The Network Centrality of Influential Bankers: a new Capital Structure Determinant

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Abstract

This paper studies the impact of the presence of bankers in the board of a corporation on its capital structure. We assume that the presence of bankers reduces information asymmetry problems, facilitating information transmission between corporations and financial institutions. Using a large database on Board of Directors, we construct the directors' social network and measure the relative influence (centrality) of bankers on the information transmission mechanism. Our results indicate the presence of bankers in the board increases the leverage ratio in US. This effect is magnified by the influence of the banker, i.e. the more connected a banker is, the higher the leverage ratio of the firm in which he or she sits. We also show that he effect of banker's social influence on the leverage ratio increases with firm's opacity, which is consistent with our interpretation of the role of bankers on the information transmission mechanism.

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1 Introduction

In this paper we examine whether the presence of influential bankers in the board of a corporation affects or not the capital structure of the firm. First, we measure the influence of bankers on the network of directors by using social network analysis, computing their centrality on the network. We then examine whether the banker's centrality impacts on the capital structure of a firm when seating on the board of directors. We thus make a link between the literature on information asymmetry and the literature on social networks.

To motivate the research topic, we first analyse how the relation between banks and corporations reduces informational asymmetries in the financial markets. One classical argument is that such relations minimize monitoring costs (Diamond, 1984). There is also empirical evidence that availability of credit increases with bank-firm relationship (Petersen and Rajan, 1994; Berger and Udell, 1995). A particular aspect of bank-firm relationship relevant here is the role of banker-directors, *i.e.* bankers who seat simultaneous on the board of directors of a bank and of a non-financial firm. Such bankers provide a significant financial expertise to the management of firms (Mace, 1971; Lorsh and MacIver, 1989). The role of bankers-directors goes however beyond their financial expertise as argued by Fama (1985). Their informational advantage and ability to discipline management, either by termination or changes in the compensation structure can be shown to be a more effective monitoring mechanism than loan covenants (Williamson, 1988; Kroszner and Strahan, 2001). For all those reasons the presence of banker-directors may reduce the monitoring costs, possibly lowering the costs of funds (James, 1987; Berger and Udell; 1995). This effect is specially noticed when the information asymmetry between insiders and the public financial markets is very high, as noticed by Fama (1985), and further analysed by Leland and Pyle (1997), Kracaw and Zenner (1998) and Kroszner and Strahan (2001) among others.

All these aspects of information asymmetry reduction have been corroborated in empirical works. The role of unaffiliated banker-directors, those who sit on the board of Banks who are not the leading arranger of the loan contracted by the firm, and therefore do not have direct conflict of interest in the capital structure's decision, have been studied by Booth and Deli (1999), Kroszner and Strahan (2001) and Bird and Mizruchi (2005). They show a positive correlation between firms' capital structure and the presence of unaffiliated banker-directors. There is an important role, however, for creditors on the board. They have an informational advantage over outside creditors. Kracaw and Zenner (1998) show evidence of negative price reaction to announcement of loan renewals involving a bank represented on the firm's board. Using an international sample, Ferreira and Matos (2008) provide evidence that banks extract informational rents from the firms, by charging higher spreads. Güner et al. (2008) also show that the presence of financial experts on the board affect corporate decisions, although not always in the best interest of shareholders. Overall, reduction of asymmetries exists whenever bankers or recognized financial experts sit on the board.

An endogeneity problem may exist in the analysis of the presence of banker-directors: firms may invite a banker anticipating future financing needs, or a banker on the board may facilitate access to credit increasing the leverage ratio. Ciammara (2006) shows that, when taking into account the endogeneity, the presence of an affiliated banker-director has

a positive effect on the firm leverage.

Beyond the simple presence of bankers-directors, the size and general composition of the board play a role in the reduction of information asymmetry and thus, in the reduction of costs. Stecher and Grønnevet (2009) propose a theoretical framework where the creditors' interests protection increases with information asymmetry, board size and proportion of outside directors on the board, providing a more benevolent interpretation of the misconduct of bankers as proposed by Güner *et al.* (2008). Similarly, Andersen et al. (2004) find that the cost of debt is inversely related to board independence and board size. Raheja (2005) proposes a model where insiders of large boards release more information to outside directors in the periods prior to CEO succession in order to increase the probability of being nominated CEO. In fact, board size plays a decisive role. On one hand, the probability of having a banker on the board increases with the board size. On the other hand, the number of connections of a director will depend on the board size.

A final ingredient to our research question is the role of social networks and how a well-connected director can leverage on his position in his role as a member of the board. Recent studies show the influence of individuals' connections on financial decisions[1]. While Fracassi (2008) shows that the social network of the management team have an impact on corporate investment decisions (connected firms make similar investments), Cohen *et al.* (2009) show that portfolio managers invest in firms they are connected through their network. In both cases, profitability is higher the more central the managers are on the network. Both studies argue that the network lower information-gathering costs (Nahapiet and Ghosal, 1998) screening and selecting the important pieces of information (Burt,1997). We use this same argument as the building block of our work, relating the capital structure to the social network of the banker-directors. In particular, we analyse the role of a banker-director on the information flow that is released to the (credit) market: if the bankers' social connections contribute to the reduction of information asymmetry, reducing monitoring costs then it should also impact on the capital structure of the firm. It is already established in the literature that the presence of bankers on the board increases the leverage ratio (Byrd and Mizruchi, 2005). We add to the literature by showing evidence that, for US firms, this effect is magnified by the social connections of the banker. We propose to classify this influence of bankers by measuring their centrality in the social network of boards and directors: the more directors a banker is linked to, the more information may pass through him, helping to reduce information asymmetry, either by disseminating information or by having a certification role.[2] Consistently with this interpretation, our results indicate that the effect of the banker's social influence on the leverage ratio increases with firm opacity, i.e. firms where information asymmetry is higher. In the presence of other factors which might reduce information asymmetry, e.g. credit rating, the role of the banker's influence as information transmission mechanism is reduced.

[1] There is also evidence that firms with politically connected boards increase their market value when the party to which they are connected wins an election (Goldman, Rocholl and So, 2009).

[2] The presence of bankers on the board may also have a certification role (Fama (1985), Bhatacharya and Chiesa (1995), BhataKracaw and Zenner (1998)]. Byrd and Mizruchi (2005) results suggest that non-lenders bankers have a certification role for distressed firms while exercising a monitoring role for non-distressed firms.

This paper is organized as follows. In Section 2 we summarize the determinants of capital structure and hypothesize how the presence (and the centrality) of a banker-director may also be considered a capital structure determinant. In Section 3 we describe the methodology and the data, addressing firstly, the directors' network and the centrality measures used to classify the influential role of bankers and secondly, the estimation procedures used to correct for a possible endogeneity bias, and finally we describe our databases. In Section 4 we present the results. The main conclusions are summarized in Section 5.

2 Capital Structure Determinants

In this paper we propose to study the role of a determinant of capital structure, based on the position of bankers in the directors' network and their role in the information transmission channels. There are, however, other capital structure determinants that must be controlled for in order to assess the relevance of the banker-directors. In this section we present these already established determinants, such as size, asset tangibility and specificity, growth opportunities, profitability, and median industry leverage[3]. We briefly discuss the theory behind and the variables we use to proxy for each determinant and then analyse in more detail the role of the bankers' position in the directors' network as a determinant.

