

Synergies Disclosure in Mergers and Acquisitions*

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Abstract

When announcing an acquisition, firms frequently choose to disclose estimates of the synergies they expect from the deal. We hypothesize that they do so to address information asymmetry problems. In order to test this hypothesis, we hand-collect the information disclosed by bidders in M&A transactions announced between US public firms over the period 1995-2008. Consistent with our prediction, we find that the synergy disclosure decision is positively influenced by the deal size, the percentage of stock used for payment, and the level of negotiation costs associated with the deal. We also find that both the decision to disclose synergies and the value of the synergy expected to accrue to the acquirer have a significantly positive impact on the abnormal stock returns of the acquiring firm at the time of the announcement of the deal, suggesting that disclosure is used to signal deal quality. We find no evidence that disclosure is used to increase the likelihood of successfully completing the deal or to reduce competition for the target.

Keywords: Mergers and Acquisitions; Synergies; Voluntary Disclosure

JEL classification: G34, M41

* The authors would like to thank Marno Verbeek, David Yermack, Renhui Fu, Mathijs van Dijk, Frederik Schlingemann, and seminar participants at the Rotterdam School of Management for their helpful comments.

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“You mentioned upfront that there is potential for synergies involving batteries [...] I just wanted you to elaborate on that a little bit, understanding the deal is primary about revenue synergies.” *Lehman Brothers analyst*

“[...] on the part about the technology synergies, I don’t think we want to get that precise. I kind of apologize in advance.” *St. Jude Medical CEO*

Conference call on ANS acquisition

St. Jude Medical (17/10/2005)

“Bank of America expects to achieve \$7 billion in pre-tax expense savings, fully realized by 2012.”

Press release on Merrill Lynch acquisition

Bank of America (15/09/2008)

I. Introduction

The fraction of U.S. acquirers that disclose their synergy estimates when announcing a deal has increased from 7% in 1995 to 27% in 2008. Despite this growing tendency, we know very little about what leads a company to disclose such valuable information or about its impact on the market. This study aims at filling this gap in the literature.

M&A activity is surrounded by uncertainty regarding the valuation of the target and of the synergies that can be achieved with a given business combination. In addition, managers typically know more about the deal than the shareholders of the firm do. As a result, stockholders use certain characteristics of the deal and of the firms involved as indicators of the quality of the acquisition being proposed. For instance, previous research has shown that the market reaction to the deal announcement is more negative when equity is used as means of payment (Travlos, 1987), when the deal is diversifying (Morck, Shleifer, and Vishny, 1990), or when the acquirer has a low Tobin’s Q (Servaes, 1991). Given this information asymmetry, managers who want to convey their positive expectations regarding an acquisition might choose to emit a costly signal. We hypothesize that the disclosure of synergy estimates can be such a signal.

An important consideration is that disclosure is not costless. There are significant proprietary and reputation costs associated with it, in addition to the associated litigation risk. Firms that suffer from higher information asymmetry or that are negotiating a more complex deal have a stronger incentive to incur disclosure costs, as the potential increase in their value due to information asymmetry resolution is more pronounced than in other firms. Our hypothesis is that firms solely disclose their synergy estimates when their marginal benefit of doing so is sufficiently high as a result of information asymmetry.

In theory voluntary disclosures of managers are expected to be credible (Core, 2001), and empirical studies have reported that they have the same degree of credibility as audited financial information (see Healy and Palepu [2001] for a survey of studies on voluntary disclosure). In general litigation and reputational risks seem to prevent the disclosure of misleading information. We expect that the same happens with synergies disclosure and that, as a result, this type of disclosure can be used as a credible signal of deal quality. We therefore anticipate a positive impact of the disclosure decision on stock prices, with cross-sectional differences depending on the dollar amount of the synergies estimated when controlling for the premium paid.

Using a unique hand-collected dataset comprising all the M&A announcements between US public firms over the period 1995-2008, we find that deals in which synergies are disclosed (disclosure deals) are larger, both in absolute and relative size, are more likely to involve equity, have higher negotiation costs, and take longer to complete. Together, these findings provide evidence for our hypothesis that information asymmetry induced by deal-specific complexity is the main driver of disclosure. We find little evidence supporting the possibility that synergy disclosure is used to mitigate information

asymmetry pertaining solely to the bidding firm, to increase the likelihood of successfully completing the deal, or to reduce competition for the target. Our results are robust to the inclusion of control variables capturing disclosure costs, industry patterns, and differences in corporate governance and managerial incentives.

We also show that, after controlling for the endogeneity in the decision to disclose synergies, its impact on the bidding firm's stock price is significantly positive. Disclosing the synergies expected from a deal is associated with an increase in announcement-period abnormal returns of approximately 2.6% on average. The amount of synergies disclosed is not directly priced in the acquirer's stock; as expected, the market only takes into account the difference between this amount and the premium being offered, which is the fraction of the synergies that accrues to the bidder. These results are robust to the inclusion of an extensive set of control variables that have been previously reported to impact bidder returns.

In more than half of the observations in which a disclosure is made the value of the synergies forecasted is below the premium offered for the target. We find evidence that targets in these bids outperform their peers, are active in a competitive industry, and are undervalued,, suggesting that there are strategic reasons to offer such high premiums. In addition, litigation risk and proprietary costs are higher in these deals, giving rise to the possibility that managers might be conservative in their estimates on purpose.

We also test whether there are motivations for disclosing synergies other than signalling the quality of a deal. Disclosure could be used to increase the likelihood of deal completion, with managers revealing more information about the deal so as to obtain shareholder support. Another possibility is that acquirers use disclosure to announce

unique synergies with the target (Barney, 1988), and as a result reduce takeover competition. We do not find any evidence to support either of these alternative explanations.

To date, only very few studies have examined synergies disclosure. Houston, James, and Ryngaert (2001) find that in bank mergers the amount of synergies disclosed by managers has significant credibility and helps explaining cross-sectional announcement returns. Bernile (2004) reports that managers' projections are relevant but heavily discounted by the stock market. While these studies focus on a sample of synergy-disclosing companies, we explicitly take the voluntary nature of the disclosure decision into account by modelling the choice to disclose and the market impact of disclosure announcements in one integrated framework. We are also the first to examine the impact of disclosure after regulation Takeovers and Security Holder Communications (MA) and regulation Fair Disclosure (FD) have come into effect in 2000. These regulations entailed an important change in the communications between managers and shareholders. More specifically, Regulation MA allows for increased communication between the firms involved in M&A and the market. It clarifies that forward-looking statements, as synergy estimates, can be made by the managers before filing with the SEC. Under regulation FD, managers can not make selective disclosures of material nonpublic information to analysts anymore. It is not clear whether previous findings on synergy disclosures are valid in this new institutional setting, and we test for any differences following the approval of regulation FD. Previous studies have reported an increase in voluntary disclosures due to the new rules (e.g., Heflin, Subramanyam, and Zhang, 2003), and we

find the same pattern in synergies disclosure. In addition, we observe a change in the economic significance of disclosure following regulation FD.

On a broader scale, our study contributes to the extensive literature on the determinants of bidder returns in M&A (e.g., Servaes, 1991; Loughran and Vijh, 1997; Datta, Iskandar-Datta, and Raman, 2001; Moeller, Schlingemann, and Stulz, 2004; Masulis, Wang, and Xie, 2007) by providing evidence that disclosure positively affects bidder returns. Furthermore, we show that investors partly price in the amount that they expect to accrue to the acquiring firm, which is given by the difference between the present value of the synergies announced and the premium offered for the target shares. Finally, our findings add to the literature on voluntary managerial disclosure (Dye, 1986; Fischer and Verrecchia, 2000; Healy and Palepu, 2001). This strand of literature focuses on the importance of costs and incentives in explaining managerial disclosures, and studies their credibility and biases. Synergies disclosure in the context of M&A provides a new laboratory to test its findings, which so far mainly pertain to voluntary earnings announcements. In line with other papers in this field, we find that voluntary disclosure decisions are influenced by proprietary costs (Dye, 1986), managerial incentives (Nagar, Nanda, and Wysocki, 2003), and information asymmetry (Healy and Palepu, 2001).

The article proceeds as follows. Section II provides the theoretical background for our study. In Section III we describe the data and methodology. Sections IV and V provide the empirical results on the determinants of disclosure and its impact on stock prices, respectively. We address alternative explanations in Section VI. Section VII concludes.

II. Hypothesis development

Studies on value creation in mergers between public firms find either that bidders earn no abnormal returns at the time of the announcement of a deal (Jensen and Ruback, 1983;

Brunner, 2002), or that they experience negative returns (Andrade, Mitchell, and Stafford, 2001; Officer, 2003). Given this evidence, it is somewhat puzzling that we see so many acquisitions occurring, especially given the potential loss in bidder's value that may arise from a misguided acquisition decision (Moeller, Schlingemann, and Stulz, 2005). However, when measuring the market reaction to an acquisition, the researcher is also capturing other effects, namely the information released about the stand-alone value of the bidder (Hansen, 1987; Bhagat et al., 2005). As a result, it is hard to establish a clear and unbiased link between the abnormal returns at the announcement date and the inherent quality of the merger being proposed.

The literature has shown that variables that proxy for bidder's overvaluation or a low deal quality are negatively correlated with market returns. Deals paid with equity (Travlos, 1987), larger deals (Moeller, Schlingemann, and Stulz, 2005), acquisitions announced by overvalued firms (Dong et al., 2006) or by firms with high asymmetric information (Moeller, Schlingemann, and Stulz, 2007), are all received more negatively by the market. However, the firm is often limited in its choice between deal design features. For example, although it is commonly found that stock-paid deals induce more negative announcement returns than cash-paid deals, many acquirers have no other choice than to pay (partly) with equity.

If a manager is trying to defend a good deal that has some of the characteristics usually associated with lower returns, or whose valuation is very difficult, he has to find a way in which he can credibly communicate the quality of the deal to the market. Most of the signals that can be used, such as using cash to pay for the deal, relate more to the valuation of the bidding firm than to the valuation of the deal in itself. Our hypothesis is

that a public disclosure of the synergies the firm expects to achieve with the merger can help a firm to signal the value of the deal to the market.

Demand for voluntary disclosure arises from the impossibility of writing perfect contracts and from the existence of private information held by managers (Healy and Palepu, 2001). In the absence of disclosure costs, full disclosure of truthful information is optimal (Grossman and Hart, 1980; Milgrom, 1981). However, disclosure is not costless. In an M&A context, the estimates of synergies to be achieved can be seen as important proprietary information, as they provide competitors with information on the maximum amount the firm is willing to pay for the target and how their fit is, thereby potentially increasing takeover competition. Even in the absence of an impact on competing offers, revealing estimated synergies allows product market competitors to partially infer important confidential information about the firm, such as its costs structure, its strategy and its future position in the market. Furthermore, announcing high synergies could result in the target's shareholders demanding a higher premium. Finally, synergy disclosure entails important reputation and litigation risks, which are explored in more detail below. As a result of these potential costs, managers become unlikely to make any disclosures that may be damaging, unless their benefits are sufficiently high (Dye, 1986).

We hypothesize that managers are more likely to disclose synergy estimates when there is high information asymmetry on the quality of the deal being negotiated. This can be due either to specific characteristics of the deal or to information asymmetry at the acquiring-firm level, which raises investor doubt regarding the quality of the transaction. When investors have less precise information, managers are more likely to increase disclosure (Verrecchia, 1990), as the value of the information released increases with

information asymmetry (Core, 2001). The information on the amount of synergies is crucial for the valuation of a deal, and having a credible management assessment contributes to a less noisy estimate made by the market. We expect that disclosure results in a positive stock price reaction due to the reduction of information asymmetry and to the signalling effect given by the managers' confidence on the success and quality of the deal.

