

Drago, Carlo; Millo, Francesco; Ricciuti, Roberto; Santella, Paolo

## Working Paper

# Corporate governance reforms, interlocking directorship networks and company value in Italy (1998-2007)

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Directorship Networks and Company Value  
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Carlo Drago  
Francesco Millo  
Roberto Ricciuti  
Paolo Santella

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# Corporate Governance Reforms, Interlocking Directorship Networks and Company Value in Italy (1998-2007)

## Abstract

In this paper we contribute to the literature on the structure of interlocking directorship networks and to the literature on the relationship between corporate governance and performance. We use a unique dataset made of corporate governance variables related to the board size and interlocking directorships of the Italian companies listed in the stock exchange over 1998-2007. We find that the corporate governance reforms introduced over the period considered have shown some effectiveness by slightly dispersing the network of companies. Moreover, we find robust evidence that interlocking directorships has been negatively related with company performance.

JEL-Code: C140, C230, G340, L140, M210.

Keywords: corporate governance, interlocking directorships, company performance, social network analysis.

*Carlo Drago*  
*University of Naples "Federico II"*  
*Department of Mathematics and Statistics*  
*Via Cintia 26*  
*Italy – Napoli, 80126*  
*carlo.drago@unina.it*

*Roberto Ricciuti*  
*University of Florence*  
*Department of Government*  
*Via delle Pandette, 21*  
*Italy – 50127 Florence (FI)*  
*roberto.ricciuti@unifi.it*

*Francesco Millo*  
*University of Verona*  
*Department of Economics*  
*Italy - Verona*  
*francesco.millo@univr.it*

*Paolo Santella*  
*Bank of Italy*  
*Via Nazionale 91*  
*Italy – 00184 Roma*  
*paolo.santella@bancaditalia.it*

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## **1. Introduction**

The Italian corporate governance system is characterized by large ownership concentration and the recourse to control-enhancing mechanisms in such a way which is conducive to controlling shareholders' dominance at the expenses of minority shareholders through the recourse to cross-shareholdings or shareholder alliances (Barker, 2010). The main evolutionary feature in the last few years has been the shift in the instruments used to ensure stability of control, that is, away from pyramids towards shareholders' coalitions (Bianchi and Bianco, 2006). The Italian system is also historically characterized by the widespread recourse to director interlocks and to cross-shareholdings (Ciocca, 2007).

In turn, the role of independent directors as a guarantee against minority shareholder expropriation has been put in doubt in Italy because of the incomplete transparency regarding such their possible conflicts of interest (Drago et al., 2006), although in the last few years the disclosure standards practiced by the Italian listed companies seem to have progressed (Assonime, 2010). In 1998 a structural reform of corporate governance was implemented in order to open up the market for corporate control and to protect minorities (the Draghi Law). This reform was followed by further laws that went – not quite linearly – in the same direction. However, as observed by several authors surveyed by Barker (2010), company-level corporate governance behavior has exhibited little response to the new legislation since incumbent block-holders have continued to dominate Italian corporations and have paid little concern to the interests of minority shareholders.

Since the available literature indicates that several features of Italian corporate governance are conducive to minority shareholder expropriation by controlling shareholders, the purpose of the present paper is to assess whether interlocking directorships (as of 1998 and 2007) may suggest the presence of shareholder expropriation by having a negative effect on company performance and whether the regulatory reforms introduced in the period considered have had any influence in this respect.

A first group of explanations for the presence of interlocking directorates focuses its attention on the relation among individuals, suggesting that board interlocks: (i) simply follow higher wages and opportunities, and therefore interlocks occur because firms are interested in hiring highly skilled directors; (ii) are used by the interlocking directors as a tool for mutual self-perpetuation on company boards; (iii) are formed by directors who belong to the same business elite.

A second group of theories is centered on the assumption that board interlocks are an instrument to connect the companies on whose boards the interlocked directors sit. In particular, according to such theories, interlocking directorates: (iv) are a vehicle for collusion between companies operating in the same business sector; (v) are a vehicle for systemic collusion among companies operating also in different business sectors finalized at expropriating minority shareholders.

The paper is organized as follows. Section 2 reviews the characteristics and the legal changes in the Italian corporate governance system, whereas Section 3 discusses the literature on interlocking directorships and company performance. In Section 4 we derive the hypotheses to test. Section 5 presents the methodology and data. Results are discussed in Section 6. Section 7 concludes.

## **2. The Italian corporate governance system: history and reforms**

In Italy, corporate control is exerted by “industrial families” through alliances based on cross participations, yielding stability in control, in a context in which pyramidal groups have been used as a way to separate ownership from control, using capital provided by third parties in order to fund growth. This allows controlling families not only to keep control over the

group but also to control the majority of the shares in all companies of the pyramid with direct ownership concentrated at the highest level of the control chain, minimizing the amount of capital invested in order to control the whole group. Italian listed companies have also issued shares with limited or without voting rights in order to increase capital without diluting the control of the parent company.<sup>1</sup> Furthermore, when additional capital was required, control has been maintained by forming coalitions with other groups (Barca, 1997; Zattoni, 2006). This peculiar way to achieve separation between ownership and control also depends on the legal constraints of the Italian legal framework which prevents, for instance, the use of shares with multiple voting rights. In Sweden, where shares with multiple voting rights are allowed, pyramidal groups are less widespread (Agnblad et al., 2001), whereas in Germany, where similar limitations on shares are imposed, cross participations are permitted (Franks et al., 2001). In general, the presence of control-enhancing mechanisms is widespread in continental Europe and does not seem to be waning (ISS Europe, ECGI and Shearman & Sterling, 2007).

Family control may have an adverse effect on company performance. According to Michellacci and Schivardi (2008) the share of firms controlled by families is an indicator of fewer diversification opportunities, and their higher quota in Italy might explain their poor performance, especially in traditional sectors. Cuccarelli (2009) maintains that families prefer to keep long term control at the expense of higher growth and profits. Moreover, family control has hindered the recourse to external managers (Franks et al., 2008).

Drago et al. (2007) find that a high percentage of the Italian listed companies are connected with each other through a very small minority of directors. This group of interlocking directors is stable over time and tends to belong to families of directors, with the first five families having more than 100 directorships in the nine years studied. The highest level of connectivity concerns those companies belonging to the Italian Blue Chips.

Dick and Zingales (2004) emphasize that in Italy private benefits of control are higher than in France, Germany and the UK, and this is related to lower investor protection, poorer accounting rules, lower tax compliance and a less independent press. La Porta et al. (1997) claim that private benefits of control reflect differences between the UK and continental Europe in investor protection and the development of capital markets. In Italy, expropriatory high private benefits of control affected the preference of controlling families in keeping control as a means to guarantee these benefits over time. In order to limit these abnormal benefits of control, corporate governance reform should increase minorities' rights and their enforcement. If this does not happen, ownership does not open up, and firms do not grow (Bianchi et al., 2005).

Two main legislative reforms have characterized the Italian corporate governance system: the Draghi Law<sup>2</sup> (Consolidated Law on Finance, TUF) in 1998 and the Vietti law reform of 2002-4,<sup>3</sup> with some marginal addition by the Law on Savings in 2005.<sup>4</sup> The aim of the Draghi Law was to modernize the legal framework for securities offerings, takeover bids, disclosure obligations and audit firms. Minority shareholders representing a minimum threshold<sup>5</sup> were granted governance rights and remedies previously either unavailable or subject to higher ownership thresholds. Disclosure on ownership structure was extended by requiring full disclosure of all shareholder agreements. A "mini-breakthrough rule" was

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<sup>1</sup> Cross-ownership of up to 2% for listed companies and up to 10% for non-listed firms is permitted. Shares with multiple voting rights are permitted, whereas special shares with right to vote only in extraordinary meetings are allowed up to 50% of capital.

<sup>2</sup> Legislative Decree No. 58/1998.

<sup>3</sup> Legislative Decree No. 61/2002; Legislative Decree No. 6/2003; Legislative Decree No. 37/2004.

<sup>4</sup> For a broader overview of these reforms see Enriques (2009).

<sup>5</sup> Ranging from 1 percent to 10 percent of the outstanding shares.

introduced, declaring shareholder agreements by which parties restrict their own freedom to sell shares ineffective in the event of a takeover bid. Finally, Consob's statutory objectives in supervising issuers were spelt out (investor protection, and efficiency and transparency of the market for corporate control and of capital markets), its regulatory authority broadened and its powers to request information, execute on-site inspections and impose *ad hoc* disclosure duties extended to a larger set of subjects (Enriques, 2009).

The Draghi Law emphasizes the autonomy of each firm in choosing its corporate governance model. The result was the adoption of the first version of the Italian Corporate Governance Code in 1999<sup>6</sup> (the so-called Preda Code), as a set of self-regulatory best practices to be adopted spontaneously by the Italian listed companies to satisfy the organizing needs of the companies and the objectives of the investors.<sup>7</sup> Among other things, the Code emphasizes the role of the Board of Directors in determining and implementing the strategic objectives of the company, the autonomy of its non-executive members and the presence of a sizable number of independent directors. Non executive directors, with their competences obtained outside the firm, should give a critical assessment of the proposals of the executives in order to align their decisions with the interest of shareholders. Independent directors should play an important role in board committees. The Code recommends establishing remuneration and internal audit committees, and suggests the setting up of an appointment committee.<sup>8</sup> The Preda Code advises the separation of the roles of the Chief Executive Officer and the Chairman of the Board, but highlights a number of cases in which lack of separation may be accepted because of specific organization needs. In the latter case, the role of the independent and non-executive directors is then the key to protect minority shareholders.

The Preda Code was amended in 2002 and in 2006 to follow the evolution of the international best practice.<sup>9</sup> Among the main innovations we signal the growing emphasis (already visible in the 2002 version with respect to the first version of the Code and also in the 2006 version) on the need for directors to make sure that the number of directorships held at the same time in listed companies in Italy or abroad does not conflict with the need to devote the necessary time to their duties. Law 231/01 introduced the responsibility of the company for criminal offences committed by board directors and company managers caused by the lack of adopting an adequate internal organizational model (Alessandri, 2002).