Size has a positive impact on leverage. First, larger firms are usually covered by a higher number of analysts, reducing the information asymmetry. Therefore, when lending to smaller firms, lenders face relatively higher monitoring costs. This extra cost is passed to the borrower by increasing the interest rate, and hence reducing the leverage. Secondly, bankruptcy costs are fixed and therefore larger firms have relatively lower bankruptcy costs. This positive relationship is empirically documented in several studies such as Rajan and Zingales (1995), Schenoy and Koch (1996), although there is some mixed evidence in the literature as in Titman and Wessels (1988).

Profitability is a second factor with impact on leverage. the most profitable firms have clearly more free cash flow to invest and are therefore less dependent on debt to pursue their investment policy. It is well known from the pecking order theory of Myers (1984) and Myers and Majluf (1984) that firms favour internal funds over external funds in order to reduce information asymmetry costs and, among these, firms favour debt over equity. Therefore, more profitable firms will be less leveraged. This negative relationship is consensual among the empirical literature (Rajan and Zingales ,1995; Booth et al., 2001; Fan et al., 2003; Jong et al.,2006).

Asset tangibility is also a relevant determinant. According to Jensen and Meckling (1976), the conflict of interests between debtholders and shareholders may be avoided by allocating collateral debt to specific projects. Therefore, firms with valuable tangible assets can have higher leverage, as new debt contracts can use those assets as collateral. Jensen et al. (1992) and Rajan and Zingales (1995) show evidence of a positive relationship between asset tangibility and leverage. However, Shenoy and Koch (1996) find mixed results across industries. This difference in results seems to be due to the asset specificity and its liquidity if used as collateral: if an asset is highly specific to the firm, it might be worthless outside the

[3]For a thorough review of the literature, see Frank and Goyal (2007).

firm even if its book value is high, implying a negative relationship between asset specificity and leverage. Also, some authors find mixed results when differentiating between short-term and long-term debt (Wijst and Thurik, 1993; Chittenden et al., 1996).

Finally we consider the growth opportunities of a firm as a relevant determinant. Under the presence of agency problems, Myers (1977) suggests that growth firms with high leverage should use more equity finance in order to avoid passing up profitable investments. The same author has suggested the use of the market-to-book ratio as a proxy for future growth opportunities for such leveraged firms. Therefore, we should expect a negative effect of the market-to-book ratio on the leverage ratio. This theory has mixed evidence on the literature. While Rajan and Zingales (1995) and Hirota (1999) have found the expected negative relationship (for an international and a Japanese sample respectively), Chiarella, Pham and Tan (1992) and Lee, Lee and Lee (2000) show the opposite (for Australian and Korean sample, respectively).

2.1 Analysis of a new capital structure determinant

Here we analyse in more detail the role of the bankers' position in the directors' network as a determinant of capital structure.

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, playing a crucial role in screening and selecting the relevant pieces of information. 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 agents in the market. 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 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.[4]

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.

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

Using social network analysis and suitable centrality measures (to be defined in Section 4.1), we infer the influence of each director. In particular, we are interested in the role of bankers-directors in the information flow, its impact on the reduction of information asymmetries and, as a consequence, its impact on the firm's capital structure. We focus on the role of bankers because of their privileged access to information during the process of credit concession. If the social network of directors is a good proxy for the real life social network, then we should expect that the presence of banker on the board of firm may reduce the information asymmetry between firm and lenders which, in turn, allows the firm to increase its leverage. Specifically, we test the following hypothesis:

Hypothesis 1 *The presence of a banker on the board increases the leverage of a firm,*

Byrd and Myzruchi (2005) have already tested for hypothesis 1, i.e. they tested for the mere presence of bankers in boards. In fact, although we test the same hypothesis, our banker and bank classification criteria is different from the one used in Byrd and Myzruchi (2005). Firms are categorized as banks if they are listed as "Banks" in Worldscope's Industry Level 3 name. This is a broader definition of bank that the one used by Byrd and Myzruchi (2005), which was restricted to commercial banks. Note that this definition of "banker-directors" will apply to everyone who is a board member of a firm that falls into our "bank" criteria. This means that there will be individuals that will be classified as "banker-directors", even if their original background is not the banking industry.[5]

However, no study has evaluated the role of banker-directors in the information transmission mechanism. If it is true that bankers have an important role in the reduction of the information asymmetry, then the more influential a banker is, the more he will contribute to lessen the information asymmetry between the market and the firm where he is also a director. Note that we do not need to assume that the banker is sharing insider information or any other form of illegal action. It suffices to interpret the banker role in the information transmission mechanism as in Burt (1997) where the network is used as a filter for the relevant pieces of information: when the market analyses all pieces of available information, it will give more weight to information coming from more influential sources of information. The more central a banker is on the network, the higher is his ability to use the network to screen and select the relevant information, providing a more reliable signal to the market and reducing information asymmetry. Again, as a reduction in the information asymmetry between firm and lenders would allow the firm to increase its leverage, we test for the following hypothesis:

Hypothesis 2 *The more influential a banker-director, the higher the leverage of a firm.*

There are other factors that can contribute to better dissemination of information. Firms which are constituents of a major index are more likely to be followed by a higher number

[5]Mr. Beattie will be considered a "banker-director" in 2006 because he sits on a bank's Board, in this case the Royal Bank of Canada's Board. Sharing this directorate is Mr. Young, an independent director who sits on the same bank's board since 1991 and was Chairman and CEO of a frozen food company from 1984 to 2001. Nevertheless, if he is central on the network, this is, if he has influence on the network, he may play an important role in the information transmission regardless of his previous background.

of analysts and will have higher media coverage than a smaller capitalization firm. Firms can also choose to be rated by credit rating agencies. The rating will serve as a certification mechanism, contributing to the reduction of information asymmetry. In these cases, the role of the banker in the information transmission mechanism should be less relevant.

The level of information asymmetry may also be proxied with other financial variables. For example, in an efficient market, prices move with the arrival of new information. If there is no information, prices do not change and one does not observe trades. Therefore, one may use a liquidity measure such as Amihud's (2002) to proxy for the level of information asymmetry. Another example would be the accruals quality proposed by Dechow and Dichev (2002): being an estimate of future cash flows, accruals are subjected to estimation error. Therefore, low quality of the accruals can contribute to higher levels of information asymmetry.

In other words, the higher the information asymmetry is, the more important is the role of an influential banker for the information transmission mechanism. If the effect of the presence (or the influence) of a banker-director on the firm's leverage is in fact due to a reduction in the information asymmetry, then one should expect this effect to be higher in more opaque firms. We specify this hypothesis as:

Hypothesis 3 *The higher the level of information asymmetry, the bigger the impact of the presence (or influence) of a banker on the leverage of a firm.*

and we will refer to the proxies cited above as proxies for firm opacity.

3 Data and Methodology

3.1 Network Construction and Centrality Measures

Our aim is to try to mimic the unobserved information flows by constructing the network formed by the boards and directors. Although a firm is a legal entity, information does not flow between firms, but rather through the individuals placed in different firms. Hence, we analyze the flow of information between firms, by constructing the network of relationship between directors. In this new network, two directors are considered to be connected in a particular year if they sit in the same board during that year. 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, one of which is a bank. Each firm has three directors. The director seating simultaneous on the board of the bank and on the board of Firm 2 is denoted by banker-director. 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.