In order for disclosure to be considered a valid signal of the fundamental value of the deal, it follows that at least one cost related to it must be negatively correlated with the quality of the transaction (Spence, 1973). Our premise is that if litigation and reputation costs associated with misleading estimates are high enough, disclosures by the bidder are on average truthful, and the bad types are unlikely to do it.. Nevertheless, it can not be assumed that a deal is of bad quality just because disclosure is not made. Given that there is considerable noise in the process arising from other costs of disclosure, the bad firm types can avoid being identified as such because the market can not distinguish them from the good types that do not have enough incentives to disclose (Verrecchia, 1983).

Whether disclosures by the acquiring firm have to be truthful deserves some further examination. Theoretically all voluntary disclosures are expected to be credible, even if some might be biased (Core, 2001); otherwise the combination of lack of impact on the market and the costs associated with it would result in no disclosures being made at all. It has also been shown empirically that voluntary disclosures from managers enjoy the same degree of credibility as audited financial information (see Healy and Palepu,[2001] for a survey of the literature on voluntary disclosure). Nevertheless, it is important to note that forward-looking statements by managers, such as the estimates of synergies in a deal,

are not audited or certified. We expect that reputation concerns, from both the acquirer and the investment bank(s) advising in the deal, and the litigation risk associated with misleading estimates are sufficient to prevent deceiving disclosures, but whether these risks are enough to prevent misleading disclosures is an empirical question that is examined by looking at the disclosure impact on stock prices. If disclosure is associated with a significant market reaction it means that at least part of the information revealed is credible.

Markets can partially attest the truthfulness of the managers' projections by analyzing the audited financial reports of the combined firm (Healy and Palepu, 2001). There are potentially important consequences arising from an eventual misleading disclosure. For the firm, reputation damage means that it might become much harder to get investors to approve future deals or capital providers to finance them. For the managers, there are important indirect costs, as the decrease of their job security, reputation and consequently future income, especially if the firm gets sued (Brown, Hillegeist, and Lo, 2005).

According to rule 10b-5 of the U.S. Security Exchange Act of 1934, a deliberately misleading disclosure regarding synergy estimates is considered unlawful, even if it happens under the "safe harbour" provision of the Private Securities Litigation Reform Act of 1995. There have been some examples in the past years of firms being sued due to supposedly unrealistic synergy estimates, illustrating the fact that there exists a real litigation risk associated with making these disclosures. For example, SunTrust was sued by First Union Corp. and Wachovia for, among other things, using "aggressive and unrealistic" assumptions regarding synergies that could be expected from their combination with Wachovia. Also, Hewlett-Packard's management had to show in court

how their synergy estimates regarding the business combination with Compaq were calculated, in a process initiated by a member of the Hewlett family to challenge the merger. Even if class actions cases are settled or won by the management side, there can be significant indirect costs for the managers arising from their occurrence (Niehaus and Roth, 1999).

It is important to note that several courts have upheld decisions that managers need not to disclose the synergies expected from a specific deal, especially if they can be considered misleading.¹ Given that synergy disclosures are entirely voluntary, another important aspect emerges. Although somewhat surprisingly, firms disclosing more information can actually increase their litigation risk due to insufficient disclosure. The SEC has repeatedly indicated that, whenever a company makes information publicly available, it has to consider whether further disclosures are needed in order to put the information disclosed in its right context.² Failure to adequately communicate all material information related to the estimation of synergies, if an amount has been disclosed, may result in litigation.³ So if a firm initially provides a quantified estimate of the synergies it may be forced to disclose more detailed information on the deal at a later stage, potentially increasing its proprietary costs, while if it is silent about synergies at the time of the announcement it does not incur that risk.

Given the benefits and costs associated with synergy disclosure, we expect that the disclosure has a positive impact on the market reactions to the deal. Managers disclosing

¹ CheckFree Corporation Shareholders Litigation, No. 3193-CC (Del. Ch. Nov. 1, 2007); Pure Resources Inc. Shareholders Litigation, No. 808 A.2d 421, 446 (Del. Ch. 2002).

² See, for example, SEC's report number 51283, on March 1 2005, on the merger agreement between Titan Corporation and Lockheed Martin Corporation.

³ The case of Netsmart Technologies (NetSmart Technologies, Inc. Shareholders Litigation, 924 A.2d. 171 (Del. Ch. 2007)) is a good example of how increased disclosure may actually increase the firm's liability.

synergies are signalling their confidence by addressing the information asymmetry associated with the deal. This information gap can arise either from the information asymmetry inherent to the deal or from the characteristics of the bidding firm. The signal is deemed credible if there are high litigation and reputation costs associated with misleading estimates – if untruthful disclosures are unlikely to happen we will see the market taking the information released into account when valuing the bidding firm.

III. Data and methodology

We obtain a sample of all mergers and acquisitions between U.S. public firms announced between January 1st 1995 and December 31st 2008 from SDC's Mergers and Acquisitions Database (henceforth SDC). We exclude minority stake repurchases, "clean-up" offers (i.e. acquisitions of remaining interest by majority owners), privatizations, leveraged buyouts, spinoffs, recapitalizations, self-tenders, exchange-offers, and repurchases. We impose the requirement that the deal value should be available in SDC. After applying these filters we are left with a sample of 4,810 deals. We further require information on the method of payment and on the merging firms' industry. We exclude utilities (SIC codes starting with 49). For both the bidder and the target we need accounting information to be available in Compustat, and stock price information to be recorded in CRSP. We also exclude targets with a share price below one dollar 22 days before the offer is publicly announced, in line with Betton, Eckbo, and Thorburn (2008). Our final sample consists of 2,794 observations, of which 2,396 are completed deals, although in some of the empirical analyses this number is further reduced due to limited data availability in some fields. We obtain accounting information from Compustat North America Fundamentals Annual Database, stock price data from CRSP, analysts' data

from IBES, deal-related data from SDC, institutional ownership information from Thomson-Reuters CDA/Spectrum s34 database, and executive compensation details from Execucomp. All variables are winsorized at the 1% and the 99% level.

Our focus is on the disclosure of synergy estimates by bidding firms at the time of the announcement of a deal. In order to get this information, we search Factiva for all the newspaper articles and press releases on the announcement day indicated in SDC and on the following three trading days. It turns out that, in those deals with synergy value disclosure, this disclosure is always made simultaneously with the news of the announcement of the deal. As a result, we limit our event window to days [-1, +1] relative to the announcement date. In the vast majority (88%) of cases the disclosure of synergies is included in a press release from the firm or in a news article. In only 12% of the observations it is announced in a conference call and then reproduced by the media, an occurrence that became more common after the approval of regulation FD. We only consider estimates in which quantified projections, in dollar terms, are made by the firm managers. It is clear from Table 1 that the popularity of disclosing synergies has increased over time, rising from 7% of all the deals announced in 1995 to 27% in 2008. This increase was more pronounced after regulation FD came into force in late 2000, which is consistent with previous evidence on the increase of voluntary disclosure following regulation FD (Heflin, Subramanyam, and Zhang, 2003). The relative importance of deals with disclosed synergy values is even more substantial when looking at the value-weighted average (42% of the total).

[Please insert Table 1 about here]

In terms of the exact content of the disclosure, managers use different ways to communicate their estimates. In most cases (84%) they report a specific value to be achieved in the future. 14% of the managers disclose a range of values, and only 2% report a present value estimate. In 7% of the observations the estimates of the synergies include revenue enhancements to occur as a result of the merger, which on average amount to 43% of the total amount of synergy value disclosed (cost savings plus revenue enhancements). In all but two of all the disclosing deals the synergy estimates include cost savings.

In those cases in which the managers do not specify which year they expect the full synergies to be attained (42% of the observations), we assume these synergies to take place as of the beginning of the following calendar year. In those cases in which the managers report the present value of these synergies (2% of the sample) we use their estimates directly. Otherwise, we follow Houston, James, and Ryngaert (2001) and assume a linear increase in the level of synergies between the disclosure date and the year of the manager's projection. For example, if the announcement is made in 2000 and synergies worth 1 million dollars are estimated to be achieved by 2002, we assume that 0.5 million dollars worth of synergies will be attained in the year 2001. After the end of the time period of the projection we assume that the value of the synergies will grow at the expected long-term inflation rate at the time of the announcement of the deal (Houston, James, and Ryngaert, 2001). We obtain this rate from the Federal Reserve Bank of Philadelphia. If only a range of values is given we use its midpoint. Following Kaplan and Ruback (1995) and Houston, James, and Ryngaert (2001), we then compute

the present value of the synergies by discounting each year's gain using the cost of equity of the bidding firm.⁴ The cost of equity is calculated by multiplying the firm's adjusted market beta, computed over a period of one year, by a 7% risk premium (Ibbotson and Associates, 1996), and adding the yield on a 10-year U.S. Treasury Bond at the time of the announcement, obtained from Datastream.⁵ The average discount rate in the subsample disclosing synergies is 12.59%, which is substantially lower than the 15.05% reported by Houston, James, and Ryngaert (2001). This difference can be caused by their focus on the banking sector, and by the fact that our observations tend to be announced in more recent periods, during which the risk-free interest rates got much lower.

From the abovementioned procedure we obtain two key variables. The variable Synergies Disclosure is a dummy variable that takes the value one in case managers make a quantified projection of their synergy estimates at the time of the announcement of a deal (474 observations, involving 370 different acquirers). This variable is used to capture the discrete effect of making a synergy disclosure. The variable Synergies Estimated is a continuous variable that corresponds to the present value of synergies, computed using the Houston, James, and Ryngaert (2001) methodology, minus the premium paid by the bidder expressed in US dollars, scaled by the bidder equity value (measured 4 days before the announcement, as in Officer (2004)). Following Officer (2003), we first

⁴ To arrive at a more precise estimate of the total synergies, we should subtract the integration costs forecasted by managers. However, these costs are not disclosed in 79% of the observations, and requiring them in all the observations would substantially reduce our sample size. We do not expect the non-inclusion of these costs to materially affect the results, given the small values usually forecasted for restructuring charges – Houston, James, and Ryngaert (2001) find an average equivalent to only 1% of the combined bidder and target equity values in their sample of bank mergers. In addition, the restructuring charges are highly correlated with the synergy benefits that can be attained, and in a cross-sectional analysis as ours the bias caused by their omission will be limited.

⁵ The adjusted market beta is widely used in practice. It is intended to correct for the mean-reversion tendency observed in market betas. It is given by: Adjusted market beta = historical market beta * 0.666 + 0.333

compute the premium using the different pay components (debt, equity, etc.) reported by SDC. If this value is below 0 or above 2, we use instead the premium computed using the initial price of the offer as reported in SDC. If this value is also either below 0 or above 2 we set the premium as missing.

To see why our weighting method is an appropriate measure of the potential impact on the bidder's stock price, consider the following example. Assume we have a bidder with a market capitalisation of V_{B0} making an offer for a target worth V_{T0} , which is equivalent to its market capitalisation at time 0. The synergies that can arise from the deal correspond to S . The bid is worth V_{T0} plus a non-zero premium P_T . The value of the combined firm will be $V_{B1} + V_{T1} + S$, where V_{B1} incorporates the revaluation of the bidding firm caused by the announcement of the offer and V_{T1} is the fundamental value of the target firm perceived by the market after the announcement, excluding the synergies. From the total value we have to subtract the offer value to get to the amount that the original shareholders are entitled to: $V_{B1} + V_{T1} + S - (V_T + P_T)$.⁶ This will give the value of the bidding firm at the time of the announcement if the market knows that the bid will be successful. Assume instead that the market attributes to the deal a probability of success of Φ . The change in value of the bidder, in terms of returns and as a proportion of the pre-bid value, can then be defined as:

$$\frac{\Delta VB}{VB_0} = \frac{VB_1 - VB_0}{VB_0} + \Phi * \left[\frac{(S - P_T)}{VB_0} + \frac{(VT_1 - VT_0)}{VB_0} \right] \quad (1)$$

⁶ In offers involving equity, the "real" premium that will be received by the target shareholders is correlated with the synergies expected from the deal through the effect that these synergies have on the stock price of the bidder. In that case our measure of the premium at the time of the announcement might be biased downwards if there are substantial synergies arising from the offer. On the other hand, equity offers usually cause a significant reduction in the market's assessment of the stand-alone value of the bidder (Travlos, 1987), and we expect these two effects to somewhat offset each other.

where the first term comprises the bidding firm's revaluation and the second term includes the synergies effect and the target's misvaluation prior to the offer.

