Directors' network and the method of payment in mergers and acquisitions

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Abstract

This paper studies the impact of the network centrality of directors on the choice of payment method in mergers and acquisitions of firms in which they sit at the board. We assume that the centrality of directors reduces information asymmetry problems, facilitating information transmission between the firms involved in each deal. Using a large database on Board of Directors, we construct the directors' social network and analyse the impact of their centrality on the resolution of information uncertainty surrounding the deal. Our results indicate that when directors seating at the acquiror board have more connections, the percentage of cash used as payment increases. On the other hand, when the director of a target firm has more social connections, the percentage of stock used as payment increases.

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1 Introduction

Takeovers payment methods range from an all-cash to an all-stock payment, with various mixtures of cash, stock and different securities in-between. Several economic hypothesis, not necessarily mutual exclusive, have been proposed in the literature to justify the choice of payment in mergers and acquisitions: tax effects, corporate control motives, behavioural arguments and information asymmetry. In this paper we focus on the latter hypothesis.

Hansen(1987), using a risk sharing argument, suggests that in the presence of one sided information asymmetry, i.e when the acquiror does not know the true value of the target, the acquiror is more likely to make a stock offer . Although Hansen analyses the two sided information asymmetry case, suggesting the existence of an equilibrium, Eckbo, Gianmarino and Heinkel (1990) model it explicitly showing that a separating equilibrium may exist with a mix of cash and stock. In this setting, the stock component increases with the uncertainty on the target true value while the cash component increases with undervaluation of the acquiror stock. We are interested in analyzing how the social network of directors of firms involved in the deal impact on the resolution of information uncertainty surrounding the deal. Our argument is that if networks lower information-gathering costs (Nahapiet and Ghoshal, 1998) by screening and selecting the important pieces of information (Burt,1997) then mergers and acquisitions involving directors who are more central on the network face less adverse selection problems. Therefore, by reducing information asymmetry, social networks may also impact on the choice of payment method.

Ultimately, we would like to test the direction of the information flows. As information can flow into or out of firms, we would like to understand if a highly central director is helping to resolve the uncertainty surrounding the signals released by its own firm on the market (information outflow), or if this director is helping to capture more information on the firm at the other end of the deal (information inflow). These two effects may, however, be simultaneously present. Nevertheless, and although we cannot separate them, our results shed some light on this issue, as they indicate that the effect of the inflow of information is stronger than the effect of information outflow. We found that, when the director of an acquiring firm has more connections on the social network, deals tend to be paid using

more cash and less stock. On the other hand, when the director of a target firm has more connections on the social network, deals tend to be paid using more stock and less cash.

The paper is organized as follows. In Section 2 we summarize the determinants of choice of payment method in mergers and acquisitions and hypothesize how the centrality of directors in both acquiring and target firms may also be considered a determinant of choice of payment method. In Section 3 we describe the methodology and the data, addressing firstly, the different characteristics of acquirors and targets on the directors' network and secondly, the estimation procedures. In Section 4 we present the results. The main conclusions are summarized in Section 5, where we also outline future research steps.

2 Choice of payment determinants

We include several variables that proxy for deal characteristics that are known to affect the choice of payment. The risk of misvaluations, shared by acquirors and targets whenever stock is used as payment, increases with the target's size. As in Martin (1996), we use the relative size of the target to proxy for the risk of misvaluations: larger values of relative size, imply larger risk of miscalculation of the target value and therefore will increase the proportion of stock being used as payment. Relative size is defined as the deal value divided by the sum of the acquirors total equity value in the year previous to the announcement and the deal value.

Financing deals with cash usually implies the issuance of new debt, therefore constraining highly leveraged firms ability to make an all-cash deal, specially if the target has a considerable size. Cash bids are shown to include a premium as compensation for the capital gains tax penalty (Huang and Walkling, 1987; Hayn, 1989). Depending on the relative size of the deal, this might also have strong implications on the capital structure of the acquiror. We measure the bidder's financial strength with the ratio of total debt to the sum of total assets with the value of the deal. This ratio represents the post deal financial leverage if the transaction was debt financed.

When the firms involved in the deal belong to the same industry, the informational risk is lower when compared with deals forming conglomerates. Therefore, we expect target

firms to accept more stock whenever the acquiror operates in the same industry as the target. To control for this, we use a dummy variable indicating that both acquiror and target operate in the same industry[1].

Although we are focusing on the information asymmetry argument, there are other arguments determining the payment method. During periods of high stock valuation, M&A deals are not only more likely to occur but also the choice of payment is more likely to be stock, as acquirors timely use their overvalued stocks. Shleifer and Vishny (2003) argue that these deals are successful due to targets having short time horizon while Rhodes-Kropf and Viswanathan (2004) argue that during these bullish periods targets also tend to overestimate synergies. We control for this behavioural aspect using a dummy variable indicating the periods of higher merger activity.

2.1 Social network centrality as a determinant of the method of payment

Social networks may be used to select and screen relevant information, therefore reducing information asymmetry problems. Podolny (1994) shows that social relationships between market agents may prevent market failure due to uncertainty and information asymmetry. Moreover, Burt (1997) shows that a network of social relationships allows people to gather more information about others whom they don't know personally. Nahapiet and Ghosal (1998) provide evidence that social networks represent information channels that lower information-gathering costs. Nohria (1992) shows that the creation and maintenance of information flows, usually referred to as "networking", increases one's information, allowing the possible inclusion of private information.

