Target insiders' trades around the takeover announcement date

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Abstract

Previous literature has documented that, due to legal jeopardy, insiders of target firms decrease their purchases before the public announcement of a takeover deal. At the same time, they drop their sales and, so, overall their net purchases increase. In this paper, we show that 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 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 firm outside of the treatment period and at the same time for change in insider trading in matched firms. Our sample of 1098 US publicly listed target firms is over the period from 2005 until 2011. We show that insiders are stronger net buyers before the public announcement in firms that are sold through informal sales, in firms that are paid for in cash and in firms that are acquired by financial buyers. Furthermore, 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 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 insiders are willing to adjust their trading after the public announcement and bet on certainty of deal completion rather than increased deal value.

Keywords: Mergers and acquisitions; Insider trading; Target firms
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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 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.

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

[1] Insider 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.

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

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

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 probability 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.

Our paper 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 lengthly 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 reminder of the paper is organized as follows. Section 2 builds the hypotheses concerning both the pre- and post-announcement periods. Section 3 introduces the data, explains the coding and the matching process and provides basic statistics. Section 4 shows and discusses the regression results and Section 5 concludes.

2 Hypotheses

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

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

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 relatively 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

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

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).

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 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 deal announcement differ depending on the deal initiation, selling mechanism, payment consideration and buyer type.*

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

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

[6] Note 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.

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 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.

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

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

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-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 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 bough 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 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 the 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 of 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.

3.1 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 EGDAR 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 1 repots 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 A. We test for differences in means using the t-test allowing for unequal variances.

- insert Table 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 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 performance 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 strategic 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%).

3.2 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 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

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

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

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 +/–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 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,

[10] All 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.

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 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 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 reports target insider purchases and sales during the post-announcement period.

Similarly to Table 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 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 results 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.

4 Results

Tables 4 to 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.

4.1 Results for pre-announcement insider trading

Table 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

[11]Coefficients 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).

'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 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 relatively 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

[12] The 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.

buying by quite a large margin. The triple interaction term is significantly positive and the total effect is significantly negative 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 outweight their diversification and liquidity needs.

- insert Table 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 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 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).

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 insiders do not seem restricted by the regulation and do not stop buying even in formal auctions when it is quite sure that a deal in inevitable. As expected, results in Panel C for the whole

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

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.

4.2 Results for post-announcement insider trading

Table 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 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 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 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

[14]We 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 **??**). The division would not result in different conclusions.

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 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 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 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 7 shows that this is indeed the case for deal initiation and payment consideration.[15] Insider

[15] Differences 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 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.

net purchases are large and significantly negative 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 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 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.

5 Conclusion

The main aim of the paper is to analyze insider trading in target firms before and after the takeover pubic 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 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 paper 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.

Appendix A 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
$CAR_{-1,+1}$	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

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Variable	Definition	Source
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
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 sales	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 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 (2011).	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 calender 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

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Variable	Definition	Source
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
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
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

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Table 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 A. All variables are winsorized at the 1^{st} and 99^{th} 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.

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

Table 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 A and winsorized at the 1^{st} and 99^{th} 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 Pre-ann.	2 Control	3 Pre-ann.	4 Control	1 vs 2	1 vs 3	3 vs 4	(1-2) vs (3-4)
Panel A: Insider purchases								
All deals								
$ shares (USD millions)	0.011	0.026	0.038	0.034	-0.015^{a}	-0.026^{a}	0.004	-0.018^{b}
% equity (base points)	0.630	1.401	1.834	1.733	-0.771^{a}	-1.205^{a}	0.101	-0.872^{b}
Bidder initiated								
$ shares (USD millions)	0.011	0.026	0.037	0.027	-0.016^{b}	-0.027^{a}	0.010	-0.026^{a}
% equity (base points)	0.605	1.302	1.593	1.309	-0.696^{b}	-0.988^{a}	0.284	-0.981^{b}
Target initiated								
$ shares (USD millions)	0.012	0.026	0.038	0.043	-0.014^{c}	-0.026^{a}	-0.005	-0.009
% equity (base points)	0.661	1.525	2.137	2.266	-0.864^{b}	-1.477^{a}	-0.129	-0.735
Informal sales								
$ shares (USD millions)	0.011	0.026	0.042	0.038	-0.015^{a}	-0.031^{a}	0.003	-0.019^{b}
% equity (base points)	0.516	1.257	1.813	2.063	-0.741^{a}	-1.298^{a}	-0.250	-0.492
Formal auction								
$ shares (USD millions)	0.013	0.027	0.030	0.026	-0.014^{c}	-0.017^{c}	0.004	-0.018
% equity (base points)	0.860	1.691	1.877	1.069	-0.831^{b}	-1.017^{b}	0.808	-1.639^{a}
Cash								
$ shares (USD millions)	0.011	0.022	0.035	0.032	-0.011^{b}	-0.024^{a}	0.003	-0.014^{c}
% equity (base points)	0.693	1.340	1.862	1.829	-0.647^{b}	-1.168^{a}	0.032	-0.679^{c}
Stock								
$ shares (USD millions)	0.012	0.036	0.044	0.040	-0.024^{b}	-0.032^{a}	0.004	-0.028^{c}
% equity (base points)	0.482	1.540	1.771	1.511	-1.058^{b}	-1.289^{a}	0.260	-1.318^{b}
Strategic								
$ shares (USD millions)	0.012	0.029	0.039	0.037	-0.017^{a}	-0.027^{a}	0.002	-0.019^{b}
% equity (base points)	0.614	1.480	1.885	1.769	-0.867^{a}	-1.272^{a}	0.116	-0.983^{b}
Financial								
$ shares (USD millions)	0.010	0.019	0.035	0.026	-0.009	-0.025^{b}	0.009	-0.018
% equity (base points)	0.680	1.154	1.678	1.623	-0.474	-0.998^{c}	0.055	-0.529

