

INTERDEPENDENCE BETWEEN BOARD AND FIRM PERFORMANCE: EVIDENCE FROM THE STOCK EXCHANGE OF TUNISIA

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Abstract

Recent empirical researches show a positive relationship between the quality of governance and firm performance. The objective of this research is to study the reverse causality between different characteristics of board and performance. Instead looking at one simple mechanism separately, we use a system of simultaneous equations in order to detect a possible endogeneity. In a panel of 36 traded firms at Tunis Stock Exchange between 2004 and 2006, our results show a significant interdependence between board size, board independence and firm performance. In addition, the 3SLS estimator allows us to conclude that board influences performance. Also, our results show that firms change their board structure in response to firm performance.

Keywords: Board size, Board independence, performance, endogeneity, causality, Tunisian firms

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1. Introduction

Within the framework of the Tunisian legislation, board of directors has the full powers to act in all circumstances in the name of the company. However, if the legislator fixed the size of the board of directors at a minimum of three and a maximum of twelve administrators, no text treats the independence of directors who sit the board although this aspect was largely discussed through the financial literature. This context leads us to study connection between this two board characteristics and their impacts on the Tunisian companies' performance.

Corporate governance is a whole of the relations between management, board, shareholders and all parts which contribute to the life of the company. Good corporate governance must encourage the board and the direction to defend the interest of company and its shareholders. In addition, it must facilitate its control. There is no single model of corporate governance. However, the basic principles of corporate governance must promote the transparency and take care that shareholders can easily exert their rights. Khiari et al. (2007) study the association between firms' specific characteristics and performance using a governance efficiency index, calculated by the Stochastic Frontier Analysis. They show a significant effect of the governance on firm performance Chen *et al.* (2007) support the idea

that companies having weak governance mechanisms are prone to conflicts of agency and carry out weak performances. Theoretically, board is an

affective governance mechanism able to solve these problems. Its principal role consists to control and discipline the managers to guarantee that they work in order to satisfy and protect the shareholders' interests.

The relation between board and firm performance was the subject of several empirical studies. The literature argue that agency problems can be attenuated by a tight control of management on behalf of independent directors or by reinforcing the control of management's decisions by decreasing the number of directors sitting on the board. This reasoning led several researches to conclude that there is an optimal percentage of board independence and board size that all companies must respect in order to boost their performance. Jensen (1993) was among the first to highlight the importance of the board size as an independent mechanism. Yermack (1996) identified a negative relationship between board size and performance. These results confirmed in only one direction of causality, that of the board size towards the performance. Others researchers (Fama and Jensen, 1983; Baysinger and Butler, 1985) were interested about the impact of independent directors on firm performance. Indeed, these studies were limited to detect the impact of each governance mechanism in isolation. The results of these studies were biased. However, they don't control for endogeneity and don't account for possible substitution between different governance mechanisms.

This paper has two major contributions. First, we present a simultaneous study of two major board characteristics as size and independence, and performance. I.e., instead studying one by one and in isolation the impact of each governance mechanism on performance we use a system of simultaneous equations in order to control the problem of

endogeneity which plagues most of empirical studies. The second major contribution of our paper is that we study the reverse causality between board's characteristics and firm performance. Hermalin and Weisbach (2003) suggest that the performance is the results of recent decisions made by directors and board's members. Moreover they claim that performance is a factor which influences the choice of board structure. It is clear that there is reverse causality between board and performance. However, this causality can be controlled only by the use of simultaneous equations where each mechanism is the dependent variable of one of the equations. The estimation method of Three Stage Least Square (3SLS) makes it possible to have non biased estimators.

The remainder of this article is organized as follows. Section 2 presents a review of theoretical and empirical studies. Section 3 describes the methodological approach, presents the data and defines the variables. The empirical results are presented in section 4. Finally, section 5 concludes.