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,

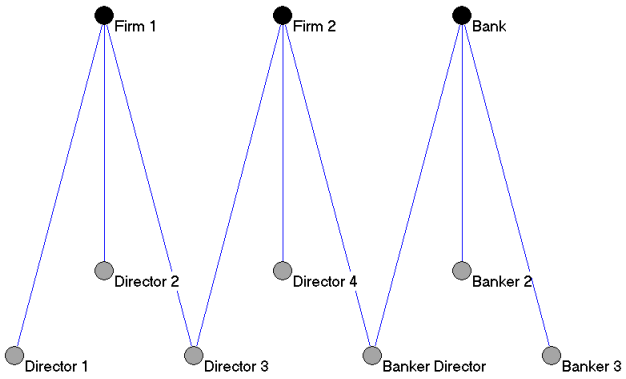

Figure 1: *Graphical representation of a 2-mode network with 3 firms and 8 directors.*

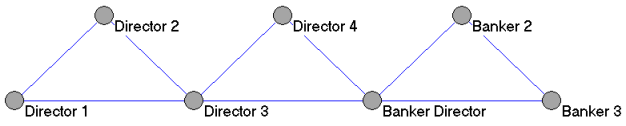

Figure 2: *Graphical representation of the projection of the network represented in figure 2 onto the space of Directors.*

i.e. each director, on the network. In this work, we will focus on three basic measures of centrality commonly used in information flows /contagion analysis: degree, closeness and betweenness.

1. 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. It is usual to normalize this measure by the maximum possible degree $(n-1)$. The normalized measure becomes the so-called **degree centrality** and is given by

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

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.

2. **Closeness centrality** (Sabidussi 1965) is the inverse of the average distance from a particular vertex to every other vertex. More formally, the closeness centrality C_i of vertex i is:

$$C_i = \left(\frac{\sum_{j \neq i} d_G(i,j)}{n-1} \right)^{-1}$$

where $d_G(i,j)$ represents the geodesic distance between i and j, i.e. the length of the shortest path between the two vertices. Within the directors' network, it represents the average number of contacts that a director would have to make in order to reach any other director on the network. As there are directors which are isolated/separated from part of the network, the classical definition of closeness is not well defined. The solution for these cases, is to use the influential range of each director, i.e. to measure the centrality within the reachable component of the network (Lin 1976) as a ratio of the total number of vertices,

$$C_i' = \left(\frac{\sum_{j \neq i} d_G(i,j)}{J_i - 1} \right)^{-1} \frac{J_i}{n}$$

where J_i is the size of the network component of vertex i. A director with higher closeness centrality will need on average less intermediaries to reach any other director.

3. **Betweenness centrality** for a given vertex i is defined (Freeman 1977) as follows. Let g_{jk} denote the number of the shortest paths connecting vertices j and k, and $g_{jk}(i)$ denote the number of the subset of those shortest paths that also pass through vertex i. The betweenness centrality B_i of vertex i is

$$B_i = \sum_{j<k} \frac{g_{jk}(i)}{g_{jk}}$$

The ratio $\frac{g_{jk}(i)}{g_{jk}}$ can be interpreted as the probability that director i is a vehicle of information transfer between director k and director j, assuming that all shortest paths are equally likely to be used.

After calculating the centrality measures of each individual in the directors' network, we aggregate the centrality measures to the firm level. As we are interested in the information role of bankers-directors, we only use these individuals for aggregation purposes: for each firm, the corresponding centrality measure is the maximum value of the banker-director in the board. If there is no banker-director, the centrality measure is 0[6]. Figure five demonstrates this procedure using the previous three firms example. Each director's centrality

[6] We repeat the whole analysis using the sum instead of the maximum and the results are robust. 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.

degree is shown in parentheses. The three directors of Firm 1 have degrees of 2, 2 and 4. However the degree centrality of Firm 1, also shown in parentheses, will be 0 as it has no banker seating on the board. Firm 2 has a one banker on the board with degree 4. Therefore the degree centrality of Firm 2 will be 4. Had the Firm had a second banker on the board with connections to less than 4 other directors, the degree of Firm 2 would had still be 4.

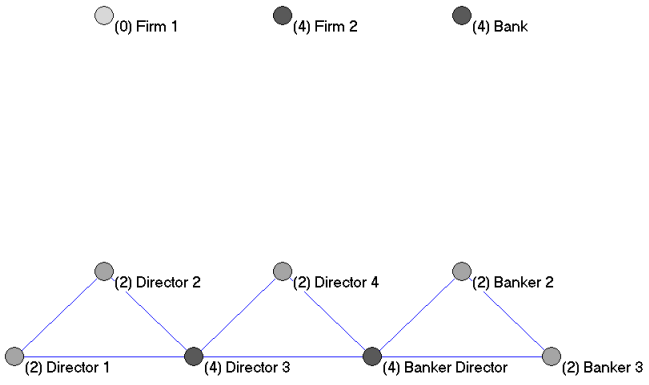

Figure 3: *Going back to the firm dimension: example using degree the centrality measure*

3.2 Estimation

We will test our hypothesis 1 and 2 by running the following regression equation

$$\begin{aligned} LR_{t+1,i} &= \beta_0 + \beta_1 \text{Size}_{t,i} + \beta_2 \text{Profitability}_{t,i} + \beta_3 \text{Asset\_Tangibility}_{t,i} \\ &\quad + \beta_4 \text{Asset\_Specificity}_{t,i} + \beta_5 \text{Growth\_Opportunities}_{t,i} + \delta \text{Banker}_{t,i} \\ &\quad + \gamma_1 \text{Industry\_Dummies}_{t,i} + \gamma_2 \text{Year\_Dummies}_t \end{aligned}$$

where the dependent variable, LR_{t+1} is the leverage ratio, measured as the ratio total debt to market capitalization, Size is measured by the logarithm of sales, Profitability is measured by return on assets, Asset Tangibility is measured as the ratio of tangible to total assets, Asset Specificity is measured as the ratio of R&D expenditure to total assets, Growth_Opportunities are measured with the log of market-to-book ratios. Banker may denote either the presence of banker on the board (hypothesis 1)or one of the three banker-director centrality measures (hypothesis 2). We also control for median industry level (using 2 digit SIC codes) and year effects. All variables are winsorized at 1% level. To test hypothesis 3, we add an extra term, interacting the centrality measure variable with one of the firm's opacity proxies.

We need to correct for possible endogeneity bias when testing for our hypothesis that bankers-directors (and their centrality on the network) affect the capital structure of a firm. The choice of board composition, and hence the presence and influence of the banker, may

not be independent of the choice of the (target) capital structure. The most common way to deal with endogenous regressors is to use Instrumental Variables (IV). However, the IV approach is not valid when the endogenous regressor is a binary variable: let d_i denote a binary variable with $d_i = 1$ if the treatment is received, and $d_i = 0$ otherwise and y_i^1 and y_i^0 denote outcome with treatment and without treatment, respectively,

$$\begin{aligned} y_i^1 &= \beta X_i + \alpha_i + \varepsilon_i \text{ if } d_i = 1 \\ y_i^0 &= \beta X_i + \varepsilon_i \qquad \text{if } d_i = 0 \end{aligned}$$

where X_i is a set of (observable) variables known to influence the outcome and $\varepsilon_i \sim N(0, \sigma_\varepsilon)$. The observable outcome y_i is

$$\begin{aligned} y_i &= (1 - d_i)\, y_i^0 + d_i y_i^1 \\ y_i &= \beta X_i + \alpha_i d_i + \varepsilon_i \end{aligned}$$