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

Table 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), control (Column 2) and pre-announcement (Column 3) period and matched firms during the post-announcement (Column 4), control (Column 5) and 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 A and winsorized at the 1^{st} and 99^{th} 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 Post-ann.	2 Control	3 Pre-ann.	4 Post-ann.	5 Control	6 Pre-ann.	1 vs 2	1 vs 3	1 vs 4	4 vs 5	4 vs 6	(1-2) vs (4-5)
Panel A: Insider purchases												
All deals												
$ 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}
Bidder initiated												
$ 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}
Target initiated												
$ 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
Informal sales												
$ 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}
Formal auction												
$ 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
Cash												
$ 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}
Stock												
$ 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
Strategic												
$ 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}
Financial												
$ shares (USD millions)	0.008	0.013	0.010	0.027	0.016	0.035	-0.005	-0.002	-0.020^{b}	0.012	-0.008	-0.017
% equity (base points)	0.191	0.557	0.680	1.125	0.844	1.678	-0.366	-0.489	-0.933^{a}	0.281	-0.553	-0.646

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

Table 4: Insider trading in target firms before public announcements: 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 A and are winsorized at the 1^{st} and 99^{th} 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
Panel A: Immediately before announcement															
Constant	-10.46^a	-10.27^a	-12.07^a	-10.23^a	-10.48^a	-15.10^a	-15.38^a	-16.26^a	-16.20^a	-14.70^a	-4.151^b	-4.485^b	-3.600^c	-3.812^c	-4.513^b
	(2.323)	(2.398)	(2.400)	(2.345)	(2.326)	(4.048)	(4.135)	(4.178)	(4.210)	(4.026)	(1.976)	(2.048)	(2.016)	(2.049)	(1.979)
Pre-announcement	-2.365^a	-2.648^a	-1.598^b	-2.361^a	-2.426^a	-3.260^a	-3.661^a	-3.854^a	-3.706^b	-4.448^a	1.137^b	1.331	1.396^c	1.515^c	2.016^a
	(0.545)	(0.774)	(0.793)	(0.799)	(0.616)	(0.967)	(1.387)	(1.467)	(1.534)	(1.110)	(0.565)	(0.813)	(0.806)	(0.853)	(0.633)
Target	-0.266	-0.789	1.453^c	0.136	-0.139	-0.776	-1.274	-2.836^b	-2.241	-0.951	0.780	0.908	2.212^a	1.642^c	1.076
	(0.483)	(0.764)	(0.746)	(0.840)	(0.559)	(0.908)	(1.444)	(1.374)	(1.500)	(1.080)	(0.572)	(0.910)	(0.772)	(0.895)	(0.685)
Target x pre-ann.	-5.014^a	-4.714^a	-9.708^a	-4.604^a	-4.863^a	-5.481^a	-4.960^b	-4.935^b	-1.887	-4.223^a	0.307	-0.178	-1.525	-1.901^c	-0.646
	(0.806)	(1.192)	(1.440)	(1.240)	(0.892)	(1.277)	(2.000)	(2.111)	(2.140)	(1.455)	(0.700)	(1.113)	(1.014)	(1.114)	(0.813)
Deal characteristic		-0.538	1.465^b	-0.088	-0.115		-0.193	0.522	1.170	-2.335		0.267	-0.340	-0.411	1.749^c
		(0.729)	(0.733)	(0.713)	(0.815)		(1.423)	(1.442)	(1.475)	(1.448)		(0.889)	(0.876)	(0.898)	(0.903)
Deal ch.x pre-ann.		0.540	-1.147	-0.014	0.234		0.751	0.926	0.675	4.613^b		-0.348	-0.397	-0.560	-3.544^a
		(1.006)	(1.022)	(1.005)	(1.171)		(1.877)	(1.897)	(1.927)	(2.145)		(1.108)	(1.086)	(1.105)	(1.294)
Deal ch.x target		0.976	-2.652^a	-0.580	-0.534		0.885	3.073^c	2.042	0.617		-0.234	-2.143^b	-1.221	-1.183
		(0.989)	(0.981)	(1.018)	(1.081)		(1.874)	(1.813)	(1.872)	(1.918)		(1.176)	(1.088)	(1.147)	(1.191)
Deal ch.x target x pre.		-0.564	6.838^a	-0.653	-0.689		-0.947	-0.935	-5.043^c	-4.888^c		0.863	2.749^b	3.143^b	3.861^b
		(1.524)	(1.658)	(1.526)	(1.849)		(2.567)	(2.641)	(2.673)	(2.917)		(1.420)	(1.363)	(1.424)	(1.598)
$CAR_{init.,1mb.ann.}$	-0.773	-0.799	-0.800	-0.792	-0.781	2.854^a	2.806^a	2.717^a	2.888^a	2.833^a	-0.930^c	-0.958^c	-0.880	-0.948^c	-0.918^c
	(0.546)	(0.548)	(0.544)	(0.545)	(0.546)	(0.902)	(0.908)	(0.898)	(0.898)	(0.896)	(0.562)	(0.567)	(0.561)	(0.561)	(0.558)
Pri. pro. length	1.634^a	1.639^a	1.721^a	1.645^a	1.655^a	1.640^a	1.695^a	1.877^a	1.600^a	1.693^a	0.006	0.034	-0.099	0.025	-0.015
	(0.244)	(0.252)	(0.254)	(0.243)	(0.244)	(0.408)	(0.415)	(0.418)	(0.405)	(0.410)	(0.197)	(0.202)	(0.203)	(0.196)	(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%