The main impact of the Vietti Reform of 2002-4 on Italian listed companies consisted in increasing corporate charter autonomy. Besides the traditional board structure made up of a board of directors and of a board of statutory auditors, companies can now choose either a one-tier (comprising an audit committee composed of independent directors) or a two-tier structure (including a Supervisory Board and a Management Board). However, these new possibilities have been used in only a few cases (Assonime, 2009). The reform also gives large autonomy to companies to issue different kinds of shares, such as correlated shares, shares without voting rights and with limited voting rights, although the issuance of multiple-voting shares was not authorized. Safeguards for minority shareholders were reduced by the reform through the relaxation of the limits to the issuance of new shares on a non-pre-emption right basis (Enriques, 2009) and by the introduction, through parallel legislative

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<sup>6</sup> The Code has been reviewed in 2002 and in 2006. The basic principle of the Code is “comply or explain”, i.e., a system in which it is possible not to comply with the prescriptions of the code if it fits better with the needs of the firm, but noncompliance should be clearly explained. Companies can either comply with the Code in a formal way in their corporate charters or comply without a formal declaration.

<sup>7</sup> Compliance with the Code is increasing over time. For an in-depth quantitative analysis see Assonime (2010).

<sup>8</sup> Allegrini and Bianchi Martini (2006) find a negative relationship between the share of the largest owner and the existence of the appointment committee.

<sup>9</sup> All the three versions of the Code are available at: [www.assonime.it](http://www.assonime.it).

provisions, of a partial decriminalization of false accounting and the reduction of the statute of limitations from 4.5 to 3 years (Barker, 2010).

In 2005 and 2006 the Law on Savings<sup>10</sup> reacted to a number of corporate scandals (Parmalat, Cirio, Banca Popolare di Lodi, Antonveneta) by amending company disclosure, internal audit, director liability on the correctness of accounting procedures and the identification of a director in charge of internal control and of the manager charged with preparing the company's financial reports. Minority shareholders representing at least 2.5 percent of total voting shares have been granted the right to appoint at least one director (or supervisory board member in companies with two-tier boards). Moreover, the implementation of the EU Market Abuse Directive has improved the regulation standards on self-dealing transactions, insider trading and market manipulation. Finally, the adoption of the EU Takeover Directive in Italy has undergone several phases, with, in turn, provisions more/ less favorable to hostile bids (Enriques, 2009), the last of which has been announced in October 2010 (Consob, 2010).

While according to Enriques (2009) the long period of reforms has produced some improvements in the degree of investor protection, the author also observes that a more radical improvement would only be possible after the enactment of mandatory disclosure of related-party transactions, which has taken place on 1 December 2010. Bianco and Bianchi (2008) provide evidence on the actual evolution of corporate governance following the above mentioned legal changes. They find that while at the beginning of the '90s, pyramids, dual class shares and cross-ownership were the most used, in 2007 their importance has substantially reduced with an increase in another control mechanism: the coalitions among shareholders. Moreover, they observe a reduced value of the proxies for control premium, a greater compliance with corporate governance codes, and an increased presence of institutional investors at annual shareholders' meetings. However, in some cases, compliance with codes is still more formal than substantial, and foreign institutional investors still participate in Italian shareholders' meetings with a lower frequency than in other countries.

### **3. Interlocking directorship networks and performance: a literature review**

In 1914, Interlocking Directorates (from now on ID) had been pointed out as the "root of many evils" by Brandeis (1914). Probably due to the fact that Brandeis was one of President Wilson's counselors, in 1914 the Clayton act prohibited ID among competitors. According to the principle that "no man can serve two masters", ID were seen as a tool to decrease competition, therefore damaging the market. In the second part of the 20<sup>th</sup> century, ID have been studied and made the object of several contributions, both theoretical and empirical.

#### ***3.1 Interlocking directorate: theoretical framework***

During the past decades, the first theoretical problem was to justify the presence of ID on the board of directors. Among the theories trying to explain the phenomenon there are two main currents: the first one sees ID as a relation between institutions; the second one focuses its attention on the relationship among individuals.

Divided in these two categories, theoretical contributions can be grouped into seven theories or models: three referring to ID as a link between individuals, and four referring to ID as a link between institutions.

##### ***a) Management Control Model***

In our synthesis this is the first model that considers ID as a link among individuals and not institutions. An important contribution supporting these theories is proposed by Palmer

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<sup>10</sup> Law No. 262/2005 and Legislative Decree No. 303/2006.

(1983) who investigated what happens when a link between two firms disappears due to the death or retirement of the director. Only a minority of these links are created again after they disappear: if these links were functional to connect two institutions they would be promptly reconstituted. Ornstein (1984) reports similar results from a Canadian context. According to Koenig et al. (1979), managers use ID to increase their power. Interlocked directors are often passive and never vote against managers that “hired” them.

Hallock (1997) studies the effect of cross interlocks between CEO’s on director’s compensation. His findings show an increase in CEO salary of about 17% due to the presence of interlocks. Fitch and White (2005) discovered a negative relation between the number of interlocks and CEO turnover. This work reaches conclusions closely related to those suggested by Cochran, Wood and Jones (1985), who found a positive relation between interlocks and the quality of the “golden parachute” for top managers.

#### *b) Class Hegemony Model*

Mills (1956) and Useem (1984) propose a different interpretation for ID. They describe ID as the result of a strong social cohesion. Directors contact other directors following a relationship pattern: for example, they go to the golf club or country club, they share the same beliefs and values, and they often have a shared political view. In other words, they all belong to the same upper class, contact each other and form a business elite (Useem, 1984). They share a common view of the world and the same social behavior (Bazerman and Schoorman, 1983).

Mizruchi (1992) reports how firms linked by ID are more likely to report and share the same political view. Also Keoning et al. (1979) studied the 1972 Nixon Presidential Campaign and observed that those companies belonging to the same network were more likely to contribute to the Nixon Campaign if one corporation had contributed before.

#### *c) Career Advancement Model*

Stockman, Van der Knoop and Wasseur (1988), Zajac (1988) and Perry and Peyer (2005) propose a theory focused on the interest of each single interlocked director. According to them, directors decide to interlock following mainly three drivers: compensation, prestige, and future networking and job opportunities.

Therefore, directors decide to interlock simply following their specific interest and we should not take into account institutions, governance or the social context. This theory supports the idea that interlocks is about skills and knowledge: in order to gain a higher salary, prestige and opportunities, directors will strive to offer those competences that the market is looking for.

#### *d) Resource dependence model*

The first model that sees ID as an instrument to connect institutions was proposed by Selnick (1947), and this was then followed and supported by many other contributors [Dooley (1969), Pfeffer (1972), Allen (1974), Bunting (1976), Pfeffer and Salancik (1978), Koenig et al. (1979), Pennings (1980), Schoorman et al. (1981), Burt (1983), Ornstein (1984), Ziegler (1984), Galaskiewicz et al. (1985), Palmer et al. (1986), Mizruchi and Stearns (1988), Lang and Lockhart (1990), Sheard (1994) and Cross and Cumming (2004)]. According to this model, companies face enormous uncertainty during their business life. Uncertainty may be about customers, suppliers, competitors, macroeconomic conditions or other features. The resource dependence model sees ID as a tool to reduce uncertainty. Firms create interlocks in order to have more power to control and predict at least some part of the uncertainty they face. That is why a part of ID brings vertical/horizontal integration or is between institutions belonging to the same industry (Dooley, 1969). The resources firms are



looking for when they interlock are also intangible, such as information, business practice or prestige. Davis (1991) discovered how companies belonging to the same network are more likely to adopt the same poison pills in order to avoid a hostile takeover. Maggio and Powell (1983) suggest that a bank is more likely to lend money if the borrower has directors with high prestige and reputation.

*e) Financial Control model*

Capital is one of the most important resources a company needs to run its business. That is why a specific model explains ID as a tool to have easier access to capital. There is high empirical evidence of ID among banks and industrial companies. Dooley, 1969; Mizruchi, 1998; and Mizruchi and Stearns (1988) found more ID with banks in those companies with an increasing demand for capital. Moreover, often banks have a central role in networks (Davis and Mizruchi, 1999; Farina 2009).

Having a banker (the director holding both industrial and banking directorships) on a company board reduces information asymmetries between the bank and the industrial company. Therefore, companies may benefit in raising more debt capital; in addition, the banker ensures better monitoring during debt life. When this relation follows or precedes a lending relationship then conflicts of interests arise. The banker faces a conflict: sitting on the board of the industrial company should maximize shareholders' values; at the same time he should maximize bank debt value. A simple way to maximize bank debt value is to reduce company leverage. But reducing company leverage is a benefit for shareholders only if the current leverage ratio is above the optimal level. On the other hand, we explained before how having a banker on their board may give industrial company the opportunity to raise more debt. Empirical evidence on the topic is mixed (Byrd and Mizruchi, 2005; Rommens et al., 2008).

*f) The collusion model*

According to the collusion theory, interlocking directorates permit the creation of communication channels between companies to make agreements against consumers. Interlocking directorships is seen as an instrument to cartelize a market because sharing directors allows cartel participants to have an observer in place monitoring activities that could undermine the cartel agreement. A system based on direct interlocking directorates may thus potentially produce economic inefficiencies (Carbonai and Di Bartolomeo, 2006). Pennings (1980) found a positive association between industry concentration and horizontal ties, while Burt (1983) found an inverted U-shaped function: in the case of very high market concentration, few producers have little need to interlock to set prices.

*g) The systemic collusion theory*

Drago et al. (2008 and 2009) examine the interlocking directorships among the Italian, French, German, UK and US listed Blue Chips with reference to end 2007/beginning 2008. The comparison of the five countries considered shows that Italy, Germany, and France (differently from the UK and, partially, the US) share a model made up of a high number of Blue Chip companies linked to each other through a small number of interlocking directors who serve on several company boards at the same time. In these three countries, the function of board interlocks seems to be that of allowing the respective Blue Chips to operate under mutual scrutiny, something that goes beyond the collusion theory (which refers to companies operating in the same market), which is defined by the authors as "systemic collusion". The same conclusion is shared by the Italian Antitrust Authority, which states that board interlocks are used by shareholders in groups of listed companies to establish coordination

among companies that do not operate necessarily in the same business sector with the purpose of expropriating minority shareholders (AGCM, 2010).

### **3.2 Interlocking directorates and performance**

The seven models presented reach different conclusions about the effects of interlocking directorships on company performance.

