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"Board Gender Diversity, Network and Firms' Performance in the Italian Listed Companies"**

Gli autori Francesca di Donato, Delio Panaro e Sara Trucco
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Dichiarano

Che nonostante l'articolo sia frutto di analisi e valutazioni congiunte,

Le seguenti parti sono da attribuire a Francesca di Donato:

1. Introduction
- 2.1 Board Gender Diversity and Firm Performance
- 6 Discussion

Le seguenti parti sono da attribuire a Delio Panaro:

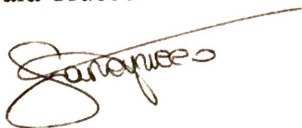
3. Sample Selection and Data Collection

Le seguenti parti sono da attribuire a Sara Trucco:

- 2.2 Network Analysis on Board of Directors
4. Research Methods
5. Empirical Findings

12/11/2016, Roma

Sara Trucco



Delio Panaro



Francesca di Donato



Board Gender Diversity, Network and Firms' Performance in the Italian Listed Companies

Francesca Di Donato¹, Delio Panaro² & Sara Trucco¹

¹ Faculty of Economics, Rome University of International Studies, Italy

² Be Consulting, Rome, Italy

Correspondence: Sara Trucco, Faculty of Economics, Rome University of International Studies, Italy. E-mail: sara.trucco@unint.eu

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Abstract

The paper aims at analysing the effect of women serving on the boards of directors, especially after the introduction of gender minority (Law 120/2011 and Consob n. 18098/2012), and the network ties on boardrooms on the overall firms' performance in the Italian context. Gender minority is defined as the percentage of women on the board of directors, whereas the network ties represent companies which are connected through shared board members. To do this, we selected a sample of industrial Italian listed companies during the period 2011-2013 and we downloaded the mandatory reports of corporate governance of each firm in our sample time period in order to extract the components of the board of directors and their characteristics. We performed a set of regression analysis to evaluate whether the participation of women in the firm's board of directors and the presence of connections among boardrooms enhance the financial performance measured through Tobin's Q and Return On Asset (ROA). Empirical results contribute to extend scientific literature about this topic and to provide interesting practical contributions on the role of gender minority and the connections among companies on firms' performance. Parallel, this research develops topics related to text mining (that is the automatic extraction of quantitative information from text-documents) referring to all the firms' disclosures, produced in the Italian language.

Keywords: board gender diversity; firm performance; network analysis; Italian listed companies; text mining

1. Introduction

The board composition has been deeply investigated by several scholars who analysed different types of features including, for example, the number of directors serving on the board, the percentage of outsider and independent directors, the structure of the board committees and the number of meetings to be held each year.

Within this framework, the recent literature about the introduction of gender minority in the board of directors and its effects on the overall performance of a firm is quite controversial. In international context some contributions were developed in France, Denmark, German, United Kingdom, but, to our knowledge, a very little contribution seems to be developed in Italy (Bianco et al. 2013; Del Prete and Stefani 2013), especially after the recent regulation about the gender minority in the board of directors (Law 120/2011 and Consob n. 18098/2012). Some scholars demonstrated that the Tobin's Q is positively correlated to the percentage of women inside the board of directors (Adams & Ferreira, 2003; Carter et al., 2003; Nekhili & Gatfaoui, 2013) and that the presence of women who serve on influential board committees is more likely to impact actions of the board and management (Carter et al., 2010). The basic assumption is that board diversity encourages different and creative new perspectives on the strategic decisions increasing the productivity and performance of the corporation (Robinson & Dechant, 1997; Brancato & Patterson 1999; Ingle, & Van der Walt, 2003). On the contrary, some other academics found exactly the opposite (Farrell & Hersch 2005). It is possible that women cannot make a firm level impact because they are a minority in the boardroom. Kanter (1977) postulates that minorities performance is less likely to be noticed by the majority members and their opinions may not be readily accepted (Kanter, 1977).

Within this framework, others underlined that the results could be affected by the diverse statistical approaches that are applied (Smith et al., 2006). Therefore, previous literature shows inconclusive results on the effects of

women in the boards on firm performance. Furthermore, empirical evidence from the Italian context seems to be very poor.

