

FEMALE REPRESENTATION ON THE BOARDS OF DIRECTORS OF NON-FINANCIAL COMPANIES

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Abstract

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This study offers new insights to help improve our understanding of the impact of female representation on firm performance, as measured by return on assets (ROA) and return on equity (ROE) and using non-financial institution data from Jordan. The study utilizes a lagged dependent variable in the regression models by employing the generalized method of moments (GMM) for dynamic panel analysis of the panel data of 77 companies over the period 2008-2018. The results of the regression analysis reveal that leverage, board size, and firm size were positive and statistically significant, while the age of the firm was statistically significant but had a negative effect, which indicates the existence of a relationship between these variables and the performance of Jordanian companies. However, the results fail to show any effect of the impact of female representation on firm performance as measured by return on assets and return on equity. This finding might be attributed to the low representation of females on non-financial institution boards, which was only 3.63%, a very low figure compared to that of males on Jordanian boards. Therefore, our results are valid only for Jordanian firms and cannot be generalized to ones in other countries, which might have different cultural and legal perspectives.

Keywords: Female Representation, Firm Performance, Corporate Governance, Dynamic Panel Analysis, Jordan

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1. INTRODUCTION

Corporate governance (CG) has attracted increasing research interest over recent decades, reflecting its fundamental importance for corporate and national economic performance; however, most CG research has focused on developed countries. With the universal preponderance of neoliberalism in the

political economies of both developed and developing countries since the 1980s, CG practices have often been transported wholesale to unfamiliar contexts, with varying degrees of success. This indicates a need for studies on such adoption (Aintablian & Boustany, 2008). In general, improved CG empowers decision-makers to be more effective, achieving improvements in performance, strategy, accountability, and compliance (Jhandir, 2012).

The ways in which firms react to different components and styles of CG are determined by numerous factors, including their own specific characteristics, one of the most instrumental of which is the nature and composition of the board of directors (BoD) (Lasfer, 2002). Directors are a core CG instrument, with the responsibility of safeguarding the rights of shareholders by preventing misalignment between the interests and activities of principals and managers (i.e., agency conflicts). The BoD is ultimately responsible for CG (Kim, 2005; Hundal & Eskola, 2020; Fania, Yan, Kuyon, Sesay, & Ntsama, 2020), and the CG infrastructure is designed to guide firm strategy, with the board, which is accountable to shareholders, effectively monitoring management (OECD, 2004).

Detailed studies of the diversity and different compositions of boards have been conducted worldwide, but mainly in developed countries, while less attention has been paid to developing countries, which have different legislative, regulatory, and cultural contexts (Kim, 2005). Consequently, there is an urgent need for studies of BoD factors in CG and their impacts on firm performance in developing countries. Perhaps the most significant change to board structure over recent decades has been the increasing representation of women; consequently, many scholars have studied the impacts of such representation on firm performance, although most research has concerned larger multinational corporations, and has reached inconclusive findings on the impacts (Kalev, Dobbin, & Kelly, 2006; Acs, Bardasi, Estrin, & Svejnar, 2011; Sicoli, Bronzetti, Ippolito, & Leonetti, 2020; Jaber, 2020). However, empirical and theoretical studies have posited that gender would be expected to have effects, both negative and positive (Shore et al., 2009).

The theoretical literature claims that in general women contribute more innovation and creativity to boards (McMahan, Bell, & Virick, 1998) and assist in problem-solving (Rose, 2007), which can result in competitive advantage (Cox & Blake, 1991). They also offer firms a more comprehensive grasp of external market conditions and confer more legitimacy to organizations (Carter, Simkins, & Simpson, 2003; Campbell & Mínguez-Vera, 2008). It should be noted that these advantages are not attributed to the performance of female directors per se, but to heterogeneous BoDs that include both women and men, who bring alternative and interactive leadership styles and dynamics (Fenwick & Neal, 2001). While diversity, including that of gender, is generally viewed as intrinsically positive, it does also have obvious drawbacks, including the prevention of directors from communicating together as freely as they would if they were a homogeneous group, which tends to undermine their cooperativeness and can cause intra-board factionalism and conflicts (Watson, Kumar, & Michaelsen, 1993; Pelled, 1996).