The synergies effect, $\frac{S - P_T}{VB_0}$, is very difficult to measure. Due to the lack of reliable proxies for the synergies, most researchers do not include this term directly in the abnormal returns regressions. We are able to use the disclosures made by managers as a proxy for S . A troubling aspect is that, under the model described in Equation 1 above, firms disclosing synergies worth less than the premium offered would see a negative impact on their stock price, which would put in question the rationality of voluntarily making the disclosure in the first place. We address this issue by introducing a dummy variable (Synergies Disclosed) to capture the positive effects of disclosing synergies that are not captured in the variable Synergies Estimated, as this latter variable can take a negative value in many of the observations. Due to the expected discrete effect of voluntary disclosure pertaining to signalling and information asymmetry resolution, a relation between disclosing synergies and returns might be better captured by the Synergies Disclosed dummy than by the variable Synergies Ratio.

IV. Determinants of the disclosure decision

a) Univariate analysis

We start by comparing the characteristics of the deals in which a disclosure is made (disclosure sample) with the characteristics of the deals for which no quantified estimate of synergies is disclosed (non-disclosure sample). Our key hypothesis is that disclosure occurs in deals that are more affected by information asymmetry or that are announced by firms with higher information asymmetry.

In the M&A literature there are various proxies for the complexity of a deal.⁷ Servaes and Zenner (1996) and Grinstein and Hribar (2004) argue that the size of an acquisition is a proxy for its complexity, as bigger firms are more difficult to value and are more likely to operate in different industries. In addition, bigger firms' operations are harder to combine and for an outsider it becomes harder to measure the synergies that can be attainable.. Hansen (1987) and Faccio and Masulis (2005) point out that the information asymmetry of a deal is rising in the relative value of the target compared to the value of the bidder. The method of payment used in a deal can also serve as a proxy for its complexity. In equity offerings the terms of the offer to the target depend on the combined synergies, making it easier for shareholders to value a deal that is paid in cash than one involving securities (Servaes and Zenner, 1996; Bates and Lemmon, 2003). Furthermore, equity offers are usually associated with bidder's overvaluation (Travlos, 1987), potentially raising more concerns from uninformed shareholders. Bates and Lemmon (2003) argue that both bidder and target termination fees are more likely to be used in complex deals, where bidding costs are higher and the parties want to lock in some sort of compensation for entering in deal negotiations. Whether an acquisition is performed in the same industry or not can have two opposite effects. A diversifying transaction may be harder to value, and hence more complex for shareholders (Servaes and Zenner, 1996; Bates and Lemmon, 2005). On the other hand, similar firms are more difficult to combine due to their overlap (Grinstein and Hribar, 2004). A good ex-post measure of deal complexity is the number of days taken to complete the deal – more complex deals are likely to take

⁷ We use the terms “complexity” and “information asymmetry” interchangeably throughout the paper when referring to M&A deals. It is not clear from the literature whether these concepts are any different or can actually be separated, and we use both of them to refer to deals which are harder to value, either due to lack of information or to higher uncertainty about its true value. This concept must not be confused with information asymmetry at the firm level.

longer to close than simpler deals (Bates and Lemmon, 2005). Finally, the complexity of the deal may also depend on the conditions of the industry in which the target operates. Shareholders will want more information on deals in industries that are going through important changes, in which more demands are put on managers (Hambrick and Cannella, 2004) We use the target industry's annualized average of the median sales growth in the two years before a merger as a proxy for industry growth, and the absolute difference in this rate between the two last years as a proxy for industry volatility (Hambrick and Cannella, 2005).

As proxy for information asymmetry about the acquiring firm, we use the standard deviation of the analysts' earnings forecasts in the month before the acquisition, scaled by the book value of equity (Bidder Analysts Disagreement). If disagreement among analysts captures market-wide disagreement, a high value of this measure can be interpreted as higher information asymmetry (Thomas, 2002). We also use the bidder's stock idiosyncratic volatility as a proxy for information asymmetry, following Moeller, Schlingemann, and Stulz (2007).

Table 2 provides detailed information of the characteristics of each of these groups and of their differences. Variable definitions can be found in Appendix 1.

[Please insert Table 2 about here]

Disclosure deals are significantly larger in both absolute and relative terms, are more likely to involve termination fees, are paid for using more equity, and take longer to complete. As previously argued, industry dynamics also impact the degree of complexity

of the deal. In line with our predictions, managers seem to be disclosing their estimates more often when the target firm is operating in a growing or unstable industry. However, disclosing firms are not experiencing higher information asymmetry prior to the deal, and have significantly lower idiosyncratic volatility.

At first glance the results are consistent with our hypothesis that disclosure arises from deal complexity, but not with the possibility that it results from the acquiring firm specific information asymmetry. In the next section we analyze whether these results hold in a multivariate setting.

b) Multivariate analysis

We start by conducting a probit analysis on the decision to disclose, using as regressors the variables proxying for deal complexity and a set of control variables. For the latter we build a Hostile dummy variable taking the value 1 if the initial target reaction to the deal is coded as hostile or unsolicited in SDC. In addition, we use a variable capturing the ratio of disclosing deals to all the deals taking place in the bidder's industry in the two years before the announcement (Disclosure Industry), as disclosure behaviour might be driven by what a firm's competitors do. We use the Fama-French 12 industry's classification from Kenneth French's website for this purpose. We also include year and industry fixed effects in all the regressions. The results reported in model (1) of Table 3 show that the main findings reported in the univariate analysis hold when including all the variables at the same time. The exceptions are the variables related to the target industry's dynamics, which become statistically insignificant due to the use of industry dummies. We also test for the effect of disclosure on the time to completion in a multivariate setting (unreported). We control for the deal's hostility and method of

payment, in addition to year and industry fixed effects. We also include the deal value and the relatedness of the merging firms as control variables, following Cai and Vijh (2007). The model has a high explanatory power (adjusted R squared of 28.73%), and the variable Synergies Disclosed has a coefficient of 16.5 (p-value of 0.01). We interpret these findings as further evidence that disclosure deals are associated with a higher degree of complexity. Nevertheless, to completely set aside the possibility of being spurious correlation or omitted variables driving the results, we test for other effects that might also influence the decision to disclose.

To control for proprietary costs (Dye, 1986), we use the Herfindhal index of the industry in which the bidder operates and the bidder's market to book ratio, following Bamber and Cheon (1998). According to these authors, a firm active in more concentrated industries and/or with more growth opportunities is less willing to disseminate information that could lead to more competition. Another potential cost of disclosing synergy estimates is the increased threat of competing offers. We assume that a competing offer is more likely to appear in liquid industries. We proxy for this risk by including the target's liquidity index in the year prior to the bid (Schlingemann, Stulz, and Walkling, 2002). In addition, we introduce a variable capturing the bidder's abnormal return in the year prior to the announcement (Bidder Runup); previous literature has reported a positive relation between firm performance and voluntary disclosure (Nagar, Nanda, and Wysocki, 2003), and legal risk can also be negatively influenced by performance (Bamber and Cheon, 1998). We control for reputational risk by including a dummy that takes value one in case the bidder appears more than once in our sample (Repeated Bidder). This variable is intended to control for the fact that a repeated bidder is more likely to be concerned about

its reputation in the market for corporate control, as it needs to seek shareholders' approval for deals and secure outside financing more often. Finally, we include the percentage of shares controlled by institutional owners. It is difficult to establish in advance the expected coefficient for this variable. Higher ownership by institutional investors is associated with increased monitoring of the managers and arguably harsher penalties if misleading estimates are provided, resulting in higher litigation risk and consequently less disclosure. On the other hand, it has been reported in the literature that institutional owners demand more voluntary disclosure from managers (El-Gazzar, 1998).

The results in column 2 of Table 3 show that proprietary costs seem to matter, as firms with higher market to book ratios and firms acquiring targets in more liquid industries are significantly less likely to disclose synergies, while the previous performance of the bidder, the fact that it makes more than one bid in the sample period, and the percentage of shares owned by institutions have no significant effect on the disclosure decision. A potential problem is that the market to book ratio may capture firm-specific and industry-wide misevaluation next to growth opportunities. We therefore use the decomposition of the ratio as proposed by Rhodes-Kropf, Robinson, and Viswanathan (2005), and focus on the long-run value to book pricing of the bidder as a measure for growth opportunities. The results of model (3) in Table 3 further support the notion that proprietary costs impact disclosure. We observe a significant negative impact of the growth opportunities of the bidder and of industry concentration on the likelihood of disclosure. The coefficient on the liquidity of the target's industry remains significantly negative. Based on these results we conclude that proprietary costs are important in explaining voluntary

disclosure by bidders. The finding that bidders with a lower market to book ratio are significantly more likely to make disclosures is inconsistent with the idea that overvalued bidders use disclosure to communicate “invented” synergies to the target shareholders (Shleifer and Vishny, 2003), and suggests that disclosure might be used to show to the market that the acquirer is not overvalued, despite being more likely to use equity financing. The strong positive relation between most of the proxies for deal complexity and the decision to disclose still holds after controlling for the impact of proprietary costs.

As discussed before, it is not necessary that the information asymmetry that leads to disclosure is deal specific, but it might instead be related to information asymmetry at the firm level. Although our univariate results suggest that this is not the case, we introduce variables capturing the information asymmetry of the acquiring firm to confirm those results in a multivariate setting. We include the standard deviation of the analysts’ forecasts before the acquisition announcement (Thomas, 2002) and the idiosyncratic volatility of its stock (Moeller et al., 2007) as proxies. The results from model (4) show that the analysts’ disagreement is significantly related to the decision to disclose, but not the bidder’s volatility. Our proxies for deal-specific information asymmetry remain unaltered, suggesting that this information asymmetry might be arising from both deal and firm specific characteristics.

Finally, we control for governance characteristics. Arguably, disclosure can be caused by a better corporate governance system, as a result of the increased pressure for transparency, or can work as its replacement, to assure shareholders of the quality of a deal made by a poorly governed firm. We proxy for the quality of corporate governance

using the G index of Gompers, Ishii, and Metrick (2003). In addition, we use the percentage of equity owned by the CEO and the fraction of his compensation that consists of stock options (equity based compensation or EBC; Datta, Iskandar-Datta, Raman, 2001) to capture incentives. Since disclosure can be seen as an agency problem, incentives that align the managers' interests with that of shareholders induce an increase in its frequency (Nagar, Nanda, and Wysocki, 2003). In column 5 of Table 3 we observe a significant negative impact of the fraction of equity owned by the CEO and of the G index on the likelihood of disclosure. This suggests that the need to disclose is greater when the CEO has a lower fraction of the firm but that poorly governed firms are less likely to engage in disclosure. This latter finding might be related with the fact that firms with fewer shareholder rights are also more likely to make poor acquisition decisions (Masulis, Wang, and Xie, 2007). We also find a significantly positive impact of the equity fraction of the CEO's pay (Bidder EBC) on the likelihood of disclosure, consistent with the importance of incentives in disclosure decisions (Nagar, Nanda, and Wysocki, 2003). Most of the variables related to deal complexity, as equity involved, relative size, deal size, and the existence of bidder termination fees, remain significant. After controlling for the governance and incentives structure, we observe that the valuation of the bidder, its pre-deal information asymmetry, and the proprietary costs do not significantly affect the decision to disclose.

Overall the results reported in Table 3 give strong support for our hypothesis that higher information asymmetry related to a deal increases the likelihood of a disclosure being made by the managers. There is weak evidence supporting the idea that this information asymmetry is firm-specific. Although other aspects also seem to impact up to some extent

the decision to disclose, namely the costs incurred with such disclosure and the relative valuation of the bidder, after controlling for the governance and incentives structure only the variables related to the complexity of the deal are still significant.

