteristic x target x post-announcement.’ As before, we include all usual control variables, but do not report their estimated coefficients because they are in line with the previous findings in the literature. We include the length of the public selling process as an additional control variable. We find that insiders increase their purchases and sales (decrease them less) when the post-announcement period is longer, indicating smaller legal jeopardy and higher uncertainty for the decision to sell. Again, results for insider purchases are reported in Columns 1 to 5, insider sales in Columns 6 to 10 and insider net purchases in Columns 11 to 15.¹⁴

In Column 1 with purchases for all firms together, the difference in differences interaction term is negative and significant at the 1-percent level. It is also larger in absolute value relatively to Table 3.4, suggesting that in line with HYPOTHESIS 3a insiders do stop buying and they do stop buying more in the post-announcement relatively to the pre-announcement period. It seems that the legal jeopardy is higher. Insiders also decrease significantly their sales. The coefficient for the plain interaction term in Column 6 for all firms is significantly negative supporting HYPOTHESIS 3b. Positive arbitrage spread together with insiders’ estimation of improved bids and ownership interests seem to motivate insiders to profit on the situation and so they decrease their

¹⁴We do not divide the post-announcement period into different sub-periods as the public selling process on average takes only 122 calendar days (see Table 2.1). The division would not result in different conclusions.

sales. Combining purchases and sales into net purchases in Column 11, we get a negative but insignificant difference in differences coefficient. Insiders decrease their sales less relatively to purchases so that the overall effect is negative. However, it remains insignificant. The decrease in sales seems to be enough to compensate for the large decrease in purchases. HYPOTHESIS 3c is not supported in the full sample.

- insert Table 3.6 about here -

Exploring the effect of deal characteristics on insider purchases in the post-announcement period in Columns 2 to 5, we see that insiders stop buying in all types of firms. In contrast to the pre-announcement period, insiders stop buying even more in informal sales. Legal jeopardy seems to be more binding. It is interesting to note that insiders stop buying somewhat less in stock deals where the round-trip rule should not be binding, but the difference with respect to cash deals is not significant. Insiders do not take advantage of the possibility perhaps because they do not wish to own more shares in stock deals.

Turning to insider sales in Columns 6 to 10, in line with HYPOTHESIS 4 we see striking differences depending on the deal characteristics. The buyer type is the only deal characteristic without a significant difference in insider sale patterns. Both strategic and financial deals exhibit decreased insider sales. We see that insiders in target initiated and formal auction deals stop selling quite intensively. The plain interaction terms in Columns 7 and 8 are significantly negative and large and the triple interaction term is also very large and significant at the 1-percent level suggesting a sizeable difference to bidder initiated and informal sales, respectively. Thus, insiders in target initiated

and formal auction deals seem to see benefits in not selling immediately after the public announcement. They are willing to postpone their liquidity and/or diversification needs and sell only at completion. In contrast, insiders in bidder initiated and informal sale deals do not see a virtue in waiting and decide to sell more during the post-announcement period. Insiders in stock deals do not consider it worth postponing their sales either. The plain interaction term in Column 9 is positive and insignificant. If anything, insiders in stock deals sell more in the post-announcement period suggesting that they seem not to believe in deal value improvement or consider the risk of deal failure too large. This is not the case for insiders in cash deals.

Big differences across deal characteristics prevail also for net purchases, further supporting HYPOTHESIS 4. Again, only the buyer type does not exhibit a differing effect: the triple interaction term in Column 15 is insignificant. In fact, the triple interaction terms for the remaining 3 deal characteristics are larger relatively to the pre-announcement period and several of the differences and overall effects have different signs. Insiders seem to behave slightly differently after relatively to before the deal announcement, probably because their information set and legal jeopardy change as well. In the post-announcement period, insiders trade on their opinion concerning the risks of deal failure, the odds of offer improvements or willingness to keep their ownership stakes. In the pre-announcement period, insiders trade on their estimation of stock price developments as well as deal success and offer size. The realized gains are smaller after the public announcement because the arbitrage spread is usually much smaller than the realized announcement premium, but the risks involved seem to be much smaller.

Table 3.6 shows that insiders significantly increase net purchases only

in firms sold in formal auctions. The plain interaction term in Column 13, which shows the net purchase effect in firms sold in formal auctions, is large, positive and significant at the 1-percent level. The corresponding effect in the pre-announcement period is negative, large, but not significant. Insiders seem to change their behavior. They do not stop selling in the pre-announcement period, but do so in the post-announcement period. The triple interaction term in Column 13 is significantly negative: insiders in informal sales increase their net purchases significantly less. In fact, the total effect in informal sales is negative. Insiders increase their net sales rather than net purchases. Insiders in informal sales sell closer after the public announcement and do not wait until completion. Also, insiders in bidder initiated and stock deal firms decrease their net purchases (Columns 12 and 14). They do not wait with their sales until completion of the deal. The triple interaction term offsets this effect resulting in insignificant net purchases in target initiated and cash deal firms. For these types of firms, insiders do stop selling significantly, but only to the extent to offset the large drop in purchases.

We further explore possible reinforcing effects across deal characteristics. The largest difference in net purchases in Table 3.6 is for formal versus informal sales. Usually, formal auctions are associated with target deal initiation, cash payment and financial buyer (Xie, 2010; Fidrmuc et al., 2012b) and, so, we might find a reinforcing effect when these characteristics overlap. Table 3.7 shows that this is indeed the case for deal initiation and payment consideration.¹⁵ Insider net purchases are large and significantly negative for

¹⁵Differences for the type of buyer are not significant and so are not tabulated. They are available upon request. We have also large overlaps concerning interaction between the type of buyer and method of payment as financial deals almost always paid for in cash and so stock payments are also almost always by strategic buyers. This means that the negative net purchases coefficient for stock deals is all due to strategic buyers. Net purchases for

informal sales in bidder initiated deal firms but not in target initiated deal firms. At the same time, insiders increase their net purchases in formal auctions that are target initiated but not in bidder initiated. Similar effect holds for the interaction between the selling mechanism and payment consideration: insiders increase net purchases in cash deals sold in formal auctions and decrease net purchases in informal sales paid in stock. The other combinations exhibit insignificant net purchases. Overall, the large triple interaction term for the selling mechanism in Table 3.6 is mostly due to selling mechanism having significantly differing effect in target initiated and cash deals. For bidder initiated and stock deals, the triple interaction term is not significant.

- insert Table 3.7 about here -

Insiders increase net purchases in firms that have smaller average realized offer improvement, smaller arbitrage spread and shorter post-announcement period. It seems they are willing to adjust their trading and bet on certainty of deal completion rather than increased deal value.

3.5 Conclusions

The main aim of the chapter is to analyze insider trading in target firms before and after the takeover public announcement depending on deal characteristics including the deal initiation, selling mechanism, method of payment and buyer type. On a sample of 1098 publicly listed US target firms, we examine insider trading patterns using the difference in differences approach that controls for insider trading in the same firm during a control period and at the same time

strategic buyers paid in cash has to be positive to result in small negative overall effect for all strategic deals together. The estimated results are available upon request.

for change in insider trading in matched firms. We confirm that target insiders decrease their purchases before the public announcement (Harlow and Howe, 1993; Agrawal et al., 1992; Agrawal and Nasser, 2012). In line with higher legal jeopardy, the decrease in insider purchases is larger as the deal public announcement becomes more imminent. At the same time, we find a large drop in insider sales only closer to the deal announcement when insiders' information concerning the future deal becomes more precise and reliable. Insiders do not stop selling in the early pre-announcement period soon after deal initiation. We believe their uncertainty concerning the expected premium at the moment is high and causes the insiders' trade off to tilt in favor of their diversification and liquidity needs.

Exploring the effect of deal characteristics, we find that insiders are stronger net buyers before the public announcement in firms sold through informal sales and in firms paid for by cash. We interpret these findings as a result of high realized takeover premium. Despite differences in realized premium, net insider purchases are not different between target versus bidder initiated deals. It seems that higher odds of success in target initiated deals offset the lower premium.

Two types of deals step out during 6 months immediately before the public announcement: stock and financial deals. Insiders in stock deals do not stop selling, which supports the hypothesis of bidder overvaluation. Insiders are strong net buyers in financial deals, which contradicts the higher realized premium in strategic deals but supports insiders' aim to increase their ownership. However, this effect mostly comes from financial deals that are sold in informal sales that do have high realized takeover premium.

Insider trading patterns change after the public announcement. Target

insiders lower their purchases in line with the short-swing restriction as deals take on average less than six months from the announcement to completion and target insiders are forced to sell their shares at the completion date. At the same time, we see drop in insider sales and no change in net purchases. Concerning deal characteristics, we find that insiders are stronger net buyers in target initiated deals, in formal auctions and in cash deals. These characteristics reinforce each other. These results suggest that insiders bet on certainty of deal completion rather than increase in deal value.

In summary, we show that insiders use their private information strategically as they trade differently across deals with different deal characteristics and before versus after the public announcement.

Future versions of the chapter could improve the analysis in several aspects. First, to control for differing patterns of insider trading during a calendar year, one could rematch the 2 control periods exactly in the same months with the pre- and post-announcement period. Second, it might be valuable to figure out when do insiders in stock deals sell after the public announcement. Do they sell immediately at the public announcement date or later after the announcement? Finally, one could check trades by other groups of insiders, e.g., CEO or CFO or all insiders but excluding blockholders.

3.6 Appendix

3.6.1 Variable definitions

Variable	Definition	Source
σ	The volatility of daily stock returns over the period from 250 to 126 trading days before the beginning of the pre-announcement, post-announcement and control period, respectively. Based on Agrawal and Nasser (2012).	CRSP, OC
$\Delta\sigma$	The change in volatility of daily stock returns over the period from 125 to 1 trading day versus the period from 250 to 126 trading days before the beginning of the pre-announcement, post-announcement and control period, respectively. Based on Agrawal and Nasser (2012).	CRSP, OC
% equity	The total fraction of shares outstanding in base points bought or sold by corporate insiders during the pre-announcement, the post-announcement or the control period and is scaled as monthly basis depending on the months of the pre-announcement, the post-announcement and the control period, respectively.	TIF, OC
\$ shares	Total value of shares (transaction price or stock price that trading day if transaction price is unavailable times total number of shares) in USD millions bought or sold by corporate insiders during the pre-announcement, the post-announcement or the control period and is scaled as monthly basis depending on the months of the pre-announcement, the post-announcement and the control period, respectively.	TIF, OC
Auction	Dummy variable equal to 1 in case the company is sold in a highly organized auction with pre-set rules and 0 otherwise. Based on Hansen (2001).	HC
Bidders contacted	Total number of bidders that the target firm contracts during the selling process.	HC
Bidder initiated deal	Deal for which, at the beginning of the private selling process, a potential buyer approaches the target firm and proposes an M&A transaction. The deal includes both final acquirer initiated and third party initiated M&As.	HC
Bidders with confid. agreement	Total number of bidders that the target signs confidentiality agreement with during the private selling process.	HC
Book to market	Book value of equity over market capitalization 1 fiscal year before the beginning of the pre-announcement, post-announcement and control period, respectively.	COMPUSTAT

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Variable	Definition	Source
$CAR_{-1,+1}$	The cumulative target abnormal stock returns of a target firm over the period from 1 day before to 1 days after the public announcement date.	CRSP, OC
$CAR_{init.,6mbef.ann.}$	The cumulative target abnormal stock returns of a target firm over period from the initiation date to 6 months before the public announcement.	CRSP, OC
$CAR_{init.,4mbef.ann.}$	The cumulative target abnormal stock returns of a target firm over period from the initiation date to 4 months before the public announcement.	CRSP, OC
$CAR_{init.,2mbef.ann.}$	The cumulative target abnormal stock returns of a target firm over period from the initiation date to 2 months before the public announcement.	CRSP, OC
$CAR_{init.,1mbef.ann.}$	The cumulative target abnormal stock returns of a target firm over period from the initiation date to 1 month before the public announcement.	CRSP, OC
$CAR_{init.,1dbef.ann.}$	The cumulative target abnormal stock returns of a target firm over period from the initiation date to 1 day before the public announcement.	CRSP, OC
Control period	Concerning the pre-announcement period, it is the one-year period before the initiation in case the private selling process takes one year or longer. It is from one year before the initiation to one year before the announcement in case the length is less than one year. Concerning the post-announcement period, it is the one-year period before the initiation in case the post-announcement period takes one year or longer. It is the period ending at initiation but in the same length with the public selling process in case the length is less than one year.	OC
Cash offer	Dummy variable equal to 1 in case the acquirer offers pure cash as the payment consideration and 0 otherwise.	SDC
Controlled sale	Dummy variable equal to 1 in case the target company decides to discreetly canvass a limited number of bidders that target management believes to have a serious interest in acquiring the company and 0 otherwise. Based on Boone and Mulherin (2009).	HC
Early pre-announcement period	The period from the initiation date to six months before the announcement in case the pre-announcement period takes six months or longer. It is from the initiation date to the public announcement in case the length is shorter than 6 months.	OC

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Variable	Definition	Source
Financial acquirer	Dummy variable equal to 1 in case the target firm is acquired by a firm that is majority owned by a private equity investor and 0 otherwise. Based on Fidrmuc et al. (2012).	SDC
Immediately before announcement	The 6-month period before public announcements in case the private selling process stays six months or longer and the initiation date to the public announcement in case the length is shorter than 6 months.	OC
Informal sale	Dummy variable equal to 1 in case the deal is sold in controlled sale or private negotiation and 0 otherwise. Based on Boone and Mulherin (2009).	HC
Initial premium to 8w b.ann	The initial offer price at the announcement date relative to the stock price 8 weeks before the SDC announcement date in percentage points.	SDC
Initial premium to initiation	The initial offer price at the announcement date relative to the stock price at the initiation date in percentage points.	SDC
Initiation date	The date on which the target starts to consider a potential sale of the firm. Based on Boone and Mulherin (2007).	HC
Insider ownership	The total fraction of shares outstanding owned by the board members and top officers (CB, CEO, CO, GC, P; AC, AF, CC, CFO, CI, CT, D, DO, EC, FC, GP, H, M, MC, MD, O, OB, OD, OP, OS, OT, OX, S, SC, TR, VC) just before the deal initiation, the public announcement and 1 year before the initiation date for the pre-announcement, the post-announcement and the control period, respectively.	TIF, OC
Liquidity	Daily average fraction of shares outstanding that is traded over the one calendar year before the beginning of the pre-announcement, post-announcement and control period.	COMPUSTAT
Market capitalization	Stock price times shares outstanding 1 fiscal year before the beginning of the pre-announcement, post-announcement and control period; in the analysis used as a natural log.	CRSP
Merger arbitrage spread	The difference between the initial offer price announced and the stock price immediately after the deal announcement in percentage points. Based on Jetley and Ji (2010).	COMPUSTAT, CRSP, OC
Net purchase	Purchase minus sale by the same insider in the same transaction date in the same company. Based on Agrawal and Nasser (2012).	TIF, OC

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Variable	Definition	Source
Offer improvement	The final offer price at the completion date relative to the initial offer price at the initiation date in percentage points.	SDC
Pre-announcement	Dummy variable equal to 1 in case insider trading is from the initiation date to the public announcement and 0 otherwise.	TIF, OC
Premium	The final offer price relative to the stock price 8 weeks before the SDC announcement date in percentage points.	SDC
$PRET_t$	Market adjusted average daily abnormal returns t quarter before the pre-announcement, the post-announcement or the control period and t equals 1, 2, 3 and 4. Based on Agrawal and Nasser (2012).	CRSP, OC
Post-announcement	Dummy variable equal to 1 in case insider trading is from the SDC announcement date to the resolution and 0 otherwise.	TIF, OC
Private negotiation	Dummy variable equal to 1 in case the target firm negotiates with only one bidder during the selling process. Based on Boone and Mulherin (2009).	HC
Pri. pro. length	Natural log of the private selling process length.	HC
Private selling process length	Length in days from the initiation date to the SDC announcement date.	HC
Pub. pro. length	Natural log of the public selling process length.	HC
Public selling process length	Length in days from the SDC announcement date to the resolution date.	HC
R&D	Research and development expenses divided by total sales.	COMPUSTAT
Selling process length	The length in days from the initiation date to the resolution date.	HC
Stock offer	Dummy variable equal to 1 in case the deals in paid for by stock or partially by stock and 0 otherwise.	SDC
Strategic acquirer	Dummy variable equal to 1 in case the target firm is acquired by a firm that usually have related type of businesses, e.g., suppliers, customers or competitors. Based on Fidrmuc et al. (2012) and Gorbenko and Manlenko (2014).	SDC
Target	Dummy variable equal to 1 for the target firm and 0 otherwise.	OC
Target initiated deal	The board of the target firm decides to sell the company and consequently contacts potential buyers.	HC
Third party initiated	Bidder initiated deal that ends up with a buyer that is not the primary initiator of the deal.	HC

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Variable	Definition	Source
Top executives and independent directors	Corporate insider group that includes the board members and top officers (CB, CEO, CO, GC, P; AC, AF, CC, CFO, CI, CT, D, DO, EC, FC, GP, H, M, MC, MD, O, OB, OD, OP, OS, OT, OX, S, SC, TR, VC, AV).	TIF, OC
Total assets	Book value of total assets in USD millions; in the analysis used as a natural log.	COMPUSTAT
Total sales	Total amount collected for providing goods and services in USD millions.	COMPUSTAT
Transaction value	Total value paid by the acquirer less fees and expenses in USD millions.	SDC

Table 3.1: Selling process summary statistics

This table presents summary statistics for all deals (Column 2) and separately for bidder initiated versus target initiated deals (Columns 3 to 4), for deals sold through informal sale versus formal auction (Columns 5 to 6), for cash versus stock deals (Columns 7 to 8) and for strategic versus financial deals (Columns 9 to 10). All variables are defined in Appendix 3.6.1. All variables are winsorized at the 1st and 99th percentiles except all dummy variables. We test for difference in means using the *t*-test. The significance of the difference between bidder initiated versus target initiated deals is denoted in Column 4, deals sold through informal sale versus sold through formal auction in Column 6, cash versus stock deals in Column 8 and strategic versus financial deals in Column 10, respectively. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

Variable	(1) # obs.	(2) All deals	(3) Bidder initiated	(4) Target initiated	(5) Informal sale	(6) Formal auction	(7) Cash	(8) Stock	(9) Strategic	(10) Financial
Transaction value(million USD)	1084	1831 ^a	2165	1409 ^a	2244	994 ^a	1300	3050 ^a	1842	1798
Premium	986	33.7% ^a	39.0% ^a	26.6% ^a	36.6% ^a	27.8% ^b	35.7% ^a	28.8% ^c	35.4% ^a	28.6% ^c
Initial premium to 8w b.ann.	986	32.1% ^a	36.8% ^a	25.8% ^a	34.8% ^a	26.6% ^b	34.0% ^a	27.4% ^c	33.9% ^a	26.8% ^c
Initial premium to initiation	986	41.5% ^a	47.1% ^a	34.3% ^a	45.8% ^a	33.1% ^a	44.6% ^a	34.0% ^b	42.2% ^a	39.7% ^a
Offer improvement	1066	1.1% ^a	1.6% ^a	0.5% ^a	1.4% ^a	0.6% ^c	1.2% ^a	1.0% ^a	1.0% ^a	1.6% ^a
$CAR_{init,6mb.ann.}$	984	-1.0%	0.2%	-2.6%	-0.9%	-1.3%	-0.9%	-1.4%	-1.2%	-0.6%
$CAR_{init,4mb.ann.}$	981	-1.7%	1.2%	-5.5% ^a	-1.3%	-2.6%	-1.7%	-1.9%	-2.2%	-0.2%
$CAR_{init,2mb.ann.}$	982	-2.2% ^c	2.6%	-8.5% ^a	-0.6%	-5.7% ^c	-2.6%	-1.4%	-1.9%	-3.2%
$CAR_{init,1mb.ann.}$	979	-1.0%	4.7%	-8.5% ^a	0.9%	-4.9% ^b	-1.2%	-0.6%	-0.6%	-2.2%
$CAR_{init,1db.ann.}$	875	1.5%	8.8%	-7.7% ^a	4.2%	-3.8% ^b	1.7%	1.1%	2.4%	-1.0%
$CAR_{-1,+1}$	881	26.3% ^a	27.8% ^a	24.3% ^b	28.2%	22.3% ^a	29.2%	19.4% ^a	27.1%	23.6% ^c
Merger arbitrage spread	986	12.0% ^a	12.8%	10.9%	13.1%	9.8% ^b	11.2%	14.0% ^c	12.5%	8.6% ^a
Private selling process length	1098	387 ^a	314	478 ^a	346	468 ^a	398	361	368	443 ^a
Public selling process length	1098	122 ^a	127	117 ^c	131	105 ^a	108	157 ^a	124	117
Selling process length	1098	509 ^a	441	595 ^a	477	573 ^a	505	518	492	560 ^c
Bidders contacted	1098	19 ^a	9	30 ^a	5	46 ^a	22	11 ^a	15	29 ^a
Bidders with confid. agreement	1098	7 ^a	4	11 ^a	2	18 ^a	9	4 ^a	6	12 ^a
Financial acquirer	1098	0.24 ^a	0.23	0.26	0.18	0.38 ^a	0.35	0.01 ^a	n.a.	n.a.
Cash offer	1098	0.70 ^a	0.71	0.68	0.63	0.84 ^a	n.a.	n.a.	0.61	0.99 ^a
Auction	1098	0.33 ^a	0.20	0.50 ^a	n.a.	n.a.	0.40	0.18 ^a	0.27	0.52 ^a
Controlled sale	1098	0.37 ^a	0.38	0.36	n.a.	n.a.	0.36	0.41 ^c	0.40	0.29 ^a
Private negotiation	1098	0.30 ^a	0.42	0.14 ^a	n.a.	n.a.	0.25	0.41 ^a	0.33	0.19 ^a
Target initiated	1098	0.44 ^a	n.a.	n.a.	0.33	0.67 ^a	0.43	0.47	0.43	0.48
Final acquirer initiated	1098	0.34 ^a	n.a.	n.a.	0.48	0.07 ^a	0.32	0.40 ^b	0.37	0.25 ^a

Table 3.2: Basic statistics for insider trading in target firms before the public announcement

The table shows mean values across target firms separately during the pre-announcement (Column 1) and control period (Column 2) and matched firms during the pre-announcement (Column 3) and control period (Column 4). Insiders are top executives and independent directors. We report insider purchases and sales for all deals, bidder initiated and target initiated deals, informal sales and formal auctions deals, cash and stock deals and strategic and financial deals. We have two measures of purchases and sales, i.e., dollar shares in USD millions and percentage of equity in base points that are scaled as monthly basis. The data covers 1098 target and 1098 matched firms over the pre-announcement and the control period. All variables are defined in Appendix 3.6.1 and winsorized at the 1st and 99th percentiles. We test for differences in means using the t -test allowing for unequal variances. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

	Target firms				Matched firms				Mean difference					
	1		2		3		4		1 vs 2		1 vs 3		(1-2) vs (3-4)	
	Pre-ann.	Control	Pre-ann.	Control	Pre-ann.	Control	Pre-ann.	Control	2	4	3	4	3	4
<i>Panel A: Insider purchases</i>														
<i>All deals</i>														
\$ shares (USD millions)	0.011	0.026	0.038	0.034	0.038	0.034	0.034	0.034	-0.015 ^a	0.004	-0.026 ^a	0.004	0.004	-0.018 ^b
% equity (base points)	0.630	1.401	1.834	1.733	1.834	1.733	1.733	1.733	-0.771 ^a	0.101	-1.205 ^a	0.101	0.101	-0.872 ^b
<i>Bidder initiated</i>														
\$ shares (USD millions)	0.011	0.026	0.037	0.027	0.037	0.027	0.027	0.027	-0.016 ^b	0.010	-0.027 ^a	0.010	0.010	-0.026 ^a
% equity (base points)	0.605	1.302	1.593	1.309	1.593	1.309	1.309	1.309	-0.696 ^b	0.284	-0.988 ^a	0.284	0.284	-0.981 ^b
<i>Target initiated</i>														
\$ shares (USD millions)	0.012	0.026	0.038	0.043	0.038	0.043	0.043	0.043	-0.014 ^c	-0.005	-0.026 ^a	-0.005	-0.005	-0.009
% equity (base points)	0.661	1.525	2.137	2.266	2.137	2.266	2.266	2.266	-0.864 ^b	-0.129	-1.477 ^a	-0.129	-0.129	-0.735
<i>Informal sale</i>														
\$ shares (USD millions)	0.011	0.026	0.042	0.038	0.042	0.038	0.038	0.038	-0.015 ^a	0.003	-0.031 ^a	0.003	0.003	-0.019 ^b
% equity (base points)	0.516	1.257	1.813	2.063	1.813	2.063	2.063	2.063	-0.741 ^a	-0.250	-1.298 ^a	-0.250	-0.250	-0.492
<i>Formal auction</i>														
\$ shares (USD millions)	0.013	0.027	0.030	0.026	0.030	0.026	0.026	0.026	-0.014 ^c	0.004	-0.017 ^c	0.004	0.004	-0.018
% equity (base points)	0.860	1.691	1.877	1.069	1.877	1.069	1.069	1.069	-0.831 ^b	0.808	-1.017 ^b	0.808	0.808	-1.639 ^a
<i>Cash</i>														
\$ shares (USD millions)	0.011	0.022	0.035	0.032	0.035	0.032	0.032	0.032	-0.011 ^b	0.003	-0.024 ^a	0.003	0.003	-0.014 ^c
% equity (base points)	0.693	1.340	1.862	1.829	1.862	1.829	1.829	1.829	-0.647 ^b	0.032	-1.168 ^a	0.032	0.032	-0.679 ^c
<i>Stock</i>														
\$ shares (USD millions)	0.012	0.036	0.044	0.040	0.044	0.040	0.040	0.040	-0.024 ^b	0.004	-0.032 ^a	0.004	0.004	-0.028 ^c
% equity (base points)	0.482	1.540	1.771	1.511	1.771	1.511	1.511	1.511	-1.058 ^b	0.260	-1.289 ^a	0.260	0.260	-1.318 ^b
<i>Strategic</i>														
\$ shares (USD millions)	0.012	0.029	0.039	0.037	0.039	0.037	0.037	0.037	-0.017 ^a	0.002	-0.027 ^a	0.002	0.002	-0.019 ^b
% equity (base points)	0.614	1.480	1.885	1.769	1.885	1.769	1.769	1.769	-0.867 ^a	0.116	-1.272 ^a	0.116	0.116	-0.983 ^b