In the same way, we should expect the social relationships of the directors of a firm to play a role in information transmission, reducing the information asymmetry between firms. Shane and Cable (2002) show the importance of social ties in obtaining venture capital. The authors survey directly a small sample of entrepreneurs classifying the degree of "acquaintanceness" of seed-stage investors, i.e. how well does each entrepreneur knows

[1]We consider two firms to operate in the same industry if they have the same 2-digit Standard Industrial Classification (SIC) code

each investor before presenting the project. They conclude that the social network of the entrepreneurs has an important role in facilitating credit. However the survey approach is not feasible when analyzing a large numbers of firms.[2]

Our proposal is to use the network of the boards and directors as a proxy for the real social network of market agents. This means that the network we construct only has partial information of the professional relationships between agents, excluding all others relationships, both professional (all non-board related connections) or private (family/friendship ties or common memberships of Universities, clubs). Also, in contrast with Shane and Cable (2002) approach, where qualitative data on the strength of the social relationship is available, we can only observe that two directors sit in the same board at a particular time and assume that those two must know each other and are, therefore, directly connected.

Using social network analysis and suitable centrality measures (to be defined in Section 3.1), we infer the influence of each director. In particular, we are interested in the role of directors in the information flow, its impact on the reduction of information asymmetries and, as a consequence, its impact on the choice of payment methods in M&A.

M&A deals face, however, a two-sided information asymmetry problem, and information about a particular firm can flow outwards (in respect to the same firm) or inwards (if the information regards the firm at the other end of the deal). If centrality measures the inflow of information, then higher levels of degree centrality in the acquiror firms would imply less uncertainty in terms of target value, which translates into less stock being used as mean of payment; and higher levels of degree centrality of target firms would imply less uncertainty on the bidders value, which allows for more stock to be used as payment. On the other hand, if centrality measures the outflow of information then higher levels of degree centrality of target firms imply less uncertainty on the target true value, which will translate into less stock being used as means of payment; and higher levels of degree centrality of the acquiror less uncertainty on the bidders value, allowing for more stock to be used as payment. It is also true that these two directions of information flows can coexist. The role of the directors on the informational flow may be twofold as they may receive and transmit information simultaneously. In our setting, we are unable to distinguish between these two flows. We

[2]The survey included 100 hours of interview for 106 individuals and 50 firms.

will, however, be able to identify if the centrality of acquirors and target directors has more impact on the outflow or in the inflow of information,

The use of social network analysis is not new in corporate finance and in the mergers and acquisitions literature. Ahern and Harford (2011) use social networks analysis to explain time variation in merger activity, i.e., merger waves. They construct the industry-level network centrality measures using customer-supplier relationships. Our work differs from theirs in two ways. Firstly, their work does not address the choice of payment but rather the impact of networks on merger waves. Secondly, our centrality measures are computed at firm-level[3] using boards interlocks as opposed to their method.

We also look at other variables that proxy for information asymmetry, interacting them with the network centrality measure. We give special attention to deals where the acquiror had a minority position on the target prior to the deal announcement. In this case, a prior relationship with the firm exists, minimizing the informational concerns. Moreover, if the position is large enough, there might be the case that the acquiror can nominate a director to sit at the board of the target, which would make this two firms directly connected in our network. We distinguish between private targets and public targets, as public firms need to comply with reporting regulations and legislation, making them more transparent to the financial markets. We identify acquiror firms that are rated by credit agencies as these certification should decrease the uncertainty surrounding their financial reporting. We also identify acquiror firms that belong to the S&P500 Index as they are closely followed by analyst and media.

3 Data and Methodology

3.1 Network Construction and Centrality Measure

Our aim is to mimic the unobserved information flows by constructing the network formed by the boards and directors using data provided by BoardEX. As information does not flow between firms, but rather through the individuals placed in different firms, we construct the network of relationship between directors in order to analyze the flow of information

[3]Excepting firms for which BoardEX does not provide data on the Board composition. For those firms we compute conditional averages as explained in section 2.3.3

between firms. In the social network terminology, we project the original network of boards and directors, a two-mode graph, onto the space of directors. Figures 1 and 2 demonstrate the projection. In Figure 1 there are three firms. Each firm has three directors. Note that there are no connections between directors. Directors are linked only to firms. This is a characteristic of affiliation networks, more generally referred to as 2-mode network. These networks have two types of vertices and connections can only occur between vertices of different types. Figure 2 is the result projecting the network in Figure 1 onto the space of directors. Each individual is linked to all others with whom he shares a board.

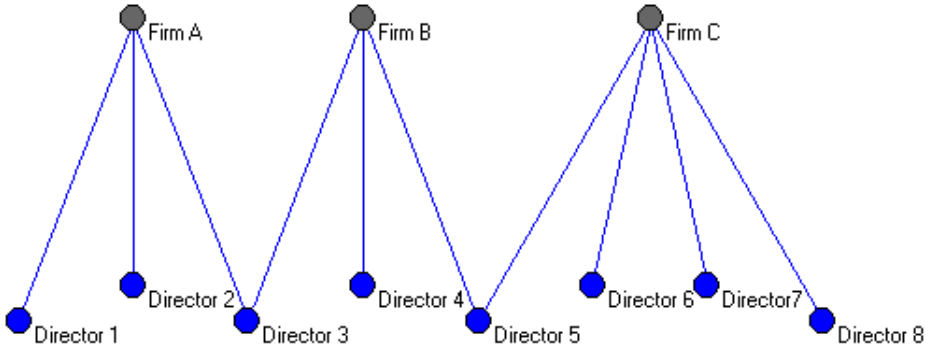


Figure 1: *Graphical representation of a 2-mode network with 3 firms and 8 directors.*

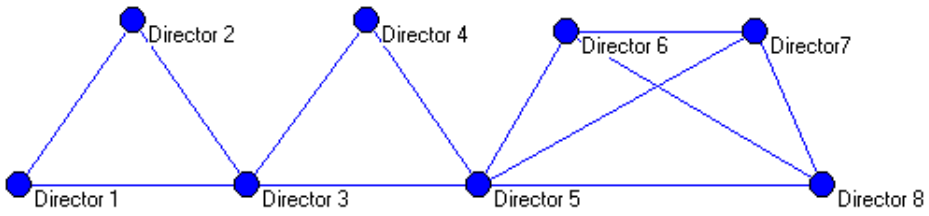


Figure 2: *Graphical representation of the projection of the network represented in figure 2 onto the space of Directors.*

We consider two directors to be connected in a particular year if they sit in the same board during that year. After constructing the network of directors (only), we are able to measure the role of each individual on the flow of information, by computing a centrality

measure for each vertex, i.e. each director, on the network. In this paper, we focus on degree as a centrality measure, *i.e.* the number of connection that each director has.

