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Banks' centrality in corporate interlock networks: evidences in Italy

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Abstract

The idea that the governance mechanisms affect firms' performance is well acknowledged in management literature. The settings prevailing in governance studies explain board's roles at the light of the agency theory framework. However, a complementary perspective is focused on the acquisition of critical resources closely related to activation of external relations with the most influential actors of firm's environment. One such kind of external relationship is called interlocking directorates and occur when an individual simultaneously sits on the board of two companies.

Moreover, since banks control financial capital, that is a resource that has a universal value for all firms, they are more likely to be very important actors inside corporate networks.

By analyzing interlocking directorates among listed banks and non financial firms in Italy, using the methods and theory of social network analysis (SNA), I find that banks are the most influential actors in the network and that centrality in the network enhances financial performance.

Keywords: Corporate Governance, Board of Directors, Performance, Social network analysis.

JEL Classification: G34, L20.

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1. Introduction

The idea that governance mechanisms affect firms' performance is well acknowledged in management literature. Board of director (BoD) is one of the most important mechanisms of governance (Donaldson and Davis, 1991; Williamson, 1985; Mintzberg, 1983).

According to Fama (1980), BoD "is viewed as a market induced institution, the ultimate internal monitor of the set of contracts called a firm, whose most important role is to scrutinize the highest decision makers within the firm".

The settings prevailing in governance studies explain BoD's roles at the light of the agency and managerial theories framework (Fama and Jensen 1983; Jensen and Meckling 1976; Berle and Means, 1932). However, a complementary perspective is focused on the contingency concept and on the acquisition of critical resources closely related to activation of external relations with the most influential actors of firm's environment. Grandori (1997) argues that governance mechanisms are bundled in specific ways to handle specific transactions and activities. Lawrence and Lorsch (1967) have stressed the notion of fit, typically among organizational and governance structures and environmental conditions.

One such kind of external relationship is called interlocking directorates and occur when an individual simultaneously sits on the BoD of two companies (Mizruchi, 1996).

Interlocking directorates have important implications for the structure and effective functioning of BoD, which in turn have an important role to play in corporate governance and company performance (Hermalin and Weisbach, 2003). In this sense, Yeo, Pochet and Alcouffe (2003) find a positive relationship between the number of CEOs reciprocal interlocks and their firms' performance measured by ROA.

According to network literature (Uzzi, 1997; Burt, 1992; Coleman, 1988; Granovetter, 1973) and strategic management literature (Gnyawali, He and Madhavan, 2006; Echols and Tsai, 2005; Zaheer and Bell, 2005; Gnyawali and Madhavan, 2001; Gulati, Nohria and Zaheer, 2000; Gulati, 1999), not only the number of interlock but also the structure of these relationships could affect firms' competitive behavior and performance.

Following Mac Canna, Brennan and O'Higgins (1998), primary to the paper is the idea that the network of interlocking directorates among banks and other firms is structured and not the result of random processes.

More in detail, the objective of this paper is to look at the incidence of interlocking directorates in Italian firms and to examine the effects of the structure of such interlocks on performance. By analyzing interlocking directorates among listed banks and non financial firms in Italy, using the methods and theory of social network analysis (SNA), this study aims to verify that banks are the most influential actors in the network and that centrality in the network enhances their financial performance.

To my knowledge, this would be the first systematic study of the relationships among structure of interlocking directorates and performance in Italy.

The study proceeds as follows.

In the first section I develop theory and hypotheses. Following I outline my study setting and methodology, and present results. Finally, I present implications, limits and conclusions.

2. Theory and hypotheses

The belief that the improvement of governance systems can contribute to increase corporate performance is an important condition for the study of BoDs. More and more importance is

being given in literature to the study of the characteristics of BoDs and to the consequences of such characteristics in terms of overall performance.

Several studies argue that the effectiveness of corporate governance depends to a large extent on structures and on decisional mechanisms of BoDs (Carretta, Regalli and Schwizer, 2006; Forbes and Milliken, 1999; Jensen, 1993; Provan, 1980; Mace, 1971).

Structure and functioning of BoD are important topics, which have been vested, over the years, with increasingly broad and complex tasks, ranging from setting strategic development guidelines to guiding and supervising the performance of management. An unreliable BoD determines investor distrust and, consequently, the increased cost of capital.

BoD, therefore, is an institution that can help to limit management-related agency problems, which primarily concern conflicts of interest between the ownership and the management of a business, and represents a key governance mechanism for making sure that the objectives of the shareholders and those of the management are kept in line (Freeman, 1984; Fama and Jensen, 1983; Jensen and Meckling, 1976).

Over the years, however, a complementary perspective sees BoD in a systemic way, within a network of relations with the most influential actors of firm's environment (Grandori and Carpani, 2004; Child and Rodriguez, 2003; Mintz and Schwartz, 1985; Pfeffer and Salancik, 1978; Levine, 1972). In this perspective, interlocking directorates can assume different meanings depending on the interpretive model (Bianco and Pagnoni, 1997):

- managerial model;
- class cohesion model;
- control model;
- financial capital model;
- resource-dependency model.

From a managerial point of view, the autonomy between ownership and management implies that can not be attributed a particular mean to interlocking directorates since structural links between BoDs can in any way influence the decisions of management (Mace, 1971).

According to the class cohesion model, however, interlocking directorates represent an instrument for the strengthening of class relationships aimed to the formation of a “corporate elite” (Scott, 2003).

The control model sees the interlocking directorates as the result of a particular structure of the economic system at the heart of which lies an actor which exercises the control of the other actors, typically a bank.

Furthermore, the model of financial capital recognizes the greater power of banks due to the greater control of financial capital flows within the belonging network (Mintz and Schwartz, 1985; Levine, 1972).

Finally, the resource-dependency model sees interlocking directorates aimed to the achievement of mutual interests for firms (Pennings, 1980), allowing the reinforcement of social capital and the access to knowledge circuits.

If it is true that the need to activate relations grows when resource-dependency increases, then networking activity is a necessary relational strategy.

According to Pfeffer (1972) interlocking directorates have at least the following benefits / implications: i) ties allow to establish relationships and alliances with other firms, ii) ties allow to acquire information on markets and competitors, iii) ties allow to have a privileged access to resources, iv) ties allow to face possible threats, iv) ties allow to influence the activities and the strategies of other firms.

In particular, from banks’ perspective, if the enforcement of contracts is poor and obtaining information about borrowers is costly lending interlocking directorates are a way for banks to

reduce asymmetries of information and monitoring costs. From firms' perspective, interlocking directorates could be useful in case of credit rationing and of limited substitutes for it.