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	Target firms				Matched firms				Mean difference							
	1		2		3		4		1 vs 2		3 vs 4		(1-2) vs (3-4)			
	Pre-ann.	Control	Pre-ann.	Control	Pre-ann.	Control	Pre-ann.	Control	1	2	3	4	1	2	3	4
<i>Financial</i>																
\$ shares (USD millions)	0.010	0.019	0.035	0.026	0.035	0.026	0.026	0.026	-0.009	-0.025 ^b	0.009	0.009	0.009	-0.018	0.009	-0.018
% equity (base points)	0.680	1.154	1.678	1.623	1.678	1.623	1.623	1.623	-0.474	-0.998 ^c	0.055	0.055	0.055	-0.529	0.055	-0.529
<i>Panel B: Insider sales</i>																
<i>All deals</i>																
\$ shares (USD millions)	0.293	0.454	0.653	0.702	0.653	0.702	0.702	0.702	-0.162 ^b	-0.361 ^a	-0.049	-0.049	-0.049	-0.112	-0.049	-0.112
% equity (base points)	3.351	4.686	6.248	6.780	6.248	6.780	6.780	6.780	-1.334 ^b	-2.897 ^a	-0.532	-0.532	-0.532	-0.802	-0.532	-0.802
<i>Bidder initiated</i>																
\$ shares (USD millions)	0.276	0.519	0.689	0.679	0.689	0.679	0.679	0.679	-0.242 ^a	-0.413 ^a	0.010	0.010	0.010	-0.253 ^c	0.010	-0.253 ^c
% equity (base points)	2.755	4.825	5.458	5.667	5.458	5.667	5.667	5.667	-2.070 ^b	-2.703 ^a	-0.209	-0.209	-0.209	-1.861	-0.209	-1.861
<i>Target initiated</i>																
\$ shares (USD millions)	0.313	0.374	0.608	0.732	0.608	0.732	0.732	0.732	-0.061	-0.295 ^b	-0.124	-0.124	-0.124	0.064	-0.124	0.064
% equity (base points)	4.099	4.511	7.239	8.177	7.239	8.177	8.177	8.177	-0.412	-3.140 ^b	-0.938	-0.938	-0.938	0.526	-0.938	0.526
<i>Informal sale</i>																
\$ shares (USD millions)	0.344	0.583	0.693	0.745	0.693	0.745	0.745	0.745	-0.239 ^a	-0.349 ^a	-0.051	-0.051	-0.051	-0.187	-0.051	-0.187
% equity (base points)	3.316	5.403	6.484	6.712	6.484	6.712	6.712	6.712	-2.087 ^a	-3.167 ^a	-0.228	-0.228	-0.228	-1.859	-0.228	-1.859
<i>Formal auction</i>																
\$ shares (USD millions)	0.189	0.196	0.572	0.617	0.572	0.617	0.617	0.617	-0.007	-0.383 ^a	-0.045	-0.045	-0.045	0.039	-0.045	0.039
% equity (base points)	3.421	3.238	5.773	6.919	5.773	6.919	6.919	6.919	0.183	-2.352 ^c	-1.146	-1.146	-1.146	1.329	-1.146	1.329
<i>Cash</i>																
\$ shares (USD millions)	0.234	0.405	0.621	0.653	0.621	0.653	0.653	0.653	-0.171 ^a	-0.386 ^a	-0.032	-0.032	-0.032	-0.139	-0.032	-0.139
% equity (base points)	3.149	5.353	6.668	7.186	6.668	7.186	7.186	7.186	-2.204 ^a	-3.519 ^a	-0.518	-0.518	-0.518	-1.686	-0.518	-1.686
<i>Stock</i>																
\$ shares (USD millions)	0.428	0.569	0.728	0.817	0.728	0.817	0.817	0.817	-0.141	-0.301 ^c	-0.089	-0.089	-0.089	-0.052	-0.089	-0.052
% equity (base points)	3.820	3.140	5.276	5.841	5.276	5.841	5.841	5.841	0.680	-1.456	-0.565	-0.565	-0.565	1.246	-0.565	1.246
<i>Strategic</i>																
\$ shares (USD millions)	0.344	0.464	0.636	0.737	0.636	0.737	0.737	0.737	-0.119	-0.291 ^a	-0.101	-0.101	-0.101	-0.018	-0.101	-0.018
% equity (base points)	3.550	4.690	5.935	7.287	5.935	7.287	7.287	7.287	-1.140	-2.385 ^a	-1.352	-1.352	-1.352	0.212	-1.352	0.212
<i>Financial</i>																
\$ shares (USD millions)	0.133	0.426	0.706	0.595	0.706	0.595	0.595	0.595	-0.293 ^b	-0.574 ^a	0.111	0.111	0.111	-0.404 ^b	0.111	-0.404 ^b
% equity (base points)	2.737	4.671	7.213	5.218	7.213	5.218	5.218	5.218	-1.934	-4.476 ^a	1.995	1.995	1.995	-3.929 ^c	1.995	-3.929 ^c

Table 3.3: Basic statistics for insider trading in target firms after the public announcement

The table shows mean values across target firms separately during the post-announcement (Column 1), the control (Column 2) and the pre-announcement (Column 3) period and matched firms during the post-announcement (Column 4), the control (Column 5) and the pre-announcement (Column 6) period. Insiders are top executives and independent directors. We report insider purchases and sales for all deals, bidder initiated and target initiated deals, informal sales and formal auctions deals, cash and stock deals and strategic and financial deals. We have two measures of purchases and sales, i.e., dollar shares in USD millions and percentage of equity in base points that are scaled as monthly basis. The data covers 1098 target and 1098 matched firms over the pre-announcement and the control period. All variables are defined in Appendix 3.6.1 and winsorized at the 1st and 99th percentiles. We test for differences in means using the *t*-test allowing for unequal variances. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

	Target firms			Matched firms			Mean difference					
	1	2	3	4	5	6	1 vs 2	1 vs 3	1 vs 4	4 vs 5	4 vs 6	(1-2) vs (4-5)
	Post-ann.	Control	Pre-ann.	Post-ann.	Control	Pre-ann.						
<i>Panel A: Insider purchases</i>												
<i>All deals</i>												
\$ shares (USD millions)	0.010	0.014	0.011	0.027	0.024	0.038	-0.004	-0.001	-0.017 ^a	0.002	-0.011 ^c	-0.007
% equity (base points)	0.351	0.882	0.630	1.174	1.083	1.834	-0.531 ^a	-0.279 ^c	-0.824 ^a	0.091	-0.660 ^b	-0.622 ^b
<i>Bidder initiated</i>												
\$ shares (USD millions)	0.010	0.015	0.011	0.023	0.022	0.037	-0.005	0.000	-0.013 ^b	0.001	-0.014 ^c	-0.006
% equity (base points)	0.377	0.924	0.605	1.120	0.953	1.593	-0.547 ^b	-0.228	-0.743 ^a	0.167	-0.473	-0.714 ^b
<i>Target initiated</i>												
\$ shares (USD millions)	0.010	0.013	0.012	0.031	0.026	0.038	-0.003	-0.003	-0.022 ^a	0.005	-0.007	-0.008
% equity (base points)	0.318	0.829	0.661	1.243	1.247	2.137	-0.511 ^b	-0.343	-0.925 ^a	-0.004	-0.895 ^c	-0.507
<i>Informal sale</i>												
\$ shares (USD millions)	0.009	0.014	0.011	0.029	0.025	0.042	-0.004	-0.001	-0.019 ^a	0.004	-0.013	-0.008
% equity (base points)	0.362	0.821	0.516	1.226	1.005	1.813	-0.459 ^b	-0.154	-0.864 ^a	0.221	-0.587	-0.680 ^b
<i>Formal auction</i>												
\$ shares (USD millions)	0.011	0.015	0.013	0.022	0.022	0.030	-0.004	-0.002	-0.011	0.000	-0.007	-0.004
% equity (base points)	0.328	1.004	0.860	1.070	1.241	1.877	-0.676 ^b	-0.532 ^c	-0.742 ^b	-0.171	-0.807	-0.506
<i>Cash</i>												
\$ shares (USD millions)	0.010	0.013	0.011	0.028	0.016	0.035	-0.003	-0.001	-0.018 ^a	0.011 ^b	-0.007	-0.014 ^b
% equity (base points)	0.387	0.866	0.693	1.362	0.947	1.862	-0.480 ^b	-0.307	-0.976 ^a	0.415	-0.500	-0.895 ^a
<i>Stock</i>												
\$ shares (USD millions)	0.009	0.017	0.012	0.024	0.042	0.044	-0.008	-0.003	-0.014 ^b	-0.018 ^c	-0.021 ^c	0.010
% equity (base points)	0.267	0.917	0.482	0.740	1.399	1.771	-0.650 ^a	-0.215	-0.472 ^b	-0.659 ^c	-1.031 ^b	0.010
<i>Strategic</i>												
\$ shares (USD millions)	0.011	0.015	0.012	0.026	0.027	0.039	-0.004	-0.001	-0.016 ^a	-0.001	-0.012	-0.003
% equity (base points)	0.402	0.987	0.614	1.191	1.161	1.885	-0.585 ^a	-0.211	-0.788 ^a	0.030	-0.695 ^b	-0.615 ^b

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	Target firms						Matched firms						Mean difference					
	1		2		3		4		5		6		1 vs 2	1 vs 3	1 vs 4	4 vs 5	4 vs 6	4 vs (1-2) vs (4-5)
	Post-ann.	Control	Post-ann.	Control	Pre-ann.	Control	Post-ann.	Control	Pre-ann.	Control	Pre-ann.	Control						
<i>Financial</i>																		
\$ shares (USD millions)	0.008	0.013	0.010	0.016	0.035	0.035	0.027	0.016	0.016	0.035	0.035	-0.005	-0.002	-0.020 ^b	0.012	0.012	-0.008	-0.017
% equity (base points)	0.191	0.557	0.680	0.844	1.678	1.678	1.125	0.844	0.844	1.678	1.678	-0.366	-0.489	-0.933 ^a	0.281	0.281	-0.553	-0.646
<i>Panel B: Insider sales</i>																		
<i>All deals</i>																		
\$ shares (USD millions)	0.352	0.319	0.293	0.452	0.653	0.653	0.452	0.497	0.497	0.653	0.653	0.032	0.059	-0.100	-0.045	-0.045	-0.201 ^b	0.078
% equity (base points)	3.009	3.085	3.351	4.251	6.248	6.248	4.251	5.065	5.065	6.248	6.248	-0.076	-0.342	-1.242 ^b	-0.814	-0.814	-1.997 ^b	0.738
<i>Bidder initiated</i>																		
\$ shares (USD millions)	0.446	0.336	0.276	0.476	0.689	0.689	0.476	0.582	0.582	0.689	0.689	0.110	0.169 ^b	-0.030	-0.106	-0.106	-0.213 ^c	0.216 ^b
% equity (base points)	3.615	2.799	2.755	3.725	5.458	5.458	3.725	5.240	5.240	5.458	5.458	0.816	0.860	-0.110	-1.515 ^c	-1.515 ^c	-1.733 ^c	2.331 ^b
<i>Target initiated</i>																		
\$ shares (USD millions)	0.234	0.299	0.313	0.421	0.608	0.608	0.421	0.391	0.391	0.608	0.608	-0.065	-0.079	-0.188 ^b	0.031	0.031	-0.186	-0.096
% equity (base points)	2.249	3.444	4.099	4.911	7.239	7.239	4.911	4.845	4.845	7.239	7.239	-1.195 ^c	-1.850 ^b	-2.662 ^a	0.065	0.065	-2.328 ^c	-1.260
<i>Informal sale</i>																		
\$ shares (USD millions)	0.458	0.381	0.344	0.464	0.693	0.693	0.464	0.559	0.559	0.693	0.693	0.077	0.114	-0.006	-0.095	-0.095	-0.229 ^b	0.172 ^c
% equity (base points)	3.627	3.261	3.316	3.996	6.484	6.484	3.996	5.479	5.479	6.484	6.484	0.366	0.311	-0.369	-1.483 ^c	-1.483 ^c	-2.488 ^b	1.849 ^c
<i>Formal auction</i>																		
\$ shares (USD millions)	0.137	0.195	0.189	0.427	0.572	0.572	0.427	0.373	0.373	0.572	0.572	-0.058	-0.052	-0.290 ^a	0.054	0.054	-0.145	-0.113
% equity (base points)	1.763	2.730	3.421	4.766	5.773	5.773	4.766	4.230	4.230	5.773	5.773	-0.967	-1.658 ^c	-3.003 ^a	0.536 ^c	0.536 ^c	-1.008	-1.503
<i>Cash</i>																		
\$ shares (USD millions)	0.313	0.296	0.234	0.472	0.621	0.621	0.472	0.457	0.457	0.621	0.621	0.017	0.079	-0.159 ^b	0.015	0.015	-0.149	0.002
% equity (base points)	3.116	3.532	3.149	4.885	6.668	6.668	4.885	5.214	5.214	6.668	6.668	-0.416	-0.032	-1.769 ^b	-0.329	-0.329	-1.782 ^c	-0.087
<i>Stock</i>																		
\$ shares (USD millions)	0.441	0.373	0.428	0.405	0.728	0.728	0.405	0.590	0.590	0.728	0.728	0.068	0.014	0.037	-0.185	-0.185	-0.324 ^b	0.253 ^c
% equity (base points)	2.761	2.049	3.820	2.781	5.276	5.276	2.781	4.720	4.720	5.276	5.276	0.712	-1.059	-0.020	-1.939 ^c	-1.939 ^c	-2.495 ^c	2.650 ^b
<i>Strategic</i>																		
\$ shares (USD millions)	0.410	0.340	0.344	0.425	0.636	0.636	0.425	0.509	0.509	0.636	0.636	0.069	0.065	-0.015	-0.084	-0.084	-0.211 ^b	0.153 ^c
% equity (base points)	3.268	3.252	3.550	4.505	5.935	5.935	4.505	5.245	5.245	5.935	5.935	0.016	-0.282	-1.237 ^c	-0.740	-0.740	-1.430	0.756
<i>Financial</i>																		
\$ shares (USD millions)	0.174	0.255	0.133	0.534	0.706	0.706	0.534	0.462	0.462	0.706	0.706	-0.082	0.041	-0.361 ^a	0.073	0.073	-0.172	-0.154
% equity (base points)	2.211	2.570	2.737	3.469	7.213	7.213	3.469	4.510	4.510	7.213	7.213	-0.359	-0.526	-1.258	-1.041	-1.041	-3.744 ^b	0.682

Table 3.4: Insider trading in target firms before the public announcement: deal initiation, selling mechanism, payment method and bidder type

This table reports estimation results of insider purchases (Columns 1 to 5), insider sales (Columns 6 to 10) and net purchases (Columns 11 to 15) in target firms before public announcements. Panels A, B and C report results of insider trading immediately before the public announcement (6-month period before public announcements in case the private selling process stays 6 months or longer and the initiation date to the public announcement in case the length is shorter than 6 months), in the early pre-announcement period (initiation date to 6 months before the announcement in case the pre-announcement period takes 6 months or longer and zero in case the length is shorter than 6 months) and during the whole pre-announcement period (the initiation date to the public announcement), respectively. The dependent variables are purchases, sales and net purchases (i.e. purchases minus sales) by top executives and independent directors measured as percentage of equity in base points. Regression of purchases and sales uses the left-censored Tobit model and regression of net purchases uses the OLS model. The data covers 1098 target and 1098 matched firms over the pre-announcement and the control period. We report Hubert/White robust standard errors in brackets. All variables are defined in Appendix 3.6.1 and are winsorized at the 1st and 99th percentiles, except for all dummy variables. Both year and industry dummies are included in the regressions but are not reported. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Insider purchases					Insider sales					Net purchases				
	all	bid	inf	cash	fin	all	bid	inf	cash	fin	all	bid	inf	cash	fin
Constant	-10.46 ^a (2.323)	-10.27 ^a (2.398)	-12.07 ^a (2.400)	-10.23 ^a (2.345)	-10.48 ^a (2.326)	-15.10 ^a (4.048)	-15.38 ^a (4.135)	-16.26 ^a (4.178)	-16.20 ^a (4.210)	-14.70 ^a (4.026)	-4.151 ^b (1.976)	-4.485 ^b (2.048)	-3.600 ^c (2.016)	-3.812 ^c (2.049)	-4.513 ^b (1.979)
Pre-announcement	-2.365 ^a (0.545)	-2.648 ^a (0.774)	-1.598 ^b (0.793)	-2.361 ^a (0.799)	-2.426 ^a (0.616)	-3.260 ^a (0.967)	-3.661 ^a (1.387)	-3.854 ^a (1.467)	-3.706 ^b (1.534)	-4.448 ^a (1.110)	1.137 ^b (0.565)	1.331 (0.813)	1.396 ^c (0.806)	1.515 ^c (0.853)	2.016 ^a (0.633)
Target	-0.266 (0.483)	-0.789 (0.764)	1.453 ^c (0.746)	0.136 (0.840)	-0.139 (0.559)	-0.776 (0.908)	-1.274 (1.444)	-2.836 ^b (1.374)	-2.241 (1.500)	-0.951 (1.080)	0.780 (0.572)	0.908 (0.910)	2.212 ^a (0.772)	1.642 ^c (0.895)	1.076 (0.685)
Target x pre-ann.	-5.014 ^a (0.806)	-4.714 ^a (1.192)	-9.708 ^a (1.440)	-4.604 ^a (1.240)	-4.863 ^a (0.892)	-5.481 ^a (1.277)	-4.960 ^b (2.000)	-4.935 ^b (2.111)	-1.887 (2.140)	-4.223 ^a (1.455)	0.307 (0.700)	-0.178 (1.113)	-1.525 (1.014)	-1.901 ^c (1.114)	-0.646 (0.813)
Deal characteristic		-0.538 (0.729)	1.465 ^b (0.733)	-0.088 (0.713)	-0.115 (0.815)		-0.193 (1.423)	0.522 (1.442)	1.170 (1.475)	-2.335 (1.448)		0.267 (0.889)	-0.340 (0.876)	-0.411 (0.898)	1.749 ^c (0.903)
Deal ch.x pre-ann.		0.540 (1.006)	-1.147 (1.022)	-0.014 (1.005)	0.234 (1.171)		0.751 (1.877)	0.926 (1.897)	0.675 (2.145)	4.613 ^b (2.145)		-0.348 (1.108)	-0.397 (1.086)	-0.560 (1.105)	-3.544 ^a (1.294)
Deal ch.x target		0.976 (0.989)	-2.652 ^a (0.981)	-0.580 (1.018)	-0.534 (1.081)		0.885 (1.874)	3.073 ^c (1.813)	2.042 (1.872)	0.617 (1.918)		-0.234 (1.176)	-2.143 ^b (1.088)	-1.221 (1.147)	-1.183 (1.191)
Deal ch.x target x pre.		-0.564 (1.524)	6.838 ^a (1.658)	-0.653 (1.526)	-0.689 (1.849)		-0.947 (2.567)	-0.935 (2.641)	-5.043 ^c (2.673)	-4.888 ^c (2.917)		0.863 (1.420)	2.749 ^b (1.363)	3.143 ^b (1.424)	3.861 ^b (1.598)
CA _{target,1mb,ann.}	-0.773 (0.546)	-0.799 (0.548)	-0.800 (0.544)	-0.792 (0.545)	-0.781 (0.546)	2.854 ^a (0.902)	2.806 ^a (0.908)	2.717 ^a (0.898)	2.888 ^a (0.898)	2.833 ^a (0.896)	-0.930 ^c (0.562)	-0.958 ^c (0.567)	-0.880 (0.561)	-0.948 ^c (0.561)	-0.918 ^c (0.558)

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Insider purchases						Insider sales						Net purchases		
	all	bid	inf	cash	fin	all	bid	inf	cash	fin	all	bid	inf	cash	fin
Pri. pro. length	1.634 ^a (0.244)	1.639 ^a (0.252)	1.721 ^a (0.254)	1.645 ^a (0.243)	1.655 ^a (0.244)	1.640 ^a (0.408)	1.695 ^a (0.415)	1.877 ^a (0.418)	1.600 ^a (0.405)	1.693 ^a (0.410)	0.006 (0.197)	0.034 (0.202)	-0.099 (0.203)	0.025 (0.196)	-0.015 (0.198)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Total effect by deal ch.		-5.278 ^a	-2.870 ^a	-5.257 ^a	-5.552 ^a		-5.907 ^a	-5.870 ^a	-6.930 ^a	-9.111 ^a		0.685	1.224	1.242	3.215 ^b
# observations	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654
F	4.594 ^a	4.175 ^a	4.243 ^a	4.193 ^a	4.174 ^a	8.175 ^a	7.42 ^a	7.493 ^a	7.451 ^a	7.407 ^a	6.506 ^a	5.995 ^a	5.961 ^a	6.126 ^a	5.963 ^a
(Pseudo) R ²	4.82%	4.83%	5.07%	4.84%	4.83%	3.07%	3.07%	3.14%	3.11%	3.11%	7.34%	7.36%	7.64%	7.54%	7.63%

continued on next page

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
	Insider purchases						Insider sales						Net purchases			
	all	bid	inf	cash	fin	all	bid	inf	cash	fin	all	bid	inf	cash	fin	
<i>Panel B: Early pre-announcement period</i>																
Constant	-49.13 ^a (4.305)	-49.49 ^a (4.345)	-50.42 ^a (4.409)	-48.76 ^a (4.331)	-49.59 ^a (4.387)	-107.3 ^a (9.816)	-105.9 ^a (9.981)	-108.8 ^a (10.08)	-109.8 ^a (10.10)	-107.1 ^a (9.829)	2.074 (2.362)	1.242 (2.531)	2.722 (2.450)	3.168 (2.411)	1.930 (2.360)	
P pre-announcement	-2.101 ^a (0.664)	-2.059 ^b (0.931)	-0.951 (0.980)	-1.118 (1.018)	-1.756 ^b (0.772)	-4.069 ^a (1.508)	-3.569 ^c (2.136)	-3.191 (2.282)	-2.925 (2.489)	-4.526 ^b (1.805)	0.645 (0.606)	0.636 (0.937)	0.421 (0.971)	0.032 (0.796)	0.950 (0.707)	
Target	-0.325 (0.563)	-1.141 (0.846)	1.366 (0.845)	0.330 (0.999)	-0.013 (0.650)	-1.768 (1.251)	-2.191 (1.967)	-2.877 (1.960)	-2.244 (1.976)	-2.394 (1.494)	1.122 ^b (0.520)	1.058 (0.923)	1.946 ^b (0.793)	0.956 (0.666)	1.441 ^b (0.617)	
Target x pre-ann.	-2.440 ^a (0.870)	-1.890 (1.200)	-4.519 ^a (1.332)	-4.149 ^a (1.487)	-3.131 ^a (1.016)	-0.359 (1.872)	0.089 (2.791)	-1.881 (2.936)	-0.499 (3.214)	0.572 (2.262)	-1.100 (0.712)	-1.103 (1.219)	-1.150 (1.148)	-0.964 (1.015)	-1.626 ^c (0.853)	
Deal characteristic																
Deal ch.x pre-ann.																
Deal ch.x target																
Deal ch.x target x pre.																
$CAR_{i,mit.,6mb,ann.}$	-0.400 (0.619)	-0.436 (0.622)	-0.391 (0.618)	-0.437 (0.620)	-0.390 (0.619)	1.591 (1.513)	1.641 (1.511)	1.586 (1.511)	1.659 (1.509)	1.617 (1.518)	-1.616 ^c (0.839)	-1.656 ^b (0.840)	-1.600 ^c (0.839)	-1.641 ^c (0.839)	-1.622 ^c (0.840)	
Pri. pro. length	6.743 ^a (0.479)	6.797 ^a (0.484)	6.779 ^a (0.487)	6.775 ^a (0.480)	6.829 ^a (0.485)	15.94 ^a (1.101)	15.79 ^a (1.106)	16.09 ^a (1.122)	15.88 ^a (1.093)	16.05 ^a (1.115)	-1.269 ^a (0.161)	-1.182 ^a (0.175)	-1.363 ^a (0.178)	-1.243 ^a (0.159)	-1.326 ^a (0.167)	
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
Total effect by deal ch.		-2.956 ^b	-1.145	-1.686	-0.284		-0.789	0.525	-0.287	-2.901		-1.103	-1.066	-1.166	0.524	
# observations	3,658	3,658	3,658	3,658	3,658	3,658	3,658	3,658	3,658	3,658	3,658	3,658	3,658	3,658	3,658	
F	6.570 ^a	5.984 ^a	6.100 ^a	6.041 ^a	5.947 ^a	7.301 ^a	6.709 ^a	6.652 ^a	6.727 ^a	6.732 ^a	5.703 ^a	5.220 ^a	5.213 ^a	5.498 ^a	5.368 ^a	
(Pseudo) R ²	8.91%	8.96%	8.98%	8.97%	8.99%	7.10%	7.11%	7.14%	7.13%	7.12%	7.98%	8.05%	8.16%	8.10%	8.11%	