The *degree* of a vertex is the number of connections of a vertex with other vertices of the network. Formally, the degree k_i of vertex i is

$$k_i = \sum_{j=1}^{n} A_{ij}$$

where A_{ij} equals 1 if vertex i is connected to vertex j, or 0 otherwise and n is the size of the network, i.e. the number of vertices in the network. Within the directors network it represents the number of directors with whom a particular individual is related to. A director with higher degree centrality knows more directors inside the network.

When aggregating at firm level, we will use the maximum of the director's degree in each board. We proxy the informational role of the board through the maximum for two reasons. First, we assume that the determinant individual in the information distribution is the one who is more connected/influential. Second, the sum of centrality measures can be ambiguously interpreted. Figure 3 demonstrates this procedure using the previous three firms example. Each director's centrality degree is shown in parentheses. The three directors of Firm A have degrees of 2, 2 and 4. The degree centrality of Firm A, also shown in parentheses, will be 4. Director 5 has a degree centrality of 5 and she is the most central on the network. Firm B and C share this Director, hence both firms will be attributed a degree centrality of 5.

3.2 Estimation

We use a two boundary Tobit model, proposed by Rosset and Nelson (1975), to model our variables of interest which are percentages belonging to the $[0, 100]$ interval. This simple generalization of the Tobit model may be written as follows:

$$y_i = \begin{cases} \alpha_1 & \text{if } y_i^* \leq \alpha_1 \\ y_i^* & \text{if } \alpha_1 < y_i^* < \alpha_2 \\ \alpha_2 & \text{if } y_i^* \geq \alpha_2 \end{cases}$$

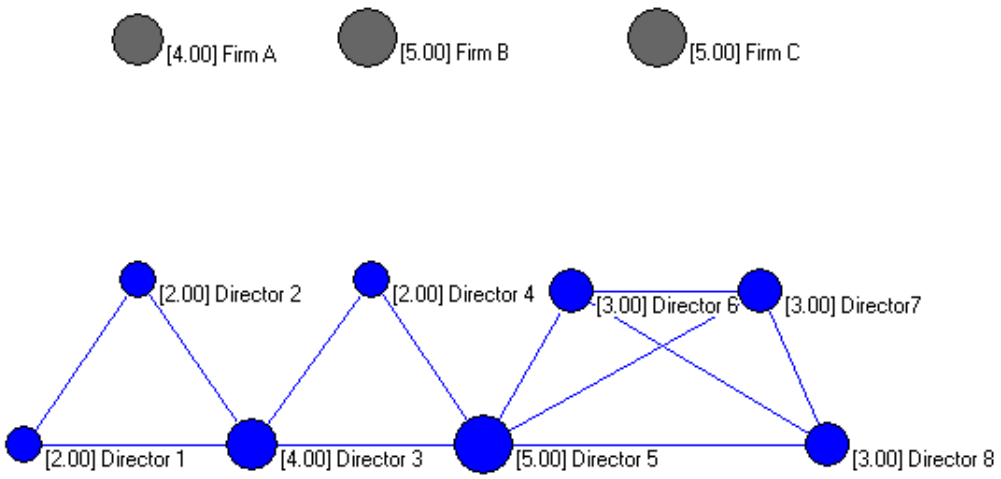


Figure 3: *Going back to the firm dimension: example using degree the centrality measure*

where $y_i^* \sim N(\mathbf{x}_i'\beta,\sigma_\varepsilon^2)$. If a constant is included in the regressors, we can assume $\alpha_1 = 0$. Then, replacing the upper boundary α_2 by ∞ yields the Standard Tobit Model.

Following Faccio and Masulis (2005), we estimate the parameters by maximum likelihood, where $\alpha_1 = 0$ and $\alpha_2 = 100$. The unconditional and conditional prediction y_i can written as

$$E(y_i) = \mathbf{x}_i'\beta\,(\Phi_{100} - \Phi_0) + \sigma_\varepsilon\,(\phi_0 - \phi_{100}) + (1 - \Phi_{100})\,100$$

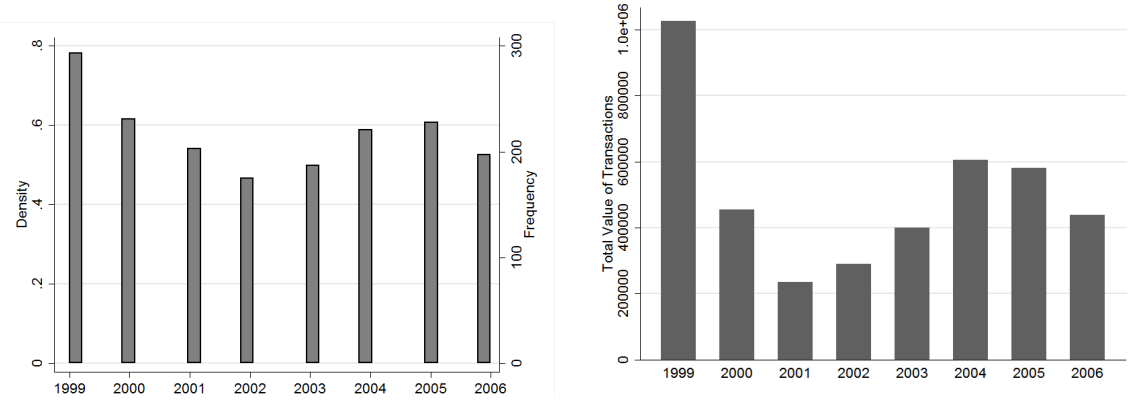
and

$$E(y_i|0 < y_i^* < 0) = \mathbf{x}_i'\beta + \sigma_\varepsilon \frac{(\phi_0 - \phi_{100})}{(\Phi_{100} - \Phi_0)}$$