The Resource Dependence Model suggests a positive effect on company performance: the ability to control or at least reduce environmental uncertainty give an advantage. The same conclusions can be drawn from the Financial Control Model: the opportunity to gain easier access to capital markets produces an important advantage for any company. On the other hand, the Management Control Model suggests a negative effect on company performance. The assumption supporting this theory is that managers hire interlocked directors in order to have a higher degree of freedom and thus move away from their fiduciary duties towards shareholders.

The Class Hegemony Model could support positive or negative effects of ID on company performance. According to this theory, directors are not chosen for their competences or skills; therefore they should produce a disadvantage for the company. On the other hand, being part of a business elite could generate new contracts, opportunities and other advantages. The Career Advancement Model supposes a positive effect of ID on company performance. If directors are chosen for their ability and their skills they will bring beneficial effects.

Table 1 summarizes the expected effects of ID Models on company performance. Looking at the table we are not surprised to see mixed empirical evidence. Among empirical contributions there are different findings. Burt (1983) and Bunting (1976) find an inverse U-shaped relation between ID and company performance. This means that ID has beneficial effects at the beginning, but adding new interlockers firstly reduces margin contribution and then brings a negative effect. As suggested by Richardson (1987), this may be the combination of two different forces: 1) directors like to join well performing companies; 2) companies experiencing business or financial problems are those most interested in creating new links.

**TABLE 1- Summary of the models**

Model	Effect on firm performance
Management Control	Negative
Class Hegemony	Mixed
Career Advancement	Positive
Resource Dependence	Positive
Financial Control	Positive
Collusion model	Positive
Systemic collusion model	Negative

Rommens et al. (2008) find no evidence about this issue using a Belgian sample. While with a Dutch sample, Franses and Non (2007) find a slightly negative effect of a new ID on company performance with a time lag after the link is created, Rommens et al. (2008) find the

opposite using a different Dutch sample. Yeo et al. (2003) find a positive relation between the number of links and profits, measuring profits with ROA. The same conclusion is drawn by Brantleys and Flingstein (1992) with a US sample. Studying samples from different contexts, with different legal or cultural environments, can therefore easily mean studying different ID models.

As for the systemic collusion theory, while the “simple” collusion theory predicts an increase in the business performance of the companies that establish collusion through interlocking directorates, empirical studies suggest that Italian interlocking directorates can improve the ability of the controlling shareholders to expropriate the minority shareholders, extracting private benefits from control (Barucci, 2006); in other terms, interlocked companies are more likely to act in concert entailing an advantage for the controlling shareholders who appoint the majority of directors (Bertoni and Randone, 2006). Such results seem to be confirmed by Croci and Grassi (2010) who find, with respect to 2008, that network centrality affects company value in a negative way.

#### **4. Hypotheses**

By considering our literature review (in particular we refer to Barros et al., 2009; Andres and Lehmann, 2009; and Croci and Grassi, 2010) we can consider the following initial hypotheses:

H0: The most capitalized companies tend to be the center of the network over time. The capitalization and the network centrality are positively related.

H1: The board interlocks create a stable network over time. The stability of the network can be measured at various, different levels.

H2: Different regulations and reforms can have an impact on the board interlocking network. This impact can be at time T or lagged over time. These impacts can be measured differently by considering different network characteristics or structures.

H3: The market-to-book ratio of a company decreases with the presence of board interlocking (a possible effect of the expropriation of value).

The core hypotheses of the study is the hypotheses H2-H3, whereas H0 and H1 are only accessory. In particular, hypothesis H3 is functional to finding evidence of shareholder expropriation; hypothesis H2 allows the verification of the impact of regulatory reforms.

#### **5. Methodology and data**

We use an original dataset, obtained from two different sources. We gathered information about all the boards of directors for the companies listed on the Italian stock exchange of Milan from the Italian security and exchange commission (Consob). We collected market and balance sheet data for the same companies in the same period (source: Datastream). We consider a ten year period from 1998 to 2007.

As for the first part of the dataset, the sample used in the work is related to the listed industrial (non-financial) companies in Italy from 1998 to 2007, where we refer to board composition as of 31 December of each year. For each listed company we collected the data from Consob (the Italian stock market regulator) datasets according to the procedure illustrated in Drago et al. (2007), and as a result we obtained some measures of centrality that we consider together with other network characteristics (see Appendix). These measures

correspond to those computed in Drago et al. (2007). As for the second part of our dataset, it contains performance measures of the Italian listed companies for nine years (2001-2009).

The final merged database consists of 150 variables of economic performance, and also includes a measure of network centrality where we compute the number of the interlocking directors on the total number of board directors. We then obtain two distinct groups of variables: (i) corporate governance variables related to board size and interlocking directorships and (ii) another group of variables related to the economic and financial performances of the companies considered. In particular, we collect variables for *int1*, *int2*, *int3*... and so on, that represent the number of directors with more than 1 directorship by *int1*, and so on.

To capture the effect of director busyness (or board interlocking) we built several proxies:

$$BU_{1,s,t} = \sum_{i=1}^3 \text{int}_{i,s,t} \quad (1)$$

Where  $BU_1$  represents an indicator of busyness for the  $s$  company at time  $t$ , and takes into account the busyness due to a lower number of directorships (no more than four directorships at the time). *Int* represents the number of interlocking directors by considering their number of directorships.

$$BU_{2,s,t} = \sum_{i=4}^9 \text{int}_{i,s,t} \quad (2)$$

A different aspect related to the busyness of the directors with a higher number of directorships is represented by  $BU_2$ . It is important to note that these two variables show very different behavior. In this work we use the busyness indicator because a high number of directorships held at the same time by the same director tend to reduce the participation rate of the director in company life. In Social Network terms, a higher number of directorships held by the same director mean a higher centrality. A higher centrality can be measured by the busyness, the Freeman degree and other social network analysis indexes. In situations in which the network is centralized around a specific center, the centrality indexes tend to be correlated.

Another common variable in literature is:

$$Int_{1,s,t} = \frac{\sum_{i=1}^{10} \text{int}_{i,s,t}}{BS_{s,t}} \quad (3)$$

where  $BS_{s,t}$  is the board size. This variable measures the number of interlocking directors of the total and represents a first measure of director busyness. It is important to note that all these variables tend to show a different economic content.

By considering only the directors with more than 5 directorships we have:

$$Int_{2,s,t} = \frac{\sum_{i=5}^{10} \text{int}_{i,s,t}}{BS_{s,t}} \quad (4)$$

In this way, we try to capture the effect of the busyness for the board only by considering directors with more than three directorships at the same time. All these four variables can be fruitfully used in different robustness checks. As usual in econometric studies, we consider different model specifications to compare the results.

The variables can also be used to study the impact of the reforms. In this respect, it is crucial to identify the reforms in which we hypothesize a specific impact on the network characteristics. The market-to-book ratio (*MKBR*) is computed as:

$$MKBR_{s,t} = \frac{MKC_{s,t}}{TA_{s,t} - TL_{s,t}} \quad (5)$$

where *MKC* is Market Capitalization, *TA* is the total assets and *TL* stands for total liabilities. Market-to-book ratio can measure both the value added by management and the value of intangible assets such as future investment opportunities. Among independent variables, we also consider other important variables such as Financial Leverage, built in two different specifications, to capture some different effects. A first specification is:

$$LM_{s,t} = \frac{TL_{s,t}}{TL_{s,t} + MKC_{s,t}} \quad (6)$$

In a second specification we introduce another variable to consider the non linearity we observe between financial leverage and market-to-book ratio: a dummy variable that is equal to 1 for  $LM_{s,t} \leq 0.30$  and 0 otherwise. From an economic point of view, highly leveraged companies pays higher interests to banks, this reduces dividends to shareholders, in turn lowering the market-to-book ratio.

We consider all the variables of the dataset to permit either a replacement of the variables used in the models for the robustness analysis, but also to allow different data analysis methods useful, for example, to answer problems of multicollinearity (sometimes it can be very useful to substitute the initial variables with factors obtained using the principal component analysis). At the same time, we do not impute the missing values in this dataset. The relevant underlying assumption we consider for the problem of missing data here is that missing data are “missing at random”, so we do not consider the missed observations. At the same time, the data does not show relevant missing values, or structural phenomena of non response (so the missing value we assume is “at random”) for the part of the database related to the interlocking directorships. For the economic performances database, the characteristics of these data are well known in literature, because the source is Datastream.

For all companies, we firstly check if the value, year by year, can be defined as a specific outlier. The usefulness of the exploratory data analysis strategy is related, in particular, to the possibility to identify some multivariate outliers using various methods, also using graphical statistics. The data exploration can be very useful, as well, where at the same time it could be important to correctly identify the existence of different statistical data structures within the dataset, for example, a first one related to large companies, a second one related to smaller companies. At the same time, these strategies can be relevant in identifying different proxies related to latent phenomena (mostly unobservable). All the findings of the exploratory data analysis can be checked also by considering the existing literature to explore the data structure with respect to the economic models and hypotheses considered in the literature. Hypotheses are stated *a priori* by the relevant literature, so the analysis of the data structure of the dataset does not change the hypotheses considered. At the end of the descriptive analysis we compute the summary statistics.

