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DOI:
10.1111/1467-8551.12374

Document Version
Peer reviewed version

Citation for published version (Harvard):
Cumming, D, Ji, S, Johan, S & Tarsalewska, M 2020, 'End-of-day price manipulation and M&As', *British Journal of Management*, vol. 31, no. 1, pp. 184-205. https://doi.org/10.1111/1467-8551.12374

End-of-Day Price Manipulation and M&As

Abstract

Based on M&As from over 45 countries from 2003-2014, we show that the presence of end-of-day (EOD) target price manipulation prior to M&As increases the probability of an M&A deal withdrawal, and decreases the premium paid. More detailed exchange trading rules that govern manipulation across countries and over time lower the probability of withdrawal, mitigate the negative impact of EOD manipulation on withdrawal, and raise premiums paid. Finally, while there are fewer cases of acquirer price manipulations prior to M&As, the data indicates positive acquirer price manipulation in share M&As and increases the probability of deal withdrawal.

Keywords: Market manipulation, M&As, Premiums, Regulation

JEL Classification: G14, G15, G18, G34, G38

INTRODUCTION

Mergers and acquisitions (M&As) are major corporate events that affect both target and bidder shareholders' wealth (Loughran, and Vijh, 1997; Andrade, Mitchell, and Stafford, 2001; Moeller, Schlingemann, and Stulz, 2005; Capron and Shen, 2007; Bena and Li, 2014). M&A deals not only have real economic consequences, they are also of particular importance to managers. Successful M&A deals hinge on future employment prospects of managers (Harford and Schonlau, 2013; Mira, Goergen, and O'Sullivan, 2018) and determine their bonuses (Grinstein and Hribar, 2004).

Managers are in the centre of the decision-making, yet their ethical standards might be often compromised by the pressures of the deal making (Aarsland et al., 2009). Therefore, managers can have strong incentives to manipulate stock prices in anticipation of an acquisition. They can engage in activities that change a firm's fundamentals and inflate stock prices, such as earnings management or stock splits (Erickson and Wang, 1999; Louis, 2004; and Guo, Liu, and Song, 2008; Anagnostopoulou and Tsekrekos, 2015). These types of manipulations can be performed internally, but managers can also manipulate stock through external market participants (Aitken et al., 2015c; Yuan et al., 2009). They may deliberately interfere with the market around the time of an acquisition in order to affect the stock price of the target or acquirer firm.

As an example, consider Maurice R. Greenberg, the Chairman of American International Group, who attempted to manipulate its stock in relation to its 2001 acquisition of American General. Greenberg contacted Richard Grasso, the head of the New York Stock Exchange, "in an effort to have Grasso prod the specialist firm responsible for trading AIG's stock on the floor of the NYSE to prop up AIG's stock price."[1] This raised inquiries at the

[1] http://securities.stanford.edu/filings-documents/1033/AIG04_01/2005419_r04c_04CV8141.pdf.

Securities and Exchange Commission and the federal courts as to whether Greenberg tried to manipulate the stock price in order to reduce the acquisition costs.

Market manipulation of target or acquirer stock prices is a previously unstudied channel that helps deceive the opposing deal party and investors. The theory of market manipulation suggests that traders can affect prices through price-destabilizing speculation (Jarrow, 1992). Stock market manipulation, typically, benefits manipulators at the expense of the firm and other investors. It can weaken a firm primarily through damage to its shareholders, by making the firm as an investment less desirable and hence making it harder for the company to raise capital in the future.

The manipulation of EOD stock price can occur to the acquirer stock price or the target stock price. The acquirer firm may try to manipulate its stock in order to save on acquisition costs, while the target firm may manipulate its stock in order to boosts its valuation before an anticipated acquisition. However, if the acquirer or target firm notice unusual stock price movements and suspect manipulation, one or the other might call off the deal.

This gives rise to three research questions that we explore in this paper: 1) Does market manipulation make the withdrawal of announced mergers more or less likely? 2) is the premium paid for a target higher or lower for stocks that have been manipulated? and 3) does regulation pertaining to market manipulation strengthen or weaken its effect on merger withdrawals and premiums?

We focus on a specific type of manipulation here: the dislocation of "closing"' or "end-of-day" (EOD) firm prices. The effects of such manipulations have significant consequences because of the widespread use of closing prices (Comerton-Forde and Putniņš, 2011). EOD prices are particularly important because they are used to set deal prices in M&As, determine how options compensation is tied to equity prices, and determine the

compensation of the key insiders of merging firms. As such, there is a massive incentive to manipulate the EOD prices by ramping up EOD trading, thereby pushing closing prices to artificially high levels in advance of an M&A deal. A successful EOD distortion may facilitate a merger, however, EOD price manipulation can also lower long-term equity values, decrease liquidity, and ultimately make share prices less informative. All of these results could exacerbate the likelihood of an M&A deal withdrawal.

In this paper, we offer novel evidence that uses the data on EOD price manipulation. An EOD stock price movement is considered dislocated if it has been four standard deviations away from its mean price change during the past 100-trading day benchmarking period at the end of the trading day, and then reverts back to the mean price the subsequent morning (further computational details are in the appendix). We do not examine manipulation of EOD prices on the actual announcement day, but instead over the thirty days prior to the M&A announcement date. Note that dislocation of the EOD price would not be a response to an M&A announcement or an expected M&A announcement for two important reasons: 1) the dislocated price reverts back to the prior level the next morning (while a price that jumps in response to an M&A announcement is likely to remain at that level for a sustained period until a merger announcement is confirmed not to be true), and 2) the dislocated price may be either positive or negative (in this paper, we assess both and find similar evidence for both).

We study a sample of M&As of publicly traded target firms from 2003 to 2014 for 45 countries. We find that, among 2,749 M&As, there were 135 cases (5%) where target closing prices were manipulated prior to the M&A deal announcement.[2] Using a regression analysis and propensity score matching, we estimate the association between EOD target price manipulation and deal withdrawal. We find strong evidence that EOD market manipulation of target shares increases the probability of deal withdrawal, even after controlling for the

[2] Based on evidence in Aitken et al. (2015a) we estimate that the stock price manipulation occurs on average in around 3.6% of firms, suggesting that the 5% probability of the target stock price manipulation before an M&A announcement is higher than for any other firm.

possibility of overbidding and for whether the direction of the manipulation is positive or negative. Moreover, we find that the presence of EOD target price manipulation decreases the premium paid to the target firm. EOD price manipulation increases the probability of a deal withdrawal by approximately 12%, and lowers premiums by approximately 25%. The data indicates that more detailed exchange trading rules in countries associated with a reduction in the probability of M&A withdrawal, a reduction in the impact of EOD target price manipulation on deal withdrawal, and higher M&A premiums (consistent with Becker's (1968) theory of crime).

The economic impact of EOD target price manipulation is quite important. For the 135 EOD cases where M&A deals were completed, there was a 25% decrease in premiums on average. This translates to U.S. $307 million in lost value, or a cumulative U.S. $41.45 billion in lost value. Therefore, targets that are subject to EOD price manipulation suffer significant losses.[3] We find fewer cases of acquirer price manipulations (50, or 2% of the sample) prior to M&As. The evidence shows that these acquirer manipulations generally do not affect M&As significantly, except for positive acquirer price manipulations of share (not cash) transactions, which tend to increase the probability of deal withdrawal.

This paper contributes to several strands of the literature. First, we draw attention to a previously unstudied channel where the business ethics are compromised, i.e. the stock price manipulation by its insiders, and we discuss its economic effects in the context of M&A decisions. We, theoretically, develop potential motives that affect the ethical-decision conflict, and empirically test how the stock price manipulation affects the M&A deal withdrawal. Our findings suggest that EOD price manipulation affects M&A decisions, a topic that has not previously been considered in the literature. Second, we contribute to the related literature on the effects of litigation and illegal insider trading on M&As. For

[3] Deal withdrawals also pose significant costs for the parties involved. For example, in 2016 alone, M&A advisers lost U.S. $1.2 billion in revenue due to withdrawn deals. See http://uk.businessinsider.com/collapsing-mergers-and-acquisitions-are-hurting-banks-2016-5.

example, Krishnan et al. (2014) find that litigation action related to a deal affects the probability of deal completion and deal premium, conditional on whether the case filed in federal or state court. Meulbroek and Hart (1997) show that detected illegal insider trading adversely affects M&As and increases takeover premiums.

Third, we contribute to a related and more specific literature on intermediaries, M&As, and market manipulation. For example, Boone and Mulherin (2011) point out that private equity consortiums might facilitate collusion in the M&A market. They find that, in the short term, target returns are lower in private equity consortiums. However, over the long run, they find opposite results. Alperovych, Cumming, and Groh (2016) find evidence that private equity rumours (as defined in the BvD Zephyr dataset) harm M&A deals in terms of raising the probability of deal withdrawals and lowering premiums. Atanasov, Davies, and Merrick (2015) explore trade-based manipulation of closing prices, while Bernile, Sulaeman, and Wang (2015) suggest that, in certain circumstances, institutional investors might destabilize the price formation process. Our findings are consistent in terms of non-PE deals involving public acquisitions. We show that market manipulation harms deal completion and lowers premiums, while regulations pertaining to it can mitigate these effects.