This research finding inconsistency might be due to differences in economic conditions, time periods covered, types of firms, countries, governance structure, sample size, measurement of diversity and financial performance, and the methodologies used (Nieto, 2018). Therefore, due to the differences in the legal and institutional frameworks, it is interesting to understand their effectiveness in the context of emerging markets, specifically the case of Jordan. Consequently, this study aims to

investigate the impact of female representation on firm performance.

Empirical studies have demonstrated a positive relationship between female representation on boards and firm performance (Smith, Smith, & Verner, 2006; Rose, 2007; Dezsö & Ross, 2012); despite this, the Jordanian Corporate Governance Code related to the representation of females on boards is ineffective. There is no legislation to motivate companies to increase or encourage the presence of females on boards. Therefore, the results of this study might have significant effects on and implications for firm boards, policymakers, and regulators, who should consider the effect of female representation on firm performance. Therefore, the study will contribute evidence to policymakers in Jordan in relation to governance reforms.

The empirical research also seems to indicate that the impact of female representation on boards on firm performance may vary in different settings. This raises the question of the Jordanian case: *Does female representation on board matter in the governance of the corporations in low female participation contexts?*

The rest structure of the paper is organized as follows. Section 2 reviews the literature review. In Section 3 the methodology and variable measurements were designed. Section 4 presents the regression analysis. Section 5 highlights the results and discussion of the main empirical findings. Section 6 presents robustness test. Finally, Section 7 ends with the conclusion, further studies, and the limitation of this study.

2. LITERATURE REVIEW

Based on general studies of gender characteristics, it can be expected that a diverse gender profile will affect decisions made by boards (Bøhren & Strøm, 2007). Some analysts suggest that diversity inherently increases the independence of the BoD because members from diverse backgrounds (e.g., in terms of ethnicity and gender) are likely to ask different and varied kinds of questions compared to homogenous boards; according to this view, diverse boards are also inherently more activist (Carter et al., 2003; Braendle, Stiglbauer, Ababneh, & Dedousis, 2020). Therefore, the effect of the presence of women on boards can be explained from different theoretical perspectives concerning the influence of female representation on firm performance.

Agency theory is a major paradigm within the CG literature; it concerns the relationship between shareholders (the principals) and management (agents), with mediation by the BoD (Carter et al., 2003). Ideally, the BoD should be as independent as possible from the influence of management in order to oversee managers on behalf of shareholders, a role that includes monitoring and advising managers in making optimal decisions to maximize shareholder value (Hermalin & Weisbach, 2003).

From the agency theory viewpoint, whether diverse board activities are beneficial depends on market conditions, and sector and firm characteristics, but in general, they are conducive to desirable board traits, such as conferring more creativity and enabling improved decision making targeted at solving problems. In addition, diverse boards provide more opinions, a wider range of

views, and better control, which can increase board independency (Reguera-Alvarado, de Fuentes, & Laffarga, 2017). Thereby, diverse boards can be viewed as a mechanism to reduce the costs linked with the agency problem.

Additionally, diversity itself is viewed positively by investors and the general public, so can have secondary positive impacts on firm performance. In scenarios where the effective inclusion of women on the BoD is novel, the introduction of gender diversity has an immediate impact of diversifying and broadening the organization's access to human resources, i.e., doubling the pool of potential candidates for key positions (Smith et al., 2006).

Potential drawbacks of diversity on the BoD and among senior management can include more costly and ineffective coordination, and a greater propensity for conflict, as mentioned previously, which need to be weighed against parallel improvements in performance via other mechanisms (e.g., a conflict-ridden board might still increase profitability and consequently firm value). One of the most costly impacts of heterogeneous boards is often the increased difficulty and time in reaching decisions, which inherently reduces firm efficiency (Smith et al., 2006). Furthermore, some critics have claimed that the assumption that diverse boards offer improved oversight may be incorrect in cases where some groups or individuals become marginalized within the board (Carter et al., 2003).

In addition, resource dependence theory is premised on the assumption that firm success (e.g., value) is determined by access to and deployment of required resources. According to this paradigm, diversity itself is a resource that can be used to increase firm access to secondary resources, particularly human and network ones (Johnson, Daily, & Ellstrand, 1996). In dynamic, modern, globalized markets, responsive and flexible human resources are essential, and diversity in terms of cultural background, nationality, age, and gender can greatly increase the competence of firms operating in diverse and complex environments (Stiles, 2001). For instance, diversity can improve the ability of management teams or BoDs to solve problems, using their experience and external networks for the benefit of their firms, being able to access valuable human, information and capital resources, and providing a more comprehensive understanding of customers and other stakeholders (Dalton, Daily, Ellstrand, & Johnson, 1998). Therefore, providing different viewpoints and new ideas to decision-makers could add value to firms.

