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Regulation of interlocking directorates in the financial sector: a comparative case study

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Abstract Network analysis techniques are used for investigating the probable effects of a change in the regulation aiming to prevent the anticompetitive effects of interlocking directorates (ID), that is the crossed presence of directors in the boards of competing firms. The case study considers a recent Italian law (Section 36 of Law Decree n. 201/2011) which prohibits ID for credit, insurance and financial companies. The ID networks of the top-100 Italian listed companies and of the financial companies in this same list are considered and compared with the analogous networks in the US. The US networks represent a benchmark given that in the US companies act under Section 8 of the Clayton Act that has banned ID since 1914. The effects on the ID networks of the new Italian law are simulated under two different interpretations of the law. If the law will be applied according to a narrow interpretation, the Italian ID network will rest substantially unaltered. However, if the law will be applied according to a broad interpretation, the ID network for financial firms will be completely modified with a network configuration very similar to the American benchmark.

Keywords Interlocking directorates · Network analysis · Impact analysis · Competition law

JEL Classification K210 · K220 · L40

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1 Introduction

An interlocking directorate occurs when a person sitting on the board of directors of a firm also sits on the board of another firm. According to Brandeis (1933) "the practice of interlocking directorates is the root of many evils. It offends laws human and divine. Applied to rival corporations, it tends to the suppression of competition". Others suggest that interlocking directorates (hereinafter ID) can be explained as the result of a strategic decision of firms, in view for example of monitoring sources of environmental uncertainty, and that the lack of direct evidence of real anticompetitive effects makes it difficult to evaluate a regulation (ABA 1984; Schoorman et al. 1981). Indeed, the main trait of ID is ambiguity (Gerber 2007). From a competition policy perspective, competing firms have to take their business decisions independently to avoid collusion and anticompetitive behaviour, while ID may reduce or eliminate competition and facilitate collusion through the exchange of information (Gonzalez Diaz 2012). Moreover, a same person sitting as director on the boards of competing firms may have an incentive to lessen competitive pressure amongst them (OFT 2010; OECD 2008). In contrast from a company perspective, ID can generate efficiencies, in terms of improving business decisions and, in some circumstances, consumer and social welfare (OFT 2010; Mizruchi 1996). In particular, vertical interlocks can facilitate tying arrangements, vertical integration, and reciprocal or exclusive dealing (OECD 2008). As a consequence, vertical ID are considered benign for consumers, except in cases where rivals can be foreclosed, and therefore pro-competitive intervention scrutinizes horizontal collusive ID only (Gabrielsen et al. 2011).

Probably, this ambiguity is a plausible explanation for the different approaches to regulation adopted by the United States (US) and the European Union (EU). In the US, Section 8 of the Clayton Act bans horizontal ID, whereas European antitrust legislation does not address the issue of ID as a separate problem (Gabrielsen et al. 2011). Namely, European jurisdiction may use general competition law to challenge interlocks that harm competition, but Articles 101 and 102 of the Treaty on the Functioning of the European Union (TFEU), and European Merger Regulation No. 139/2004 are considered inappropriate devices to this end (Ezrachi and Gilo 2006). With respect to the European regulation framework, a recent Italian law represents a bold innovation. Indeed Section 36 of Law Decree n. 201/2011 (ratified by amendments by Law 214/2011) integrated competition law with an intervention clearly inspired by the American law and aimed to reduce pervasive links among financial firms (AGCM 2008) through the prohibition of the crossed presence of the same directors on the boards of credit, insurance and financial companies.

Our aim is to investigate the probable impact of this new law. The analysis was conducted with the instruments of network analysis. The crossed presence of same persons acting as directors on the boards of different companies can be represented as a network where two firms are connected if they have at least a common member on their boards. The effects of a change of the ID regulation is investigated by analysing the ID network structure and by adopting a comparative approach.

In particular the ID network of the top-100 Italian listed companies is considered and compared with the network of the top-100 listed companies in the US. The choice of analysing the top-100 listed companies instead of the subset of financial companies permits to consider the ID among financial firms as a part of the overall ID network. This allows to consider not only the direct links among financial companies, but also the indirect links realized through non-financial companies. For Italy this choice is also coherent with previous literature underlining that ID has been an important trait of the Italian capitalism for a long time (Rinaldi and Vasta 2005) and it has survived also recent improvements in corporate governance law (Enriques and Volpin 2007; CONSOB 2012). The family control of listed companies that are often part of larger business groups (Bianchi and Bianco 2006) is in fact only a partial explanation for ID network persistence over time in Italy.

The reason of the choice of the US network in view of developing a comparative analysis is twofold. The US represents a good benchmark because it is considered as the country with the lowest level of ID in capitalist economies (Schifeling and Mizruchi 2012; Chu 2012). Indeed ID has been banned in the US since 1914 and the diffusion of ID among firms has been curbed. Moreover, Section 36 of Law Decree n. 201/2011, is explicitly inspired to the US legislation. The US ID network represents therefore the natural benchmark for evaluating the impact of the new Italian law.

The paper is organized as follows. In the next section, Section 8 of the Clayton Act and the recent Italian legislation are illustrated; the third section compares the structure of the network of the top 100 US and Italian firms, with a particular emphasis on financial firms. The fourth section contains the simulation of the impact of the recent Italian law on the network of financial firms, and a comparison with the US benchmark. The fifth part concludes.

2 An overview of the regulations

Concerns regarding monopoly and big companies were widespread at the beginning of the twentieth century in the US and as a consequence ID became a hot political issue. In 1908 the Democratic Party platform proposed a law to prohibit it, and in 1912 the platforms of all three national parties called for ID legislation to supplement the Sherman Act. In the build-up of the legislation, two committees investigated and documented the extent of ID.[1] Brandeis, an influential advisor to President Woodrow Wilson, published articles highly critical of the practice (1915). The issues raised by these committees and commentators were broader: they concerned collusion, information exchange and conflicts of interest. Policy proposals were directed toward the prohibition of almost any kind of interlock (Travers 1968).

Congress approached the problem of ID selectively, limiting both the classes of corporations and the kinds of ID subject to regulation (ABA 1984); and in fact Section 8 of the Clayton Act, enacted in 1914 and still effective today, prohibits ID for competing corporations larger than a certain size (Waller 2011; ABA 2011).

Revisions to Section 8 followed quickly upon the statute's 1914 passage, but the most significant changes took place in the last quarter of the twentieth century. In 1978 Congress enacted the Depository Institution Management Interlocks Act

[1] For the Stanley Committee see H.R. Rep. No. 62-1127 (1912). Whereas for the Pujo committee see H.R.Rep. No. 62-1593 (1913).

(1978) to discipline bank interlocks and expanded the role of agencies to grant exemption.[2] The Act supersedes the first three paragraphs of Section 8 of the Clayton Act and, in general,[3] bans directors and management officials of depository institutions from serving as directors or management officials of an unaffiliated institution if the two institutions are in the same geographic area or if they are of a certain asset size. The exclusion of banks[4] represented a significant break in the history of Section 8: substantial portions of earlier versions of Section 8 had dealt with banking interlocks, and many of the early amendments to the Section focused exclusively on modifying the banking provisions of the act. In 1990 a modification excluded relatively small companies from coverage under the law.[5] Current wording of this rule prohibits any person from serving as a director and officer "in any two corporations (…) that are (…) by virtue of their business and location of operation, competitors, so that the elimination of competition by agreement between them would constitute a violation of any of the antitrust laws" (United States Code 2013).

From an enforcement standpoint, it is interesting to note that Section 8 is not a criminal statute and persons who serve on interlocking boards, and their corporations, are not subject to criminal penalties. The most common remedy is for either the Department of Justice (DOJ), the Federal Trade Commission (FTC), and private parties, including state attorneys general, to bring an enforcement action to eliminate the unlawful interlock. The Clayton Act sets up "a scheme of dual enforcement" (ABA 2011), whereby the FTC is granted the power to issue cease and desist orders barring violations of the prohibition on interlocking boards, while private parties and DOJ must seek relief in Courts. Moreover, compliance with Section 8 is enforced by corporate counsellors—without the intervention of the authorities—, because the ID problem is self-evident (Garon 2010). As a result,

[2] A number of statutory provisions prohibit or regulate interlocking directorates in specific industries (Miller 1997). For instance, interlocks between public utility holding companies or their subsidiaries are covered by the Public Utility Holding Company Act of 1935; interlocks between telephone companies and other regulated communication carriers are covered by the Communication Act of 1934; interlocks amongst registered investment companies and underwriters, and between investment companies and banks, are covered by the Investment Company Act of 1940.