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	Insider purchases			Insider sales			Net purchases									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
	all	bid	inf	cash	fin	all	bid	inf	cash	fin	all	bid	inf	cash	fin	
<i>Panel C: Whole pre-announcement period</i>																
Constant	-25.98 ^a (3.375)	-25.85 ^a (3.473)	-28.07 ^a (3.505)	-25.30 ^a (3.380)	-25.98 ^a (3.383)	-36.29 ^a (6.193)	-36.53 ^a (6.388)	-38.76 ^a (6.406)	-37.49 ^a (6.444)	-35.76 ^a (6.158)	-3.825 (2.740)	-4.129 (2.897)	-2.681 (2.788)	-3.384 (2.848)	-4.234 (2.747)	
Pre-announcement	0.211 (0.691)	0.677 (1.007)	1.505 (1.034)	0.499 (0.795)	0.046 (0.795)	0.154 (1.516)	1.026 (2.228)	0.897 (2.279)	-0.758 (2.473)	-1.350 (1.749)	0.529 (0.801)	0.551 (1.171)	0.420 (1.158)	0.954 (1.190)	1.571 ^c (0.903)	
Target	-0.356 (0.627)	-1.039 (1.003)	1.783 ^c (0.933)	0.137 (1.102)	-0.214 (0.732)	-1.650 (1.281)	-2.879 (2.086)	-3.954 ^b (1.987)	-3.321 (2.082)	-1.839 (1.534)	1.176 ^c (0.705)	1.425 (1.144)	2.564 ^a (0.923)	2.080 ^b (1.061)	1.510 ^c (0.856)	
Target x pre-ann.	-4.800 ^a (0.954)	-4.661 ^a (1.399)	-8.192 ^a (1.488)	-5.515 ^a (1.520)	-4.873 ^a (1.076)	-4.898 ^a (1.819)	-2.942 (2.793)	-4.448 (2.881)	-0.438 (3.118)	-3.688 ^a (2.126)	-0.039 (0.923)	-0.739 (1.471)	-1.475 (1.359)	-2.312 (1.464)	-1.171 (1.084)	
Deal characteristic		-0.121 (0.932)	2.379 ^b (0.939)	-0.655 (0.921)	-0.798 (1.024)		0.799 (2.159)	2.028 (2.186)	1.286 (2.171)	-3.955 ^c (2.172)		0.114 (1.179)	-0.936 (1.140)	-0.500 (1.151)	2.441 ^b (1.171)	
Deal ch.x pre-ann.		-0.909 (1.324)	-1.967 (1.341)	-0.452 (1.311)	0.638 (1.479)		-1.592 (2.929)	-1.111 (2.954)	1.333 (3.029)	5.758 ^c (3.205)		-0.036 (1.542)	0.156 (1.518)	-0.630 (1.518)	-4.172 ^b (1.747)	
Deal ch.x target		1.267 (1.286)	-3.300 ^a (1.255)	-0.709 (1.331)	-0.632 (1.389)		2.147 (2.697)	3.428 (2.600)	2.328 (2.630)	0.624 (2.670)		-0.443 (1.468)	-2.078 (1.330)	-1.281 (1.389)	-1.335 (1.416)	
Deal ch.x target x pre.		-0.209 (1.782)	5.196 ^a (1.809)	1.030 (1.838)	0.367 (2.028)		-3.470 (3.637)	-0.719 (3.657)	-6.259 (3.857)	-4.574 (3.982)		1.234 (1.871)	2.161 (1.807)	3.236 ^c (1.883)	4.583 ^b (2.062)	
$CAR_{i,mit.,1m.b.ann.}$	-0.399 (0.712)	-0.443 (0.719)	-0.443 (0.709)	-0.438 (0.711)	-0.406 (0.713)	2.183 (1.514)	2.133 (1.529)	2.022 (1.506)	2.230 (1.508)	2.165 (1.516)	-0.939 (0.848)	-0.965 (0.859)	-0.865 (0.847)	-0.961 (0.845)	-0.923 (0.848)	
Pri. pro. length	3.655 ^a (0.367)	3.642 ^a (0.373)	3.763 ^a (0.380)	3.687 ^a (0.367)	3.700 ^a (0.369)	4.360 ^a (0.623)	4.374 ^a (0.642)	4.676 ^a (0.643)	4.311 ^a (0.617)	4.481 ^a (0.629)	-0.147 (0.250)	-0.117 (0.264)	-0.302 (0.260)	-0.124 (0.247)	-0.201 (0.252)	
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
Total effect by deal ch.		-4.870 ^a	-2.996 ^a	-4.485 ^a	-4.506 ^b		-6.412 ^a	-5.167 ^b	-6.697 ^a	-8.262 ^b		0.495	0.686	0.924	3.412 ^c	
# observations	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	
F	4.633 ^a	4.216 ^a	4.274 ^a	4.302 ^a	4.212 ^a	5.973 ^a	5.530 ^a	5.419 ^a	5.517 ^a	5.422 ^a	5.354 ^a	4.908 ^a	5.018 ^a	5.018 ^a	4.971 ^a	
(Pseudo) R ²	3.99%	4.01%	4.08%	4.02%	4.01%	2.33%	2.35%	2.39%	2.36%	2.37%	6.74%	6.76%	7.00%	6.86%	7.01%	

Table 3.5: Insider trading in target firms before the public announcement: reinforcing effect of selling mechanism on method of payment and bidder type

This table reports estimation results of insider purchases, sales and net purchases before the public announcement in target firms sold through informal sales (Columns 1 to 6) and through formal auctions (Columns 7 to 12). Panels A, B and C report results of insider trading immediately before the public announcement (6-month period before public announcements in case the private selling process stays 6 months or longer and the initiation date to the public announcement in case the length is shorter than 6 months), in the early pre-announcement period (initiation date to 6 months before the announcement in case the pre-announcement period takes 6 months or longer and zero in case the length is shorter than 6 months) and during the whole pre-announcement period (the initiation date to the public announcement), respectively. The dependent variables are purchases, sales and net purchases (i.e. purchases minus sales) by top executives and independent directors measured as percentage of equity in base points. Regression of purchases and sales uses the left-censored Tobit model and regression of net purchases uses the OLS model. The data covers 1098 target and 1098 matched firms over the pre-announcement and the control period. We report Hubert/White robust standard errors in brackets. All variables are defined in Appendix 3.6.1 and are winsorized at the 1st and 99th percentiles, except for all dummy variables. Both year and industry dummies are included in the regressions but are not reported. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)				
	Informal sales						Formal auctions									
	Insider purchases			Insider sales			Insider purchases			Insider sales			Net purchases			
	cash	fin		cash	fin		cash	fin		cash	fin	cash	fin	cash	fin	
<i>Panel A: Immediately before announcement</i>																
Constant	-14.69 ^a (3.085)	-14.53 ^a (3.052)	-16.21 ^a (5.422)	-14.53 ^a (5.173)	-5.472 ^b (2.732)	-6.379 ^b (2.638)	-2.579 (3.693)	-3.395 (3.495)	-19.29 ^a (6.366)	-16.13 ^a (5.908)	3.096 (2.830)	1.857 (2.684)				
Pre-announcement	-2.665 ^a (0.969)	-2.956 ^b (0.798)	-3.889 ^b (1.766)	-4.543 ^a (1.397)	1.576 (0.985)	2.258 ^a (0.815)	-1.609 (1.330)	-1.168 (0.822)	-1.969 (3.105)	-3.593 ^b (1.626)	0.689 (1.721)	1.192 (0.873)				
Target	0.223 (1.005)	-1.005 (0.729)	-2.261 (1.778)	-0.468 (1.367)	1.594 (1.067)	0.786 (0.881)	-0.736 (1.336)	1.410 ^c (0.807)	-2.265 (2.510)	-2.016 (1.527)	1.403 (1.256)	1.659 ^c (0.878)				
Target x pre-ann.	-4.209 ^a (1.467)	-3.291 ^a (1.090)	-1.969 (2.435)	-4.518 ^b (1.785)	-1.717 (1.276)	-0.232 (1.019)	-6.464 ^a (2.348)	-8.241 ^a (1.611)	-2.510 (4.609)	-3.797 ^c (2.278)	-2.412 (2.229)	-1.676 (1.181)				
Deal characteristic	0.673 (0.943)	0.627 (1.208)	0.298 (1.878)	-5.926 ^a (1.770)	0.012 (1.149)	4.906 ^a (1.022)	-0.839 (1.071)	-0.249 (0.968)	3.571 (2.338)	2.269 (2.199)	-1.682 (1.315)	-2.371 (1.456)				
Deal ch.x pre-ann.	-0.382 (1.313)	0.363 (1.780)	1.655 (2.427)	8.535 ^a (3.105)	-1.111 (1.841)	-7.141 ^a (1.403)	0.411 (1.527)	-0.290 (1.403)	-1.869 (3.430)	0.049 (2.824)	0.991 (1.939)	0.891 (1.771)				
Deal ch.x target	-2.485 ^c (1.331)	-1.624 (1.601)	4.161 ^c (2.379)	4.509 ^c (2.580)	-2.566 ^c (1.484)	-4.325 ^a (1.588)	2.284 (1.498)	-0.618 (1.326)	-0.645 (2.879)	-1.950 (2.637)	0.905 (1.520)	1.325 (1.688)				
Deal ch.x target x pre.	1.951 (1.947)	1.611 (2.703)	-6.510 ^b (3.261)	-8.460 ^b (4.146)	4.637 ^a (1.783)	7.801 ^a (2.312)	-2.193 (2.559)	-0.281 (2.337)	-2.154 (5.048)	-1.415 (3.922)	1.252 (2.492)	0.884 (2.147)				
$CAR_{mit-1,mb,ann.}$	-0.888 (0.804)	-0.876 (0.802)	3.930 ^a (1.275)	3.887 ^a (1.266)	-1.419 ^c (0.841)	-1.392 ^c (0.826)	-0.902 ^c (0.540)	-0.866 (0.545)	1.294 (1.049)	1.239 (1.049)	-0.316 (0.577)	-0.268 (0.580)				

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)						
	Insider purchases			Insider sales			Net purchases			Insider purchases			Insider sales			Net purchases		
	cash			fin			cash			fin			cash			fin		
Pri. pro. length	2.225 ^a	2.213 ^a	2.008 ^a	2.074 ^a	0.083	0.027	0.177	0.231	0.942	0.909	-0.569	-0.501						
Control variables	(0.320)	(0.320)	(0.498)	(0.501)	(0.236)	(0.237)	(0.434)	(0.427)	(0.709)	(0.702)	(0.383)	(0.376)						
	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES						
Total effect by deal ch.	-2.255 ^c	-1.680	-8.479 ^a	-12.98 ^a	2.920 ^b	7.569 ^a	-8.657 ^a	-8.522 ^a	-4.664 ^b	-5.212 ^c	-1.160	-0.792						
# observations	2,437	2,437	2,437	2,437	2,437	2,437	1,217	1,217	1,217	1,217	1,217	1,217						
F	3.178 ^a	3.154 ^a	5.491 ^a	5.467 ^a	4.330 ^a	4.322 ^a	1.695 ^a	1.705 ^a	3.443 ^a	3.456 ^a	3.298 ^a	3.326 ^a						
(Pseudo) R ²	5.20%	5.17%	3.47%	3.50%	9.25%	9.70%	6.45%	6.45%	3.66%	3.65%	9.23%	9.61%						

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Informal sales						Formal auctions					
	Insider purchases		Insider sales		Net purchases		Insider purchases		Insider sales		Net purchases	
	cash	fin	cash	fin	cash	fin	cash	fin	cash	fin	cash	fin
Constant	-59.78 ^a (6.216)	-59.75 ^a (6.210)	-123.1 ^a (13.49)	-118.3 ^a (12.97)	4.113 (3.211)	1.985 (3.128)	-32.74 ^a (4.458)	-34.67 ^a (4.404)	-98.86 ^a (13.11)	-97.10 ^a (12.85)	5.676 ^c (2.961)	4.378 (2.882)
Pre-announcement	-2.077 ^c (1.230)	-2.895 ^a (1.050)	-2.781 (2.953)	-5.215 ^b (2.364)	0.052 (0.860)	1.074 (0.895)	1.050 (1.931)	0.306 (1.035)	-1.395 (5.013)	-2.408 (2.578)	-0.710 (2.174)	0.579 (1.080)
Target	0.601 (1.256)	-0.858 (0.895)	-2.424 (2.435)	-2.303 (1.947)	0.965 (0.802)	1.341 ^c (0.790)	-0.831 (1.500)	1.457 ^c (0.844)	-1.708 (3.197)	-2.116 (2.106)	0.623 (0.987)	1.448 ^c (0.834)
Target x pre-ann.	-3.927 ^b (1.815)	-1.979 (1.365)	-1.275 (3.720)	1.022 (2.888)	-0.819 (1.071)	-1.645 (1.056)	-4.265 (2.722)	-4.891 ^a (1.452)	0.917 (6.957)	-1.355 (3.277)	-1.744 (2.876)	-1.498 (1.298)
Deal characteristic	0.913 (1.143)	0.446 (1.449)	3.149 (2.683)	-7.467 ^a (2.724)	-1.464 (1.049)	4.125 ^a (1.004)	-1.882 (1.262)	-0.402 (1.134)	2.691 (2.714)	2.951 (2.975)	-1.660 (1.105)	-2.207 (1.570)
Deal ch.x pre-ann.	-1.911 (1.716)	-1.967 (2.063)	-2.720 (3.864)	2.176 (3.773)	0.830 (1.288)	-2.100 (1.221)	-1.735 (2.127)	-1.775 (1.674)	-1.933 (5.331)	-1.616 (4.107)	1.781 (2.322)	0.512 (2.020)
Deal ch.x target	-3.257 ^b (1.657)	-3.013 (1.971)	2.263 (3.314)	6.812 ^c (3.718)	-0.506 (1.260)	-3.776 ^a (1.346)	2.299 (1.681)	-1.055 (1.487)	-1.259 (3.742)	-1.604 (3.617)	1.494 (1.320)	1.151 (1.734)
Deal ch.x target x pre.	4.580 ^c (2.458)	4.743 (3.161)	2.529 (4.984)	-3.154 (5.339)	-0.368 (1.658)	3.262 ^c (1.727)	0.598 (2.911)	2.947 (2.286)	-3.172 (7.490)	-1.213 (5.479)	0.640 (3.133)	0.861 (2.463)
$CAR_{mit,6mb,ann.}$	-0.492 (0.925)	-0.462 (0.917)	3.551 ^c (2.149)	3.514 (2.152)	-3.286 ^b (1.314)	-3.248 ^b (1.307)	-0.304 (0.681)	-0.250 (0.682)	-0.887 (1.783)	-1.000 (1.800)	0.357 (0.847)	0.416 (0.849)
Pri. pro. length	8.121 ^a (0.683)	8.159 ^a (0.687)	18.32 ^a (1.524)	18.46 ^a (1.545)	-1.382 ^a (0.212)	-1.473 ^a (0.220)	4.508 ^a (0.536)	4.522 ^a (0.534)	11.89 ^a (1.448)	11.86 ^a (1.440)	-1.433 ^a (0.326)	-1.332 ^a (0.325)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Total effect by deal ch.	0.653	2.764	1.254	-2.130	-1.187	1.617	-3.667 ^a	-1.944	-2.255	-2.570	-1.104	-0.637
# observations	2,439	2,439	2,439	2,439	2,439	2,439	1,219	1,219	1,219	1,219	1,219	1,219
F	4.393 ^a	4.216 ^a	4.694 ^a	4.811 ^a	3.557 ^a	3.387 ^a	2.588 ^a	2.571 ^a	2.952 ^a	2.908 ^a	3.916 ^a	3.909 ^a
(Pseudo) R ²	11.60%	11.60%	8.91%	8.92%	9.60%	9.91%	6.15%	6.05%	5.24%	5.25%	10.00%	10.20%

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Panel B: Early pre-announcement period

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Informal sales				Net purchases				Formal auctions			
	Insider purchases		Insider sales		Net purchases		Insider purchases		Insider sales		Net purchases	
	cash	fin	cash	fin	cash	fin	cash	fin	cash	fin	cash	fin
Constant	-31.40 ^a (4.510)	-31.54 ^a (4.482)	-38.65 ^a (8.435)	-36.08 ^a (8.061)	-4.118 (3.811)	-5.721 (3.693)	-16.40 ^a (4.532)	-17.76 ^a (4.231)	-42.62 ^a (9.770)	-39.09 ^a (8.847)	3.210 (3.747)	1.851 (3.466)
Pre-announcement	-0.011 (1.228)	-0.591 (1.031)	-1.163 (2.831)	-1.910 (2.239)	1.079 (1.344)	1.802 (1.170)	2.067 (1.964)	1.503 (1.156)	2.642 (5.196)	0.546 (2.524)	-0.663 (2.660)	0.750 (1.232)
Target	0.281 (1.338)	-1.212 (0.974)	-3.561 (2.472)	-1.440 (1.946)	2.097 ^c (1.272)	1.321 (1.115)	-0.834 (1.553)	1.640 ^c (0.959)	-1.794 (3.326)	-2.365 (2.172)	1.215 (1.315)	1.663 ^c (0.992)
Target x pre-ann.	-5.108 ^a (1.802)	-3.579 ^a (1.363)	-0.443 (3.499)	-3.880 (2.643)	-2.235 (1.626)	-0.914 (1.368)	-6.743 ^b (2.767)	-7.257 ^a (1.705)	-1.287 (7.275)	-3.880 (3.260)	-2.350 (3.497)	-1.733 (1.529)
Deal characteristic	0.431 (1.238)	0.247 (1.530)	0.786 (2.802)	-8.499 ^a (2.530)	-0.384 (1.503)	6.127 ^a (1.276)	-1.702 (1.295)	-0.811 (1.176)	4.306 (3.069)	2.681 (3.399)	-1.589 (1.422)	-2.757 (1.885)
Deal ch.x pre-ann.	-0.863 (1.704)	0.392 (2.234)	1.977 (3.788)	9.791 ^b (4.461)	-1.196 (1.894)	-7.412 ^a (2.355)	-0.582 (2.150)	0.311 (1.819)	-2.457 (5.491)	0.001 (4.428)	1.742 (2.844)	0.076 (2.307)
Deal ch.x target	-3.087 ^c (1.766)	-2.207 (2.069)	5.049 (3.359)	5.748 ^c (3.421)	-2.744 (1.829)	-5.104 ^a (1.773)	2.710 (1.777)	-0.586 (1.649)	-2.326 (3.909)	-3.525 (3.853)	1.440 (1.646)	2.032 (2.030)
Deal ch.x target x pre.	3.234 (2.400)	2.586 (3.101)	-7.769 (4.721)	-7.803 (5.488)	4.624 ^b (2.328)	8.697 ^a (2.796)	-0.336 (2.895)	0.566 (2.469)	-3.444 (7.763)	-0.939 (5.577)	1.216 (3.776)	1.186 (2.944)
$CAR_{init.,1mb,ann.}$	-0.160 (1.046)	-0.134 (1.045)	4.149 ^c (2.197)	4.105 ^c (2.199)	-1.853 (1.278)	-1.812 (1.272)	-1.175 ^c (0.653)	-1.119 ^c (0.665)	-0.603 (1.463)	-0.731 (1.481)	0.360 (0.764)	0.430 (0.772)
Pri. pro. length	4.385 ^a (0.481)	4.384 ^a (0.483)	4.902 ^a (0.774)	5.024 ^a (0.785)	-0.108 (0.308)	-0.202 (0.312)	2.095 ^a (0.510)	2.121 ^a (0.503)	3.905 ^a (1.038)	3.860 ^a (1.014)	-0.928 ^b (0.454)	-0.790 ^c (0.440)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Total effect by deal ch.	-1.874	-0.993	-8.212 ^a	-11.68 ^b	2.389	7.783 ^a	-7.079 ^a	-6.691 ^a	-4.731	-4.819	-1.134	-0.547
# observations	2,437	2,437	2,437	2,437	2,437	2,437	1,217	1,217	1,217	1,217	1,217	1,217
F	3.399 ^a	3.286 ^a	4.207 ^a	4.128 ^a	3.431 ^a	3.497 ^a	1.653 ^a	1.600 ^b	2.214 ^a	2.140 ^a	3.805 ^a	3.654 ^a
(Pseudo) R ²	4.94%	4.91%	2.54%	2.56%	7.69%	8.12%	3.71%	3.67%	2.88%	2.87%	9.82%	10.20%

Panel C: Whole pre-announcement period

Table 3.6: Insider trading in target firms after the public announcement: deal initiation, selling mechanism, payment method and bidder type

This table reports estimation results of insider purchases (Columns 1 to 5), insider sales (Columns 6 to 10) and net purchases (Columns 11 to 15) in target firms after the public announcement date. The dependent variables are purchases, sales and net purchases (i.e. purchases minus sales) by top executives and independent directors measured as percentage of equity in base points. Regression of purchases and sales uses the left-censored Tobit model and regression of net purchases uses the OLS model. The data covers 1098 target and 1098 matched firms over the post-announcement and the control period. We report Hubert/White robust standard errors in brackets. All variables are defined in Appendix 3.6.1 and are winsorized at the 1st and 99th percentiles, except for all dummy variables. Both year and industry dummies are included in the regressions but are not reported. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Insider purchases					Insider sales					Net purchases				
	all	bid	inf	cash	fin	all	bid	inf	cash	fin	all	bid	inf	cash	fin
Constant	-34.83 ^a (3.751)	-34.10 ^a (3.765)	-34.02 ^a (3.810)	-32.23 ^a (3.933)	-34.66 ^a (3.754)	-49.60 ^a (5.965)	-50.54 ^a (6.038)	-49.70 ^a (6.093)	-48.95 ^a (6.645)	-48.11 ^a (5.993)	-6.132 ^a (2.355)	-5.629 ^b (2.394)	-5.203 ^b (2.331)	-6.718 ^b (2.759)	-6.644 ^a (2.411)
Post-announcement	0.291 (0.731)	-0.391 (1.117)	-0.812 (1.266)	-1.680 ^c (0.955)	0.233 (0.798)	1.397 (1.441)	4.524 ^b (2.220)	5.734 ^b (2.411)	-1.806 (2.089)	1.790 (1.659)	-0.504 (1.659)	-1.870 ^c (1.089)	-3.000 ^a (1.110)	0.723 (1.002)	-0.587 (0.815)
Target	-1.030 (0.667)	-2.673 ^b (1.063)	-1.683 (1.267)	-1.030 (0.976)	-0.770 (0.737)	-2.788 ^b (1.308)	-2.053 (2.138)	-2.659 (2.264)	-2.561 (1.985)	-2.186 (1.521)	1.272 ^b (0.597)	0.399 (0.982)	0.248 (0.910)	2.158 ^b (0.939)	1.361 ^c (0.712)
Target x post-ann.	-8.363 ^a (1.197)	-7.540 ^a (1.833)	-8.263 ^a (2.300)	-6.884 ^a (1.551)	-8.361 ^a (1.352)	-5.509 ^a (1.877)	-11.97 ^a (3.097)	-16.98 ^a (3.783)	0.339 (2.784)	-4.772 ^b (2.194)	-0.662 (0.835)	1.789 (1.280)	2.665 ^a (1.350)	-2.852 ^b (1.208)	-0.812 (0.997)
Deal characteristic		-1.526 (0.971)	-0.333 (1.064)	-2.030 ^b (1.017)	-0.040 (1.158)		2.298 (2.112)	2.476 (2.128)	-0.465 (2.208)	-0.560 (2.245)		-0.868 (1.043)	-2.041 ^a (0.988)	0.785 (1.136)	0.787 (1.106)
Deal ch.x post-ann.		1.291 (1.347)	1.631 (1.460)	3.084 ^b (1.308)	0.270 (1.553)		-5.391 ^b (2.737)	-6.333 ^b (2.835)	4.641 ^c (2.688)	-1.971 (2.893)		2.466 ^c (1.344)	3.704 ^a (1.354)	-1.767 (1.332)	0.440 (1.409)
Deal ch.x target		2.959 ^b (1.358)	0.960 (1.471)	0.017 (1.310)	-1.161 (1.651)		-1.306 (2.689)	-0.163 (2.742)	-0.336 (2.575)	-2.310 (2.928)		1.569 (1.234)	1.529 (1.187)	-1.260 (1.202)	-0.395 (1.288)
Deal ch.x target x post.		-1.491 (2.326)	-0.235 (2.655)	-2.344 (2.202)	0.043 (2.699)		10.87 ^a (3.958)	15.85 ^a (4.435)	-8.717 ^b (3.742)	-4.019 (4.444)		-4.375 ^a (1.670)	-4.967 ^a (1.698)	3.130 ^c (1.607)	0.607 (1.753)
Pub. pro. length	5.249 ^a (0.596)	5.259 ^a (0.596)	5.152 ^a (0.600)	5.017 ^a (0.612)	5.227 ^a (0.595)	5.549 ^a (1.003)	5.499 ^a (1.008)	5.342 ^a (1.002)	5.509 ^a (1.046)	5.499 ^a (1.002)	0.702 (0.427)	0.697 (0.433)	0.774 ^c (0.434)	0.714 (0.457)	0.717 ^c (0.429)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Total effect by deal ch.		-9.031 ^a	-8.498 ^a	-9.228 ^a	-8.318 ^a		-1.092	-1.132	-8.378 ^a	-8.791 ^b		-2.586 ^b	-2.302 ^b	0.278	-0.205
# observations	3,723	3,723	3,723	3,723	3,723	3,723	3,723	3,723	3,723	3,723	3,723	3,723	3,723	3,723	3,723
F	6.477 ^a	5.910 ^a	5.873 ^a	5.925 ^a	5.881 ^a	6.428 ^a	5.890 ^a	5.905 ^a	5.861 ^a	5.853 ^a	3.408 ^a	3.138 ^a	3.255 ^a	3.213 ^a	3.144 ^a
(Pseudo) R ²	6.55%	6.61%	6.59%	6.66%	6.56%	2.66%	2.75%	2.86%	2.73%	2.76%	4.50%	4.70%	4.84%	4.58%	4.62%