If selection into treatment does not depend on the outcome y_i, we can estimate the average treatment effect by OLS, provided that, apart from regressors exogeneity, the usual OLS assumptions hold.

$$E\left[\hat{\alpha}_{OLS}\right] = \frac{1}{n}\sum_{i=1}^{N} \alpha_i = \bar{\alpha}$$

In our case, y_i is the leverage ratio defined as the ratio of total debt to market value, d_i indicates the presence of a Banker on the firm's Board and X_i are firm control variables which are empirically known to affect the capital structure. However, firms simultaneously choose the capital structure and Board composition, which implies that d_i is correlated with ε_i and

$$E\left[\hat{\alpha}_{OLS}\right] = \bar{\alpha} + E\left[\varepsilon_i | d_i = 1\right] - E\left[\varepsilon_i | d_i = 0\right]$$

leading for the inconsistency of the OLS estimator.[7]This means that, in spite the IV approach being correct for measuring the impact of bankers centrality on the capital structure, the same is not true when measuring the impact of the mere presence of a banker-director. The latter is methodologically equivalent to evaluating the impact of a treatment on a variable of interest, where selection into treatment is endogenous. We use Rosenbaum and Rubin's (1984) Average Treatment Effects (ATE) approach where selection into treatment is model as an index function dependent on a set of instruments.

3.3 Data

Our final dataset is the result of the merge of two types of data: the financial data and the board composition database. Our data on boards is based on BoardEx reports, which provide information on the interlocks of the boards, i.e. instead of presenting a directory of names and titles, BoardEx provides historical linkages between boards of different firms and not between directors themselves. The sample includes data of US firms from 2000 to 2006 although firm coverage increases through time.

[7]See also Imbens and Angrist (1994) and Angrist, Imbens and Rubens (1996).

Figure 4 is a graphical representation of part of the original data. It is, however, just a small part of all the boards and directors network for 2006.The top vertex represents the board of Thomson Corporation. The vertices that are connected to the top vertex are Thompson's directors. Each of these individuals may be seated in another firm's board. As an example, Mr. Beattie, who was a Thompson's board member in 2006, was also a board member at the Royal Bank of Canada in the same year. Firms that shared at least one director with Thomson in 2006 are depicted by the vertices in the next layer. The bottom layer represents directors of the latter firms that are not Thompson's directors, while individuals who also sit at Thompson's are depicted above.

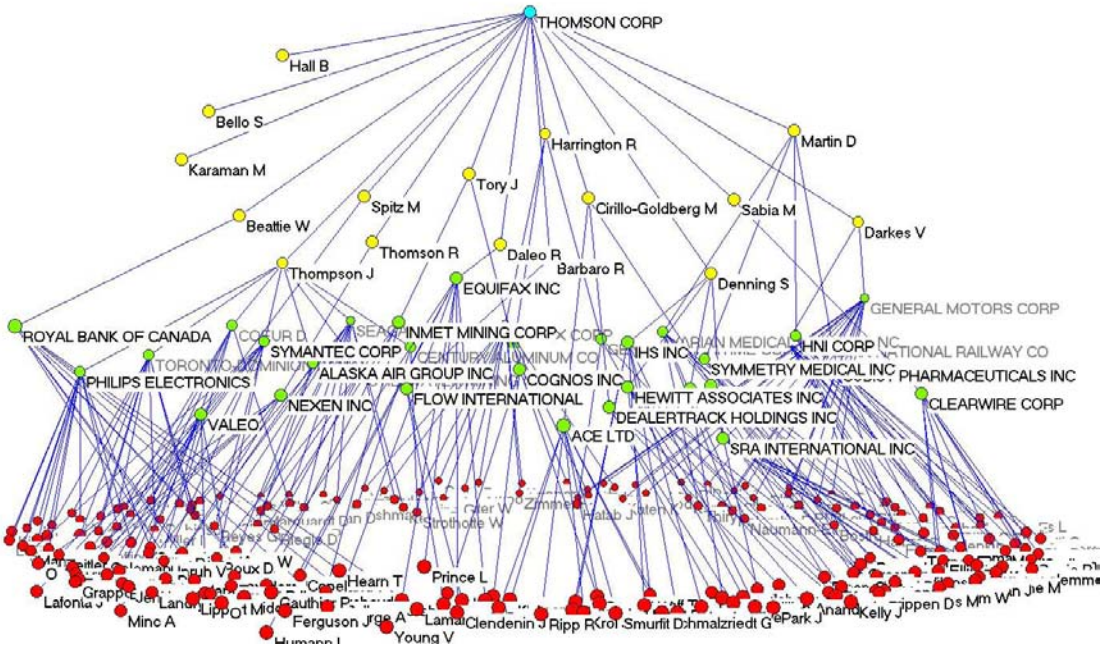

Figure 4: ***Boards and Directors Network:*** *Graphical representation of the 3-neighboorhood of Thomson Corporation Board in 2006. Yellow vertices (second tier from top) represent Thomson Directors. Green vertices (Third tier from top, capital letters) represent firms which have a Thomson Director on its board. Red vertices represent the directors of firms which have a Thomson Director on its board.*

Figure 5 is the result of projecting the network of Figure 1 onto the space of directors. Again, there are only directors and no firms. The top layer of vertices represents Thomson's directors. In this layer, each vertex is now connected to every other vertex because they were all linked to Thomson's board. Some of these vertices are connected to vertices in the lower layer. This happens when a Thomson's director also sits in another firm's board. Mr. Beattie, the director we selected before as an example, will be connected to every individual who is also a Thompson's director. In addition, he will also be connected to all Royal Bank of Canada's directors, as he is also a board member in this firm.

When a firm does not appear on BoardEx reports, it does not necessarily mean that there is no banker-director: it may be the case that the firm is not analyzed by BoardEx.

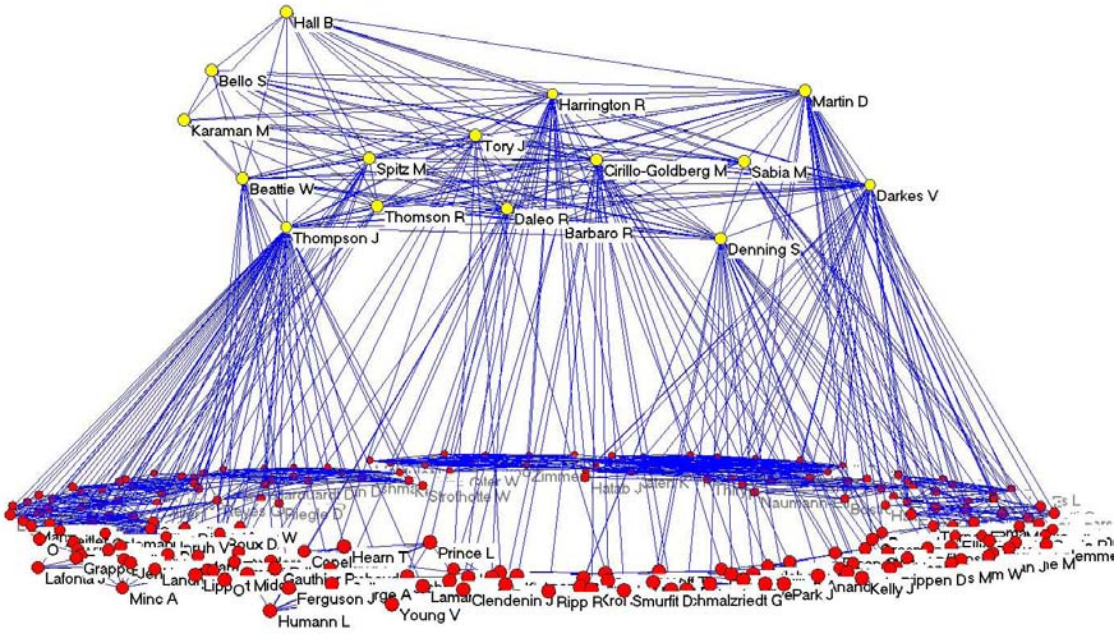

Figure 5: ***Directors Network:*** *Graphical representation of the projection of the network represented in figure 2 onto the space of Directors. Yellow vertices represent Thomson Directors. Red vertices represent the directors of firms which have a Thomson Director on its board.*

This is evident in Table 1, which compares the proportion of firms with banker-directors using the whole WorldScope[8] sample or restricting the sample to firms for which BoardEx also provides information on board size (only available from 2001 onwards).