where $\Phi_0, \Phi_{100}, \phi_0$ and ϕ_{100} denote $\Phi\left(-\frac{\mathbf{x}_i'\beta}{\sigma_\varepsilon}\right)$, $\Phi\left(\frac{100-\mathbf{x}_i'\beta}{\sigma_\varepsilon}\right)$, $\phi\left(-\frac{\mathbf{x}_i'\beta}{\sigma_\varepsilon}\right)$ and $\phi\left(\frac{100-\mathbf{x}_i'\beta}{\sigma_\varepsilon}\right)$, respectively.

3.3 Data description

Data is provided by the SDC database for mergers between 1999 and 2006. The merger activity has varied throughout this period with the years 1999-2000 and 2002-2006 considered to be merger wave years. Figure 2.1 plots the number of transactions and the total value of transactions per year internationally. We drop a large fraction of our initial sample as we exclude all non-US firms and all financial firms.



(a) Number of Deals

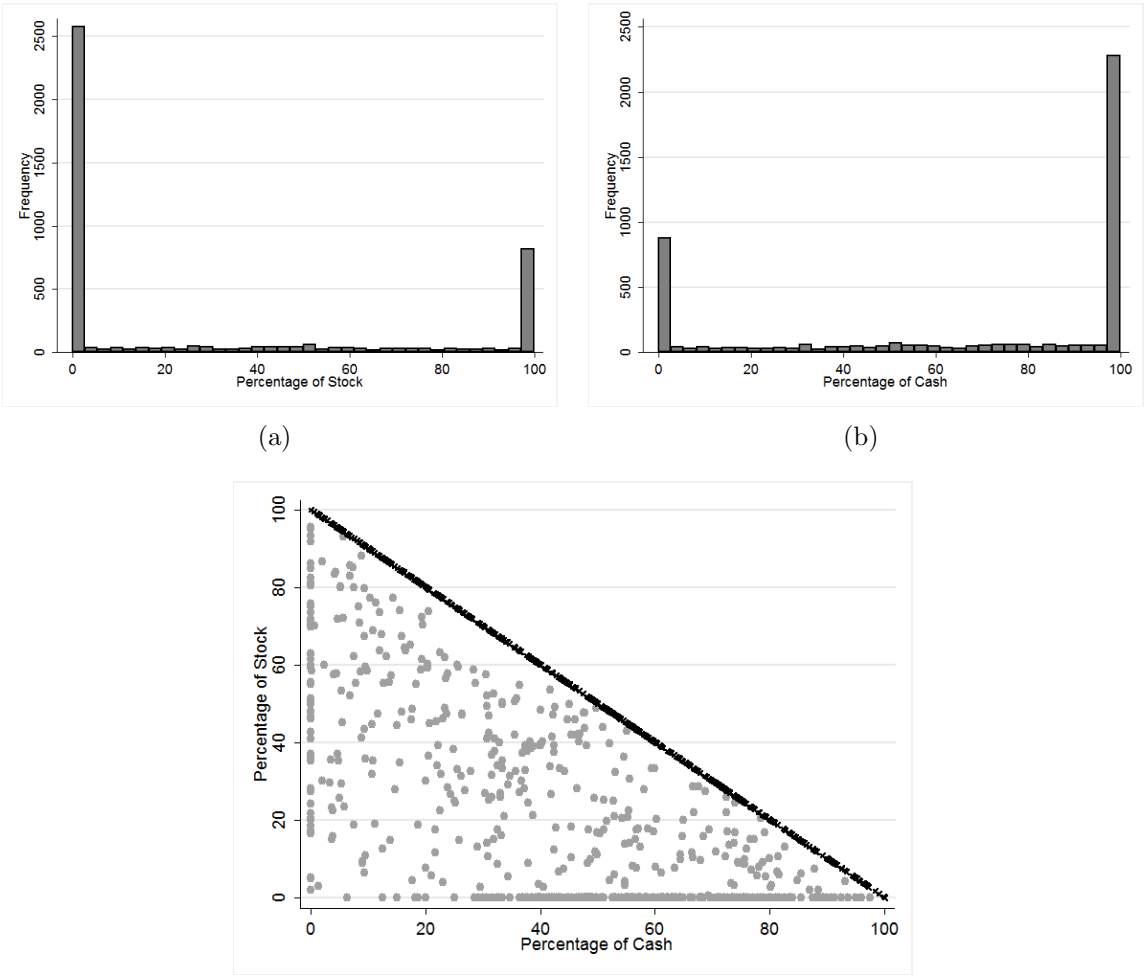
(b) Value of Deals

Figure 4: *Number and total value of deals per year*

The SDC database provides percentages of methods of payment in three different categories: stock, cash and "other". Panels A and B of Figure 2.2 plot the histogram of the percentage of stock and cash, respectively, with 18% of deals being an all-stock transaction (48,6% are all-cash deals). Panel C is particularly informative as it shows that there is a large fraction of our sample (31%) for which the mean of payment is classified as "other".The broad classification of "other" makes it harder to relate it to any informational asymmetry on either parts of the deal. As we are interested in this component of the determinants of the method of payment, we perform our analysis for both cash and stock. We also present results for a sample where we exclude any deal for which there are payments other than cash or stock.