Our paper has a number of important policy implications. Perhaps most notably, for regulators and surveillance authorities, the data indicates higher levels of EOD manipulation around failed mergers. Typically, the focus is on regulation and surveillance around completed mergers (see, e.g., Poser, 1986), but the analyses here indicate that failed mergers are often a result of manipulation, and hence warrant greater surveillance efforts. This is because the manipulation attempts could lead to hold-up problems in the M&A market, thereby disabling the efficient allocation of resources. Our results also suggest that, on average, there are scant benefits to insiders from manipulating stocks around the time of

M&As, particularly in countries with effective market manipulation trading rules. Indeed, the harm to firms generally outweighs the possible benefits to insiders.

The remainder of the paper is organized as follows. The next section discusses the intuition behind why market manipulation affects M&A transactions. We use a recent widely publicized case to illustrate how price manipulation around the time of a merger works in the real world. Thereafter we describe our sample, and research design. The empirics begin with a presentation of the descriptive statistics and univariate tests, followed by the results on the relation between market manipulation and the likelihood of M&A deal withdrawal. The last section concludes.

THEORY AND HYPOTHESES

In this section, we discuss the theory and hypotheses about EOD stock price manipulation and M&As before presenting our data and empirical tests in subsequent sections. M&A deals are an important form of efficient capital reallocation. Yet, the significant information asymmetry can hold up many deals. Typically, both entities have access only to publicly available information about the other entity before announcing the M&A deal. The amount of information they acquire before agreeing on the deal has critical impact on the estimation of the intrinsic value of the deal. The M&A agreement is a binding contract to purse the deal, yet it does not preclude the deal failure. If any of the initial agreed conditions are breached, the deal might be withdrawn. Much of the negotiation process is about agreeing on the purchase price.

There is significant incentive to manipulate EOD stock prices in anticipation of M&A deals. The agreed transaction price and compensation to insiders is often based on recent posted EOD stock prices (Comerton-Forde and Putniņš, 2011).[4] Typically, the stock prices

[4] For example, see the terms in the Eagle Bancorp and Virginia Heritage Bank Announced Merger, posted here https://globenewswire.com/news-release/2014/06/09/642813/10085123/en/Eagle-Bancorp-and-Virginia-Heritage-Bank-Announce-Merger-Agreement.html. See also the terms of the Howard Bancorp and Patapsco

can be manipulated through earnings management, yet the breach of ethical standards can go beyond manipulating the accounting numbers alone.

Several corporate scandals unravel another way to set up the stock prices artificially. In particular, the managers or firm insiders can reach out and externally manipulate the firm's stock price. Such unethical behaviour brings damage to organisations' stakeholders and the economy. The ethical-decision making is particularly important in the context of M&As where the pressures for the decision maker are particularly strong. In line with Schwartz (2016) ethical-decision making theory, the ethical stance is a function of individual motives, time, and financial constraints. Ullah et al. (2018) propose that ethical-decision making is an interaction of various factors that involve "other organizational actors, processes and policies as well as the external context of the business".

Market manipulation can be motivated by several such factors, on either the target or the acquirer firm side. Stock market manipulation is typically an intentional action performed by an informed trader. The decision to manipulate the stock price can take a form of either: 1) *information-based manipulation* where the informed trader affects the stock price directly without disclosing any information, i.e. a trade-based manipulation or 2) *action-based manipulation* where the trader takes actions in order to affect the stock price (Chakraborty and Yılmaz, 2004). Stock price manipulation is difficult to detect. Becker (1968) suggests that agents commit fraud only if the benefits exceed the cost of getting caught and punished. If the latter is lower than the benefits associated with manipulation, the manipulator will have strong incentives to engage in manipulative activities. We, thus, hypothesize that the firm's insiders, i.e. managers or shareholders, may wish to engage in stock price manipulation as the benefit is higher than the loss.

Bancorp merger posted here http://www.businesswire.com/news/home/20150303006036/en/Howard-Bancorp-Patapsco-Bancorp-Merge-Howard-Receives. Both examples show that targets' EOD prices in the recent period prior to the merger are used to set the M&A deal price.

In the case of M&A transactions, the stock price manipulation affects the deal structure and its success or failure. Manipulation can either strengthen or weaken the deal. The stock price manipulation can be performed or initiated by either the firm insiders (such as officers and directors) and management, or non-insider shareholders.

The M&A agreements can be cancelled due to variety of reasons that might include outbidding, negative market reaction (Luo, 2005), or problems discovered over the due diligence phase when both entities have access to private information. While the insiders' incentives to complete the deal might be particularly strong, and might lead to unethical resolutions before the deal announcement, the discovery by either party of any irregularities after the announcement might lead to withdrawal or renegotiation. Thus, such uncertainty has enormous consequences for M&A outcomes (Officer, Poulsen, and Stegemoller, 2009; Bhagwat, Dam, and Harford, 2016; Nguyen and Phan, 2017).

Below, we summarize the reasons that might motivate and interfere with the insiders, i.e. managers or shareholders, decision-making process and how it subsequently affects M&A deals.

On one hand, the EOD stock price manipulation might facilitate an M&A transaction by benefiting the insiders of the target or acquirer firm. We call this the *deal-strengthening manipulation M&A conjecture*. The incentives of the EOD stock price manipulation might occur to the target stock price in the case of M&A deals financed with cash, stock, or a combination of both. The target firm insiders can engage in EOD target stock price manipulation in order to improve target firm valuation before the anticipated acquisition attempt. Given that the negotiations prior to the announcement can take several months, there is usually sufficient time to manipulate the EOD stock price to be used in the deal. There are incentives to manipulate the target stock price irrespective of the deal currency, because the manipulation will benefit the target insiders in either case. The target shareholders can either

obtain more cash in all-cash acquisitions, or obtain a higher equity ratio when they are paid in stock.

The incentives of the EOD stock price manipulation might occur also to the acquirer stock price where the medium of exchange is stock or a combination of cash and stock. In those deals where the exchange currency is the acquirer's stock there are also incentives to manipulate EOD acquirer stock prices in order to strengthen the M&A deal fundamentals. An acquirer may attempt to distort the EOD stock price in order to reduce the acquisition cost, rendering the deal otherwise unattractive, and thus, unlikely will be approved by shareholders.

We use an illustrative example of the 2015 Samsung C&T merger with Cheil Industries. Reported by CNBC on 7 December 2015, the Samsung Group faced allegations of insider trading and EOD price manipulation during the merger.[5] The price manipulation enabled the deal to be narrowly approved by shareholders[6] despite the objections of several major shareholders, such as U.S. hedge fund Elliott Associates, who objected to the undervalued offer price and the transfer of wealth to insiders such as Samsung's founding Lee family.[7] Due to this, the head of Korea's National Pension Service was indicted in January 2017,[8] followed by key Samsung executives in February 2017.[9] The Samsung case shows that manipulation enabled the merger, despite the low premium offered, to the benefit of insiders. However, there is some hope that the enforcement action taken in this case may serve to curtail future manipulation activity around the time of subsequent mergers.[10]

[5] http://english.hani.co.kr/arti/english_edition/e_business/746361.html.

[6] http://www.cnbc.com/2015/07/16/shareholders-vote-on-key-samsung-merger.html.

[7] https://www.ft.com/content/560d4ff8-3506-11e5-bdbb-35e55cbae175.

[8] https://www.wsj.com/articles/south-korea-indicts-pension-chief-involved-in-samsung-merger-1484532698.

[9] http://www.680news.com/2017/02/17/samsung-family-succession-hits-snag-with-chiefs-arrest/.

[10] Ibid.

The Samsung case suggests that manipulation was used to ensure that otherwise unattractive M&A deals nevertheless proceed. It shows that,[11] if insiders involved in the manipulation scheme benefit, the likelihood that the deal will be withdrawn decreases. EOD prices are not only important to set merger prices, but they are also used for options tied to the equity price, as well as for the compensation schemes of key insiders in the merging firms (Aitken, Cumming, and Zhan, 2015). As such, manipulators have pronounced incentives to distort EOD stock prices. This suggests that the EOD stock price manipulation either of the target or acquirer stock might affect the M&A outcome and lower the withdrawal probability.

The discussion above leads us to the following conjecture: EOD manipulation enables gains to insiders who can set M&A prices and compensation terms, trade ahead of M&A announcements, and thereby incentivize insiders not to withdraw announced M&A deals.

Yet, on the other hand, EOD stock price distortions may increase the withdrawal probability, because it can have negative consequences for firm value. If the agreed terms of the M&A deal are based on distorted EOD stock prices, the agreement may fail due to an increased uncertainty. We call this the *deal-weakening manipulation M&A conjecture*.

There are two primary reasons why stock price manipulation can make the target or acquirer less attractive (Aitken, Cumming, and Zhan, 2015a). First, EOD target stock price manipulation lowers long-term equity values and firm liquidity. As such, the target firm may be less desirable at the given price set for the transaction in either the stock-or-cash-financed acquisitions. In addition, the EOD acquirer stock price manipulation can make its stock less desirable as a deal currency for the target. Second, EOD stock price manipulation makes

[11] http://english.hani.co.kr/arti/english_edition/e_business/746361.html.

firms' share prices less informative. Information quality has significant consequences in the process of deal making (Marquardt and Zur, 2015). Martin and Shalev (2016) claim that when the acquirer discovers negative information about the target after the announcement it can downwardly revise its estimate, thus prompting a withdrawal decision. In turn, EOD stock price manipulation increases uncertainty associated with the deal and the probability that the deal will be withdrawn increases. The deceitful tactics might be discovered by either the target or the acquirer firm, which may lead to the deal being called off.