The empirical literature generally affirms the potential advantages of diversity for the performance of boards and firms. Specific impacts of gender diversity include the tendency of female directors to ask questions that men would be less likely to, which improves board performance (Carter et al., 2003), and which is thus conducive to competitive advantage due to the leveraging of female directors and their attributes to balance boards (Cox & Blake, 1991; Watson et al., 1993; Farrell & Hersch 2005; Wiley & Monllor-Tormos, 2018; Asaoka, 2020).

Behavioral and psychological studies affirm that women have notably honed skills in innovation and creativity (McMahan et al., 1998), and their contributions to board discussions, in particular, can be advantageous to firms (Daily & Dalton, 2003).

The inclusion of women also enables firms to address issues from a more panoramic perspective, which greatly helps in solving problems (Rogelberg & Rumery, 1996; Rose, 2007). Such factors have been highlighted by numerous empirical studies, which have found beneficial effects on boards from gender diversity (Watson, 2002; Farrell & Hersch 2005; Adusei, 2020).

Numerous studies have also found that in general women are more receptive to the opinions, needs, and concerns of others, and are more concerned with fostering relationships, while men tend to be more task-oriented; consequently, women's propensity for developing relationships within the organization and with external stakeholders can be beneficial for long-term strategic growth and opportunities (Book, 2000; Arnaboldi, & Capizzi, 2020).

Moreover, women have been found to be more committed and conscientious in their professional activities in senior management and on BoDs, with a greater sense of responsibility and (often) more freedom of opinion and originality, which enables boards with a strong female presence to improve their strategy and monitoring activities (Gundry, Miriam, & Posig, 2002; Ravaonoroahanta, 2020). Greater inclusion of women is advantageous to firms in improving their corporate image and can increase their ability to penetrate markets (Carter et al., 2003; Campbell & Mínguez-Vera, 2008; Adel & Alqatan, 2019).

In contrast, several studies conducted in Europe have identified disadvantages of gender diversity on BoDs, particularly in Scandinavian countries (which are generally acknowledged to have some of the most gender-inclusive cultures in the world), including Sweden (Randøy Thomsen, & Oxelheim, 2006), Norway (Randøy et al., 2006) and Denmark (Rose, 2007), and in the Mediterranean country of Spain (Jimeno de la Mara & Redondo Cristobal, 2007). Contrary to expectations, these studies found that improved gender diversity reduced board effectiveness and thus undermined corporate value.

This was likely due to the heterogeneity commonly supposed to be an advantage of diversity, which can also reduce the frequency and effectiveness of communication between team members (Cox & Blake, 1991; Watson et al., 1993), reduce collaborative working (Tajfel, 2010; Chebri & Bahoussa, 2020) and result in clashes between the different leadership styles preferred by men and women (Fenwick & Neal, 2001). More prosaically, Lam, McGuinness, and Vieito (2013), Husted and de Sousa-Filho (2019) found that female directors weakened performance *per se*. However, this could be due to the particularly volatile environment seen in the aftermath of the 2008–2009 financial crisis and subsequent recession; homogenous boards tend to perform better in turbulent conditions, which could give male-dominated boards an edge in short-term responsiveness (Hambrick, Cho, & Chen, 1996).

Conflicts have obvious negative impacts on performance (Pelled, 1996), and even if open conflict does not ensue, diverse boards are less time efficient and decisive in making decisions and adopting strategic direction, which is particularly disadvantageous in more competitive environments (Hambrick et al., 1996). This is essentially the case for all market sectors in the modern globalized economy; for instance, firms may need to respond quickly and decisively to dynamic market shocks or

developments, an action that is facilitated by a homogenous board. However, heterogeneous boards are generally more efficient for long-term development, as explained previously.

Empirically, the effect of female representation on boards of directors is mixed. BoD diversity was found to positively affect return on assets (ROA) and return on investment (ROI) in a study of multi-sector public firms in the US in 1998 (Erhardt, Werbel, & Shrader, 2003). However, Randøy et al. (2006) found no impact of BoD gender diversity on corporate performance based on a sample that included the most valuable companies in Sweden, Norway, and Denmark, corroborating the findings of Rose (2007) for Danish firms on the Copenhagen Stock Exchange, and indicating no statistically significant effect of female board members over the period 1998–2001.