Besides, sociocognitive studies about social network concerning corporate governance suggested the relevance of directors appointed to other boardrooms in having the proper strategic knowledge useful for the strategic decision making process and for enhancing the financial performance of a firm (Walsh, 1995; Carpenter & Westphal 2001). However, some scholars emphasised the potential benefits for a company in having directors who are involved in other boardrooms, such as the possibility that directors may obtain private and more information through their external networks (Palmer et al., 1993; Stiles, 2001) and the possibility to develop inter-organizational relationships, thereby facilitating the performance of the board tasks of service and strategy (Zahra & Pearce 1989), whereas few others found a negative association between the presence of network ties and firm performance (Kaczmarek et al., 2014). To our best knowledge, in the Italian context, few contributions are recently carried out on this topic (Di Donato & Tiscini, 2009).

The aim of this research project is thus to contribute to the development of the above-mentioned literature streams, by analysing the effect of women serving on the boards of directors, especially after the introduction of gender minority (Law 120/2011 and Consob n. 18098/2012), and the network ties on boardrooms on the overall firms' performance, measured by Tobin's Q and ROA, in the Italian setting.

The remainder of the paper is organised as follows: Section 2 presents literature review about board gender diversity and network analysis on board of directors along with the research hypotheses development; Section 3 and 4 present data collection, sample selection and research method; Section 5 presents empirical findings and Section 6 discusses results, limitations and further development.

2. Literature Review and Research Hypotheses Development

2.1 Board Gender Diversity and Firm Performance

A recent open debate on corporate governance regards the effects of the gender minority on the financial performance and, in general, on the overall performance of a company. Previous literature about this topic confirmed the relevance of the composition of the board of directors on financial performance, by highlighting some features which may have some effects on the firm value such as different types of diversity e.g. gender, racial and culture ones (Carter et al., 2003). According to some scholars, corporate diversity within the board of directors and the top management is able to produce more effective problem-solving due to variety of perspectives and to increase creativity and innovations (Robinson & Dechant, 1997) and promotes more effective global relationships in an international environment (Carter et al., 2003).

In this paper, gender minority is mainly defined as the percentage of women serving on the board of directors. Women hold few corporate board seats even if the situation is changing because boards around the world are under increasing pressure to choose female directors. In the UK, the Higgs report (Higgs, 2003) argues that diversity could enhance board effectiveness (Adams & Ferreira, 2009). In Sweden gender diversity as a legal requirement (Medland, 2004). In Norway, since 2008 all listed companies must have a 40% of female directors or face dissolution. Spain followed Norway, enacting a law requiring companies to increase the share of female directors to 40% by 2015. The presence of women on boards is also relevant for professionals and standard setters, because, as a matter of fact, codes of best practices and several regulatory requirements in several countries around the world (e.g. Belgium, Brazil, France, Germany, Iceland, Italy, Malaysia, Netherlands, Norway, Spain, etc.) are mainly aimed at balancing the gender in company boardrooms.

However, there is not yet a consensus on the topic and some scholars highlight benefits relating the presence of women, whereas others do not find such similar results.

Within the first stream of literature, some scholars emphasized the positive effects of female directors concerning social issues, such as corporate social responsibility control, because they are more participative (Eagly & Carli, 2003) and democratic (Eagly & Johnson, 1990), whereas men are mainly money oriented (Broadbridge et al., 2006; Huse et al., 2009). Other scholars demonstrated that women in the boardrooms have significant and positive effects on board governance, since they seem to have less attendance problems than men and since they could more closely correspond to the concept of the independent director emphasized in theory because female directors do not belong to the "old boys club" (Adams & Ferreira, 2009). In particular, female directors are more likely to be assigned to audit, nominating, and corporate governance committees, although they are less likely to sit on compensation committees than men are. These results suggest that the higher the percentage of women, the higher the effort spent on monitoring activities inside the company (Adams & Ferreira, 2009). Other studies, in fact, suggest that females are often appointed by firms in order to lower the overall risk of the company (Martin

et al., 2009) because females are perceived more risk-averse than males (Oakley, 2000; Atkinson et al., 2003; Lee & James, 2007).