The percentage of payment done in stocks for public targets is lower than for private stocks (22% vs. 33%) which is consistent with both (Hansen 1987) and Eckbo et al. (1990). The average relative size of firms is slightly larger for all-stock deals (0.903 vs. 0.838) while the difference in leverage is substantial: the average (post deal) financial leverage of acquirors in all-stock deals is 0.467 (0.257 for all-cash deals). All financial variables were downloaded from Compustat.

We are able to identify the boards of 6681 acquirors and 831 targets on the BoardEX database. For each, we compute the degree centrality of every board member. We then assign each firm the maximum degree value of its board members. Figure 2.3 plots the



(a) (b)

(c)

Figure 5: *Distribution of the percentage of stock and cash used in the payment of deals. Panels A and B plot the histogram of the percentage of stock and cash, repsectively, Panel C plots the percentage of stock against the percentage of cash: the black dots represent deals where only stock and cash were used as payment, while grey dots represent deals where other means of payment where used.*

histograms for the Acquiror and Target samples. The first thing to notice is that we have more observations for acquiror firms than for target firms. This is due to coverage of BoardEX database which has more information on larger firms than on small firms, as usually acquirors are larger than the targets. Secondly, the average degree of acquirors (27) is higher than the average degree of target firms. This is expected and it is again related to the size of firms: as there is well a established literature positively relating firm size

with board size and also because we consider two individuals to be connected if they sit at the same board in the same year, larger boards imply higher degree centrality for their members, independently of any existent board interlocks.

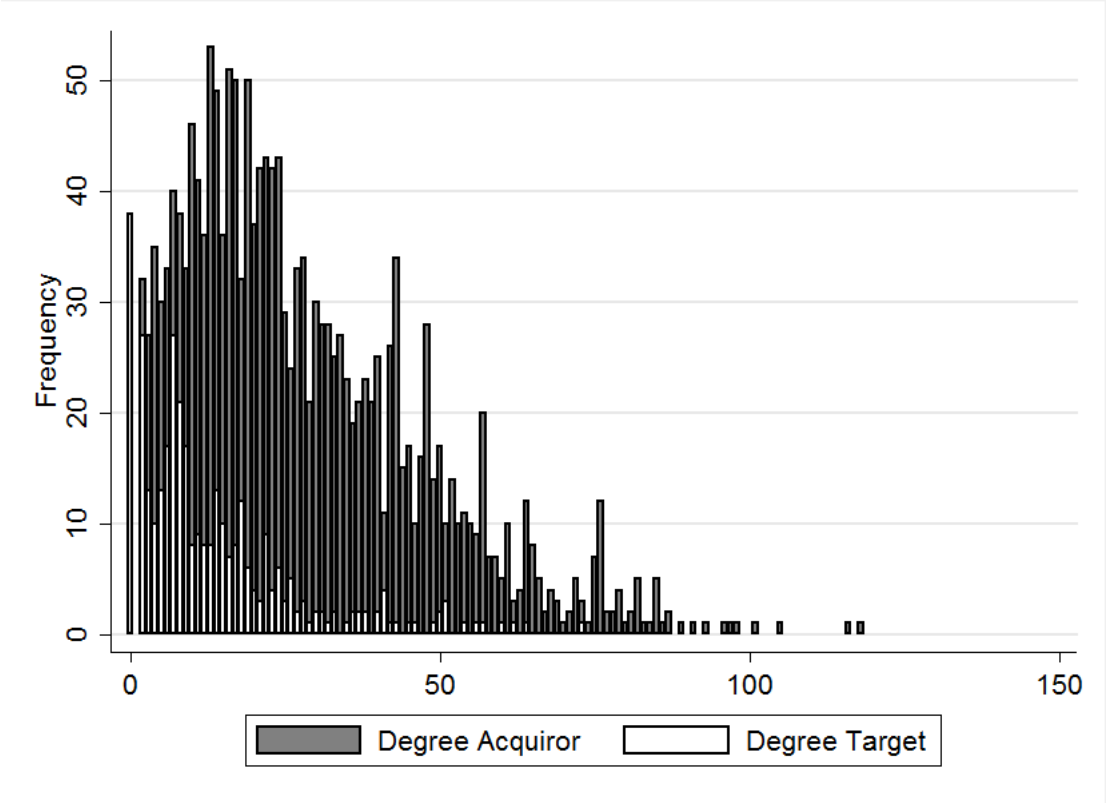


Figure 6: *Degree Histogram: We plot the histograms of the maximum director's degree in each year, both for acquiring firms and targeted firms.*

When merging the data from BoardEX, SDC and Datastream, we are only able to completely link 121 deals, *i.e.* we only have information on the degree centrality of both acquirors and targets in 121 deals. With this small number of observations not even the known determinants of the method of payments are empirically significant. In order to increase our sample size, we follow the methodology suggested by Schafer and Schenker (2000) and filling the values for the missing datapoints with conditional means. Although the methodology is based in i.i.d variables, we know that centrality degree is power-distributed, implying that the impact of the mean is not sufficient and has to be adjusted by other moments. The way we empirically adjust for that is by regressing the available information of degree centrality on the size of the firms, controlling for industry and year effects. We then use the linear

prediction to fill in the missing datapoints. This procedure was estimated separately for acquirors and targets. This popular filling method is better than replacing the missing datapoints by zero or unconditional means because, by using all the information on the present data, maximizes the chance that the relationship between the dependent variable and the regressors are preserved (Han and Kampber, 2006), namely the dependence structure[4].