The statistical methodology followed in this work is divided into two distinct parts: the first explorative and the second confirmative. In the first part, we study the network structure by obtaining some indices of centrality, density and in general a measure of the network structure year by year. From the social network analysis, we obtain some important insights into the network dynamics over time. It is important to note that the dynamic analysis is particularly relevant because we can observe the evolution of the board busyness over time. Second, we test some hypotheses about the network stability over time and the impact of the reforms (we test H1 and H2). In particular, some tests of equality of medians can be used to observe that the variables related to the number of directors with 2 directorships and more (3, 4 to 7 directorships in a year) tend to be different year by year (and so they are directly impacted by the considered reforms). The general idea is to combine the exploratory data analysis with confirmatory data analysis to check the robustness of the results with respect to possible outliers. Third, we identify from the econometric literature some models based on the hypotheses we wish to test (in particular H3 and H4). The estimated model using longitudinal data is:

$$MKBR_{s,t} = \beta_0 + \beta_1 \ln(TA_{s,t}) + \beta_2 TDC_{s,t} + \beta_3 SS_{s,t} + \beta_4 BS_{s,t} + \beta_5 BU_{1,s,t} + \sum_{j=1}^9 \vartheta_j Y_{s,t} + \varepsilon_{s,t} \quad (7)$$

Where *TDC* is the Total Debt-to-capital ratio, *SS* is the sales-per-share, *BS* is the board size, *BU* is the interlocking directorship (or director busyness), and  $Y_{s,t}$  are the year-dummies. We consider different specifications of the model starting from the present one for robustness checks. For each specification we study the different outliers that can be identified in a post estimation analysis.<sup>11</sup>

## 6. Results and Discussion

The Social Network Analysis is conducted on the interlocking directorship network. We compute various relevant indices to understand the specific network structure over time. We only consider the Italian Blue Chip companies; those belonging to the so-called Italian Mib index. In this way, we consider the most capitalized companies of the entire network and we are concretely viewing the “centre” of the network. The results seem consistent with a static image of the entire system over time, where the most centralized companies (and at the same time the most centralized directors) tend to stay in the same position for seven years (see Appendix). Directors with a higher number of directorships tend to keep the higher number of directorships over time, whereas those with a lower number of directorships (at maximum two) tend to have a higher turnover. This result seems consistent with the observation in the literature that the Italian system appeared to be very stable in the period 2001-2007.

The econometric results are built on the Social Network Analysis of the network, where it is interesting to note that we are able to measure some network effects. In particular, the analysis suggests the presence of a network with the same features over the years. The results are presented in the graphs representing the network considered comparatively for the period 1998-2006 (see Appendix). The empirical evidence shows the relevance of the interlocking directorship networks over time, where a high percentage of all the listed companies are linked to the network. A group of companies shows very high levels in Freeman degrees, betweenness, closeness and other centrality indicators. It is important to note that these indicators are related also to the network structure, where a company can be central as regards Freeman degrees, it is not obvious that it is also at the centre of the network

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<sup>11</sup> The software used are Stata 9, Ucinet and R.

as regards betweenness (depending on the structure of the network). However, the empirical finding is a strong network structure, very stable over time.

We can test the hypothesis H1 by considering the stability of the network. We use the test of the equality of the medians and a graphical analysis. Table 2 shows the equality means for the variables *int1*, *int2* to *int5*. The null hypothesis is the equality between the medians over the time where the alternative is the difference. The values in the table represent the number of values greater than the median. It is important to note that we are considering the variables *int1*, *int2*... and so on, as proxies of the network, in the sense that we are not considering the specific network structure but are interested in testing the changes in these variables. The exploratory data analysis allows the understanding of the structure of the data before conducting the test. The idea is to directly identify some outliers that could be useful to detect. The equality of the median test is conducted iteratively on all the variables relative to the number of directors with some specific number of directorships. We cannot reject the null hypothesis of equality of the means for the variables *int1* and *int2*, whereas we reject the null hypothesis (equality of the median) for the variables *int3* to *int5*. The result is consistent with the observation that the network tends to reduce the number of linkages over time. The economic interpretation is that there is a reduction of the number of the multiple directorships over time, whereas the interlocking directorates based on two directorships tend to be stable. The conclusion is that we cannot find evidence of network destruction over time, but we observe a reduction of the linkages (directors with more than 3 directorships tend to decrease).

The Hypothesis H2 can be tested by considering the dynamics of the interlocking directorship indicators over the time. In particular, we observe stability over time, except for the values of the variables related to the centre of the network. This could be interpreted as the relative impact of the reforms over the time. In fact we observe a differentiated impact for the reforms in different network zones. Reforms seem not to strictly affect the network structure but seem to reduce the number of the highest number of linkages (see Appendix). The economic interpretation is related to the impact of some reforms on the possibility to have multiple directorships on company boards. In this respect, we observe that the reduction in the number of multiple directorships takes place in 2004-2007, and that since 1998 the Italian regulatory framework progressively emphasizes the need for directors to limit the number of directorships. It is important to note that the impact of the reforms does not greatly affect the network in a broad sense, since we observe that over time the network does not change its structure, for example, as regards the ranking in betweenness (centrality), etc (see Appendix).

**TABLE 2 - Equality tests for the medians**

<b>Int1</b>											
<i>Greater than the median</i>	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	<i>Total</i>
No	78	93	110	129	118	108	103	114	137	156	1,146
Yes	56	54	69	65	76	83	85	87	84	83	742
<b>Total</b>	134	147	179	194	194	191	188	201	221	239	1,888
Pearson $\chi^2(9) = 11.2522$ pr = 0.259											
<b>Int2</b>											
<i>Greater than the median</i>	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	<i>Total</i>
No	69	86	114	113	115	127	124	116	140	142	1,146
Yes	65	61	65	81	79	64	64	85	81	97	742
<b>Total</b>	134	147	179	194	194	191	188	201	221	239	1,888
Pearson $\chi^2(9) = 12.8150$ pr = 0.171											
<b>Int3</b>											
<i>Greater than the median</i>	1999	1999	2000	2001	2002	2003	2004	2005	2006	2007	<i>Total</i>
No	94	112	134	149	162	129	137	142	155	175	1,389
Yes	40	35	45	45	32	62	51	59	66	64	499
<b>Total</b>	134	147	179	194	194	191	188	201	221	239	1,888
Pearson $\chi^2(9) = 18.2287$ pr = 0.033											
<b>Int4</b>											
<i>Greater than the median</i>	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	<i>Total</i>
No	117	122	162	154	161	162	150	163	181	181	1,580
Yes	17	25	17	40	33	29	38	38	40	40	308
<b>Total</b>	134	147	179	194	194	191	188	201	221	239	1,888
Pearson $\chi^2(9) = 15.8715$ pr = 0.070											
<b>Int5</b>											
<i>Greater than the median</i>	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	<i>Total</i>
No	116	133	154	181	173	177	164	162	197	234	1,691
Yes	18	14	25	13	21	14	24	39	24	5	197
<b>Total</b>	134	147	179	194	194	191	188	201	221	239	1,888
Pearson $\chi^2(9) = 44.9377$ pr = 0.000											

To test the significance of the H3 hypothesis we estimate two different specifications related to the Market-to-book ratio. In particular, we estimate a fixed effect regression and a random effect regression, in order to test the impact of the interlocking directorships on the market-to-book ratio. We use all the different variables we considered as proxies for director



busyness. We consider all the variables in the different models to check the robustness of our findings. The dummy variables are related to 1998 and 2007. Both dependent variables are proxies of the market value, so we try to analyze the impact of the interlocking directorships on the dependent variables as market value. In this sense, we explicitly test H3, where we expect a negative coefficient in the estimated model. The result for the first model confirms our expectations (table 3 with fixed effects and table 4 with random effects): we estimate five different models to check the robustness of the relationship. In particular, signs follow the expectations, the log of the assets impacts positively on the market-to-book ratio, where interlocking directorships in four different specifications tend to impact negatively on the market value. This result is coherent with the literature. All the results seem robust, since different econometric specifications do not significantly change the results.

**TABLE 3 - Market-to-book ratio: fixed-effects estimation**

	(1)	(2)	(3)	(4)	(5)
Total assets	-0.059	0.266***	0.219***	0.205***	0.231***
Total debt- to-capital	0.019**				
Sales-per-share	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
Board size	-0.037	-0.094*	0.098*	-0.098*	-0.077
Share of interlocking directors	-0.614	-1.113***			
Financial leverage		-2.254***	-2.150***	-2.117***	-2.162***
Financial leverage<0.30		1.011***	1.029***	1.033***	1.023***
Share of interlocking directors with more than 5 directorships			-1.487*		
Number of interlocking Directors with more than 5 directorships				-0.060	
Number of interlocking directors					0.059*
Constant	2.563***	0.685	1.005*	1.131*	0.781
N	1669	1669	1669	1669	1669
R <sup>2</sup>	0.028	0.078	0.073	0.072	0.073

Year-dummies are not shown. p-values are indicated by stars (\* p<0.5, \*\* p<0.1, \*\*\* p<0.001). The results are corrected for heteroscedasticity.

**TABLE 4 - Market-to-book ratio: random-effects estimations**

	(1)	(2)	(3)	(4)	(5)
Total assets	-0.038	0.294***	0.244***	0.230***	0.258***
Total debt-to-capital	0.017***				
Sales-per-share	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
Board size	-0.052	-0.109**	-0.114**	-0.113**	-0.092*
Share of interlocking directors	-0.578	-1.103***			
Financial leverage		-2.552***	-2.444***	-2.410***	-2.456***
Financial leverage <0.30		1.021***	1.042***	1.046***	1.034***
Share of interlocking directors with more than 5 directorships			-1.298		
Number of interlocking directors with more than 5 directorships				-0.041	
Number of interlocking directors					-0.058*
Constant	2.492***	0.605	0.056*	1.100*	0.711
N	1669	1669	1669	1669	1669

p-values are indicated by stars (\* p<0.5, \*\* p<0.1, \*\*\* p<0.001). The results are corrected for heteroscedasticity.

It is interesting to note that interlocking directorships related to the centre of the network tend to have a higher impact (as coefficients) than interlocking directorships related to a peripheral role in the network. This result shows that a higher level of interlocking directorship is correlated with the expropriation of minority investors.

By considering the impact of Financial Leverage, we consider a first variable significantly positive (which should not however be interpreted as proof of overcapitalization of the Italian companies, due to the need to consider other variables in the context of the different estimated models), whereas the variable representing the logarithm of total assets seems not to be significant. We need to consider the two variables jointly (Financial Leverage and the Logarithms of the Total Assets), and it is not possible to consider only the impact of Financial Leverage on the market-to-book ratio.<sup>12</sup> The level of Financial Leverage that positively impacts is below 0.3, whereas values higher than 0.3 have a negative effect on the market-to-book ratio. This value characterizes some specific companies that have a particular market situation as newly listed companies. At the same time, this finding could be consistent

<sup>12</sup> In any case, a statistical analysis of the Financial leverage and the Total assets lies outside the objectives of this work.

with the idea that some companies show a structurally high level of Financial Leverage due to particular situations, and this could be positively related to the market-to-book ratio. By using this specification we take into account these types of situations. The results show that there are no changes in the different specifications. However, an interesting result is that the variables related to the effects of the interlocking for more than 5 directorships seem to have a greater impact than other types of directorships. This result seems consistent with the idea that a higher level of director busyness can negatively impact on the market-to-book ratio.