Theoretically, according to financial capital, control and resource-dependency perspectives, banks should have the higher power of influence than the other firms. Effectively, Allen (1974) observes that banks have more interlocking directorates compared with other firms. Moreover, Kotz (1978) states that banks, as shareholders and creditors, can exercise a significant influence in the decisions of the bodies of government of other firms. Furthermore, since resource-dependency becomes greater during the periods of crisis, it is in these moments that banks may play a central role in the decision-making of firms.

However, Davis and Mizruchi (1999), through an analysis of comprehensive data on the BoDs of the fifty largest banks and their connections with the several hundred largest non-bank corporations from 1982 to 1994, show that the centrality of banks has significantly declined during that period as consequence of banks' strategic choices.

Based on these arguments, it is possible that banks, by virtue of the greater control of environmental key resources, are the most central players in the network of interlocking directorates activated with the BoDs of other firms. Thus:

H1: Banks are the most central players in the network of interlocking directorates formed with other firms.

Could the greater centrality positively affect performance? If networks provide channels for the exchange of information and resources then central firms can use these channels to reach key information and resources that enhance, from one side, the knowledge about strategies

and resources of competing firms, even in the absence of any asset flows (Harrigan, 1986) and, from the other side, power (Gnyawali and Madhavan, 2001; Wasserman and Faust, 1994; Burt, 1980).

Actors occupying central positions in a network are viewed as potentially powerful because of their greater access to and possible control over relevant resources and several studies have shown that differential access to network resources leads to different performance levels. A substantial body of literature has analyzed both the contingencies under which one network structure is more beneficial relative to the other (Burt, 2007; Soda, Usai and Zaheer, 2004; Ahuja, 2000; Rowley, Behrens and Krackhardt, 2000; Podolny 1993) and the relations between firms' network position (deriving from ties with other firms) and performance (Almeida, Dokko and Rosenkopf, 2003; Lee, Lee and Pennings, 2001; Powell, Koput, Smith-Doerr and Owen-Smith, 1999; Stuart, 2000).

In synthesis, relationships in a network are potential sources of firm internal resources (Langlois, 1992; Nohria, 1992), whose effectiveness is dependent by network structure (Burt, 1992) and by internal capabilities (McEvily and Zaheer, 1999). Following, quality and relevance of information and resources deriving from favourable networks positions can improve a firm's performance (Cross and Cummings, 2004).

In fact, an important feature of network ties is that they operate as "pipelines" through which information' and resources' flows are exchanged among firms (Owen-Smith and Powell, 2004). The strategic contingencies and resource dependency frameworks (Hickson, Butler, Cray, Mallory and Wilson, 1971; Salancik and Pfeffer, 1977) posit that power derives from the control of relevant resources. This concept of control by one single actor implies that others in the network have few alternative sources for acquiring the resource, such that the actor controls or mediates others' access to the resource.

Centrality in the network is the extent to which an actor controls or is deeply involved in these network flows (Gnyawali and Madhavan, 2001; Wasserman and Faust, 1994; Burt, 1980).

If networks provide channels for the exchange of information and resources then central firms can use these channels to reach key information and resources that enhance, from one side, the knowledge about strategies and resources of competing firms, even in the absence of any asset flows (Harrigan, 1986) and, from the other side, power (Gnyawali and Madhavan, 2001; Wasserman and Faust, 1994; Burt, 1980).

Actors occupying central positions in a network are viewed as potentially powerful because of their greater access to and possible control over relevant resources (Boje and Whetten, 1981).

Central firms enjoy advantages from network position also because their resource superiority reduces competitors' likelihood of response (Chen, 1996) as less central competitors will find it more difficult and costly to give a response because their limited information set. In addition, since central competitors are more prestigious and more powerful, other firms are less likely to want to provoke them.

In this sense, from a greater centrality should derive an increased possibility of controlling all potential flows of resources (e.g., information and capital) and an increased performance.

Thus:

H2: Bank's performance is positively related to centrality.

3. Data and variables

The sample consists of all firms listed on the Italian Stock Exchange in 2006 with the exception of Expandi market (collectively relationships between 255 firms are analyzed). To verify the hypothesis H1 I used a sub-sample formed by listed banks and insurance companies. To verify the hypothesis H2 the former sub-sample was restricted to 30 banks

(without insurance companies). The analysis of the relationship between BoDs is based on the use of CONSOB's data while the performance of banks was calculated using Bankscope's data referred to year 2006.

The analysis of the performance of banks is based on ROE and ROA measures, commonly used in literature (Goddard, Molyneux and Wilson, 2004; Molyneux, 2003; Demirguc-Kunt and Huizinga, 2000; Berger, 1995).

In addition, in order to measure banks' power of influence (given by the centrality in the network of interlocking directorates), I used the technique of social network analysis (Wasserman and Faust, 1994; Mitchell, 1969). Using a social network analysis software, UCINET VI (Borgatti, Everett and Freeman, 2002), I applied this technique in order to describe the structure of the network, through the following indicators: i) number of connections of each actor (degree) and ii) centrality of each actor in the network (betweenness).

The degree of individual players in the network is important because it reveals the number of connections that are activated for each subject and, consequently, the size of individual relationships.

However, the information on the degree is not in itself sufficient to determine the importance of the actors. To determine the importance of an actor in connecting other players in the network means, in fact, to analyze the degree of intervention, that is the frequency with which each actor is on the minimum path between other players.

Betweenness refers to how often an actor in the network is the shortest route to reach the other players, regardless of the direction of the relationship (in or out). Betweenness for a given actor i is calculated to sum up the number of geodesic paths between two distinct actors, j and k that pass through i . Increasing the value given to the centrality measure also

increases the likelihood that the plaintiff will be able to influence the interaction between the other players.

4. Analysis

Checking the hypothesis that banks are the most central players in the network of interlocking directorates among listed companies (H1) is based on the observation and the comparison of the indicators related to degree and betweenness. In particular, the hypothesis H1 is verified if degree and betweenness of banks and insurance companies are greater than degree and betweenness of the other firms.