[3] Some management interlocks are exempted by statute, and some qualify for exemption under the relevant banking agency regulation without filing application. Other interlocks may be exempted if the banking agency approves a specific application. The authority may exempt a prohibited management interlock if it determines that dual service would not result in a monopoly or substantial lessening of competition and would not present safety and soundness concerns. 12 U.S.C. §§ 3201–3208.

[4] The current version of Section 8(a)(1) begins: "No person shall, at the same time, serve a director or officer in any two corporations (…) other than banks, banking associations, trust companies". The Supreme Court in the case Bankamerica Corp./United States (462 U.S. 122 (1983) interpreted the expression "other than banks" as indicating companies none of which is a bank. The lack of coverage over bank interlocks under Section 8 should not be read to mean that these interlocks are lawful, due to the Depository Institutions Management Interlocks Act.

[5] The Act applies if each of the corporations has capital, surplus, and undivided profits of more than $ 10,000,000, (adjusted for inflation to $ 29,945,000). Three exemptions are provided for interlocks viewed as having a minimal effect on competition: a) the competitive sales of either corporation are less than $ 1,000,000 (adjusted for inflation to $ 2,994,500); b) the competitive sales of either corporation are less than two percent of that corporation's total sales; c) the competitive sales of each corporation are less than four percent of that corporation's total sales. See Revised Jurisdictional Thresholds for Section 8 of the Clayton Act, 79 Fed. Reg. No.15, 3813.

directors and companies tend to act accordingly to Section 8 and there is not much litigation (Waller 2011; Rosch 2009). According to Wilson (1976): "the Department of Justice and Federal Trade Commission, in their enforcement of Section 8 of the Clayton Act, have pursued a policy on director interlocks which has been punctuated by a few bursts of mild activity and then followed by long periods of benign neglect". This sleepy enforcement effort has been so peculiar that it has also been noted by courts: the Supreme Court rejected a proffered interpretation of the law exactly maintaining that the government had not attempted to enforce that interpretation for over 60 years (ABA 1984).

In contrast, the European competition law does not follow the per se approach of the Clayton Act on ID amongst competitors (Rosch 2009). This regulatory gap, however, did not discourage antitrust authorities to assess and pursue personal links that harm competition through three alternative regulatory instruments: cartel prohibition,[6] the abuse of a dominant position,[7] and merger control.[8]

As anticipated, these legal provisions can be used to monitor and remove dangerous links (Ezrachi and Gilo 2006): in some cases antitrust authorities used traditional antitrust tools by imposing structural (severance of ID) or behavioural remedies ("Chinese walls") to reactivate competition (Moavero Milanesi and Winterstein 2002; Giannino 2009). The existing regulation appears to be able to comprehensively cover illicit personal links (Ezrachi and Gilo 2006). The problem regards, in particular, the possibility to use antitrust procedures for collusive behaviour for which there is not an evident proof of a cartel. Personal links amongst competitors can be considered prerequisites for the realization of a stable cooperative mechanism, because they permit both reaching a consensus regarding given actions and also the reduction of the time that is necessary for unmasking deviation and for effectuating punishment (Buccirossi and Spagnolo 2008; Motta 2004). However, it may not be easy to establish the presence of an agreement or just a concerted practice among competing firms, which Article 101 TFUE forbids. In many cases, there are only separate arrangements between the director and the respective companies that are not pursuable with competition law (OECD 2008). Moreover, the abuse of a dominant position, apart from several controversial points for identifying requirements (Wish 2009), does not appear an incisive legal instrument for eliminating anticompetitive ID, as for example the sharing of sensible information that can be carried out by directors of a firm without relevant market power (Ghezzi 2011). Furthermore, the EU antitrust enforcers are limited to deal with ID in merger control regulation where ID is considered a factor facilitating co-ordination among interlocked firms. In most instances the preferred remedy is the elimination of the structural link and the end of the interlock; in other cases authorities required members of management and supervisory boards to abstain from discussing and voting certain proposals in view of reducing dangerous connections[9] (OECD 2008).

6 Article 101, TFEU.

7 Article 102, TFEU.

8 Council Regulation No. 139/2004 of 20 January 2004, on the Control of Concentrations between Undertakings, (the EC Merger Regulation) OJ L24/1, (2004).

9 There is a general skepticism on the efficacy of a "Chinese Wall" as a remedy to risks of co-ordination from interlocking directorates, because it is difficult to monitor parties' compliance and to impede the

The Italian competition rules are modelled on European policy (Wish 2009). Italian lawmakers have recently innovated on this legal framework by introducing a new law clearly inspired by the US regulation of ID. ID is an endemic phenomenon in Italy (Baccini and Vasta 1997) and some analysts suggested that the most natural form of regulation would be addressed under a general ban (Assonime 2010). The Italian policy maker opted instead for a sector based approach by introducing a set of provisions restricted to the financial market. More specifically, Section 36 of the so called "Rescue-Italy Law Decree" (Law Decree 201/2011, ratified by amendments by Law 214/2011 in force as from 28 December 2011), aiming to improve competition in the financial system has provided a new incompatibility regime for corporate governance bodies of certain companies. The first part of the rule foresees that no member of management boards, supervisory boards and statutory board of auditors,[10] as well no top official ("Funzionari di vertice"), of companies or of corporate groups which are active on banking, insurance and financial markets shall serve, at the same time, in "corresponding" positions in competing companies or corporate groups. Section 36 (2) clarifies that "competing companies or corporate groups" are companies or corporate groups which are active on the same product and geographic markets and which have no relationships of control within the meaning of Section 7 of the Italian antitrust law. Paragraph 2-*bis* of Section 36 contains the possibility for a director being in an incompatible situation to opt for one of the offices; this choice must be exercised within 90 days from the appointment, though for the first application of the Decree such time-limit is extended to 120 days. Wherever the option is not exercised, the person concerned must be dismissed from any of such offices; termination must be declared by the competent corporate bodies within 30 days from the expiration of the above time-limit or from the date that the infringement was acknowledged. In case of failure to act by the competent corporate body, the termination must be declared by the surveillance authority of the considered market[11] (Ghezzi 2012; Drago 2012).

Footnote 9 continued

sharing of sensitive data among persons sitting in the same corporate board. See European Commission, Blokker/Toys "R" US, case IV/M.980, in OJ L316, 25.11.1998; European Commission, Hoechst/Rhone Poulenc, case M.1378, in OJ C42, 18.02.2004.

[10] The policymaker adopted a general wording to cover every possible corporate governance option. In that regard, the Italian reform of corporate law of 2003 allowed corporations to choose among three different models of corporate governance: the traditional model, the two-tier system and the one-tier system. Companies that adopt the traditional model are governed by three corporate bodies: the shareholders' meeting (assemblea degli azionisti), the board of directors (consiglio di amministrazione) and the board of auditors (collegio sindacale). In addition to these corporate bodies, the Civil Code requires that corporations appoint an external auditor that is not considered a corporate body. In the two-tier system of corporate governance the shareholders' meeting (assemblea degli azionisti) appoints the members of the supervisory board (consiglio di sorveglianza), which is the monitoring body of the corporation. The supervisory board then appoints the management board (consiglio di gestione), whose principal function is to manage the corporation. As in the traditional model, in the two-tier system of governance the shareholders' meeting also appoints an external auditor, which performs functions similar to those performed in the traditional model. In the one-tier model of corporate governance the shareholders' meeting appoints the board of directors, which manages the corporation, while the management control committee—whose members are selected among, and appointed by, the directors who sit on the board—performs the monitoring function (Ghezzi and Malberti 2008).

[11] The law text is available at: http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legge:2011;201.