Bagnoli and Lipman (1996) show in a theoretical model that the incentives to manipulate the target's stock price might also be performed by the acquirer himself. In their model, they show that the acquirer initiates the takeover bid just in order to make profits from an increased target's firm stock price, by selling its shares in the target firm, and then withdraws its offer. This is supported by several examples such as the Trump's takeover proposal of AMR's that raised its stock price by 20%, it was later withdrawn.[12] Another example, is when T Boone Pickens' Mesa Limited Partnership announced the acquisition of Homestake Mining Company in 1988. After an increase in the stock price, Pickens liquidated his position. The SEC investigated this as stock price manipulation.[13]

Thus, EOD stock price manipulation can make target firms less desirable in both stock- and-cash-financed acquisitions because the acquirer's shares may be less valuable if it acquires the target in stock-financed acquisitions. Therefore, EOD stock price manipulation might increase the probability of the deal being withdrawn.

The discussion above leads us to the following conjectures:

EOD manipulation lowers long-term equity values and hence lowers the attractiveness of the M&A, thereby increasing the probability of withdrawal and lowering the premium associated with an M&A deal.

[12] Bagnoli and Lipman (1996) and Wall Street Journal, October 6, 1989.
[13] Bagnoli and Lipman (1996) and Wall Street Journal, October 6, 1989.

EOD manipulation renders share prices less informative, thereby increasing uncertainty and increasing the probability of withdrawal of an announced M&A deal

It is difficult to predict ex-ante which conjecture dominates so we propose a null hypothesis that either the target's or the acquirer's EOD stock price manipulation has no effect on the probability of the deal withdrawal.

EOD target stock price manipulation also affects the premiums paid for M&A targets. The acquirer might anticipate that the target firm might try to boost its valuation through stock price manipulation, and thus offer a lower premium to offset the potential effects. Dionne, La Haye, and Bergerès (2015) find that information asymmetry between the bidder and target firms is an important determinant of the premium paid in the transaction. Better-informed bidders pay lower premiums in M&A transactions. Furthermore, as suggested by Tarsalewska (2018), the premiums paid to target firms generally decrease with uncertainty. Therefore, we predict that greater uncertainty regarding target firm valuation may decrease the premium.

Finally, as the Samsung case suggests, we posit that regulation and enforcement curtails manipulation around mergers. The *regulation-strengthening manipulation M&A conjecture* states that regulations to curtail manipulation make it less prevalent and less severe, thereby increasing equity values and price informativeness. This encourages trading activity, which also lowers the probability of an M&A withdrawal, lessens the impact of any manipulation on an M&A withdrawal, and lessens the negative impact of manipulation on the premium associated with an M&A. These effects are more likely to be observed if market manipulation regulation is effectively enforced, and less likely if it is not.

The discussion above leads us to the following conjecture*:* Regulation curtailing EOD manipulation makes manipulation less prevalent and less severe, thereby increasing equity values and price informativeness, lowering the probability of an M&A withdrawal, lowering

the severity of the impact of manipulation on an M&A withdrawal, and lowering the severity of the negative impact of manipulation on the premium associated with an M&A deal These predictions are empirically tested in the remainder of the paper.

DATA

We obtain a sample of mergers and acquisitions from the Thomson One SDC database and supplement it with data from Zephyr. We identify completed and withdrawn transactions worldwide from 2003 through 2014, where the target firm is publicly traded (i.e., a public target). Our sample begins in 2003, because data on market manipulation is not available prior to that year. We follow standard sample selection criteria. In particular, we require that the acquirer seeks to buy more than 50% of the target, and we further limit our sample to deals in which the target has daily stock return data, this enables us to calculate the market manipulation measures. We also include only deals where the value of the transaction is higher than $10 million. We use the Thomson Reuters databases as our primary source of annual accounting data for at least one year prior to the deal announcement. Where necessary, we supplement the accounting information using DatAnalysis, Orbis, and Compustat.

The manipulation data come from SMARTS, Inc., and Capital Markets CRC (CMCRC) in Sydney. SMARTS and CMCRC collect data on suspected manipulation cases for over fifty stock exchanges around the world, and are used by regulators in those countries. We do not use actual enforced cases, because enforcement varies widely in practice across countries. Instead, we use suspected cases, because they can influence investors' activities and perceptions, and hence have real financial consequences (Aitken, Cumming, and Zhan, 2015b).

Table 1, panel A, presents our sample construction. The final sample with the required data for deal withdrawal analysis totals 2,749 deals, where 324 (12%) announced deals were

terminated. The final sample with the required data for premium analysis is 1,883, where 232 (11%) announced deals were terminated. The proportion of withdrawn deals is similar to previously reported numbers (Skaife and Wangerin, 2013). Also, similarly to previous studies (Golubov, Petmezas, and Travlos, 2016), our sample exhibits the well documented merger wave pattern, with a period of increased activity around 2007 and a subsequent decrease in the number of deals after the 2008 financial crisis.

Table 1 shows our sample composition by year in panel B and by industry in panel C. The proportions are similar to other recent cross-country M&A studies (Bris and Cabolis, 2008). In panel D, we present distributions by country. The final sample includes deals spanning forty-five countries. The first column of Table 1, panel D, gives the total number of announced deals. The countries that dominate in our sample are the U.S., Canada, Australia, and the UK. In the next two columns, we categorize the deals as either completed or withdrawn. Subsequently, we provide the average premium paid for the target in an M&A deal. The last three columns show, respectively, the number of EOD target stock price manipulations prior to the M&A announcement, and the number of EOD cases that resulted in deal withdrawal or deal completion. India, Switzerland, France, and Australia have the highest percentages of manipulation cases scaled by the total number of withdrawn deals. We find that EOD target stock price manipulation occurred in more than 20% of withdrawn deals.

[Please insert Table 1 here]

RESEARCH DESIGN

This section describes our research design. We employ two different econometric procedures to examine the effect of EOD stock price manipulation on the deal withdrawal probability and premiums paid. First, we estimate a regression model using a pooled sample.

We use a logit regression model when the outcome variable is an integer variable, or we use the OLS model when the outcome variable is continuous. Second, we use a control sample of propensity score matched control observations. In order to test our predictions, we estimate the following regression model:

$$\text{OUTCOME} = \beta_0 + \beta_1 \text{EOD MANIPULATION} + \beta_2 \text{INDUSTRY} + \beta_3 \text{TOEHOLD} + \beta_4 \text{STOCK} + \beta_5 \text{CASH} + \beta_6 \text{HOSTILE} + \beta_7 \text{PUBLICBIDDER} + \beta_8 \text{LEVERAGE} + \beta_9 \text{PB} + \beta_{10} \text{ROA} + \delta_n \text{FE} + \varepsilon \quad (1)$$

Where OUTCOME is either 1) WITHDRAWN that is an indicator variable that equals 1 if the deal is withdrawn, and 0 otherwise; or 2) PREMIUM that is the premium of the offer price to the share price four weeks before the announcement. In each regression, we include proxies for EOD price manipulation, which is our main independent variable: 1) EODPD is an indicator variable that equals 1 if the dislocation of EOD price is detected over thirty days before the announcement date, and 0 otherwise, and 2) EODPD_T is the average trading value as a percentage of the daily trading volume surrounding each suspected dislocating EOD target price case.[14]

EOD price manipulation measures are constructed by a surveillance team from CMCRC and SMARTS, Inc. The formal definition is provided in the Appendix. In brief, an EOD price is dislocated if, in the fifteen minutes before the continuous trading period, it is four standard deviations away from its mean price change during the past 100-trading day benchmarking period, and then reverts back to the benchmark price range the following morning.

[14] In an earlier version of this paper, we used other proxies for manipulation such as information leakage variables. Those variables were insignificant, and, as such, they are not included here, but are available upon request.

Following prior literature, we include several control variables (Walkling, 1985; Betton and Eckbo, 2000). Deals are less likely to be withdrawn if the target and acquirer firm operate in the same industry. We include an indicator variable INDUSTRY that equals 1 if firms are within the same industry (e.g., have the same two-digit SIC code), and 0 otherwise. There is some evidence that deals are less likely to be withdrawn if the acquirer already owns a certain percentage of the target firm. However, as Skaife and Wangerin (2013) suggest, there is a possibility that the cost of integration might outweigh the benefits. Therefore, we include the initial ownership of the acquirer (TOEHOLD) and leave the sign on the coefficient unassigned.

The method of payment also affects the probability of deal withdrawal. Ben-David, Drake, and Roulstone (2015) claim that misvaluation is a strong determinant of merger decisions, as well as the use of stock or cash as the payment currency. Shleifer and Vishny (2003) show that deals where stock is used as the method of payment are more likely to be withdrawn, while deals using cash, as the method of payment, are less likely to be withdrawn. Therefore, we include two integer variables, STOCK and CASH.