4 Results

Our results indicate that i) acquiror firms with higher degree centrality tend to use more cash and less stock and ii) target firms with higher degree centrality tend to be paid with more stock and less cash. Table 1 presents these results for three different samples. In the first sample, we only include the deals for which we have information on the board of both the acquiror and the target, while on the other two samples, we fill in the missing datapoints of degree centrality with the conditional averages explained above. The second sample excludes deals where the payment method is other than stock or cash. In the first sample, the number of observation is very small due to the merger of SDC and BoardEX. This yields that all the coefficients are not significant, even those known in the literature to be determinants of choice of payment. We decided to include these results in columns (1) and (2) for two reasons. Firstly, and although not significant, these coefficients have the expected sign for the know determinants. Secondly, the coefficients related to the centrality measures also have the same sign as when we use the extended samples. With this we hope to convince the reader that using the year-industry average of degree centrality to fill the missing data does not lead the results. In fact, columns (3) to (6), *i.e.* when using the extended sample, show that the coefficients are statistically significant with the percentage of stock used in payments increasing with the centrality of the target, and percentage of cash increasing with the centrality of the acquiror.

This differences in the coefficients' signs allow us to argue on the direction of the information flow, although we cannot separate the two directions (outflow and inflow). We can merely state in which direction centrality impacts more. In this case, the results seem to

[4]For a limited class of estimation problems, conditional mean imputation is nearly optimal if special corrections are made to standard errors (Schafer and Schenker, 2000).

indicate that the impact of centrality on the inflow of information is higher than the impact of centrality on the outflow of information. In other words, the more central a director is, the more information he can gather from the network. This effect has a greater impact on the choice of payment than the possible release of information by the director.

Toehold

We analyze how interaction of centrality with the acquiror's previous position in the target affects the payment choice. Results are presented in Table 2. If the acquirors held a minority position on the target prior to the deal, the percentage of stock increases with the size of the position. Nevertheless, the magnitude of the impact of the acquirors degree centrality on the percentage of stock is higher when the acquiror has a previous minority position on the target. Although this interaction effect is not significant separately, the coefficients of the levels and the interaction are jointly significant.

The same happens when analyzing the centrality of the target firm. The magnitude of the effect of centrality in the method of payment is amplified when acquirors have a position on the target prior to the deal announcement.

We deem that this higher magnitude of impact is due to the direct links to the firm: if the minority position allows the acquiror to have a director seating on the board of the target, this director can bring more information to the acquiror which is then filtered and subjected to scrutiny using the whole acquiror's network.

Private versus Public target

Public firms need to follow more transparency procedures (reporting) than private firms. Some are also monitored by analysts and the media. Therefore, it is safe to assume that on average information asymmetry is higher for private firms. Our results, presented in Table 3, indicate that on average private firms target firms are paid with more stock and less cash. One can also argue that, if the centrality of the board measures the ability to acquire information, then the centrality of firms buying private targets should impact more on the choice of payment. On the other hand, and because our network is constructed with using only board interlocks, a private firm may be out of reach of the acquirors network. Therefore, even a very central director may not have an informational advantage. Our results are not conclusive as the impact of centrality of the acquiror in the percentage of

either stock or cash is just slightly diminished if the target is private. If we relate the target's centrality to the ability of acquiring information on the true value of the acquiror, our results point towards the "out-of-network" argument: the magnitude of the impact of the target's centrality on the percentage of stock is strongly reduced. This is, if a firm is private, is less likely that a target's director can reach the acquiror's director (or the information released/certified by him) through his network (the target may be isolated or in a different cluster from the acquiror).

Rating

Prior to the recent credit crisis, firms rated by credit rating agencies were considered to be more transparent. If the acquiror is rated by a credit agency, then one would expect the percentage of stock to increase. Our results, presented in Table 4 indicate the opposite: whenever the acquiror is rated, the percentage of stock paid increases. Moreover, when looking at the impact of the centrality of rated firms on the percentage of stock used, the magnitude is largely reduced, although it is still negative and significant. This may be due to the fact that we are only testing the existence of a rating, and not the quality of the rating. On the other hand, the magnitude of the impact of target's centrality on the percentage of stock increases significantly (almost fourfold). More research needs to be done in order to understand the differences in the rated firms, specially the impact of different ratings on the method of payment.

Index

Firms belonging to the index are more scrutinized by both analyst and the media. Therefore, we should expect these firms to be less opaque. Nevertheless, our results (Table 5) indicate that firms belonging to the index use less stock and more cash to pay for the merger or acquisition. The impact of the acquiror' centrality on the percentage of stock used as payment when the acquirors belong to the index is not statistically different from when the firms do not belong to the index. The impact of the target's centrality, however, changes significantly when the acquiror belongs to the index. Our interpretation is that firms which are in the Index are able to signal information about themselves to more agents outside our network, which is composed only by board directors. This allows the target firms to resolve more uncertainty on the acquiror's true value, by using their centrality in

the real and extended network, to which we don't have access. However, with the current data limitations, we are not able to confirm this interpretation.

5 Conclusions and further research

We analyse the impact of social networks of directors of firms on the choice of payment method of in mergers and acquisitions involving their firms using a sample of US firms for 1999 to 2006. Focusing on the information asymmetry argument, our results indicate that social networks reduce adverse selection problems: acquiror firms with highly central directors are more likely to use more cash and less stock as payment for the deal; target firms with highly central directors are paid more in stock and less in cash. Although we cannot identify the direction of the information flows, these results point towards the inflow hypothesis, as centrality of the directors seems to impact more on the information acquisiton than on the information propagation. We also look at other variables affecting information asymmetry in deals. We show that the impact of centrality is magnified whenever an acquiror held a position on the target previous to the deal announcement.