Table 3.7: Insider trading in target firms after the public announcement: reinforcing effects of deal initiation and method of payment on selling mechanism

This table reports estimation results of target insider purchases, sales and net purchases after the public announcement date in bidder initiated deals (Columns 1 to 3), target initiated deals (Columns 4 to 6), cash deals (Columns 7 to 9) and stock deals (Columns 10 to 12). The dependent variables are purchases, sales and net purchases (i.e., purchases minus sales) by top executives and independent directors measured as percentage of equity in base points. Regression of purchases and sales uses the left-censored Tobit model and regression of net purchases uses the OLS model. The data covers 1098 target and 1098 matched firms during the post-announcement and the control period. We report Hubert/White robust standard errors in brackets. All variables are defined in Appendix 3.6.1 and are winsorized at the 1st and 99th percentiles, except for all dummy variables. Both year and industry dummies are included in the regressions but are not reported. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Bidder initiated deals			Target initiated deals			Cash deals			Stock deals		
	Insider purchases	Insider sales	Net purchases	Insider purchases	Insider sales	Net purchases	Insider purchases	Insider sales	Net purchases	Insider purchases	Insider sales	Net purchases
Constant	-36.86 ^a (5.004)	-40.36 ^a (7.416)	-10.05 ^a (3.092)	-33.31 ^a (6.074)	-62.15 ^a (10.43)	1.152 (3.555)	-42.40 ^a (5.667)	-61.94 ^a (8.354)	-4.902 (2.981)	-17.10 ^a (4.220)	-26.29 ^a (8.638)	-7.692 ^c (4.490)
Post-announcement	1.653 (1.800)	1.434 (3.681)	-0.988 (1.851)	-1.923 (1.725)	8.612 ^a (3.263)	-4.015 ^a (1.409)	-0.545 (1.741)	6.954 ^b (2.969)	-3.731 ^a (1.256)	-2.130 (1.652)	0.187 (4.287)	0.553 (2.654)
Target	0.760 (1.873)	-6.635 ^b (3.302)	2.350 ^c (1.387)	-2.899 ^c (1.667)	-0.640 (3.033)	-0.668 (1.177)	-1.175 (1.657)	-2.159 (2.727)	-0.478 (0.957)	-2.997 (2.066)	-5.366 (4.195)	3.566 (2.537)
Target x post-ann.	-9.700 ^a (3.410)	-4.383 (5.658)	-1.341 (2.270)	-8.934 ^a (3.001)	-26.82 ^a (5.193)	4.883 ^a (1.677)	-11.76 ^a (3.223)	-20.33 ^a (4.627)	3.761 ^b (1.510)	-2.908 (2.768)	-8.146 (5.957)	-2.134 (2.909)
Informal sales	1.022 (1.404)	-0.076 (2.825)	-0.747 (1.450)	-0.078 (1.569)	3.535 (3.308)	-2.987 ^c (1.536)	-0.593 (1.491)	3.609 (2.675)	-2.821 ^b (1.143)	-1.791 (1.563)	-2.547 (4.041)	0.961 (2.628)
Informal x post-ann.	-0.756 (1.983)	-2.917 (4.034)	1.985 (2.048)	2.353 (2.213)	-7.818 ^c (4.408)	4.452 ^b (2.088)	2.946 (2.103)	-6.580 ^c (3.619)	4.419 ^a (1.635)	1.604 (1.815)	-1.130 (4.714)	0.034 (2.940)
Informal x target	-0.366 (2.043)	4.383 (3.667)	-0.627 (1.599)	-0.120 (2.201)	-3.184 (4.297)	2.511 (1.921)	0.001 (2.087)	-1.315 (3.571)	2.326 (1.435)	2.769 (2.153)	3.449 (4.532)	-1.814 (2.724)
Informal x target x post.	1.425 (3.698)	4.285 (6.226)	-1.586 (2.567)	1.083 (3.866)	24.26 ^a (6.629)	-6.016 ^b (2.544)	0.448 (3.946)	15.67 ^a (5.747)	-5.521 ^a (2.094)	-2.034 (3.018)	11.255 ^c (6.532)	-1.207 (3.199)
Pub. pro. length	5.569 ^a (0.783)	3.725 ^a (1.207)	1.723 ^a (0.582)	4.596 ^a (0.943)	7.834 ^a (1.723)	-0.714 (0.645)	6.132 ^a (0.862)	6.277 ^a (1.313)	0.653 (0.539)	3.342 ^a (0.768)	3.234 ^b (1.463)	1.324 ^c (0.800)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Total effect by deal ch.	-8.275 ^a	-0.098	-2.927 ^b	-7.851 ^a	-2.560	-1.127	-11.31 ^a	-4.657	-1.760	-4.942 ^a	3.109	-3.341 ^b
# observations	2,087	2,087	2,087	1,636	1,636	1,636	2,611	2,611	2,611	1,112	1,112	1,112
F	3.749 ^a	3.358 ^a	2.124 ^a	3.016 ^a	3.206 ^a	2.151 ^a	3.993 ^a	4.743 ^a	2.144 ^a	2.375 ^a	1.981 ^a	1.769 ^a
(Pseudo) R ²	8.10%	2.54%	5.89%	6.24%	4.20%	7.12%	7.04%	3.05%	4.41%	7.06%	3.62%	11.30%

Chapter 4

Acquirer Insiders' Trades around the Takeover Announcement Date

4.1 Introduction

Insider trading on material information has been widely discussed in the US, Europe and other countries. Insider trading regulation in the US that dates back to 1934 is one of the most restrictive and effective around the world.¹ Takeover targets are usually associated with a strong positive market reaction around the public announcement date, which provides a direct evidence of the effectiveness of insider trading restrictions before public releases of material

¹Insider trading is regulated by the Securities Exchange Act of 1934. Insider trading on material, non-public information is not allowed by Section 10b and SEC rule 10b-5 and Section 16a requires corporate insiders to report their trades to the SEC. Further, Section 16b of the Securities Exchange Act of 1934 limits round-trip trades within six-month. According to this rule, any profits earned by insiders on a round trip within any six-month period are required to be paid back to the firm. Corporate insiders are defined as officers, directors and blockholders owning at least 10% of a firm's stock.

information. Acquiring firms are, however, associated with small positive or even insignificant announcement stock abnormal returns.² This might rather suggest the ineffectiveness of insider trading regulations or the market's perception of low synergies.

Seyhun (1990) shows that insiders in acquiring firms increase their purchases and decrease their sales over one year before the public announcement, which indicates that insider trading restriction might not be effective. Boehmer and Netter (1997) however find that insider net purchases are not changed during 6 months before the public announcement of a deal. We contribute to the literature by focussing on insiders' trades even closer to the public announcement. Only at this point in time do all acquirers' participation in the takeover process seem to be more certain. In line with high legal jeopardy, we show that insiders reduce their purchases as the public announcement becomes more imminent. At the same time, acquirer insiders are willing to stop selling to profit from their material information without violating insider trading regulation. It seems that insiders are only confident about their own estimation of the synergy when closer to the deal announcement. More importantly, we show that acquirer insiders use their material information in a selective way. Their trading decisions differ depending on the information that they possess about the future deal during the negotiation process, which suggests that they consider some types of deals to be more profitable than others. The information also affects insiders' trading activity after the public announcement.

Buying another firm is an important investment and company development decision that potentially creates benefits for the firm. Insiders learn

²See Lorderer and Martin (1990), Moeller et al. (2004), Bradley and Sundaram (2006), Moeller et al. (2007), and Akbulut and Matsusaka (2010) for detailed results.

about their firm being ‘in play’ after they participate in the takeover process at or after the initiation date. Acquirer insiders might then decide to (not) buy or (not) sell depending on their own estimation concerning the net synergy, which is the difference between the expected synergy and the premium paid. Insiders also consider the effect of bidding winning probability. These three factors are uncertain and subjective, and most likely are affected by takeover deal characteristics. Therefore, we conjecture that insiders’ trades depend on the deal initiation, selling mechanism and method of payment.

As an additional contribution, we extend our analysis beyond the public announcement and conjecture that insider trading decisions after the public announcement also differ depending on deal characteristics. Insiders’ trades after the deal public announcement are mainly affected by the dispersion between insiders’ expectation of final net synergies and the market’s perception. Moreover, insiders take into account the risks of deal failure, possible offer improvement and their ownership dilution after the completion of a deal.

We analyze the open market stock trades by insiders in 627 publicly listed US acquiring firms over the period from 2005 to 2011. For the purpose of examining insider trading before and after the public announcement of takeover deals, we use the difference in differences approach relatively to matched firms and a control period. Our analysis of the pre-announcement period results in four main findings. First, insiders are stronger net buyers in deals sold in informal sales both before and after the public announcement. This evidence strongly supports the private value hypothesis. Gorbenko and Malenko (2013) argue that private value deals that are associated with informal sales can create higher synergies/value due to the specific asset fit between acquiring and target firms. Second, insiders are stronger net buyers in stock

deals during the pre- and post-announcement periods. This result provides an evidence for bidder overvaluation and long-term value creation hypotheses. Stock payment is preferred because acquirers can take advantage of target insiders sharing the overpayment cost (Hansen, 1987; Eckbo et al., 1990). At the same time, these stock takeovers can make expected long-run abnormal returns less negative and so a high perceived synergy/value would be essential (Shleifer and Vishny, 2003; Savor and Lu, 2009).

Third, the selling mechanism and payment consideration reinforce each other. We show that insiders are net sellers in cash deals that are sold in formal auctions both before and after the public announcement. It seems that insiders keep selling to avoid being cursed by their overvaluation of the target when they cannot share the overpayment cost with target insiders (Roll, 1986; Varaiya and Ferris, 1987; Hansen, 1987; Eckbo et al., 1990). For informal sales, insiders are stronger net buyers in stock deals before the public announcement but in cash deals after the public announcement. Cash deals that are associated with positive acquirer announcement returns (Bargeron et al., 2008; Savor and Lu, 2009) enhance the value creation by private value deals (Gorbenko and Malenko, 2013). Finally, despite a greater willingness to buy, net insider purchases do not differ between final acquirer versus other parties initiated deals during pre- and post- announcement periods. We interpret the finding as a result of the offsetting effect by lower takeover premium in other party initiated deals.

Overall, our results contribute to the literature on takeover value creation, neutral and destruction.³ Therefore, it would not be accurate to con-

³See Bradley et al. (1983), Bradley et al. (1988), Roll (1986), Jensen (1986) and Betton et al. (2008) for details.

clude that takeover deals are all associated with small market reaction.

This chapter extends the empirical literature on trades by acquirer insiders (Seyhun, 1990; Boehmer and Netter, 1997; Song, 2007; Akbulut et al., 2014). Seyhun (1990) finds that insiders increase their net purchases due to increase in purchases and drop in sales. Boehmer and Netter (1997) then document that insiders do not change their net purchases patterns around the public announcement. Moreover, Seyhun (1990) shows that net purchases are higher in deals paid by cash relatively to by stock while Song (2007) and Akbulut et al. (2014) figure out that insider sales increase in overpaid M&A deals before the public announcement. In the chapter, we make a precise definition of the pre- and post-announcement periods. We carefully code the initiation date of each deal and so we capture relatively more precise timing of insiders' acquisition of information concerning a possible takeover deal. Moreover, exact information concerning the timing of the selling process allows us to explore whether insiders trade on their material information since early in the selling process or only later, as their information concerning negotiation outcomes becomes more reliable. It also helps to explore whether insiders adjust their trading activities during the public selling process.

The reminder of the chapter is organized as follows. Section 4.2 explains in more detail the hypotheses of acquirer insider trading before and after the announcement date. Section 4.3 introduces the data, explains the coding and the matching process and provides basic statistics. Section 4.4 shows and discusses the regression results and Section 4.5 concludes.

4.2 Hypotheses

4.2.1 Insider trading in the pre-announcement period

At or after the M&A initiation date, acquiring firms actively approach or are contacted by the target firms to explore the interest of making an acquisition (Boone and Mulherin, 2011). Acquirer insiders then start to learn about a potential deal and estimate their expected net synergies, the expected difference between synergies and the premium paid to targets. The synergy and premium vary widely and would also differ depending on takeover deal characteristics. Therefore, our main conjecture is that insider trading decisions also depend on deal characteristics. In particular, we consider the deal initiation, selling mechanism and method of payment.

Seyhun (1990) shows that top managers of acquiring firms increase their net purchases before the takeover public announcement date due to increase in purchases and decrease in sales. However, Boehmer and Netter (1997) find no change in the trading patterns by all managers. Positive synergies can be created after completion of a takeover (Bradley et al., 1988) and acquirer insiders are overconfident about the takeover synergies (Roll, 1986; Malmendier and Tate, 2008). Therefore, acquirer insiders can benefit from increasing their purchases after participating in bidding for a target. However, insider trading on the material information of a potential takeover is illegal as acquirer stock prices would be affected by the takeover. In contrast, insiders can strategically choose to postpone their sales until the public announcement without violating any insider trading regulation and still profit on their private information. Acquiring firms usually involve taking part in a bidding process at the later stage of the takeover process, and thus usually, insiders could only decide to

reduce their purchases when closing to the public announcement. When it is at the beginning of the takeover process, on average, acquirer insiders might not learn about a potential takeover and thus do not change their purchases patterns. A similar effect holds for insider sales: acquirer insiders might also not change their sales pattern early in the selling process.

In contrast to Seyhun (1990) and Boehmer and Netter (1997), we consider the time effects by checking when the acquiring firm participates in the bidding process and build our first hypothesis as follows:

- HYPOTHESIS 1: *(a) As a result of insider trading regulation acquirer insiders decrease their purchases in the period close to the public announcement but do not stop buying in the early stages of takeover process.*
- (b) Acquirer insiders stop selling immediately before the public announcement but do not stop selling immediately after the deal initiation.*
- (c) As a result, insiders are net buyers only as the public announcement of the deal becomes imminent.*

Insiders' expected net synergy is mainly affected by their valuation concerning the target firms that could differ depending on deal characteristics. Estimated net synergies could be large in case acquirer insiders have high target valuation even though they are willing to pay high premium. However, insiders' trades might not always be in line with the estimated target valuation and could be affected by other important factors. Therefore, we also build alternative hypotheses. In the following text, we first provide hypotheses in terms of the target valuation and then argue for an alternative relationship. As each deal characteristics is associated with two alternative hypotheses, we do not state them explicitly. Our underlying hypothesis is as follows:

HYPOTHESIS 2: *Insider net purchases from deal initiation up to the public announcement differ depending on deal initiation, selling mechanism and payment consideration.*

Initiation. The selling process is usually initiated either by a prospective bidder, including the final acquirer or a third party, proposing to takeover the firm or the board of the selling company deciding that they want to be sold. We take into account the acquirers' willingness to buy and classify deal initiation into final acquirer initiation and other party initiation, including target and a third party initiation. Final acquirer initiated deals are usually associated with higher bidder valuations of target firms (Xie, 2010; Masulis and Simsir, 2015) and so higher expected net synergies. This is due to higher acquirers' willingness to buy from the beginning of the takeover process. At the same time, the uncertainty of a successful takeover is smaller in case the final buyer is the only bidder before the public announcement. Therefore, acquirer insiders in final acquirer initiated deals may be motivated to increase their net purchases. Alternatively, other parties initiation, especially target initiation, results in lower takeover premium (Aktas et al., 2010; DeBodt et al., 2014). Acquirer insiders in other parties initiated deals might expect higher net synergies and, therefore, be motivated to increase their net purchases.

Selling mechanism. Target firms could be sold using full-scale auctions, controlled sales or private negotiations (Boone and Mulherin, 2009). We classify selling mechanisms along the odds of winning that depends on the number of bidders into formal auctions and informal sales, which include controlled sales and private negotiations.⁴ A formal full-scale auction is associated with

⁴Note that our classification differs from the classification in Boone and Mulherin (2007) who contrast private negotiations against 'auctions,' which include controlled sales and full-

a very structured process that follows multiple designed rounds and accommodates relatively large number of bidders (Hansen, 2001). Controlled sales and private negotiations involve a smaller number of bidders. In controlled sales, target firms discretely canvass interest from a chosen and a limited number of bidders who then counter-bid each other, while private negotiations involve only one bidder (Boone and Mulherin, 2009). Informal sales takeovers are on average private value deals, and thus are associated with higher bidder valuations and higher expected net synergies. Gorbenko and Malenko (2013) argue that private value deals involve a smaller number of bidders because they depend on a specific asset fit between acquiring and target firms. At the same time, higher odds of winning in informal sales could be associated with higher probability of gaining a higher net synergy. In contrast, the fit in common value deals is not bidder specific, and thus more bidders that are able to create value in a similar way are attracted. Therefore, we conjecture that insiders in deals sold in informal sales rather than formal auctions are more motivated to increase their net purchases. Alternatively, formal full-scale auctions exhibit lower takeover premium (Fidrmuc et al., 2012a), which could increase expected net synergies. As a result, acquirer insiders in deals organized as full-scale auctions might be motivated to increase their net purchases.

Payment consideration. Seyhun (1990) finds that acquirer insiders in cash deals are more optimistic before the public announcement relatively to stock deals. Song (2007) and Akbulut et al. (2014) then figures out that insider sales increase in overvalued firms before the public announcement. Deals paid for in cash could be associated with higher bidder valuation of targets and higher expected net synergies. The reason for this could be that ac-

scale auctions.

quiring firms who choose cash payment are sufficient in cash reserves or/and less leveraged and have a higher growth prospect. Also, acquirers in cash deals usually suffer stock undervaluation (Shleifer and Vishny, 2003) and thus insiders would expect price increasing after a takeover, further increasing expected net synergies. Therefore, acquirer insiders in deals paid for in cash might be motivated to increase their net purchases. Alternatively, bidders prefer to pay for targets using their overvalued stock because they can benefit from the advantage of target shareholders sharing the overpayment cost (Hansen, 1987; Eckbo et al., 1990). Moreover, stock deals are associated with lower realized takeover premium (Huang and Walking, 1987; Eckbo and Langohr, 1989; Hayn, 1989), further increasing insiders' expected net synergies. In contrast, Jensen (1986) suggest that firms with high free cash flows have higher agency problems and, therefore, managers in cash deals could enlarge their firm size through a takeover for the purpose of personal benefits instead of firm's long-term synergies. This argument then suggests that it is the stock rather than cash deal firms whose insiders might be motivated to increase their net purchases.

4.2.2 Insider trading in the post-announcement period

Information concerning the acquisition of a firm together with deal characteristics is released at the public announcement date. Therefore, after the public announcement, acquirer insiders are relatively free to trade. Insiders' trades after the public announcement depend on the dispersion between insiders' expectation of final net synergies after a takeover and the market perception. The market reacts immediately after the public announcement of a takeover

and acquiring firms are associated with small positive or even insignificant announcement abnormal stock returns (Lorderer and Martin, 1990; Moeller et al., 2004, 2007; Akbulut and Matsusaka, 2010). This stock performance reflects the market's perception of smaller final net synergies. Overconfident acquirer insiders might, however, believe that the market undervalues potential net synergies (Roll, 1986; Malmendier and Tate, 2008). Therefore, in contrast to Boehmer and Netter (1997) who find no change of insider trading pattern, we conjecture that acquirer insiders might be motivated to buy or stop sell immediately after the public announcement. Our hypothesis concerning the post-announcement period is as follows:

HYPOTHESIS 3: Acquirer insiders increase their purchases and stop selling after the public announcement. As a result, insider net purchases are expected to increase after the public announcement.

The dispersion between insiders' view of the future synergies and the market perception is the main factor that could affect insiders' trading activity after the public announcement. Furthermore, insiders might also have intuition concerning the risks of deal failure, possible improved offers and their ownership dilution. All of these factors might depend on deal characteristics, in particular deal initiation, selling mechanism and method of payment. As in section 4.2.1, for each deal characteristic, we provide arguments for two alternative hypotheses. Our underlying hypothesis is the following:

HYPOTHESIS 4: Insider net purchases after the deal public announcement differ depending on deal initiation, selling mechanism, payment consideration.

Initiation. Final acquirer initiation usually represents higher final buyers' willingness to acquire. Therefore, acquirer insiders might be confident in future synergies that could be created after deal completion relatively to market's perception at the announcement date and then intent to increase their net purchases. At the same time, however, a greater willingness to buy in final buyer initiated deals might also be associated with increased bids or/and higher risks of deal completion due to more competition (e.g., white knights) after the public announcement. Therefore, insiders in other parties initiated deals might be motivated to increase their net purchases.

Selling mechanism. Acquirers in informal sales are quite cautious in evaluating and paying for targets' value as they require specific asset fit between their firm and the selling company (Gorbenko and Malenko, 2013). Therefore, informal sales are associated with lower overpayment costs and higher future synergies. In contrast, the hubris theory argues that winning bidders in full-scale auctions are more likely to be cursed by their overvaluation of the target (Roll, 1986; Varaiya and Ferris, 1987). If acquirer insiders in informal sales believe higher final net synergies relatively to the market's perception, they might be motivated to increase their net purchases. Alternatively, after a pre-determined takeover process, full-scale auctions are associated with relatively certain winning bidder and offered price which are rarely changed during the public selling process after the public announcement. Therefore, insiders in the winning firm expect larger odds of deal completion. In contrast, firms participating in informal sales might face higher probability of competition after the deal announcement and thus could involve higher risks of failure. For the purposes of successfully completing the deal, acquiring firms might need to increase their bid, which could further reduce the expected net

synergies. If insiders perceive the different risks of failure and levels of offer improvement, acquirer insiders in firms participating in formal auctions rather than informal sales might be motivated to increase their net purchases.

Payment consideration. Acquiring firms in stock deals usually suffer negative announcement stock abnormal returns due to market's perception of stock overvaluation before the announcement (Shleifer and Vishny, 2003; Rhodes-Kropf et al., 2005). At the same time, acquirer insiders might expect negative long-term abnormal returns but takeovers could make these returns less negative (Shleifer and Vishny, 2003; Savor and Lu, 2009). Consequently, a high perceived synergy would be essential and acquirer insiders might be motivated to increase their net purchases. In contrast, cash deals exhibit relatively high bidder announcement stock prices and thus motivate acquirer insiders to sell. Furthermore, issuance of new acquirer's shares in stock deals at the completion date could dilute acquirer insiders' ownership after the takeover (Faccio and Masulis, 2005), further motivating acquirer insiders to increase their ownership after the public announcement. Alternatively, cash deals offer a more certain and fixed price and are also less volatile in the odds of deal completion. Under the circumstances of market perceived positive synergies, acquirer insiders in deals paid for in cash might be motivated to increase their net purchases.