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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
Panel B: Early pre-announcement period															
Constant	-49.13^{a}	-49.49^{a}	-50.42^{a}	-48.76^{a}	-49.59^{a}	-107.3^{a}	-105.9^{a}	-108.8^{a}	-109.8^{a}	-107.1^{a}	2.074	1.242	2.722	3.168	1.930
	(4.305)	(4.345)	(4.409)	(4.331)	(4.387)	(9.816)	(9.981)	(10.08)	(10.10)	(9.829)	(2.362)	(2.531)	(2.450)	(2.411)	(2.360)
Pre-announcement	-2.101^{a}	-2.059^{b}	-0.951	-1.118	-1.756^{b}	-4.069^{a}	-3.569^{c}	-3.191	-2.925	-4.526^{b}	0.645	0.636	0.421	0.032	0.950
	(0.664)	(0.931)	(0.980)	(1.018)	(0.772)	(1.508)	(2.136)	(2.282)	(2.489)	(1.805)	(0.606)	(0.937)	(0.971)	(0.796)	(0.707)
Target	-0.325	-1.141	1.366	0.330	-0.013	-1.768	-2.191	-2.877	-2.244	-2.394	1.122^{b}	1.058	1.946^{b}	0.956	1.441^{b}
	(0.563)	(0.846)	(0.845)	(0.999)	(0.650)	(1.251)	(1.967)	(1.960)	(1.976)	(1.494)	(0.520)	(0.923)	(0.793)	(0.666)	(0.617)
Target x pre-ann.	-2.440^{a}	-1.890	-4.519^{a}	-4.149^{a}	-3.131^{a}	-0.359	0.089	-1.881	-0.499	0.572	-1.100	-1.103	-1.150	-0.964	-1.626^{c}
	(0.870)	(1.200)	(1.332)	(1.487)	(1.016)	(1.872)	(2.791)	(2.936)	(3.214)	(2.262)	(0.712)	(1.219)	(1.148)	(1.015)	(0.853)
Deal characteristic		-0.010	1.859^{b}	-0.270	-0.469		-0.718	1.105	2.663	-2.814		0.546	-0.389	-1.339^{c}	1.483
		(0.847)	(0.868)	(0.828)	(0.953)		(1.980)	(2.064)	(1.973)	(2.082)		(0.909)	(0.924)	(0.791)	(0.945)
Deal ch.x pre-ann.		-0.079	-1.825	-1.453	-1.470		-1.077	-1.407	-1.509	1.517		0.038	0.332	0.850	-1.168
		(1.268)	(1.300)	(1.287)	(1.356)		(2.876)	(2.937)	(3.009)	(2.914)		(1.184)	(1.196)	(1.062)	(1.188)
Deal ch.x target		1.622	-2.731^{b}	-0.932	-1.278		0.847	1.789	0.639	2.326		0.101	-1.238	0.246	-1.308
		(1.141)	(1.139)	(1.201)	(1.274)		(2.522)	(2.547)	(2.504)	(2.678)		(1.093)	(1.044)	(0.958)	(1.123)
Deal ch.x target x pre.		-1.066	3.374^{c}	2.463	2.847		-0.878	2.406	0.212	-3.473		-0.000	0.084	-0.202	2.150
		(1.712)	(1.731)	(1.803)	(1.942)		(3.737)	(3.778)	(3.942)	(3.973)		(1.473)	(1.452)	(1.373)	(1.523)
$CAR_{init.,6mb.ann.}$	-0.400	-0.436	-0.391	-0.437	-0.390	1.591	1.641	1.586	1.659	1.617	-1.616^{c}	-1.656^{b}	-1.600^{c}	-1.641^{c}	-1.622^{c}
	(0.619)	(0.622)	(0.618)	(0.620)	(0.619)	(1.513)	(1.511)	(1.511)	(1.509)	(1.518)	(0.839)	(0.840)	(0.839)	(0.839)	(0.840)
Pri. pro. length	6.743^{a}	6.797^{a}	6.779^{a}	6.775^{a}	6.829^{a}	15.94^{a}	15.79^{a}	16.09^{a}	15.88^{a}	16.05^{a}	-1.269^{a}	-1.182^{a}	-1.363^{a}	-1.243^{a}	-1.326^{a}
	(0.479)	(0.484)	(0.487)	(0.480)	(0.485)	(1.101)	(1.106)	(1.122)	(1.093)	(1.115)	(0.161)	(0.175)	(0.178)	(0.159)	(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}	5.763^{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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	(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
Panel C: Whole pre-announcement period															
Constant	-25.98^a	-25.85^a	-28.07^a	-25.30^a	-25.98^a	-36.29^a	-36.53^a	-38.76^a	-37.49^a	-35.76^a	-3.825	-4.129	-2.681	-3.384	-4.234
	(3.375)	(3.473)	(3.505)	(3.380)	(3.383)	(6.193)	(6.388)	(6.406)	(6.444)	(6.158)	(2.740)	(2.897)	(2.788)	(2.848)	(2.747)