Table 1

	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Panel A	10%	10%	10%	11%	13%	14%	15%
Panel B	-	35%	30%	30%	20%	18%	19%

Table 1: Proportion of firms with banker-directors. Panel A includes all firms present in WorldScope sample while the Panel B restricts the sample to firms for which BoardEX also provides information on board size.

The sharp decrease in the proportion of bankers after 2003 may be due to regulatory change. Following the Enron financial scandal, the 2002 Sarbanes-Oxley strongly recom-

[8]The comprehensive coverage available on Worldscope represents more than 95% of the world's market value. Worldscope includes up to 20 years of historical data on more than 50,000 public and private companies, with up to 1,500 data elements on each company record.

mended[9] that bankers should not seat on the board of firms with whom they also had a lending relationship through the bank. On the other hand, this may be due to the fact that firm coverage is not constant. BoardEX started its activity in 1998, covering 2783 firms in 34 countries, while in 2006 its coverage included 8187 firms in 57 countries. Although BoardEX provides no information on how firms are selected, we deem that initial coverage included bigger and more known firms, with smaller firms being added posteriorly. This hypothesis is supported by the decrease of the average market value of firms in the sample through time.

Our main data source for financial variables is Datastream using all the firms from WorldScope list. Our variable of capital structure is the leverage ratio computed as the ratio of total debt to market capitalization. We use the logarithm of sales as a measure of size, the ratio of tangible to total assets as a measure of asset tangibility, the ratio of R&D expenditure to total assets as a proxy for asset specificity, market-to-book ratio as the usual growth opportunities measure, ROA as the profitability measure. We also use industrial sector dummies (SIC 2-digit level) in order to control for the median industry value.

	Initial Sample			**Final Sample**				
					All firms		**Firms with banker-directors**	
Variable	**Obs**	**Mean**	**Std. Dev.**		**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Leverage ratio	14125	0.140	0.171	3962	0.110	0.124	0.147	0.124
%firms with Bankers	15385	0.168	0.374		0.146	0.353		
Degree							7.506	5.863
Closeness							0.117	0.050
Betweenness							0.000	0.001
log(Sales)	14680	12.49	2.430		13.31	2.236	14.85	1.883
ROA	14672	-0.073	1.880		0.005	0.224	0.049	0.101
Log(Market-to-book)	13195	0.883	-0.955		0.222	0.184	0.280	0.203
Tangibility ratio	14609	0.249	0.227		0.062	0.093	0.029	0.041
R&D ratio	15385	0.062	0.226		1.054	0.773	1.034	0.694
Volatility	13106	60.75	61.80		51.50	26.40	40.15	18.54
Board size	10664	12.98	4.780		13.75	4.58	16.58	3.89
Distance	12405	1819.7	1519.1		1880.7	1570.8	1294.8	1184.0
Observations					3962		577	

Table 2: Descriptive statistics: *Columns represent the initial US sample and the final sample (after the merge with BoardEX data) with all firms and restricting the sample only to firms with a banker on the board, respectively.*

Regarding the proxies for firm opacity, we use Compustat to create two variables indicating if the firm is rated by S&P or if the firm belongs to the S&P500 index; we use Joel Hasbrouck's database for the Amihud (2002) illiquidity measure[10] and we compute Dechow and Dichev (2002) measure. With the exception of the last one, these variables decrease with the firm's opacity, this is, higher values of the variables indicate less information asymmetry.

[9] The original SOX proposal limited the pool of financial expert to CPAs or other professional with direct accounting experience, but the final proposal would include bankers.

[10] The authors would like to thank Joel Hasbrouk for providing this data.

We use two instruments: board size and distance to New York. Board size is the total number of directors on each board. The larger the number of directors on the board, the higher the probability that one of the directors also sits at a bank. We do not expect the board size itself to impact directly on the leverage ratio of the firm, however there is a positive relationship between firm size and board size documented in the literature. Both Linck, Netter and Yang (2008) and Boone et al. (2007) find evidence that the board size of firms increase with size and complexity of operations, where the former study focuses on young firms (<10 years since IPO) and the latter on the different characteristics of boards in small and large firms. This positive relationship between firm and board size is also present in our data. Nevertheless, when using the centrality measures under the IV approach, board size seems a good candidate for instrument as the centrality measures of the directors are, by construction, dependent of the original board size. Remember that we constructed the network of directors, by projecting the original (2-mode) network, with boards and directors, onto a network of only directors, where directors are connected if they share the same board. Therefore, larger boards will automatically increase the number of connections between the directors seating on those boards, independently of any boards interlocks. The second instrument is distance to New York. Board meetings are required to occur at the same address of the firm's headquarters and the board members need to be physically present. Therefore, if we assume that most bankers in the US work in the American financial centre, New York, the further a firm's headquarter is from New York, the costlier (in terms of time consumption) is for a banker to travel to a Board meeting.

4 Results

Table 3 presents the results of the OLS regressions, i.e. without taking into account any endogeneity in the regressors. When restricting the specification to the capital structure determinants already established in the literature (column 1), all coefficients have the expected sign and are highly significant. The leverage of a firm increases with its size, the tangibility of its assets and with its stock volatility and decreases with profitability, the specificity of the pledgeable assets and the growth opportunities. However, when analyzing the impact of the presence (column 2) and influence of banker-directors (columns 3-5) with OLS, all coefficients are statistically insignificant. Therefore, if one does not correct for the presence of endogenous regressors, both hypothesis 1 and 2 are rejected.

When correcting for endogeneity, the results become statistically significant. These are presented in Table 4. Using the average treatment effects approach (column 1), we may confirm that *the presence of bankers in the board of the firms affects the leverage ratio* (hypothesis 1): on average, the mere presence of a banker on the board of a firm increases the leverage ratio by 4.5%. We also conclude that *the magnitude of this effect increases with the banker's influence on the network* (hypothesis 2), independent of which centrality measure we use (columns 2-4): on average, the higher the banker's centrality, the stronger is his/her impact on the leverage ratio of the firm. These effects are also economically significant as one standard deviation increase in the degree, closeness or betweenness measure is associated with an increase of 7.4, 4 and 27.6 percentage points of the leverage ratio.