[Please insert Table 3 about here]

V. Impact of disclosure on stock price reactions to the deal announcement

The impact of disclosure on the market reaction to the announcement of the deal can be captured in two different ways. One relates to the impact of making the disclosure as opposed to not disclose any value. This effect is captured by the variable Synergies Disclosed. The other way of capturing it is by measuring the impact of the amount of synergies disclosed, which is proxied by the variable Synergies Ratio, described in detail in the Data and Methodology section. Both variables take the value zero when no disclosure is made.

Testing whether the market reaction to the decision to disclose is positive is a test of our hypothesis that disclosure works as a signalling device. We have shown that disclosure arises from high information asymmetry pertaining to a specific deal, but for our hypothesis to hold true it is also necessary that disclosure reveals the good types. As such, the variable Synergies Disclosure should have a positive impact on the bidder abnormal returns at the time of the announcement of a deal. Another crucial aspect of our hypothesis is whether the information released by managers is deemed credible and can not simply be made without any reasonable basis (Spence, 1973).⁸ If this is the case,

⁸ It is important to note the distinction between misleading and overoptimistic estimates. The first implies that managers make a disclosure that they know to be untruthful. The latter means that the estimate is based

disclosure must be associated with a significant market reaction (Fischer and Verrecchia, 2000). Testing whether the information released is taken into account by the market is therefore a test of whether disclosure is truthful, and it is done by looking at the impact of the variable Synergies Ratio on the bidder's stock price.

It has been shown that investors tend to take into account voluntary disclosures of managers (Healy and Palepu, 2001), but it is not clear whether these findings can be translated to the synergies disclosure in M&A. Houston, James, and Ryngaert (2001) show that the managers' estimates enjoy some credibility in the stock market, and that analysts tend to agree with them. Based on a qualitative assessment, the authors also find that only in one out of 30 cases the post-merger performance was significantly below the managers' estimates. Although we expect litigation and reputational costs to be high enough to prevent false disclosure, to test the hypothesis that synergies disclosure can be used as a signal of deal quality we make a thorough analysis of the impact of disclosure on stock prices.

a) Synergies disclosed

We start by analyzing the distribution of the variable Synergies Ratio. This variable captures the part of the synergies that will be extracted by the bidder with the transaction. A priori, we expect its values to be clustered around zero as, in a competitive takeover market, the premium paid in an acquisition should reflect most if not all the synergies expected to be achieved (Travlos, 1987).

[Please insert Table 4 about here]

on the value observed by the managers but that can be upwards biased compared to the true value due to hubris or any other reasons. Consistently misleading estimates of managers would be ignored in a rational market setting, while overoptimistic projections would only be discounted.

In panel A of Table 4 we see that both the mean and the median are negative, although not statistically different from zero. At first glance it can be puzzling to observe that in more than half of the observations the premium offered is higher than the synergies that are announced ($P > S$). Why would managers announce synergies that are lower than the premium they are paying for the target?⁹ We start by analyzing whether this surprising result is due to any specific characteristics of our sample. We must first take into account that we do not include restructuring costs in our calculation and that managers are probably more likely to make disclosures when the value of the synergies is high. We compare our synergy estimates with the values for synergies reported by Devos, Kadapakkam, and Krishnamurthy (2009). These authors use analysts' data obtained from Value Line to measure the forecasted value of synergies in a sample of transactions between U.S. public firms. In our sample, the average (median) synergies estimated by the managers are 11.68% (6.91%) of the combined bidder and target market capitalization, compared to 10.03% (5.11%) in their sample. Our valuation procedure is therefore producing reasonable estimates; at most we can expect it to be overoptimistic and, as a result, biased against finding these $S < P$ cases. The average (median) premium for the disclosure sample is 48% (38%), lower than the 55% (48%) reported using the same methodology in Officer (2003), and thus again working against finding cases where $S < P$. We also check for the changes in the Synergies Ratio arising from the use of

⁹ We could also ask why shareholders of the target firm do not demand a higher premium when they can observe that very high synergies are being captured by the bidder. This can be explained by the characteristics of the takeover market. On average we expect the bidder to pay most of the synergies to the target shareholders, as a result of the competition among bidders (Travlos, 1987), but this does not have to happen when the bidder has unique synergies with the target (Barney, 1988).

different assumptions for the growth and discount rates, as well as from the use of different premium measures. The result of a large fraction of deals with $S < P$ is unchanged. We conclude that this unexpected distribution of the synergies ratio variable is not due to any special characteristics of our sample or to our calculation procedure.

We hypothesize that there are several reasons that might induce managers to make acquisitions in which the synergies announced are lower than the premium paid. It is possible that they can not quantify all the benefits arising from the merger (as access to resources or avoiding a competitor taking over the target [Akdogu, 2009]), that they think the target is undervalued, or that they want to be pessimistic due to the increased litigation risk or even to avoid jeopardizing the merger negotiations with the target. Consistent with some of these explanations is the fact that many times the managers refer to the amount disclosed as the lower boundary of the synergies to be attained or they imply that the amount disclosed is only part of the total synergies. An alternative possibility is that these acquisitions are plagued by agency problems, with managers being able to put through a deal that is destroying shareholder value.

In order to better understand why in many deals the synergies disclosed are below the premium paid, we run a probit analysis in which the dependent variable takes value one when the present value of synergies disclosed is below the premium paid (Low Synergies), and zero when the opposite happens. We exclude deals in which no disclosure was made.

Low Synergies make up for 52% of the disclosure deals under analysis. The results in Panel B of Table 4 show that targets in these deals have a lower market to book ratio than in other disclosure deals, providing evidence in favour of the possibility that acquirers are

buying undervalued targets in Low Synergies deals. Furthermore, these acquisitions occur in more concentrated industries, as measured by the Herfindhal index (Target HHI), where competitive pressure is higher, and involve targets with a performance above industry average. It is thus likely that these deals generate important strategic benefits that are not captured by the amount of synergies estimated.. The possibility that some costs lead bidders to understate their synergies is supported as well. Firstly, our proxy for proprietary costs, bidder market to book ratio (Bamber and Cheon, 1997), is positively correlated with the probability of announcing synergies below the premium paid. In addition, litigation risk seems to also be of importance, with the variables Deal Size and Institutional Ownership being statistically significant in some of the specifications. Larger deals are likely to attract more attention from shareholders, and institutions usually monitor managers more closely. As a result, in larger deals or in deals made by companies with more institutional holders the managers might be especially careful not to be overoptimistic.

b) Market impact analysis

Panel A of Table 5 presents statistics on the relation between synergies disclosure and the acquiring firm stock prices. The difference in CAR between disclosing and non-disclosing deals is striking, with significantly worse abnormal returns experienced by disclosing deals. However, this does not have to go against our hypothesis. We expect that only when the merger's quality is uncertain the benefits of signalling outweigh its costs, but this does not necessarily mean that disclosing deals would on average be better than non-disclosing deals, as the latter also include all the deals that are good enough not to need any type of disclosure.

Panel B of Table 4 shows a regression of the bidders' CAR on the decision to disclose and on the Synergies Ratio, using only industry and year fixed effects. We also show the results using Houston, James, and Ryngaert (2001) measure of the present value of synergies scaled by the market value of the bidder. By not deducting the premium paid, this measure works against finding any statistical impact of the amount disclosed.

The results confirm that disclosing deals are associated with lower abnormal returns. Our expectation that the disclosure is credible seems supported, as the cross-sectional differences in the amount disclosed have a strongly significant impact on returns. Measuring the synergies value following Houston, James, and Ryngaert (2001) results in insignificant estimates. Following the arguments exposed in the data section, in the rest of the paper we use the variable Synergies Ratio to capture the effect of the amount of synergies disclosed.¹⁰

[Please insert Table 5 about here]

c) Multivariate regressions

In this section we report the results of multivariate regressions on the CAR of the bidder at the time of the announcement of an acquisition, using as regressors our variables of interest, Synergies Disclosure and Synergies Ratio, and a wide set of control variables. We measure the CAR using the market model based on the CRSP value weighted index. We include only completed deals to mitigate the effect of different probabilities of deal completion on abnormal returns. We include year and industry fixed-effects in all the

¹⁰ We re-run all our analyses using Houston, James, and Ryngaert (2001) measure, but its coefficient is never significantly different from zero.

specifications. As further control variables we need to include variables that have been previously reported in the literature as impacting bidder abnormal returns. These include the deal's absolute size (Kisgen, Qian, and Song, 2009) and relative size (Moeller, Schlingemann, and Stulz, 2004), the method of payment (Travlos, 1987), and whether the deal is diversifying (Morck, Shleifer, and Vishny, 1990) or a tender offer (Loughran and Vijh, 1997). We control for the target's industry liquidity following Schlingemann, Stulz, and Walkling (2002), and for firms that make more than one bid during our sample period following Fuller, Netter, and Stegemoller (2002) insight that frequent acquirers announcements might be better anticipated by the market. We also include the market to book value of the bidder and target's equity to proxy for Tobin's Q, which has been shown to have an impact on bidder returns (Lang et al., 1989; Servaes, 1991). In addition, we include the target's stock price runup (Betton, Eckbo, and Thorburn, 2009), the bidder's leverage (Masulis, Wang, and Xie, 2007), the corporate governance index and a proxy for the institutional ownership of the acquirer (Masulis, Wang, and Xie, 2007), and the acquirer's CEO equity-based compensation and stock ownership (Datta, Iskandar-Datta, and Raman, 2001; Cai and Vijh, 2007).

Ordinary Least Squares

We start by estimating the impact of disclosure on bidder returns using ordinary least squares (OLS).

[Please insert Table 6 about here]

Although the variable Synergies Ratio is always significantly positive, especially when using the disclosure sample only, the dummy Synergies Disclosure is never significantly different from 0 at the conventional levels. This result goes against our hypothesis of disclosure working as a signalling device. However, it is also possible that the model we are currently using is misspecified, and before rejecting our hypothesis we check for the model's validity. Our concern with the current setting is that by running an OLS on the bidder CAR we are assuming that any unobservable factors impacting the decision to disclose are uncorrelated with the market reaction to the deal. Such assumption might not hold in reality. One can think of several deal characteristics for which we do not have a perfect proxy, such as deal complexity or quality, that have an impact on the decision to disclose and on bidder returns. As a result of this endogeneity problem, the error term of the probit on the decision to disclose and of the OLS presented above will be correlated, and the OLS estimates biased. To check and potentially correct for this, we study the impact of disclosure on bidder returns using different methods to control for endogeneity.

Treatment effects model

The first model we use to deal with endogeneity is a two-step estimation procedure as the one used by Campa and Kedia (2002) and Kisgen, Qian, and Song (2009). In the first step we run a probit regression on the decision to disclose, in which we assume there is an unobservable latent variable $Synergies\ Disclosure^+$ that, if greater than 0, will mean that the bidder makes a disclosure. From these results, a hazard rate is computed following Heckman (1979), and is then included in the second stage regression on the bidder CAR. In this regression, the dummy variable Synergies Disclosure is amplified by the hazard rate, and as a result it can be consistently estimated using OLS (Verbeek,

2008). We make use of the probit analysis reported in Table 3 for the first-stage analysis. For identification purposes, it is advisable that exclusion restrictions are present in the first-stage of the model (Verbeek, 2008). We use different variables in the first stage that are correlated with the decision to disclose, but not with the bidder returns. In Table 4 we show that the disclosure pattern in the industry of the bidding firm (Disclosure Industry) is important in explaining disclosure decisions; arguably this variable has no connection with returns given the fact that we include industry fixed-effects in the regressions. As a result, we use it as an instrument. In previous literature no relation was found between termination fees and returns (Bates and Lemmon, 2003), but given their significant relation with disclosure they can also be used for identification purposes. We also draw on the variables related to the firms' industry characteristics that are not expected to impact returns given the extensive set of control variables we already use; these include the concentration ratio (Bidder HHI), the target's industry instability (Target Industry Instability) and growth (Target Industry Growth). Finally, we use a dummy capturing whether the deal was hostile or unsolicited (Hostile); although this variable is usually correlated with bidder returns, with our set of control variables (namely a dummy for tender offers) we can consider using it as an instrument.