The probability of withdrawal and premiums paid also depends on the overall "attitude" of the deal. If the nature of the deal is hostile, it is more likely to be withdrawn. We, therefore, include an integer variable if the deal is hostile (HOSTILE). Public bidders are more likely to overpay for the deal, and it is thus more likely the deal will be completed. We include an integer variable that equals 1 if the acquirer is a public firm (PUBLICBIDDER).

We also include three additional control variables that proxy for the financial position of the firm (LEVERAGE), its growth opportunities (PB), and its profitability (ROA), consistent with other research showing financial position is pertinent to acquisitions, such as indicated by Harford, Klasa, and Walcott (2009). Finally, we include industry, year and country fixed effects. All variables are as defined in Table A1 in the appendix. The t-statistics

are based on industry-clustered errors (Petersen, 2009). The findings are robust to clustering by time and/or by country.

Second, we use propensity score matching, following Rosenbaum and Rubin (1983), in order to create a control group of deals that are similar to the treated deals i.e. with EOD stock price manipulation. We match the deals based on industry, year, and country. This procedure involves the following steps. First, we estimate propensity scores for all EOD stock price manipulation in our sample by estimating a logit model of EOD stock price manipulation on industry, year, and country variables. We then match EOD stock price manipulation deals and non- EOD stock price manipulation deals based on propensity scores using nearest neighbor matching. Second, we test whether means of the control variables differ between the treated and control samples. We find no significant differences between the treated and control sample except their public status, that the target and the acquirer are in the same industry and 100% stock payment. Yet, we control for those variables in the regression.[15] Third, we run a following regression model specified in Equation (1).

SUMMARY STATISTICS AND UNIVARIATE TESTS

In Table 2, we present descriptive statistics for completed (column 1) and withdrawn (column 2) deals. In the last two columns, we provide the difference in means between withdrawn and completed deals, as well as the t-test for significance. We also provide the descriptive for the manipulation measures. The mean EODPD over thirty days before the deal announcement date is lower for a subsample of completed deals. The difference in means for the mean EODPD is statistically significant.

We present the descriptive for shorter periods, i.e., EODPD[-20; 0] over twenty days; and EODPD[-10; 0] over ten days before the deal announcement date. The results are similar.

[15] Our results are robust to matching on other covariates as well.

The mean in EODPD_T over thirty days before the deal announcement date is also lower for a subsample of completed deals, which implies inferences similar to those above. For consistency, we also present the descriptive statistics for EODPD_T over different time periods.

Other controls are as expected, such as, the toehold is higher for completed deals, and the announcements of hostile deals are more likely to be terminated. Cash offers are more likely to be completed; stock offers are more likely to be withdrawn. A greater percentage of deals initiated by public bidders is completed. Targets in completed deals seem to have lower leverage, higher price-to-book ratios, and lower return on assets.

[Please insert Table 2 here]

In Table 3, we show the correlations among our variables. EODPD and EODPD_T are significantly positively correlated with WITHDRAWN. This indicates that target price manipulation increases the probability of a deal termination. EODPD and EODPD_T are significantly positively correlated with PREMIUM. Other variables are also significantly correlated with WITHDRAWN, suggesting they are important controls in our regressions.

[Please insert Table 3 here]

MULTIVARIATE RESULTS

In this section, we empirically test which conjecture dominates i.e. *the M&A deal-strengthening* or *the M&A deal-weakening*. We divide our empirical analysis into two parts. First, we analyse the effect of EOD target stock price manipulation on the M&A outcomes.

Second, we analyse the effect of EOD acquirer stock price manipulation on the M&A outcomes.

Target price manipulation, deal withdrawal, and premium

In Tables 4 to 6 we present the results of estimating Equation (1). In each table columns 1 and 2 present the estimated coefficients where we use the pooled sample, while columns 3 and 4 show the results for the sample of treated and control deals matched by year, industry, and country.

In Table 4, the results show that EOD target stock price dislocation (EODPD) increases the probability that a deal will be withdrawn by 12.3% (Model 1) and by 10.6% (Model 3). Moreover, higher trading values around EOD target stock price manipulation (EODPD_T) by approximately 1 standard deviation increase the probability of deal withdrawal by 5% (Model 2).

[Please insert Table 4 here]

Table 5 presents the results of estimating Equation (1) where we also control for the possibility of overbidding. We include PREMIUM and COMPETING as additional controls. PREMIUM is computed as the ratio of the offer price to the target's share price four weeks prior to the announcement date as reported by Thomson One SDC (Boone and Mulherin, 2007). COMPETING is an indicator variable that equals 1 if there was a competing bidder, and 0 otherwise. The findings in Table 5 are consistent with those in Table 5 for the presence of EOD target stock price dislocation in Models 1 and 3, but with higher economic significance, 16.2% (Model 1) and 10.7% (Model 3). The findings in Table 6 are also

consistent with those in Table 5 for the trading values around EOD target stock price dislocation, with a slightly larger effect in Model 2 and a slightly smaller effect in Model 4.

[Please insert Table 5 here]

As expected, the control variables are significant in Tables 4 and 5. Deals are more likely when the bidder and target are in the same industry. Toeholds increase the probability of withdrawal in the matched sample, but not in the full sample. Stock bids, hostile bids, and higher target leverage all tend to increase the probability of withdrawal.

Table 6 presents the results of estimating the effect of target price manipulation on the premium. The data indicates that deal premiums are approximately 22% (Model 1) to 25% (Model 3) lower for targets with EOD dislocated stock prices. Furthermore, a 1-standard deviation increase in trading value around EOD target stock price dislocation reduces premiums by between 16% (Model 2) and 12% (Model 4).

The control variables, moreover, are consistent with expectations in Table 6. Premiums are higher when the target and bidder are in the same industry, cash is used, the deal is hostile, and the bidder is public. Premiums are lower for stock deals, toeholds, and when the target has greater leverage.

[Please insert Table 6 here]

Overall, these results support *the deal-weakening M&A conjecture*. EOD target stock price manipulation weakens the deal. It increases the withdrawal probability and premiums paid.

In subsequent analysis, we distinguish between positive and negative EOD target stock price manipulation. We present the results in Table 7 where the main dependent

variable is WITHDRAWN in Models 1 and 2, and PREMIUM in Models 3 and 4. We explicitly test for positive versus negative EOD target stock price dislocations. The findings remain consistent, and show a slightly larger effect of positive EOD dislocations on deal withdrawals (marginal effect is 13.4%) than negative dislocations (marginal effect is 9.8%). Similarly, the reduction in deal premiums is smaller with negative EOD dislocations (a 20% reduction for a 1-standard deviation increase) than with positive dislocations (a 25% reduction for a 1-standard deviation increase). The findings pertaining to the additional control variables are consistent with those reported earlier.

[Please insert Table 7 here]

Acquirer price manipulation and deal withdrawal

In this subsection, we analyse the EOD acquirer stock price manipulation. Overall, we find 50 cases where the EOD stock price of the acquirer is dislocated. In Table 8, we present the results of estimating Equation (1). In column 1, we present the estimated coefficients where we use the pooled sample; in column 2, the results for the sample of treated and control deals matched by year, industry, and target and country; in columns 3-5 we present the results for the subsample of deals paid in stock. The results show that EOD acquirer stock price dislocation (EODPD) has no effect on the withdrawal probability. Thus, we find no significant evidence that EOD acquirer stock price manipulation having any effect on the probability of withdrawal (Table 9, column 1-2).

We subsequently analyze only those deals where the stock was the method of payment (Table 8, columns 3-5). Our analysis reveals that positive (up) EOD acquirer stock price dislocations increases the probability of withdrawal by 25.6% (column 4). The negative (down) EOD acquirer stock price dislocations has not significant effect on the probability of

withdrawal (column 5). This findings are consistent with the intuition that the price of the acquirer typically drops. Thus, a manipulated price in the opposite direction would be a bad signal of expected problems, and could impede deal completion. Acquirer stock as an exchange currency becomes overvalued, and may lead to a deal withdrawal. In summary, these results indicate that the positive EOD acquirer price manipulation also increases the probability of a deal withdrawal when the stock is the medium of exchange and supports *the deal-weakening M&A conjecture*.

[Please insert Table 8 here]

Regulation and manipulation

We also test whether any of the major regulatory changes that affected trading rules in European countries impact our predictions. In November 2007, the Directive on Markets in Financial Instruments (MiFID) harmonized trading rules across Europe (Cumming, Johan, and Li, 2011). The authors used the MiFID date for the implementation of the 2004 Market Abuse Directive (MAD), because the timing of the implementation of surveillance alerts (computer software used to detect rules in MAD) came about at the same time as the MiFID implementation (see also Cumming and Johan, 2008). This regulatory change was perceived as an exogenous shock, because the rule was not implemented by a single exchange or country, but was instead imposed by the European Commission for all member states. The trading rules in Cumming, Johan, and Li (2011) capture the rule changes brought about by MAD, and reflect the magnitude of the rule changes in the different European exchanges. They are used to test the *regulation-strengthening manipulation M&A conjecture*.