Studying a longer time frame, Campbell and Mínguez-Vera (2008) found no impact of the presence of a single female director on firm performance for the period 1995–2000. For the similar period of 1993–2001, Smith et al. (2006) obtained mixed results from the operational measurement of financial performance, using panel data from 2500 of the largest Danish firms, indicating no significant effect of gender. Bøhren and Strøm (2007) studied a sample of non-financial firms listed in Norway for over a decade (1989–2002), and using Tobin's Q they found that firm performance was superior in firms with fewer female directors.

Studying panel data from 1,779 major US public firms in a more recent period (1992–2006), Dezsó and Ross (2012) found that the presence of female management staff below CEO level positively affected the performance of firms whose strategies were innovation-intensive.

Adams and Ferreira (2009) extrapolated their findings to consider the implications for governance more directly, using data from over 1,900 firms over the period 1996–2003. They found an average, negative impact on performance associated with gender diversity, which they speculated could be due to the greater stringency of monitoring by gender-diverse BoDs, which could inhibit the freedom of action (i.e., potentially lucrative, risk-taking behaviors) of CEOs. More stringent monitoring is generally advantageous in firms with latently weak CG, but for organizations with robust governance, it can be disruptive and detrimental to performance.

The Jordanian financial market is classified as an emerging economy, as the Amman Stock Exchange (ASE) clearly has been suffered from the repercussions of the crises that occurred internationally, regionally, and locally (Khataybeh, Abdulaziz, & Marshdeh, 2019). Consequently, it is surrounded by many repercussions and crises that affect it greatly, as weak protection rights, high family concentration, unstable economy, and political conditions played a major role in many financial firms failures, which led to the collapse in stock prices, thus reduce companies from improving their performance (Marshdeh, 2014; Saidat, Bani-Khalid, Al-Haddad, & Marshdeh, 2020; Khataybeh, 2020). The social and cultural features of a country similarly play an important role in the development of corporate governance practice. Jordan is an appropriate setting to examine the effect of female representation on firm performance. The female representation on the board of the non-financial listed companies was

found around 22%. This means the number of females who participate in the companies is very low. This might be due to the cultural perspective and people's perception of women (IFC, 2011).

Therefore, dependent upon the Jordanian culture, the low percentage of Jordanian females on the board of directors and inconsistent with the expectation of agency theory, resource dependency theory, and the suggestion of the most previous researches that the presence of females on board has a positive impact on firm performance. Thus, this study hypothesizes:

Null hypothesis (H_0): Female representation will have a positive and significant effect on the performance of Jordanian industrial and services companies.

3. METHODOLOGY

3.1. Population and sample

The study sample consisted of 847 observations for 77 listed companies of the industrial and services sector out of 83 companies listed on the ASE. The percentage of these selected non-financial firms compared to the whole firms is 93%. The period of analysis was from 2008 to 2018, although at times there is no available information for certain firms and periods, meaning that the sample had an unbalanced character. The financial data used to measure firm performance as a dependent variable and the corporate governance variables as independent variables were obtained from the annual reports of the companies.

3.2. Variables

3.2.1. Dependent variables (firm performance)

In corporate governance research, it has been argued that there is no consensus on which is the best measure to fit the measurement of financial performance (Haniffa & Hudaib, 2006). This study measured firm performance using an accounting-based approach (ROA and ROE). ROA was calculated based on the most usual proxy, net income after tax divided by total assets, and shows the capability and capacity of management to use firm assets, which belong to the stockholders (Javed, Saeed, Lodhi, & Malik, 2013). Javed et al. (2013) state that lower ROA and ROE will reflect the ineffectiveness of corporate management. In addition, the ROA proxy has been widely used as a financial performance measure in previous studies (Adams & Ferreira, 2009). ROE is calculated as net income divided by total equity and shows the ability of a firm to generate income for every dollar invested in equity.

3.2.2. Independent variables

Female representation (FR). The representation of female directors on a board was measured by the percentage of directors and calculated as the total number of female directors divided by the total number of directors. Female representation was extracted directly from the firms' annual reports.

In order to avoid biased results, we considered the set of control variables described below, for which corresponding results have been found in

the literature, as represented by board size, sales, leverage, and firm age.