Checking the hypothesis that the performance of banks is positively influenced by the centrality in the network of reference (H2) is based on the construction of an appropriate model of analysis. In detail, following relations should be verified:

$$(1) ROE = \beta_0 + \beta_1 LN_ASSET + \beta_2 EQUIT_TA + \beta_3 COSTINCO + \beta_4 CENTRAL + \varepsilon$$

$$(2) ROA = \beta_0 + \beta_1 LN_ASSET + \beta_2 COSTINCO + \beta_3 CENTRAL + \varepsilon$$

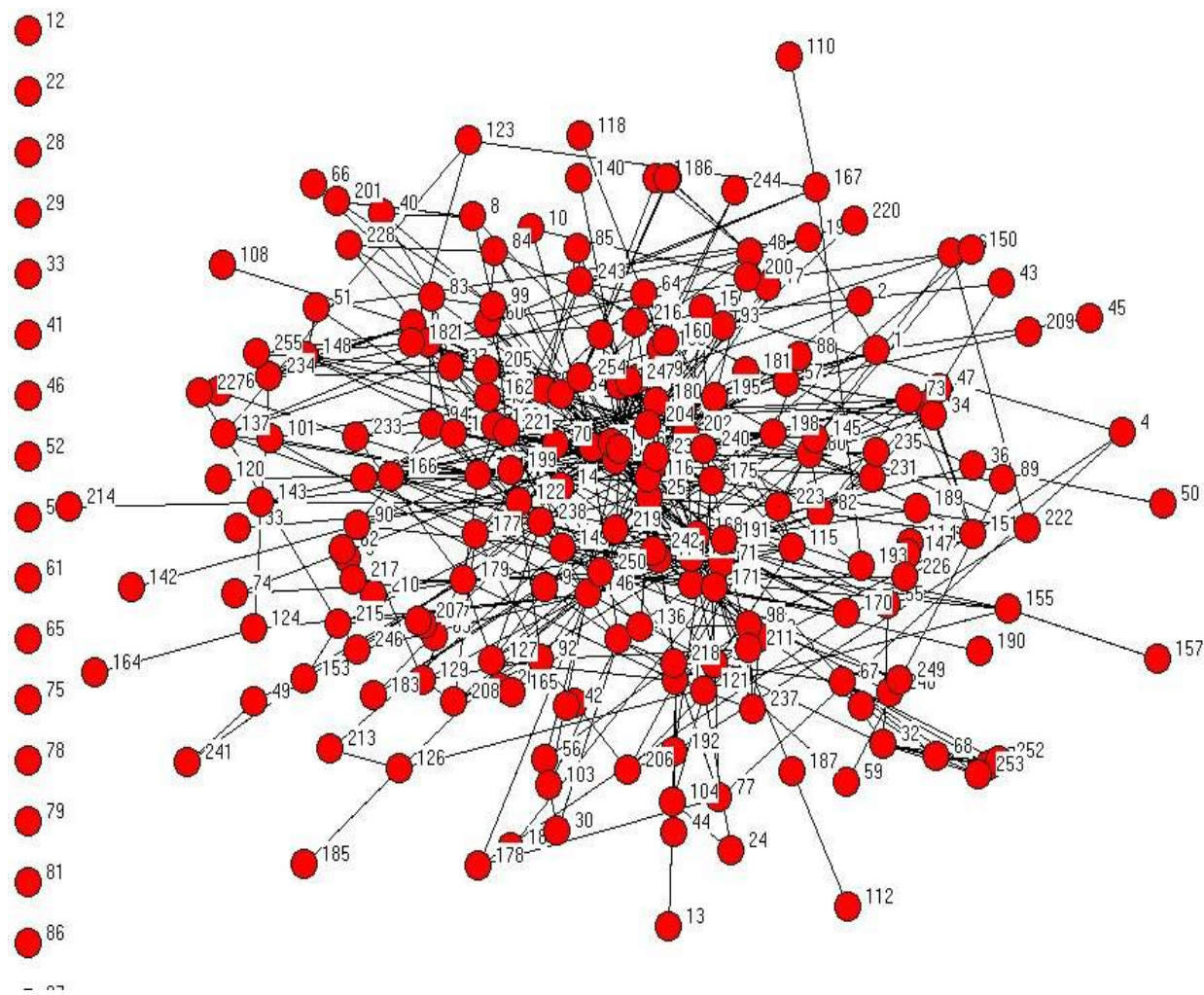
In the models it is identified: with the variable ROE the ratio between net income and equity; with the variable ROA the ratio between net income and total assets; with the variable LN_ASSET the logarithm of total assets, which expresses the size of the bank; with the variable EQUIT_TA the weight of equity on total assets (book value), which is an indicator of the bank's financial leverage (adequacy of capital); with the variable COSTINCO the level of efficiency of the bank; with the variable CENTRAL the degree of centrality (betweenness) of the bank. In response, hypothesis H2 is verified if:

- in model 1, coefficient β_4 is positive and statistically significant;
- in model 2, the coefficient β_3 is positive and statistically significant.

5. Results

Following figure shows the graphic representation of the network structure for the 255 firms listed in Italian Stock Exchange (Figure 1).

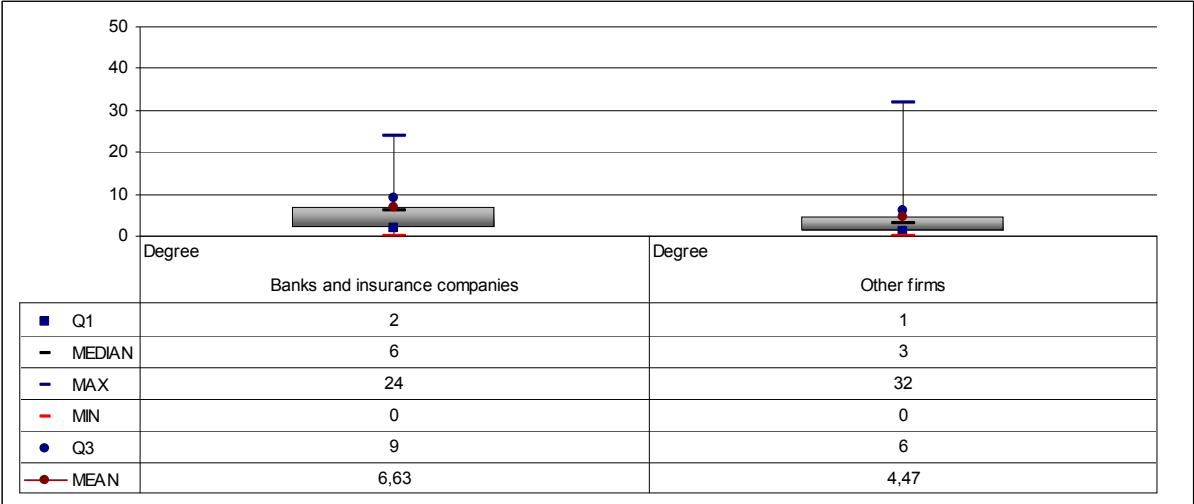
Figure 1 – Network structure



The hypothesis H1 is verified as banks and insurance companies are characterized by a greater number of connections and by a superior centrality.

In particular, the degree of individual players in the network shows how banks are connected to a larger number of actors (Figure 2).

Figure 2 – Degree



Degree of banks and insurance companies is also due to the greater BoD size and to the larger presence of BoD members with more than one appointment (Figures 3 and 4).