The coefficients for the instruments in the first stage have the predicted sign: both the

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS
SIZE	0.0149***	0.0144***	0.0147***	0.0146***	0.0148***
	(7.31)	(7.04)	(7.20)	(7.13)	(7.31)
ROA	-0.130***	-0.129***	-0.130***	-0.129***	-0.130***
	(-6.69)	(-6.62)	(-6.66)	(-6.64)	(-6.68)
TANG	0.0433*	0.0437*	0.0436*	0.0435*	0.0435*
	(1.66)	(1.68)	(1.67)	(1.67)	(1.68)
R&D RATIO	-0.202***	-0.200***	-0.201***	-0.200***	-0.201***
	(-4.75)	(-4.72)	(-4.73)	(-4.73)	(-4.74)
log MARKET-TO-BOOK	-0.0297***	-0.0297***	-0.0297***	-0.0297***	-0.0297***
	(-7.14)	(-7.15)	(-7.16)	(-7.16)	(-7.14)
VOLATILITY	0.000423***	0.000434***	0.000427***	0.000429***	0.000424***
	(2.80)	(2.88)	(2.83)	(2.85)	(2.81)
BANKER		0.0122			
		(1.55)			
DEGREE			0.000734		
			(1.09)		
CLOSENESS				0.0642	
				(1.08)	
BETWEENESS					6.836
					(0.82)
Constant	-0.0360	-0.0336	-0.0347	-0.0342	-0.0355
	(-1.02)	(-0.95)	(-0.99)	(-0.97)	(-1.01)
Controls	Yes	Yes	Yes	Yes	Yes
N	3962	3962	3962	3962	3962
r2_a	0.324	0.325	0.324	0.324	0.324

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

Table 3: *OLS Estimate: We test hypothesis 1 and 2 by running the following OLS regression:* $LR_{t+1,i} = \beta_0 + \beta_1 SIZE_{t,i} + \beta_2 ROA_{t,i} + \beta_3 TANG_{t,i} + \beta_4$ *R&D RATIO* $_{t,i} + \beta_5$ *log MARKET-TO-BOOK*$_{t,i} + \delta BANKER_{t,i}$ *where the dependent variable,* LR_{t+1} *is the leverage ratio, measured as the ratio total debt to market capitalization, SIZE is measured by the logarithm of sales, ROA denotes Profitability and is measured by return on assets, TANG denotes Asset Tangibility and is measured as the ratio of tangible to total assets, R&D RATIO denotes Asset Specificity is measured as the ratio of R&D expenditure to total assets, log MARKET-TO-BOOK denotes Growth Opportunities and is measured as the logarithm of market-to-book ratios. BANKER denotes the presence of banker on the board (hypothesis 1). DEGREE, CLOSENESS and BETWEENESS are the banker-director's centrality measures (hypothesis 2). We also control for median industry level (using 2 digit SIC codes) and year effects. All variables are winsorized at 1% level. Robust Standard errors.*

	(1) TREATREG	(2) IV-GMM	(3) IV-GMM	(4) IV-GMM
Second Stage				
SIZE	0.0136***	0.0108***	0.0109***	0.0106***
	(11.45)	(4.79)	(4.96)	(4.13)
ROA	-0.126***	-0.116***	-0.115***	-0.119***
	(-9.66)	(-6.94)	(-6.87)	(-7.11)
TANG	0.0426***	0.0485***	0.0464***	0.0544***
	(3.32)	(3.00)	(2.92)	(3.04)
R&D RATIO	-0.199***	-0.187***	-0.188***	-0.187***
	(-7.06)	(-6.15)	(-6.28)	(-6.04)
log MARKET-TO-BOOK	-0.0299***	-0.0306***	-0.0307***	-0.0297***
	(-12.01)	(-10.27)	(-10.42)	(-9.54)
VOLATILITY	0.000451***	0.000493***	0.000501***	0.000473***
	(4.60)	(4.33)	(4.46)	(4.02)
BANKER	0.0452**			
	(2.28)			
DEGREE		0.0127**		
		(2.14)		
CLOSENESS			0.809**	
			(2.15)	
BETWEENESS				275.8*
				(1.95)
Constant	-0.0289			
	(-0.28)			
First Stage				
BOARD SIZE	0.0842***			
	(11.77)			
DISTANCE	-0.000138***			
	(-6.89)			
Constant	-7.580***			
	(-11.98)			
Controls	Yes	No	No	No
N	3962	3962	3962	3962
$\bar{R}^2$		-0.0275	0.0225	-0.254
Hansen's J		2.038	2.255	1.977
p-value		0.153	0.133	0.160
Weak Id. test		20.25	28.66	9.473

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

Table 4: *IV-GMM*

probability of having a banker on the board and the centrality of the banker on the board increase with the size of the board and decrease with the distance from the firm's headquarters to New York. In the case of board size, that could merely represent a mathematical consequence: increasing the board size automatically increases the probability of having a banker on the board due to the increase of available seats; centrality measures are expected also to increase as the number of first degree connections increases with board size. That is not so in the case of the distance to New York. Statistically, the use of these instruments seems valid as well. Both instruments are significant in the first stage regression, with the exception of Boardsize when used as instrument for the betweenness centrality measure. The Hansen's J statistics (which jointly tests for the validity of the instruments and for the appropriate exclusion of instruments in the main equation) is not rejected. The Kleibergen-Paap F statistic rejects the weak identification hypothesis of the IV regressions if compared to the Stock and Yogo (2004) critical values. Again, betweenness does not perform as well in this test as degree or closeness centrality. We also successfully test for endogeneity rejecting the use of OLS in favour of IV. Note that the coefficients of the previously documented capital structure determinants continue to be significant and have the expected sign.

In Tables 5 and 6, we test hypothesis 3 by including interactions variables between the degree centrality measure and each of the firm's opacity proxy presented before. The results are consistent with our interpretation that the presence of a banker in the firm reduces the information asymmetry. The impact of the banker's influence on the leverage ratio increases with firm opacity, i.e. the effect is weaker when other information asymmetry reduction mechanism is present. In Table 5, we analyse size and asset tangibility. We expect that bigger firms, being thoroughly scrutinized by analysts and media, are less subjected to information asymmetry problems, which reduces the impact of banker's influence. The interaction the log of total asset with our centrality measure is negative as expected, however, it is not significant (column 2). At the same time the coefficient for the centrality measure also loses its significance when comparing to the previous regression without interactions (column 1). When separating the impact of the centrality measure of the top size quartile firms from the lower quartiles(column 3), the interaction coefficient becomes significant, keeping the expected negative sign.

Firms with higher levels of tangible assets, by being able to pledge more assets as collateral, may reduce the information asymmetry risk faced by lenders. Our results indicate that the impact of the banker's social influence on leverage decreases with higher levels tangible to total assets ratio, both when interacting our centrality measure with asset tangibility (column 4) and when separating the centrality measure impact of the top tangibility quartile firms (column 5).