Although the purpose of Section 36 is clearly the promotion of competition (Dell'Atti and Marroni 2012), the law contains some ambiguities. These ambiguities originated a harsh and ongoing interpretative debate among authorities, associations and law firms (AGCM 2011; Banca d'Italia et al. 2012; Assonime 2012; Assosim 2012). The main question, the one that will be considered in our analysis later on, is how to determine whether two corporations are competitors and which markets are covered by the ID ban. However, the ambiguity of Section 36 originates also by the use of the expression "funzionari di vertice" (top officials) that is not defined in Italian corporate law. This wording does not allow to precisely and unambiglously identify people subjected to the ban. A literal interpretation of Section 36, supported by the preparatory papers of the law, suggests that all the managers of a company are "funzionari di vertice" and are therefore subjected to the law. Other interpreters suggest that the ambiguity of the wording requests a case by case approach. A "funzionario di vertice" is subjected to the law only if she or he has an effective decision power or retain important information about companies. This interpretation prevents to consider the law as stating a per se violation, given that it explicitly requires a specific assessment of the power and information available to the considered manager before the law is applied (Ghezzi 2012). The interpretative issues appear to be unsolvable, because there is not a legal basis to clarify the ambiguities of the law and amendment through authority's guidelines appears to be ineffective.[12]

3 The interlocking directorship networks: Italy versus US

As a first step in our empirical analysis we need a context for discussing the impact of the different regulations of ID. This context is provided by considering the boards of directors of the top 100 companies in capitalization in the US and Italy. The databases [available on request from the authors] was constructed from the S&P Capital IQ [https://www.capitaliq.com/home.aspx] for the US, and from the Italian Stock Exchange for Italy. Italian data refer to the composition of the boards up until the 31st of December 2010,[13] US data refer to the composition of the boards in 2011.[14]

For Italy and the US, all effective members of corporate bodies are considered, because both Section 36[15] and Section 8 do not envisage individual exemption. The database was analyzed by the package *Pajek* (de Nooy et al. 2011).

Some empirical evidence is already known. The Italian network consists of a high number of companies linked to each other through directors serving on several company boards at the same time (Santella et al. 2007; Drago et al. 2011). The US network shows a high number of companies connected to each other, but such

[12] Nevertheless, the authorities issued a set of guidelines to clarify the application of Section 36 (Banca d'Italia et al. 2012).

[13] Except for *Fiat Industrial* dated 1st January 2011, when the division from *Fiat s.p.a* became effective.

[14] Data was collected between the 1st May 2011 and the 1st June 2011.

[15] Section 36 is applicable to the three Italian corporate governance models introduced by the corporate law reform of 2003: the traditional model, the two-tier system and the one-tier system.

connections are made through directors who tend to have just two board positions at the same time. This is considered as an evidence that in the US the ID network structure is not designed in view of organizing systemic collusion (Chu 2012; Drago et al. 2009; Bearden and Mintz 1985). Our results, as drawn in Figs. 1 and 2, confirm this prevailing wisdom. Data contained in Table 1 underline that Italian ID network is more connected and centralized than the US one. In particular the density (i.e. the ratio of the actual number of links among companies to the maximum possible number of links) of the Italian network almost doubles the US density. For analyzing the role of each company in the network it is usual to consider its degree, that is the number of links in which each company is involved. A higher degree value indicates that a firm has a relatively high number of links with other firms and it is therefore more central in the ID network. Table 2 compares the frequency distributions of the Italian and the US firms according to their degree values. The average degree and the median degree in Italy nearly double that of the US. The Italian firms show a distribution skewed toward higher degree values: that is in Italy the top-100 companies tend to have more links than in the US. Tables 4 and 5 of the appendix provide other usual centrality measures testifying that Italian companies tend to have higher values of centralities than the US firms. Moreover, the Italian network is also more centralized in terms of the overall degree centralization and closeness centralization (Wasserman and Faust 1994).

It is not easy to explain the different configurations of the two ID networks. From our limited point of view we can suggest, first of all, that in the US, companies probably act according to Section 8 of the Clayton Act. Indeed, the simple existence of a per se rule may deter companies from using ID as an instrument for collusive strategies. However the historical lack of regulation of ID in Italy tends to allow the use of ID as an instrument for the reduction of competitive pressure amongst companies. A relevant question is about the links among companies that belong to a same business group. These links are expression of de iure or de facto control relationships (Fattori 2010), and they are not covered by Section 8.[16] The diffusion of these links in the Italian and US network deserves a careful examination. The information available to the authors cannot provide a complete reconstruction of the control relationships amongst all of the firms considered. Therefore a two steps strategy is adopted. In the first step, groups of firms are identified by using network analysis techniques. In the second step information about ownership structure (such as pyramids, majority of voting capital, shareholder agreements, identity of owners) is explored.

In the first step, for identifying groups of firms a working hypothesis is adopted according to which the strength of the relationship between two firms is approximated by the number of common directors sitting on their boards (for a similar strategy in a different context see Baccini and Barabesi 2010). The network of companies is

[16] Although the rule is silent on this subject, some practical issues allow to argue that it is unrealistic to require internal competition among members of a single business unit and that a limited number of interlocks between affiliated companies may promote greater efficiency in the operation of the entire unit (ABA 1984). In Copperweld Corp. v. Independence Tube Corp. the Supreme Court explained that: a parent and its wholly owned subsidiary have a complete unity of interest. Their objectives are common, not disparate; their general corporate actions are guided or determined not by two separate corporate consciousnesses, but one (ABA 2011). Copperweld Corp./Indep. Tube Corp., 467 U.S. 752 (1984).

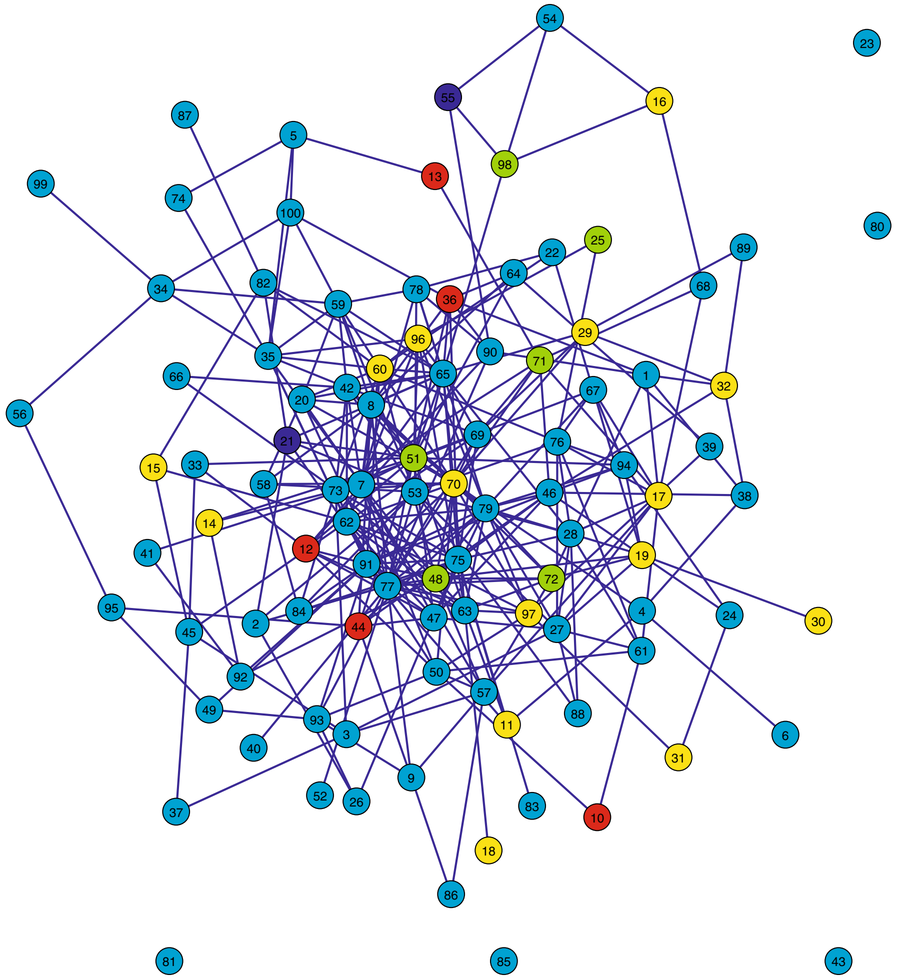

Fig. 1 The interlocking directorship network of the top 100 companies in Italy (2010). *Red* financial; *Green* insurance; *Yellow* banks; *Blue* real estate investment companies; *Cyan* other non-financial firms (Color figure online)

characterized as a valued network, where the lines have a value indicating the strength of the tie linking two vertices (Wasserman and Faust 1994). In our case the value of the line is the number of directors sitting on the board of the two companies linked by that line. The idea is that the observation of the level of overlapping among boards makes it possible to infer the level of proximity of companies. At one extreme, there is the case of two firms with two boards composed by the same directors; they can coordinate perfectly their decision without information asymmetries. At the other extreme, there are two firms without common directors: that is without coordination and without common information. So if we consider the number of common directors—technically the value of the link—as a measure of the strength of the link between two firms, it is possible to search for cohesive subgroups of firms in the network. A cohesive subgroup