Figure 3 – BoD members

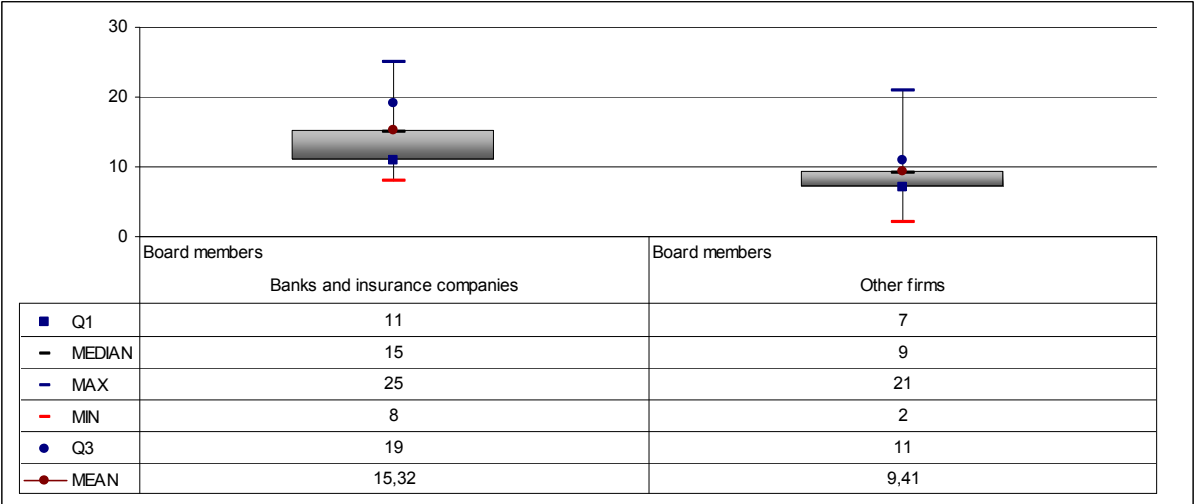
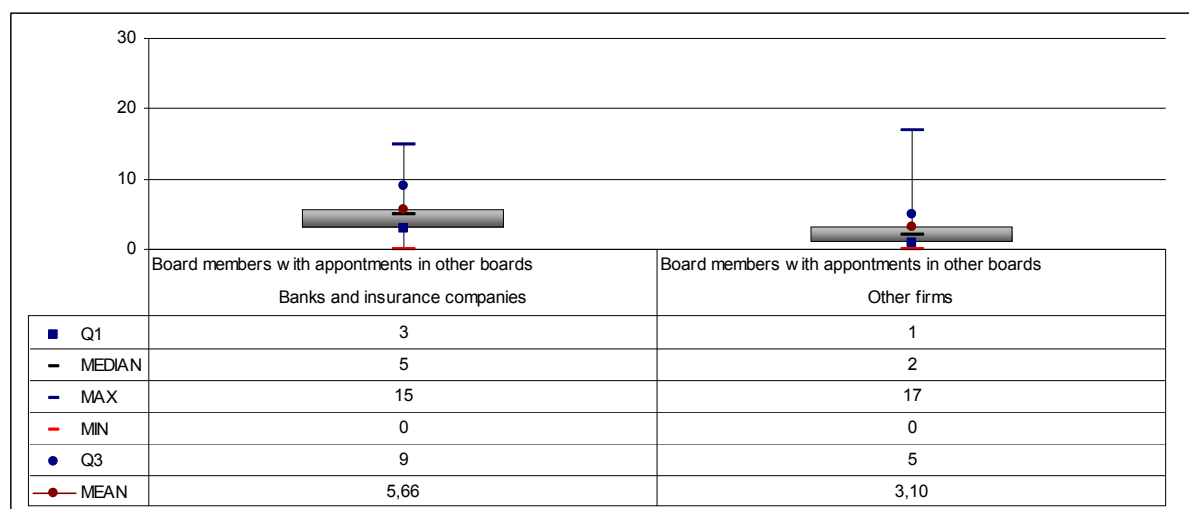
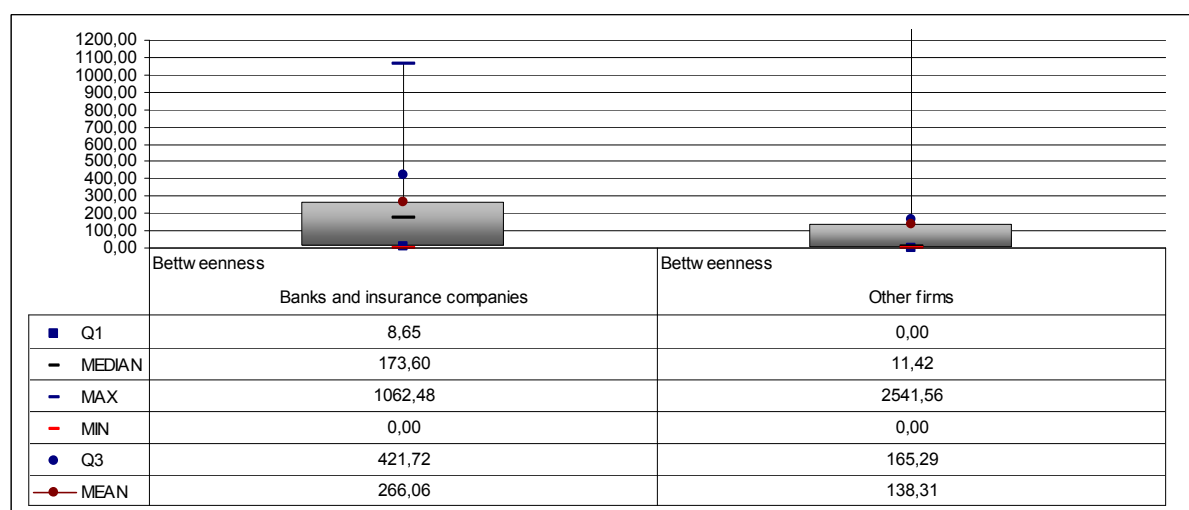


Figure 4 - BoD members with appointments in other BoDs



However, in order to verify the importance of the actors in connecting other players in the network, it should also be analyzed the frequency with which each actor is on the minimum path between other actors (betweenness). Even in this case, banks are, on average, in the shortest route to reach the other players. This high level of centrality shows a greater ability to influence interactions in the network. This role may get greater importance in the network because warrants, in the relational space, the ability to control resources and the possibility to connect subgroups (Figure 5).

Figure 5 – Betweenness



Moreover, the regression models 1 and 2 seem to confirm (even if only partially, since in the model 1 β_4 is positive but not significant) the hypothesis H2 on the existence of a relationship among centrality and banks' financial performance.

Table 1 presents means, standard deviations and correlations among variables included in the analysis.