2. Literature review

As a legal authority, board plays an important role. It consists to resolve all the conflicts between management and shareholders. The major function of the board is to monitor the firm management in order to protect the shareholder's interests. Between a multitude of functions: selection, evaluation and manager turnover constitute a central responsibility to board. Two board characteristics as size and independence were the subjects of a multiple debates on corporate governance. The majority of empirical research recommends a small board size with a majority of independent directors and has concluded that board represents an important determinant of firm performance. In literature, there are two different approaches to explain the relation between these two governance mechanisms and firm performance. The first approach refers to the exogeneity who consider every governance mechanism as an independent and optimal mechanism. The second approach takes into consideration the endogeneity of variables. This supposes that the interpretation of the relation governance performance should consider the interrelation between governance mechanisms and the reverse causality between corporate governance and performance.

2.1. The impact of board size on firm performance

The majority of the studies, which treated the impact of board size on firm performance, highlighted the importance of a small board size. These studies draw their conclusions while being based on the assumption which stipulates that greater board have a lot of difficulties to coordinate, communicate and exert an effective management control.

Jensen (1993) argues that beyond 7 or 8 directors, boards is not ready any more to function effectively and becomes easy to handle by the manager. He adds that greater boards are unable to ensure an honest discussions concerning firm management. Thus, board becomes fictive. As consequence, the manager notoriety rise when the number of directors within board rises.

Empirically, Yermack (1996) confirmed that small boards were more effective. He funds an inverse relationship between board size and firm performance measured by Tobin's Q. Moreover, he identified a negative relationship between firm performance and manager turnover for firms who have large boards. Thus, he confirmed the fact that small board's size is more likely to make a decision to dismiss the manager after a succession of bad firm performance. Harris and Raviv (2008) explained the negative impact of board size on firm performance by the fact that every director will makes less and less effort to exploit his expertise in the firm profit, when he saw increasing his individual contribution. Then, this attitude makes the board becomes an ineffective and a symbolic board. Thus, such board can't monitor and control the decisions made by the manager. This situation presents an opportunity for the manager who will try to maximize his profit on the detriment of shareholders. Beiner *et al.* (2004) have not found any relation between board size and firm performance. They suggest that there is no optimal size and that the board size must grow until the marginal benefit is equal to the marginal cost. On the other hand, according to other approaches concentrated on director's competence and expertise or on the problem of the access to certain resources, large boards are asked and this is because competences brought are more numerous. In this sense, Godard (2002) argue that firms, which are characterized by an uncertain environment, have a large boards whose members are experts and can brings all information that are necessary to company in order to create bonds with environment to reduce the uncertainty. Klein (1998) points out the fact that requirement in advice for the manager increases with the dependence of the firm on the resources. In addition to the uncertainty of the environment, the diversification of the company has an impact on the board size. Boone *et al.* (2006) suggest that more company carries out a better performance, diversifies and their activities become complex, more it needs to increase the number of independent directors to reinforce the role of monitoring and control of the manager. Thus, Eisenberg *et al.* (1998) explain the persistence of large boards in large firms by the need to reinforce the control of the firm management exerted by the board of directors. Coles *et al.* (2008) specify that the optimal board size differs according to the requirement of the company in terms of advice or monitoring. Although literature highlights the advantages of small board size, it specifies that these boards have a positive impact on firm performance

only when the board exerts a monitoring role. So this positive relationship, which was identified by the majority of the empirical studies, is the consequence of the concentration of these researches on the monitor's role for the board. On the other hand, the role of advising did not receive much attention. According to Coles *et al.* (2008), this explains the existence of the large board at the present time. Finally, Hermalin and Weisbach (2003) specify that the optimal size of a board depends on a compromise between the costs and the profits associated with the board size's increase.