In Table 5 we deal with the problem of endogeneity, and we use a two stage estimation model (2SLS). The assumption we consider according to the literature is the existence of a problem of simultaneity where, in fact, there is a lower performance of the companies induced by interlocking directorships, there is also a mechanism in which companies that perform badly tend to persuade their directors to change companies. According to the previous literature (Fich and Shivdasani, 2006; Barros et al., 2009), the instruments used are the lagged values of the interlocking variables considered, when they are correlated with the actual values of the interlocking variables. The results are consistent with the previous ones.

**TABLE 5 - Market-to-book ratio: Instrumental Variables (Two Stage Least Squares)**

	(1)	(2)	(3)	(4)	(5)
Share of interlocking directors	-0.510	-0.934**			
Total assets	-0.878	0.269***	0.243***	0.224***	0.224***
Total debt-to-capital	0.228**				
Sales-per-share	-0.002***	-0.002***	-0.002***	-0.002***	0.002***
Financial leverage		-2.133***	-2.078***	-2.023**	-2.032**
Financial leverage <0.30		0.821**	0.821**	0.829**	0.830**
Board size		-0.100*	-0.099*	0.099*	-0.096
Share of interlocking directors with more than 5 directorships			-2.086*		
Number of interlocking directors with more than 5 directorships				-0.087	
Number of interlocking directors					-0.270
Constant	2.300***	0.561	0.669	0.832	0.846
N	1440	1440	1440	1440	1440
R <sup>2</sup>	0.035	0.069	0.063	0.063	0.065

Year-dummies are not shown. p-values are indicated by stars (\* p<0.5, \*\* p<0.1, \*\*\* p<0.001). The results are corrected for heteroscedasticity.

Finally, in Table 6 we use the Generalized Method of Moments according to the procedure devised by Arellano and Bond (1991) in order to address endogeneity and dynamic effects<sup>13</sup>. Results are pretty much in line with the estimates obtained with other methods. Interlocking has no effect at time  $t$ , but negative effects cumulate over time. Interestingly, the effect of the board size becomes significantly negative, and therefore interlocking seems a relevant problem for small boards. Diagnostics tests are fairly good. We cannot reject the null of no-overidentifying restrictions in the Sargan tests, although this happens for with p-values slightly higher than 10%.<sup>14</sup> Furthermore, the residuals are autocorrelated at lag 1 but not at lag 2, as expected by the procedure.

**TABLE 6 - Market-to-book ratio: Arellano-Bond estimates**

	(1)	(2)	(3)	(4)
LDMarket-to-book ratio	0.113***	0.113***	0.114***	0.113***
DITotal assets	0.966**	1.008**	1.010**	0.954**
LDITotal assets	-0.075	-0.103	-0.105	-0.069
DFinancial leverage	-1.692	-1.962	-1.954	-1.830
DFinancial leverage <0.30	2.055***	2.082***	2.082***	2.055***
LDFinancial leverage <0.30	-0.049	-0.041	-0.045	-0.046
DSales-per-share	-0.009	-0.009	-0.009	-0.008
LDBoard size	0.083**	0.081**	0.081**	0.090**
DShare of interlocking directors	-0.050			
LDShare of interlocking directors	-0.84**			
L2DShare of interlocking directors	-0.728			
DShare of interlocking directors with more than 5 directorships		-0.077		
LDShare of interlocking directors with more than 5 directorships		-0.096		
L2DShare of interlocking directors with more than 5 directorships		0.185		
DNumber of interlocking directors with 5 more directorships			0.006	

<sup>13</sup> The Arellano-Bond estimates are obtained using XTABOND in Stata 9.

<sup>14</sup> For each estimation, the p-values are: 0.1103, 0.1070, 0.1117, and 0.1165, respectively.

LDNumber of interlocking directors with 5 more directorships			-0.006	
L2DNumber of interlocking directors with 5 more directorships			0.020	
DNumber of interlocking directors				0.004
LDNumber of interlocking directors				-0.059
L2DNumber of interlocking directors				-0.064
Constant	0.029	0.028	0.028	0.037
N	1009	1009	1009	1009
Wald test	192.544	177.086	177.056	182.530
Sargan test	44.35	44.52	44.27	44.03
AR(1)	-2.15*	-2.11*	-2.12*	-2.07*
AR(2)	-0.13	-0.04	-0.04	-0.14

Year-dummies are not shown. p-values are indicated by stars (\* p<0.5, \*\* p<0.1, \*\*\* p<0.001). The results are corrected for heteroscedasticity. L and D are the lag and the difference operators, respectively.

## 7. Conclusions

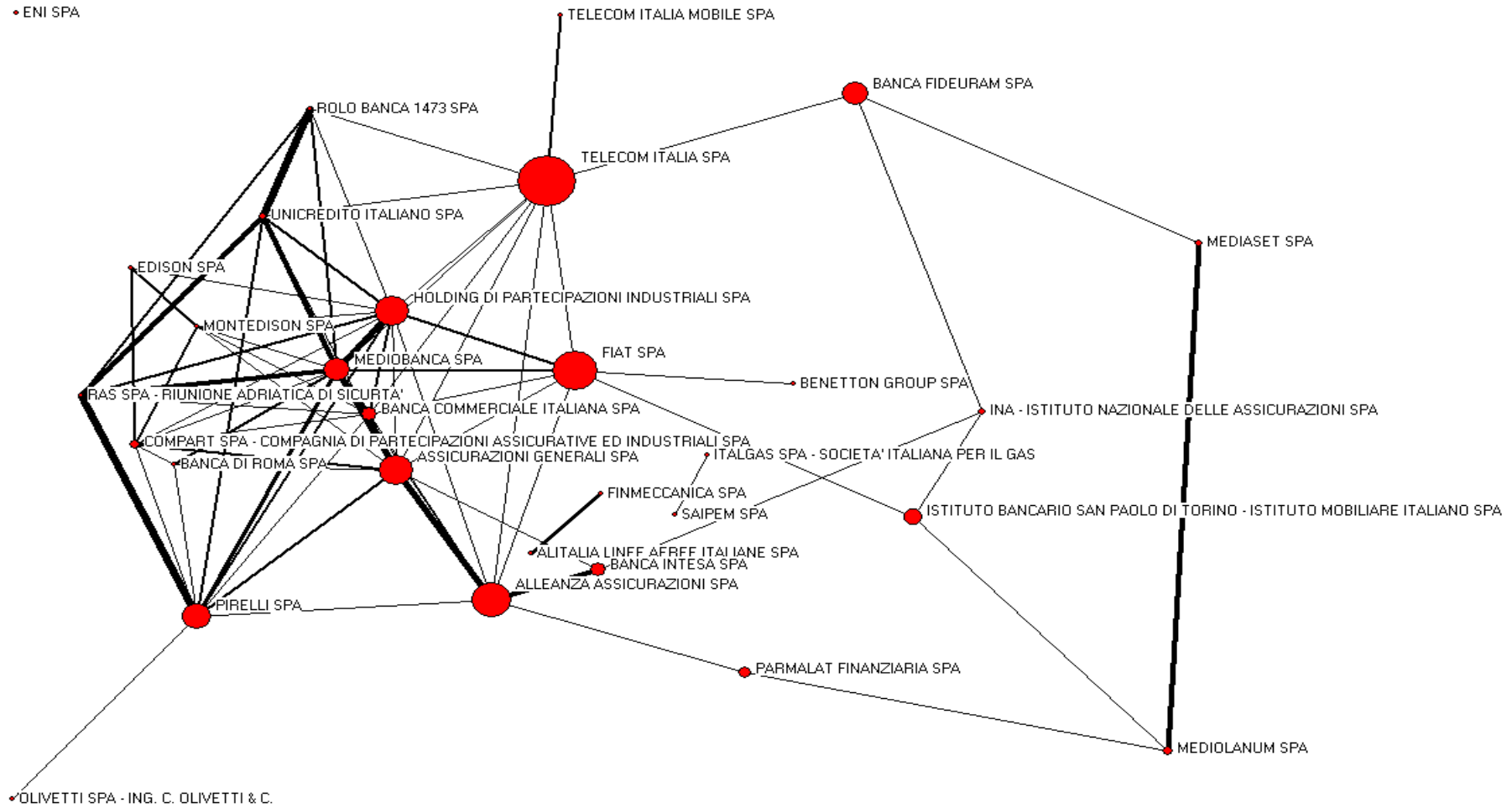
The purpose of this paper is to assess the relationship between interlocking directorships and company performance for the main companies listed on the Italian stock market in the period 1998-2007. We also analyze the Italian network of interlocking directorships to verify its structural features over a time period which has been characterized by a changing regulatory framework.

We use a unique dataset that includes two distinct groups of variables: (i) corporate governance variables related to board size and interlocking directorships and (ii) a group of variables related to the economic and financial performance of the companies considered. We observe that the main regulatory aspect that has had a direct relevance on the structure of the Italian network is the growing emphasis in the successive versions of the Italian corporate governance code to limit the number of directorships that directors may hold at the same time.