Pre-announcement	0.211	0.677	1.505	0.499	0.046	0.154	1.026	0.897	-0.758	-1.350	0.529	0.551	0.420	0.954	1.571^c
	(0.691)	(1.007)	(1.034)	(1.035)	(0.795)	(1.516)	(2.228)	(2.279)	(2.473)	(1.749)	(0.801)	(1.171)	(1.158)	(1.190)	(0.903)
Target	-0.356	-1.039	1.783^c	0.137	-0.214	-1.650	-2.879	-3.954^b	-3.321	-1.839	1.176^c	1.425	2.564^a	2.080^b	1.510^c
	(0.627)	(1.003)	(0.933)	(1.102)	(0.732)	(1.281)	(2.086)	(1.987)	(2.082)	(1.534)	(0.705)	(1.144)	(0.923)	(1.061)	(0.856)
Target x pre-ann.	-4.800^a	-4.661^a	-8.192^a	-5.515^a	-4.873^a	-4.898^a	-2.942	-4.448	-0.438	-3.688^a	-0.039	-0.739	-1.475	-2.312	-1.171
	(0.954)	(1.399)	(1.488)	(1.520)	(1.076)	(1.819)	(2.793)	(2.881)	(3.118)	(2.126)	(0.923)	(1.471)	(1.359)	(1.464)	(1.084)
Deal characteristic		-0.121	2.379^b	-0.655	-0.798		0.799	2.028	1.286	-3.955^c		0.114	-0.936	-0.500	2.441^b
		(0.932)	(0.939)	(0.921)	(1.024)		(2.159)	(2.186)	(2.171)	(2.172)		(1.179)	(1.140)	(1.151)	(1.171)
Deal ch.x pre-ann.		-0.909	-1.967	-0.452	0.638		-1.592	-1.111	1.333	5.758^c		-0.036	0.156	-0.630	-4.172^b
		(1.324)	(1.341)	(1.311)	(1.479)		(2.929)	(2.954)	(3.029)	(3.205)		(1.542)	(1.518)	(1.518)	(1.747)
Deal ch.x target		1.267	-3.300^a	-0.709	-0.632		2.147	3.428	2.328	0.624		-0.443	-2.078	-1.281	-1.335
		(1.286)	(1.255)	(1.331)	(1.389)		(2.697)	(2.600)	(2.630)	(2.670)		(1.468)	(1.330)	(1.389)	(1.416)
Deal ch.x target x pre.		-0.209	5.196^a	1.030	0.367		-3.470	-0.719	-6.259	-4.574		1.234	2.161	3.236^c	4.583^b
		(1.782)	(1.809)	(1.838)	(2.028)		(3.637)	(3.657)	(3.857)	(3.982)		(1.871)	(1.807)	(1.883)	(2.062)
$CAR_{init.,1m.b.ann.}$	-0.399	-0.443	-0.443	-0.438	-0.406	2.183	2.133	2.022	2.230	2.165	-0.939	-0.965	-0.865	-0.961	-0.923
	(0.712)	(0.719)	(0.709)	(0.711)	(0.713)	(1.514)	(1.529)	(1.506)	(1.508)	(1.516)	(0.848)	(0.859)	(0.847)	(0.845)	(0.848)
Pri. pro. length	3.655^a	3.642^a	3.763^a	3.687^a	3.700^a	4.360^a	4.374^a	4.676^a	4.311^a	4.481^a	-0.147	-0.117	-0.302	-0.124	-0.201
	(0.367)	(0.373)	(0.380)	(0.367)	(0.369)	(0.623)	(0.642)	(0.643)	(0.617)	(0.629)	(0.250)	(0.264)	(0.260)	(0.247)	(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 5: Insider trading in target firms before public announcements: 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 public announcements 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 A and are winsorized at the 1^{st} and 99^{th} 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 selling mechanisms						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
Panel A: Immediately before announcement												
Constant	-14.69^a	-14.53^a	-16.21^a	-14.53^a	-5.472^b	-6.379^b	-2.579	-3.395	-19.29^a	-16.13^a	3.096	1.857
	(3.085)	(3.052)	(5.422)	(5.173)	(2.732)	(2.638)	(3.693)	(3.495)	(6.366)	(5.908)	(2.830)	(2.684)
Pre-announcement	-2.665^a	-2.956^b	-3.889^b	-4.543^a	1.576	2.258^a	-1.609	-1.168	-1.969	-3.593^b	0.689	1.192
	(0.969)	(0.798)	(1.766)	(1.397)	(0.985)	(0.815)	(1.330)	(0.822)	(3.105)	(1.626)	(1.721)	(0.873)
Target	0.223	-1.005	-2.261	-0.468	1.594	0.786	-0.736	1.410^c	-2.265	-2.016	1.403	1.659^c