Some empirical results are not as clear. When analyzing the interaction between centrality and public status of firms, rating and index inclusion, the results are inconclusive, although they provide us with interesting questions for future research. The largest contributor for these less strong results is the sample of board directors. Our data on boards is not complete which limits the analysis, specially in this second chapter where most target firms involved are small and/or private, and therefore, not covered by BoardEX. It would be interesting to try different databases to construct the directors and managers social networks, other than the one formed by board interlocks, in order to confirm our results. Faccio and Masulis (2005) also find evidence that corporate control concerns favours cash instead of stocks. The fact that our network is created using board's interlocks suggests that there might be a link between the firm control and governance literature with the social networks literature. Martynova and Renneboob (2006) relate a country's corporate governance system to the market reaction to payments in stocks. Further research needs to be done in order to explain the link between corporate governance and the social net-

works. Other interesting research direction would be the behavioural analysis. Fracassi (2008) shows that managers who are connected take similar investment decisions. It would be interesting to extend that analysis to mergers and acquisitions possibly connecting it to Bouwman, Fuller and Nain (2006) who found that the long-run underperformance of M&As is consistent with managerial herding.

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	(1) Stock	(2) Cash	(3) Stock	(4) Cash	(5) Stock	(6) Cash
RELSIZE	2463.8	-2463.8	856.1***	-856.1***	63.70***	-50.54***
	(0.86)	(-0.86)	(4.63)	(-4.63)	(7.08)	(-7.68)
FINLEV	7638.9	-7638.9	970.8***	-970.8***	79.94***	-60.00***
	(0.98)	(-0.98)	(5.76)	(-5.76)	(11.03)	(-10.88)
INTRAINDUSTRY	-235.5	235.5	-144.9*	144.9*	0.832	0.365
	(-0.24)	(0.24)	(-1.89)	(1.89)	(0.19)	(0.11)
MERGERWAVE	-3531.9	3531.9	-665.3***	665.3***	54.54***	-44.03***
	(-0.87)	(0.87)	(-3.69)	(3.69)	(6.04)	(-6.40)
ln(Degree Acquiror)	-1511.0	1511.0	-359.4***	359.4***	-20.39***	18.31***
	(-0.95)	(0.95)	(-5.85)	(5.85)	(-8.90)	(10.39)
ln(Degree Target)	521.2	-521.2	163.1**	-163.1**	9.802**	-5.363
	(-0.95)	(0.95)	(1.99)	(-1.99)	(2.12)	(-1.58)
Constant	-1049.6	1149.6	-1280.9***	1380.9***	-69.30***	120.9***
	(-0.40)	(0.44)	(-4.01)	(4.32)	(-4.32)	(10.11)
sigma						
Constant	2989.0	2989.0	1274.8***	1274.8***	111.9***	89.67***
	(1.01)	(1.01)	(7.59)	(7.59)	(37.39)	(44.91)
Year Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	121	121	2900	2900	4186	4355

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1: *We estimate the impact of centrality on the choice of payments using a two-boundary TOBIT regression. Centrality of the firm is measured with the logarithm of the maximum degree of a director seating in the board of the firm one year prior to the deal announcement. Columns (1) and (2) refer to the percentage of stock and cash, respectively for a sample restricted to deal for which we have information on the board of both the acquiror and the target. Columns (3) and (4) refer to the percentage of stock and cash, respectively for a sample restricted to deals where only pure stock and cash were used. Columns (5) and (6) refer to the percentage of stock and cash, respectively.*

	(1) Stock	(2) Stock	(3) Stock	(4) Stock	(5) Stock
RELSIZE	63.70***	64.36***	63.93***	64.86***	64.34***
	(7.08)	(7.15)	(7.10)	(7.20)	(7.14)
FINLEV	79.94***	80.65***	80.75***	80.50***	80.62***
	(11.03)	(11.12)	(11.13)	(11.10)	(11.12)
INTRAINDUSTRY	0.832	0.912	0.934	0.861	0.883
	(0.19)	(0.21)	(0.21)	(0.20)	(0.20)
MERGERWAVE	54.54***	54.26***	54.25***	-54.20***	54.52***
	(6.04)	(6.02)	(6.02)	(-5.62)	(6.05)
ln(Degree Acquiror)	-20.39***	-20.57***	-20.22***	-20.63***	-20.13***
	(-8.90)	(-8.98)	(-8.73)	(-9.01)	(-8.70)
ln(Degree Target)	9.802**	9.756**	9.857**	8.324*	8.180*
	(2.12)	(2.11)	(2.13)	(1.77)	(1.74)
TOEHOLD		31.62**	72.85*	-59.52	-20.77
		(2.51)	(1.66)	(-1.00)	(-0.31)
$\mathbf{1}_{Toehold} \times ln$(Degree Acquiror)			-13.18		-19.42
			(-0.98)		(-1.39)
$\mathbf{1}_{Toehold} \times ln$(Degree Target)				37.43	46.39*
				(1.56)	(1.84)
Constant	-69.30***	-70.31***	-71.24***	-67.04***	-67.73***
	(-4.32)	(-4.38)	(-4.43)	(-4.15)	(-4.20)
sigma					
Constant	111.9***	111.7***	111.7***	111.7***	111.7***
	(37.39)	(37.39)	(37.39)	(37.39)	(37.40)
Year Controls	Yes	Yes	Yes	Yes	Yes
Observations	4186	4186	4186	4186	4186

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2: *We estimate the impact of centrality on the percentage of stock used using a two-boundary TOBIT model. We interact the centrality measure with a dummy variable indicating acquirors that held a position on the target prior the the deal announcement. TOEHOLD measures the size of that position.*