Table 1 - Mean, Standard Deviations, and Correlations

	Mean	Std. Deviation	1	2	3	4	5
ROE	11,6	8,168907					
ROA	1,067333	0,989563	0,629914				
LN_ASSET	16,96624	1,671506	-0,13908	-0,42716			
COSTINCO	62,9	19,71408	-0,40752	-0,63431	0,152377		
EQUIT_TA	0,109936	0,147926	-0,19476	0,539542	-0,30335	-0,55152	
CENTRAL	156,6	195,252	0,151621	0,348257	0,064285	-0,21415	0,269431

The summary information relating to the models 1 and 2 are shown in the following table (Table 2).

Table 2 – Regression results

<i>Variables</i>	<i>ROE</i>		<i>ROA</i>	
	<i>(Model 1)</i>		<i>(Model 2)</i>	
	<i>Coefficients</i>	<i>VIF</i>	<i>Coefficients</i>	<i>VIF</i>
LN_ASSET	-1,2902** (0,730)	1,129991	-0,21556** (,077)	1,034194
COSTINCO	-0,30078** (0,070)	1,446826	-0,02626** (,007)	1,079423
EQUIT_TA	-0,40415** (9,890)	1,626359		
CENTRAL	0,0088 (0,006)	1,11335	0,001316* (0,001)	1,058736
<i>Constant</i>	55,47384** (13,628)		6,170626** (1,305)	
<i>Size of the sample</i>	30		30	
<i>R</i>	0,507		0,578	
<i>R² Adjusted</i>	0,428		0,529	
<i>F Statistic</i>	6,426**		11,863**	

** Significant at 5% level

* Significant at 10% level

In model 1, the coefficient of the variable CENTRAL, although positive, is not very significant and therefore it is impossible to fully confirm the original hypothesis (H2). The coefficients of the other explanatory variables for the model 1 are, however, all significant at the level of 5% and the signs are consistent with expectations.

The value R^2 adjusted for the model 1 is 0,428 while the F statistic is 6,426 and confirms the significance of the model. The values reported for the statistic Variance Inflation Factor (VIF) indicate the absence of multi-collinearity between the explanatory variables of the model 1.

In model 2, the coefficient on the variable CENTRAL is positive and significant at the 10% level and this confirms the original hypothesis (H2). As in the case of model 1 also coefficients for the other explanatory variables considered for the model 2 are all significant at the 5% level and the signs are consistent with expectations.

The value R^2 adjusted for this model is 0,529 while the F statistic is equal to 11,863. Finally, the values of the statistic Variance Inflation Factor (VIF) indicate in this case, the absence of multi-collinearity between explanatory variables.

6. Conclusions

This study gives a contribution to governance literature by investigating the relations of influence in the Italian corporate network and their effects on performance and results shows favourable evidences for banks. In further detail I suggest a systemic vision of governance that sees firms not as isolated individuals but as actors belonging to a network of relationships that contribute to define governance mechanisms.

By considering the social processes that underlie the formation of interlocking directorates among banks and other firms I examined performance's consequences for banks in terms of opportunities that they can extract from their network-building activities. Results provide evidence that banks benefit from their positions within networks.

Based on the assumption that the power depends not only by the number of connections activated but also by the quality, these results show how the centrality in the network gives a positive and significant contribution to the performance in financial industry.

Moreover, according to financial capital, control and resource-dependency perspectives, the relationships between banks and other firms are characterized mainly by the firms' dependence on banks since they are greater control of financial capital.

In greater detail, two evidences can be observed: i) banks are actually the players which hold the greater power of influence in the network of interlocking directorates formed with other firms; ii) the contribution given by the quality of network ties on the overall performance of banks is positive and significant.

However, this study has several limitations.

First, I concentrate only on one type of interorganizational relations but the analysis of the Italian corporate network should be enriched by adding data about ownership ties and other relations (supplier relations, customer relations, etc.) among banks and firms.

Second, rather than taking a snapshot of the Italian corporate network in 2006, it would be preferable to study its evolution a larger period.

Finally, although the primary focus of my analysis was effects of network position on banking performance, other important questions could be raised. In particular, an interesting area for future research is the way through which changes that occur in competitive environment determine changes of banks' position in corporate network.

References

- Ahuja, G. (2000). Collaboration networks, structural holes and innovation: a longitudinal study. *Administrative Science Quarterly*, 45, 425-455.
- Allen, M.P. (1974). The structure of interorganizational elite cooptation: interlocking corporate directorates. *American Sociological Review*, 39, 393-406.
- Almeida, P., Dokko, G. & Rosenkopf, L. (2003). Startup size and the mechanisms of external learning: increasing opportunity and decreasing ability? *Research Policy*, 32, 301-315.
- Berger, A.N. (1995). The profit-structure relationship in banking - tests of market-power and efficient-structure hypotheses. *Journal of Money, Credit and Banking*, 27, 404-431.
- Bianco, M. & Pagnoni, E. (1997). Interlocking directorates across listed companies in Italy: the case of banks. *Banca Nazionale del Lavoro Quarterly Review, Special Issue on Property, Control and Corporate Governance of Banks*, March, 215-244.
- Boje, D.M. & Whetten, D.A. (1981). Effects of organizational strategies and constraints on centrality and attributions of influence in interorganizational networks. *Administrative Science Quarterly*, 26, 378-395.
- Borgatti, S. P., Everett, M. G. & Freeman, L. C. (1992). Ucinet IV: network analysis software. *Connections*, 15, 12-15.
- Burt, R.S. (1980). Actor interests in a social topology: foundations for a structural theory of action. *Sociological Inquiry*, 49, 107-132.
- Burt, R.S. (1992). *Structural holes: the social structure of competition*. (Cambridge, MA: Harvard University Press)
- Burt, R.S. (2007). Secondhand brokerage: evidence on the importance of local structure for managers, bankers and analysts. *Academy of Management Journal*, 50, 119-148.

- Carretta, A., Regalli, M. & Schwizer, P. (2006). Indipendenza significa competenza? Un'analisi del funzionamento dei board dopo il SOA. (Paper presented 29° AIDEA conference, Rome).
- Chen, M.J. (1996). Competitor analysis and interfirm rivalry: toward a theoretical integration. *Academy of Management Review*, 21, 100-134.
- Child, J. & Rodriguez, S.B. (2003). Corporate governance and new organizational forms: issues of double and multiple agency. *Journal of Management and Governance*, 7, 337-360.
- Coleman, J.S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, 95–120.
- Cross, R. & Cummings, J.N. (2004). Tie and network correlates of individual performance in knowledge-intensive work. *Academy of Management Journal*, 47, 928–937.
- Davis, G.F. & Mizruchi, M.S. (1999). The money center cannot hold: commercial banks in the U.S. system of corporate governance. *Administrative Science Quarterly*, 44, 215-239.
- Demirguc-Kunt, A. & Huizinga, H. (2000). Financial structure and bank profitability. Policy Research Working Paper 2430, World Bank.
- Donaldson, L. & Davis, J.H. (1991). Stewardship theory or agency theory: CEO governance and shareholder returns. *Australian Journal of Management* 16, 49-64.
- Echols, A. & Tsai, W. (2005). Niche and performance: the moderating effect of network embeddedness. *Strategic Management Journal*, 26, 219-238.
- Fama, E.F & Jensen, M. (1983). Separation of ownership and control. *Journal of Law and Economics*, 26, 301-326.
- Fama, E.F. (1980), Agency Problems and the Theory of the Firm. *Journal of Political Economy*, 88, 288–307.