2.2. The impact of board independence on firm performance

According to Fama and Jensen (1983), board is a monitoring mechanism whose effectiveness depends on the presence of the independent directors. The majority of empirical studies which treat the relationship between board independence and firm performance have not identify a correlation between these two variables. However, they confirm that the independent directors play a primordial role in the boards and that there are the only people able to make the decision to dismiss the non powerful manager. In short, all these studies convergent to say that the presence of a high percentage of independence within board is the best means which makes it possible to protect the shareholders interests against any discriminating behaviour of manager (Leftwich *et al.* (1981); Baysinger and Butler, 1985).

But in order to do it, these directors must have the necessary independence and the competence to guarantee the exercise of their mission. Empirically, Helland and Sykuta (2005) confirmed that companies, which are the object of litigation between manager and shareholders, have systematically a high number of internal directors within their boards.

However, Rosenstein and Waytt (1990) found that the price of actions increases on average by 0.2% when the company increases the number of its independent directors by one.

The manager independence with respect to the members of the board of directors was also the object of several studies. Companies in which the same person cumulates the functions of general manager and chairman of the board have a monist structure. The CEO of the companies characterized by such structure represents a threat on one hand, for the quality of the published information (Forker, 1992) and on the other hand, for the management control (Fama and Jensen, 1983). This is due to the fact that these persons would be aligned with the direction than with the shareholders. Another disadvantage of this structure was advanced by Goyal and Park (2002). They specify that when the same person cumulates the two functions of general director and chairman of the board, this assigns the sensitivity of the CEO turnover compared to the performance of the companies. This structure reduces the power of board;

so, it is difficult to dismiss the CEO who has realised a bad performance. In this sense, Hermalin and Weisbach (1988) were interested about the role of board in evaluating manager's performance. With this attention, they studied the relation between the performance and the turnover of manager when the board is dominated by independent directors. Their results show that the correlations between manager's turnover and performance is more higher for companies whom boards are dominated by independent directors. Khorana *et al.* (2006) argue that independent directors are less tolerant than the internal directors in the event of bad performance. Kamran *et al.* (2006) point out that the independent directors must prevent the opportunist behaviours of the managers in order to protect the value of the company. A degradation of market value of the company is the result of the noncredible financial reports. In this condition, these financial reports can affect the degree of the independence and decreases by consequence the request by the market of their supervising authority. So, a high percentage of independent directors can be the synonym of an effective way to decrease agency problems through improving the quality of financial reports and, as consequence, the performance of the firm.

Adams *et al.* (2007) argue that the monitoring and the advising roles of board depend on a large fraction on the ability and the desire of the CEO to reveal the information which he holds, because board act more effectively when he is better informed. Empirically, Beasley (1996) found that the probability of falsification of financial statements is conversely related to the fraction of the independent directors within a board.

In other hand, several reasons encourage the external administrators to prove their independences with respect to the direction. First, when they fail to achieve their tasks, they will assume all the responsibility for the caused damage being given the legal obligations which they have towards the shareholders. Second, they do not have any interest to be suspected of collusion with the manager because they are preoccupied so much by their value on the market of directors. Fama (1980) argues that, under these conditions, independent directors will preserve their reputation of qualified directors. In conclusion, all these studies succeeded in identifying an effect of causality in only one direction, that of the board of directors towards the performance.

2.3. Interdependence between performance, board size, and board independence

The divergence of literature concerning the impact of board size and board independence on firm performance, leads us to wonder about the existence of an optimal and single board structure. To answer this question, some researchers tried to develop a corporate governance index which at the same time