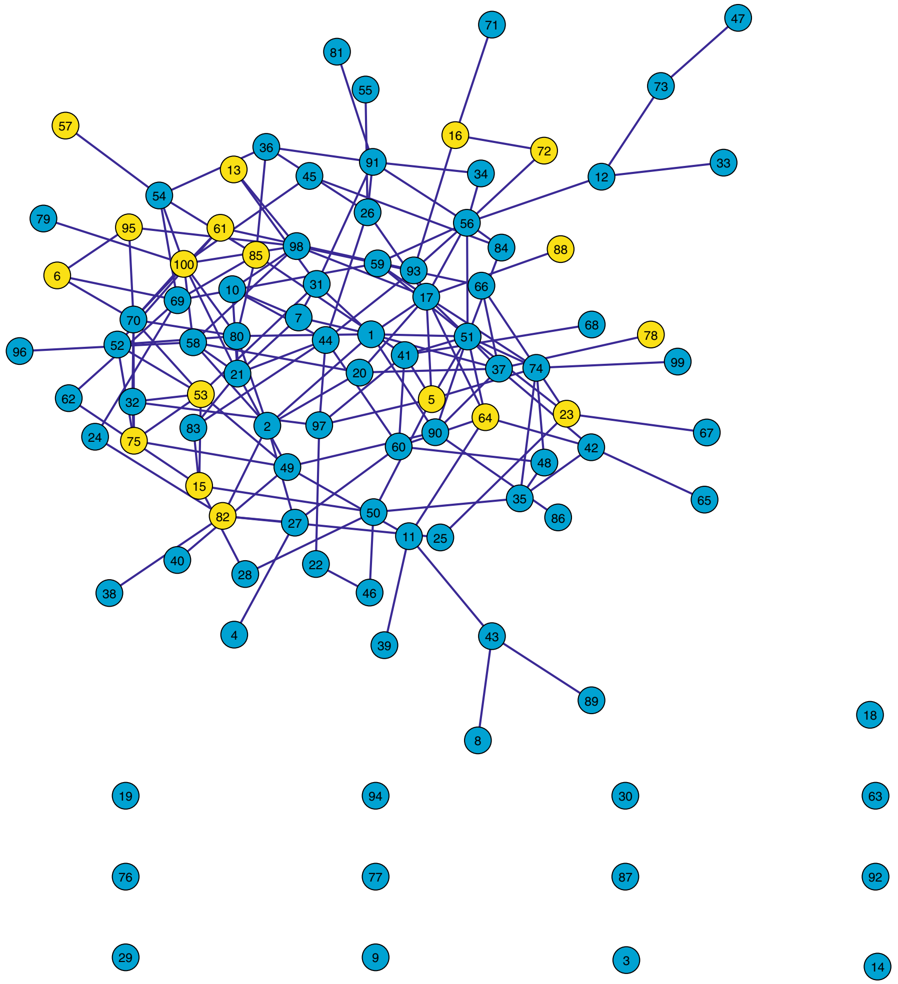

Fig. 2 The interlocking directorship network of the top 100 companies in the US (2011). *Yellow* financial and banks; *Cyan* other non-financial firms (Color figure online)

is a subset of companies among which there are relatively strong ties (Wasserman and Faust 1994). More technically, in a valued network a cohesive subgroup is a subset of vertices among which ties have a value higher than a given threshold. In our case, a cohesive subgroup of companies is a set of companies sharing a number of directors equal to or higher than a chosen threshold. A minimum value of threshold of 2 was chosen, because this allows to consider as potentially relevant for group identification all links generated by more than one common director. The group identification consists in a two steps procedure. In the first step the network is *sliced* by removing all the links with value 1, that is all the links generated by only one common director. In the second step a technique for cohesive subgroup identification (weak component search) is applied to the sliced network (de Nooy et al. 2011).

Table 1 The interlocking directorship networks of the top 100 companies

	ITALY	US
No. of firms	100	100
No. of seats	1,621	1,386
No. of directors	1,411	1,227
(of which) women	68	200
Average seats per firm	16.21	13.86
Average seats per director	1.15	1.13
Isolated firms	5	13
Number of links	312	167
Number of links with value #1	256	155
Number of links with value #2	25	12
Number of links with value >2	31	0
Density	0.063	0.034
Average degree	6.24	3.34
Median degree	5	3
Max degree	25	12
Degree standard deviation	5.15	2.64
Degree centralization	0.193	0.097
Closeness centralization	0.287	0.239
Betweenness centralization	0.110	0.160

Italy (2010) and US (2011)

Despite the low threshold chosen, in the US network no cohesive subgroups of firms can be individuated. In fact in the US network, 155 lines out of 167 have value 1, being generated by only one common director; the other 12 lines have value 2. As a result no cohesive subgroups emerge in the US ID network.

For Italy data are completely different. Table 3 shows the distribution of line values. Lines with a value equal or greater than 2 are 56 out of a total of 313; these 56 lines represent relative strong relationship linking 49 firms out of the 100 considered.

The search for cohesive subgroups results in 9 subgroups, as illustrated in Fig. 3, for which information about control relationship have been collected. Five subgroups are composed by pairs of companies (*Marcolin-Tod's*, *Banco Popolare-Credito Bergamasco*, *IGD-Unipol*, *Fondiaria Sai-Milano Assicurazioni*, *Banca Popolare Emilia Romagna-Marr*; the latter two are between financial companies). A sixth subgroup is formed by 3 companies (*Edison-Credito Valtellinese-A2A*) where a bank is linked with two companies operating in the energy industry. The seventh group is formed by 4 companies, three of which (*Mondadori Editore-Mediolanum-Mediaset*) are owned by a same family (Berlusconi) and the fourth is ENI, the largest Italian multinational oil and gas company.

The eighth subgroup contains 5 companies (*Piaggio & Co.-Gruppo Ed. L'Espresso-Cir-Cofide-Sogefi*). *Cir* is the center of the group, having links with all other companies and serving as broker amongst *Piaggio & Co.-Sogefi-Cofide*. The last is the holding of the De Benedetti family.

Table 2 Frequency distributions of firms according to their degree

Degree	Italy Number of firms/ frequency	Italy Cumulative frequency	US Number of firms/ frequency	US Cumulative frequency
0	5	5	13	13
1	8	13	21	34
2	12	25	11	45
3	13	38	10	55
4	8	46	12	67
5	9	55	13	80
6	6	61	7	87
7	6	67	5	92
8	8	75	5	97
9	5	80	1	98
10	3	83	1	99
11	3	86	0	99
12	4	90	1	100
13	2	92		
14	1	93		
17	1	94		
19	4	98		
22	1	99		
25	1	100		

Italy (2010) and US (2011)

The ninth and last cohesive subgroup of Fig. 3 includes 27 companies. At the centre there is *Mediobanca* having links with seven companies (*RCS Mediagroup, Italmobiliare, Pirelli & Co., Benetton Group, Unicredit, Generali, Telecom*), whereof two that are active in financial industry (*Generali*, *Unicredit*). On the upper right *Telecom* is the bridge toward *Intesa San Paolo*; at the top *Generali* is the bridge toward *Banca Generali*; on the upper left *Unicredit* is the bridge toward *Credito Emiliano*; on the lower right *RCS Mediagroup* and *Italmobiliare* are the bridge to *UBI Banca*. Inside this subgroup we can identify companies among which there are lines with high value: *Autostrada TO-MI-Sias* with seven common directors; *Autogrill-Benetton Group* with five shared councillors; *Lottomatica-Dea Capital*, *Italcementi-Italmobiliare*, *Rcs Mediagroup-Telecom* and *Exor-Fiat* with four common directors.

When exploring these relationships, in terms of relevance for Section 36, it is interesting to note a combination of familial and ownership links. Indeed, from an ownership point of view many links regard listed companies controlled by another listed company (pyramidal groups), shareholder coalitions (voting or meeting agreement), and declared control mechanisms realized with less than 50 % of capital (de facto control).[17]

[17] Pyramids, cross-ownership and shareholder alliances tend to be the most widespread control enhancing mechanisms used by Italian listed companies. See CONSOB (2012), *Rapporto 2012 sulla corporate governance delle società quotate*, available at: www.consob.it.