The results from the treatment effects estimation are reported in Table 7.¹¹ We progressively introduce in the regression the control variables mentioned before, as the sample size decreases due to limited data availability in some fields. In all the specifications the variables of interest are positive and significantly different from zero.

¹¹ We have also run this analysis including only the treated part of the sample in the second stage, i.e., using only the disclosure sample. The results on the Synergies Ratio coefficient and the control variables are similar. They are also unchanged with the inclusion of the premium offered as a regressor in any of the specifications.

These results provide support for our hypothesis that synergies disclosure is used as a signal on the quality of the deal and that the disclosure is regarded as credible, as the amount of synergies disclosed is taken into account by the market on the valuation it makes of the bidder.

[Please insert Table 7 about here]

The results on the control variables are consistent with previous studies. Our measure of relative size has a significantly negative coefficient, consistent with the evidence in Moeller, Schlingemann, and Stulz (2005) and Fuller, Netter, and Stegemoller (2002). The deal size also negatively affects returns, as in Kisgen, Qian, and Song (2009). The percentage of cash used to finance the deal and the target's runup in price prior to the offer are positively related to the abnormal returns, as in Betton, Eckbo, and Thorburn (2008). Tender offers are associated with significantly higher returns, consistent with Loughran and Vijh (1997), but we find no significant impact of the target's industry liquidity (Schlingemann, Stulz, and Walkling, 2003). There is some evidence that repeated bidders experience more positive abnormal returns. The market to book ratio of both the bidder and the target are not significantly impacting returns. Conversely, the coefficient on the acquirer's leverage ratio is significantly positive, in line with previous research (Masulis, Wang, and Xie, 2007). We find no impact of the difference in shareholder rights as captured by the variable Bidder G Index and of different levels of institutional ownership or CEO equity ownership. Somewhat puzzling, the coefficient of the equity based fraction of the CEOs compensation (Bidder EBC) is also significantly

negative. The statistical insignificance in some of the variables compared to previous studies is probably due to our more recent sample and to the introduction of year and industry fixed effects. The coefficient on the hazard rate is always significantly different from 0; we can therefore reject the hypothesis that there is no selection bias in the market return regression. Its negative coefficient means that the unobservable characteristics that lead a bidder to disclose synergies have a negative impact on returns.

Two-stage regression model

In the treatment effects reported above we assume that the disclosure of synergies is endogenous but that it is not influenced by the expected abnormal stock returns around the merger announcement. However, this assumption might be too restrictive. It is possible that managers can accurately anticipate the way the market will react to the announcement of a specific deal and adjust their disclosure policy accordingly.

In order to take into account the potential endogeneity between returns and decision to disclose, we estimate a simultaneous equation system as in Officer (2003) and Boone and Mulherin (2008). In the first stage of the model we regress separately the dependent variables on a group of exogenous variables. From this procedure we obtain the fitted values for both dependent variables, Synergies Disclosures and Bidder CAR. In the second step we use the fitted value of Synergies Disclosure as explanatory variable in the regression of Bidder CAR and vice-versa (we only report the second stage of the regression on Bidder CAR). One of our dependent variables is continuous and the other discrete, meaning that the estimation procedure is different from the standard two stage least squares regression with a continuous endogenous variable (Heckman, 1978; Keshk, 2003). In order to address this problem we use the procedure described by Keshk (2003).

However, this algorithm is very sensitive to multicollinearity. To ensure that it can be run we drop the industry fixed effects from all regressions. In addition, we include separately the variables Bidder CEO Ownership and Bidder G index, while excluding the variable Bidder EBC.

As before, it is important for identification purposes that some of the variables included in one of the regressions are not included in the other. For this purpose we use the same set of instruments as in the treatment effects model. The second stage results for the Bidder CAR equation are reported in Table 8.¹²

[Please insert Table 8 about here]

The results do not change dramatically compared to the previous model, and we again find evidence in favour of our hypothesis that disclosure positively impacts stock prices. The coefficient of the variable Synergies Disclosure is smaller than in the previous model, but its statistical significance is unaffected. The variable Disclosure Ratio is also strongly significant and positive, consistent with our prediction that disclosure is deemed credible.

d) Impact of regulation Fair Disclosure

The SEC introduced regulation FD in late 2000 with the aim of increasing public confidence in the capital markets, prohibiting selective disclosures of value-relevant information to specific market participants. This means that managers can no longer give detailed information to analysts without transmitting such information to the public at

¹² The second stage results for the Synergies Disclosure equation are qualitatively similar to the results reported in Table 3.

large. The professional investment community argued that such change would result in less disclosure by managers concerned with litigation and proprietary risks, lower quality of the information disclosed, and less informative stock prices.

Empirical evidence on the impact of regulation FD is mixed, but all studies report an increase in voluntary disclosure by firms (e.g., Heflin, Subramanyam, and Zhang, 2003) as observed in our sample. Bailey et al. (2003) report an increase in the dispersion of analysts' forecasts but no change in the volatility of the stock following the introduction of regulation FD. In contrast, Heflin, Subramanyam, and Zhang (2003) report no change in the analysts' forecasts dispersion but a decrease in the stock volatility.

We do not have specific guidance from previous literature on what to expect regarding synergies disclosure following the introduction of regulation FD, other than their increase in number. Nevertheless, most previous studies report that the information environment of firms changed significantly (Bailey et al., 2003). As a result, we test whether the effects we report in the previous section are different for deals announced after this regulation came into place in October 23, 2000. We do so by re-running the treatment effects model of Table 7 with two interaction terms between a dummy taking value one if the announcement was after regulation FD and the variables Synergies Disclosure and Synergies Ratio. Our results are reported in Table 9.

[Please insert Table 9 about here]

We find evidence supporting the notion that the impact of the information released by the firm changes after regulation FD came into force. The signalling component of synergies

disclosure becomes weaker but is still significant. This result might be related to the fact that these disclosures were much scarcer before 2000 and as a result investors valued them more highly. On the other hand, their content seems to be taken more in account by the market, as the coefficient of the variable Synergies Ratio significantly increases. This change might be due to the fact that after regulation FD the market depends less on analysts to transmit information, and as a result relies more on the disclosures of managers. Overall the results in Table 9 are consistent with the view that regulation FD significantly changed the voluntary disclosure policies of firms and their impact (Bailey et al., 2003), but are also consistent with our previous findings pertaining to the importance of synergies disclosure in M&A.

e) Robustness checks

We have tested the robustness of our results to different specifications. Our results are robust to changing the assumption of perpetual growth of the synergies disclosed, assuming instead that they do not grow after the end of the forecast period. All our results remain the same if we compute the premium using the target's equity value 22 or 46 days before the announcement date, although the coefficients in our variables of interest become smaller. We also run all our analyses using only the sample of deals announced after regulation Fair Disclosure became effective. The results are qualitatively similar, with slight decreases in the magnitude of the effects being reported. Finally, we estimate a Heckman selection model including only the disclosure deals that also reported the costs associated with the integration process (82 observations). We then recalculate the Synergies Ratio and subtract these costs from the synergies announced. The results on this variable are similar to the ones reported in the main analysis.

f) Discussion

We have shown evidence that supports the idea that management disclosures of synergy estimates are informative; they are interpreted as a signal of quality by the market and priced in the valuation of the bidder. However, we can not be sure about the possibility of the market being discounting the projections because managers are biased in their estimates. If only information on the quality of the deal is being evaluated by the market, and if there is no anticipation of the takeover, we would expect an extra dollar of synergies disclosed and believed by the market to correspond to an increase of one dollar in the market value of the bidder, taking into account the premium paid. In our model, this would correspond to a coefficient of one in the variable Synergies Ratio. In all our specifications the coefficient is much lower than that, ranging from 0.093 to 0.160. A possible explanation for this difference is that managers bias their reports and the market reacts to their reduced information content by discounting their projections, which is reflected in the slope coefficient of the variable (Fischer and Verrecchia, 2000). This is the interpretation favoured by Bernile (2004).

Another possibility is that there is noise in the regression caused by the bidder and target's revaluation or some other benefits of the merger that are not quantified in the synergy estimates. We know from previous literature (Travlos, 1987; Bhagat et al., 2005) that the bidding firm sends a signal to the market simply by making a takeover offer, and as a result its stand-alone value is reassessed, an effect that is captured in the term $\frac{V_{B1} - V_{B0}}{V_{B0}}$ of Equation 1. In addition, in our analyses we find some support to the notion that bidders might offer a higher premium than the synergies expected to be achieved

because the target is undervalued, an aspect that is reflected in the term $\frac{VT1 - VT0}{VB_0}$.

Having non-zero values in the first or third term of Equation 1 will result in biasing the coefficient of the variable Synergies Ratio if there is any correlation between the two. In addition, there are aspects that influence the market reaction but are not fully reflected in the Synergies Ratio. For instance, there can be important strategic benefits from acquiring specific targets, or the bidder may have good reasons to underestimate the synergies to be achieved, as discussed in subsection a). In such cases it is likely that market infers it and takes it into account when valuing the bidder's stock price. If any of these effects can not be perfectly proxied for, as it is the case, there will be noise in the regression that again will bias the Synergies Ratio coefficient.

We abstain from taking a position on which effect might be prevailing. In unreported analyses we do not find different effects for firms with higher CEO ownership or better corporate governance, suggesting that at least there is no clear bias arising from the differences in the governance structure. We also find no impact no difference in the effect when the bidding firm is more concerned about its reputation due to its repeated presence in the market for corporate control (Repeated Bidders) or about the increase in litigation risk due to the presence of institutional shareholders (Institutional Ownership). The type of synergy and the precision of the value disclosed (point estimate or interval) also have no role in explaining market returns. In opposition to Houston, James, and Ryngaert (2001), we do not find that revenue enhancements are any different from cost savings in terms of market reaction to the amount disclosed.

VI. Alternative explanations

We have shown evidence supportive of the notion that managers use disclosure to send a positive signal to the market on the deal they are proposing, and that this mechanism is mostly used when there is high information asymmetry related to the deal being negotiated, as the proprietary costs and the litigation risk of disclosure are high. However, it is possible that there are other benefits or costs arising from disclosure, which might lead bad firm types to engage in disclosure as well. In this section we test whether disclosure has an impact on the probability of completing the deal or on the likelihood of receiving a competing offer.

a) Impact on deal completion

We run a probit analysis on a dependent variable taking the value one if the deal is completed, zero otherwise. We use a set of control variables in line with Bates and Lemmon (2003) and Kisgen, Qian, and Song (2009). In addition, we control for the target's industry liquidity index and we introduce year and industry fixed effects. Since the endogeneity problem that affects returns may also be present in the case of deal completion, we run an instrumental variables probit analysis as well. As instruments we use variables that are not correlated with the probability of the deal being completed, but do affect the decision to disclose. These are the disclosure behaviour in the bidder's industry (Disclosure Industry), the bidder market to book ratio, and its decomposition following Rhodes-Kropf, Robinson, and Viswanathan (2005). Arguably, characteristics related to the valuation of the bidding firm will not impact the chances of success of the deal when controlling for industry characteristics.

[Please insert Table 10 about here]

The results of the probit analyses in Table 10 show that disclosing deals do not significantly impact the likelihood of success of the deal. This finding holds whether we control for endogeneity or not. As a result, we exclude this possibility as a motivation for acquirers to engage in synergies disclosure.

b) Impact on deal competition

When describing the proprietary costs related to disclosure we mentioned that takeover competition could potentially be stimulated as a result of the increase in the information disclosed. The reasoning is that if competitors know exactly what the company is worth for the acquirer they can immediately infer whether it is worth for them to enter in a bidding contest. However, there are at least two reasons why we may not find a clear relation between synergies disclosure and takeover competition. Firstly, given the dynamics of the disclosure process, managers first weight the costs they can be incurring in if making a disclosure. If they anticipate the likelihood of getting a competing offer to be high, they might restrain from making the disclosure, and as a result the disclosing sample would in fact consist of the firms that end up being subject to less takeover competition. Another reason is that bidders might be using synergies disclosure to actually avoid takeover bids – if they can credibly announce that they have unique synergies with the target, they will pre-empt any potential competitors that will abstain from entering the contest as they know they can not match the offer (Barney, 1988). In this sense, disclosing synergies would work in the same way as a high premium in the model of Fishman (1988). In Table 11 we present the results of the probit analysis, in

which the dependent variable takes the value one if a competing offer for the same target is received until one year after the initial bid.