4.3 Data

Our main focus is to analyze insider trading in acquiring firms before and after takeover public announcement depending on deal characteristics, including deal initiation, selling mechanism and method of payment. The sample

includes US M&A deals that were announced between January 2005 and December 2011 and are covered by the Security Database Corporation (SDC) in Thomson ONE Banker. We apply the following 4 selection criteria: (i) both the acquirers and targets are US companies; (ii) all targets are publicly listed firms before the deal while acquirers could be publicly listed or private firms; (iii) the acquirers own 100% of targets' shares after the deal; (iv) acquirers have data in COMPUSTAT and CRSP concerning accounting and stock price data. We hand collect and code information concerning the selling process from the 'background of the deal' section of DEFM14A, PREM14A, SC14D9, or S-4 filings, which we recover from the EGDAR filing collection provided by the SEC. We hand collect information concerning initiation, private date, selling mechanism, number of bidders contacted and the number of bidders signing a confidentiality agreement. For our acquiring firms of all M&A deals over the period 2005-2011, out of 2003 deals identified in SDC we are able to find SEC filings on EDGAR for 1260 deals. For further 103 deals, we are not able to classify the initiator. Finally, we are not able to get data from Compustat or CRSP for 530 acquirers.⁵ All together, the data collection results in a sample of 627 deals of acquirers.

4.3.1 Deal and acquirer characteristics

We classify deal initiation into final acquirer or other parties initiation, including target and a third party initiation, depending on final buyers' willingness to buy. A deal could be sold in formal full-scale auction or an informal sale. We classify controlled sales and private negotiations together in one category

⁵We are not able to get data from CRSP for 410 private acquirers. For further 120 acquirers, we are not able to get data from COMPUSTAT or CRSP.

as they are associated with higher odds of bidder winning. Acquiring firms can pay for target firms by cash or by stock, including partial stock and pure stock payments.

Table 4.1 displays the selling process summary statistics. Column 2 shows the means for all deals and the significance. Further, we show means separately for final acquirer versus other parties initiated deals in Columns 3 and 4, respectively, and report the significance of the difference in Column 4. Columns 5 and 6 display means for deals sold through informal sales versus formal full-scale auctions. Means for cash versus stock deals are reported in Columns 7 and 8 while for informal sales paid for in stock versus formal auctions paid for in stock in Columns 9 and 10. Variable definitions are provided in Appendix 4.6.1. We test for differences in means using the t-test allowing for unequal variances.

- insert Table 4.1 about here -

Column 2 shows that the transaction value for public acquiring firms is on average USD2.2 billion which is 31% of acquirer market capitalization at the completion date. The final premium paid to target firms, relatively to the price 8 weeks before the public announcement, is positive (35%) for the full sample. The premium is slightly smaller (34%) when we consider the initial offer instead of the final offer. This indicates a slight increase (1%) of final offer price at the completion date relatively to the initial offer price at the public announcement. Table 4.1 further shows abnormal stock returns over different windows over 2 year period before the initiation and over different windows from the initiation date up to the public announcement. We see positive stock returns in the pre-initiation period and the return drops as the

deal initiation becomes more imminent. Stock returns are positive from the initiation date up to 1 day before the announcement and the returns increase when closer to the public announcement. The announcement effect measured as a 3 days abnormal return around the announcement date is negative (-1%) and significant at the 1-percent level. Stock returns over the whole post-announcement period are negative (-2%). We further see positive short-term synergies but insignificant one-year future synergies measured as Fama-French 3-factor adjusted monthly calendar-time portfolio abnormal returns (Fama and French, 1993).

Next, we show strongly large and positive total assets and market capitalization in one fiscal year before the pre- and post-announcement period and their corresponding control periods. The book to market ratios of equity over 4 different periods are on average 0.50, indicating higher growth prospects of acquiring firms. The mean private, public and whole selling process lengths are 360, 126 and 486 calendar days, respectively. The average number of bidders, including acquiring firms, contacted by and sign confidentiality agreements with a target firm is 14 and 5, respectively. 50% of deals with public acquiring and target firms are paid for in cash. 25% of deals are sold in full-scale auctions, 41% in controlled sales and 34% in private negotiations. Moreover, we classify a deal as target initiated if the target firm firmly decides on a sale or at least hires a financial advisor to identify and contact potential bidders. Finally, column 2 reveals that 43% of deals are initiated by targets and 37% are initiated by the final acquiring firms.

Columns 3 and 4 show that final acquirer initiated deals are larger in transaction value (USD2.9 billion) relatively to other parties initiated deals. They also exhibit larger relative size (0.36 versus 0.28), higher premium (41%

versus 32%) and higher initial premium (39% versus 31%). We also see that final acquirer initiated deals are associated with a larger offer improvement relatively to other parties initiated deals (1.2% versus 0.5%). Acquirer abnormal returns over the 2 year period before the initiation are significantly larger in final acquirer initiated deals. The stock performance during the private selling process is, however, not different for the 2 groups of deals. We also do not see any difference in terms of acquirer abnormal returns from 1 day before the public announcement to the completion and short-term synergies. Final acquirer initiated deals are associated with larger one-year future synergies (0.1% versus -0.3%). Moreover, the 2 partitions do not exhibit difference in total assets, market capitalization and book to market ratio.

Concerning deal characteristics, final acquirer initiated deals take on average fewer days from the initiation date to the public announcement (245 versus 429 days) and to the completion (383 versus 547 days) but stay longer in the public selling process (139 versus 118 days). They contact and sign a confidentiality agreements with smaller number of bidders (4 versus 20 and 2 versus 7, respectively). The majority of final acquirer initiated deals are sold in private negotiations (71% versus 12%), but less frequently sold in full-scale auctions (5% versus 38%) or controlled sales (24% versus 50%).

Columns 5 and 6 show that deals sold through informal sales are notably larger (USD2.6 billion) relatively to formal auctions (USD0.9 billion) while their relative sizes are not different. In line with Fidrmuc et al. (2012b) and Fidrmuc and Moeller (2015), acquiring firms pay higher premium (37% versus 28%) and higher initial premium (36% versus 28%) in deals sold using informal sales. Acquirer abnormal returns are higher over the 2 year period before the initiation (20% versus 9%) but smaller from the initiation to 4 months

before the public announcement (4% versus 9%). They are not different over other windows from initiation to the public announcement for the 2 groups of deals. We also do not find a significant difference in the announcement effect and stock performance during the public selling process. Informal sales are associated with larger total assets and market capitalization, but smaller growth prospect before the public announcement due to the larger book to market ratio. In terms of deal characteristics, we see that deals sold through informal sales take on average a shorter time from the initiation date to the public announcement (321 versus 475 days) and to the completion (455 versus 576 days) but longer from the public announcement to completion (134 versus 101 days). The average number of bidders contacted (5 versus 41) and signing a confidentiality agreement (2 versus 14) is significantly lower for informal sales. Deals sold using informal sales are less often paid for by cash (45% versus 66%). They are less frequently target initiated (34% versus 70%) and are more often final acquirer initiated (48% versus 7%).

Deals could be paid in cash or stock. The first variable in Columns 7 and 8 shows that cash deals are significantly smaller (USD1.4 billion) relatively to stock deals (USD3.0 billion). They also exhibit smaller relative size (17% versus 45%) but pay higher premium (42% versus 27%) and initial premium (41% versus 26%), consistent with Hazelkorn et al. (2004) and Ling and Petrova (2008). We do not see any difference in improving offers for cash versus stock deals. Acquirer abnormal returns are smaller in cash deals over the 2-year period before the initiation and during the private selling process. They are even negative as the public announcement becomes more imminent. Furthermore, cash deals are associated with higher acquirer stock performance around the announcement date (0% versus -2%) and during the public sell-

ing process (-1% versus -4%). They also exhibit higher short- and long-term synergies (2% versus 1% and 0% versus -0.2%, respectively). These statistics suggest that acquirers' stock before the public announcement is undervalued for cash deals but is overvalued for stock deals. Furthermore, cash deals exhibit larger acquirer total assets and market capitalization and smaller book to market ratio which implies higher growth prospect. They stay fewer days in the public selling process (96 versus 155 days) but their private or whole selling processes are not different. The number of bidders contacted (17 versus 11) and signing a confidentiality agreement (7 versus 4) is significantly larger for cash takeovers. Deals paid for by cash are more often sold in formal auctions (33% versus 17%) but less frequently in private negotiations (26% versus 42%).

We also introduce 2 additional partitions of deals, informal sales paid for in stock and formal auctions paid for in cash. Stock deals sold in informal sales are sizeably larger (USD3.2 billion) relatively to cash deals sold in full-scale auctions (USD0.5 billion). They are also associated with larger relative size (45% versus 16%) but the premiums are not different. Acquirer abnormal performance before the initiation is not different for the 2 groups of deals but the returns are larger during the 6 months period before the public announcement for informal sales paid for in stock. Stock deals sold in informal sales suffer smaller and even negative announcement effect (-2% versus 0%) and acquirer stock returns during the public selling process (-4% versus 1%), but the short- and long-term synergies are not different. They exhibit smaller market capitalization before the pre- and post-announcement period and larger book to market ratio, so smaller growth prospect. In terms of deal characteristics, stock deals sold in informal sales take fewer days from the initiation date to

the public announcement (324 versus 489 days) and to the completion (483 versus 570 days) but longer from the announcement to completion (159 versus 81 days). They contact and sign confidentiality agreements with significantly smaller number of bidders (5 versus 40 and 2 versus 15, respectively). They are less frequently initiated by targets (39% versus 63%) and more often initiated by final acquirers (47% versus 10%).

4.3.2 Summary statistics for insider trading

Insider trading is from Thomson Financial Insider Filings Data, Table 1, which contains corporate insider non-derivatives transactions required to be reported via Form 4 by Section 16 of the Securities Exchange Act of 1934. We have information on the transaction date, transaction price, number of shares traded, person ID, firm ID, company name, resulting shares held and transaction code (purchase or sale). We exclude inaccurate or unreasonable filings ⁶ and transactions labeled as amendments of previous insider transactions ⁷ (Agrawal and Nasser, 2012). If a transaction price is missing, we replace it with the CRSP closing price on the transaction date. We merge multiple purchases (sales) by the same insider on the same transaction date in the same company. We are interested in examining insider purchases and sales separately and, therefore, we keep both purchases and sales transacted on the same day separately. We also compute insider net purchases as purchases minus sales by the same insider on the same transaction date in the same firm (Agrawal and Nasser, 2012).

It is very important in our analysis to compare insider purchases and

⁶They are indicated by the Cleanse Indicator as "A" or "S".

⁷They are indicated by the Amendment Indicator as "A".

sales in the pre- and post-announcement period to a non-event period within the same firm. Concerning insider trading during the private selling process before the public announcement, we take the initiation date as the cut-off point when defining the pre-announcement and the control periods. Bidders start to enter the selling process and obtain information of a potential takeover together with deal characteristics at the initiation date. The pre-announcement period is the time from the deal initiation date to the public announcement date. Because insider trading depends on the length of the private selling process and also varies within a year, we define the control period as a one-year period before deal initiation in case the pre-announcement period takes one year or longer. In case the private selling process is shorter than one year, the control period is matched in length and the time of year, e.g. it is from one year before the initiation date to one year before the announcement date. In terms of insider trading during the public selling process, the post-announcement period is defined from the public announcement date to the completion date. The corresponding control period is a one-year period before the initiation date in case the public selling process takes one year or longer. It is the period of the same length as the public selling process ending at the initiation date in case the post-announcement period is shorter than one year.

Then we compare the change in insider trading in acquiring firms relatively to change in insider trading in matched firms that do not experience any takeover and remain publicly listed. The purpose is to adjust the overall change/difference in acquirer insider trading for the ‘normal’ outcome, that is the change/difference in insider trading in firms that do not experience any information shock but are similar to the treatment (acquiring) firms and operate over the same period of time. The change/difference in insider trading from

the control period to the event period for the matched firms then measures the ‘normal’ effect. We use it to adjust the overall acquiring firms’ effect to get a clean treatment effect that is free of any time trends. This is the essence of the difference in differences approach.

We match based on the industry and firms’ total assets just before the initiation date (Shrieves and Stevens, 1979; Agrawal and Nasser, 2012). Our matching procedure is as follows. From the pool of all potential matching firms with available accounting, stock price and insider trading data, we pick the firm that is in the same Fama-French 30 industry and comes the closest in terms of total assets in the same fiscal year using a $\pm 25\%$ range. In case we fail to find a matching firm, we repeat the process for the corresponding Fama-French 12 industry. If we still do not have a match, we apply the 4-digit SIC code industry and then the 3-digit, 2-digit and finally 1-digit SIC code industry. We also require that the same publicly listed firm is not matched repeatedly to different acquiring firms and that those acquirers dropped out from our data set due to unavailable SEC filing data are not included as matched firms.⁸

We focus on trading by top executives and independent directors. Top executives manage their firms’ day to day operations and thus should possess the most accurate information in terms of firm value and future prospects (Seyhun, 1986; Fidrmuc et al., 2006). Independent directors should also be informed about the value and prospects of their firms as they monitor top executives’ work and are quite pivotal in takeover decisions. Combining the 2 types of insiders creates a well informed and relatively well populated group

⁸All together, 509 acquiring firms are matched based on FF30 industry, 82 based on FF12, 5 based on 4-digit SIC, 4 based on 2-digit SIC and finally 27 based on 1-digit SIC.

for our analysis. We use two proxies to measure insider trading: \$ shares traded (dollar value of shares traded in USD millions) and % equity traded (number of shares traded as a fraction of shares outstanding in base points). For all the 4 studied periods, we aggregate all shares bought (sold) by the top executives and independent directors over the whole period and then divide them by the length of the period in months. We do this re-scaling on a monthly basis because the length of the pre- and post-announcement periods and their corresponding control periods varies from deal to deal.

Table 4.2 shows insider purchases and sales for the pre-announcement period. For acquiring firms, means for the pre-announcement versus the control period are reported in Columns 1 and 2. For matched firms, Columns 3 and 4 document means for the corresponding two periods. The next three columns report differences in means and their significance and the last column displays the difference in differences. We first show the results for all deals and then by the four deal characteristics: final acquirer initiated versus other parties initiated deals, deals sold through informal sale versus formal auction, cash versus stock deals and informal sales paid for in stock versus formal auctions paid for in cash. The two insider trading measures are reported on monthly basis and are winsorized at 1% and 99%.

- insert Table 4.2 about here -

The significant difference reported by Panel A comes from the dollar shares measure. For all deals, we see that acquirer insiders decrease their purchases during the pre-announcement period relatively to the control period but not to matched firms. Insiders in matched firms do not change their purchases in the pre-announcement versus the control period. The difference

in differences is also significantly negative. Reduction of insider purchases in acquiring firms before the public announcement is in line with legal jeopardy. Concerning deal characteristics, Panel A documents that acquirer insiders in only stock deals significantly reduce their purchases in the pre-announcement period relatively to the control period. Insider trading in acquiring firms before the announcement is however not significantly different relatively to matched firms for all 8 partitions. The last column shows that the difference in differences is significantly negative for deals initiated by the final acquirer or sold using informal sales or/and paid for by stock.

Dollar shares measure in Panel B shows that acquirer insiders in all deals significantly increase their sales relatively to matched firms but not to the control period. Insider sales in matched firms do not change in the pre-announcement versus the control period. The last column documents positive and significant difference in differences. These statistics become negative and insignificant when we consider percentage of equity measure that also includes firm size effect.

In terms of deal characteristics, we see in Panel B that acquirer insiders increase their sales (significant only for the dollar shares measure) during the pre-announcement period relatively to the control period only in cash deals. Relatively to matched firms, insider sales before the announcement are significantly larger in deals sold through informal sales or/and paid for by cash. Interestingly, insiders in matched firms for deals sold in formal auctions or/and paid for in cash decrease their sales in the pre-announcement period relatively to the control period even though they are significant only for the percentage of equity measure. This is mainly due to the significantly smaller market capitalization before the control period for matched firms of deals sold in formal

auctions.⁹ As a result, the last column shows that the difference in differences is positive and significant for deals sold in formal auctions or/and paid for by cash. It is negative and significant for stock deals or deals sold in informal sales and at the same time paid for in stock.

Table 4.3 reports insider purchases and sales in acquiring firms during the post-announcement period. Similarly to Table 4.2, we show means of insider trading for acquiring and matched firms for the post-announcement and the control period. For comparison reasons, we also report pre-announcement trading. With respect to differences in means, we report the differences for acquiring firms over the post-announcement period relatively to both the control and pre-announcement period and also to the matched firms. The difference in post-announcement period relatively to the control and pre-announcement periods is repeated also for the matched firms. The last column shows the difference in differences between target versus control firms. We again report insider trading for all deals and for the 8 partitions by deal characteristics. Both measures of insider trading are on monthly basis and are winsorized at 1% and 99%.

- insert Table 4.3 about here -

Panel A reports acquirer insider purchases and we see that differences in means are not significant for all deals. During the post-announcement period, acquirer insiders significantly increase their purchases in stock deals while significantly reduce their purchases in cash deals sold in formal auctions relatively to the control period. They also significantly increase their purchases in other parties initiated or stock deals relatively to matched firms. These

⁹These statistics are not reported, but are available on request.

statistics are significant only for the percentage of equity measure. Insider purchases in matched firms do not change in the post-announcement period relatively to the control and pre-announcement periods. The last column shows that the difference in differences is however not significant for all deals and all 8 partitions.

Panel B displays insider sales and shows that differences in means analyzed below are significant mostly for the percentage of equity measure, except for additional instructions. For all deals, we see that insiders in acquiring and matched firms decrease their sales in the post-announcement versus the control period, so no significant difference in differences. Concerning deal characteristics, we find that acquirer insiders significantly reduce their sales in 3 partitions, deals sold in informal sales or/and paid for by stock, after the public announcement relatively to the control period. The difference is positive for cash deals sold in formal auctions, though they are significantly only for the dollar shares measure. Furthermore, acquirer insiders in cash deals sold in formal auctions significantly reduce their sales in the post- versus pre-announcement period for both two measures. Relatively to matched firms, insiders stop selling in stock deals with/without being sold in informal sales during the post-announcement period but do not stop selling in formal auctions paid for in cash. For matched firms, Panel B shows that insiders significantly decrease their sales during the post-announcement period relatively to the control period in 5 partitions, final acquirer initiated, formal auctions or/and paid for in cash and stock deals. These effects are mostly due to a smaller market capitalization before the control period for matched firms in other parties initiated or formal auction or cash deals.¹⁰ The difference is how-

¹⁰These statistics are not reported, but are available on request.

ever not significant relatively to the pre-announcement period all 8 partitions. Consequently, the difference in differences in the last column is positive and significant for 3 partitions, deals sold in formal auctions or/and paid for by cash.

4.4 Results

Tables 4.4 to 4.7 report our results for insider trading patterns in acquiring firms before and after the M&A public announcement date depending on the deal initiation, selling mechanism and method of payment. For each table, insider purchases, sales and net purchases by top executives and independent directors are measured as a fraction of common equity in base points and all are re-adjusted on a monthly basis. We believe that scaling the number of shares traded by all shares outstanding provides the best insider trading measure as it incorporates both the trading volume as well as firm size. All regressions include the following control variables: natural log of market capitalization, book to market ratio, volatility of daily stock returns, change in volatility of daily stock returns, market-adjusted average daily abnormal returns lagged 1, 2, 3 and 4 quarters relatively to the studied period, insider ownership, R&D over total sales, liquidity, time and industry dummies.¹¹ Insider purchase and sale regressions are estimated using a left-censored Tobit model while net purchase regressions are estimated using OLS. We report Hubert/White robust standard errors in brackets.

¹¹Coefficients for control variables are not reported in the tables to preserve space, but are available on request. The estimated values are consistent with the literature concerning insider trading (Seyhun, 1986; Aboody and Lev, 2000; Lakonishok and Lee, 2001).

4.4.1 Results for pre-announcement insider trading

Table 4.4 shows the results for insider trading before the takeover announcement. To test HYPOTHESIS 1, we partition the pre-announcement period into the 2-month period immediately before the public announcement and the early pre-announcement period and report the results for these two subperiods in Panel A and Panel B, respectively. Panel C reports results for the whole pre-announcement period, starting at the initiation date. We include three additional control variables that are not considered in the literature so far: the abnormal stock return during the pre-announcement period, takeover transaction value as a fraction of acquirer market value and the period length.¹² Insider purchases are reported in Columns 1 to 4, insider sales in Columns 5 to 8 and insider net purchases in Columns 9 to 12.

Column 1 in Panel A reports the results for insider purchases immediately before the public announcement. The interaction term ‘acquirer x pre-announcement’ shows the clean difference in differences effect.¹³ It is negative and significant at the 1-percent level showing that acquirer insiders significantly decrease their purchases during the last 2 months before the public announcement. In line with HYPOTHESIS 1a, the reduction in purchases is likely due to strict legal restrictions in the post-SOX environment. At the same time, the interaction term in Column 5 shows that insider sales also drop significantly, which is consistent with HYPOTHESIS 1b. It seems that

¹²We see that insider purchases increase and sales increase more when the pre-announcement period is longer. It seems that acquirers do not participate in the takeover process when it is so far to the public announcement and thus insiders are relatively more free to trade.

¹³The interaction term shows the difference in differences effect as ‘acquirer’ stands for a dummy variable for acquirers versus matched firms and ‘pre-announcement’ is the dummy variable for pre-announcement versus control period.

insiders for all takeovers are quite certain in estimating the expected net synergy when it is only 2-month before the public announcement and stop selling. Overall, acquirer insiders do not change their net purchases: the interaction term in Column 9 is positive but not significantly different from zero, which is inconsistent with HYPOTHESIS 1c. Insiders reduce their purchases and sales to the same extent and thus overall do not benefit from the private information that they possess immediately before the public announcement.

Columns 2 to 4 explore the effect of deal characteristics on insider purchases immediately before the public announcement. In order to show differing effects of insider trading depending on individual deal characteristics in the difference in differences approach, we have to include a set of additional interaction terms. Ultimately, we are interested in the triple interaction term ‘deal characteristic x acquirer x pre-announcement’ and its sum with the plain interaction term ‘acquirer x pre-announcement’ that is reported at the bottom of the panel under the heading ‘total effect by deal characteristic.’

The effect of deal initiation is reported in Column 2. The plain interaction term is significantly negative while the triple interaction term is not significant: insider purchases drop in other parties initiated deals and this drop is not significantly different relatively to final acquirer initiated deals. The total effect which represents the overall insider purchases patterns in final acquirer initiated deals is significantly negative, suggesting that insiders also lower their purchases significantly in final acquirer initiated deals. Columns 3 and 4 show similar results for deals sold in informal sales and paid for in stock, respectively.

Columns 6 to 8 report insider sales depending on the three deal characteristics. The plain interaction terms show that insiders increase their sales

in formal auctions and do not stop selling in final acquirer initiated and cash deals. The triple interaction terms are significantly negative in Columns 7 and 8: the selling mechanism and payment consideration matter for insider sales. The overall effect is negative and significant for all three deal characteristics: final acquirer initiated, informal sales and stock deals.

- insert Table 4.4 about here -

Columns 10 to 12 report net purchases and show some interesting results. First of all, the selling mechanism and payment method do exhibit significant differences in net insider purchases: both the triple interaction terms are significantly positive in Columns 11 and 12, which supports HYPOTHESIS 2. The difference suggests that insiders' estimation of expected net synergies and other takeover benefits differ depending on the deal characteristics. Secondly, larger net insider purchases in deals sold in informal sales rather than formal auctions are in line with higher expected net synergies that can be created by private value deals. Insiders in stock (versus cash) deals increase their net purchases, which alternatively supports the bidder stock overvaluation hypothesis. The results is contradictory to Seyhun (1990), Song (2007) and Akbulut et al. (2014). It rather indicates that insiders aim to take advantage of target insiders sharing the overpayment cost (Hansen, 1987; Eckbo, 2009). No difference of net insider purchases for initiation indicates that higher willingness to acquire for final acquirer initiated deals might even out the lower premium for other parties initiated deals. Finally, we see in Column 11 that insiders increase their net sales in deals sold in formal auctions and they increase their net purchases in deals sold in informal sales: the plain interaction term is significantly negative and the total effect is significantly positive. Insiders seem

to be quite confident about future synergies associated with specific assets fit (Gorbenko and Malenko, 2013).

Panel B reports the results for insiders' trades during the early pre-announcement period, that is from the initiation date up to 2 months before the public announcement. Column 1 shows that overall acquirer insiders do not stop buying when it is still far to deal announcement, which supports HYPOTHESIS 1a. Neither the result is affected by deal characteristics (Columns 2 to 4). The result suggests that final buyers are on average not participating in the takeover process at this point in time, or are more lenient with rules when they actively initiate a deal. For insider sales, we see in Column 5 that overall acquirer insiders do not stop selling but deal characteristics do matter. The triple interaction terms in Columns 7 and 8 are significantly negative: insiders significantly decrease their sales in informal sales versus formal auctions and stock versus cash deals. The total effect is significantly negative for stock deals.