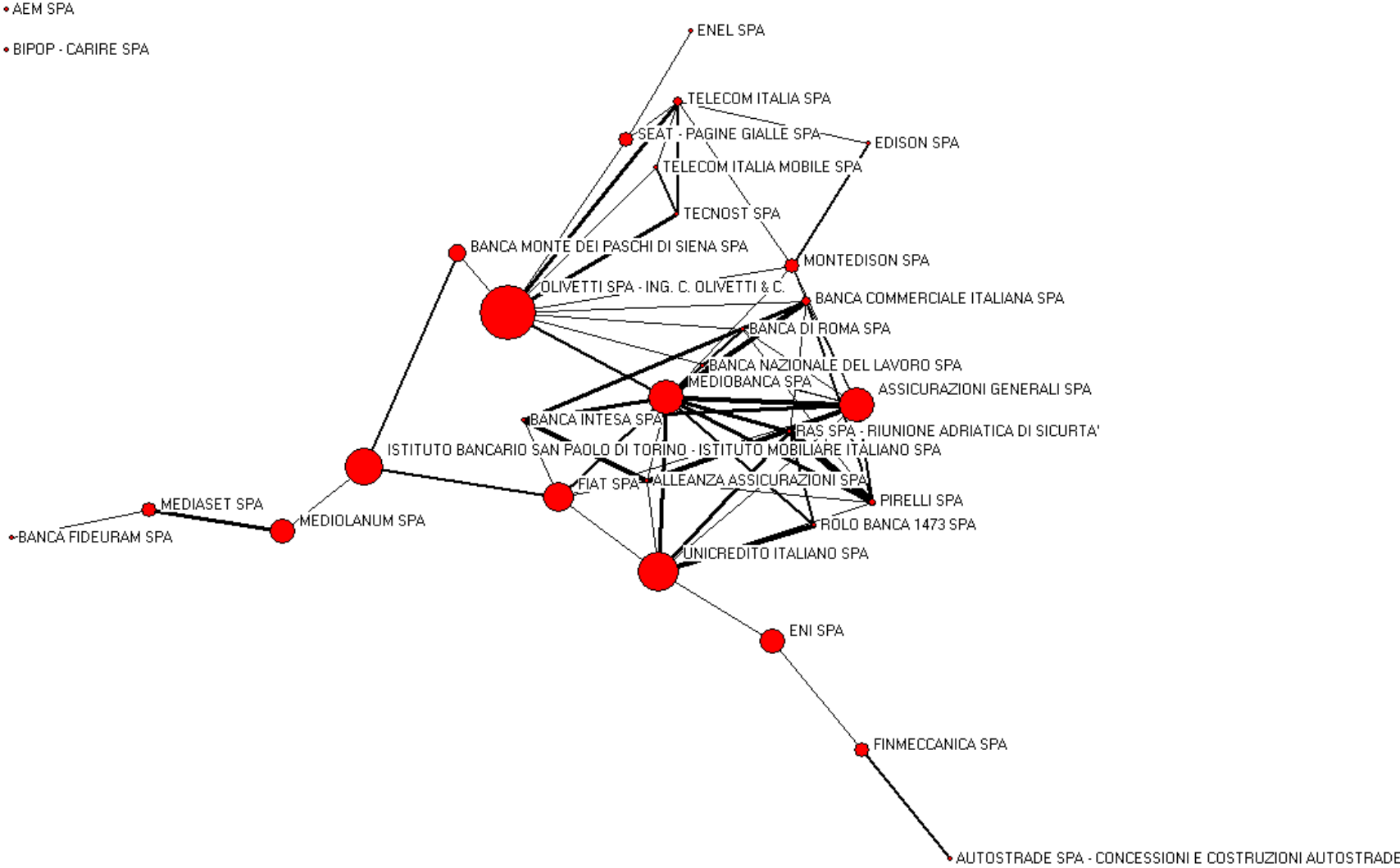
We find that interlocking directorships are negatively related with company performance. This is consistent with the ownership structure of Italian listed firms, which may be more interested in expropriating minority shareholders than in increasing profits. Interlocking may be instrumental to this strategy. We also find that the progressive reduction in the number of multiple directorships produces, during the period considered, only a slight dispersion of the network of companies. However, the structure of this network does not change over time. We, therefore, believe that the reforms implemented during this period have only been partially effective, they have somehow reduced the pathological cases of interlocking (as shown by the often insignificant effect of the number of directors with more than three directorships), but its negative effect persisted over time.

## APPENDIX

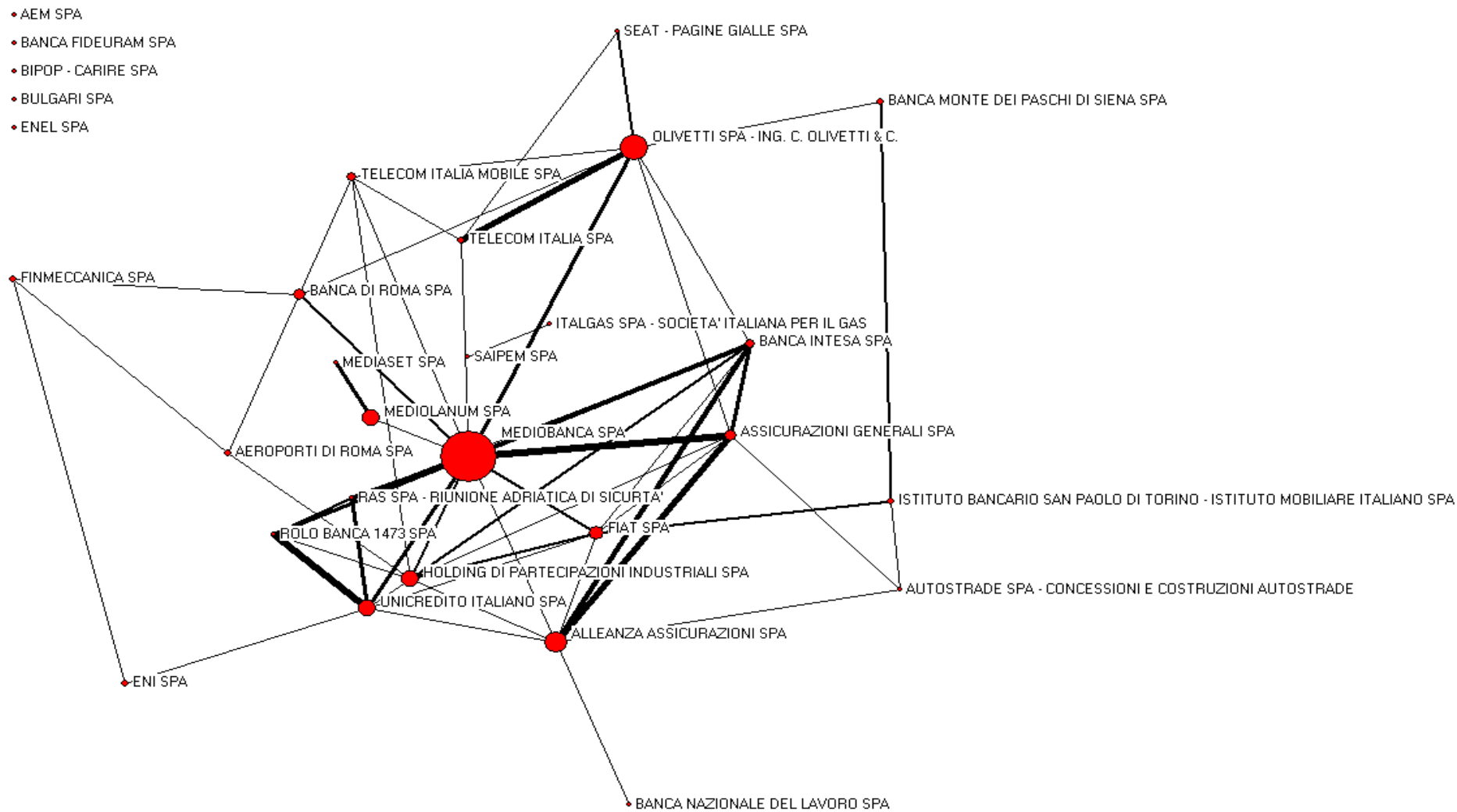
**FIGURE 1**  
**Interlocking Directorship Network, 1998.**