Table 3 Line values in Italian top-100 companies network

Lines value	Frequency	Cumulative frequency
1	257	257
2	25	282
3	17	299
4	9	308
5	2	310
6	0	310
7	2	312
8	1	313

In particular, *Milano Assicurazioni* is subject to the control of *Fondiaria Sai* (with 60.579 % of voting capital) in turn controlled by *Premafin,* the holding company of *Unipol Group*; *Credito Bergamasco* belongs to *Banco Popolare Group* what has 77.428 % of voting capital in the first one. Della Valle family, owner of *Tod's,* wields de facto joined control on *Marcolin*[18] taking part of a formal pact on voting capital.[19] As previously noted, the Berlusconi family by means of the holding company *Fininvest Spa,* rules *Mondadori Ed.*, *Mediaset* and *Mediolanum*, holding respectively the 38.618 % of voting capital on the first one, the 50.408 % of voting capital on the second one, and the 35.886 % of voting capital on the third.[20] The De Benedetti family, via the holding company *Cofide*[21] exerts a control power on *Cir,*[22] another holding company of an Italian industrial group active in five business areas (energy, media, automotive components, healthcare, non-core investments) whereof *Sogefi* is the firm operative in automotive components sector, as 56.46 % of voting capital is in fee of *Cir,* and *Gruppo Editoriale L'Espresso,* the group active in media industry, because 54.956 % of voting capital belongs to *Cir*. On the subgroup composed by 27 companies we can notice that: *Sias* and *Autostrade TO-MI* are subject to the direction and coordination activity of *Argo Finanziaria,* as it has in the second one 50.579 % of voting capital and *Autostrade TO-MI* holds 61.705 % of *Sias's* voting capital. The Benetton family, through *Edizione s.r.l.* and *Schemattrentaquattro s.r.l.*, controls *Autogrill,* with 58.28 % voting capital, *Benetton Group,* holding 67.08 % of voting capital and *Atlantia*, having 43.208 % of voting capital.[23]

[18] Andrea and Diego Della Valle hold jointly the 30.100 % of voting capital.

[19] Partners of the coalition are: Giovanni Marcolin Coffen (10.423 % voting capital), Maria Giovanna Zandegiacomo (1.409 % voting capital), Cirillo Coffen Marcolin (2.234 % voting capital), Maurizio Coffen Marcolin (2.234 % voting capital), Monica Coffen (3.800 % voting capital), Inmar s.r.l. (20.100 % voting capital), ADV Partecipazioni s.r.l. (15.050 % voting capital), DDV Partecipazioni s.r.l. (15.050 % voting capital).

[20] In *Mediolanum Group* there is a joint stake amongst Fininvest spa and Doris Group.

[21] Controlled by Carlo De Benedetti for the 52.033 % of voting capital: whereof 34.343 % by Carlo De Benedetti & Figli S.a.p.a. - 17.241 % by Bim Fiduciaria S.p.a.- 0.449 % by Romed S.p.a.

[22] Carlo De Benedetti has, via Cofide s.p.a., 45.92 % of voting capital.

[23] Via Schemaventotto s.p.a. (34.243 % of voting capital), and Sintonia S.A. (8.965 % of voting capital).

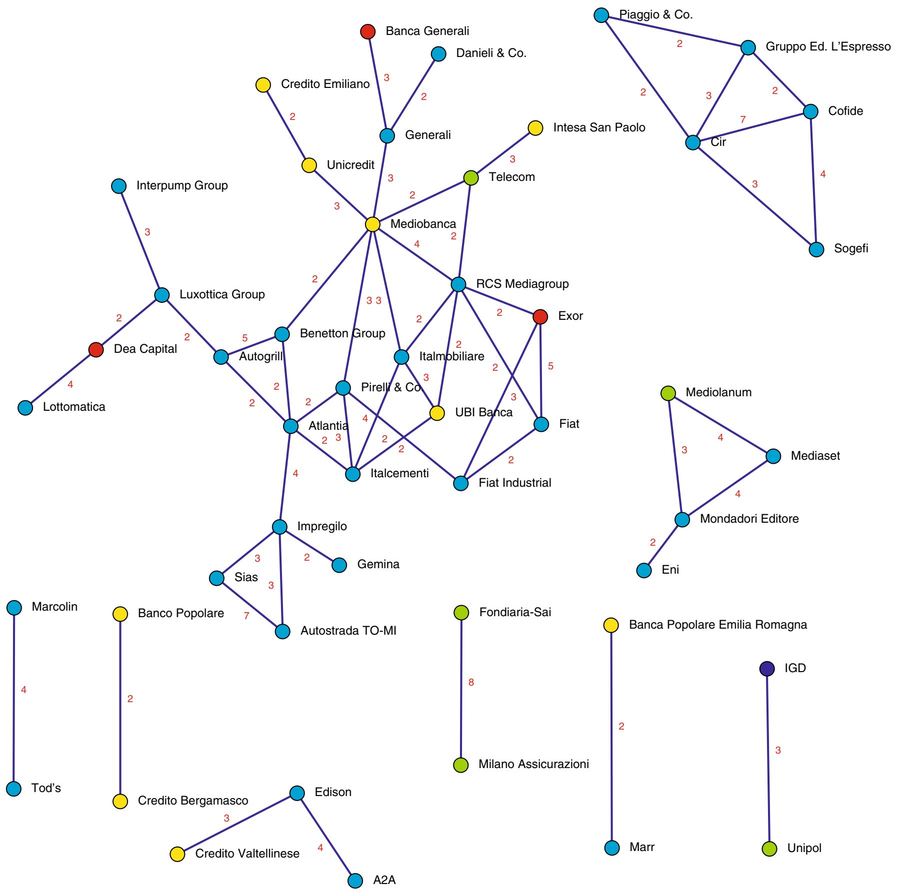

Fig. 3 Cohesive subgroups in the Italian network (weak components in 2-slices)

Italcementi and *Italmobiliare* are controlled both by the Pesenti family, via *Epifarind B.V.* which keeps 47.26 % (the majority of voting capital) in *Italmobiliare* which, in turn, controls *Italcementi* with 60.26 % of voting capital. The Agnelli family controls *Exor*, *Fiat* and *Fiat Industrial:* these listed firms are subject to the control of *Giovanni Agnelli & Co. S.a.p.az*. which manages respectively in *Exor* the 52.66 % of voting capital, in *Fiat* (via *Exor)* the 30.419 % of voting capital, and in *Fiat Industrial* (via *Exor*) the 30.417 % of voting capital. *Assicurazioni Generali s.p.a.* is the holding company which owns *Banca Generali,* as the insurance firm holds the 65.453 % of voting capital of the bank. Finally, the Drago and Boroli families, through De Agostini s.p.a.,[24] control *Dea Capital* with 58.3 % of voting capital and *Lottomatica* with 60.782 % of voting capital.

[24] Controlled in turn by B&D holding of Marco Drago & Co. s.a.p.a.

From this summary description it is possible to infer that in Italy the existence of cohesive subgroups is the result of the familial capitalism and ownership concentration, traditional traits of Italian listed companies (CONSOB 2012; Faccio and Lang 2002). As for the financial sector, the subset of financial companies included in the top-100 firms in Italy (28 firms) and the US (18) is considered, each one with its ID network. In the US network 11 companies out of 18 (61 %) are isolated (*Simon Property Group Inc., The Bank of New York Mellon Corporation, MetLife Inc., Citigroup Inc., Mastercard Incorporated, Bank of America Corporation, The Goldman Sachs Group Inc., US Bancorp., Wells Fargo & Company, American Express Company, Morgan Stanley*). There are two pairs of firms sharing only one director (*American International Group Inc.* with *Visa Inc.*; *BlackRock Inc.* with *PNC Financial Services Group Inc.*); and a triad where *JPMorgan Chase & Co.* shares one director with *Berkshire Hataway Inc.* and one with *Prudential Financial Inc.*

In contrast, Fig. 4 points out that in Italy only 4 out of 28 financial companies are isolated (14 %: *Banca Carige, Banco di Desio e Brianza, Azimut Holding, Banca Popolare di Sondrio*).

Figure 4 shows that *Mediobanca* is the centre of the Italian financial network, with 6 links toward banks (*Unicredit* and *Credito Artigiano*) or insurance companies (*Generali*, *Fondiaria-Sai*, *Milano Assicurazioni*, *Mediolanum*), these latter acting as bridges with other banks. In particular *Fondiaria Sai* is the bridge toward *Banco Popolare* and *Intesa San Paolo*; *Generali* is linked to *Banca Mps, Exor, Beni Stabili, Dea Capital, Banca Generali,* and *Ubi Banca*; *Mediolanum* is the bridge toward *Banca Popolare di Milano* and *Banca Intermobiliare*. We can observe that *Generali* has seven connections (*Banca Mps, Exor, Beni Stabili, Dea Capital, Banca Generali, Ubi Banca, Mediobanca*), not one of which with insurance players. These links may be able to generate indirect information channels with competitors. The indirect form of ID is the weakest and less discernible and occurs when two rivals with no directors in common are linked through a non-competitor company (or companies) with whom they share directors (Schoorman et al. 1981). In this perspective, 3 links of *Generali* could constitute a bridge to insurance companies: in the centre of Fig. 4, *Mediobanca* could act as bridge with *Mediolanum, Milano Assicurazioni* and *Fondiaria Sai*; on the upper right *UBI Banca* could serve as an intermediary with *Cattolica Assicurazioni.* This evidence reinforces other empirical surveys (Drago et al. 2011; AGCM 2008) documenting that the overwhelming majority of Italian financial operators were linked by ID in a stable and pervasive way.