- Forbes D.P. & Milliken F.J. (1999). Cognition and corporate governance: understanding boards of directors as strategic decision-making groups. *Academy of Management Review*, 24, 489-505.
- Freeman, L.C., (1979). Centrality in social networks: conceptual clarification. *Social Networks*, 1, 215-239.
- Freeman, R.E. (1984). *Strategic management: a stakeholder approach*. (Boston: Pitman)
- Gnyawali, D. R., He, J. & Madhavan, R. (2006). Impact of co-opetition on firm competitive behavior: an empirical examination. *Journal of Management*, 32, 507-530
- Gnyawali, D.R. & Madhavan, R. (2001). Cooperative networks and competitive dynamics: a structural embeddedness perspective. *Academy of Management Review*, 26, 431–45.
- Goddard, J.A., Molyneux, P., Wilson, J.O.S. (2004) The profitability of European banks: a cross-sectional and dynamic panel analysis. *Manchester School*, 72, 363-381.
- Grandori, A. & Carpani, S. (2004). Reti interaziendali e corporate governance. *Economia & Management*, 6, 99-110.
- Grandori, A. (1997). Governance structures, coordination mechanisms, and cognitive models. *Journal of Management and Governance*, 1, 29-47.
- Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology*, 78, 1360-1380.
- Gulati, R. (1999). Network location and learning: the influence of network resources and firm capabilities on alliance formation. *Strategic Management Journal*, 20, 397-420.
- Gulati, R., Nohria, N. & Zaheer A. (2000). Strategic networks. *Strategic Management Journal*, 21, 203–215.
- Harrigan, K.R. (1986). *Managing for joint venture success*. (Massachusetts: Lexington Books)

- Hermalin, B.E., & Weisbach, M.S. (2003). Boards of directors as an endogenously determined institution: a survey of the economic literature. *Economic Policy Review*, 9, 7-26.
- Hickson, D.J., Butler, R.J., Cray, D., Mallory, G.R. & Wilson, D.C. (1986). *Top decisions: strategic decision making in organizations*. (San Francisco: Jossey-Bass)
- Jensen, M. & Meckling, W.H. (1976). Theory of the firm: managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3, 303-360.
- Jensen, M. (1993). The modern industrial revolution, exit and the failure of internal control systems. *Journal of Finance*, 7, 831-80.
- Kotz, D.M. (1978). *Bank control of large corporations in the United States*. (Berkeley: University of California Press)
- Langlois, R.N. (1992). Transaction-cost economics in real time. *Industrial and Corporate Change*, 1, 99 - 127.
- Lawrence, P.R. and Lorsch J.W. (1967). Differentiation and Integration in Complex Organizations, *Administrative Science Quarterly*, 12, 1-47.
- Lee, C., Lee, K. & Pennings, J.M. (2001). Internal capabilities, external networks, and performance: a study on technology-based ventures. *Strategic Management Journal*, 22, 615–640.
- Levine, J.H. (1972). The sphere of influence. *American Sociological Review*, 37, 14-27.
- Mac Canna L., Brennan N. & O’Higgins (1998). National networks of corporate power: an Irish perspective. *Journal of Management and Governance*, 2, 357-379.
- Mace, M. (1971). *Directors, myth and reality*. (Boston: Harvard Business School Press)
- McEvily, B. & Zaheer, A. (1999). Bridging ties: a source of firm heterogeneity in competitive capabilities. *Strategic Management Journal*, 20, 1133–1156.
- Mintz, B. & Schwartz, M. (1985). *The power structure of American business*. (Chicago: Chicago University Press)

- Mintzberg, H. (1983). *Structure in fives: designing effective organizations*. (New Jersey: Prentice-Hall)
- Mitchell, J.C. (1969). *Social networks in urban situations*. (Manchester: Manchester University Press)
- Mizruchi, M.S. (1996). What do interlocks do? An analysis, critique and assessment of research on interlocking directorates. *Annual Review of Sociology*, 22, 271-299.
- Molyneux, P. (2003) Does size matter? Financial restructuring under Emu. EIFC - Technology and Finance Working Papers 03-30.
- Nohria, N. (1992). Is a network perspective a useful way of studying organizations? (In N. Nohria & R.G. Eccles (Eds.), *Networks and organizations: structure, form, and action*. Boston: Harvard Business School Press.)
- Owen-Smith, J. and W.W. Powell (2004). 'Knowledge networks as channels and conduits: the effects of spillovers in the Boston biotechnology community. *Organization Science*, 15, 5-21.
- Pennings, J. M. (1980). *Interlocking directorates*. (San Francisco: Jossey-Bass)
- Pfeffer, J. & Salancik, G.R. (1978). *The external control of organizations*. (New York: Harper & Row)
- Pfeffer, J. (1972) Size and composition of corporate boards of directors: the organisation and its environment. *Administrative Science Quarterly*, 17, 218-228.
- Podolny, J. (1993). A status-based model of market competition. *American Journal of Sociology* 98, 829–872.
- Powell, W.W., Koput, K. W., Smith-Doerr, L. & Owen-Smith, J. (1999). Network position and firm performance: organizational returns to collaboration in the biotechnology industry. *Research in the sociology of organizations*, 16, 129–159.