Finally, Column 11 shows that insiders in formal auctions increase their net sales rather than purchases. The triple interaction term is significantly positive: insiders increase their net purchases in informal sales relatively to formal auctions. This might be due to higher odds of winning associated with informal sales and higher expected net synergies. A similar effect holds for the payment consideration. Net insider sales increase for cash deals suggesting that insiders' diversification and liquidity needs prevail at the beginning of takeover process. Net insider purchases increase for stock versus cash deals, which further supports overvaluation of bidders' stock hypothesis. Panel C shows insider trading over the whole private selling process. The results are similar relatively to Panel A, but due to the weaker effect in the early pre-announcement period

(Panel B), the overall effect over the whole pre-announcement period is a bit weaker. One exception is that insiders in cash deals significantly increase their net sales in the whole pre-announcement period due to the stronger effect in the early stage of private selling process (Panel B).

Table 4.5 further explores the possible reinforcing effects between selling mechanism and method of payment. In particular, we separately report insider trading effects depending on the payment consideration in firms sold in informal sales in Columns 1 to 3 versus in firms sold in formal auctions in Columns 4 to 6. Target firms determine a particular selling mechanism shortly after the initiation date. Informal sales are usually associated with stock deals while formal auctions are more often paid for in cash (Fidrmuc et al., 2012b).¹⁴ Similar to Table 4.4, Panels A, B and C report results for the period immediately before the public announcement, early pre-announcement and the whole pre-announcement period, respectively.

- insert Table 4.5 about here -

Panel A reports the results immediately before the public announcement. Insiders in stock deals sold in informal sales stop buying and at the same time stop selling even more: the total effects are significantly negative in Columns 1 and 2. Therefore, the total coefficient (Column 3) is significantly positive, showing that these insiders increase their net purchases. For formal auctions, insider purchases drop in stock deals: the total coefficient in Column 4 is significantly negative. The plain interaction term in Column 5 is significantly positive showing that insiders increase their sales in cash deals. As a

¹⁴We see in Table 4.1 that 95% of final acquirer initiated deals are sold in informal sales and the reinforcing effect of across the two characteristics does not lead to any interesting results.

result, insiders in deals sold in formal auctions increase their net sales rather than purchases, independent of the payment consideration during the 2-month before the public announcement. The results suggest that private value deals reinforce the effect of the overvaluation of bidder hypothesis (Gorbenko and Malenko, 2013; Hansen, 1987; Eckbo, 2009). Insiders seem to profit from sharing target insiders the overpayment cost only when they are confident about higher future net synergies. This effect however does not present for stock deals sold in formal auctions. In cash deals sold in formal auctions involving a large number of bidders, insiders might expect an increasing stock price due to information leakage as the public announcement becomes more imminent and their diversification or/and liquidity needs prevail.

Panel B still shows some interesting results in the period after deal initiation. The triple interaction term in column 3 is significantly positive: insiders increase their net purchases in stock (versus cash) deals sold in informal sales due to drop in sales. Even in the early pre-announcement period, insiders seem to believe that private value deals can create higher future synergies associated with larger odds of winning and at the same time they can take advantage of target insiders sharing the overpayment cost (Gorbenko and Malenko, 2013; Hansen, 1987; Eckbo, 2009). For formal auctions, insider sales increase even more in cash deals when it is so far rather than closer to the public announcement. The results are in contrast to the acquirer stock undervaluation hypothesis associated with cash payment. It rather supports the agency cost theory in Jensen (1986). Insiders in firms with high free cash flows expect lower odds of winning associated with formal auctions at the early stage of takeover process and thus increase selling to satisfy their personal benefits in first time. Panel C reports the results for the whole pre-announcement and

shows similar but a bit weaker results relatively to Panels A and B.

In essence, we wish to highlight four points to summarize our results for insider trading in acquiring firms before the public announcement. First of all, in line with HYPOTHESIS 1a insiders decrease their purchases only as the public announcement becomes more imminent when final acquirers usually have participated in the takeover process. At the same time, the imminent takeover announcement represents increased legal jeopardy and restricts insider purchases. Second, insiders strategically reduce their sales when closer to the public announcement to profit from higher expected net synergies as regulation is less restrictive on insider sales. At this point in time, insiders are more precise about the information concerning the potential takeover. Third, insider net purchases measure the combined effect of drop in insider purchases and reduction in insider sales during the 2 months before the public announcement. The combined effect for all firms together is insignificantly different from zero. Insiders are forced by strict regulation to stop buying, but they adjust their sales accordingly and offset the negative effect of purchases. Still, net purchases are affected by deal characteristics. They are significantly positive for deals sold in informal sales, suggesting that private value deals are expected to create higher net synergies (Gorbenko and Malenko, 2013). Finally, insiders are stronger net buyers in stock deals sold in informal sales. The advantage of target insiders sharing the overpayment cost seems to enhance the high synergy creation in private value deals.

4.4.2 Results for post-announcement insider trading

Table 4.6 shows the patterns of insider trading in acquiring after the public announcement up to the resolution of a deal. The results are reported in a similar fashion to Table 4.4, but we replace the pre-announcement dummy with a post-announcement dummy to reflect the change of the studied period. Again we are interested in the plain interaction term ‘acquirer x post-announcement,’ the triple interaction term ‘deal characteristic x acquirer x post-announcement’ and the total effect for a given deal characteristic ‘acquirer x post-announcement + deal characteristic x acquirer x post-announcement.’ As before, we include all usual control variables, but do not report their estimated coefficients because they are in line with the previous findings in the literature. We include the relative size and the length of the public selling process as an additional control variable.¹⁵ Again, results for insider purchases are reported in Columns 1 to 4, insider sales in Columns 5 to 8 and insider net purchases in Columns 9 to 12.¹⁶

Column 1 shows that insiders in all firms do not stop buying: the difference in differences interaction term is positive but not significant. Insiders also do not stop selling in the post-announcement period, so no change of their net purchases. This result does not support HYPOTHESIS 3 but is consistent with Boehmer and Netter (1997). It seems that on average insiders’ expectation of final net synergies are the same as market’s perception. Nothing is significant for insider purchases in Columns 2 to 4.

By exploring the effect of deal characteristics on insider sales and net

¹⁵Insiders increase their purchases and sales when the post-announcement period is longer.

¹⁶We do not divide the post-announcement period into different sub-periods as the public selling process on average takes only 126 calendar days (see Table 4.1). The division would not result in different conclusions.

purchases in the post-announcement period, we see large difference which is in line with HYPOTHESIS 4. Insiders increase their sales in deals sold in formal auctions or paid for in cash. The triple interaction terms in Columns 6 to 8 are significantly negative: insider sales drop in final acquirer initiated, informal sales and stock cash deals. Consequently, insiders in formal auction and cash deals increase their net sales rather than purchases. The plain interaction terms in Columns 11 and 12 are significantly negative. Triple interaction terms are significantly positive suggesting a markedly difference to informal sale and stock deals. Insiders do not change their trading behavior from the pre- to post-announcement period. Insiders in informal sales seem to believe in future net synergy improvement associated with lower overpayment cost and thus increase their net purchases. In contrast, insiders in deals sold in formal auctions are worried about winner's curse due to a large overpayment cost (Roll, 1986; Varaiya and Ferris, 1987) and decide to sell immediately after the announcement. Insiders in stock deals increase their net purchases during the public selling process, suggesting that takeovers add value to acquiring firms in the long-term (Shleifer and Vishny, 2003; Savor and Lu, 2009). In contrast, stock prices increase after public announcement of cash deals and thus insiders are willing to sell.

- insert Table 4.6 about here -

We further explore possible reinforcing effects across deal characteristics. Table 4.6 shows that the largest difference in insider sales and net purchases is for informal versus formal sales. Formal auctions are usually associated with cash payment (Fidrmuc et al., 2012b) and thus we examine the

reinforce effect of payment consideration on selling mechanism.¹⁷ We see in Table 4.7 that the difference depending on the selling mechanism comes from deals paid for in cash rather than in stock. Nothing is significant in Columns 1 to 3. For cash deals, insiders in formal auctions do not stop buying and at the same time sizeably increase their sales, so large drop in net insider purchases. The triple interaction term in Column 5 is large and significantly negative: insiders stop selling more in deals sold in informal sales and paid for by cash. Net insider purchases thus increase. Therefore, cash payment reinforces the effect of both formal auctions and informal sales during the post-announcement period. This suggests larger expected future synergies when private deals also exhibit positive announcement stock returns (Gorbenko and Malenko, 2013; Barger et al., 2008; Savor and Lu, 2009).

- insert Table 4.7 about here -

Insiders increase net purchases in firms that exhibit higher potential future net synergies relatively to market's perception and lower overpayment cost. They seem to be quite confident in value creation after the completion of a deal.

4.5 Conclusions

Our main focus in the chapter is to analyze insider trading in acquiring firms before and after the takeover public announcement depending on deal characteristics. In particular, we consider the deal initiation, selling mechanism and method of payment. By studying a sample of 627 publicly listed US acquiring

¹⁷The reinforcing effect across the payment method deal initiation does not lead to any interesting results.

firms, we examine insider trading patterns using the difference in differences approach that controls for insider trading in the same firm during a control period and at the same time for change in insider trading in matched firms. Consistent with Boehmer and Netter (1997), we confirm that acquirer insiders do not change their net purchases pattern before the public announcement. Insider purchases drop only as the deal public announcement becomes more imminent, which is in line with legal jeopardy. Acquiring firms on average participate in the takeover process closer to the public announcement and are regulated in that point of time. At the same time, we find that insiders decrease their sales to profit on the private information of a potential takeover. Insider purchases and sales patterns are on average unchanged during the early stage of private selling process and after the public announcement. Their diversification and liquidity needs prevail.

We further explore the effect of deal characteristics. We find that acquirer insiders are stronger net buyers, both before and after the public announcement, in deals sold in informal sales rather than formal auctions and in deals paid for by stock rather than by cash. It seems that insiders are quite certain about higher expected net synergies and the probability to win associated with private value deals (Gorbenko and Malenko, 2013). Insiders in stock deals can also benefit from sharing target insiders the overpayment cost and less reduction in future stock prices after completion of a deal. Despite higher willingness to buy, net insider purchases are not different between final acquirer versus other parties initiated deals during pre- and post- announcement periods. We interpret the finding as a result of the offsetting effect by lower takeover premium in other parties initiated deals.

Selling mechanism and payment consideration reinforce each other. We

find that insiders are stronger net buyers before the public announcement in stock deals sold in informal sales and stronger net sellers in cash deals sold in formal auctions. The effect on changes after the public announcement and comes from only cash deals. Insiders are still stronger net buyers in deals sold through informal sales but only for cash deals. These results suggest that insiders are more optimistic in firms that exhibit higher future synergies relatively to market's perception and at the same time that are associated with lower overpayment cost.

In summary, our analysis shows that insiders take into account their private information and their trading activities differ across takeovers with different deal characteristics.

Future versions of the chapter could improve the analysis in several aspects. First, to control for differing patterns of insider trading during a calendar year, one could rematch the 2 control periods exactly in the same months with the pre- and post-announcement period. Second, one could check trades by other groups of insiders, e.g., CEO or CFO or all insiders but excluding blockholders. Third, one can figure out whether the Global Financial Crisis from 2007 to 2009 affect insiders' trades, especially in the control periods. Fourth, one could check insider trading by firm and industry characteristics, e.g., cash levels leverage ratio, CEO remuneration, industry fluidity, industry concentration and etc. Finally, it might be valuable to analyze the long-term stock and operating abnormal performance of acquiring firms relatively to matched firms that do not have a takeover.

4.6 Appendix

4.6.1 Variable definitions

Variable	Definition	Source
σ	The volatility of daily stock returns over the period from 250 to 126 trading days before the beginning of the pre-announcement, post-announcement and control period, respectively. Based on Agrawal and Nasser (2012).	CRSP, OC
$\Delta\sigma$	The change in volatility of daily stock returns over the period from 125 to 1 trading day versus the period from 250 to 126 trading days before the beginning of the pre-announcement, post-announcement and control period, respectively. Based on Agrawal and Nasser (2012).	CRSP, OC
% equity	The total fraction of shares outstanding in base points bought or sold by corporate insiders during the pre-announcement, post-announcement or control period and is scaled as monthly basis depending on the length in months of the pre-announcement, post-announcement and control period, respectively.	TIF, OC
\$ shares	Total value of shares (transaction price or stock price that trading day if transaction price is unavailable times total number of shares) in USD millions bought or sold by corporate insiders during the pre-announcement, post-announcement or control period and is scaled as monthly basis depending on the length in months of the pre-announcement, post-announcement and control period, respectively.	TIF, OC
Acquirer	Dummy variable equal to 1 for the acquiring firm and 0 otherwise.	OC
Auction	Dummy variable equal to 1 in case the company is sold in a highly organized auction with pre-set rules and 0 otherwise. Based on Hansen (2001).	HC
Bidders contacted	Total number of bidders that the target firm contracts during the selling process.	HC
Bidder initiated deal	Deal for which, at the beginning of the private selling process, a potential buyer approaches the target firm and proposes an M&A transaction. The deal includes both final acquirer initiated and third party initiated M&As.	HC
Bidders with confid. agreement	Total number of bidders that the target firm signs confidentiality agreement with during the private selling process.	HC

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Variable	Definition	Source
Book to market	Book value of equity over market capitalization 1 fiscal year before the beginning of the pre-announcement, post-announcement and control period, respectively.	COMPUSTAT
$CAR_{-1,+1}$	The cumulative acquirer abnormal stock returns from 1 day before to 1 day after the public announcement.	CRSP, OC
$CAR_{1yb.init.,init}$	The cumulative acquirer abnormal stock returns over the 1-year period before the initiation.	CRSP, OC
$CAR_{2yb.init.,init}$	The cumulative acquirer abnormal stock returns over the 2-year period before the initiation.	CRSP, OC
$CAR_{2mb.ann.,1db.ann.}$	The cumulative acquirer abnormal stock returns from 2 month before to 1 day before the public announcement.	CRSP, OC
$CAR_{4mb.ann.,1db.ann.}$	The cumulative acquirer abnormal stock returns from 4 months before to 1 day before the public announcement.	CRSP, OC
$CAR_{6mb.ann.,1db.ann.}$	The cumulative acquirer abnormal stock returns from 6 months before to 1 day before the public announcement.	CRSP, OC
$CAR_{ann.,comp.}$	The cumulative acquirer abnormal stock returns from the public announcement date to the completion.	CRSP, OC
$CAR_{init.,6mb.ann.}$	The cumulative acquirer abnormal stock returns over period from the initiation date to 6 months before the public announcement.	CRSP, OC
$CAR_{init.,4mb.ann.}$	The cumulative acquirer abnormal stock returns over period from the initiation date to 4 months before the public announcement.	CRSP, OC
$CAR_{init.,2mb.ann.}$	The cumulative acquirer abnormal stock returns over period from the initiation date to 2 months before the public announcement.	CRSP, OC
$CAR_{init.,1db.ann.}$	The cumulative acquirer abnormal stock returns over period from the initiation date to 1 day before the public announcement.	CRSP, OC
Control period	Concerning the pre-announcement period, it is the 1-year period before the initiation in case the private selling process takes one year or longer It is from 1 year before the initiation to 1 year before the announcement in case the length is less than one year. Concerning the post-announcement period, it is the 1-year period before the initiation in case the public selling process takes one year or longer. It is the period of the same length as the public selling process ending at the initiation date in case the length is shorter than one year.	OC

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Variable	Definition	Source
Cash offer	Dummy variable equal to 1 in case the acquirer offers pure cash as the payment consideration and 0 otherwise.	SDC
Controlled sale	Dummy variable equal to 1 in case the target company decides to discreetly canvass a limited number of bidders that target management believes to have a serious interest in acquiring the company and 0 otherwise. Based on Boone and Mulherin (2009).	HC
Early pre-announcement period	The period from the initiation date to 2 months before the announcement in case the pre-announcement period takes 2 months or longer. It is from the initiation date to the public announcement in case the length is shorter than 2 months.	OC
Immediately before announcement	The 2-month period before public announcements in case the private selling process stays six months or longer and the initiation date to the public announcement in case the length is shorter than 2 months.	OC
Informal sale	Dummy variable equal to 1 in case the deal is sold in controlled sales or private negotiations and 0 otherwise. Based on Boone and Mulherin (2009).	HC
Initial premium	The initial offer price at the announcement date relative to the stock price 8 weeks before the announcement in percentage points.	SDC
Initiation date	The date on which the target starts to consider a potential sale of the firm. Based on Boone and Mulherin (2007).	HC
Insider ownership	The total fraction of shares outstanding owned by the board members and top officers (CB, CEO, CO, GC, P; AC, AF, CC, CFO, CI, CT, D, DO, EC, FC, GP, H, M, MC, MD, O, OB, OD, OP, OS, OT, OX, S, SC, TR, VC) just before the beginning of the pre-announcement, post-announcement and control period, respectively.	TIF, OC
Length of private selling process	Length in days from the initiation date to the SDC announcement date.	HC
Length of public selling process	Length in days from the SDC announcement date to the resolution date.	HC
Length of whole selling process	The length in calendar days from the initiation date to the resolution date.	HC
Liquidity	Daily average fraction of shares outstanding that is traded over the one calendar year before the beginning of the pre-announcement, post-announcement and control period.	COMPUSTAT

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Variable	Definition	Source
Long-term synergies	Fama-French 3-factor adjusted calendar-time portfolio monthly abnormal returns. The realized returns are 1-year monthly returns after the completion date. Based on Fama and French (1993).	CRSP, Kenneth R. French - Data Library, OC
Market capitalization	Stock price times shares outstanding 1 fiscal year before the beginning of the pre-announcement, post-announcement and control period, respectively; in the analysis used as a natural log.	CRSP
Net purchase	Purchase minus sale by the same insider in the same transaction date in the same company. Based on Agrawal and Nasser (2012).	TIF, OC
Offer improvement	The final offer price at the completion date relative to the initial offer price at the initiation date in percentage points. SDC	
Pre-announcement	Dummy variable equal to 1 in case insider trading is from the initiation date to the public announcement and 0 otherwise.	TIF, OC
Premium	The final offer price relative to the stock price 8 weeks before the SDC announcement date in percentage points.	SDC
$PRET_t$	Market adjusted average daily abnormal returns t quarter before the pre-announcement, the post-announcement or the control period and t equals 1, 2, 3 and 4. Based on Agrawal and Nasser (2012).	CRSP, OC
Post-announcement	Dummy variable equal to 1 in case insider trading is from the SDC announcement date to the resolution and 0 otherwise.	TIF, OC
Private negotiation	Dummy variable equal to 1 in case the target firm negotiates with only one bidder during the selling process. Based on Boone and Mulherin (2009).	HC
Pri. pro. length	Natural log of the private selling process length.	HC
Pub. pro. length	Natural log of the public selling process length.	HC
R&D	Research and development expenses divided by total sales.	COMPUSTAT
Relative size	Transaction value as a fraction of acquirer market capitalization shortly before the completion.	SDC, CRSP, OC
Selling process length	The length in days from the initiation date to the resolution date.	HC
Short-term synergies	Weighted average of acquirer and target abnormal stock returns 3 days around the public announcement.	CRSP, OC
Stock offer	Dummy variable equal to 1 in case the acquirer offers fully or partially merged firm's shares as the payment consideration and 0 otherwise.	SDC

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Variable	Definition	Source
Target initiated deal	The board of the target firm decides to sell the company and consequently contacts potential buyers.	HC
Third party initiated	Bidder initiated deal that ends up with a buyer that is not the primary initiator of the deal.	HC
Top executives and independent directors	Corporate insider group that includes the board members and top officers (CB, CEO, CO, GC, P; AC, AF, CC, CFO, CI, CT, D, DO, EC, FC, GP, H, M, MC, MD, O, OB, OD, OP, OS, OT, OX, S, SC, TR, VC, AV).	TIF, OC
Total assets	Book value of total assets in USD millions; in the analysis used as a natural log.	COMPUSTAT
Total sales	Total amount collected for providing goods and services in USD millions.	COMPUSTAT
Transaction value	Total value paid by the acquirer less fees and expenses in USD millions.	SDC

Table 4.1: Selling process summary statistics

This table presents summary statistics separately for all deals (Column 2), for final acquirer initiated versus target and third party initiated deals (Columns 3 and 4), for deals sold in informal sale versus formal auction (Columns 5 and 6), for cash versus stock deals (Columns 7 and 8) and for stock deals sold in informal sales versus cash deals sold in formal auctions (Columns 9 and 10), respectively. All variables are defined in Appendix 4.6.1. The unit for total assets and market capitalization is USD millions. All variables are winsorized at the 1st and 99th percentiles except all dummy variables. We test for difference in means using the *t*-test. The significance of difference in means between final acquirer initiated versus target and third party initiated deals in Column 4, deals sold through informal sale versus sold through formal auction in Column 6, cash versus stock deals in Column 8 and stock deals sold in informal sales versus cash deals sold in formal auctions in Column 10, respectively. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

Variable	(1) # obs.	(2) All deals	(3) Final acquirer initiated	(4) Other parties initiated	(5) Informal sale	(6) Formal auction	(7) Cash	(8) Stock	(9) Informal sale & stock	(10) Formal auction & cash
Transaction value (USD millions)	621	2165 ^a	2868	1746 ^b	2603	870 ^a	1382	2956 ^a	3244	515 ^a
Relative size	553	0.31 ^a	0.36	0.28 ^b	0.33	0.26	0.17	0.45 ^a	0.45	0.16 ^a
Premium	522	35.2% ^a	40.6%	31.7% ^b	37.4%	28.4% ^c	41.8%	27.4% ^a	28.4%	31.1%
Initial premium	522	33.9% ^a	38.6%	31.0% ^c	36.0%	27.8% ^c	40.8%	25.9% ^a	26.8%	30.7%
Offer improvement	593	0.8% ^a	1.2%	0.5% ^b	0.9%	0.4%	0.6%	1.0%	1.0%	0.3%
<i>CAR</i> _{2yb,init.,init.}	535	16.9% ^a	23.2%	13.0% ^c	19.7%	8.6% ^c	11.7%	22.1% ^c	27.0%	13.3%
<i>CAR</i> _{1yb,init.,init.}	534	7.9% ^a	8.8%	7.4%	7.0%	10.7%	8.3%	7.6%	7.6%	12.4%
<i>CAR</i> _{init.,6mb.ann.}	564	4.6% ^a	3.3%	5.4%	3.6%	7.5%	4.7%	4.5%	4.5%	9.3%
<i>CAR</i> _{init.,4mb.ann.}	564	5.6% ^a	3.5%	6.9%	4.4%	9.3% ^c	5.5%	5.6%	5.4%	10.6%
<i>CAR</i> _{init.,2mb.ann.}	563	5.9% ^a	3.7%	7.2%	4.7%	9.5%	4.9%	6.8%	6.6%	10.4%
<i>CAR</i> _{init.,1mb.ann.}	563	6.2% ^a	4.3%	7.4%	5.4%	8.6%	4.7%	7.7%	8.3%	10.6%
<i>CAR</i> _{init.,1db.ann.}	537	6.8% ^a	5.2%	7.7%	6.3%	8.1%	4.0%	9.5% ^c	11.0%	11.1%
<i>CAR</i> _{6mb.ann.,1db.ann.}	533	1.9% ^b	2.0%	1.8%	2.3%	0.4%	-0.3%	4.0% ^a	4.9%	0.7% ^c
<i>CAR</i> _{4mb.ann.,1db.ann.}	535	0.6%	1.2%	0.2%	1.2%	-1.1%	-1.2%	2.4% ^a	3.6%	0.0% ^c
<i>CAR</i> _{2mb.ann.,1db.ann.}	537	0.4%	0.8%	0.1%	0.5%	0.0%	-0.8%	1.5% ^b	2.0%	0.4%
<i>CAR</i> _{-1,+1}	540	-1.2% ^a	-1.5%	-1.1%	-1.4%	-0.8%	-0.0%	-2.4% ^a	-2.4%	0.1% ^a
<i>CAR</i> _{ann.,comp.}	540	-2.2% ^a	-3.3%	-1.6%	-2.7%	-0.9%	-0.6%	-3.9% ^b	-3.7%	1.1% ^b
Short-term synergies	413	1.8% ^a	2.2%	1.6%	1.9%	1.7%	2.3%	1.3% ^b	1.3%	2.0%
Long-term synergies	102	-0.1%	0.1%	-0.3% ^a	0.0%	-0.2%	0.0%	-0.2% ^b	-0.2%	-0.2%
Total assets b. pre-ann.	610	22039 ^a	22825	21562	25131	12721 ^b	25847	18230 ^c	21015	16862
Total assets b. post-ann.	616	23363 ^a	24440	22716	26739	13407 ^b	27871	18825 ^c	21612	17493
Total assets b. control of pre.	610	20461 ^a	20933	20176	23389	12721 ^b	23528	17395	20050	15399
Total assets b. control of post.	610	20462 ^a	20933	20176	23389	11718 ^b	23528	17395	20050	15399