**FIGURE 2**  
**Interlocking Directorship Network, 1999.**

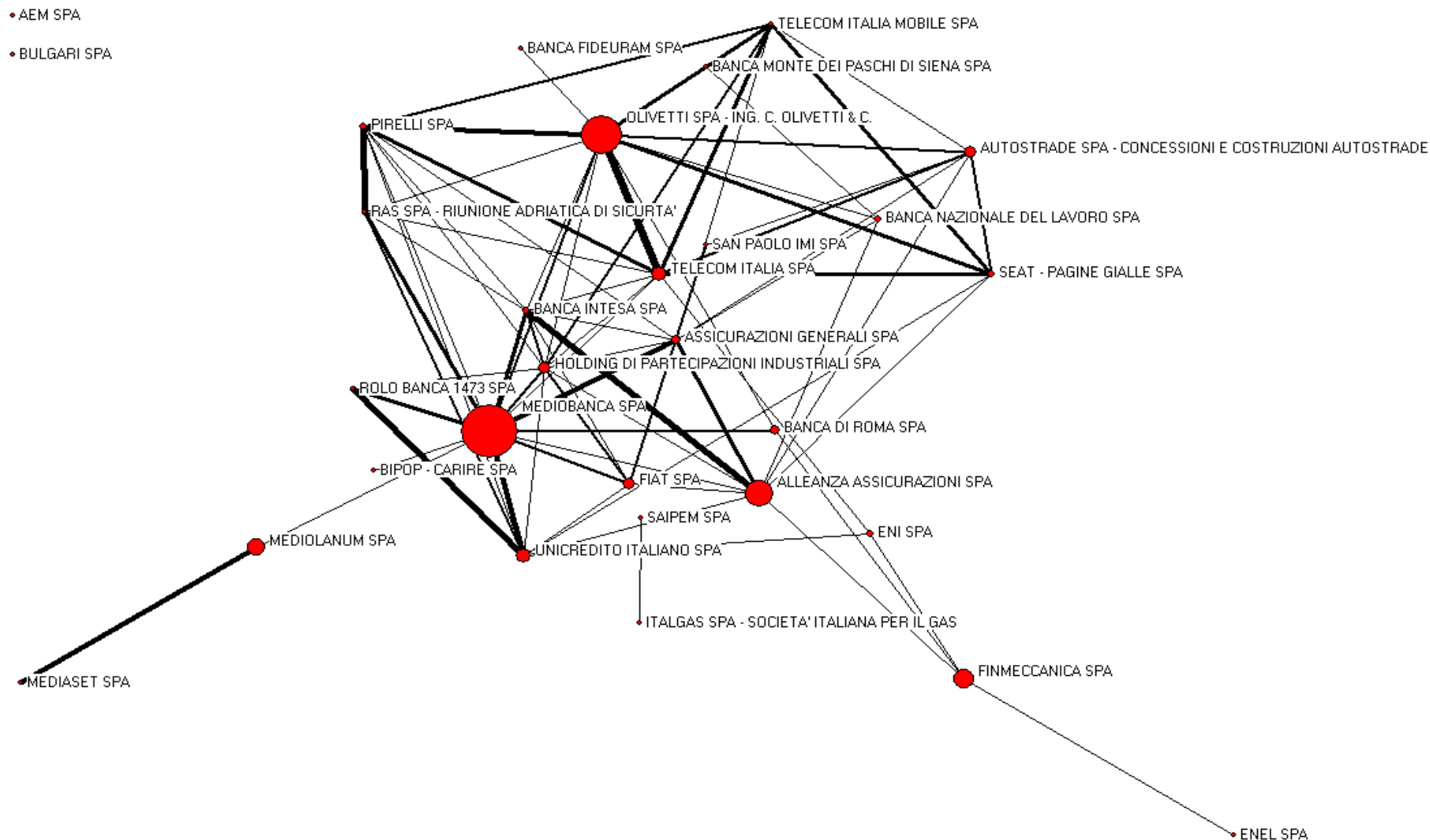


**FIGURE 3**  
**Interlocking Directorship Network, 2000.**

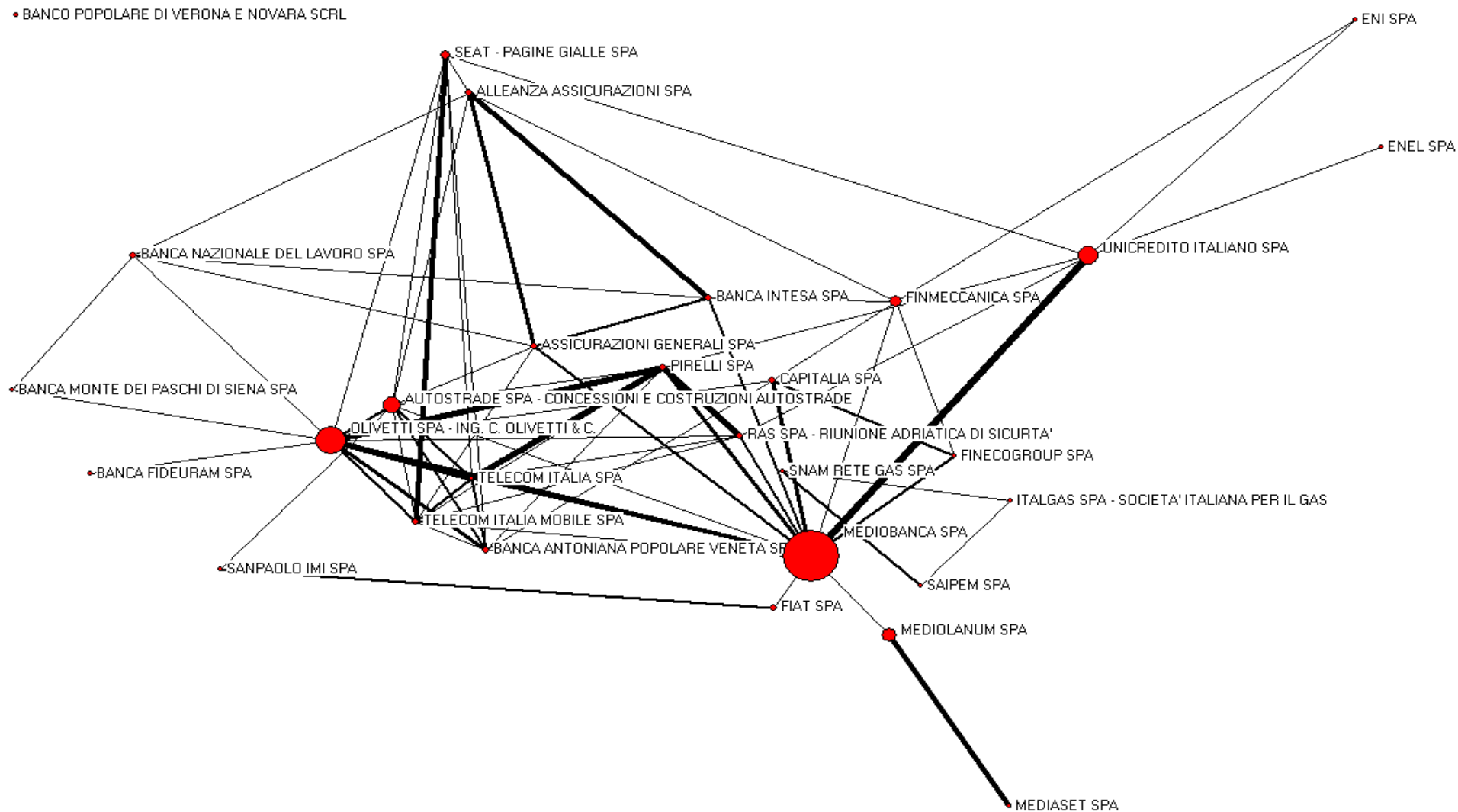




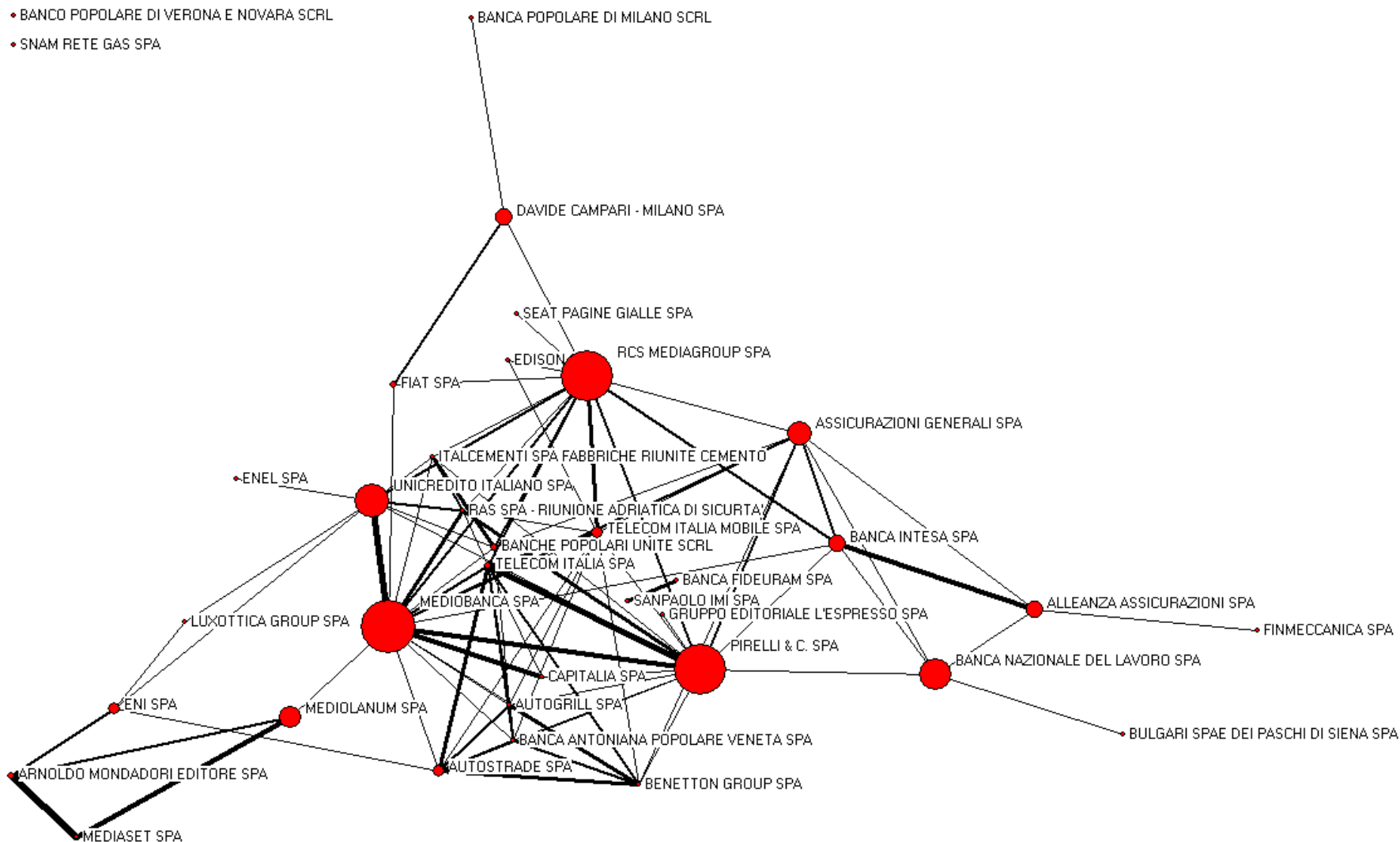
**FIGURE 4**  
**Interlocking Directorship Network, 2001.**