wraps several mechanisms in order to judge the performance of the company. With this index, they can evaluate the governance structure of the firm. This reasoning allowed Beiner *et al.* (2006) to confirm that the most powerful companies have the best governance structures. These studies try to explain the relation between governance and performance by taking account the endogeneity in order to avoid obtaining non conclusive results. Indeed, Lasfer (2006) examined the relationship between the board structure, the managerial ownership and firm performance in a system of simultaneous equation. He succeeds to show that the manager can influence the decisions related to board composition. Beiner *et al.* (2004) used the simultaneous equation in order to take account the interdependence between board size and others governance variables such as board composition, debt and manager ownership. They tried to re-examine the causality between board size and firm performance. They found that the average size of the boards which constitute their sample is equal to 6,6 administrators, a size close to the optimal size suggested by Jensen (1993). However, contrary to the prior empirical studies, they did not find any significant relationship between board size and the performance measured by Tobin's Q. they explain there results by the fact that Swiss companies choose their board size optimally. In addition, their results confirm that the board size is an exogenous mechanism to board independence. However, this conclusion contradicted the assumption of Yermack (1996) which stipulates that the board size depends on its independent director's number. He explains it by when the company decide to reinforce the monitoring and supervising roles of its board, it must increase the number of independent directors. Another important issue in studying the relation between governance and performance is the direction of causation in which performance can affects the governance structure of the company. Prior researchers have identified that board size and board independence influence the performance. But, performance, leads the company to modify its board structure too. Few researchers were interested to the endogenous relationships between board characteristics and firm performance and this how performance can affect board structure (Bhagat and Black, 2002).

In there study, they have adopted a simultaneous equations approach in order to explain the reverse causality between board composition and firm performance. There results show that firms which carried out a bad performance tend to increase the number of independent directors sit on the board. However, a high percentage of independent directors do not have any impact on the performance of the company. They explain there results that these companies need to reinforce their board power by increasing the number of its independent directors. In the same way, Prevost *et al.* (2002) adopted the simultaneous equation. But contrary to Bhagat and

Black (2002), they identified a positive and reciprocal relationship between board composition and firm performance. Hermalin and Weisbach (2003) support

the idea that the performance of the company is the result of recent decisions made by direction and board's members. Moreover, they support that the performance is a factor which influences the choice of the governance structure of the company. Yermack (2004) comes, thereafter, to confirm this assumption by showing that during the two or three first years which follow the addition of new independent directors, we can not observe any significant impact on performance to this decision. But, as from the firth year, a positive impact stars to be observed. In conclusion, this leads to that the evaluation of services of new board director's takes time.

3. Data and methodology

3.1. Data sources

Our study relates to performance of 36 traded firms at Tunis Stock Exchange between 2004 and 2006. Although the fact that today we have a 57 traded firms, our sample integrates only 36 of them. Indeed, we eliminated the firms which were not traded during all the period of study and two other companies of which the necessary data were not available. Finally we exclude mutual funds from our sample because mutual funds shareholders are also customers so, due to this specific structure, the governance of these organisms differs. Data are obtained From the Financial Market Council (CMF¹) and the Tunis Stock Exchange electronic data (BVMT², www.bvmt.com.tn) and the TUSTEX³ site (www.tustex.com). The data used in this study are, in addition to firm's quotations, board structure, the inception date of firm, the equity, the dividends, the total assets and the debt. Table 1 shows the descriptive statistics off selected variables in our analysis.

3.2. Methodology

In the literature, there are a lot of governance mechanisms, which discipline and control the manager attitude, to guarantee a good firm's management, to protect shareholder's interest and so increase the value of the firm. Among these mechanisms, the board of director constitutes an important way to reduce the potential conflicts of interest between manager and shareholders since it has all the capabilities to act directly in the event of bad firm management. The majority of recent studies were focused on only board characteristic.

Nevertheless, it is crucial to study the interrelation of these mechanisms because of the

¹ Conseil du Marché Financier.

² Bourse des Valeurs Mobilières de Tunis.

³ First Tunisian stock data site.

endogeneity of governance variables, which contributes to a biased estimator of the relation governance performance. The ordinary least squares (OLS) regression analysis of the system do not control for the sources of endogeneity and give us a biased estimator. The reason is that OLS estimation assumes that neither governance variables nor control variables are correlated with the error term. However, in our studies, board size, board independence and performance are simultaneously determined, then the assumption of strict exogeneity is violated and OLS estimator will be biased. For this reason, we use the three stages least squares (3SLS) method in order to control the endogeneity to estimate our system.