Others demonstrated that some financial measures of firm value, such as Tobin's Q, are positively correlated to the percentage of women inside the boardrooms (Adams & Ferreira, 2003; Carter et al., 2003; Campbell & Minguez-Vera, 2008; Nekhili & Gatfaoui, 2013). Recently, Terjesen et al. (2015) show that companies with a higher presence of female directors in the boardrooms have higher performance both in terms of Tobin's Q and Return on Assets (ROA) measures (Terjesen et al., 2015). Terjesen et al. (2015) also demonstrated that the female directors are able to enhance the effectiveness of the entire board by analysing a large sample of public firms around the world, therefore controlling the different set of corporate governance mechanisms.

Others suggested that women are able to offer fresh solutions to complex issues, thus helping correct informational bias in strategy formulation and problem solving (Francoeur et al., 2008). Virtanen (2012) demonstrated that female directors are more likely to cover active roles compared to their male colleagues (Virtanen et al., 1996) and other scholars provided evidence that female directors are more likely to have debate than male managers and have leadership and collaborative skills (Eagly & Johnson, 1990; Ingley & Van Der Walt, 2005). Muller-Kahle and Lewellyn (2011) found that gender diversity within the board can have positive effects on firm operations, especially when risky strategic decisions are to be evaluated (Muller-Kahle & Lewellyn, 2011). Gul et al. (2011) demonstrated a positive association between gender diversity and stock price informativeness due to an increased voluntary public disclosure (Gul et al., 2011). Furthermore, Gregory et al. (2013) demonstrated that, in the long term, the market is able to recognize the positive effect of the women in the board on firms' performance, whereas in the short term, market tends to underrate this positive role (Gregory et al., 2013). Moreover, others highlighted that women on boardrooms have more experience in non-business activities than men (Hillman et al., 2002).

The latter stream of literature found a negative relationship or did not find any relationship between corporate performance and female directors (Zahra & Stanton, 1988); for example, Ola and Proffitt (2015) found that the gender of a fired CEO has no impact on stock price, meaning that males and females are perceived in the same way by the investors (Ola & Proffitt, 2015). Some scholars even found that industrial firms perform worse in case of a greater gender diversity of the board (Shrader et al., 1997; Adams & Ferreira, 2009), so that in the banking industry (Kilic, 2015). This results are consistent with the argument that too much board monitoring can decrease shareholder value. That is why some authors found a negative correlation between the percentage of female board members and financial value of a company (Almazan & Suarez, 2003; Adams & Ferreira, 2007).

Also in the Italian context, empirical evidence about the effects of the gender diversity on the overall performance of a firm is not clear and it needs further investigation. In particular, to our best knowledge there is no empirical evidence regarding the effect of the introduction of gender minority in the board of directors (Law 120/2011 and Consob n. 18098/2012). In fact, the existing contributions concerning the Italian context are related to the years before 2011 (Bianco et al., 2013; Del Prete & Stefani, 2013). In particular, Law no. 120 of 12 July 2011 ("Law 120") represented a very important procedural step in the gender diversity awareness in the Italian legal system, introducing affirmative actions for women in companies (significantly called, in Italian, "quote rosa", i.e. "pink quotas"). This policy is aimed at promoting a larger presence of women in the governing bodies of publicly-traded corporations as a consequence of the perceived underrepresentation of this gender in these positions. The Law requires that all companies listed on the Italian Stock Exchange reserve one third of the board of directors positions (1/3) to the "underrepresented gender" in the governing body, that is typically represented by women.

On the basis of the controversial findings in international context and the introduction of a regulation which regards the gender minority in the board of directors in Italy, we do not predict the sign of the association between women on the board of directors and financial performance and we posit the following research hypotheses:

Hp1a: Ceteris paribus, the percentage of women on the board of directors is associated with the financial performance of Italian listed companies.

Hp1b: Ceteris paribus, the percentage of women on the board of directors after the introduction of gender minority in the Board of Directors (Law 120/2011 and Consob n. 18098/2012) is associated with the financial performance of Italian listed companies.

2.2 Network Analysis on Board of Directors

Social network with regard to corporate governance refers to the interaction among directors of different

boardrooms, thus identifying network ties. Sociocognitive studies about this topic suggested the relevance of directors' network of appointments to other boardrooms in having the proper strategic knowledge useful for the strategic decision making process (Walsh, 1995; Carpenter & Westphal, 2001). Within this framework, directors could use knowledge derived from experiences in similar roles (Walsh, 1995). Other scholars on interlocking directors previously emphasised the potential benefits for a company in having directors who are involved in other boardrooms. Such benefits due to external network are linked to 1) the possibility that directors may obtain private and more information through their external networks (Palmer et al., 1993; Stiles, 2001); 2) the possibility to develop inter-organizational relationships, thereby facilitating the performance of the board tasks of service and strategy (Zahra & Pearce, 1989); and 3) the possibility to reduce incentives for opportunism by increasing mutual flow of information between exchange partners (Kaczmarek et al., 2014).