In Table 6, we interact the centrality measure with a dummy variable indicating if the firm is rated (column 1). The negative coefficient is coherent with our interpretation that, by providing certification, credit rating firms aim to reduce the uncertainty of the informational signals released by firms, therefore reducing the role of the banker on the information transmission mechanism. The coefficient of the interaction between degree and a dummy indicating firms belonging to the S&P500 index (column 2) has the expected negative sign but it is not significant. Our interpretation is that because firms belonging to the index are also the largest in our sample we should have the same type of effect as when

	(1) No Interaction	(2) SIZE	(3) SIZE	(4) TANGIBILITY	(5) TANGIBILITY
DEGREE	0.0120**	0.0979	0.00204***	0.0318**	0.00153***
	(2.03)	(1.04)	(2.70)	(2.14)	(2.60)
LEVEL		0.0208***	0.0154***	0.128***	0.0484***
		(3.58)	(13.51)	(3.00)	(3.13)
Interaction		-0.00648		-0.0832**	
		(-1.03)		(-2.17)	
Interaction Quartile 4			-0.00242**		-0.00271***
			(-2.57)		(-2.89)
controls	Yes	Yes	Yes	Yes	Yes
Observations	3962	3962	3962	3962	3962

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

Table 5: *Interactions between degree and information opacity proxies. IV-GMM Estimates.*

using size as a firm opacity interaction variable. As size is always present in the equation as a control, we may add only the interaction term, which yields a significant negative coefficient.

When using Amihud's illiquidity measure as a proxy for firm opacity (column 3), the interaction coefficient is negative and significant, both statistically and economically, with a standard deviation of the interaction term implying a decrease of 2.4%. The interpretation follows the same information asymmetry argument used before: the more liquid is a stock, the more informative the price is, reducing the importance of the banker on the information transmission mechanism.

The last information opacity to be considered is Accruals quality, which is measured by the standard deviations of accruals. This measure increases with firm's opacity as higher levels of accruals quality imply a greater correction of the estimates of future earnings. The coefficient of the interaction term is negative though not significant, when we would expect it to be positive. We proceeded by separating the effect of the most transparent firms, interacting the degree centrality measure with a dummy variable indicating the 25% firms with better accruals quality (lowest value of the numerical value of this variable). Looking at the last column, we can see once more that the effect of the banker's centrality on leverage is reduced for firms with better accruals quality.

Although all these measures of firm's opacity are proxies, the results point in the same direction of our hypothesis 3: the lower the level of the transparency, the smaller the impact of the influence of a banker on the leverage of a firm.

Table 7 presents the evolution of the estimated impact of the presence and influence of the banker on the leverage ratio using different sample periods. The first three columns analyse consecutive two years periods. The coefficients for both the presence and the centrality of baker-directors on the board, although positive, lose their significance in the

	(1)	(2)	(3)	(4)	(5)	(6)
	RATING	INDEX		ILLIQUIDITY	ACCRUALS	
DEGREE	0.00279***	0.00135*	0.00193***	0.0156**	0.0200*	0.00109
	(3.09)	(1.83)	(2.65)	(2.22)	(1.71)	(1.61)
LEVEL	0.0882***	-0.0364***		-0.000000257*	0.261**	0.0641
	(17.87)	(-6.89)		(-1.85)	(2.21)	(1.31)
Interaction	-0.00309***	-0.000442	-0.00214**	-0.000000153**	-0.284	
	(-2.93)	(-0.44)	(-2.26)	(-2.21)	(-1.56)	
Interaction Quartile 4						-0.00205**
						(-2.14)
controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3725	3725	3725	3772	3348	3348

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

Table 6: *Interactions between degree and information opacity proxies. IV-GMM Estimates.*

	2000 2001	2002 2003	2004 2005	pre SOX	post SOX	All Sample
BANKER	0.0321	0.0512	0.0175	0.0276	0.0409	0.0452**
	(0.91)	(1.61)	(0.54)	(1.06)	(1.46)	(2.28)
DEGREE	0.00221	0.00836	0.0187*	0.00357	0.0206**	0.0120**
	(0.22)	(0.97)	(1.86)	(0.50)	(2.13)	(2.03)
CLOSENESS	0.142	0.533	1.200	0.204	1.348**	0.765**
	(0.18)	(0.75)	(1.56)	(0.46)	(2.22)	(2.04)
BETWEENESS	46.15	95.54	415.4	140.6	320.4*	258.7*
	(0.21)	(0.60)	(1.48)	(0.66)	(1.72)	(1.84)
Observations	837	1292	1833	1335	2627	3962

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

Table 7: *IV-GMM Estimates (different sample periods)*

regressions. We deem that this is due to the smaller number of observations as most of the coefficients of the other capital structure's determinants also become non significant. We also split the sample in years before and after the enactment of Sarbanes-Oxley Act (SOX). We would expect the role of bankers to diminish after the introduction of the act, however the results indicate the opposite: the presence and centrality measures impact positively in both periods but are only significant in the period after the regulatory change enactment. Again we suspect that the different number of observations may be leading this difference in results. There is also the possibility that, due to the three years staggering rule for Boards, the impact of the regulatory change may be significant in more recent years. Nevertheless, the results in our sample indicate that the new legislation didn't impact negatively on the role of bankers in the information transmission mechanism.

These results are robust for changes in the aggregation criteria (sum of individual bankers' centrality measure), the dependent variable (book value leverage ratio) and banker definition (using SIC financial sector classification (2-digit SIC 2 [60; 70)).

5 Conclusion

Our results show the impact of bankers-directors on the capital structure of firms. After correcting for endogeneity and controling for other capital structure determinants, the presence of a banker-director is shown to significantly increase the leverage ratio of US firms. Moreover, this impact is stronger the higher the centrality of the banker on the directorship network. This suggests that bankers-directors have an essential role in the dissemination of information in the US market. The more central a banker is on the network, e.g. the more connected the banker is to other directors, the more influence he has on the information transmission, reducing information asymmetries between the firm and the credit market, consequently allowing for higher levels of leverage. This impact on the leverage ratio is reduced for less opaque firms, sustaining our interpretation of the role of bankers-directors as an information asymmetry reduction mechanism.

References

[1] Amihud, Y., 2002. Illiquidity and stock returns: cross-section and time-series effects. Journal of Financial Markets 5(1), 31-56.

[2] Chiarella, C., T. Pham, A. Sim, and M. Tan, 1992. Determinants of corporate capital structure: Australian evidence, Pacific Basin Capital Markets Research 3, 139–158.

[3] Anderson, R.C., Mansi, S.A., Reeb, D.M., 2004. Board characteristics, accounting report integrity, and the cost of debt. Journal of Accounting and Economics 37, 315–342.

[4] Baxter, N., 1967. Leverage, Risk of Ruin and the Cost of Capital, Journal of Finance 22, 395-403.

[5] Berger, A., and Udell, G., 1995. Relationship Lending and Lines of Credit in Small Firm Finance, Journal of Business 68, 351-81.

[6] Boone, A., Field, L., Karpoff, J. and Raheja, C., 2007. The determinants of corporate board size and composition: An empirical analysis, Journal of Financial Economics 85, 66-101.

[7] Booth, J.R., Deli, D.N., 1999. On executives of financial institutions as outside directors. Journal of Corporate Finance 5, 227–250.

[8] Booth, L., V. Aivazian, A. Demirgüç-Kunt, and V. Maksimovic, 2001. Capital structures in developing countries, Journal of Finance 56, 87–130.

[9] Burt, R., 1997. The contingent value of social capital. Admin. Sci. Quart. 42 339-365.

[10] Byrd, D.J., Mizruchi, M.S., 2005. Bankers on the board and the debt ratio of firms. Journal of Corporate Finance 11, 129–173.

[11] Chittenden, F., G. Hall, and P. Hutchinson, 1996. Small firm growth, access to capital markets and financial structure: Review of issues and empirical investigation, Small Business Economics 8, 59–67.

[12] Ciamarra, E., 2006. Monitoring by Afi liated Bankers on Corporate Boards: Evidence from corporate Financing Outcomes, working paper.