Our study consists in studying the interdependence between the various boards' characteristics retained and the firm performance. Do to it we define a system of three equations which is written as following:

$$\begin{cases} TACA_{it} = \alpha_0 + \alpha_1 \cdot PERF_{it} + \alpha_2 \cdot INCA_{it} + \alpha_3 \cdot AGEN_{it} + \alpha_4 \cdot TAEN_{it} + \alpha_5 \cdot ENDT_{it} + \varepsilon_i \\ INCA_{it} = \alpha_0 + \alpha_1 \cdot PERF_{it} + \alpha_2 \cdot TACA_{it} + \alpha_3 \cdot DUAL_{it} + \alpha_4 \cdot TAEN_{it} + \alpha_5 \cdot ENDT_{it} + \varepsilon_i \\ PERF_{it} = \alpha_0 + \alpha_1 \cdot TACA_{it} + \alpha_2 \cdot INCA_{it} + \alpha_3 \cdot AGEN_{it} + \alpha_4 \cdot DIVD_{it} + \alpha_5 \cdot ENDT_{it} + \varepsilon_i \end{cases}$$

As Proxy for performance (*PERF it*), we use the following ratio: (market value of equity + book value of debt) / book value of equity. Board size (*TACA it*) is measured by the number of directors which sit on the same board. Yermack (1996) demonstrates an inverse relation between board size and performance. Nevertheless, the company must adjust its board size in response to bad performance. For board independence (*INCA it*) we use, as measure, the number of independent directors divided by the total number of directors who sit in the board. Hermalin and Weisbach (1988) argue that boards dominated by independent directors are more able to replace managers when firm perform worse. Rosenstein and Waytt (1990) argue that the action's price increase after the addition of new independent member in the board. A high percentage of board independence is associated with better firm performance. Moreover, Hermalin and Weisbach (1988) point out that the number of independent directors rises after a bad firm performance.

Within the framework of our empirical analysis, we introduce some of control variables largely used into the literature as being significant determinants of the governance mechanisms as:

- Firm size (*TAENit*): measured by the logarithm of total assets. Eisenberg *et al.* (1998) suggest that the impact of board size differs according to its size.
- Firm age (*AGENit*): measured by the number of years since the company's constitution.
- Dividend paid by the company at the year *t* (*DIVDit*).
- Debt (*ENDTit*): measured by the following ratio: total debt divided by total equity.
- Duality of function (*DUALit*): is a dummy variable which takes 1 if the manager of the company is the board chairman, 0 if not. According to Goyal and Park (2001), the non independence of these two functions reduces the board effectiveness and makes

difficult the revocation of manager who performs worse.

4. Empirical results

Table 1 shows descriptive statistics of dependant and independent variables of the model.

The average board size of our sample is equal to 10 with a minimum of 6 and maximum of 12 directors. The independence percentage varies between 10% and 100% with an average of 65,22%. These results show that the majority of Tunisian firms have large board of which 22,22% consist of 50% independent directors and 50% internal directors, and 77,78% have the majority of independent directors.

Table 1. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
<i>PERF</i>	2.9858	3.8298	0.0081	31.5819
<i>TACA</i>	10.0648	1.7764	6	12
<i>INCA</i>	0.6521	0.2471	0.1	1
<i>TAEN</i>	33.8056	21.8116	10	122
<i>AGEN</i>	8.4049	0.8619	7.0797	11.6446
<i>DIVD</i>	1.0160	1.2667	0	7
<i>ENDT</i>	0.4982	0.3876	0.0005	1.5244
<i>DUAL</i>	0.5556	0.4971	0	1

PERF: Performance; *TACA*: Board size; *INCA*: Board independence; *TAEN*: Firm size; *AGEN*: Firm age; *DIVD*: Dividend paid by the company; *ENDT*: Debt; *DUAL*: Duality of function.