	(1) Stock	(2) Stock	(3) Stock	(4) Stock	(5) Stock
RELSIZE	63.70***	60.54***	60.42***	59.81***	59.61***
	(7.08)	(6.75)	(6.74)	(6.67)	(6.64)
FINLEV	79.94***	88.02***	88.34***	87.15***	87.51***
	(11.03)	(11.89)	(11.91)	(11.76)	(11.79)
INTRAINDUSTRY	0.832	1.713	1.622	1.646	1.527
	(0.19)	(0.39)	(0.37)	(0.38)	(0.35)
MERGERWAVE	54.54***	55.02***	54.98***	56.41***	54.92***
	(6.04)	(6.12)	(6.11)	(6.58)	(6.11)
ln(Degree Acquiror)	-20.39***	-16.95***	-19.03***	-17.17***	-19.81***
	(-8.90)	(-7.28)	(-5.26)	(-7.36)	(-5.43)
ln(Degree Target)	9.802**	12.10***	12.37***	18.90***	19.70***
	(2.12)	(2.61)	(2.66)	(3.04)	(3.14)
PRIVATE		27.51***	18.05	64.46***	54.92**
		(6.18)	(1.35)	(2.83)	(2.20)
$\mathbf{1}_{Private} \times ln$(Degree Acquiror)			3.316		4.198
			(0.75)		(0.95)
$\mathbf{1}_{Private} \times ln$(Degree Target)				-15.37*	-16.38*
				(-1.65)	(-1.75)
Constant	-69.30***	-98.42***	-92.67***	-114.9***	-107.2***
	(-4.32)	(-5.85)	(-5.03)	(-5.97)	(-5.28)
sigma					
Constant	111.9***	111.3***	111.3***	111.2***	111.2***
	(37.39)	(37.41)	(37.41)	(37.41)	(37.41)
Year Controls	Yes	Yes	Yes	Yes	Yes
Observations	4186	4186	4186	4186	4186

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: *We estimate the impact of centrality on the percentage of stock used using a two-boundary TOBIT model. We interact the centrality measure with a dummy variable indicating target firms that are privately held.*

	(1) Stock	(2) Stock	(3) Stock	(4) Stock	(5) Stock
RELSIZE	63.70***	58.30***	59.57***	57.76***	58.90***
	(7.08)	(6.47)	(6.58)	(6.42)	(6.51)
FINLEV	79.94***	83.38***	82.92***	82.74***	82.35***
	(11.03)	(11.47)	(11.41)	(11.40)	(11.34)
INTRAINDUSTRY	0.832	0.140	0.320	0.190	0.346
	(0.19)	(0.03)	(0.07)	(0.04)	(0.08)
MERGERWAVE	54.54***	54.04***	53.14***	53.79***	53.29***
	(6.04)	(6.00)	(6.18)	(5.98)	(6.20)
ln(Degree Acquiror)	-20.39***	-16.51***	-17.20***	-16.28***	-16.90***
	(-8.90)	(-7.04)	(-7.19)	(-6.96)	(-7.08)
ln(Degree Target)	9.802**	11.59**	11.60**	4.885	5.047
	(2.12)	(2.50)	(2.50)	(0.95)	(0.98)
RATING		-43.77***	-99.99***	-129.1***	-176.8***
		(-6.10)	(-2.58)	(-4.22)	(-3.73)
$\mathbf{1}_{Rating} \times ln$(Degree Acquiror)			16.37	33.89***	14.61
			(1.48)	(2.89)	(1.32)
$\mathbf{1}_{Rating} \times ln$(Degree Target)					32.94***
					(2.81)
Constant	-69.30***	-72.50***	-71.36***	-56.19***	-55.85***
	(-4.32)	(-4.52)	(-4.45)	(-3.33)	(-3.31)
sigma					
Constant	111.9***	111.3***	111.2***	111.1***	111.0***
	(37.39)	(37.42)	(37.42)	(37.42)	(37.42)
Year Controls	Yes	Yes	Yes	Yes	Yes
Observations	4186	4186	4186	4186	4186

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: *We estimate the impact of centrality on the percentage of stock used using a two-boundary TOBIT model. We interact the centrality measure with a dummy variable indicating acquiror firms that are credit rated.*

	(1) Stock	(2) Stock	(3) Stock	(4) Stock	(5) Stock
RELSIZE	63.70***	61.55***	61.61***	60.95***	60.91***
	(7.08)	(6.79)	(6.78)	(6.73)	(6.71)
FINLEV	79.94***	80.22***	80.18***	78.85***	78.87***
	(11.03)	(11.06)	(11.03)	(10.86)	(10.85)
INTRAINDUSTRY	0.832	0.601	0.604	0.378	0.376
	(0.19)	(0.14)	(0.14)	(0.09)	(0.09)
MERGERWAVE	54.54***	54.48***	54.43***	54.15***	54.18***
	(6.04)	(6.03)	(6.02)	(6.00)	(5.99)
ln(Degree Acquiror)	-20.39***	-19.31***	-19.34***	-19.29***	-19.27***
	(-8.90)	(-8.22)	(-8.15)	(-8.23)	(-8.13)
ln(Degree Target)	9.802**	10.69**	10.69**	6.798	6.793
	(2.12)	(2.30)	(2.30)	(1.39)	(1.39)
S&P500		-17.11**	-22.52	-117.9***	-114.7*
		(-1.98)	(-0.38)	(-2.82)	(-1.65)
$\mathbf{1}_{S\&P500} \times ln$(Degree Acquiror)			1.481		-0.913
			(0.09)		(-0.06)
$\mathbf{1}_{S\&P500} \times ln$(Degree Target)				38.73**	38.79**
				(2.48)	(2.48)
Constant	-69.30***	-70.69***	-70.62***	-60.34***	-60.36***
	(-4.32)	(-4.40)	(-4.39)	(-3.65)	(-3.65)
sigma					
Constant	111.9***	111.9***	111.9***	111.8***	111.8***
	(37.39)	(37.39)	(37.39)	(37.39)	(37.39)
Year Controls	Yes	Yes	Yes	Yes	Yes
Observations	4186	4186	4186	4186	4186

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: *We estimate the impact of centrality on the percentage of stock used using a two-boundary TOBIT model. We interact the centrality measure with a dummy variable indicating acquiror firms that belong to the S&P500 index.*