On the other hand, few scholars instead found a negative association between the presence of network ties and firm performance (Kaczmarek et al., 2014) even if the effect of interlocking directorships on firm performance is likely to turn positive in the presence of board diversity (Di Donato & Tiscini, 2009). To our best knowledge, in the Italian context, few contributions are carried out on this topic (Drago et al., 2011; Croci & Grassi, 2013) and no contributions are developed more recently.

On the basis of the controversial findings produced by previous scholars and to fill the literature gap in the Italian setting, we posit the following research hypothesis:

H_{p2}: Network ties on corporate governance enhance the financial performance of an Italian company.

3. Sample Selection and Data Collection

Our sample consists of all companies listed on the Italian Stock Exchange, with the exclusion of the financial sector, in order to preserve the homogeneity of the research sample, since the financial companies are subjected to regulatory which could affect differently corporate governance mechanisms and structures (Adams and Mehran, 2003). We thus identified 390 Italian listed firms and we excluded financial firms. We used a panel of firms during a 4-year period running from 2010 to 2013. The final sample consisted of annual data for 124 companies over 4 years, therefore, a total of 496 firm-years observations. For each company we collected corporate governance documents in our sample time period. Corporate governance reports can be found on the Italian Stock Exchange website (<http://www.borsaitaliana.it/>) embedded as PDFs within a java applet. Each page of PDFs is composed by JPG images. Using "requests" (<http://docs.python-requests.org/en/master/>), "beautifulsoup" (<https://www.crummy.com/software/BeautifulSoup/>) and "selenium" browser (<http://www.seleniumhq.org/>), we wrote a python script to scrape JPG files. After this phase, we rebuilt PDFs rearranging JPG images and extracted text using Tesseract (<https://github.com/tesseract-ocr>) in order to store corporate governance documents' content as plain text.

Finally, each corporate governance document was tokenized using the NLTK package (Bird 2006) and stemmed using the Porter stemmer (Porter & Boulton, 2001). Tokenization consists of breaking down a stream of text into words, phrases or other meaningful elements or tokens; stemming involves reducing inflected words to their root form. Therefore we trained a Support Vector Machines (SVMs) model able to recognize sentences containing in order to extract board members' names (Joachims, 2002). The list of companies' board members has been validated manually checking the SVMs' results with corporate governance documents. Therefore, we calculated the percentage of women which is the number of women on boardrooms divided by the size board. Furthermore, we checked if two companies have a board member in common to build a weighted network of companies' board members. Namely, nodes represent companies, arcs represent shared board members and the weight of each arc is given by the number of board members shared by companies. The number of connection for each company is given by the sum of arcs' weights incoming in each node. For each company, we used Thomson Reuters Datastream to extract measures of financial performance.

4. Research Methods

To evaluate the financial performance of our sample of listed firms we used Tobin's Q and Return on Assets (ROA) as suggested by previous scholars (Hillman et al., 2002; Adams & Ferreira, 2009). In particular, Tobin's Q ratio provides information on how well company's investments pay off and it is calculated as market value of assets / replacement value of assets or (equity market value + liabilities market value) / (equity book value + liabilities book value).

In order to test the research hypotheses, we performed a set of regression analysis that are the following:

$$Y = \beta_0 + \beta_1 \text{ Share of Women} + \beta_2 \text{ Connections} + \beta_3 \text{ Net Sales or Revenues} + \beta_4 \text{ Dummy for Year 2013} + \beta_5 \text{ Auditor's Opinion} + \beta_6 \text{ Board Size} + \varepsilon \quad (1)$$

Where:

Y is Tobin's Q and ROA, respectively, and measures the financial performance of a listed company in the time period between 2010 and 2013.

$$Y = \beta_0 + \beta_1 \text{ Share of Women} + \beta_2 \text{ Connections} + \beta_3 \text{ Net Sales or Revenues} + \beta_4 \text{ Auditor's Opinion} + \beta_5 \text{ Board Size} + \varepsilon \quad (2)$$

Where:

Y is Tobin's Q and ROA, respectively, and measures the financial performance of a listed company in the year 2013.