[Please insert Table 11 about here]

We base our control variables on Officer (2003), and we add year and industry fixed-effects. We again run a standard probit and one controlling for potential endogeneity. The instruments are the same as in the analysis of Table 10. We do not find any significant impact of disclosing synergies on the probability of receiving a competing offer in either of the models.

VII. Summary and Conclusion

In this paper we focus on disclosures of managers made at the time of the announcement of a merger. Managers often disclose quantified estimates of the synergies they expect to attain with the transaction, and we hypothesize that they use this to signal deal quality.

All the econometric specifications we use to control for endogeneity lead to the same results: the disclosure of synergies has a significantly positive impact on the market reactions to the deal announcement, and the amount estimated by managers is taken into account when pricing the bidder's stock. These results are consistent with our initial hypothesis that disclosure is used to signal deal quality. In our analysis of the determinants of the disclosure decision, we find that disclosing firms are the ones that are more likely to suffer from high information asymmetry related to the deal they are making.

Appendix 1 - Variables description

Variables	Description
Bidder characteristics	
Bidder Analysts Disagreement	Standard deviation of analysts' earnings forecasts up to the month prior to the bid, scaled by the book equity value per share.
Bidder CAR	Cumulative abnormal return of the bidder's stock in the event window [-1, +1] surrounding the announcement date, using the market model based on CRSP value-weighted index. Estimation period ends in day -43 and has a minimum of 100 trading days and a maximum of 200.
Bidder CEO ownership	Percentage of the shares of the bidding firm owned by its CEO.
Bidder EBC	Percentage of total compensation of CEO that consists of stock options, following Datta, Iskandar-Datta, and Ramana (2001). Stock options are valued following Black and Scholes (1973).
Bidder Firm Specific Overvaluation	Equals the true market value of assets of the bidding firm minus the predicted market value of assets applying time-varying industry multiples to the firm's accounting data. Gives by how much the bidding firm is overvalued compared to its industry (Rhodes-Kropf, Robinson, and Viswanathan, 2005).
Bidder G Index	G index of the bidding in the year before the announcement provided by IRRC. In the years missing from the database we take the value of the previous year that is covered. Computed excluding firms with dual-class stocks following Gompers, Ishii, and Metrick (2003).
Bidder HHI	Sum of the squared market share of all the firms in the bidder's Fama-French (1997) industry listed in Compustat in the year before the announcement of the merger. The market share is given by dividing each firm's sales by the sum of the sales of all the firms in the same industry.
Bidder Industry Overvaluation	Equals the difference between the valuation using time-variant yearly industry multiples and using the specific year's average industry multiple, applied to each bidding firm's accounting information. It gives the fraction of the overvaluation of the bidding firm that is attributable to the industry (Rhodes-Kropf, Robinson, and Viswanathan, 2005).
Bidder Leverage	Debt to equity ratio. Debt is computed by adding LT debt and debt in current liabilities from Compustat. Market value of equity is obtained from CRSP, 22 days before the announcement of the deal.
Bidder Long Run Value	It is the portion of the market to book ratio of the bidding firm that can not be attributable to firm-specific deviations or industry-wide waves. It represents the difference between the long-run average growth rates and discount rates that should be applied to firms in the acquirer's industry and their current book value (Rhodes-Kropf, Robinson, and Viswanathan, 2005).
Bidder Market to Book	Market value of equity of the bidding firm, measured 46 days before the announcement of the deal, scaled by the book value of equity reported in the previous year.
Bidder Runup	Abnormal return of the bidder's stock in the window [-264, -2] relative to the announcement date, computed using the market model based on the CRSP value-weighted index.
Bidder Termination Fee	Dummy that takes value one if there is reference to a termination fee of the bidder in the merger agreement, as reported by SDC.
Bidder Volatility	Standard deviation of the market adjusted residuals of the bidder stock returns measured in the window [-264, -2] relative to the announcement date (Moeller, Schlingemann, and Stulz, 2007).
Institutional Ownership	Log transformation of one plus the fraction of the bidder shares outstanding held by institutional investors.
Repeated Bidder	Dummy that takes value one if the bidding firm bids for more than one public firm during the whole

sample period.

Deal characteristics

Competing offer	Dummy taking the value one if a second bidder makes an offer for the same target in the year following the announcement.
Completed Deal	Dummy taking the value one if the deal announced was completed according to SDC.
Deal Value	Log transformation of the value of the transaction reported by SDC
Disclosure Industry	Fraction of disclosure deals to the total deals announced in the same industry in the two years before the acquisition. Each firm is classified to one of Fama-French 12 industries.
Equity Involved	Dummy that takes the value one if the consideration is to be paid for with equity, or with a combination of equity and cash.
Hostile	Dummy that takes value one if the bid is coded as hostile or unsolicited by SDC.
Not first offer	Dummy that takes value one if there was an offer for the same target until one year prior to the bid.
Percentage of Cash	Percentage of the total offer value which is paid with cash, as reported by SDC.
Premium	Premium computed following Officer (2003) methodology, compared to the target's share price 4 days before the announcement (Officer, 2004). Premiums below 0 and above 2 are excluded.
Relative Size	Log transformation of one plus the ratio of the deal value to the market capitalization of the bidder 22 days before the announcement.
Revenue Enhancement	Dummy taking the value one if managers include revenue increases resulting from the merger in their quantified estimates of the synergies to be achieved.
Same Industry	Dummy that takes the value one if the bidder is active in the Fama French (1997) industry of the target's main SIC. Uses all SIC codes of the bidder and the main SIC code of target, all obtained from SDC.
Synergies Disclosure	Dummy taking the value one if the bidding firm managers make public disclosure of the value of the synergies they expected to achieve with the deal being announced. This disclosure has to take place in the three days following the announcement date to be considered.
Synergies Ratio	Ratio of the present value of the synergies announced minus the premium scaled by the market value of the bidder's equity four days before the announcement date. The present value of the synergies is computed following the methodology of Houston, James, and Ryngaert (2001), and described in detail in section III. The premium is computed as described above.
Tender Offer	Dummy taking the value one in case the transaction being announced is classified as a tender offer by SDC.
Time to Completion	Number of days between the announcement day and the day of conclusion of the deal.

Target characteristics

Target Industry Growth	Annualized average of the median sales growth in the years t-2 and t-1 of the target's Fama-French (1997) industry, where t is the year of the announcement of the merger (Hambrick and Cannella, 2005). We use all the firms listed on Compustat.
Target Industry Volatility	Absolute difference in the target's industry growth rate from t-3 to t-2 and t-2 to t-1, where t is the year of the announcement of the merger (Hambrick and Cannella, 2005). We use all the firms listed on Compustat.
Target Liquidity	Estimated following Schlingemann et al. (2002) with the data of the year before the announcement of the

Index	deal, and based on each Fama-French (1997) industry. It is given by the ratio of the total value of corporate control transactions completed over the total assets of all the firms in the same industry.
Target Market to Book	Market value of equity of the target firm, measured 46 days before the announcement of the deal, scaled by the book value of equity reported in the previous year.
Target Relative Performance	Target's average EBITDA/Total Assets in the three years before the announcement, scaled by the industry's average, minus one. If the industry's average is negative the observation is given as missing.
Target Runup	Abnormal return of the target's stock in the window [-42, -2] relative to the announcement date, computed using the market model based on the CRSP value-weighted index.
Target Termination Fee	Dummy that takes value one if there is reference to a termination fee of the target in the merger agreement, as reported by SDC.

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Table 1 – Yearly distribution of disclosure and non disclosure sample

	Disclosure	Non disclosure	Disclosing deals as fraction of all the deals	Disclosing deals as fraction of the total value
1995	16	224	6.67%	41.55%
1996	18	216	7.69%	31.30%
1997	34	312	9.83%	18.62%
1998	46	282	14.02%	39.52%
1999	37	268	12.13%	32.20%
2000	44	210	17.32%	38.94%
2001	35	171	16.99%	61.32%
2002	20	87	18.69%	17.23%
2003	33	105	23.91%	32.88%
2004	45	102	30.61%	29.99%
2005	31	99	23.85%	64.73%
2006	45	89	33.58%	58.88%
2007	46	91	33.58%	56.28%
2008	24	64	27.27%	74.83%
TOTAL	474	2320	16.96%	41.68%

Table 1: This Table presents the number and relative value of disclosure and non-disclosure deals per year. The sample consists of 2794 deals announced between U.S. public firms from 1995 to 2008 and listed on SDC. We exclude minority stake repurchases, clean-up offers, privatizations, leveraged buyouts, spinoffs and recapitalizations. We further exclude observations for which no data on the target or on the bidder firm exists on Compustat or CRSP, or for which no deal value or method of payment is reported. Finally, we exclude deals made by firms whose SIC code starts with 49 (utilities), and deals in which the target had a stock price below one dollar 22 days before the announcement date. Disclosure deals are deals in which managers make a public disclosure of the value of the synergies they expected to achieve with the deal at the time of the announcement of the acquisition. Non-disclosure deals are all the other deals from the sample. Deal value is obtained from SDC.

Table 2 – Univariate comparison between disclosure and non-disclosure sample

	Disclosure sample		Non-disclosure sample		Difference		N
	Mean	Median	Mean	Median	Means	Medians	
Deal Value in Millions \$	4353.94	1176.12	1244.95	198.50	3108.99***	977.62***	2794
Relative Size of Target	71.93%	53.89%	41.90%	17.78%	30.03%***	36.11%***	2794
Percentage of Cash	28.77%	0	35.77%	0	-7.00%***	0	2794
Bidder Termination Fee	33.76%	0	15.69%	0	18.07%***	0	2794
Target Termination Fee	75.74%	1	61.47%	1	14.27%***	0	2794
Same Industry	88.40%	1	83.36%	1	5.03%***	0	2794
Time to Completion (in days)	146.23	133.00	127.71	115.00	18.52***	18***	2398
Target Industry Growth	8.40%	10.42%	6.44%	7.67%	1.95%**	2.76%***	2794
Target Industry Volatility	25.69%	15.61%	22.29%	17.39%	3.40%***	-1.78%	2781
Bidder Analysts Disagreement	0.28%	0.12%	0.26%	0.10%	0.02%	0.01%	2148
Bidder Volatility	34.98%	31.11%	41.29%	34.46%	-6.30%***	-3.35%***	2743

Table 2: This Table presents univariate statistics on the decision to disclose. The sample consists of 2794 deals meeting the criteria set in Table 1 and for which there is information on each variable. Disclosure deals are deals in which managers make a public disclosure of the value of the synergies they expected to achieve with the deal at the time of the announcement of the acquisition. Non-disclosure deals are all the other deals from the sample. A t-test for the difference of means and a Pearson chi-squared test of equality of the medians are run. All the variables are described in Appendix 1, except Deal Value in Millions \$, which is equal to the deal value reported in SDC, and Relative Size of Target, which is equal to deal value divided by the bidder market capitalization 22 days before the announcement of the deal. Statistical significance at the 1, 5, and 10% levels is denoted by ***, **, and * respectively.