- Provan, K.G. (1980). Board power and organizational effectiveness among human service agencies. *Academy of Management*, 23, 221-236.
- Rowley, T., Behrens, D. & Krackhardt, D. (2000). Redundant governance structures: an analysis of structural and relational embeddedness in the steel and semiconductor industries. *Strategic Management Journal*, 21, 369-286.
- Salancik, G.R. & Pfeffer J. (1977). Who gets power and how they hold on to it: a strategic contingency model of power. *Organizational Dynamics*, 5, 3-21.
- Scott, W.R. (2003). *Organizations: rational, natural and open systems*. (Englewood Cliffs, NJ: Prentice Hall)
- Soda, G., Usai, A. & Zaheer, A. (2004). Network memory: the influence of past and current networks on performance. *Academy of Management Journal*, 47, 893–906.
- Stuart, T.E. (2000). Interorganizational alliances and the performance of firms: a study of growth and innovation rates in a high-technology industry. *Strategic Management Journal*, 21, 791–811.
- Uzzi, B. (1997). Social structure and competition in interfirm networks. *Administrative Science Quarterly*, 42, 35–67.
- Wasserman, S. & Faust, K. (1994). *Social network analysis*. (Cambridge: Cambridge University Press)
- Williamson, O.E. (1985). *The economic institutions of capitalism*. (New York: The Free Press)
- Yeo, H.Y., Pochet, C. & Alcouffe, A. (2003). CEO reciprocal interlocks in French corporations. *Journal of Management and Governance*, 7, 87-108.
- Zaheer, A. & Bell, G. (2005). Benefiting from network position: firm capabilities, structural holes, and performance. *Strategic Management Journal*, 26, 809-825.

Appendix

N.	Name	Degree	Betweenness
1	ACEA	6	262
2	ACEGAS	2	0
3	ACOTEL	1	0
4	ACQUE POTABILI	3	0
5	ACSM	1	0
6	ACTELIOS	6	368
7	AEDES	9	176
8	AEM	4	69
9	AEROPORTO DI FIRENZE	5	97
10	AEROPORTO VENEZIA	2	16
11	ALERION	14	853
12	ALGOL	0	0
13	ALITALIA	1	0
14	ALLEANZA ASSICURAZIONI	13	965
15	AMGA	6	380
16	AMPLIFON	4	28
17	ANIMA SGR	3	34
18	ANSALDO STS	1	0
19	ARNOLDO MONDADORI EDITORE	4	13
20	ART'E	1	0
21	ASM BRESCIA	8	282
22	AS ROMA	0	0
23	GENERALI	15	684
24	ASTALDI	2	0
25	AUTOGRIL	16	613
26	AUTOSTRADA TORINO MILANO	3	8
27	AUTOSTRAD SPA	18	963
28	AZIENDA ENERGETICA METROPOLITANA TORINO	0	0
29	AZIMUT	0	0
30	CARIGE	2	0
31	FIDEURAM	8	447
32	BANCA FINNAT	7	174
33	BANCA IFIS	0	0
34	BANCA INTERMOBILIARE DI INVESTIMENTI E GESTION	6	47
35	BANCA INTESA	9	223
36	BANCA ITALEASE	4	210
37	BANCA LOMBARDA E PIEMONTESE SPA	7	254
38	BANCA MPS	5	139
39	BNL	16	1.019
40	BANCA PICCOLO CREDITO VALTELLINESE SOCIETA' COOPERATIVA	3	4
41	BANCA POPOLARE DELL'ETRURIA E DEL LAZIO	0	0
42	BANCA POPOLARE DI INTRA SOCIETA' COOPERATIVA PER AZIONI	1	0
43	BPM	2	11
44	BANCABANCA POPOLARE DI SPOLETO SPA	1	0
45	BPI	1	0
46	BANCA PROFILO	0	0
47	BPU	2	18
48	BANCO DI DESIO E DELLA BRIANZA SPA	6	68
49	BANCO DI SARDEGNA SPA	2	67
50	BPVN	1	0
51	BASIC NET	3	17
52	BASTOGI	0	0
53	BEGHELLI	6	110
54	BENETTON	16	449
55	BENI STABILI	3	151
56	BIESSE	2	10
57	BIPIELLE INVESTIMENTI	6	462
58	BOERO BARTOLOMEO	0	0

N.	Name	Degree	Betweenness
59	BONIFICA TERRENI FERRARESI E IMPRESE AGRICOLE SPA	2	15
60	BREMBO	5	21
61	BRIOSCHI FINANZIARIA	0	0
62	BULGARI	1	0
63	BUONGIORNO VITAMINIC	2	0
64	BUZZI UNICEM	5	58
65	CAD IT	0	0
66	CAIRO COMMUNICATION	1	0
67	CALTAGIRONE EDITORE	8	516
68	CALTAGIRONE SPA	6	31
69	CAMFIN CAM FINANZIARIA SPA	15	607
70	CAPITALIA	13	190
71	CARRARO	8	14
72	CASSA RISPARMIO FIRENZE	8	438
73	CDB WEB TECH SPA	7	61
74	CDC POINT	2	31
75	CEMBRE SPA	0	0
76	CEMENTIR	5	0
77	CENTRALE LATTE TORINO	4	79
78	CHL	0	0
79	CICCOLELLA	0	0
80	CIR	10	169
81	CLASS EDITORI	0	0
82	COFIDE	9	176
83	CREDITO ARTIGIANO	6	292
84	CREDITO BERGAMASCO	5	81
85	CREDITO EMILIANO	3	13
86	CREMONINI	0	0
87	CSP - INTERNATIONAL INDUSTRIE CALZE	0	0
88	DADA	3	0
89	DANIELI	2	57
90	DATALOGIC	6	252
91	DATAMAT	0	0
92	DATA SERVICE SPA	7	161
93	DAVIDE CAMPARI - MILANO	6	88
94	DE LONGHI SPA	8	165
95	DIGITAL BROS SPA	0	0
96	DMAIL GROUP SPA	0	0
97	DMT DIGITAL MULTIMEDIA TECHNOLOGIES SPA	0	0
98	DUCATI MOTOR HOLDING SPA	8	144
99	EDISON SPA	7	351
100	EEMS ITALIA SPA	0	0
101	ELEN. SPA	3	9
102	EMAK SPA	0	0
103	ENEL	3	40
104	ENERTAD SPA	4	204
105	ENGINEERING	0	0
106	ENI	9	106
107	ERGO PREVIDENZA	4	0
108	ERG	1	0
109	ESPRINET	0	0
110	EUPHON	1	0
111	EUROFLY	0	0
112	EUROTECH	1	0
113	EUTELIA	0	0
114	EXPRIVIA	1	0
115	FASTWEB	7	105
116	FIAT	15	740
117	FIDIA	0	0
118	FIERA DI MILANO	1	0
119	FILATURA DI POLLONE	0	0
120	FINARTE	1	0
121	FINMECCANICA	6	403
122	FONDIARIA SAI	12	551