	(1.005)	(0.729)	(1.778)	(1.367)	(1.067)	(0.881)	(1.336)	(0.807)	(2.510)	(1.527)	(1.256)	(0.878)
Target x pre-ann.	-4.209^a	-3.291^a	-1.969	-4.518^b	-1.717	-0.232	-6.464^a	-8.241^a	-2.510	-3.797^c	-2.412	-1.676
	(1.467)	(1.090)	(2.435)	(1.785)	(1.276)	(1.019)	(2.348)	(1.611)	(4.609)	(2.278)	(2.229)	(1.181)
Deal characteristic	0.673	0.627	0.298	-5.926^a	0.012	4.906^a	-0.839	-0.249	3.571	2.269	-1.682	-2.371
	(0.943)	(1.208)	(1.878)	(1.770)	(1.149)	(1.022)	(1.071)	(0.968)	(2.338)	(2.199)	(1.315)	(1.456)
Deal ch.x pre-ann.	-0.382	0.363	1.655	8.535^a	-1.111	-7.141^a	0.411	-0.290	-1.869	0.049	0.991	0.891
	(1.313)	(1.780)	(2.427)	(3.105)	(1.398)	(1.841)	(1.527)	(1.403)	(3.430)	(2.824)	(1.939)	(1.771)
Deal ch.x target	-2.485^c	-1.624	4.161^c	4.509^c	-2.566^c	-4.325^a	2.284	-0.618	-0.645	-1.950	0.905	1.325
	(1.331)	(1.601)	(2.379)	(2.580)	(1.484)	(1.588)	(1.498)	(1.326)	(2.879)	(2.637)	(1.520)	(1.688)
Deal ch.x target x pre.	1.951	1.611	-6.510^b	-8.460^b	4.637^a	7.801^a	-2.193	-0.281	-2.154	-1.415	1.252	0.884
	(1.947)	(2.703)	(3.261)	(4.146)	(1.783)	(2.312)	(2.559)	(2.337)	(5.048)	(3.922)	(2.492)	(2.147)
$CAR_{init.,1mb.ann.}$	-0.888	-0.876	3.930^a	3.887^a	-1.419^c	-1.392^c	-0.902^c	-0.866	1.294	1.239	-0.316	-0.268
	(0.804)	(0.802)	(1.275)	(1.266)	(0.841)	(0.826)	(0.540)	(0.545)	(1.049)	(1.049)	(0.577)	(0.580)
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
	(0.320)	(0.320)	(0.498)	(0.501)	(0.236)	(0.237)	(0.434)	(0.427)	(0.709)	(0.702)	(0.383)	(0.376)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Total effect by deal ch.	-2.258^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 selling mechanisms						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
Panel B: Early pre-announcement period												
Constant	-59.78^a	-59.75^a	-123.1^a	-118.3^a	4.113	1.985	-32.74^a	-34.67^a	-98.86^a	-97.10^a	5.676^c	4.378
	(6.216)	(6.210)	(13.49)	(12.97)	(3.211)	(3.128)	(4.458)	(4.404)	(13.11)	(12.85)	(2.961)	(2.882)
Pre-announcement	-2.077^c	-2.895^a	-2.781	-5.215^b	0.052	1.074	1.050	0.306	-1.395	-2.408	-0.710	0.579
	(1.230)	(1.050)	(2.953)	(2.364)	(0.860)	(0.895)	(1.931)	(1.035)	(5.013)	(2.578)	(2.174)	(1.080)
Target	0.601	-0.858	-2.424	-2.303	0.965	1.341^c	-0.831	1.457^c	-1.708	-2.116	0.623	1.448^c
	(1.256)	(0.895)	(2.435)	(1.947)	(0.802)	(0.790)	(1.500)	(0.844)	(3.197)	(2.106)	(0.987)	(0.834)
Target x pre-ann.	-3.927^b	-1.979	-1.275	1.022	-0.819	-1.645	-4.265	-4.891^a	0.917	-1.355	-1.744	-1.498
	(1.815)	(1.365)	(3.720)	(2.888)	(1.071)	(1.056)	(2.722)	(1.452)	(6.957)	(3.277)	(2.876)	(1.298)
Deal characteristic	0.913	0.446	3.149	-7.467^a	-1.464	4.125^a	-1.882	-0.402	2.691	2.951	-1.660	-2.207
	(1.143)	(1.449)	(2.683)	(2.724)	(1.049)	(1.004)	(1.262)	(1.134)	(2.714)	(2.975)	(1.105)	(1.570)
Deal ch.x pre-ann.	-1.911	-1.967	-2.720	2.176	0.830	-2.100	-1.735	-1.775	-1.933	-1.616	1.781	0.512
	(1.716)	(2.063)	(3.864)	(3.773)	(1.288)	(1.221)	(2.127)	(1.674)	(5.331)	(4.107)	(2.322)	(2.020)
Deal ch.x target	-3.257^b	-3.013	2.263	6.812^c	-0.506	-3.776^a	2.299	-1.055	-1.259	-1.604	1.494	1.151