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Variable	(1) # obs.	(2) All deals	(3) Final acquirer initiated	(4) Other parties initiated	(5) Informal sale	(6) Formal auction	(7) Cash	(8) Stock	(9) Informal sale & stock	(10) Formal auction & cash
Market cap. b. pre-ann.	610	19298 ^a	22152	17570	21463	12772 ^b	29059	9536 ^a	11052	18363 ^c
Market cap. b. post-ann.	613	20134 ^a	22731	18564	22404	13369 ^b	30401	9901 ^a	11426	19024 ^b
Market cap. b. control of pre.	610	18718 ^a	21880	16805	20906	12185 ^b	27919	9518 ^a	11057	17477
Market cap. b. control of post.	610	18892 ^a	22072	16967	21089	12329 ^b	28145	9639 ^a	11203	17697
Book/Market b. pre-ann.	586	0.46 ^a	0.45	0.46	0.46	0.47	0.41	0.50 ^a	0.49	0.41 ^c
Book/Market b. post-ann.	595	0.47 ^a	0.47	0.48	0.49	0.43 ^c	0.42	0.52 ^a	0.53	0.39 ^a
Book/Market b. control of pre.	579	0.44 ^a	0.44	0.45	0.45	0.44	0.39	0.50 ^a	0.50	0.41 ^b
Book/Market b. control of post.	579	0.44 ^a	0.44	0.44	0.44	0.43	0.39	0.49 ^a	0.50	0.41 ^c
Length of private selling process	627	360 ^a	245	429 ^a	321	475 ^a	375	346	324	489 ^a
Length of public selling process	627	126 ^a	139	118 ^a	134	101 ^a	96	155 ^a	159	81 ^a
Length of whole selling process	627	486 ^a	383	547 ^a	455	576 ^a	471	501	483	570 ^b
Bidders contacted	627	14 ^a	4	20 ^a	5	41 ^a	17	11 ^a	5	40 ^a
Bidders with confid. agreement	627	5 ^a	2	7 ^a	2	14 ^a	7	4 ^a	2	15 ^a
Cash offer	627	0.50 ^a	0.47	0.52	0.45	0.66 ^a	n.a.	n.a.	n.a.	n.a.
Auction	627	0.25 ^a	0.05	0.38 ^a	n.a.	n.a.	0.33	0.17 ^a	n.a.	n.a.
Controlled sale	627	0.41 ^a	0.24	0.50 ^a	n.a.	n.a.	0.41	0.41	n.a.	n.a.
Private negotiation	627	0.34 ^a	0.71	0.12 ^a	n.a.	n.a.	0.26	0.42 ^a	n.a.	n.a.
Target initiated	627	0.43 ^a	n.a.	n.a.	0.34	0.70 ^a	0.39	0.47 ^c	0.39	0.63 ^a
Final acquirer initiated	627	0.37 ^a	n.a.	n.a.	0.48	0.07 ^a	0.35	0.40	0.47	0.10 ^a

Table 4.2: Basic statistics for insider trading in acquiring firms before the public announcement

The table shows mean values across acquiring firms separately during the pre-announcement (Column 1) and the control period (Column 2) and matched firms during the pre-announcement (Column 3) and the control period (Column 4). Insiders are top executives and independent directors. We report insider purchases and sales for all deals, final acquirer initiated, other parties (target and a third party) initiated, informal sales, formal auctions, cash, stock, informal sales paid for in stock and formal auctions paid for in cash deals. We have two measures of purchases and sales, dollar shares in USD millions and percentage of equity in base points that are scaled as monthly basis. The data covers 627 matched firms over the pre-announcement and the control period. All variables are defined in Appendix 4.6.1 and winsorized at the 1st and 99th percentiles. We test for differences in means using the *t*-test allowing for unequal variances. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

	Acquiring firms		Matched firms		Mean difference				
	1	2	3	4	1 vs 2	1 vs 3	3 vs 4	(1-2) vs (3-4)	
	Pre-ann.	Control	Pre-ann.	Control					
<i>Panel A: Insider purchases</i>									
<i>All deals</i>									
\$ shares (USD millions)	0.031	0.047	0.038	0.032	-0.016 ^c	-0.008	0.007	-0.023 ^b	
% equity (base points)	0.347	0.413	0.365	0.328	-0.066	-0.018	0.036	-0.102	
<i>Final acquirer initiated</i>									
\$ shares (USD millions)	0.029	0.056	0.055	0.036	-0.027	-0.025	0.019	-0.046 ^b	
% equity (base points)	0.203	0.431	0.318	0.289	-0.228	-0.115	0.029	-0.257	
<i>Other parties initiated</i>									
\$ shares (USD millions)	0.031	0.041	0.029	0.030	-0.010	0.003	-0.001	-0.009	
% equity (base points)	0.433	0.402	0.393	0.352	0.031	0.040	0.041	-0.010	
<i>Informal sale</i>									
\$ shares (USD millions)	0.032	0.048	0.041	0.033	-0.016	-0.009	0.008	-0.025 ^c	
% equity (base points)	0.317	0.413	0.345	0.323	-0.096	-0.028	0.022	-0.118	
<i>Formal auction</i>									
\$ shares (USD millions)	0.026	0.043	0.029	0.028	-0.017	-0.004	0.001	-0.018	
% equity (base points)	0.434	0.413	0.422	0.345	0.021	0.012	0.078	-0.056	
<i>Cash</i>									
\$ shares (USD millions)	0.036	0.043	0.036	0.034	-0.007	0.000	0.002	-0.009	
% equity (base points)	0.247	0.243	0.207	0.265	0.004	0.039	-0.057	0.061	
<i>Stock</i>									
\$ shares (USD millions)	0.025	0.051	0.041	0.030	-0.026 ^b	-0.016	0.011	-0.037 ^b	
% equity (base points)	0.449	0.586	0.525	0.393	-0.137	-0.076	0.132	-0.269	
<i>Informal sale & stock</i>									
\$ shares (USD millions)	0.024	0.047	0.044	0.034	-0.023	-0.020	0.010	-0.033 ^c	
% equity (base points)	0.383	0.523	0.504	0.438	-0.139	-0.121	0.066	-0.205	

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	Acquiring firms		Matched firms		Mean difference			
	1 Pre-ann.	2 Control	3 Pre-ann.	4 Control	1 vs 2	1 vs 3	3 vs 4	(1-2) vs (3-4)
<i>Formal auction & cash</i>								
\$ shares (USD millions)	0.025	0.030	0.031	0.038	-0.005	-0.006	-0.007	0.002
% equity (base points)	0.265	0.169	0.319	0.430	0.096	-0.054	-0.111	0.208
<i>Panel B: Insider sales</i>								
<i>All deals</i>								
\$ shares (USD millions)	2.082	1.663	1.531	1.634	0.419	0.551 ^b	-0.103	0.522 ^c
% equity (base points)	2.853	3.199	3.067	3.306	-0.346	-0.214	-0.240	-0.106
<i>Final acquirer initiated</i>								
\$ shares (USD millions)	2.537	2.107	1.796	1.983	0.429	0.741	-0.187	0.616
% equity (base points)	3.101	3.350	3.460	2.921	-0.249	-0.359	0.539	-0.789
<i>Other parties initiated</i>								
\$ shares (USD millions)	1.812	1.399	1.373	1.426	0.413	0.439	-0.053	0.465
% equity (base points)	2.705	3.109	2.833	3.536	-0.403	-0.128	-0.703	0.300
<i>Informal sale</i>								
\$ shares (USD millions)	2.204	1.884	1.610	1.730	0.320	0.594 ^c	-0.121	0.441
% equity (base points)	2.647	3.195	3.177	2.960	-0.548	-0.530	0.217	-0.765
<i>Formal auction</i>								
\$ shares (USD millions)	1.723	1.014	1.298	1.348	0.709	0.425	-0.050	0.759
% equity (base points)	3.460	3.212	2.744	4.327	0.248	0.715	-1.583 ^b	1.831 ^b
<i>Cash</i>								
\$ shares (USD millions)	2.862	1.999	1.988	2.160	0.863 ^c	0.874 ^c	-0.172	1.035 ^b
% equity (base points)	2.860	2.598	2.619	3.592	0.262	0.241	-0.973 ^c	1.234 ^b
<i>Stock</i>								
\$ shares (USD millions)	1.289	1.322	1.066	1.099	-0.033	0.223	-0.033	0.000
% equity (base points)	2.846	3.810	3.522	3.017	-0.964	-0.676	0.505	-1.469 ^b
<i>Informal sale & stock</i>								
\$ shares (USD millions)	1.497	1.544	1.087	1.166	-0.048	0.409	-0.079	0.032
% equity (base points)	2.997	4.011	3.451	2.814	-1.014	-0.454	0.637	-1.651 ^c
<i>Formal auction & cash</i>								
\$ shares (USD millions)	2.454	1.399	1.469	1.641	1.055	0.985	-0.172	1.227 ^c
% equity (base points)	4.143	3.396	2.171	4.506	0.747	1.972 ^b	-2.336 ^b	3.082 ^b

Table 4.3: Basic statistics for insider trading in acquiring firms after the public announcement

The table shows mean values across acquiring firms separately during the post-announcement (Column 1), the control (column 2) and the pre-announcement (Column 3) period and matched firms during the post-announcement (Column 4), the control (Column 5) and the pre-announcement (Column 6) period. Insiders are top executives and independent directors. We report insider purchases and sales for all deals, final acquirer initiated, other parties (target and a third party) initiated, informal sales, formal auctions, cash, stock, informal sales paid for in stock and formal auctions paid for in cash deals. We have two measures of purchases and sales, i.e., dollar shares in USD millions and percentage of equity in base points that are scaled as monthly basis. The data covers 627 acquiring and 627 matched firms over the pre-announcement and the control period. All variables are defined in Appendix 4.6.1 and winsorized at the 1st and 99th percentiles. We test for differences in means using the *t*-test allowing for unequal variances. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

	Acquiring firms			Matched firms			Mean difference					
	1	2	3	4	5	6	1 vs 2	1 vs 3	4 vs 5	4 vs 6	(1-2) vs (4-5)	
	Post-ann.	Control	Pre-ann.	Post-ann.	Control	Pre-ann.						
<i>Panel A: Insider purchases</i>												
<i>All deals</i>												
\$ shares (USD millions)	0.032	0.032	0.031	0.035	0.031	0.038	0.000	0.001	0.004	0.004	-0.004	-0.004
% equity (base points)	0.386	0.306	0.347	0.260	0.237	0.365	0.080	0.039	0.023	0.126	-0.105	0.057
<i>Final acquirer initiated</i>												
\$ shares (USD millions)	0.037	0.029	0.029	0.047	0.040	0.055	0.008	0.007	0.007	-0.011	0.007	0.000
% equity (base points)	0.275	0.272	0.203	0.255	0.237	0.318	0.003	0.072	0.018	0.020	-0.063	-0.015
<i>Other parties initiated</i>												
\$ shares (USD millions)	0.029	0.033	0.031	0.027	0.026	0.029	-0.004	-0.002	0.002	0.002	-0.002	-0.006
% equity (base points)	0.452	0.326	0.433	0.263	0.237	0.393	0.125	0.019	0.026	0.189 ^c	-0.130	0.100
<i>Informal sale</i>												
\$ shares (USD millions)	0.036	0.033	0.032	0.038	0.036	0.041	0.002	0.004	0.003	-0.003	-0.003	0.000
% equity (base points)	0.430	0.295	0.317	0.270	0.250	0.345	0.136	0.113	0.020	0.160	-0.075	0.116
<i>Formal auction</i>												
\$ shares (USD millions)	0.021	0.026	0.026	0.024	0.017	0.029	-0.006	-0.005	0.007	-0.003	-0.005	-0.013
% equity (base points)	0.254	0.339	0.434	0.229	0.198	0.422	-0.085	-0.180	0.031	0.025	-0.193	-0.116
<i>Cash</i>												
\$ shares (USD millions)	0.025	0.032	0.036	0.027	0.020	0.036	-0.008	-0.012	0.007	-0.002	-0.009	-0.014
% equity (base points)	0.157	0.245	0.247	0.142	0.119	0.207	-0.088	-0.090	0.024	0.015	-0.065	-0.112
<i>Stock</i>												
\$ shares (USD millions)	0.039	0.031	0.025	0.043	0.042	0.041	0.008	0.014	0.001	-0.004	0.002	0.008
% equity (base points)	0.618	0.368	0.449	0.379	0.358	0.525	0.250 ^c	0.169	0.022	0.239 ^c	-0.146	0.229
<i>Informal sale & stock</i>												
\$ shares (USD millions)	0.038	0.031	0.024	0.047	0.047	0.044	0.007	0.014	-0.009	-0.009	0.003	0.008
% equity (base points)	0.610	0.322	0.383	0.403	0.373	0.504	0.287	0.227	0.207	0.207	-0.102	0.258

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	Acquiring firms						Matched firms						Mean difference				
	1	2	3	4	5	6	1 vs 2	1 vs 3	1 vs 4	1 vs 5	1 vs 6	4 vs 5	4 vs 6	(1-2) vs (4-5)			
	Post-ann.	Control	Pre-ann.	Post-ann.	Control	Pre-ann.											
<i>Formal auction & cash</i>																	
\$ shares (USD millions)	0.007	0.023	0.025	0.023	0.017	0.031	-0.016	-0.018	-0.016	-0.016	-0.016	-0.016	-0.008	-0.023			
% equity (base points)	0.046	0.212	0.265	0.209	0.155	0.319	-0.167 ^c	-0.220	-0.163	-0.163	-0.163	-0.163	-0.110	-0.221			
<i>Panel B: Insider sales</i>																	
<i>All deals</i>																	
\$ shares (USD millions)	1.678	1.693	2.082	1.469	1.560	1.531	-0.015	-0.404	0.209	0.209	-0.091	-0.091	-0.062	0.077			
% equity (base points)	2.044	2.870	2.853	2.297	3.522	3.067	-0.825 ^b	-0.809	-0.252	-0.252	-1.226 ^a	-1.226 ^a	-0.770	0.400			
<i>Final acquirer initiated</i>																	
\$ shares (USD millions)	1.889	2.103	2.537	1.715	1.996	1.796	-0.215	-0.648	0.173	0.173	-0.281	-0.281	-0.080	0.066			
% equity (base points)	2.368	3.466	3.101	2.967	3.459	3.460	-1.098	-0.733	-0.598	-0.598	-0.492	-0.492	-0.493	-0.605			
<i>Other parties initiated</i>																	
\$ shares (USD millions)	1.552	1.448	1.812	1.322	1.301	1.373	0.104	-0.259	0.230	0.230	0.022	0.022	-0.051	0.083			
% equity (base points)	1.851	2.514	2.705	1.898	3.560	2.833	-0.663	-0.854	-0.046	-0.046	-1.662 ^a	-1.662 ^a	-0.936	0.999			
<i>Informal sale</i>																	
\$ shares (USD millions)	1.760	1.966	2.204	1.557	1.678	1.610	-0.206	-0.444	0.203	0.203	-0.121	-0.121	-0.052	-0.085			
% equity (base points)	1.925	2.892	2.647	2.451	3.050	3.177	-0.968 ^b	-0.722	-0.527	-0.527	-0.598	-0.598	-0.725	-0.369			
<i>Formal auction</i>																	
\$ shares (USD millions)	1.435	0.888	1.723	1.209	1.213	1.298	0.547	-0.288	0.226	0.226	-0.005	-0.005	-0.090	0.551			
% equity (base points)	2.396	2.803	3.460	1.841	4.912	2.744	-0.407	-1.063	0.556	0.556	-3.071 ^a	-3.071 ^a	-0.904	2.665 ^b			
<i>Cash</i>																	
\$ shares (USD millions)	2.519	2.346	2.862	2.012	1.904	1.988	0.172	-0.344	0.507	0.507	0.108	0.108	0.024	0.065			
% equity (base points)	2.561	2.575	2.860	1.927	3.254	2.619	-0.014	-0.299	0.634	0.634	-1.327 ^b	-1.327 ^b	-0.692	1.313 ^c			
<i>Stock</i>																	
\$ shares (USD millions)	0.823	1.028	1.289	0.917	1.211	1.066	-0.205	-0.466	-0.094	-0.094	-0.293	-0.293	-0.149	0.089			
% equity (base points)	1.519	3.169	2.846	2.672	3.794	3.522	-1.649 ^a	-1.327	-1.153 ^a	-1.153 ^a	-1.122 ^c	-1.122 ^c	-0.850	-0.527			
<i>Informal sale & stock</i>																	
\$ shares (USD millions)	0.963	1.150	1.497	1.003	1.309	1.087	-0.187	-0.534	-0.040	-0.040	-0.306	-0.306	-0.084	0.118			
% equity (base points)	1.666	3.192	2.997	2.680	3.605	3.451	-1.526 ^a	-1.331	-1.014 ^a	-1.014 ^a	-0.925	-0.925	-0.771	-0.600			
<i>Formal auction & cash</i>																	
\$ shares (USD millions)	2.091	1.115	2.454	1.568	1.454	1.469	0.976 ^c	-0.363 ^b	0.522	0.522	0.114	0.114	0.099	0.862			
% equity (base points)	3.206	2.671	4.143	1.431	5.024	2.171	0.535	-0.937 ^c	1.775 ^b	1.775 ^b	-3.592 ^a	-3.592 ^a	-0.739	4.128 ^a			

Table 4.4: Insider trading in acquiring firms before the public announcement: deal initiation, selling mechanism and method of payment

This table reports estimation results of insider purchases (Columns 1 to 4), insider sales (Columns 5 to 8) and net purchases (Columns 9 to 12) in acquiring firms before the public announcement. Panels A, B and C report results of insider trading immediately before the public announcement (2-month period before the public announcement in case the private selling process stays two months or longer and from the initiation date to the public announcement in case the length is shorter than 2 months), in the early pre-announcement period (initiation date to 2 months before the announcement in case the pre-announcement period takes 2 months or longer and zero in case the private selling process length is shorter than 2 months) and during the whole pre-announcement period (the initiation date to the public announcement), respectively. The dependent variables are purchases, sales and net purchases (i.e. purchases minus sales) by top executives and independent directors measured as percentage of equity in base points. Regression of purchases and sales uses the left-censored Tobit model and regression of net purchases uses the OLS model. The data covers 627 acquiring and 627 matched firms over the pre-announcement and the control period. We report Hubert/White robust standard errors in brackets. All variables are defined in Appendix 4.6.1 and are winsorized at the 1st and 99th percentiles, except for all dummy variables. Both year and industry dummies are included in the regressions but are not reported. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Insider purchases				Insider sales				Net purchases			
	all	acq	inf	stock	all	acq	inf	stock	all	acq	inf	stock
<i>Panel A: Immediately before announcement</i>												
Constant	-1.447 (1.036)	-1.134 (1.086)	-1.885 ^c (1.097)	-1.538 (1.055)	0.187 (2.334)	0.634 (2.425)	2.268 (2.424)	1.052 (2.323)	-5.234 ^a (1.397)	-5.202 ^a (1.504)	-6.487 ^a (1.493)	-5.805 ^a (1.402)
Pre-announcement	-1.285 ^a (0.236)	-1.408 ^a (0.303)	-0.725 (0.497)	-1.033 ^a (0.314)	-3.641 ^a (0.580)	-4.480 ^a (0.739)	-6.429 ^a (1.064)	-4.196 ^a (0.813)	1.269 ^a (0.381)	1.767 ^a (0.504)	3.306 ^a (0.739)	1.644 ^a (0.557)
Acquirer	0.218 (0.184)	0.349 (0.234)	0.568 (0.410)	0.055 (0.248)	-0.052 (0.489)	-0.497 (0.618)	-1.884 ^b (0.944)	-1.282 ^b (0.649)	0.224 (0.386)	0.633 (0.509)	1.559 ^b (0.781)	0.949 ^c (0.517)
Acquirer x pre-ann.	-1.102 ^a (0.347)	-1.148 ^a (0.432)	-1.891 ^b (0.782)	-0.946 ^b (0.471)	-1.443 ^c (0.787)	-0.752 (0.994)	2.941 ^c (1.535)	0.793 (1.031)	0.157 (0.513)	-0.473 (0.663)	-2.799 ^a (1.035)	-0.822 (0.710)
Deal characteristic	-0.228 (0.264)	-0.228 (0.264)	0.505 (0.321)	0.119 (0.258)	-1.202 ^c (0.728)	-1.202 ^c (0.728)	-2.373 ^a (0.841)	-1.356 ^c (0.822)	0.563 (0.553)	0.563 (0.553)	1.537 ^b (0.680)	0.955 (0.617)
Deal ch.x pre-ann.	0.334 (0.473)	0.334 (0.473)	-0.741 (0.562)	-0.475 (0.455)	2.222 ^c (1.141)	2.222 ^c (1.141)	3.751 ^a (1.237)	1.162 (1.117)	-1.286 ^c (0.750)	-1.286 ^c (0.750)	-2.704 ^a (0.859)	-0.746 (0.752)
Deal ch.x acquirer	-0.378 (0.384)	-0.378 (0.384)	-0.453 (0.462)	0.299 (0.366)	1.190 (0.999)	1.190 (0.999)	2.450 ^b (1.104)	2.529 ^a (0.977)	-1.060 (0.782)	-1.060 (0.782)	-1.764 ^b (0.899)	-1.447 ^c (0.774)
Deal ch.x acquirer x pre.	0.139 (0.693)	0.139 (0.693)	1.039 (0.861)	-0.289 (0.660)	-1.832 (1.629)	-1.832 (1.629)	-5.860 ^a (1.802)	-4.752 ^a (1.601)	1.622 (1.049)	1.622 (1.049)	3.907 ^a (1.195)	1.964 ^c (1.034)
$CAR_{init,1mb,ann.}$	-0.221 (0.251)	-0.225 (0.250)	-0.221 (0.253)	-0.233 (0.253)	-0.075 (0.674)	-0.068 (0.674)	-0.054 (0.671)	-0.054 (0.672)	0.108 (0.466)	0.101 (0.466)	0.104 (0.464)	0.098 (0.467)

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Insider purchases			Insider sales			Net purchases					
	all	acq	inf	stock	all	acq	inf	stock	all	acq	inf	stock
Relative size	-0.241 (0.208)	-0.212 (0.207)	-0.268 (0.208)	-0.253 (0.218)	-0.437 (0.563)	-0.443 (0.562)	-0.351 (0.557)	-0.217 (0.591)	0.005 (0.353)	0.027 (0.353)	-0.023 (0.350)	-0.112 (0.370)
Pri. pro. length	0.312 ^a (0.110)	0.272 ^b (0.113)	0.331 ^a (0.112)	0.313 ^a (0.111)	0.774 ^a (0.249)	0.774 ^a (0.251)	0.680 ^a (0.257)	0.756 ^a (0.250)	-0.040 (0.151)	-0.074 (0.152)	-0.007 (0.158)	-0.030 (0.152)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Total effect by deal ch.		-1.009 ^c	-0.852 ^b	-1.235 ^a		-2.584 ^b	-2.919 ^a	-3.959 ^a		1.149	1.108 ^c	1.142
# observations	2,108	2,108	2,108	2,108	2,108	2,108	2,108	2,108	2,108	2,108	2,108	2,108
F	3.177 ^a	2.899 ^a	2.957 ^a	2.931 ^a	6.694 ^a	6.141 ^a	6.283 ^a	6.094 ^a	5.509 ^a	5.145 ^a	5.242 ^a	5.015 ^a
(Pseudo) R ²	6.97%	7.10%	7.06%	7.08%	3.62%	3.66%	3.76%	3.75%	11.20%	11.40%	11.80%	11.50%