Board size. Board size represents the total number of directors on the board. The results in the previous literature regarding its effect on firm performance are mixed. Jensen (1993), Lipton and Lorsch (1992) found that small boards were better at improving firm performance. They argue that large boards are more likely to increase problems and reduce coordination between board members. Therefore, board members will face difficulties in monitoring management behaviors, leading to an increased agency problem and consequently poor firm performance. On the other hand, Dalton et al. (1998), Haniffa and Hudaib (2006) report that as the size of the board increases, there is more likely to be diversity in communication skills and directors' backgrounds, thus providing more experience and external linkages outside the firm. This will result in improving the outcomes of decisions, which might result in reducing agency costs and thereby lead to better firm performance. The board size was calculated as the total number of directors on the board.

Firm age (AGE). Firm age has been used in previous studies in terms of how many years the firm has been incorporated (Borghesi, Houston, & Naranjo, 2007). In addition, it has been argued that it is an important indicator of expected growth opportunities. For instance, Claessens, Djankov, Fan, & Lang (2002) found that older firms were more likely to have diversified activities, better disclosure, and more liquid trading, which might result in lower risk of financial distress, but fewer growth opportunities. However, younger firms tended to have better growth opportunities but were more exposed to adverse market conditions. Firm age was calculated in this study by subtracting the establishment date of the firm from 2016. The age of the firms was extracted directly from firms' annual reports.

Firm size (LSALE). Firm size is a usual measurement of firm performance. Smith et al. (2006) observed that larger firms are more likely to generate and create funds internally and to access external resources than smaller ones, leading to better performance. This is because of their greater market power. Furthermore, when firm size increases, the firm becomes more diversified, which can help to describe the nature of its complexity (Fama & Jensen, 1983). On the other hand, Agrawal and Knoeber (1996) argue that larger firms are less efficient than smaller ones, which might be due to the reduced control by management over firm operations and strategies. In addition, as firm size increases, it is more likely that agency costs will increase because of the need for more control that arises from managerial opportunism and discretion (Jensen & Meckling, 1976). In this study, we used the natural logarithm of total sales (*Log SALE*) as a proxy for firm size. Total sales were extracted directly from firms' annual reports.

Leverage (LEV). Myers (1977) argues that higher levels of debt will affect firm performance negatively. In other words, higher amounts of leverage will reduce the ability of firms to raise new debt or acquire investment opportunities. In addition, Myers (1977) reports that higher leverage will affect the market value of shares negatively, leading to higher financial risk. Abdullah (2014) found that higher levels of leverage might lead to the violation of debt agreements, meaning firms will be exposed to the risk of bankruptcy. In other words, a high level of bankruptcy costs is linked with high amounts of debt. Therefore, a negative relationship is expected between leverage and firm performance (Isidro & Sobral, 2014). Leverage typically determines companies' specific risk and is measured as a percentage of the book value of total debt to total assets.

3.3. Model specification

A regression model was employed to analyze the panel data and examine the effect of female representation on the performance of Jordanian firms. Based on the literature review, the following empirical regression model was constructed:

$$Performance_{it} = a_i + \sum_{j=1}^k B_j X_{it} + U_{it} \dots \dots \dots (1)$$

where, the performance index is measured by the logarithms of a firm's ROA and ROE; X_{it} is the logarithm of the independent variables for the firm "i" at the time "t"; C is a constant; β is the coefficient, and U is the error term.

According to Baltagi (1995), the most common advantage of a static panel data analysis that it allows examining a large number of observations with heterogeneous information, and produces less data multicollinearity among the explanatory variables. Moreover, it allows using more data and can keep track of each unit of observation. It has also disadvantages as the data becomes more complex and heterogeneity appears and is not properly treated. If the properties of the country or some model components are not observable, then the errors will be correlated with the observations, and the fixed effects and random effects estimators will be biased and inconsistent (De Hoyos & Sarafidis, 2006). Here one may follow an instrumental variables (IVs) approach like the generalized method of moments (GMM); two-stage least square (2SLS). Therefore, this study applies the cross-section dependence test to determine whether the static panel data approach or instrumental variable approach is appropriate for our models.