4 Two scenarios on how to tackle the Italian financial network through Section 36 of Law Decree 201/2011

The recent Italian legislation (Section 36 of Law Decree 201/2011) aims to remove the anomaly represented by the wide diffusion of ID among financial companies. The impact of this new regulation on the ID network of financial companies depends on the interpretation of the law, as we anticipated. Two interpretations are plausible.

According to the first broad interpretation of Section 36, the aim of the law is to prohibit personal links inside the financial sector on the whole. So all financial companies must be considered as competitors and then be subjected to the law because they offer the same goods and services (banking services, insurance and saving products) to customers (AGCM 2008). However, a second and narrower interpretation of Section 36 considers as the reference market of a financial firm the one in which it has the biggest share of revenues, according to the method elaborated by the Italian Stock Exchange. For example, a company is qualified as a bank, if the biggest part of its revenue is generated in the banking sector. As a consequence, two firms are competitors only if they have a predominance of revenues in a same market. This interpretation is inspired by the American regulation system of ID which expressly prohibits ID among firms competing in a same markets.

If the first broad interpretation is adopted, then 26 out of 28 financial companies can be considered as subjected to Section 36. The only exceptions are two real estate investment companies (*Beni Stabili* and *Igd*) which, according to the authorities (Banca d'Italia et al. 2012) do not operate properly in financial market, as they offer ancillary services. If the second narrow interpretation is adopted, it is not possible to define *ex ante* the number of firms to which the regulation must be applied, because it depends on the revenues share obtained by the companies for each sector. However, following the method used by Italian Stock Exchange, it is possible to classify 15 companies as banks, 6 as insurance, 5 as belonging to financial services sector and 2 as real estate investment. Section 36 acts inside each of the small groups of rival companies, with the only exception of the two companies that are classified as real estate because they are let off by the application of Section 36 (Banca d'Italia et al. 2012).

The effects of the application of the Section 36 on the network of financial firms are simulated by removing the links that can be considered unlawful under the broad and the narrow interpretations of the Section 36. In both cases, ID are considered legitimate when they link financial companies belonging to a same industrial group or when there is a control relationship (de jure or de facto) among them. Figure 5 shows that under the broad interpretation the impact on the financial ID network would be dramatic, allowing a situation similar to the one that we have seen for the US. In Fig. 5 all links among competitors are eliminated, while links among firms belonging to a same group and with real estate investment companies are left unchanged. The number of isolated firms in the financial sector increases from 4 to 17 out of 28. The big component centered around *Mediobanca* is completely fragmented. Only five small groups survive. *Generali* preserves connections with *Banca Generali* and *Beni Stabili; IGD,* a real estate investment firm, is linked with *Unipol*; *Banco Popolare* remains connected with *Credito Bergamasco*, as the former has the 77.428 % of voting capital in the latter. *Credito Artigiano* controls, with 69.88 % of voting capital, *Credito Valtellinese*, therefore this connection is kept. The link between *Fondiaria Sai* and *Milano Assicurazioni* survives, because they are controlled by the same holding company (*Premafin*). This effect may be lessened when the top-100 ID network is considered because of the persistence of indirect links, in which two representatives of different financial corporations sit on

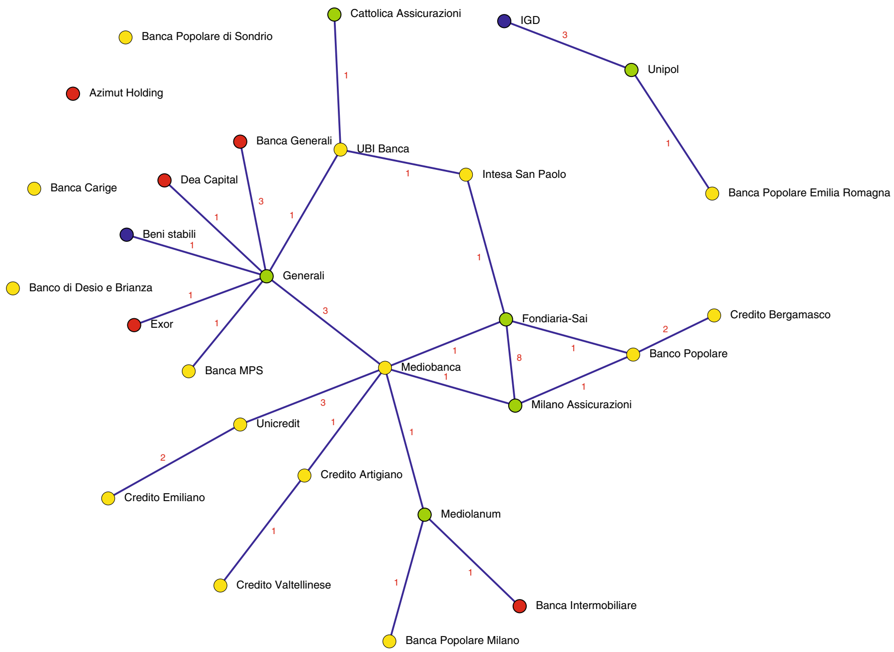

Fig. 4 Network of the subset of financial companies included in the top-100 firms in Italy

the board of a third non-financial firm and thus can have face-to-face interaction on a regular basis (Vance 1968).

If the narrow interpretation of the Section 36 is adopted, the impact of the law is much more limited, as drawn in Fig. 6. The number of isolated companies rises from 4 of the actual network to only 6 (*Banca Popolare di Sondrio, Azimut Holding, Banca Carige, Banco di Desio e Brianza, Credito Emiliano, Unicredit).* Contrary to the previous interpretation, in this case *Mediobanca* is left in a strategic position to influence the competitors, as the investment bank keeps channels to share information with others through insurance firms which have a "broker position" in the network. In particular, it is possible to distinguish the following connections: *Mediobanca-Fondiaria Sai-Intesa San Paolo, Mediobanca-Milano Assicurazioni-Banco Popolare, Mediobanca-Mediolanum-Banca Popolare di Milano, Mediobanca-Generali-Ubi Banca, Mediobanca-Generali-Banca Mps.* Therefore according to the narrow interpretation, the prohibition removes only two connections relevant in terms of competition: *Mediobanca-Unicredit*, *Mediobanca-Credito Artigiano*. Furthermore, *Generali* has the highest number of ties (6 with *Mediobanca, Beni Stabili, Dea Capital, Ubi Banca, Exor, Banca Mps*; and control directly *Banca Generali*).

The effects of a narrow interpretation of Section 36 on the network of financial firms are minimal: the revenues criterion leaves not only the network substantially unaltered, but also the risks of collusive behaviour and market cartelization.

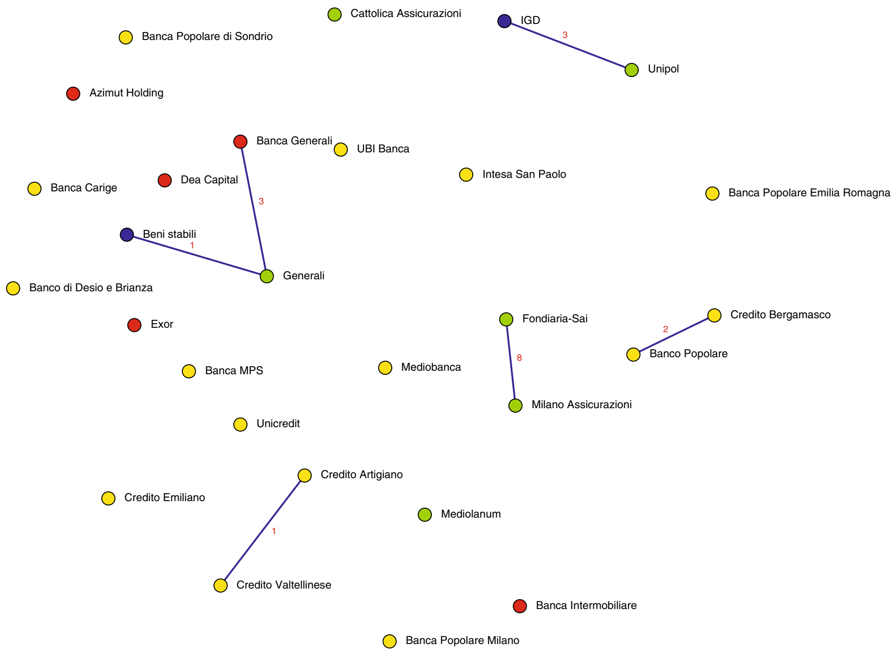

Fig. 5 The network of Italian financial companies when the Section 36 is applied (broad interpretation)