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Insider purchases				Insider sales				Net purchases			
	all	acq	inf	stock	all	acq	inf	stock	all	acq	inf	stock
<i>Panel B: Early pre-announcement period</i>												
Constant	-4.333 ^a (0.819)	-4.245 ^a (0.824)	-4.857 ^a (0.870)	-4.527 ^a (0.846)	-5.077 ^b (2.332)	-4.632 ^c (2.498)	-3.860 (2.443)	-4.315 ^c (2.305)	-4.826 ^a (1.637)	-5.056 ^a (1.805)	-5.734 ^a (1.746)	-5.357 ^a (1.629)
Pre-announcement	-0.132 (0.157)	-0.123 (0.186)	0.318 (0.331)	0.033 (0.204)	-1.657 ^a (0.541)	-1.708 ^b (0.674)	-2.890 ^a (0.963)	-2.316 ^a (0.705)	0.821 ^b (0.415)	0.987 ^c (0.541)	2.168 ^a (0.798)	1.466 ^a (0.559)
Acquirer	0.288 ^c (0.170)	0.432 ^b (0.213)	0.604 (0.377)	0.145 (0.224)	0.158 (0.509)	-0.267 (0.646)	-1.557 (0.979)	-0.979 (0.660)	0.179 (0.411)	0.588 (0.544)	1.372 ^c (0.823)	0.912 ^c (0.539)
Acquirer x pre-ann.	-0.079 (0.231)	0.022 (0.283)	-0.241 (0.506)	-0.186 (0.299)	-0.003 (0.738)	0.557 (0.906)	3.123 ^b (1.373)	1.982 ^b (0.953)	-0.173 (0.574)	-0.659 (0.738)	-2.325 ^b (1.151)	-1.590 ^b (0.763)
Deal characteristic												
Deal ch.x pre-ann.												
Deal ch.x acquirer												
Deal ch.x acquirer x pre.												
$CAR_{init,2mb,ann.}$	-0.266 (0.182)	-0.276 (0.181)	-0.274 (0.183)	-0.277 (0.183)	-0.346 (0.640)	-0.353 (0.642)	-0.324 (0.643)	-0.337 (0.641)	0.358 (0.556)	0.355 (0.557)	0.349 (0.557)	0.350 (0.558)
Relative size	0.161 (0.148)	0.174 (0.146)	0.137 (0.146)	0.103 (0.156)	-0.375 (0.556)	-0.348 (0.553)	-0.311 (0.555)	-0.231 (0.580)	-0.131 (0.419)	-0.137 (0.416)	-0.151 (0.416)	-0.190 (0.434)
Pri. pro. length	0.718 ^a (0.085)	0.695 ^a (0.084)	0.736 ^a (0.086)	0.725 ^a (0.085)	2.108 ^a (0.263)	2.065 ^a (0.275)	2.052 ^a (0.273)	2.099 ^a (0.262)	-0.394 ^b (0.177)	-0.386 ^b (0.188)	-0.374 ^b (0.186)	-0.388 ^b (0.177)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Total effect by deal ch.		-0.296	-0.034	0.019		-0.939	-1.079	-2.145 ^c		0.591	0.518	1.246
# observations	2,108	2,108	2,108	2,108	2,108	2,108	2,108	2,108	2,108	2,108	2,108	2,108
F	3.677 ^a	3.434 ^a	3.518 ^a	3.362 ^a	7.126 ^a	6.626 ^a	6.594 ^a	6.466 ^a	6.726 ^a	6.198 ^a	6.239 ^a	6.104 ^a
(Pseudo) R ²	6.48%	6.64%	6.60%	6.58%	3.87%	3.89%	3.94%	3.96%	14.40%	14.50%	14.60%	14.70%

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Insider purchases				Insider sales				Net purchases			
	all	acq	inf	stock	all	acq	inf	stock	all	acq	inf	stock
<i>Panel C: Whole pre-announcement period</i>												
Constant	-3.368 ^a (0.848)	-3.130 ^a (0.876)	-3.824 ^a (0.913)	-3.561 ^a (0.875)	-2.050 (2.131)	-1.770 (2.263)	-0.609 (2.245)	-1.371 (2.104)	-4.911 ^a (1.600)	-4.861 ^a (1.742)	-5.897 ^a (1.711)	-5.412 ^a (1.594)
Pre-announcement	0.244	0.243	0.729 ^b	0.435 ^b	-0.837 ^c	-1.331 ^b	-2.619 ^a	-1.566 ^b	0.826 ^b	1.246 ^b	2.407 ^a	1.470 ^a
Acquirer	0.285	0.422 ^c	0.371	0.221	0.484	0.606	0.890	0.666	0.397	0.511	0.761	0.562
Acquirer x pre-ann.	(0.184)	(0.231)	(0.401)	(0.239)	(0.495)	(0.630)	(0.960)	(0.645)	(0.412)	(0.545)	(0.826)	(0.538)
Deal characteristic	-0.370 (0.246)	-0.286 (0.300)	-0.649 (0.537)	-0.419 (0.321)	-0.392 (0.673)	0.332 (0.826)	2.910 ^b (1.293)	1.418 (0.885)	-0.112 (0.554)	-0.743 (0.706)	-2.567 ^b (1.125)	-1.403 ^c (0.750)
Deal ch.x pre-ann.												
Deal ch.x acquirer												
Deal ch.x acquirer x pre.												
$CAR_{init,1mb,ann.}$	-0.272 (0.190)	-0.281 (0.189)	-0.275 (0.191)	-0.287 (0.191)	-0.484 (0.599)	-0.481 (0.599)	-0.462 (0.599)	-0.478 (0.599)	0.331 (0.528)	0.325 (0.528)	0.327 (0.528)	0.324 (0.530)
Relative size	0.054	0.080	0.034	0.002	-0.212	-0.213	-0.154	-0.118	-0.201	-0.181	-0.221	-0.249
Pri. pro. length	0.152	0.151	0.150	0.160	0.522	0.518	0.519	0.541	0.416	0.411	0.412	0.429
Control variables	0.594 ^a (0.093)	0.555 ^a (0.094)	0.608 ^a (0.095)	0.601 ^a (0.093)	1.475 ^a (0.235)	1.472 ^a (0.243)	1.418 ^a (0.246)	1.471 ^a (0.235)	-0.331 ^c (0.174)	-0.363 (0.180)	-0.308 ^c (0.184)	-0.327 ^c (0.174)
Total effect by deal ch.	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
# observations	2,108	2,108	2,108	2,108	2,108	2,108	2,108	2,108	2,108	2,108	2,108	2,108
F	3,242 ^a	3,010 ^a	3,058 ^a	2,995 ^a	6,635 ^a	6,030 ^a	6,171 ^a	6,054 ^a	6,708 ^a	6,128 ^a	6,231 ^a	6,118 ^a
(Pseudo) R ²	5.35%	5.50%	5.43%	5.45%	3.53%	3.55%	3.61%	3.60%	14.40%	14.50%	14.70%	14.60%

Table 4.5: Insider trading in acquiring firms before the public announcement: interaction effect of selling mechanism on method of payment

This table reports estimation results of insider purchases, sales and net purchases before the public announcement in acquiring firms participating in informal sales (Columns 1 to 3) and formal auctions (Columns 4 to 6). Panels A, B and C report results of insider trading immediately before the public announcement (two-month period before the public announcement in case the private selling process stays two months or longer and from the initiation date to the public announcement in case the length is shorter than two months), in the early pre-announcement period (initiation date to two months before the announcement in case the pre-announcement period takes two months or longer and zero in case the private selling process length is shorter than two months) and during the whole pre-announcement period (the initiation date to the public announcement), respectively. The dependent variables are purchases, sales and net purchases (i.e., purchases minus sales) by top executives and independent directors measured as percentage of equity in base points. Regression of purchases and sales uses the left-censored Tobit model and regression of net purchases uses the OLS model. The data covers 627 acquiring and 627 matched firms over the pre-announcement and the control period. We report Hubert/White robust standard errors in brackets. All variables are defined in Appendix 4.6.1 and are winsorized at the 1st and 99th percentiles, except for all dummy variables. Both year and industry dummies are included in the regressions but are not reported. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

	(1)	(2)	(3)	(4)	(5)	(6)
	Informal sales			Formal auctions		
	Insider purchases	Insider sales	Net purchases	Insider purchases	Insider sales	Net purchases
<i>Panel A: Immediately before announcement</i>						
Constant	-1.566 (1.065)	-3.085 (2.608)	-4.136 ^a (1.565)	0.890 (3.232)	13.49 ^b (5.285)	-8.611 ^b (3.544)
Pre-announcement	-1.006 ^a (0.322)	-2.955 ^a (1.008)	0.801 (0.685)	-1.120 ^c (0.666)	-6.244 ^a (1.304)	3.194 ^a (0.951)
Acquirer	0.268 (0.265)	-0.963 (0.786)	0.848 (0.614)	-0.615 (0.589)	-2.207 ^c (1.179)	1.324 (0.978)
Acquirer x pre-ann.	-0.773 (0.499)	-0.522 (1.267)	-0.021 (0.863)	-1.280 (1.035)	3.069 ^c (1.647)	-2.326 ^c (1.231)
Stock	0.309 (0.256)	-0.657 (0.978)	0.515 (0.715)	-0.853 (0.723)	-2.677 ^c (1.587)	1.670 (1.291)
Stock x pre-ann.	-0.614 (0.468)	0.408 (1.325)	-0.297 (0.882)	0.919 (1.129)	-0.161 (2.145)	0.311 (1.517)
Stock x acquirer	-0.229 (0.387)	2.835 ^b (1.143)	-1.868 ^b (0.892)	2.847 ^a (0.982)	0.406 (1.870)	1.150 (1.530)
Stock x acquirer x pre.	-0.044 (0.677)	-4.573 ^b (1.831)	2.029 ^c (1.191)	-2.577 (1.717)	-0.843 (3.177)	-1.528 (2.040)
$CAR_{init.,1mb.ann.}$	-0.444 ^c (0.251)	0.550 (0.810)	-0.470 (0.543)	0.705 (0.632)	-1.556 (1.087)	1.441 ^c (0.859)
Relative size	-0.207 (0.218)	0.018 (0.673)	-0.166 (0.427)	-1.477 ^c (0.815)	-1.714 (1.421)	0.248 (0.873)
Pri. pro. length	0.355 ^a (0.110)	0.963 ^a (0.290)	-0.146 (0.174)	-0.132 (0.410)	-0.434 (0.583)	0.356 (0.378)
Control variables	YES	YES	YES	YES	YES	YES
Total effect by stock	-0.817 ^c	-5.095 ^a	2.008 ^b	-3.857 ^a	2.226	-3.854 ^b
# observations	1,598	1,598	1,598	510	510	510
F	2.325 ^a	4.290 ^a	3.835 ^a	1.310 ^c	3.050 ^a	2.648 ^a
(Pseudo) R ²	8.23%	3.60%	10.10%	9.52%	6.76%	27.80%

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	(1)	(2)	(3)	(4)	(5)	(6)
	Informal sales			Formal auctions		
	Insider purchases	Insider sales	Net purchases	Insider purchases	Insider sales	Net purchases
<i>Panel B: Early pre-announcement period</i>						
Constant	-4.551 ^a (0.932)	-9.475 ^a (2.654)	-2.849 (1.783)	-2.878 (1.859)	13.69 ^a (5.289)	-14.62 ^a (4.502)
Pre-announcement	-0.090 (0.213)	-1.971 ^b (0.903)	0.919 (0.692)	0.300 (0.400)	-2.813 ^a (1.055)	2.393 ^b (0.944)
Acquirer	0.295 (0.246)	-0.779 (0.806)	0.892 (0.639)	-0.193 (0.470)	-1.903 (1.165)	1.279 (1.026)
Acquirer x pre-ann.	-0.277 (0.329)	0.944 (1.187)	-0.784 (0.910)	0.182 (0.601)	4.060 ^a (1.528)	-3.316 ^b (1.360)
Stock	0.268 (0.236)	-1.138 (1.025)	0.693 (0.778)	-0.526 (0.568)	-1.734 (1.553)	1.256 (1.348)
Stock x pre-ann.	-0.340 (0.324)	1.207 (1.284)	-0.880 (0.956)	0.378 (0.713)	0.268 (1.979)	-0.997 (1.700)
Stock x acquirer	-0.198 (0.364)	2.761 ^b (1.206)	-1.957 ^b (0.948)	2.134 ^a (0.794)	0.465 (1.865)	0.698 (1.619)
Stock x acquirer x pre.	0.441 (0.487)	-3.731 ^b (1.762)	2.325 ^c (1.316)	-1.073 (1.093)	-2.982 (2.690)	2.912 (2.240)
$CAR_{init.,2mb.ann.}$	-0.395 ^c (0.212)	-0.665 (0.808)	0.414 (0.688)	0.022 (0.373)	-0.417 (1.115)	0.600 (1.020)
Relative size	0.159 (0.168)	-0.023 (0.689)	-0.321 (0.519)	-0.526 (0.375)	-0.333 (1.220)	-0.458 (0.885)
Pri. pro. length	0.727 ^a (0.094)	2.539 ^a (0.322)	-0.590 ^a (0.205)	0.603 ^a (0.220)	0.272 (0.584)	0.399 (0.496)
Control variables	YES	YES	YES	YES	YES	YES
Total effect by stock	0.164	-2.787 ^b	1.541	-0.891	1.078	-0.404
# observations	1,598	1,598	1,598	510	510	510
F	2.943 ^a	4.672 ^a	4.393 ^a	1.357 ^c	4.777 ^a	15.88 ^a
(Pseudo) R ²	7.94%	4.12%	14.00%	7.63%	4.98%	25.70%

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	(1)	(2)	(3)	(4)	(5)	(6)
	Informal sales			Formal auctions		
	Insider purchases	Insider sales	Net purchases	Insider purchases	Insider sales	Net purchases
<i>Panel C: Whole pre-announcement period</i>						
Constant	-3.622 ^a (0.965)	-6.001 ^b (2.399)	-2.920 ^c (1.743)	-1.147 (2.075)	14.37 ^a (5.081)	-13.89 ^a (4.404)
Pre-announcement	0.310 (0.226)	-0.826 (0.840)	0.806 (0.697)	0.688 (0.448)	-2.793 ^a (1.021)	2.622 ^a (0.941)
Acquirer	0.313 (0.265)	-0.859 (0.779)	0.915 (0.638)	-0.387 (0.499)	-1.896 ^c (1.142)	1.235 (1.013)
Acquirer x pre-ann.	-0.456 (0.356)	0.082 (1.074)	-0.438 (0.883)	-0.167 (0.636)	4.006 ^a (1.463)	-3.408 ^b (1.344)
Stock	0.349 (0.248)	-0.972 (0.990)	0.675 (0.781)	-0.729 (0.600)	-1.916 (1.505)	1.295 (1.324)
Stock x pre-ann.	-0.441 (0.344)	1.009 (1.157)	-0.818 (0.927)	0.544 (0.746)	0.964 (1.771)	-0.919 (1.572)
Stock x acquirer	-0.191 (0.394)	2.767 ^b (1.167)	-1.971 ^b (0.952)	2.369 ^a (0.844)	0.424 (1.815)	0.816 (1.600)
Stock x acquirer x pre.	0.335 (0.510)	-2.927 ^c (1.584)	1.987 (1.275)	-1.225 (1.116)	-3.529 (2.439)	2.467 (2.072)
$CAR_{init.,1mb.ann.}$	-0.387 ^c (0.220)	-0.551 (0.734)	0.187 (0.632)	0.082 (0.388)	-0.980 (1.037)	1.059 (0.971)
Relative size	-0.017 (0.171)	0.151 (0.635)	-0.447 (0.514)	-0.443 (0.401)	-0.518 (1.163)	-0.229 (0.868)
Pri. pro. length	0.636 ^a (0.102)	1.799 ^a (0.285)	-0.513 ^b (0.200)	0.254 (0.279)	0.040 (0.545)	0.361 (0.492)
Control variables	YES	YES	YES	YES	YES	YES
Total effect by stock	-0.121	-2.845 ^b	1.549 ^c	-1.392	0.477	-0.941
# observations	1,598	1,598	1,598	510	510	510
F	2.544 ^a	4.432 ^a	4.531 ^a	1.339 ^c	4.002 ^a	10.10 ^a
(Pseudo) R ²	6.65%	3.66%	14.00%	6.68%	5.18%	26.60%

Table 4.6: Insider trading in acquiring firms after the public announcement: deal initiation, selling mechanism and method of payment

This table reports estimation results of insider purchases (Columns 1 to 4), insider sales (Columns 5 to 8) and net purchases (Columns 9 to 12) in acquiring firms after the public announcement. The dependent variables are purchases, sales and net purchases (i.e., purchases minus sales) by top executives and independent directors measured as percentage of equity in base points. Regression of purchases and sales uses the left-censored Tobit model and regression of net purchases uses the OLS model. The data covers 627 acquiring and 627 matched firms over the post-announcement and the control period. We report Hubert/White robust standard errors in brackets. All variables are defined in Appendix 4.6.1 and are winsorized at the 1st and 99th percentiles, except for all dummy variables. Both year and industry dummies are included in the regressions but are not reported. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Insider purchases			Insider sales				Net purchases				
	all	acq	inf	stock	all	acq	inf	stock	all	acq	inf	stock
Constant	-10.05 ^a (1.240)	-10.24 ^a (1.267)	-10.20 ^a (1.278)	-10.10 ^a (1.276)	-4.872 ^c (2.771)	-4.441 (2.814)	-3.434 (2.978)	-5.261 ^c (2.802)	-7.181 ^a (1.952)	-7.549 ^a (1.999)	-8.176 ^a (2.166)	-7.029 ^a (1.979)
Post-announcement	-0.209 (0.209)	-0.259 (0.277)	0.115 (0.472)	-0.049 (0.310)	-0.862 (0.644)	-1.539 ^b (0.862)	-3.399 ^b (1.453)	-1.063 (0.910)	0.711 (0.438)	0.968 (0.603)	2.708 ^b (1.075)	0.818 (0.603)
Acquirer	0.324 (0.215)	0.582 ^b (0.275)	0.636 (0.526)	0.470 (0.336)	-0.394 (0.671)	-1.085 (0.867)	-3.602 ^b (1.638)	-0.349 (0.970)	0.675 (0.493)	1.175 ^c (0.637)	2.654 ^b (1.221)	0.738 (0.704)
Acquirer x post-ann.	0.333 (0.302)	0.196 (0.391)	-0.148 (0.700)	-0.140 (0.457)	0.524 (0.847)	1.669 (1.108)	4.635 ^b (1.996)	2.075 ^c (1.255)	-0.578 (0.595)	-1.182 (0.778)	-3.509 ^b (1.430)	-1.808 ^b (0.876)
Deal characteristic		-0.004 (0.296)	0.372 (0.373)	0.093 (0.297)		-0.921 (0.996)	-3.465 ^b (1.372)	0.103 (1.051)		0.283 (0.717)	2.331 ^b (1.053)	-0.334 (0.768)
Deal ch.x post-ann.		0.103 (0.423)	-0.408 (0.522)	-0.264 (0.408)		1.756 (1.211)	3.376 ^b (1.564)	0.444 (1.210)		-0.706 (0.822)	-2.642 ^b (1.138)	-0.233 (0.828)
Deal ch.x acquirer		-0.690 (0.432)	-0.392 (0.574)	-0.242 (0.424)		1.782 (1.342)	4.225 ^b (1.779)	-0.015 (1.335)		-1.288 (0.973)	-2.608 ^b (1.316)	-0.168 (0.982)
Deal ch.x acquirer x post.		0.379 (0.616)	0.609 (0.781)	0.780 (0.606)		-2.932 ^c (1.749)	-5.431 ^b (2.201)	-3.123 ^c (1.704)		1.549 (0.336)	3.878 ^b (1.568)	2.586 ^b (1.193)
Relative size	0.174 (0.207)	0.190 (0.205)	0.165 (0.206)	0.165 (0.208)	-0.125 (0.622)	-0.131 (0.617)	-0.048 (0.606)	-0.045 (0.629)	0.012 (0.443)	0.036 (0.440)	-0.038 (0.433)	0.005 (0.447)
Pub. pro. length	1.578 ^a (0.179)	1.605 ^a (0.184)	1.557 ^a (0.182)	1.570 ^a (0.188)	1.635 ^a (0.403)	1.621 ^a (0.413)	1.793 ^a (0.416)	1.753 ^a (0.431)	0.187 (0.276)	0.231 (0.284)	0.087 (0.281)	0.159 (0.299)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Total effect by deal ch.		0.575	0.461	0.640		-1.263	-0.796	-1.048		0.367	0.369	0.718
# observations	2,122	2,122	2,122	2,122	2,122	2,122	2,122	2,122	2,122	2,122	2,122	2,122
F	3.867 ^a	3.581 ^a	3.590 ^a	3.548 ^a	3.598 ^a	3.302 ^a	3.294 ^a	3.402 ^a	3.734 ^a	3.446 ^a	3.382 ^a	3.650 ^a
(Pseudo) R ²	9.87%	10.00%	9.90%	9.92%	1.68%	1.71%	1.81%	1.76%	7.78%	7.93%	8.37%	8.28%

Table 4.7: Insider trading in acquiring firms after the public announcement: reinforcing effect of payment consideration on selling mechanism

This table reports estimation results of insider purchases, sales and net purchases after the public announcement in acquiring firms paying for stock (Columns 1 to 3) cash (Columns 4 to 6). The dependent variables are purchases, sales and net purchases (i.e, purchases minus sales) by top executives and independent directors measured as percentage of equity in base points. Regression of purchases and sales uses the left-censored Tobit model and regression of net purchases uses the OLS model. The data covers 627 acquiring and 627 matched firms over the post-announcement and the control period. We report Hubert/White robust standard errors in brackets. All variables are defined in Appendix 4.6.1 and are winsorized at the 1st and 99th percentiles, except for all dummy variables. Both year and industry dummies are included in the regressions but are not reported. ^a, ^b and ^c indicate significance at the one-, five- and ten-percent levels.

	(1)	(2)	(3)	(4)	(5)	(6)
	Stock deals			Cash deals		
	Insider purchases	Insider sales	Net purchases	Insider purchases	Insider sales	Net purchases
Constant	-7.701 ^a (1.824)	-4.948 (4.724)	-5.712 ^c (3.442)	-11.05 ^a (1.928)	-2.396 (4.072)	-11.19 ^a (2.901)
Post-announcement	-0.777 (0.769)	-2.186 (2.080)	1.486 (1.537)	0.524 (0.529)	-4.097 ^b (1.923)	3.406 ^b (1.423)
Acquirer	1.560 ^c (0.805)	-4.107 (2.589)	2.957 (1.947)	-0.172 (0.628)	-3.229 (2.068)	2.404 (1.552)
Acquirer x post-ann.	1.032 (1.106)	1.312 (3.075)	-0.783 (2.199)	-0.917 (0.846)	6.101 ^b (2.494)	-4.910 ^a (1.797)
Informal sale	0.732 (0.561)	-2.362 (1.896)	1.533 (1.478)	-0.075 (0.430)	-4.619 ^b (1.873)	3.169 ^b (1.415)
Informal x post-ann.	0.502 (0.809)	1.817 (2.296)	-1.120 (1.693)	-0.695 (0.604)	4.464 ^b (2.106)	-3.682 ^b (1.499)
Informal x acquirer	-1.530 ^c (0.854)	4.250 (2.777)	-2.719 (2.096)	0.750 (0.725)	4.911 ^b (2.289)	-2.968 ^c (1.671)
Informal x acquirer x post.	-0.501 (1.189)	-2.693 (3.312)	1.779 (2.370)	1.091 (0.981)	-6.210 ^b (2.870)	4.549 ^b (2.030)
Relative size	0.443 ^c (0.257)	0.777 (0.694)	-0.434 (0.506)	-0.930 ^b (0.398)	-1.454 (1.371)	0.486 (0.920)
Pub. pro. length	1.050 ^a (0.255)	1.231 (0.793)	0.423 (0.580)	1.796 ^a (0.333)	2.865 ^a (0.585)	-0.343 (0.371)
Control variables	YES	YES	YES	YES	YES	YES
Total effect by informal	0.531	-1.381	0.996	0.174	-0.109	-0.361
# observations	1,061	1,061	1,061	1,061	1,061	1,061
F	2.138 ^a	2.323 ^a	2.751 ^a	1.330 ^c	1.965 ^a	2.029 ^a
(Pseudo) R ²	7.03%	2.54%	11.30%	14.60%	2.23%	10.50%

Chapter 5

Concluding Remarks

The thesis presents discussions concerning M&A deal initiation, managers' motivation in actively participation and insiders' trades in target and acquiring firms in three separate chapters.

The main aim of Chapter 2 is to explore explore empirically the reasons for why a board of directors might decide to sell its firm and how the board incentivizes its managers for the sale. Overall, our analysis shows that even though target versus bidder initiated deal firms are quite alike and together much more different from non-deal firms, they still differ in two important respects in terms of the CEO motivation and firm specific circumstances. The first difference indicates that CEOs in target versus bidder initiated deals are more motivated for active participation in takeover negotiations. Second, it suggests that the firm intends to avoid possible future financial distress that would largely destroy firm value associated with valuable growth options.

The main focus of Chapter 3 is to analyze target insiders' trades before and after the takeover public announcement depending on deal characteristics. In particular, we consider the deal initiation, selling mechanism, payment con-

sideration and buyer type. First, we shows that target insiders in all deals stop selling during 6 months immediately before the public announcement but do not stop selling in the early pre-announcement period. Second, deal characteristics do matter for insiders' trading activities during the pre- and post-announcement periods. Third, we find that insiders are willing to change their trading patterns turning from before to after the public announcement.

Chapter 4 also mainly explores the effect of deal characteristics on insiders' trade, but for acquiring firms. This chapter shows that, overall, acquirer insiders reduce their purchases and sales to the same extent during the 2-months immediately before the public announcement. Furthermore, insider trading differs depending on the selling mechanism and payment method before and after the public announcement. The two factors reinforce each other.

Future research could improve the analysis in several aspects. For both Chapters 3 and 4, to control for differing patterns of insider trading during a calendar year, one could first rematch the 2 control periods exactly in the same months with the pre- and post-announcement period. Second, one could check trades by other groups of insiders. One additional analysis might be valuable for Chapter 3 is to figure out when do insiders in stock deals sell after the public announcement. Do they sell immediately at the public announcement date or later after the announcement?

For Chapter 4, we present three additional points. First, one can figure out whether the Global Financial Crisis affect insiders' trades, especially in the control periods. Second, one can check insider trading by firm and industry characteristics. Finally, it might be valuable to analyze long-term stock and operating abnormal performance of acquiring firms relatively to matched firms that do not have a takeover.

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