3.3.1. Descriptive statistics

The statistical characteristics of the tested variables are summarized in Table 1 below:

Table 1. Descriptive statistics

	ROA%	ROE%	FR%	AGE	LEV%	BSIZE	LSALE
Average	3.93	3.62	3.63	23.42	10.47	8.19	7.09
Maximum	99.48	248.05	33.33	80.00	96.89	23.00	9.66
Minimum	-95.29	-137.89	0.00	1.00	-23.36	3.00	3.51
Std. dev.	9.29	18.25	6.84	15.78	16.41	2.55	0.88
Observations	789	789	789	789	789	789	789

As shown in Table 1, the statistics indicate that ROA and ROE have average values of 3.93% and 3.62% respectively. This means the firms are performing well and creating value for their shareholders. This result varies from that found in Julizaerma and Sori's (2012) study of Malaysian public listed firms, which was 3.41. The average of *FR*, which represents the percentage of female representation on the board of directors, is 3.63%. This means that 3.63% of non-financial institutions in Jordan have zero or more women on their board of directors, compared to 70% in the US (Farrell & Hersch, 2005). However, this degree of female representation on boards is in line with some European countries, such as Italy (2%), Belgium (3%), and Spain (3.1%), as reported by Cambell and Mínguez-Vera (2008). The mean value of firm age is 23.42, which means that the firms had been operating for an average of 23.42 years in their respective sectors. Furthermore, the mean value of leverage is 10.47% which means that Jordanian non-financial institutions are in a better position to make repayments on their debts. The average board size is 8.19, indicating that the selected firms have on average 8 members on their board. Finally,

the mean value of *Log SALE* is 7.09, which shows that the majority of the firms are small or medium.

3.3.2. Cross-section dependence test

Cross-section dependence is one of the most important diagnoses that a researcher should investigate before performing a static panel data analysis (fixed effects and random effects), whereas, one of the assumptions of static panel data regression analysis is the independence of residuals. If the unobserved components that create interdependencies across cross-sections are correlated with the included regressors, the fixed effects and random effects estimators will be biased and inconsistent (De Hoyos & Sarafidis, 2006). Here one may follow an IVs approach.

To detect residuals independence, the Breusch-Pagan LM test, the Pesaran scaled LM test, and the Pesaran CD test can be used. The null hypothesis (H_0) for these tests indicates that there is no cross-section dependence "correlation" in residuals. Therefore, by performing the cross-dependence tests results were shown in Table 2.

Table 2. Cross-section dependence tests

ROA Model			ROE Model		
Test	Statistic	Probability	Test	Statistic	Probability
Breusch-Pagan LM	5122.88	0.00	Breusch-Pagan LM	4515.11	0.00
Pesaran scaled LM	27.71	0.00	Pesaran scaled LM	19.76	0.00
Pesaran CD	-0.80	0.41	Pesaran CD	-0.67	0.50

Note: Null hypothesis: No cross-section dependence (correlation) in residuals.

The probability values of the Breusch-Pagan LM test, the Pesaran scaled LM test were zero for the above tests as in Table 2, meaning that there is a "correlation" between the residuals in the variables of the study. Therefore, the study utilized a lagged dependent variable in the regression models by introducing the GMM for the dynamic panel analysis. The panel GMM estimator allows for control of the heterogeneity of the non-financial institutions and enables one to overcome the endogeneity of the explanatory variables that may arise in the relationship between firm performance and the dependent variables by using instrumental variables,

thus, yielding consistent estimates (Baum, Caglayan, & Talavera, 2010).

3.3.3. Testing endogeneity between variables

The study applied variance inflation factors (VIF) as a diagnostic test that reveals the multicollinearity. According to O'Brien (2007) and a rule of thumb is that the VIF above 5 or the tolerance value ($1/VIF$) below 0.2 is an indication that there is a problem of multicollinearity (endogeneity) among the variables. The results are presented in Table 3.

Table 3. Testing variance inflation factors (VIF)

ROA Model		ROE Model	
Variables	VIF	Variables	VIF
<i>FR</i>	1.60	<i>FR</i>	1.63
<i>AGE</i>	1.41	<i>AGE</i>	1.28
<i>LEV</i>	1.74	<i>LEV</i>	1.53
<i>BSIZE</i>	1.09	<i>BSIZE</i>	1.17
<i>LSALE</i>	1.17	<i>LSALE</i>	1.17
Mean VIF	1.40	Mean VIF	1.35

Table 3 shows that there is no VIF greater than 5; in turn, reveals any of the independent variable included in this study is not explained by the other. Hence, all variables can be retained in the model of this study.