We use the three stage least squares (3SLS) to estimate a system with three simultaneous equations. This system includes three endogenous variables and five exogenous variables. The estimation of this system can be made by several methods. First, recall the fact that we can use the OLS regression. This due to the fact that an endogenous variable of a given equation figure as an explanatory variable in other equation of the system, violates the assumption of no correlation between the error term and endogenous variables. The choice into a series of estimators depends on the identification of the system. The criteria of identification applied to each equation of the system allow, before any estimation, to say if all coefficients which appear in each equation can be given. For our system, the order and row conditions were checked. Results show that our system is over-identified.

Table 2 summarizes the correlation coefficients between different governance mechanism and performance. There is a positive and statistically significant correlation at the 5% level between performance and board independence. Board size and board independence are also positively correlated. In contrast, board size and performance are negatively correlated. The duality and the two board

characteristics we use are negatively and statistically significant correlated at the 5% level. However the table shows a positively and statistically significant correlation between firm age, firm size and board size.

Table 2. Correlation matrix

	PERF	TACA	INCA	DUAL	ENDT	DIVD	TACA	AGEN
PERF	1.0000							
TACA	-0.0249	1.0000						
	0.3697							
INCA	0.0542*	0.0023	1.0000					
	0.0512	0.9335						
DUAL	-0.0106	-0.1143*	-0.0915*	1.0000				
	0.7042	0.0000	0.0010					
ENDT	0.2353*	-0.1235*	0.1403*	0.1731*	1.0000			
	0.0000	0.0000	0.0000	0.0000				
DIVD	-0.0526*	-0.0177	-0.3110*	-0.0251	-0.0605*	1.000		
	0.0583	0.5235	0.0000	0.3672	0.0293			
TAEN	-0.1212*	0.0773*	-0.2902*	0.0989*	-0.2444*	-0.0605	1.000	
	0.0000	0.0053	0.0000	0.0004	0.0000	0.0000		
AGEN	-0.0338	0.4334*	0.0104	0.0211	-0.2650*	-0.0251	0.1731	1.000
	0.2234	0.0000	0.7092	0.4474	0.0000	0.0000	0.0000	

PERF: Performance; TACA: Board size; INCA: Board independence; TAEN: Firm size; AGEN: Firm age; DIVD: Dividend paid by the company; ENDT: Debt; DUAL: Duality of function.

*/** denote statistical significance at the 5%/10% level.

Table 3 presumes obtained results by 3SLS regression. Such method allows us to highlight the effect of causality between the governance mechanisms we use in our regression and firm performance and to control the endogeneity.

Specific results relative to the impact of board size on performance show a positive but relatively weak impact. These results contradict the results of Yermack (1996) and Harris and Raviv (2008) which identified a negative relation between these two variables. This impact was explained by the problems of coordination and communication in large boards. The average board size of our sample (equal to 10) is rather high (a value higher than the board size average found by the preceding studies). Our results can be explained by the hypothesis which suggests that companies need to increase their board size in order to reinforce the supervising and control of the decisions made by manager. However, our results show a positive and significant impact at the 5% level of firm age and on board size. In contrast, they show a negative and significant impact at the 10% level of debt o board size.

In accordance with previous studies, we have identified a positive and relatively higher impact of the board independence on performance. The addition of one independent director causes an improvement of performance of Tunisian companies by about 5.48 points. Concerning the impact of performance on board size and independence, our results show a positive and significant impact of performance on board size. They show Also that the relation between board independence is negative but not statistically

significant. The obtained results enable us to confirm the reverse causality as well for the relation performance board size as performance board independence.