Independent research variables for both regressions are: 1) Share of women, which is the number of women on boardrooms divided by the size board; 2) Connections, which measure if two companies have a board member in common. Control variables for both regressions regards the size of each company, the size of each boardroom and the reliability of the financial reporting as perceived by external auditors. Control variables are the following: 1) Net Sales and Revenues; 2) Board Size and 3) Auditors' Opinion (we assign 0 if the auditors' opinion is unqualified and 1 if the auditors' opinion is qualified). For the regression applied for the whole time period, we created a dummy for the Year 2013. We normalized between zero and 1 research and control variables.

5. Empirical Findings

Table 1 provides some information on numbers of women on boards of directors throughout the years with respect to our sample of Italian industrial listed firms. Over the whole sample period, no company has more than four women on its board of directors. From 2010 to 2012, the average percentage of women increases slightly from 7.153% to 8.500%, whereas it increases highly in 2013 (17.443%). Furthermore, table 1 shows that the average number of women on the board is less than one from 2010 to 2012, which confirms the minority of women within corporate boards during these years. At the same way, it is possible to observe an increase of the average number of women on board in 2013 which becomes more than one (1.597). Moreover, in 2013 the percentage of firms with three or more women on board increases significantly (21.774), thereby demonstrating the increasing number of women within the corporate boards due to the introduction of gender minority in the board of directors (Law 120/2011).

Table 1. Breakdown of the number and percentage of women in the board over each year in Italian listed firms

Years	Average number of women on board	Percentage of women on board	Percentage of firms with no woman on board	Percentage of firms with one woman on board	Percentage of firms with two women on board	Percentage of firms with three or more women on board
2010	0.589	7.153%	51.613%	38.710%	8.871%	0.806%
2011	0.699	7.540%	45.968%	41.935%	11.290%	0.806%
2012	0.766	8.500%	41.935%	44.355%	9.677%	4.032%
2013	1.597	17.443%	18.548%	31.452%	28.226%	21.774%

Table 2 and Table 3 show some descriptive statistics for all the years (2010-2013) and just for the year 2013, respectively.

Table 2. Descriptive statistics of the research variables for all the years (124 companies over 4 years, number of observations = 496)

Research variable	Min	Max	Mean	Standard deviation
Tobin's Q	0.537	12.516	1.620	1.168
ROA	-79.490	31.050	1.276	7.388
Share of Women	0.000	0.750	0.102	0.111
Dummy for Year 2013	0.000	1.000	0.250	0.433
Net Sales or Revenues	706.000	126482000.000	4122687.870	15535182.759
Auditor's Opinion	0.000	1.000	0.010	0.109
Connections	0.000	11.000	1.710	2.352
Size Board	1.000	21.000	9.220	3.114

Table 3. Descriptive statistics of the research variables for the year 2013 (number of observations = 124)

Research variable	Min	Max	Mean	Standard deviation
Tobin's Q	0.697	12.516	1.769	1.541
ROA	-22.320	31.050	1.065	6.560
Share of Women	0.000	0.500	0.174	0.116
Net Sales or Revenues	966.000	114722000.000	4282468.540	16350150.498
Auditor's Opinion	0.000	1.000	0.020	0.126
Connections	0.000	9.000	1.680	2.229
Size Board	3.000	20.000	9.150	2.840

In table 4 and table 5 are presented correlation matrix and Pearson index.

Table 4. Correlation matrix and Person index of the research variables for all the years (124 companies over 4 years, number of observations = 496)

	ROA	Tobin's Q	Share of Women	Connections
ROA Pearson	1			
Sig (two-tailed)				
Number of observations	496			
Tobin's Q Pearson	0.379**	1		
Sig (two-tailed)	0.000			
Number of observations	496	496		
Share of Women Pearson	-0.032	-0.026	1	
Sig (two-tailed)	0.480	0.570		
Number of observations	496	496	496	
Connections Pearson	0.086	0.103*	-0.104*	1
Sig (two-tailed)	0.055	0.022	0.020	
Number of observations	496	496	496	496

* Correlation is significant at 0.05 (2-tails). ** Correlation is significant at 0.01 (2-tails).