Tables 9 and 10 present the results of estimating the effect of EOD target stock price manipulation on deal termination and deal premiums, respectively. In Table 9, Model 1, we

interact EOD target stock price manipulation with Market Manipulation Index (MMI). In Model 2, we interact it with Insider Trading Index (ITI). In Model 3, we interact it with Broker Agency Index (BAI). These indices are defined in the appendix, and are correlated with surveillance (the first step in enforcement; see Cumming and Johan, 2008). Specifically, Cumming, Johan, and Li (2011) define these variables with respect to the changes made over time to ensure proper enforcement in terms of computer surveillance.

[Please insert Tables 9 and 10 here]

The data in Table 9 indicates that more detailed exchange trading rules, in terms of the MMI and the ITI reduce the probability of a deal withdrawal. Each additional rule reduces the probability by 3%-8% in Models 1-2. This is as expected, because regulation improves transaction certainty and liquidity (Cumming, Johan, and Li, 2011). However, counter to expectations, in Model 3, more detailed broker agency rules increase the probability of deal withdrawal. This suggests that brokers are more inclined to facilitate deals when they are less regulated (each additional BAI rule increases the probability of deal withdrawal by 2.4%). The data further indicates that more detailed rules make the effect of manipulation on withdrawal less severe, where each additional rule reduces the effect by approximately 0.9%-1.4% in Models 1-3. This latter finding is consistent with the *regulation-strengthening manipulation M&A conjecture*.

Table 10 shows that more detailed exchange trading rules do not have a direct effect on lowering the premiums paid in M&A deals. Nevertheless, the data indicates that premiums are significantly higher in the presence of stricter trading rules when there is manipulation, and economic significance ranges from 1.2% (Model 2) to 2.6% (Model 3) higher. These findings are not expected. One explanation is that the higher risk of an indictment associated with EOD stock price manipulation, in the presence of stricter regulation, requires a higher premium paid to the manipulator. This is consistent with Becker's (1968) theory of crime (the

reward must be greater in order to incentivize an illegal act in the presence of a greater risk and the cost of being caught).

Additional robustness checks

Over the course of our analyses, we carried out several additional tests that we do not include here for the sake of brevity. However, they are available upon request. These robustness checks include: (1) the use of other legal indices; (2) tests on subsamples (a) excluding selected countries, such as the U.S. and the U.K, (b) domestic versus international mergers, (c) excluding all countries with zero observations of suspected EOD market manipulations, (d) excluding the financial industry, (e) subsets by time; (3) we changed the definition of the EOD manipulation with different thresholds, and different dates for media, month-end, quarter-end;[16]among all these checks we found the results to be robust. We also considered both target and acquirer EOD price manipulations, but found only four cases where the price of the target and the acquirer were manipulated simultaneously, so these cases were too few to materially affect the probability of withdrawal. Finally, we analysed the effect of information leakage on the probability of withdrawal and premiums paid. We found only thirty-five cases for the target and only one for the acquirer. We did not include these results because they were insignificant. These checks are available upon request.

CONCLUSION

The goal of this paper is to examine whether EOD stock price manipulation affects the likelihood of M&A deal withdrawal and premiums paid. In theory, EOD manipulation could increase the likelihood of a deal, if there are gains to the insiders associated with

[16] MEDIA is the newspaper coverage that is the count of press articles in the month prior to the M&A announcement. MONTH_END is an indicator variable equal to one if there was a month-end, and zero otherwise. QUARTER_END is an indicator variable equal to one if there was a month-end, and zero otherwise. All the data were provided by CMCRC.

manipulation. Target management may try to pump up deal prices when they feel they have a strong negotiating position and the bidder is not likely to withdraw the deal; also, target management may try to inflate deal process to increase the probability of an undesirable hostile takeover withdrawal. Acquirors may try to decrease value when they want to pay a lower premium.

Based on M&As from over 45 countries from 2003-2014, we find that target price manipulation increases uncertainty and volatility with prices, reduces M&A premiums, and makes announced deals more likely to be withdrawn. This confirms the *deal-weakening manipulation M&A conjecture.* Our results are robust by using several proxies for target price manipulation and to control for overbidding. They are also robust when we control for media and for specific dates. Target price manipulation lowers the premiums paid in M&A deals. These effects hold regardless of the direction of the manipulation.

Overall, the data is consistent with stock price manipulations bringing down the premium prior to an acquisition. One might strategically trade prior to a tender offer to reduce the cost of a tender offer. However, is it legal in terms of trading rules, and can it be detected in terms of computer surveillance? No, at least for most countries and time period covered by our analyses. That is, our results confirm the *regulation-strengthening manipulation M&A conjecture,* indicating that regulation-reducing manipulation makes the impact of target price manipulation on M&A outcomes less severe. In fact, more detailed exchange trading rules reduce the probability of deal withdrawal, as well as, the severity of the effect of manipulation on an M&A withdrawal. We find that more detailed exchange trading rules increase the premiums associated with deals that are subject to manipulation. This is consistent with Becker's (1968) prediction that higher costs and enforcement requires greater benefits to wrongdoers to incentivize them to undertake illegal activities. It is also

consistent with the liquidity improvements with trading rules (Cumming et al., 2011) and surveillance (Cumming and Johan, 2008).

We find that acquirer share price manipulations are less common than target share price manipulations prior to M&As. A subset of these manipulations materially affected the probability of deal completion. In particular, positive manipulation of acquirer shares in stock transactions increased the probability of deal withdrawal.

The paper has several limitations. First, our results need to be interpreted with caution due to the self-selection problem present in M&A studies that firms might self-select into becoming a target or acquirer based on some unobservable characteristics. Second, the data on the EOD stock price manipulation are the suspected cases not the actually prosecuted. Consistent with Aitken et al. (2015b), it is necessary to focus on suspected cases because enforcement takes place many years afterward (if at all, which varies a great deal across countries in our sample) and long after the real effects of manipulation on M&As may have already taken place. Third, we focus only on the probability of withdrawal of the M&A transaction. Future research could examine the impact of market manipulation on the long-term performance of completed mergers. It would also be instructive to examine the long-term performance differences between one-off acquirers and serial acquirers around manipulated M&As. Research in the future could likewise examine the role of different intermediaries (such as investment banks, auditors, lawyers) in mitigating the impact of market manipulation on M&As. These issues could help explain why some deals are more likely to go through. They could also better inform practitioners and policymakers about the causes and consequences of the interactions between market manipulation and M&As.

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Table 1. Sample construction and composition

This table presents the sample construction and the distribution of our sample by announcement year, target Fama-French industry, and target country for M&A deals announced between 2003 and 2014 in which the acquirer was seeking to buy more than 50% of the target.

Panel A: Sample construction			
	Completed deals	Terminated deals	Total
Number of observations with required data for deal termination analysis	2,425	324	2,749
%	88%	12%	100%
Number of observations with required data for premium analysis	1,883	232	2,115
%	89%	11%	100%

Panel B: Composition of sample by year			
Year	Completed deals	Terminated deals	Total
2003	147	21	168
2004	156	33	189
2005	204	23	227
2006	281	49	330
2007	318	50	368
2008	181	54	235
2009	164	20	184
2010	206	16	222
2011	226	10	236
2012	208	16	224
2013	174	16	190
2014	160	16	176
Total	2,425	324	2,749

Panel C: Composition of sample by industry (12 Fama-French)			
Industry	Completed deals	Terminated deals	Total
Consumer Non-Durables	110	19	129
Consumer Durables	40	7	47
Manufacturing	179	23	202
Oil, Gas, and Coal	231	36	267
Chemicals and Allied Products	47	5	52
Business Equipment	565	50	615
Telephone and Television Transmission	81	15	96
Utilities	54	11	65
Wholesale, Retail, and Some Services	159	22	181
Healthcare, Medical Equipment, Drug	300	24	324
Finance	197	22	219
Other	462	90	552

Total	2,425	324	2,749

Table 1. Sample construction and composition - continued

Panel D: Composition of sample by country

Country	Total Number of Announced M&A Deals	Number of Completed M&A Deals	Number of Withdrawn M&A Deals	Average M&A Deal Premium (%)	Number of EOD Manipulations Prior to Merger Announcement	# of EOD Cases that Resulted in an M&A Withdrawal	# of EOD Cases that Resulted in a Completed M&A Deal
Argentina	2	2	0	n/a	0	0	0
Australia	227	163	64	37.48	33	15	18
Austria	11	9	2	28.94	0	0	0
Belgium	17	15	2	38.13	0	0	0
Bermuda	36	34	2	14.16	4	0	4
Brazil	16	15	1	12.75	0	0	0
British Virgin	1	1	0	-13.33	0	0	0
Bulgaria	2	2	0	62.22	0	0	0
Canada	524	459	65	40.88	24	7	17
Cayman Islands	16	16	0	-2.31	1	0	1
China	6	6	0	-8.41	1	0	1
Colombia	2	2	0	n/a	0	0	0
Czech Republic	2	2	0	n/a	0	0	0
Denmark	19	17	2	40.85	0	0	0
Egypt	5	4	1	-8.12	0	0	0
Finland	13	12	1	42.78	0	0	0
France	56	53	3	28.26	5	1	4
Germany	88	84	4	35.31	0	0	0
Greece	1	1	0	24.76	0	0	0
Hong Kong	4	3	1	17.42	0	0	0
India	13	12	1	56.07	3	1	2