4. REGRESSION ANALYSIS

The reliability of the GMM critically depends on the validity of the instruments, which can be evaluated with Hansen J-test of over-identifying restrictions, which produces a J-statistic,

asymptotically distributed as Chi-square in the number of restrictions. A rejection of the null hypothesis (H_0) that instruments are orthogonal to errors would indicate that the estimates are not consistent (Baum et al., 2010). Therefore, if the J-statistic is lower than the critical value, or if its probability exceeds 5%, then we do not reject the null hypothesis (H_0)¹ and conclude that the instruments are exogenous. Table 4 presents the GMM estimator analysis.

¹ The hypothesis that instrumental variables are not correlated with the set of residuals.

Table 4. Generalized method of moments (GMM) regression results

ROA Model				ROE Model			
Variable	Coefficient	t-statistic	Prob.	Variable	Coefficient	t-statistic	Prob.
ROA(-1)	-0.158	-4.421	0.000*	ROE(-1)	0.244	4.468	0.000*
FR	-0.335	-1.144	0.252	FR	-0.713	-0.392	0.694
AGE	-0.807	-4.356	0.000*	AGE	-3.946	-3.482	0.000*
LEV	2.641	3.332	0.000*	LEV	4.727	6.923	0.000*
BSIZE	1.359	2.017	0.044*	BSIZE	4.648	4.589	0.000*
LSALE	8.703	4.801	0.000*	LSALE	3.543	4.035	0.000*
AR(1) p-value		0.002		AR(1) p-value		0.043	
AR(2) p-value		0.178		AR(2) p-value		0.488	
J-statistic		42.05		J-statistic		46.12	
J-probability		0.339		J-probability		0.201	
Observations (unbalanced)		505		Observations (unbalanced)		528	
Instrument rank		45		Instrument rank		45	

Note: * indicates significance at levels of 5%. Instruments are the lagged independent variables.

The results of the GMM regression analysis reveal that all the independent variables apart from *FR* are significant, the Hansen J-test with associated p-value, is proved as valid instruments for all tested equations. Therefore, the results from the GMM estimator prove the null hypothesis. As a result, the Hansen p-value test failed to reject the null hypothesis (H_0). In addition, the study presents the Arrelano-Bond test statistics for the first and second-order serial correlations (*AR(1)* and *AR(2)*). In a dynamic panel data context, the second-order serial correlation should not be present if the instruments are appropriately uncorrelated with the errors (Baum et al., 2010). It can be observed from Table 4 that the *AR(2)* tests show that at the 5% significance level our instruments are appropriately orthogonal to the error and no second-order serial correlation is detected.

5. RESULTS AND DISCUSSION

Based on our results, we failed to find any relationship between female representation on boards and firm performance using both ROA and ROE measurements. This finding might be attributed to the absence of social pressure in Jordan to increase the number of women on boards (World Bank Group, 2013). Furthermore, the finding might be related to social and cultural factors, which are likely to deprive females of the chance to participate on boards. In other words, women are perceived to be at a lower level than men on matters such as career ambition, leadership ability, and skills to solve issues under pressure (Qasem & Abdullatif, 2014).

The results also show that age has a negative and significant effect on firm performance, from both the ROA and ROE measurements. The *AGE* coefficient indicates that an increase in a firm's age by 1 year will weaken its performance by 0.807% and 3.946% respectively. That means that younger firms outperform older ones to a limited extent. Borghesi et al. (2007) and Evans (1987) found that older companies were more experienced and skilled, but were less flexible and dynamic in modifying themselves or adjusting to any changes resulting from market conditions. Therefore, younger firms are in a good position to have better growth opportunities, leading to better firm performance.

The results shown in Table 4 indicate a positive and significant effect of leverage on firm performance, as measured by both ROA and ROE. The estimated coefficients indicate that an increase in leverage by 1% will improve firm performance by 2.641% and 4.727% respectively. Our results are in line with those of Jensen and Meckling (1976), Jensen (1986), who found that increasing debt, will help reduce agency problems, specifically ones related to free cash. This is because increasing debt will limit managerial discretion. In addition, it gives a good signal about the capability of the firm to serve high amounts of debt.