[13] Cohen, L, Frazzini, A. and Malloy, C. 2008. The Small World of Investing: Board Connections and Mutual Fund Returns, Journal of Political Economy, vol. 116, no. 5

[14] DeAngelo, H. and Masulis, R., 1980. Optimal Capital Structure under Corporate and Personal Taxation, Journal of Financial Economics 8, 3-29.

[15] Dechow, P.M. and I. Dichev., 2002. The Quality of Accruals and Earnings: The Role of Accrual Estimation Errors. The Accounting Review, 77 (Supplement), pp. 35-59.

[16] Diamond, D., 1984, Financial Intermediation and Delegated Monitoring, The Review of Economic Studies 51, 393-414.

[17] Doksum, K., 1974. Empirical Probability Plots and Statistical Inference for Nonlinear Models in the Two-Sample Case, The Annals of Statistics 2, 267–277.

[18] Fama, E., 1985. What's different about banks?, Journal of Monetary Economics 15, 29-39.

[19] Fan, Joseph P. H., Twite, Garry J. and Titman, Sheridan ,An International Comparison of Capital Structure and Debt Maturity Choices(October 1, 2008). AFA 2005 Philadelphia Meetings.

[20] Ferreira, M. and Matos, P., 2009. Universal Banks and Corporate Control: Evidence from the Global Syndicated Loan Market

[21] Fracassi, C. 2008. Corporate Finance Policies and Social Networks, working paper

[22] Frank, M., and Goyal, V., 2007, Trade-Off and Pecking Order Theories of Debt, The Handbook of Empirical Corporate Finance, chapter 7, Elsevier Science.

[23] Freeman, L. C., 1977. A set of measures of centrality based on betweenness. Sociometry 40:35-41.

[24] Goldman, E., Rocholl, J. and So, Jongil, 2009. Do Politically Connected Boards Affect Firm Value? Rev. Financ. Stud. 22-6, 2331-2360.

[25] Guner, B., Malmendier, U., Tate, G., 2008. Financial expertise of directors, Journal of Financial Economics, Volume 88, Issue 2, Pages 323-354

[26] Hirota, S., 1999. Are corporate financing decisions different in japan? an empirical study on capital structure, Journal of the Japanese and International economies 13, 201–229.

[27] James, C., 1987. Some evidence on the uniqueness of bank loans. Journal of Financial Economics 19, 217–235.

[28] Jensen, G., D. Solberg, and T. Zorn, 1992. Simultaneous determination of insider ownership, debt and dividend policies, Journal of Financial and Quantitative Analysis 27, 247–261.

[29] Jensen, M.C., and Meckling, W.H., 1976. Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, Journal of Financial Economics 3, 305-360.

[30] Jong, A., R. Kabir, and T. Nguyen, 2008, Capital structure around the world: The roles of firm- and country-specific determinants, Journal of Banking & Finance 32, 1954–1969

[31] Kim, E.H., 1978. A Mean-Variance Theory of Optimal Capital Structure and Corporate Debt Capacity, Journal of Finance 33, 45-63.

[32] Kracaw, W., Zenner, M., 1998. Bankers in the boardroom: good news or bad news? Working Paper, Smeal College of Business Administration, Pennsylvania State University.

[33] Kraus, A., and Litzenberger, R.H., 1973, A State Preference Model of Optimal Financial Leverage, Journal of Finance 28, 911-922.

[34] Kroszner, R.S., Strahan, P.E., 2001. Bankers on boards: monitoring, conflicts of interest, and lender liability. Journal of Financial Economics 62, 415–452.

[35] La Porta, R., Lopez-de-Silanes, F., Shleifer, A., and Vishny, R.,1998, Law and Finance, Journal of Political Economy 106, 1113-1155.

[36] Lee, J., Y. Lee, and B. Lee, 2000, The determination of corporate debt in korea, AsianEconomic Journal 14, 333–356.

[37] Lehmann, E., 1974, Nonparametrics: Statistical Methods Based on Ranks. San Francisco: Holden-Day.

[38] Leland, H., Pyle, D., 1997. Information asymmetries, financial structure and financial intermediation. Journal of Finance 32, 371–387.

[39] Lin, N. 1976 Foundations of Social Research. New York: McGraw-Hill.

[40] Linck, J.S., Netter, J.M., Yang, T., 2008. The determinants of board structure. Journal of Financial Economics, Volume 87, Issue 2, Pages 308-328

[41] Lorsch, J.W., MacIver, E., 1989. Pawns and Potentates: The Reality of America's Corporate Boards. Harvard Business School Press, Boston, MA.

[42] Mace, M.L., 1971. Directors: Myth and Reality. Harvard Business School Press, Boston, MA.

[43] Miller, M., 1977, Debt and Taxes, Journal of Finance 32, 261-275.

[44] Modigliani, F., and Miller, M., 1958, The Cost of Capital, Corporate Finance and the Theory of Investment, American Economic Review 48, 261-296.

[45] Modigliani, F., and Miller,M., 1963, Taxes and the Cost of Capital: A Correction, American Economic Review 53, 433-443.

[46] Myers, S., and Majluf, N., 1984, Corporate Financing and Investment Decisions when Firms have Information that Investors Do Not Have, Journal of Financial Economics 13, 187-221.

[47] Myers, S.,1984, The capital structure puzzle, Journal of Finance 39, 575–592.

[48] Nahapiet, J., S. Ghoshal. 1998. Social capital, intellectual capital, and the organizational advantage. Acad. Management Rev. 23(2) 242-266.

[49] Nohria, N. 1992. Information search in the creation of new business ventures. N. Nohria, R. Eccles, eds. Networks and Organizations. Harvard University Press, Cambridge, MA, 241-261.

[50] Petersen, M., and Rajan, R., 1994, The benefits of lending relationships: Evidence from small business data, Journal of Finance 49, 3–37.

[51] Raheja, C., 2005, Determinants of Board Size and Composition: A Theory of Corporate Boards. Journal of Financial and Quantitative Analysis, Vol. 40, No. 2, pp. 283-306

[52] Rajan, R., and L. Zingales, 1995, What do we know about capital structure? some evidence from international data, Journal of Finance 50, 1421–1460.

[53] Ross, S., 1973, The Economic Theory of Agency: The Principal's Problem, The American Economic Review 63, 134-139.

[54] Sabidussi, G. (1965). The centrality index of a graph. Psychometrika, 31: 581-603.

[55] Schumpeter, J., 1939, Business Cycles, McGraw-Hill.

[56] Shane, Scott, and Daniel Cable. 2002. Network Ties, Reputation, and the Financingof New Ventures. Management Science 48:364–81.

[57] Shenoy, C., and P. Koch, 1996, The firm's leverage-cash flow relationship, Journal of Empirical Finance 2, 1–19.

[58] Stecher, J. and Grønnevet, G., 2009, Credit Markets, Board Size and Board Composition, working paper.

[59] Stiglitz, J.E., 1972, A Re-Examination of the Modigliani-Miller Theorem, American Economic Rev59, 784-793.

[60] Titman, S., and R. Wessels, 1988, The determinants of capital structure choice, Journal of Finance 43, 1–19.

[61] Wijst, N., and R. Thurik, 1993, Determinants of small firm debt ratios: An analysis of retail panel data, Small Business Economics 5, 55–65

[62] Williamson, O.E., 1988. Corporate finance and corporate governance. Journal of Finance 63, 567–591.