Table 3. 3SLS regression results

	Coef.	Err. Std.	z	P> z	[95% conf. interval]	
TACA						
PERF	1.6921**	0.1935	1.42	0.156	-0.6470	4.0312
INCA	-3.6361	3.7508	-0.97	0.332	-10.9876	3.7153
TAEN	0.0079	0.0174	0.46	0.648	-0.0262	0.0420
AGEN	0.6723*	0.3085	2.18	0.029	0.0678	1.2770
ENDT	-3.6693**	2.6436	-1.39	0.165	-8.8508	1.5122
_cons	3.2925	2.4918	1.32	0.186	-1.5913	8.1765
INCA						
PERF	1.0730	2.1716	0.49	0.621	-3.1833	5.3291
TACA	-0.2126	0.4925	-0.43	0.666	-1.1779	0.7526
TAEN	0.0097	0.0264	0.37	0.713	-0.0420	0.0614
DUAL	0.2428	0.6064	0.40	0.689	-0.9457	1.4313
ENDT	2.4456	5.0927	-0.48	0.631	-12.4272	7.5360
_cons	0.3440	1.5855	0.22	0.828	-2.7635	3.4516
PERF						
INCA	5.4775	4.8428	1.13	0.258	-4.0142	14.9692
TACA	0.2002	0.9625	0.21	0.835	-1.6862	2.0867
AGEN	-0.0487	0.9288	-0.05	0.958	-1.8691	1.7717
ENDT	1.9607*	0.4624	4.24	0.000	1.0543	2.8671
DIVD	0.2076	0.3941	0.53	0.598	0.5650	0.9802
_cons	-3.3804	2.3165	-1.46	0.144	-7.9209	1.1599

PERF: Performance; TACA: Board size; INCA: Board independence; TAEN: Firm size; AGEN: Firm age; DIVD: Dividend paid by the company; ENDT: Debt; DUAL: Duality of function.

*/** denote statistical significance at the 5%/10% level.

Thus, the performance of Tunisian companies seems to influence the structure of their boards. Our results confirm the Hermalin and Weisbach (2003) hypothesis which argue that the firm performance is the results of recent decisions made by direction and board's members.

Bhagat and Black (2002) used simultaneous equations to control the interdependence between the number of independent directors and performance. Our results join those found by Bhagat and Black (2002). They show that firms whose perform worse systematically increase the number of their board's independent directors. In other dimension, the estimate of the relation between board size and his composition shows an inverse correlation between these two variables.

The duality function has a positive impact on the percent of board's independence. We can conclude that this duality affect positively the independence degree of directors who sit on the board. This result contradict those of Goyal and Park (2002) and of Helland and Sykuta (2005), which specify that the cumulus of the two functions of director and board chairman affects the control effectiveness of the manager and reduce the degree of independence of board' members. Our results can support the idea that independent directors have to be aligned with the

manager in order to protect their interest and their places in the company.

5. Conclusion

The aim of this article is to test the interdependence between board's characteristics and firm performance. In literature, there are two different approaches to explain the relation between corporate governance and performance. The first treats each governance mechanism exogenously. The second approach tries to control the endogeneity of the relation between different governance mechanisms and performance. Through this study, we tested the interdependence and the reverse causality between board size, board independence and firm performance.

The estimation, in isolation of the impact of each mechanism on performance, contributes to biased estimators owing to the fact that these variables are endogenous. To avoid this problem, we have estimated our simultaneous system using the three stages least squares (3SLS) method. The results show the advantages of high number of directors in the same board for the Tunisian companies. This joins the theory which proposes the advantages of large board, in particular because competence and expertise brought are more numerous.

Moreover, with accordance to previous studies, we validate the positive impact of board independence on Tunisian companies' performance. Within the framework of these studies, we can not confirm the assumption that the duality function could attenuates the degree of independence of board external members. The major result of this study consists to the confirmation of the reverse causality between board characteristics and performance. We found that the firm performance influences the size of board and its composition. Our results confirm the causality in two directions. Companies' governance influences the performance and so, companies must adjust their governance structures according to their performance.

Simultaneous equations and 3SLS estimator make us significant results about the relation between governance mechanism and performance. We use this method to control for one source of endogeneity related to this simultaneous relation. However, to control for a possible dynamic endogeneity, this estimator may be biased.

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