	(1.657)	(1.971)	(3.314)	(3.718)	(1.260)	(1.346)	(1.681)	(1.487)	(3.742)	(3.617)	(1.320)	(1.734)
Deal ch.x target x pre.	4.580^c	4.743	2.529	-3.154	-0.368	3.262^c	0.598	2.947	-3.172	-1.213	0.640	0.861
	(2.458)	(3.161)	(4.984)	(5.339)	(1.658)	(1.727)	(2.911)	(2.286)	(7.490)	(5.479)	(3.133)	(2.463)
$CAR_{init.,6mb.ann.}$	-0.492	-0.462	3.551^c	3.514	-3.286^b	-3.248^b	-0.304	-0.250	-0.887	-1.000	0.357	0.416
	(0.925)	(0.917)	(2.149)	(2.152)	(1.314)	(1.307)	(0.681)	(0.682)	(1.783)	(1.800)	(0.847)	(0.849)
Pri. pro. length	8.121^a	8.159^a	18.32^a	18.46^a	-1.382^a	-1.473^a	4.508^a	4.522^a	11.89^a	11.86^a	-1.433^a	-1.332^a
	(0.683)	(0.687)	(1.524)	(1.545)	(0.212)	(0.220)	(0.536)	(0.534)	(1.448)	(1.440)	(0.326)	(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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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Informal selling mechanisms						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
Panel C: Whole pre-announcement period												
Constant	-31.40^a	-31.54^a	-38.65^a	-36.08^a	-4.118	-5.721	-16.40^a	-17.76^a	-42.62^a	-39.09^a	3.210	1.851
	(4.510)	(4.482)	(8.435)	(8.061)	(3.811)	(3.693)	(4.532)	(4.231)	(9.770)	(8.847)	(3.747)	(3.466)
Pre-announcement	-0.011	-0.591	-1.163	-1.910	1.079	1.802	2.067	1.503	2.642	0.546	-0.663	0.750
	(1.228)	(1.031)	(2.831)	(2.239)	(1.344)	(1.170)	(1.964)	(1.156)	(5.196)	(2.524)	(2.660)	(1.232)
Target	0.281	-1.212	-3.561	-1.440	2.097^c	1.321	-0.834	1.640^c	-1.794	-2.365	1.215	1.663^c
	(1.338)	(0.974)	(2.472)	(1.946)	(1.272)	(1.115)	(1.553)	(0.959)	(3.326)	(2.172)	(1.315)	(0.992)
Target x pre-ann.	-5.108^a	-3.579^a	-0.443	-3.880	-2.235	-0.914	-6.743^b	-7.257^a	-1.287	-3.880	-2.350	-1.733
	(1.802)	(1.363)	(3.499)	(2.643)	(1.626)	(1.368)	(2.767)	(1.705)	(7.275)	(3.260)	(3.497)	(1.529)
Deal characteristic	0.431	0.247	0.786	-8.499^a	-0.384	6.127^a	-1.702	-0.811	4.306	2.681	-1.589	-2.757
	(1.238)	(1.530)	(2.802)	(2.530)	(1.503)	(1.276)	(1.295)	(1.176)	(3.069)	(3.399)	(1.422)	(1.885)
Deal ch.x pre-ann.	-0.863	0.392	1.977	9.791^b	-1.196	-7.412^a	-0.582	0.311	-2.457	0.001	1.742	0.076
	(1.704)	(2.234)	(3.788)	(4.461)	(1.894)	(2.355)	(2.150)	(1.819)	(5.491)	(4.428)	(2.844)	(2.507)
Deal ch.x target	-3.087^c	-2.207	5.049	5.748^c	-2.744	-5.104^a	2.710	-0.586	-2.326	-3.525	1.440	2.032
	(1.766)	(2.069)	(3.359)	(3.421)	(1.829)	(1.773)	(1.777)	(1.649)	(3.909)	(3.853)	(1.646)	(2.030)
Deal ch.x target x pre.	3.234	2.586	-7.769	-7.803	4.624^b	8.697^a	-0.336	0.566	-3.444	-0.939	1.216	1.186
	(2.400)	(3.101)	(4.721)	(5.488)	(2.328)	(2.796)	(2.895)	(2.469)	(7.763)	(5.577)	(3.776)	(2.944)
$CAR_{init.,1mb.ann.}$	-0.160	-0.134	4.149^c	4.105^c	-1.853	-1.812	-1.175^c	-1.119^c	-0.603	-0.731	0.360	0.430
	(1.046)	(1.045)	(2.197)	(2.199)	(1.278)	(1.272)	(0.653)	(0.665)	(1.463)	(1.481)	(0.764)	(0.772)
Pri. pro. length	4.385^a	4.384^a	4.902^a	5.024^a	-0.108	-0.202	2.095^a	2.121^a	3.905^a	3.860^a	-0.928^b	-0.790^c
	(0.481)	(0.483)	(0.774)	(0.785)	(0.308)	(0.312)	(0.510)	(0.503)	(1.038)	(1.014)	(0.454)	(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%