Table 5. Correlation matrix and Person index of the research variables for the year 2013 (number of observations = 124)

	ROA	Tobin's Q	Share of Women	Connections
ROA Pearson	1			
Sig (two-tailed)				
Number of observations	124			
Tobin's Q Pearson	0.455**	1		
Sig (two-tailed)	0.000			
Number of observations	124	124		
Share of Women Pearson	-0.166	-0.116	1	
Sig (two-tailed)	0.65	0.201		
Number of observations	124	124	124	
Connections Pearson	0.089	0.148	-0.047	1
Sig (two-tailed)	0.324	0.102	0.601	
Number of observations	124	124	124	124

* Correlation is significant at 0.05 (2-tails). ** Correlation is significant at 0.01 (2-tails).

Table 6 and Table 7 show empirical results for all the years (2010-2013) and for the year 2013 for both the two dependent variables (Tobin's Q and ROA).

Table 6. Regression analysis for all the years (2010-2013) and for the year 2013 (Dependent variable: Tobin's Q)

Independent Research variable	Time period: 2010-2013		Year: 2013	
	β	p-value	β	p-value
Share of Women	-0.059	0.167	-0.128	0.203
Connections	0.089	0.001***	0.120	0.089*
Dummy for Year 2013	0.023	0.036**		
Net Sales or Revenues	-0.078	0.035**	-0.082	0.365
Auditor's Opinion	-0.053	0.186	-0.075	0.419
Size Board	-0.071	0.064*	-0.063	0.547

*, **, *** indicate significant between 0.10 and 0,05; between 0.05 and 0,01; and between 0.01 and 0, respectively.

The statistical significant value (β and p-value) are shown in bold.

Table 7. Regression analysis for the whole database and for the year 2013 (Dependent variable: ROA)

Independent Research variable	Time period: 2010-2013		Year: 2013	
	β	p-value	β	p-value
Share of women	-0.014	0.634	-0.084	0.069*
Connections	0.035	0.063*	0.004	0.904
Dummy year 2013	-0.001	0.902		
Net sales or revenues	0.015	0.553	0.019	0.639
Auditor's opinion	-0.047	0.086*	-0.054	0.205
Size Board	-0.025	0.350	0.051	0.294

*, **, *** indicate significant between 0.10 and 0,05; between 0.05 and 0,01; and between 0.01 and 0, respectively.

The statistical significant value (β and p-value) are shown in bold.

Empirical analysis allows us to test the research hypotheses. In particular, regression analysis does not demonstrate that women on the board of directors enhance or worsen the financial performance of Italian companies, therefore the Hp1a (*Ceteris paribus, the percentage of women on the board of directors is associated with the financial performance of Italian listed companies*) is not supported either for the dependent variable Tobin's Q or for ROA. However, the sign of β for both measures of financial performance of listed firms is negative, but the p-value is not statistical significant.

With regard to the Hp1b, regression analysis shows that the percentage of women on the boardrooms after the introduction of gender minority in the Board of Directors (Law 120/2011 and Consob n. 18098/2012) is not statistically correlated with the financial performance of Italian companies, measured by Tobin's Q. On the other hand, regression analysis for the year 2013 demonstrates that if the percentage of women increases, the ROA decreases. Therefore, the Hp1b (*Ceteris paribus, the percentage of women on the board of directors after the introduction of gender minority in the Board of Directors (Law 120/2011 and Consob n. 18098/2012) is associated with the financial performance of Italian listed companies.*) is partially supported and deserves further investigations.

Finally, the Hp2 (*Network ties on corporate governance enhance the financial performance of an Italian company*) is supported. As a matter of fact, results show that if the network ties among different boardrooms increase, the financial performance increases (measured by Tobin's Q and ROA), if we consider all the years in our sample (2010-2013). If we analyse results for the year 2013, we find that the research variable Connections is positively correlated to Tobin's Q, whereas, the relationships between Connections and financial performance, measured by ROA, is not statistical significant for the year 2013.

Among control variables, we found that Net Sales and Revenues and Size Board are negatively correlated with Tobin's Q; and Auditor's Opinion is negatively correlated with ROA if we analyse the dataset regarding all the years.

Figure 1 shows network ties on boardrooms for Italian industrial listed firms in our sample time period (2010-2013) created by using Gephi.