Table 1. Sample construction and composition - continued

Indonesia	8	8	0	21.41	0	0	0
Ireland	1	0	1	31.40	0	0	0
Israel	1	0	1	3.32	0	0	0
Italy	5	4	1	-0.05	0	0	0
Japan	19	15	4	22.23	0	0	0
Korea Republic	5	4	1	85.85	0	0	0
Malaysia	5	4	1	30.92	0	0	0
Morocco	1	1	0	n/a	0	0	0
New Zealand	4	1	3	28.64	0	0	0
Nigeria	1	1	0	n/a	0	0	0
Peru	1	1	0	-5.48	0	0	0
Philippines	1	1	0	50.00	0	0	0
Poland	8	5	3	14.31	0	0	0
Portugal	3	1	2	19.42	0	0	0
Russia	7	7	0	n/a	0	0	0
Singapore	8	3	5	64.00	1	1	0
Slovenia	1	1	0	-44.69	0	0	0
Spain	19	17	2	23.90	0	0	0
Sweden	4	3	1	15.92	0	0	0
Switzerland	25	19	6	21.03	7	4	3
Taiwan	1	0	1	20.56	0	0	0
United Kingdom	140	126	14	38.34	6	2	4
United States	1,419	1,290	129	41.73	50	7	43
Vietnam	1	1	0	n/a	0	0	0
Totals	2,749	2,425	324	39.13	135	38	97

Table 2. Descriptive statistics

This table shows the summary statistics for the variables used in our base model. The sample includes all mergers and acquisitions announced between 2003 and 2014 in which the acquirer was seeking to buy more than 50% of the target. The sample size consists of 2,749 deals, where 324 are withdrawn and 2,425 are completed. PREMIUM, LEVERAGE, PB, and ROA are winsorized at the 99% level. All variables are defined in the appendix.

	(1) Withdrawn deals		(2) Completed deals		(2) - (1) Difference in Mean	t-stat
	Mean	SD	Mean	SD		
Manipulation measures						
EODPD [-30;0]	0.1173	0.3223	0.0400	0.1960	-0.0773	-6.08
EODPD [-20;0]	0.0833	0.2768	0.0264	0.1603	-0.0569	-5.41
EODPD [-10;0]	0.0432	0.2036	0.0136	0.1159	-0.0296	-3.87
EODPD_T [-30;0]	0.0159	0.0849	0.0037	0.0394	-0.0122	-4.37
EODPD_T [-20;0]	0.0136	0.0826	0.0026	0.0315	-0.0110	-4.53
EODPD_T [-10;0]	0.0085	0.0703	0.0009	0.0161	-0.0077	-4.54
EODPD_N	0.0556	0.2294	0.0202	0.1407	-0.0353	-3.88
EODPD_P	0.0617	0.2410	0.0198	0.1393	-0.0419	-4.58
Controls						
PREMIUM	34.6299	47.3682	39.7266	43.0353	5.0967	1.88
INDUSTRY	0.4167	0.4938	0.5130	0.4999	0.0963	3.26
TOEHOLD	3.9717	9.7775	1.8701	6.9832	-2.1016	-4.82
STOCK	0.1883	0.3915	0.1295	0.3358	-0.0588	-2.90
CASH	0.5926	0.4921	0.6256	0.4841	0.0330	1.15
HOSTILE	0.0741	0.2623	0.0082	0.0905	-0.0658	-8.99
PUBLICBIDDER	0.5370	0.4994	0.6219	0.4850	0.0848	2.95
CROSS-COUNTRY	0.2469	0.4319	0.2384	0.4262	-0.0086	-0.34
LEVERAGE	7.9955	34.6653	3.3803	22.4781	-4.6152	-3.22
PB	1.5207	2.5825	1.8798	2.7910	0.3592	2.19
ROA	0.6921	2.4343	0.5131	1.7404	-0.1791	-1.65

Table 3. Correlation Table

This table shows Pearson correlations for the variables used in our base model. All variables are defined in the appendix.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	WITHDRAWN	1.00													
2	PREMIUM	-0.04	1.00												
3	EODPD	0.13*	-0.08*	1.00											
4	EODPD_T	0.10*	-0.02	0.46*	1.00										
5	INDUSTRY	-0.08*	0.08*	-0.13*	-0.05*	1.00									
6	TOEHOLD	0.09*	-0.05*	0.05*	0.04*	-0.08*	1.00								
7	STOCK	0.04	-0.08*	-0.07*	-0.04	0.18*	-0.01	1.00							
8	CASH	-0.02	0.06*	0.01	0.02	-0.24*	0.04*	-0.54*	1.00						
9	HOSTILE	0.17*	0.04	-0.02	0.02	0.02	0.06*	-0.01	0.01	1.00					
10	PUBLICBIDDER	-0.07*	0.04*	-0.03	-0.04	0.32*	-0.11*	0.30*	-0.40*	0.04	1.00				
11	CROSS-COUNTRY	0.01	0.02	0.02	-0.01	-0.00	0.02	-0.09*	0.10*	0.05*	0.00	1.00			
12	LEVERAGE	0.09*	-0.06*	-0.01	-0.00	-0.03	0.05*	-0.02	0.03	0.02	-0.07*	0.07*	1.00		
13	PB	-0.05*	-0.04	0.01	0.00	0.05*	-0.05*	0.01	-0.03	-0.03	0.16*	-0.03	0.10*	1.00	
14	ROA	0.04*	-0.03	0.01	0.06*	-0.04*	0.02	-0.04	0.03	-0.01	-0.01	0.04*	0.04*	-0.01	1.00

Note: * $p < 0.05$.

Table 4. Target price manipulation and deal withdrawal

This table shows the main results of the regression analysis where the main dependent variable is WITHDRAWN. Models 1 and 2 are estimated for the full sample, which consists of all mergers and acquisitions announced between 2003 and 2014 in which the acquirer was seeking to buy more than 50% of the target. All regressions include constant, country, year, and Fama-French industry dummies. Models 3 and 4 are estimated for a propensity score matched sample (based on Fama-French industry, year, and country). EODPD_T, LEVERAGE, PB, and ROA are winsorized at the 99% level. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively. Marginal effects are reported. Standard errors are clustered by country. All variables are defined in the appendix.

	Full Sample		Matched Sample	
	(1)	(2)	(3)	(4)
EODPD	**0.1231*** **		**0.1059** **	
	[4.00]		**[2.38]**	
EODPD_T		**0.8721*** **		**0.8108** **
		[3.81]		**[2.06]**
INDUSTRY	-0.0241***	-0.0273***	0.0052**	0.0047**
	[-3.15]	[-3.60]	[2.19]	[2.20]
TOEHOLD	0.0008	0.0008	0.0137	-0.0089
	[1.63]	[1.57]	[0.20]	[-0.14]
STOCK	0.0660***	0.0616***	-0.0783	-0.0768
	[3.69]	[3.48]	[-1.60]	[-1.51]
CASH	-0.0096	-0.0108	0.3918***	0.3567***
	[-0.72]	[-0.78]	[4.29]	[3.55]
HOSTILE	0.4278***	0.4152***	-0.0511	-0.0468
	[3.28]	[3.18]	[-1.62]	[-1.33]
PUBLICBIDDER	-0.0482***	-0.0476***	-0.1203***	-0.1383***
	[-3.38]	[-3.26]	[-3.03]	[-3.69]
CROSS-COUNTRY	0.0062	0.0072	-0.0146	-0.0253
	[0.36]	[0.42]	[-0.43]	[-0.63]
LEVERAGE	0.0005	0.0006	0.0004	0.0003
	[1.30]	[1.33]	[0.57]	[0.41]
PB	-0.0048***	-0.0046***	-0.0066*	-0.0054
	[-3.22]	[-2.90]	[-1.65]	[-1.34]
ROA	0.0022	0.0022	0.0081*	0.0070
	[0.52]	[0.50]	[1.87]	[1.31]
Observations	2,749	2,749	268	268
Pseudo R-squared	0.1364	0.1327	0.1006	0.0951

Table 5. Target price manipulation and deal withdrawal controlling for overbidding (PREMIUM, COMPETING)

This table shows the main results of the regression analysis where the main dependent variable is WITHDRAWN. Models 1 and 2 are estimated for the full sample, which consists of all mergers and acquisitions announced between 2003 and 2014 in which the acquirer was seeking to buy more than 50% of the target. All regressions include constant, country, year, and Fama-French industry dummies. Models 3 and 4 are estimated for a propensity score matched sample (based on Fama-French industry, year, and country). All variables are defined in appendix 1. EODPD_T, PREMIUM, LEVERAGE, PB, and ROA are winsorized at the 99% level. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively. Marginal effects are reported. Standard errors are clustered by country. All variables are defined in the appendix.