Table 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 A and are winsorized at the 1^{st} and 99^{th} 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	-34.10^a	-34.02^a	-32.23^a	-34.66^a	-49.60^a	-50.54^a	-49.70^a	-48.95^a	-48.11^a	-6.132^a	-5.629^b	-5.203^b	-6.718^b	-6.644^a
	(3.751)	(3.765)	(3.810)	(3.933)	(3.754)	(5.965)	(6.038)	(6.093)	(6.645)	(5.993)	(2.355)	(2.394)	(2.331)	(2.759)	(2.411)
Post-announcement	0.291	-0.391	-0.812	-1.680^c	0.233	1.397	4.524^b	5.734^b	-1.806	1.790	-0.504	-1.870^c	-3.000^a	0.723	-0.587
	(0.731)	(1.117)	(1.266)	(0.955)	(0.798)	(1.441)	(2.220)	(2.411)	(2.089)	(1.659)	(0.704)	(1.089)	(1.110)	(1.002)	(0.815)
Target	-1.030	-2.673^b	-1.683	-1.030	-0.770	-2.788^b	-2.053	-2.659	-2.561	-2.186	1.272^b	0.399	0.248	2.158^b	1.361^c
	(0.667)	(1.063)	(1.267)	(0.976)	(0.737)	(1.308)	(2.138)	(2.264)	(1.985)	(1.521)	(0.597)	(0.982)	(0.910)	(0.939)	(0.712)
Target x post-ann.	-8.363^a	-7.540^a	-8.263^a	-6.884^a	-8.361^a	-5.509^a	-11.97^a	-16.98^a	0.339	-4.772^b	-0.662	1.789	2.665^a	-2.852^b	-0.812
	(1.197)	(1.833)	(2.300)	(1.551)	(1.352)	(1.877)	(3.097)	(3.783)	(2.784)	(2.194)	(0.835)	(1.280)	(1.350)	(1.208)	(0.997)
Deal characteristic		-1.526	-0.333	-2.030^b	-0.040		2.298	2.476	-0.465	-0.560		-0.868	-2.041^a	0.785	0.787
		(0.971)	(1.064)	(1.017)	(1.158)		(2.112)	(2.128)	(2.208)	(2.245)		(1.043)	(0.988)	(1.136)	(1.106)
Deal ch.x post-ann.		1.291	1.631	3.084^b	0.270		-5.391^b	-6.333^b	4.641^c	-1.971		2.466^c	3.704^a	-1.767	0.440
		(1.347)	(1.460)	(1.308)	(1.553)		(2.737)	(2.835)	(2.688)	(2.893)		(1.344)	(1.354)	(1.332)	(1.409)
Deal ch.x target		2.959^b	0.960	0.017	-1.161		-1.306	-0.163	-0.336	-2.310		1.569	1.529	-1.260	-0.395
		(1.358)	(1.471)	(1.310)	(1.651)		(2.689)	(2.742)	(2.575)	(2.928)		(1.234)	(1.187)	(1.202)	(1.288)
Deal ch.x target x post.		-1.491	-0.235	-2.344	0.043		10.87^a	15.85^a	-8.717^b	-4.019		-4.375^a	-4.967^a	3.130^c	0.607
		(2.326)	(2.655)	(2.202)	(2.699)		(3.958)	(4.435)	(3.742)	(4.444)		(1.670)	(1.698)	(1.607)	(1.753)
Pub. pro. length	5.249^a	5.259^a	5.152^a	5.017^a	5.227^a	5.549^a	5.499^a	5.342^a	5.509^a	5.499^a	0.702	0.697	0.774^c	0.714	0.717^c