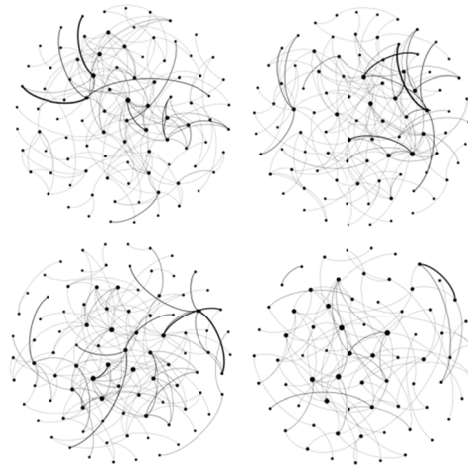


Figure 1. Italian network ties on boardrooms from 2010 to 2013 created by using Gephi

Network ties for: 2010 (upper left corner); 2011 (upper right corner); 2012 (lower left corner); and 2013 (lower right corner).

6. Discussion

Empirical results contribute to extend scientific literature about gender minority and social network with regard to corporate governance and to provide interesting practical contributions on the role of minority and the network ties of the board of directors on firms' performance measured by Tobin's Q and ROA.

In particular, our paper contributes to the literature in several ways.

First of all, we found that, over the whole sample period, no company has more than four women on its board of directors. Furthermore, in 2013 the percentage of firms with three or more women on board increases significantly, thereby demonstrating the increasing number of women within the corporate boards due to the introduction of gender minority in the board of directors (Law 120/2011).

Secondly, our results are consistent with that part of the literature which did not find any effect on corporate performance with regard to the presence of women on the board and in general with regard to minority on board (Zahra & Stanton, 1988; Shrader et al., 1997) and we extend such literature to the Italian setting.

Furthermore, we did not find any statistically significant correlation between the percentage of women on the board of directors after the introduction of gender minority in the Board of Directors (Law 120/2011 and Consob n. 18098/2012) and the financial performance of Italian companies in terms of Tobin's Q. On the other hand, empirical results demonstrated that if the share of women increases, the ROA decreases. Our results are thus consistent with the results of some scholars who found that industrial firms perform worse in case of a greater gender diversity of the board (Shrader et al., 1997; Adams & Ferreira, 2009).

Thirdly, we found a positive correlation between financial performance of a listed firm and the connections between directors on different boardrooms, thereby confirming previous literature which suggested the relevance of directors' network of appointments to other boardrooms in having the proper strategic knowledge useful for the strategic decision making process and in enhancing the overall performance of a company in terms of Tobin's Q and ROA for the years from 2010 to 2013 (Walsh, 1995; Carpenter & Westphal, 2001). However, if we analyse results for the year 2013, we found that network ties are positively correlated to Tobin's Q, whereas, the relationship between connections and financial performance measured by ROA is not statistically significant for the year 2013. This result could mean that in case of more gender diversity, interlocked directorates lose their relevance and their effects on the financial performance of a listed firm.

From a methodological standpoint, this research develops topics related to text mining (that is the automatic extraction of quantitative information from text-documents) referring to all the firms' disclosures, produced in the Italian language.

This paper contributes to our understanding of gender in management. Moreover, it has important practical implications in contexts where the persistent underrepresentation of women in the upper echelons of management has received significant attention by regulators and mass media. Furthermore, the topic of interlocking is widely discussed among practitioners and managers and our results could be useful to understand

the effects of Italian network ties on boardrooms and their state of art. Firms may use our results to increase their connections among firms in the awareness that this could be effective for firms' financial performance.

Some limitations could arise from the fact that huge effects with regard to the introduction of the gender minority in Italy could be verified in the medium term, therefore it could be interesting to extend this analysis in the next future and over a longer period of analysis. Our negative effects concerning the presence of women on financial performance could be linked to some possible problems that could arise in subsequent years of significant changes, such as resistance to change or some cultural matters. Future research could be addressed to analyse the effect that different roles of women on the boardrooms (e.g. independent versus dependent, executive versus non-executive directors etc.) can have on financial performance. Furthermore, it could be interesting to analyse the effects that women may have on the overall performance of a listed firm, in terms of financial and non-financial measures of performance. Finally, further research could be addressed to examine network ties among women on Italian boardrooms and how these connections could have some impacts on the firms' performance.

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