5 Concluding remarks

The basic premises of this study was twofold: the existence of ID can be considered a threat for competition and different regulations of ID affect the behaviour of firms. In the US Section 8 of Clayton Act defines ID as a *per se* violation and therefore its application does not require that anticompetitive effects must be proved (Gerber 2007). The easy observability of breaches prevents the use of ID as a means to share information. Firms tend therefore to act in accordance with the Section 8 and this results in an ID network structure with a high number of independent companies, that is companies without common directors in their boards, in industries and especially in the financial sector. In comparison, Italian companies show a high level of personal relationships probably due to a combination of a lack of regulation and of the diffusion of familial/ownership links that mark the Italian corporate governance system. According to previous findings (Drago et al. 2011; AGCM 2008) this study has shown the anomaly of Italian financial connections in 2010: compared to the American case, the shape of the Italian financial ID network is such that corporations can share information and elaborate common strategies, because they are directly or indirectly connected.

It is this evidence that probably called for a change in legislation which resulted in Section 36 of Law Decree n. 201/2011. The incompatibility regime stated in the law apparently represented a revolution for corporate governance in the financial sector, as it provided a ban corresponding to the one adopted in the

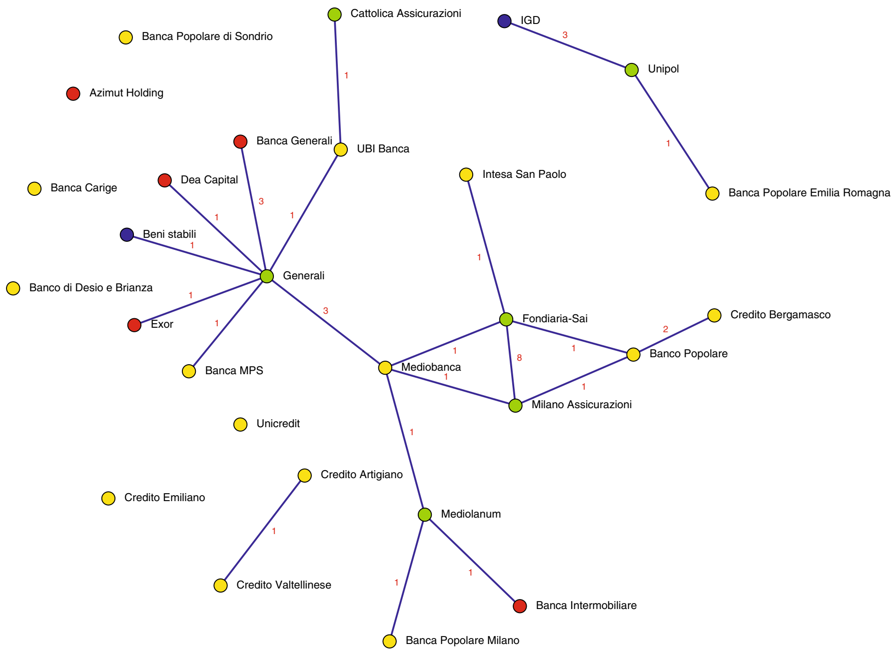

Fig. 6 The network of Italian financial company when the Section 36 is applied (narrow interpretation)

US regulation of ID. Nevertheless, the ambiguity of the law fostered two different interpretations: a narrow one and a broad one. According to the simulations proposed, the narrow interpretation of the law would leave the ID network substantially unaltered. A broad interpretation of the law instead would completely modify the ID network for financial firms, with a final configuration totally similar to the one of the US.

The interpretative debate regarding Section 36 sets pro-market supporters defending a broad interpretation of the law against custodians of the *status-quo*. Our sad opinion is that a single law intervention may simply be useless. The introduction of a law similar to the Clayton act when limited to the financial sector can be easily eluded: the absence of a similar prohibition of ID for non-financial firms could favor the diffusion and the strengthening of indirect links among financial firms actuated through non-financial companies. These indirect links will probably substitute in the medium period the direct link characterizing the Italian capitalism.

Appendix

See Tables 4 and 5.

Table 4 Centrality measures of top-100 Italian firms

Label	Company	Degree	Closeness centrality	Normalized degree	Betweenness centrality
1	A2A	6	0.350	0.061	0.015
2	Acea	4	0.345	0.040	0.003
3	Amplifon	5	0.327	0.051	0.015
4	Ansaldo Sts	4	0.337	0.040	0.023
5	Ascopiave	4	0.291	0.040	0.004
6	Astaldi	1	0.249	0.010	–
7	Atlantia	19	0.458	0.192	0.062
8	Autogrill	11	0.412	0.111	0.015
9	Autostrada TO-MI	7	0.345	0.071	0.010
10	Azimut Holding	2	0.292	0.020	–
11	Banca Carige	4	0.346	0.040	0.004
12	Banca Generali	8	0.387	0.081	0.010
13	Banca Intermobiliare	2	0.284	0.020	0.002
14	Banca MPS	3	0.336	0.030	0.001
15	Banca Popolare di Sondrio	3	0.319	0.030	0.002
16	Banca Popolare Emilia Romagna	3	0.257	0.030	0.003
17	Banca Popolare Milano	9	0.356	0.091	0.025
18	Banco di Desio e Brianza	1	0.289	0.010	–
19	Banco Popolare	7	0.346	0.071	0.024
20	Benetton Group	8	0.395	0.081	0.003
21	Beni stabili	6	0.375	0.061	0.008
22	Buzzi Unicem	3	0.313	0.030	0.002
23	Cairo Communication	0	–	–	–
24	Campari	3	0.299	0.030	0.003
25	Cattolica Assicurazioni	2	0.304	0.020	0.000
26	Cementir Holding	3	0.312	0.030	0.001
27	Cir	10	0.383	0.101	0.025
28	Cofide	8	0.380	0.081	0.014
29	Credito Artigiano	5	0.360	0.051	0.020
30	Credito Bergamasco	1	0.254	0.010	–
31	Credito Emiliano	2	0.287	0.020	0.001
32	Credito Valtellinese	5	0.313	0.051	0.006
33	Danieli & Co.	3	0.326	0.030	0.003
34	Datalogic	5	0.312	0.051	0.032
35	De' Longhi	11	0.390	0.111	0.062
36	Dea Capital	8	0.390	0.081	0.021
37	Diasorin	2	0.263	0.020	–
38	Edison	4	0.307	0.040	0.004
39	Enel	2	0.290	0.020	0.001
40	Enel Green Power	1	0.312	0.010	–
41	Engineering	2	0.316	0.020	0.000

Table 4 continued

Label	Company	Degree	Closeness centrality	Normalized degree	Betweenness centrality
42	Eni	12	0.421	0.121	0.020
43	Erg	0	–	–	–
44	Exor	7	0.369	0.071	0.023
45	Falck Renewables	5	0.324	0.051	0.012
46	Fiat	10	0.399	0.101	0.043
47	Fiat Industrial	9	0.406	0.091	0.010
48	Fondiaria-Sai	12	0.417	0.121	0.021
49	Gas Plus	3	0.319	0.030	0.005
50	Gemina	9	0.392	0.091	0.027
51	Generali	19	0.451	0.192	0.064
52	GEOX	1	0.312	0.010	–
53	Gruppo Ed. L'Espresso	13	0.408	0.131	0.034
54	Hera	3	0.249	0.030	0.000
55	IGD	3	0.276	0.030	0.005
56	IMA	2	0.251	0.020	0.002
57	Impregilo	8	0.372	0.081	0.024
58	Indesit Company	5	0.353	0.051	0.001
59	Interpump Group	10	0.393	0.101	0.033
60	Intesa San Paolo	11	0.415	0.111	0.032
61	Iren	6	0.333	0.061	0.007
62	Italcementi	14	0.440	0.141	0.051
63	Italmobiliare	12	0.413	0.121	0.028
64	Lottomatica	4	0.331	0.040	0.005
65	Luxottica Group	19	0.453	0.192	0.097
66	Maire Tecnimont	2	0.312	0.020	–
67	Marcolin	5	0.356	0.051	0.003
68	Marr	3	0.297	0.030	0.009
69	Mediaset	9	0.402	0.091	0.011
70	Mediobanca	22	0.483	0.222	0.103
71	Mediolanum	7	0.382	0.071	0.035
72	Milano Assicurazioni	8	0.397	0.081	0.012
73	Mondadori Editore	12	0.408	0.121	0.030
74	Nice	2	0.281	0.020	–
75	Parmalat	13	0.431	0.131	0.053
76	Piaggio & Co.	9	0.369	0.091	0.016
77	Pirelli & Co.	25	0.463	0.253	0.116
78	Prysmian	7	0.393	0.071	0.011
79	RCS Mediagroup	19	0.458	0.192	0.058
80	Recordati	0	–	–	–
81	Safilo Group	0	–	–	–
82	Saipem	5	0.343	0.051	0.023