N.	Name	Degree	Betweenness
123	FULLSIX	3	20
124	GABETTI	3	222
125	GARBOLI	0	0
126	GEFRAN	4	196
127	GEMINA	6	161
128	GEOX	0	0
129	GEWISS	5	48
130	GIM SPA - GENERALE INDUSTRIE METALLURGICHE	13	612
131	GIOVANNI CRESPI SPA	0	0
132	GRANITIFIANDRE SPA	4	0
133	GRUPPO CERAMICHE RICCHETTI SPA	1	0
134	GRUPPO COIN	0	0
135	GRUPPO EDITORIALE L'ESPRESSO SPA	15	656
136	GUALA CLOSURES SPA	4	22
137	HERA SPA (HOLDING ENERGIA RISORSE AMBIENTE)	5	146
138	IFIL	8	77
139	IFI	12	280
140	IGD IMMOBILIARE GRANDE DISTRIBUZIONE SPA	1	0
141	I GRANDI VIAGGI SPA	0	0
142	I.M.A. INDUSTRIA MACCHINE AUTOMATICHE SPA	1	0
143	IMMOBILIARE LOMBARDA SPA	4	185
144	IMMSI SPA	12	450
145	IMPREGILO	7	333
146	INDESIT	15	938
147	INET	1	0
148	INTEK SPA	4	16
149	INTERPUMP GROUP SPA	14	473
150	INVESTIMENTI & SVILUPPO SPA	3	39
151	IPI SPA	6	65
152	IRCE SPA - INDUSTRIA ROMAGNOLA CONDUTTORI ELETTRICI	0	0
153	ISAGRO SPA	3	137
154	ITALCEMENTI SPA FABBRICHE RIUNITE CEMENTO	16	879
155	ITALJOLLY SPA - COMPAGNIA ITALIANA DEI JOLLY HOTELS	5	195
156	ITALMOBILIARE SPA	9	241
157	IT HOLDING SPA	1	0
158	ITWAY SPA	0	0
159	I VIAGGI DEL VENTAGLIO SPA	0	0
160	JUVENTUS FOOTBALL CLUB SPA	8	166
161	KAITECH SPA	0	0
162	KME GROUP SPA	6	94
163	LA DORIA SPA	0	0
164	LA GAIANA SPA	1	0
165	LAVORWASH SPA	1	0
166	LINFICIO E CANAPIFICIO NAZIONALE SPA	6	113
167	LOTTOMATICA SPA	5	240
168	LUXOTTICA GROUP SPA	15	582
169	MAFFEI SPA	4	0
170	MARAZZI GROUP SPA	5	65
171	MARCOLIN SPA	11	834
172	MARIELLA BURANI FASHION GROUP SPA	0	0
173	MARR SPA	0	0
174	MANIFATTURA LANE GAETANO MARZOTTO & FIGLI	11	300
175	MEDIASET SPA	10	385
176	MEDIOBANCA SPA	24	1.062
177	MEDIOLANUM SPA	9	180
178	MEDITERRANEA DELLE ACQUE SPA	3	0
179	MELIORBANCA SPA	9	786
180	MILANO ASSICURAZIONI SPA	10	389
181	MIRATO SPA	2	0
182	MITTEL SPA	6	158
183	MONRIF SPA	3	8
184	MONTEFIBRE SPA	0	0
185	NAVIGAZIONE MONTANARI SPA	1	0
186	NEGRI BOSSI SPA	4	0

N.	Name	Degree	Betweenness
187	NICE SPA	2	185
188	OLIDATA SPA	0	0
189	PAGNOSSIN SPA	1	0
190	PANARIAGROUP INDUSTRIE CERAMICHE SPA	1	0
191	PARMALAT SPA	9	850
192	PARTECIPAZIONI ITALIANE SPA	4	40
193	PERMASTEELISA SPA	4	154
194	PININFARINA SPA	4	47
195	PIRELLI & C. REAL ESTATE SPA	10	319
196	PIRELLI & C. SPA	32	2.542
197	POLIGRAFICA S. FAUSTINO SPA	2	0
198	POLIGRAFICI EDITORIALE SPA	6	56
199	PREMAFIN FINANZIARIA SPA HOLDING DI PARTECIPAZIONI	11	342
200	PREMUDA SPA	2	19
201	PRIMA INDUSTRIE SPA	2	0
202	RAS HOLDING SPA	20	875
203	RATTI SPA	0	0
204	RCS MEDIAGROUP SPA	25	1.313
205	RECORDATI SPA - INDUSTRIA CHIMICA E FARMACEUTICA	5	184
206	RENO DE MEDICI SPA	4	21
207	REPLY SPA	2	0
208	RETELIT SPA	5	36
209	RETI BANCARIE SPA	1	0
210	RICHARD GINORI 1735 SPA	1	0
211	RISANAMENTO SPA	9	235
212	RONCADIN SPA	0	0
213	SABAF SPA	2	14
214	SADI SPA	1	0
215	SAES GETTERS SPA	5	196
216	SAFILO GROUP SPA	3	3
217	SAIPEM SPA	1	0
218	SANPAOLO IMI SPA	7	422
219	SARAS SPA RAFFINERIE SARDE	6	92
220	SCHIAPPARELLI 1824 SPA	2	0
221	SEAT PAGINE GIALLE SPA	10	306
222	SIAS - SOCIETA' INIZIATIVE AUTOSTRADALI E SERVIZI SPA	4	26
223	SIRTI SPA	9	403
224	SMURFIT SISA SPA	0	0
225	SNAI SPA	0	0
226	SNAM RETE GAS SPA	1	0
227	SNIA SPA	4	37
228	SOCIETA' CATTOLICA DI ASSICURAZIONE SCARL	3	9
229	SOCIETA' SPORTIVA LAZIO SPA	0	0
230	SOCOTHERM SPA	0	0
231	SOGEFI SPA	4	0
232	SOL SPA	0	0
233	SO.PA.F. SPA - SOCIETA' DI PARTECIPAZIONI FINANZIARIE	5	150
234	SORIN SPA	7	129
235	STEFANEL SPA	3	7
236	TARGETTI SANKEY SPA	0	0
237	TAS TECNOLOGIA AVANZATA DEI SISTEMI SPA	5	0
238	TELECOM ITALIA MEDIA SPA	12	530
239	TELECOM ITALIA SPA	21	794
240	TERNA - RETE ELETTRICA NAZIONALE SPA	5	233
241	TISCALI SPA	2	2
242	TOD'S SPA	8	197
243	TORO ASSICURAZIONI SPA	7	238
244	TREVI - FINANZIARIA INDUSTRIALE SPA	2	0
245	TREVISAN COMETAL SPA	0	0
246	TXT E-SOLUTIONS SPA	3	0
247	UNICREDITO ITALIANO SPA	10	318
248	UNI LAND SPA	3	0
249	UNIPOL SPA - COMPAGNIA ASSICURATRICE UNIPOL	4	60
250	VALENTINO FASHION GROUP SPA	14	822

N.	Name	Degree	Betweenness
251	VEMER SIBER GROUP SPA	0	0
252	VIANINI INDUSTRIA SPA	5	0
253	VIANINI LAVORI SPA	5	0
254	VITTORIA ASSICURAZIONI SPA	12	652
255	ZUCCHI SPA - VINCENZO ZUCCHI	4	41