	(0.596)	(0.596)	(0.600)	(0.612)	(0.595)	(1.003)	(1.008)	(1.002)	(1.046)	(1.002)	(0.427)	(0.433)	(0.434)	(0.457)	(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 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 A and are winsorized at the 1^{st} and 99^{th} 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}	-40.36^{a}	-10.05^{a}	-33.31^{a}	-62.15^{a}	1.152	-42.40^{a}	-61.94^{a}	-4.902	-17.10^{a}	-26.29^{a}	-7.692^{c}
	(5.004)	(7.416)	(3.092)	(6.074)	(10.43)	(3.555)	(5.667)	(8.354)	(2.981)	(4.220)	(8.638)	(4.490)
Post-announcement	1.653	1.434	-0.988	-1.923	8.612^{a}	-4.015^{a}	-0.545	6.954^{b}	-3.731^{a}	-2.130	0.187	0.553
	(1.800)	(3.681)	(1.851)	(1.725)	(3.263)	(1.409)	(1.741)	(2.969)	(1.256)	(1.652)	(4.287)	(2.654)
Target	0.760	-6.635^{b}	2.350^{c}	-2.899^{c}	-0.640	-0.668	-1.175	-2.159	-0.478	-2.997	-5.366	3.566
	(1.873)	(3.302)	(1.387)	(1.667)	(3.033)	(1.177)	(1.657)	(2.727)	(0.957)	(2.066)	(4.195)	(2.537)
Target x post-ann.	-9.700^{a}	-4.383	-1.341	-8.934^{a}	-26.82^{a}	4.883^{a}	-11.76^{a}	-20.33^{a}	3.761^{b}	-2.908	-8.146	-2.134
	(3.410)	(5.658)	(2.270)	(3.001)	(5.193)	(1.677)	(3.223)	(4.627)	(1.510)	(2.768)	(5.957)	(2.909)
Informal sale	1.022	-0.076	-0.747	-0.078	3.535	-2.987^{c}	-0.593	3.609	-2.821^{b}	-1.791	-2.547	0.961
	(1.404)	(2.825)	(1.450)	(1.569)	(3.308)	(1.536)	(1.491)	(2.675)	(1.143)	(1.563)	(4.041)	(2.628)
Informal x post-ann.	-0.756	-2.917	1.985	2.353	-7.818^{c}	4.452^{b}	2.946	-6.580^{c}	4.419^{a}	1.604	-1.130	0.034
	(1.983)	(4.034)	(2.048)	(2.213)	(4.408)	(2.088)	(2.103)	(3.619)	(1.635)	(1.815)	(4.714)	(2.940)
Informal x target	-0.366	4.383	-0.627	-0.120	-3.184	2.511	0.001	-1.315	2.326	2.769	3.449	-1.814
	(2.043)	(3.667)	(1.599)	(2.201)	(4.297)	(1.921)	(2.087)	(3.571)	(1.435)	(2.153)	(4.532)	(2.724)
Informal x target x post.	1.425	4.285	-1.586	1.083	24.26^{a}	-6.010^{b}	0.448	15.67^{a}	-5.521^{a}	-2.034	11.255^{c}	-1.207
	(3.698)	(6.226)	(2.567)	(3.866)	(6.629)	(2.544)	(3.946)	(5.747)	(2.094)	(3.018)	(6.532)	(3.199)
Pub. pro. length	5.569^{a}	3.725^{a}	1.723^{a}	4.596^{a}	7.834^{a}	-0.714	6.132^{a}	6.277^{a}	0.653	3.342^{a}	3.234^{b}	1.324^{c}
	(0.783)	(1.207)	(0.582)	(0.943)	(1.723)	(0.645)	(0.862)	(1.313)	(0.539)	(0.768)	(1.463)	(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%