The next result showed a positive and significant relationship between board size (*BSIZE*) and firm performance using both ROA and ROE measurements. The estimated coefficients of board size indicated that larger boards would improve firm performance, a result that is consistent with resource dependency theory. Large boards link board members with external resources, which might include access to raw materials, markets, and new and better technologies. In addition, large boards allow members to exchange ideas and share experience, leading to improvement in the outcomes of decisions and thereby better firm performance (Dalton et al. 1998; Hillman & Dalziel, 2003).

Our results also show a positive and significant relationship between firm size, as measured by *LSALE*, and firm performance, as measured by both ROA and ROE. The coefficients of firm size indicate that any improvement of 1% in the size of a firm will increase the return on assets by 8.903% and return on equity by 3.543%. The size of the firm shows its ability to achieve market power and economies of scale. Furthermore, larger firms are more likely to use their economics of scale to improve production processes, which will result in a positive effect on firm performance. Moreover, in terms of market growth, larger firms are more diversified, conduct broader activities, and have larger information sets and more complex and value-creation sources (Short & Keasey, 1999).

6. ROBUSTNESS TEST

To check for the robustness of the results, this study introduces the GMM of sub-samples of firms without female representation. Table 5 presents the GMM estimator analysis.

Table 5. GMM regression results without female representation

ROA Model				ROE Model			
Variable	Coefficient	t-statistic	Prob.	Variable	Coefficient	t-statistic	Prob.
ROA(-1)	-0.159	-5.168	0.000*	ROE(-1)	0.234	4.703	0.000*
AGE	-0.829	-4.510	0.000*	AGE	-3.254	-3.041	0.000*
LEV	2.753	3.852	0.000*	LEV	4.189	5.578	0.000*
BSIZE	1.625	1.816	0.069**	BSIZE	4.387	2.801	0.005*
LSALE	8.999	4.849	0.000*	LSALE	3.848	3.703	0.000*
AR(1) p-value		0.003		AR(1) p-value		0.001	
AR(2) p-value		0.201		AR(2) p-value		0.725	
J-statistic		42.43		J-statistic		52.96	
J-probability		0.366		J-probability		0.082	
Observations (unbalanced)		505		Observations (unbalanced)		528	
Instrument rank		45		Instrument rank		45	

Note: *, ** indicates significance at levels of 5%, 10% respectively. Instruments are the lagged independent variables.

The results from the GMM estimator remain robust in terms of directions and significance levels. Whereas they keep the same sign, the same order of magnitude, they remain significant, as they were so in the previous female representation models (Table 4).

7. CONCLUSION

Female representation is considered a crucial aspect of corporate governance reform efforts worldwide. This study offers new insights, which help to improve our understanding of the impact of such representation on firm performance, using data from non-financial institutions in Jordan. The generalized method of moments (GMM) was employed for the dynamic panel regression analysis of the panel data of 77 companies over the period 2008–2018. However, the study failed to find any relationship between female representation on boards and firm performance, as measured by both ROA and ROE. Such a result might be related to social and cultural factors, which are likely to deprive females of the opportunity to participate on firm boards. In other words, females are perceived to be at a lower level than males on matters such as career ambition, leadership ability, skills to solve issues under pressure, and leadership ability (Qasem & Abdullatif, 2014). Furthermore, Jordanian listed firms tend to have more male directors than female ones. This might be due to the cultural perspective and people's perception of women. Our findings show that the average female representation on boards is only 3.63%, clearly much lower than that of males. Therefore, our results are valid only for

Jordanian firms and cannot be generalized to firms in other countries that might have different cultural and legal perspectives.

However, the results of the regression analysis reveal that the age of the firm, leverage, board size and firm size were significant, which indicates the existence of a relationship between these variables and the performance of non-financial institutions in Jordan.

Further studies could include more variables than our study; in particular, variables related to board characteristics, such as age, education, and experience. This study is also limited to non-financial institutions listed on the Amman Stock Exchange (ASE) of Jordan. Therefore, it is important to include other sectors, which might lead to different results. Likewise, different methodologies, such as surveys and event studies, might provide insights to help understand the issues that arise from female representation. Finally, it would be interesting to examine the participation of women in top executive positions.

Jordan is a country with a low representation of women with board responsibilities. In Jordan, the regulations of the corporate governance code do not stipulate any requirements regarding the representation of women on boards of directors. This is a situation that needs to be raised with the government and policymakers in order to be addressed via legislative and corporate governance reforms. Therefore, the findings in this study regarding the relationship between female representation and firm performance may have important implications for policymakers, corporations, and shareholders.

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