	Full Sample		Matched Sample	
	(1)	(2)	(3)	(4)
EODPD	**0.1624*** **		**0.1065** **	
	[4.88]		**[2.24]**	
EODPD_T		**0.9375*** **		**0.9616***
		[4.24]		**[1.94]**
PREMIUM	-0.0002	-0.0002*	-0.0017***	-0.0017***
	[-1.44]	[-1.70]	[-2.63]	[-2.78]
COMPETING	0.1471***	0.1460***	0.5249***	0.4984***
	[9.15]	[8.48]	[4.03]	[4.26]
INDUSTRY	-0.0284***	-0.0325***	0.0038**	0.0032*
	[-2.90]	[-3.06]	[2.12]	[1.92]
TOEHOLD	0.0007	0.0007	-0.0181	-0.0432
	[1.32]	[1.20]	[-0.31]	[-0.72]
STOCK	0.0526***	0.0464***	-0.1282**	-0.1233**
	[3.69]	[3.37]	[-2.16]	[-2.04]
CASH	-0.0169	-0.0173	-0.0304	-0.0469
	[-1.54]	[-1.51]	[-0.72]	[-1.35]
HOSTILE	0.2170***	0.2066***	-0.0553	-0.0523
	[2.81]	[2.70]	[-1.39]	[-1.32]
PUBLICBIDDER	-0.0336***	-0.0326***	-0.0756***	-0.0828**
	[-2.82]	[-2.58]	[-2.96]	[-2.55]
CROSS-COUNTRY	0.0011	0.0026	-0.0926***	-0.1067***
	[0.08]	[0.20]	[-3.93]	[-5.58]
LEVERAGE	0.0007	0.0007	0.0023***	0.0024***
	[1.36]	[1.36]	[2.62]	[2.68]
PB	-0.0027***	-0.0028**	-0.0063	-0.0056
	[-2.70]	[-2.26]	[-1.17]	[-1.04]
ROA	0.0019	0.0020	-0.0108	-0.0133
	[0.53]	[0.51]	[-0.98]	[-1.55]
Observations	2,115	2,115	250	250
Pseudo R-squared	0.2251	0.2172	0.1557	0.1541

Table 6. Target price manipulation and deal premium

This table shows the main results of the regression analysis where the main dependent variable is PREMIUM. Models 1 and 2 are estimated for the full sample, which consists of all mergers and acquisitions announced between 2003 and 2014 in which the acquirer was seeking to buy more than 50% of the target. All regressions include constant, country, year, and Fama-French industry dummies. Models 3 and 4 are estimated for a propensity score matched sample (based on Fama-French industry, year, and country). EODPD_T, LEVERAGE, PB, and ROA are winsorized at the 99% level. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively. Marginal effects are reported. Standard errors are clustered by country. All variables are defined in the appendix.

	Full Sample		Matched Sample	
	(1)	(2)	(3)	(4)
EODPD	**-8.9644*** **		**-9.9198** **	
	[-5.70]		**[-2.88]**	
EODPD_T		**-147.1135*** **		**-109.1770*** **
		[-3.10]		**[-4.62]**
INDUSTRY	-0.1078*	-0.1121*	-0.2857	-0.2461
	[-1.71]	[-1.76]	[-1.15]	[-0.91]
TOEHOLD	-5.7782***	-5.6887***	-11.2805*	-9.8327
	[-4.26]	[-4.22]	[-1.94]	[-1.82]
STOCK	1.8368***	1.8511***	0.1584	0.2299
	[3.53]	[3.42]	[0.06]	[0.09]
CASH	4.7863	5.0003	22.6672***	24.7948***
	[1.25]	[1.30]	[8.48]	[9.19]
HOSTILE	2.2274**	2.0927**	-1.5217	-3.0520
	[2.28]	[2.19]	[-0.72]	[-1.57]
PUBLICBIDDER	1.8989***	2.0464***	3.9306	5.6155
	[3.05]	[3.39]	[1.23]	[1.40]
CROSS-COUNTRY	1.3701	1.4067	8.0733***	9.2502**
	[1.49]	[1.46]	[3.77]	[3.00]
LEVERAGE	-0.0423**	-0.0471**	-0.0302**	-0.0410
	[-2.08]	[-2.28]	[-2.26]	[-1.58]
PB	-0.1571*	-0.1580*	0.5928**	0.5222**
	[-1.94]	[-1.93]	[2.88]	[2.84]
ROA	0.0220	0.0216	-0.2566	-0.0548
	[0.06]	[0.06]	[-0.94]	[-0.19]
Observations	2,115	2,115	184	184
R-squared	0.1010	0.1000	0.1520	0.1520

Table 7. Target price manipulation direction, deal withdrawal, and premium

This table shows the results of the regression analysis where the main dependent variable is WITHDRAWN in Models 1 and 2, and PREMIUM in Models 3 and 4. The sample consists of mergers and acquisitions announced between 2003 and 2014 in which the acquirer was seeking to buy more than 50% of the target. EODPD_N is an indicator variable that equals 1 if the negative dislocation of EOD prices is detected over thirty days before the announcement date, and 0 otherwise. EODPD_P is an indicator variable that equals 1 if the positive dislocation of EOD prices is detected over thirty days before the announcement date, and 0 otherwise. All regressions include constant, country, year, and Fama-French industry dummies. PREMIUM, LEVERAGE, PB, and ROA are winsorized at the 99% level. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively. Marginal effects are reported. Standard errors are clustered by country. All variables are defined in the appendix.

	Withdrawn (1)	Withdrawn (2)	Premium (3)	Premium (4)
EODPD_N	**0.0980****		**-7.7621*****	
	[2.32]		**[-2.93]**	
EODPD _P		**0.1338*****		**-9.6839*****
		[4.65]		**[-4.80]**
INDUSTRY	-0.0277***	-0.0275***	2.0713***	2.1404***
	[-3.29]	[-3.56]	[3.62]	[3.50]
TOEHOLD	0.0008*	0.0008	-0.1100*	-0.1051
	[1.73]	[1.56]	[-1.81]	[-1.66]
STOCK	0.0589***	0.0635***	-5.4801***	-5.5940***
	[3.62]	[3.32]	[-3.93]	[-4.11]
CASH	-0.0129	-0.0103	2.0018***	1.9329***
	[-0.94]	[-0.67]	[3.91]	[3.57]
HOSTILE	0.4283***	0.4176***	5.0290	5.0553
	[3.21]	[3.18]	[1.33]	[1.31]
PUBLICBIDDER	-0.0510***	-0.0464***	2.2956**	2.0716**
	[-3.73]	[-3.15]	[2.41]	[2.10]
CROSS-COUNTRY	0.0058	0.0079	1.3225	1.3476
	[0.35]	[0.46]	[1.44]	[1.54]
LEVERAGE	0.0005	0.0006	-0.0407*	-0.0459**
	[1.20]	[1.31]	[-1.94]	[-2.16]
PB	-0.0045***	-0.0048***	-0.1760**	-0.1586*
	[-3.25]	[-3.22]	[-2.23]	[-2.01]
ROA	0.0023	0.0023	0.0037	-0.0023
	[0.54]	[0.55]	[0.01]	[-0.01]
Observations	2,693	2,693	2,115	2,115
Pseudo R-squared	0.1304	0.1326	0.0973	0.0980

Table 8. Acquirer price manipulation and deal withdrawal

This table shows the results of the regression analysis where the main dependent variable is WITHDRAWN. The sample consists of mergers and acquisitions announced between 2003 and 2014 in which the acquirer was seeking to buy more than 50% of the target. In Model 1, we eliminate the deals where the information on EODPD for the acquirer price was missing. In Model 2, we use a matched sample. In Models 2-5, we include only deals where the percentage of stock as the method of payment was higher than zero. In this table, EODPD is an indicator variable that equals 1 if the dislocation of the acquirer's EOD price is detected over thirty days before the M&A announcement date, and 0 otherwise. EODPD_N is an indicator variable that equals 1 if the negative dislocation of the acquirer's EOD price is detected over thirty days before the announcement date, and 0 otherwise. EODPD_P is an indicator variable that equals 1 if the positive dislocation of the acquirer's EOD price is detected over thirty days before the announcement date, and 0 otherwise. All regressions include constant, country, year, and Fama-French industry dummies. LEVERAGE, PB, and ROA are winsorized at the 99% level. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively. Marginal effects are reported. Standard errors are clustered by country. All variables are defined in the appendix.