Table 3 - Probit analysis of the decision to disclose

Variables	(1) Synergies Disclosure	(2) Synergies Disclosure	(3) Synergies Disclosure	(4) Synergies Disclosure	(5) Synergies Disclosure
Equity Involved	0.0516*** (-0.0122)	0.0635*** (0.0147)	0.0630*** (0.0147)	0.0497*** (0.0176)	0.0501*** (0.0124)
Same Industry	0.0287 (-0.0198)	0.0117 (0.0167)	0.0157 (0.0144)	0.0178 (0.0207)	0.0474** (0.0225)
Relative Size	0.104*** (-0.0195)	0.113*** (0.0227)	0.104*** (0.0214)	0.196*** (0.0338)	0.209*** (0.0511)
Deal Value	0.0509*** (-0.00598)	0.0527*** (0.00676)	0.0563*** (0.00616)	0.0553*** (0.00863)	0.0408*** (0.00776)
Target Termination Fee	-0.00623 (-0.00929)	0.00119 (0.00830)	0.00357 (0.00951)	0.00106 (0.00960)	-0.0121 (0.0320)
Bidder Termination Fee	0.0534*** (-0.0163)	0.0519*** (0.0154)	0.0488*** (0.0146)	0.0445*** (0.0158)	0.108*** (0.0295)
Target Industry Growth	-0.0294 (-0.0585)	-0.00923 (0.0567)	-0.0259 (0.0565)	0.0246 (0.0589)	0.0394 (0.0944)
Target Industry Volatility	0.0381 (-0.0329)	0.0455 (0.0280)	0.0427 (0.0313)	0.0497* (0.0284)	0.00236 (0.0451)
Bidder Market to Book		-0.00319** (0.00157)		-0.00300* (0.00175)	-0.00111 (0.00145)
Bidder Runup		-0.0151 (0.0145)	-0.0248* (0.0136)	-0.00785 (0.0159)	-0.0187 (0.0190)
Bidder HHI		-0.194* (0.116)	-0.222** (0.113)	-0.0959 (0.155)	-0.0523 (0.0901)
Target Liquidity Index		-0.229** (0.101)	-0.239*** (0.0799)	-0.186** (0.0947)	0.0685 (0.115)
Repeated Bidder		0.00857 (0.00609)	0.000131 (0.00711)	-0.00281 (0.0114)	0.0157 (0.0305)
Institutional Ownership		-0.00761 (0.0520)	0.00230 (0.0523)	-0.0675 (0.0629)	0.0342 (0.168)
Bidder Long Run Value			-0.0990*** (0.0279)		
Bidder Industry Overvaluation			-0.103* (0.0558)		
Bidder Firm Specific Overvaluation			-0.0647*** (0.0171)		
Bidder Analysts Disagreement				3.385** (1.582)	-0.132 (4.185)
Bidder Volatility				-0.0535 (0.0643)	0.0848 (0.0789)
Bidder G Index					0.00658** (0.00301)
Bidder CEO ownership					-0.0115** (0.00531)
Bidder EBC					0.0711* (0.0389)
Disclosure Industry	0.689*** (0.0870)				0.620*** (0.167)
Hostile	-0.0388** (0.0168)				-0.0296 (0.0285)
Pseudo R2	0.2495	0.2662	0.271	0.2792	0.3293
Observations	2781	2509	2406	2024	823

Table 3: This Table presents a probit analysis on the decision to disclose. The sample consists of 2794 deals meeting the criteria set in Table 1 and for which there is information available on every independent variable. The dependent variable takes the value one if the deal belongs to the disclosure sample as defined in Table 1, 0 otherwise. All models include year and industry dummies, the latter based on Fama-French 12 industries classification. Standard errors are reported in brackets and are robust to heteroskedasticity and clustered per industry. All the variables are described in Appendix 1. Statistical significance at the 1, 5, and 10% levels is denoted by ***, **, and * respectively.

Table 4 – Synergies Ratio distribution and Low Synergies deals

Panel A				
	Obs	Median	Mean	Std. Dev.
Synergies Ratio	474	-0.003	-0.016	0.238
Panel B				
	Low Synergies	Low Synergies	Low Synergies	
Equity Involved	-0.0147 (0.0490)	0.0400 (0.0584)	0.143 (0.126)	
Revenue Enhancement	0.00273 (0.0868)	0.0293 (0.0650)	-0.00739 (0.134)	
Bidder Market to Book	0.0295*** (0.00863)	0.0282*** (0.00761)	0.0464*** (0.00833)	
Target Market to Book	0.00167 (0.00377)	0.000330 (0.00321)	-0.0163*** (0.00448)	
Target Liquidity Index	0.370 (0.267)	0.407 (0.369)	-0.438 (0.443)	
Deal Value	0.0597*** (0.0140)	0.0415*** (0.0152)	0.0169 (0.0357)	
Target HHI		1.445 (0.965)	6.521** (2.576)	
Institutional Ownership		0.0668 (0.121)	0.508*** (0.175)	
Target Runup		-0.370** (0.164)	-0.470* (0.272)	
Target Relative Performance		0.0259*** (0.00749)	0.0296** (0.0123)	
Bidder CEO ownership			-0.00547 (0.0397)	
Pseudo R2	0.1164	0.1389	0.2237	
Observations	463	374	180	

Table 4: Panel A exhibits descriptive statistics of the variable Synergies Ratio. Panel B reports a multivariate probit regression on a variable that takes the value one in case Synergies Ratio is negative, 0 otherwise. Deals with Synergies Disclosed equal to 0 are excluded. The sample in Panel A consists of 474 deals meeting the criteria set in Table 1 that also belong to the disclosure sample as defined in Table 1 and have a premium between 0 and 2. The sample in Panel B is formed using the same criteria as the sample in Panel A, but we further require information to be available on all the independent variables. All models include year and industry dummies, the latter based on Fama-French 12 industries classification. Standard errors are reported in brackets and are robust to heteroskedasticity and clustered per industry. All the variables are described in Appendix 1, except Low Synergies deals, which are disclosure deals that have a Synergies Ratio below 0. Statistical significance at the 1, 5, and 10% levels is denoted by ***, **, and * respectively.

Table 5 – Bidder CAR

Panel A						
Panel A	Disclosure sample		Non-disclosure sample		Difference	
	Mean	Median	Mean	Median	Means	Medians
Bidder CAR	-2.97%	-2.09%	-1.77%	-1.05%	-1.20%***	-1.04%***

Panel B			
	Bidder CAR	Bidder CAR	Bidder CAR
Synergies Disclosure	-0.0102* (0.0054)		
Synergies Ratio		0.0908*** (0.0259)	
Present Value of Synergies / Market value of bidder's equity			0.0012 (0.0106)
Adjusted R-Squared	0.036	0.045	0.034
Observations	2396	2396	2396

Table 5: Panel A exhibits descriptive statistics of the variable Bidder CAR. Panel B reports regressions on the Bidder CAR. In Panel A the sample consists of 2794 deals meeting the criteria set in Table 1. In Panel B the sample consists of 2396 deals meeting the criteria set in Table 1 that were not withdrawn. The bidder CAR is the abnormal return on the bidding firm's stock from day -1 to day +1 relative to the announcement date, using the market model based on CRSP value-weighted index. All models in Panel B include year and industry dummies, the latter based on the bidder's two digit SIC code. Standard errors are reported in brackets and are robust to heteroskedasticity and clustered per industry. The present value of synergies is computed following the methodology described in section III. The market value of bidder's equity is computed twenty-two days before the announcement of the acquisition. All the other variables are described in Appendix 1. Statistical significance at the 1, 5, and 10% levels is denoted by ***, **, and * respectively.

Table 6 – OLS on Bidder CAR

Variables	(1) Bidder CAR	(2) Bidder CAR	(3) Bidder CAR	(4) Bidder CAR	(5) Bidder CAR	(6) Bidder CAR
Synergies Disclosure	0.00513 (0.00633)		0.00585 (0.00626)		0.00233 (0.00929)	
Synergies Ratio	0.0905*** (0.0314)	0.111*** (0.0317)	0.0879** (0.0337)	0.109*** (0.0356)	0.149** (0.0649)	0.144** (0.0600)
Relative Size	-0.0194* (0.0107)	-0.0114 (0.0172)	-0.0170 (0.0111)	-0.00381 (0.0173)	-0.0134 (0.0262)	0.0218 (0.0672)
Deal Value	-0.00381*** (0.00122)	-0.00304 (0.00233)	-0.00438*** (0.00112)	-0.00642** (0.00292)	-0.00436* (0.00247)	-0.0195* (0.0101)
Percentage of Cash	0.0259*** (0.00518)	0.0256* (0.0131)	0.0260*** (0.00529)	0.0268* (0.0155)	0.0239*** (0.00499)	0.0400 (0.0309)
Target Runup	0.0233*** (0.00866)	0.0511 (0.0358)	0.0202** (0.00949)	0.0522 (0.0394)	0.0215 (0.0170)	0.0366 (0.0538)
Tender Offer	0.0122** (0.00503)	-0.00852 (0.0146)	0.0112** (0.00516)	-0.0129 (0.0181)	0.00175 (0.00657)	-0.0244 (0.0370)
Target Liquidity Index			0.0177 (0.0286)	-0.139 (0.127)	-0.0177 (0.0316)	0.0124 (0.129)
Repeated Bidder			0.00514 (0.00381)	0.00518 (0.0100)	0.0160** (0.00608)	0.0151 (0.0192)
Institutional Ownership			0.00864 (0.00993)	0.0449* (0.0268)	-0.00594 (0.0246)	-0.0107 (0.0640)
Bidder Market to Book			5.84e-05 (6.04e-05)	0.00190** (0.000750)	-0.000131 (0.000208)	-0.00120 (0.00220)
Target Market to Book			4.28e-06 (8.58e-06)	0.000658 (0.000458)	-3.31e-06* (1.81e-06)	0.000163 (0.00171)
Bidder Leverage			0.00666** (0.00264)	0.00760 (0.00686)	0.00909 (0.00805)	-0.00185 (0.0284)
Bidder CEO ownership					-0.000299 (0.000791)	-0.00964 (0.0110)
Bidder G Index					-0.000251 (0.000513)	-0.00712 (0.00511)
Bidder EBC					-0.0195** (0.00731)	-0.0806** (0.0315)
Constant	-0.00619 (0.00927)	-0.0118 (0.0206)	-0.0205* (0.0122)	-0.0542** (0.0255)	-0.0223 (0.0291)	0.172 (0.121)
Observations	2374	407	2223	389	765	137
Adjusted R-Squared	0.0838	0.1691	0.0966	0.1844	0.1018	0.2228

Table 6: This Table presents OLS regressions on the Bidder CAR. The sample consists of 2396 deals meeting the criteria set in Table 1 that were not withdrawn, and for which there is information available on all the independent variables. In models 2, 4, and 6 only disclosure deals, as defined in Table 1, are included. The bidder CAR is the abnormal return on the bidding firm's stock from day -1 to day +1 relative to the announcement date, using the market model based on CRSP value-weighted index. All models include year and industry dummies, the latter based on the bidder's two digit SIC code. Standard errors are reported in brackets and are robust to heteroskedasticity and clustered per industry. All the variables are described in Appendix 1. Statistical significance at the 1, 5, and 10% levels is denoted by ***, **, and * respectively.