Table 4 continued

Label	Company	Degree	Closeness centrality	Normalized degree	Betweenness centrality
83	Salvatore Ferragamo	1	0.298	0.010	–
84	Saras	6	0.378	0.061	0.003
85	Save	0	–	–	–
86	Sias	2	0.286	0.020	–
87	Snam rete gas	1	0.253	0.010	–
88	Sogefi	3	0.311	0.030	–
89	Sol	2	0.271	0.020	–
90	Sorin	6	0.360	0.061	0.022
91	Telecom	17	0.456	0.172	0.071
92	Telecom Italia Media	4	0.326	0.040	0.003
93	Terna	6	0.359	0.061	0.008
94	Tod's	7	0.364	0.071	0.012
95	Trevi Fin Industriale	3	0.285	0.030	0.007
96	UBI Banca	8	0.393	0.081	0.017
97	Unicredit	8	0.397	0.081	0.032
98	Unipol	4	0.318	0.040	0.029
99	Yoox	1	0.236	0.010	–
100	Zignago Vetro	5	0.330	0.051	0.008

Table 5 Centrality measures of top-100 US firms

Label	Company	Degree	Closeness centrality	Normalized degree	Betweenness centrality
1	3M Co.	8	0.324	0.081	0.054
2	Abbott Laboratories	6	0.273	0.061	0.041
3	Altria Group Inc.	0	–	–	–
4	Amazon.com Inc.	1	0.193	0.010	–
5	American Express Company	6	0.302	0.061	0.039
6	American International Group, Inc.	3	0.239	0.030	0.004
7	Amgen Inc.	4	0.273	0.040	0.004
8	Anadarko Petroleum Corporation	1	0.163	0.010	–
9	Apache Corp.	0	–	–	–
10	Apple Inc.	4	0.268	0.040	0.005
11	AT&T, Inc.	4	0.255	0.040	0.072
12	Baker Hughes Incorporated	3	0.234	0.030	0.052
13	Bank of America Corporation	2	0.240	0.020	0.001
14	Baxter International Inc.	0	–	–	–
15	Berkshire Hathaway Inc.	5	0.255	0.051	0.029
16	BlackRock Inc.	3	0.221	0.030	0.019
17	Boeing Co.	10	0.337	0.101	0.091

Table 5 continued

Label	Company	Degree	Closeness centrality	Normalized degree	Betweenness centrality
18	Bristol-Myers Squibb Company	0	–	–	–
19	Carnival Corporation	0	–	–	–
20	Caterpillar Inc.	4	0.283	0.040	0.014
21	Chevron Corporation	8	0.296	0.081	0.051
22	Cisco Systems, Inc.	2	0.213	0.020	0.004
23	Citigroup Inc.	4	0.265	0.040	0.031
24	Colgate-Palmolive Co.	2	0.221	0.020	0.007
25	Comcast Corporation	2	0.223	0.020	0.005
26	ConocoPhillips	5	0.279	0.051	0.031
27	Corning Inc.	4	0.248	0.040	0.029
28	Costco Wholesale Corporation	2	0.216	0.020	–
29	CVS Caremark Corporation	0	–	–	–
30	Danaher Corp.	0	–	–	–
31	Deere & Company	5	0.289	0.051	0.028
32	Dell Inc.	4	0.252	0.040	0.009
33	Devon Energy Corporation	1	0.185	0.010	–
34	DIRECTV	2	0.241	0.020	–
35	eBay Inc.	4	0.249	0.040	0.012
36	EI DuPont de Nemours & Co.	4	0.247	0.040	0.011
37	Eli Lilly & Co.	7	0.290	0.071	0.040
38	EMC Corporation	1	0.186	0.010	–
39	Emerson Electric Co.	1	0.198	0.010	–
40	Express Scripts Inc.	1	0.215	0.010	–
41	Exxon Mobil Corporation	6	0.298	0.061	0.042
42	Ford Motor Co.	4	0.251	0.040	0.025
43	Freeport-McMoRan Copper & Gold Inc.	3	0.200	0.030	0.035
44	General Electric Co.	7	0.302	0.071	0.056
45	Gilead Sciences Inc.	2	0.250	0.020	0.004
46	Google Inc.	2	0.198	0.020	0.001
47	Halliburton Company	1	0.153	0.010	–
48	Hewlett-Packard Company	3	0.249	0.030	0.004
49	Honeywell International Inc.	6	0.284	0.061	0.063
50	Intel Corporation	5	0.249	0.051	0.032
51	International Business Machines Corp.	12	0.351	0.121	0.142
52	Johnson & Johnson	4	0.259	0.040	0.005
53	JPMorgan Chase & Co.	7	0.277	0.071	0.038
54	Kraft Foods Inc.	5	0.255	0.051	0.027
55	Lowe's Companies Inc.	1	0.212	0.010	–
56	Marathon Oil Corporation	9	0.310	0.091	0.125
57	Mastercard Incorporated	1	0.198	0.010	–
58	McDonald's Corp.	6	0.278	0.061	0.030
59	Medtronic Inc.	4	0.297	0.040	0.026

Table 5 continued

Label	Company	Degree	Closeness centrality	Normalized degree	Betweenness centrality
60	Merck & Co. Inc.	5	0.282	0.051	0.041
61	MetLife, Inc.	3	0.253	0.030	0.011
62	Microsoft Corporation	2	0.232	0.020	0.006
63	Monsanto Co.	0	–	–	–
64	Morgan Stanley	5	0.295	0.051	0.072
65	News Corp.	1	0.195	0.010	–
66	Nike Inc.	3	0.256	0.030	0.008
67	Occidental Petroleum Corporation	1	0.204	0.010	–
68	Oracle Corp.	1	0.223	0.010	–
69	Pepsico, Inc.	6	0.271	0.061	0.041
70	Pfizer Inc.	8	0.279	0.081	0.034
71	Philip Morris International, Inc.	1	0.177	0.010	–
72	PNC Financial Services Group Inc.	2	0.232	0.020	0.007
73	Praxair Inc.	2	0.186	0.020	0.018
74	Procter & Gamble Co.	8	0.292	0.081	0.047
75	Prudential Financial Inc.	5	0.253	0.051	0.006
76	QUALCOMM Incorporated	0	–	–	–
77	Schlumberger Limited	0	–	–	–
78	Simon Property Group Inc.	1	0.218	0.010	–
79	Southern Company	1	0.217	0.010	–
80	Target Corp.	7	0.302	0.071	0.038
81	Texas Instruments Inc.	1	0.207	0.010	–
82	The Bank of New York Mellon Corporation	5	0.235	0.051	0.031
83	The Coca-Cola Company	3	0.260	0.030	0.009
84	The Dow Chemical Company	3	0.277	0.030	0.010
85	The Goldman Sachs Group, Inc.	5	0.273	0.051	0.022
86	The Home Depot, Inc.	1	0.221	0.010	–
87	Time Warner Inc.	0	–	–	–
88	U.S. Bancorp	1	0.244	0.010	–
89	Union Pacific Corporation	1	0.163	0.010	–
90	United Parcel Service, Inc.	5	0.296	0.051	0.035
91	United Technologies Corp.	6	0.271	0.061	0.037
92	Unitedhealth Group, Inc.	0	–	–	–
93	Verizon Communications Inc.	5	0.291	0.051	0.060
94	Viacom	0	–	–	–
95	Visa, Inc.	3	0.246	0.030	0.004
96	Walgreen Co.	1	0.211	0.010	–
97	Wal-Mart Stores Inc.	5	0.272	0.051	0.032
98	Walt Disney Co.	7	0.293	0.071	0.043
99	Well Point Inc.	1	0.219	0.010	–
100	Wells Fargo & Company	8	0.288	0.081	0.051

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