	(1)	(2)	(3)	(4)	(5)
EODPD	**-0.0157**	**-0.0033**	**0.0637**		
	[-0.65]	**[-1.09]**	**[0.50]**		
EODPD_P				**0.2557****	
				[2.37]	
EODPD _N					**-0.0508**
					[-0.49]
INDUSTRY	-0.0225**	-0.0409**	-0.0384***	-0.0380***	-0.0394***
	[-2.10]	[-2.33]	[-2.65]	[-2.71]	[-2.61]
TOEHOLD	0.0005		0.0012	0.0013	0.0012
	[0.90]		[0.57]	[0.64]	[0.60]
STOCK	0.0528***	0.6572***			
	[2.95]	[7.10]			
CASH	-0.0131	0.0046			
	[-0.55]	[0.49]			
HOSTILE	0.4948***	0.9545***	0.7629***	0.7672***	0.7909***
	[5.54]	[78.39]	[6.34]	[6.22]	[8.11]
PUBLICBID					
DER	-0.0614***	-0.0322***	-0.0062	-0.0105	-0.0052
	[-4.18]	[-7.31]	[-0.13]	[-0.22]	[-0.11]
CROSS-					
COUNTRY	-0.0027	0.0803***	0.0135	0.0122	0.0113
	[-0.19]	0.0031	[0.39]	[0.32]	[0.35]
LEVERAGE	0.0004	[1.38]	0.0018	0.0016	0.0015
	[1.40]	-0.0005	[0.37]	[0.32]	[0.32]
PB	-0.0028	[-1.05]	-0.0045	-0.0043	-0.0043
	[-0.98]	0.0057	[-1.13]	[-1.12]	[-1.10]
ROA	0.0033	[1.42]	0.0190	0.0193	0.0189
	[0.53]	0.0031	[1.11]	[1.13]	[1.16]
	-0.0225**	[1.38]	-0.0384***	-0.0380***	-0.0394***

Observations	1,571	100	614	614	614
Pseudo R-squared	0.1304	0.6285	0.1326	0.0973	0.0980

Table 9. Target price manipulation, regulation, and deal withdrawal

This table shows the main results of the regression analysis where the main dependent variable is WITHDRAWN. The sample consists of all mergers and acquisitions announced between 2003 and 2014 in which the acquirer was seeking to acquire more than 50% of the target. All regressions include constant, controls, country, year, and Fama-French industry dummies. In Model 1, interaction with MMI (Market Manipulation Index) is included. In Model 2, interaction with ITI (Insider Trading Index) is included. In Model 3, interaction with BAI (Broker Agency Index) is included. All variables are defined in appendix 1. LEVERAGE, PB, and ROA are winsorized at the 99% level. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively. Marginal effects are reported. Standard errors are clustered by country. All variables are defined in the appendix.

	(1)	(2)	(3)
EODPD	**0.2654***	**0.2015*****	**0.1637*****
	[1.85]	**[4.19]**	**[3.66]**
EODPD_MMI	**-0.0068**		
	[-1.30]		
MMI	-0.0314***		
	[-7.66]		
EODPD_ITI		**-0.0093*****	
		[-3.74]	
ITI		-0.0766***	
		[-7.73]	
EODPD_BAI			**-0.0136****
			[-2.26]
BAI			0.0243**
			[2.24]
Controls	Yes	Yes	Yes
Observations	2,435	2,435	2,435
Pseudo R-squared	0.1426	0.1433	0.1431

Table 10. Target price manipulation and deal premium

This table shows the results of the regression analysis where the main dependent variable is PREMIUM. The sample consists of all mergers and acquisitions announced between 2003 and 2014 in which the acquirer was seeking to acquire more than 50% of the target. All regressions include constant, controls, country, year, and Fama-French industry dummies. In Model 1, interaction with MMI (Market Manipulation Index) is included. In Model 2, interaction with ITI (Insider Trading Index) is included. In Model 3, interaction with BAI (Broker Agency Index) is included. LEVERAGE, PB, and ROA are winsorized at the 99% level. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively. Marginal effects are reported. Standard errors are clustered by country. All variables are defined in the appendix.

	(1)	(2)	(3)
EODPD	**-16.3592*** **	**-12.7580*** **	**-12.4432*** **
	[-4.39]	**[-6.27]**	**[-8.40]**
EODPD_MMI	**0.6128***		
	[1.87]		
MMI	0.2807		
	[0.77]		
EODPD_ITI		**0.5115** **	
		[1.99]	
ITI		0.3650	
		[0.77]	
EODPD_BAI			**1.0290** **
			[2.57]
BAI			0.6547
			[0.77]
Controls	Yes	Yes	Yes
Observations	1,919	1,919	1,919
Pseudo R-squared	0.1091	0.1091	0.1092

Appendix

Table A1. Variable descriptions

Name	Description [Source]
Dependent Variables	
WITHDRAWN	An indicator variable that equals 1 if the deal is withdrawn, and 0 otherwise [Thomson One SDC].
PREMIUM	The premium of the offer price to the share price four weeks before the announcement [Thomson One SDC].
Manipulation Variables	
EODPD	An indicator variable that equals 1 if the dislocation of the target's EOD price is detected over thirty days before the M&A announcement date, and 0 otherwise. CMCRC surveillance staff constructed the dislocation of EOD price cases by examining the price change between the last trade price (Pt) and the last available trade price fifteen minutes before the continuous trading period ends (Pt-15). For securities exchanges that have closing auctions, the close price at auction is used (Pauction). A price movement is dislocated if it is four standard deviations away from the mean price change during the past 100-trading day benchmarking period, and if it reverts back to the mean level the next morning. To be considered as dislocation of EOD price case, the price movement between the last trade price (Pt) and the next day opening price (Pt+1), and between the last trade price (Pt) and the last available trade price fifteen minutes before the continuous trading period ends (Pt-15), must be larger than 50% (Pauction or Pt - Pt+1)/(Pauction or Pt - Pt-15) ≥50% [Capital Markets Cooperative Research Centre (CMCRC)].
EODPD_T	Average trading value as a percentage of the daily trading volume surrounding each suspected dislocating EOD price case (CMCRC).
Deal Characteristics	
COMPETING	An indicator variable that equals 1 if there is a competing bidder, and 0 otherwise [Thomson One SDC.
INDUSTRY	An indicator variable that equals 1 if the target firm and acquirer firm are in the same industry (two-digit SIC), and 0 otherwise [Thomson One SDC].
TOEHOLD	The percentage of the target's common shares held by the acquirer on the acquisition announcement date [Thomson One SDC].
STOCK	An indicator variable that equals 1 if the consideration for the acquisition consists in 100% of the acquiring firm's stock, and 0 otherwise [Thomson One SDC].

CASH	An indicator variable that equals 1 if the consideration for the acquisition consists of only cash, and 0 otherwise [Thomson One SDC].
HOSTILE	An indicator variable that equals 1 if the deal is reported as hostile, and 0 otherwise [Thomson One SDC].
PUBLICBIDDER	An indicator variable that equals 1 if the acquiring firm is a publicly traded company, and 0 otherwise [Thomson One SDC].
CROSS-COUNTRY	An indicator variable that equals 1 if the acquiring firm is from a different country than the target firm, and 0 otherwise [Thomson One SDC].
Target Characteristics	
LEVERAGE	Ratio of target's long-term debt to book value of common equity [Thomson Reuters].
PB	Ratio of target's market value to book value of common equity [Thomson Reuters].
ROA	Target income before extraordinary items divided by total assets [Thomson Reuters].
Exchange Trading Rules	
MMI	Market Manipulation Index. Sum of Price Manipulation Rules Index, Volume Manipulation Rules Index, Spoofing Rules Index, and False Disclosure Rules Index [Cumming, Johan, and Li, 2011].
ITI	Insider Trading Index. Sum of dummy variables for front-running, client precedence, trading ahead of research reports, separation of research and trading, broker ownership limit, restrictions on affiliation, restrictions on communications, investment company securities, influencing or rewarding the employees of others, and anti-intimidation/coordination [Cumming, Johan, and Li, 2011].
BAI	Broker Agency Index. Sum of dummy variables for trade through, improper execution, restrictions on member use of exchange name, restrictions on sales materials and telemarketing, and fair dealing with customers [Cumming, Johan, and Li, 2011].

Table A2. Summary statistics

	(1)					(2)				
	Withdrawn Deals					Completed Deals				
	Mean	SD	Min	Median	Max	Mean	SD	Min	Median	Max
EODPD [-30;0]	0.1173	0.3223	0	0	1	0.0400	0.1960	0	0	1
EODPD [-20;0]	0.0833	0.2768	0	0	1	0.0264	0.1603	0	0	1
EODPD [-10;0]	0.0432	0.2036	0	0	1	0.0136	0.1159	0	0	1
EODPD_T [-30;0]	0.0159	0.0849	0	0	0.8744	0.0037	0.0394	0	0	1
EODPD_T [-20;0]	0.0136	0.0826	0	0	0.8744	0.0026	0.0315	0	0	0.7894
EODPD_T [-10;0]	0.0085	0.0703	0	0	0.8744	0.0009	0.0161	0	0	0.5671
EODPD_N	0.0556	0.2294	0	0	1	0.0202	0.1407	0	0	1
EODPD_P	0.0617	0.2410	0	0	1	0.0198	0.1393	0	0	1
Controls										
PREMIUM	34.63	47.37	-58.71	25.44	261.54	39.73	43.04	-58.71	31.39	261.54
INDUSTRY	0.4167	0.4938	0	0	1	0.5130	0.4999	0	1	1
TOEHOLD	3.9717	9.7775	0	0	48.1400	1.8701	6.9832	0	0	49.7900
STOCK	0.1883	0.3915	0	0	1	0.1295	0.3358	0	0	1
CASH	0.5926	0.4921	0	1	1	0.6256	0.4841	0	1	1
HOSTILE	0.0741	0.2623	0	0	1	0.0082	0.0905	0	0	1
PUBLICBIDDER	0.5370	0.4994	0	1	1	0.6219	0.4850	0	1	1
CROSS-COUNTRY	0.2469	0.4319				0.2384	0.4262			
LEVERAGE	7.9955	34.6653	-2.2094	0.1246	343.3330	3.3803	22.4781	-2.2094	0.0632	343.3330
PB	1.5207	2.5825	-9.3040	1.3386	12.3626	1.8798	2.7910	-9.3040	1.4066	15.1864
ROA	0.6921	2.4343	-11.9270	0.3386	16.6560	0.5131	1.7404	-19.9690	0.4624	16.6560