Table 7 – Treatment effects model on Bidder CAR

Variables	(1) Bidder CAR	(2) Bidder CAR	(3) Bidder CAR
Synergies Disclosure	0.0454*** (0.0174)	0.0392** (0.0171)	0.0357* (0.0195)
Synergies Ratio	0.0940*** (0.0177)	0.0930*** (0.0189)	0.160*** (0.0361)
Relative Size	-0.0286*** (0.00697)	-0.0241*** (0.00798)	-0.0280* (0.0166)
Deal Value	-0.00613*** (0.00152)	-0.00601*** (0.00165)	-0.00567*** (0.00196)
Percentage of Cash	0.0273*** (0.00492)	0.0288*** (0.00515)	0.0256*** (0.00640)
Target Runup	0.0222*** (0.00759)	0.0220*** (0.00805)	0.0211** (0.00971)
Tender Offer	0.0129** (0.00565)	0.0111* (0.00579)	0.00173 (0.00647)
Target Liquidity Index		0.0320 (0.0264)	-0.0254 (0.0347)
Repeated Bidder		0.00437 (0.00429)	0.0164*** (0.00635)
Institutional Ownership		0.0103 (0.0126)	-0.00822 (0.0242)
Bidder Market to Book		8.07e-05 (0.000119)	-9.59e-05 (0.000316)
Target Market to Book		4.06e-06 (1.13e-05)	-4.16e-06 (8.52e-06)
Bidder Leverage		0.00582** (0.00283)	0.00911* (0.00531)
Bidder CEO ownership			-0.000142 (0.000602)
Bidder G Index			-0.000354 (0.000939)
Bidder EBC			-0.0208** (0.00852)
Lambda	-0.0243** (0.0100)	-0.0210** (0.00991)	-0.0212* (0.0115)
Constant	0.0203 (0.0793)	0.00417 (0.0802)	-0.158** (0.0672)
Wald Chi Squared	520.99	478.31	261.12
P-value model	0	0	0
Observations	2365	2131	760

Table 7: This Table presents treatment effects regressions on the Bidder CAR, where only the second stage regression is reported. The sample consists of 2396 deals meeting the criteria set in Table 1 that were not withdrawn, and for which there is information available on all the independent variables. The bidder CAR is the abnormal return on the bidding firm's stock from day -1 to day +1 relative to the announcement date, using the market model based on CRSP value-weighted index. All models include year and industry dummies, the latter based on the bidder's two digit SIC code. Standard errors are reported in brackets and are robust to heteroskedasticity and clustered per industry. The first stage of model (1) is the probit model (1) reported in Table 3. The first stage of model 2 is the probit model (2) reported in Table 3. The first stage of model (3) is the probit model (2) reported in Table 3, plus the variables bidder CEO ownership, bidder G index, and bidder EBC. All the variables are described in Appendix 1. Statistical significance at the 1, 5, and 10% levels is denoted by ***, **, and * respectively.

Table 8 – Two-stage regression on Bidder CAR

Variables	(1) Bidder CAR	(2) Bidder CAR	(3) Bidder CAR	(4) Bidder CAR
Synergies Disclosure [#]	0.0227*** (0.0062)	0.0183*** (0.0063)	0.0123*** (0.0045)	0.0093** (0.0046)
Synergies Ratio	0.0844*** (0.0188)	0.0827*** (0.0196)	0.1301*** (0.0255)	0.0952*** (0.0188)
Relative Size	-0.0307*** (0.0081)	-0.0272*** (0.0087)	-0.0474*** (0.0106)	-0.0155 (0.0103)
Deal Value	-0.0091*** (0.0021)	-0.0080*** (0.0023)	-0.0052*** (0.0016)	-0.0068*** (0.0018)
Percentage of Cash	0.0312*** (0.0055)	0.0330*** (0.0056)	0.0248*** (0.00436)	0.0239*** (0.0049)
Target Runup	0.0294*** (0.0088)	0.0268*** (0.0088)	0.0202*** (0.0070)	0.021513*** (0.0080)
Tender Offer	0.0185*** (0.0064)	0.0171*** (0.0063)	0.0159*** (0.0047)	0.0080 (0.0055)
Target Liquidity Index		-0.0040 (0.0254)	-0.0289 (0.0201)	0.0006 (0.0239)
Repeated Bidder		0.0011 (0.0044)	0.0011 (0.0040)	0.0043 (0.0043)
Institutional Ownership		0.0076 (0.0122)	-0.0022 (0.0130)	-0.0061 (0.0144)
Bidder Market to Book		0.0003 (0.0002)	-0.0001 (0.0002)	5.2E-05 (0.0002)
Target Market to Book		3.10E-05 3.50E-05	2.55E-05 5.30E-05	4.6E-05 4.10E-05
Bidder Leverage		0.0069*** (0.0026)	0.0052** (0.0024)	0.0057*** (0.0026)
Bidder CEO ownership			0.0003 (0.0007)	
Bidder G Index				0.0003 (0.0007)
Constant	0.0699*** (0.0227)	0.0435* (0.0237)	0.0324* (0.0177)	0.0219 (0.0207)
Adjusted R-Squared	0.0620	0.0610	0.0885	0.0727
P-value model	0	0	0	0
Observations	2365	2131	992	1333

Table 8: This Table presents the estimates of a simultaneous equation system, where only the second stage regression on the Bidder CAR is reported. The sample consists of 2396 deals meeting the criteria set in Table 1 that were not withdrawn, and for which there is information available on all the independent variables. The bidder CAR is the abnormal return on the bidding firm's stock from day -1 to day +1 relative to the announcement date, using the market model based on CRSP value-weighted index. All models include year dummies. Standard errors are reported in brackets and are computed using the procedure described in Keshk (2003). The first equation of model (1) is the probit model (1) reported in Table 3. The first equation of model (2) is the probit model (2) reported in Table 3. The first equation of model (3) is the probit model (2) reported in Table 3, plus the variable bidder CEO ownership. The first equation of model (4) is the probit model (2) reported in Table 3, plus the variable bidder G index. The variable Synergies Disclosure[#] is the fitted value of these first stage regressions. All the other variables are described in Appendix 1. Statistical significance at the 1, 5, and 10% levels is denoted by ***, **, and * respectively.

Table 9 – Impact of Regulation Fair Disclosure

Variables	(1) Bidder CAR	(2) Bidder CAR	(3) Bidder CAR
Synergies Disclosure	0.0681*** (0.0199)	0.0531*** (0.0196)	0.0691*** (0.0235)
Synergies Disclosure * FD	-0.0233** (0.00940)	-0.0158 (0.00972)	-0.0345** (0.0135)
Synergies Ratio	0.0665*** (0.0241)	0.0492* (0.0259)	0.147*** (0.0500)
Synergies Ratio * FD	0.0704** (0.0349)	0.102*** (0.0375)	0.0959 (0.0697)
Relative Size	-0.0318*** (0.00708)	-0.0264*** (0.00805)	-0.0339** (0.0168)
Deal Value	-0.00674*** (0.00156)	-0.00627*** (0.00168)	-0.00588*** (0.00197)
Percentage of Cash	0.0274*** (0.00493)	0.0290*** (0.00515)	0.0257*** (0.00640)
Target Runup	0.0221*** (0.00760)	0.0220*** (0.00804)	0.0202** (0.00968)
Tender Offer	0.0132** (0.00565)	0.0113* (0.00578)	0.00262 (0.00645)
Target Liquidity Index		0.0306 (0.0264)	-0.0329 (0.0350)
Repeated Bidder		0.00413 (0.00430)	0.0160** (0.00638)
Institutional Ownership		0.0112 (0.0127)	-0.00657 (0.0244)
Bidder Market to Book		9.16e-05 (0.000119)	-2.33e-05 (0.000319)
Target Market to Book		4.13e-06 (1.12e-05)	-3.82e-06 (8.39e-06)
Bidder Leverage		0.00534* (0.00283)	0.00820 (0.00527)
Bidder CEO ownership			-2.40e-05 (0.000606)
Bidder G Index			-0.000449 (0.000944)
Bidder EBC			-0.0203** (0.00858)
Lambda	-0.0301*** (0.0103)	-0.0245** (0.0101)	-0.0276** (0.0117)
Constant	0.0353 (0.0783)	0.00750 (0.0785)	-0.159** (0.0677)
Wald Chi Squared	531.07	489.42	273.50
P-value model	0	0	0
Observations	2365	2131	760

Table 9: This Table presents treatment effects regressions on the Bidder CAR, controlling for the impact of regulation FD. The sample consists of 2396 deals meeting the criteria set in Table 1 that were not withdrawn, and for which there is information available on all the independent variables. The bidder CAR is the abnormal return on the bidding firm's stock from day -1 to day +1 relative to the announcement date, using the market model based on CRSP value-weighted index. All models include year and industry dummies, the latter based on the bidder's two digit SIC code. Standard errors are reported in brackets and are robust to heteroskedasticity and clustered per industry. The first stage of model (1) is

the probit model (1) reported in Table 3. The first stage of model 2 is the probit model (2) reported in Table 3. The first stage of model (3) is the probit model (2) reported in Table 3, plus the variables bidder CEO ownership, bidder G index, and bidder EBC. All the variables are described in Appendix 1. Statistical significance at the 1, 5, and 10% levels is denoted by ***, **, and * respectively.

Table 10 – Probit analysis on probability of deal completion

Variables	(1) Completed Deal	(2) Completed Deal
Synergies Disclosure	-0.0998 (0.161)	
Synergies Disclosure*		-0.849 (0.564)
Premium	0.144 (0.0965)	0.122 (0.0977)
Not first offer	-0.294* (0.174)	-0.351* (0.203)
Competing offer	-2.041*** (0.226)	-2.007*** (0.231)
Same Industry	0.449*** (0.122)	0.462*** (0.106)
Hostile	-1.748*** (0.250)	-1.719*** (0.276)
Deal Value	0.0768*** (0.0272)	0.125*** (0.0472)
Percentage of Cash	0.171*** (0.0589)	0.102 (0.0736)
Bidder Termination Fee	-0.106 (0.108)	-0.0175 (0.131)
Target Termination Fee	0.713*** (0.193)	0.665*** (0.180)
Tender Offer	0.552*** (0.169)	0.589*** (0.197)
Target Liquidity Index	-0.454* (0.263)	-0.754*** (0.216)
Constant	0.288 (0.181)	0.0886 (0.223)
Pseudo R-Squared	0.3499	-
Observations	2483	2385

Table 10: This Table presents a probit analysis on the variable Completed Deal, which takes value one in case the deal announced was completed, 0 otherwise. The sample consists of 2794 deals meeting the criteria set in Table 1 and for which there is information available on every independent variable. All models include year and industry dummies, the latter based on Fama-French 12 industries. Standard errors are reported in brackets and are robust to heteroskedasticity and clustered per industry. The second model uses instrumental variables to estimate the variable synergies disclosure*, which is the fitted value of a first stage regression using all the other exogenous variables as regressors, in addition to the set of instruments described in section VI (Disclosure industry, Bidder Market to Book Ratio, Bidder Firm Specific Overvaluation, Bidder Industry Overvaluation, Bidder Long Run Value). All the variables are described in Appendix 1. Statistical significance at the 1, 5, and 10% levels is denoted by ***, **, and * respectively.

Table 11 – Probit analysis on probability of receiving a competing offer

Variables	(1) Competing Offer	(2) Competing Offer
Synergies Disclosure	-0.00710 (0.162)	
Synergies Disclosure*		0.799 (0.539)
Premium	0.0526 (0.147)	0.0561 (0.151)
Percentage of Cash	0.0567 (0.0938)	0.0909 (0.0980)
Same Industry	-0.0792 (0.133)	-0.101 (0.128)
Hostile	0.949*** (0.182)	1.003*** (0.167)
Deal Value	0.0199 (0.0402)	-0.0379 (0.0435)
Bidder Termination Fee	-0.209 (0.182)	-0.190 (0.185)
Target Termination Fee	0.878*** (0.275)	1.182*** (0.315)
Tender Offer	-0.209 (0.182)	-0.190 (0.185)
Target Liquidity Index	0.893*** (0.266)	1.168*** (0.292)
Constant	-1.799*** (0.245)	-1.559*** (0.267)
Pseudo R-Squared	0.1221	-
Observations	2357	2263

Table 11: This Table presents a probit analysis on the variable Competing Offer, which takes value one in case a different bidder made an offer for the same target in the year following the announcement, 0 otherwise. The sample consists of 2794 deals meeting the criteria set in Table 1 and for which there is information available on every independent variable. All models include year and industry dummies, the latter based on Fama-French 12 industries. Standard errors are reported in brackets and are robust to heteroskedasticity and clustered per industry. The second model uses instrumental variables to estimate the variable synergies disclosure*, which is the fitted value of a first stage regression using all the other exogenous variables as regressors, in addition to the set of instruments described in section VI (Disclosure industry, Bidder Market to Book Ratio, Bidder Firm Specific Overvaluation, Bidder Industry Overvaluation, Bidder Long Run Value). All the variables are described in Appendix 1. Statistical significance at the 1, 5, and 10% levels is denoted by ***, **, and * respectively.