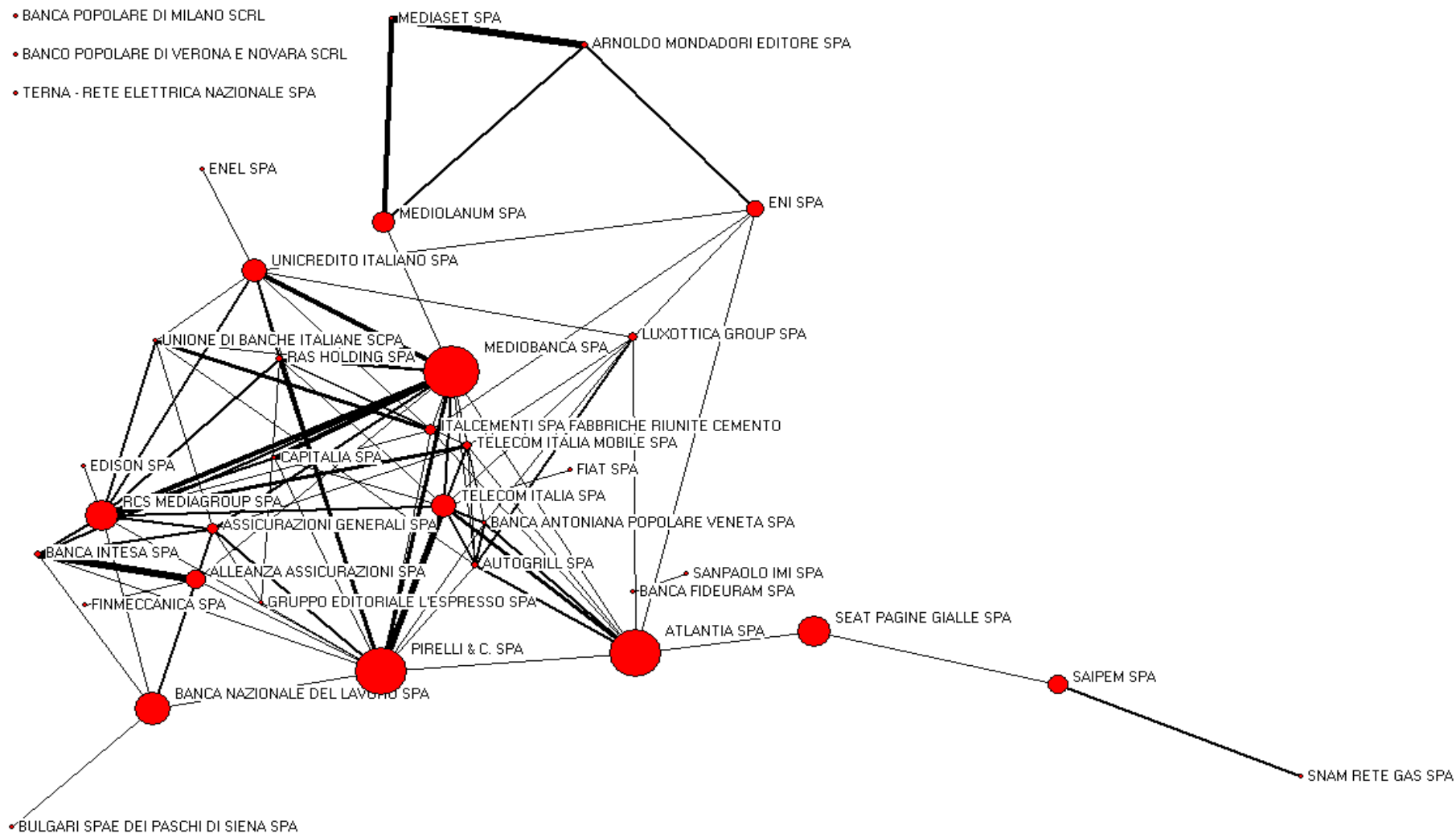
**FIGURE 5**  
**Interlocking Directorship Network, 2002.**



**FIGURE 6**  
**Interlocking Directorship Network, 2003.**

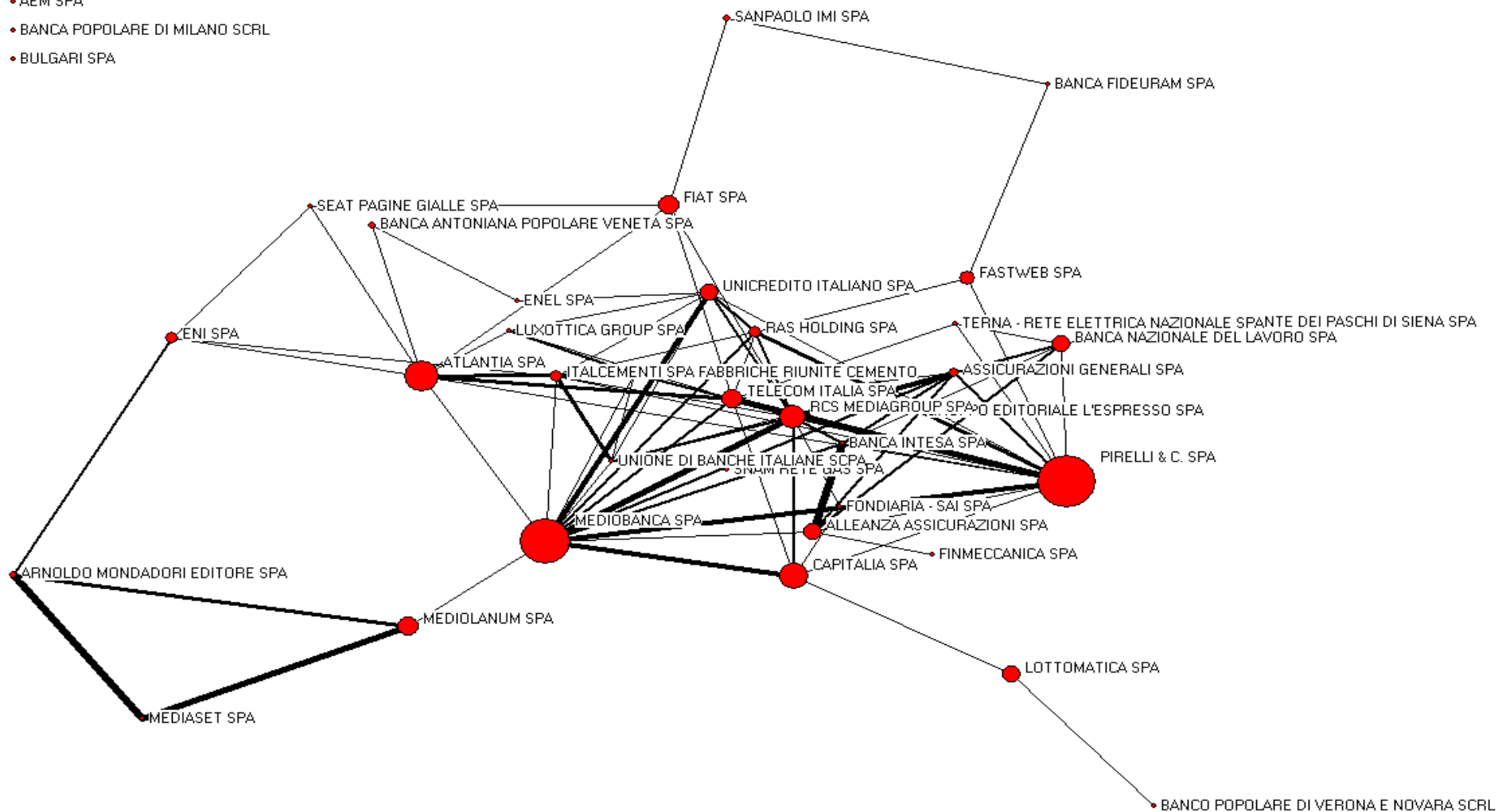


**FIGURE 7**  
**Interlocking Directorship Network, 2004.**

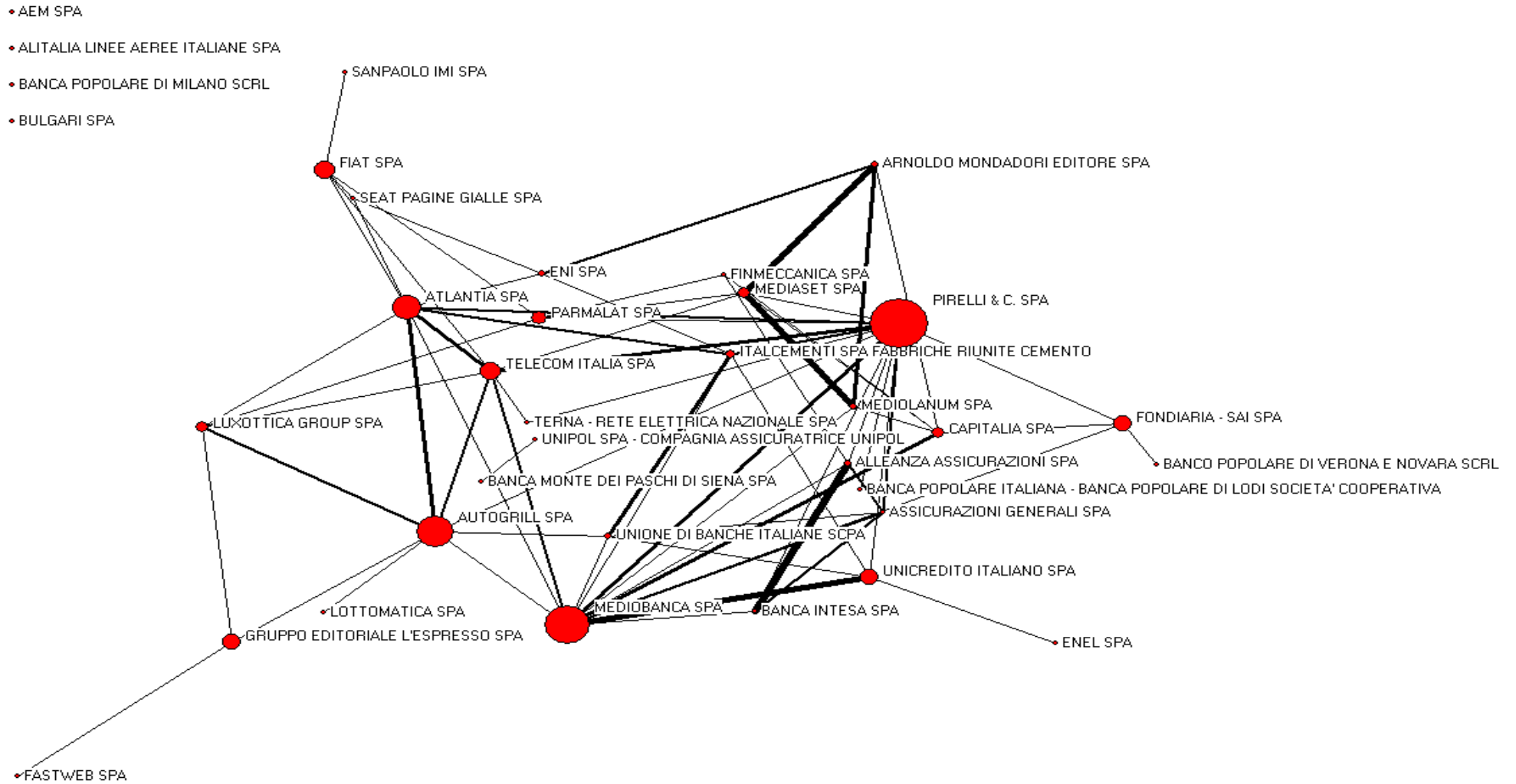


**FIGURE 8**  
**Interlocking Directorship Network, 2005.**

- AEM SPA
- BANCA POPOLARE DI MILANO SCRL
- BULGARI SPA



**FIGURE 9**  
**Interlocking Directorship Network, 2006.**



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