



Do women on boards enhance firm performance? Evidence from top Indian companies

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Abstract

This paper examines whether gender diversity (GD) on corporate boards influences financial performance (FP) of Indian firms using System Generalized Methods of Moments (GMM) methods by considering panel data of 364 firms during 2017 to 2021, comprising of 1820 firm-year observations. The study reveals that the mere presence of a woman director (WD) on boards makes no difference in financial performance. Presence of WDs as a significant portion of the boards and their active roles in the functioning and governance of companies positively contribute to firms' financial performances and economic value creation. Regarding other governance parameters, the study shows that larger boards do not necessarily improve firm performance. Also, independent directors do not necessarily add value to corporate performance and value creation. While a higher promoter's stake is an important factor for Indian companies to drive corporate performance, firms with separate CEO and chairperson outperform firms with CEO duality. The study also reveals that the covid 19 pandemic has negatively influenced the financial performance and economic profit generation of the Indian firms. This study is important for several reasons. First, this study considers the period (2017–2021) when Indian companies adopted new financial reporting practices (IND-AS) in line with International Financial Reporting System (IFRS), the mandatory quota system of women directors' appointment is implemented and new corporate governance norms are implemented. Hence, our study contributes to the literature by proving meaningful insights on the role of gender diversity and other corporate governance parameters on financial performance of Indian firms in the light of newly adopted accounting and financial reporting practices. Second, few previous India based studies have mostly used pooled OLS or fixed effect models, and did not address the endogeneity problem in different forms like *Dynamic Endogeneity*, *Simultaneity*, and *Unobserved Heterogeneity*. This paper addresses the endogeneity problem appropriately by using the system generalized method of moments (GMM) while modelling the relation between WDs and firms' FP. Therefore, the findings of this study are more reliable and unbiased and can be useful for effective policy making on gender diversity and corporate governance issues. Third, few prior studies which have looked into the role of WDs on FP of Indian firms, have mostly used return on assets (ROA), return on equity (ROE) and Tobin's Q as performance parameters. Here, in addition to ROA, ROE and Tobin's Q, we also use economic value added (EVA) as indicators of corporate performance to understand the role of WDs on economic value creation for companies. The EVA is considered as modern technique to measure the economic profit earned by a firm, and it has gained huge popularity among companies as an improved technique for measuring financial performance for companies. To the best of our knowledge, the role of WDs on economic value creation by firms has not been investigated before particularly in the Indian context. This is another unique contribution of this study. Fourth, the Covid 19 pandemic had impacted global economy severely and India was no exception. Financial performances of most Indian firms were negatively impacted due to the nationwide lockdown and uncertainties about production, revenue and earnings. This study considers both the pre and post Covid 19 pandemic period in examining our central research question using a year dummy. Therefore, our study also captures whether the covid 19 pandemic has actually impacted the financial performance of Indian firms, while modelling this relation. This is another valuable and unique contribution of this study to the literature. The findings of this study provide an understanding of how board gender diversity and other governance parameters influence financial performance of Indian firms in an emerging market context. The outcomes are also explained and aligned with the relevant policy implications in the light of recent Indian corporate governance norms and policies. These findings are useful to the companies and policymakers, as they can use these findings while designing effective boards, which can be useful in improving firm performance. Board of directors,



investors, regulators, and policymakers can effectively use these findings to understand how gender diverse boards and other corporate governance parameters influence firms' financial performance under the concentrated ownership pattern.

Keywords Corporate governance · Gender diversity · Women directors · Board of directors · GMM · Financial performance

Introduction

Historically boards of Indian companies are male-dominated, and women's participation has been meager at Indian corporate boards. The dominance of male directors in the Indian corporate boards has a linkage with the cultural aspects of the Indian society. Although the Indian Constitution has enshrined gender equality in its preamble, the Indian culture has predominantly remained male-dominated, and women's participation in the workforce has remained subdued. However, things are changing in the modern times, where women empowerment has got a key focus. Developed economies like Norway, France, Iceland, Germany and Belgium have regulations to maintain at least 40 percent women directors on the boards of publicly traded firms (Hoel, 2019). Also, countries like Australia, Britain, and Sweden meticulously follow to select appropriate mix of female directors on corporate boards (The Economist, 2014). Following these instances, The Companies Act, 2013 has made it mandatory to have at least one woman director (here after called WD) on boards of every publicly traded company falling under specific criteria.¹ Accordingly, the Securities and Exchange Board of India (SEBI), India's capital market regulator, requires the top 500 listed firms to appoint at least one WD on their boards by April 2019 and the remaining top 1000 firms by April 2020.

While this step of empowering women in the corporate world is a welcome approach, an important question is: Do WDs add value to corporate boards? Existing literature show mixed impact of Gender Diversity (here after called GD) on firms' financial performance (here after called FP). Several consultancy reports argue that GD is immensely important, as it leads to smarter and improved decision making, and thereby impacting earnings significantly (Credit Suisse Research Institute 2019. Bank of America Merrill Lynch 2018. Deloitte 2018). However, the Times Report (2003) argues that UK companies are better off without WDs on boards, and indicates a negative association between corporate performance and the presence of WDs in FTSE 100 firms. Matsa and Miller (2012) find a significant reduction in the value of Nordic firms after adopting the quota system for WDs. Some scholars argue that WDs bring new

perspectives, create new board dynamics and a positive environment, which ultimately improves corporate performance (Huse et al. 2009). While this inclusivity is essential, there are many practical challenges like finding suitable WDs with required qualifications and adequate experiences.

While these instances are primarily for developed economies, there is a lack of adequate empirical evidence for emerging economies like India. Deloitte report (2018) shows that female participation on Indian boards (13.8 percent) is markedly lower than the global average (16.9 percent), and is far below than some other countries like, Norway (41 percent), France (37.2 percent) and South Africa (26.4 percent). Moreover, the ownership structure and style of governance are quite different for Indian firms which are mostly owned by family business houses. In India, ownership and control are concentrated to founding families (i.e., promoters), and the founding family members hold senior management positions. Thus, to comply with the mandatory norms, most Indian firms are likely to appoint women from promoters' families and friends. Norwegian firms appointed many WDs who were less experienced. While GD is useful for any society, it is crucial to select deserving and qualified women as board members. When a healthy GD balance is maintained, and companies recognize talented female employees, it is likely to boost the motivation of other female employees to perform better. This culture of recognizing talent irrespective of gender is a welcome initiative for any progressive society. The inclusion of female directors on boards is crucial, and the board of directors is primarily responsible for the overall governance and corporate performance. Apart from WDs on boards, several other governance parameters like board independence, the board size, promoter's holding and, CEO duality influence corporate performance immensely. However, not all governance parameters impact corporate performance equally and in the same direction.

The present paper investigates how WDs' presence on corporate boards influences corporate performance in a large emerging economy, with a concentrated ownership style. Therefore, the central objective of this paper is to examine how WDs on boards impact financial performance of Indian companies, along with other governance parameters as moderating variables.

The contribution of this paper are four fold. First, after implementing the mandatory quota system for WDs in Indian boards in the New Companies' Act 2013, very few studies have examined the role of WDs on FP of Indian firms. Studies like Jyothi and Mangalagiri (2019); Kumar

¹ Every public company with paid-up share capital of INR 100 crores or more or turnover of INR 300 crore or more shall appoint at least one woman director on boards.



et al. (2020); Sanan (2016) examine the role of WDs on FP of Indian firms. These studies have used either pooled regression, fixed effect or random effect panel regression for modelling such type of relation. However, these studies ignored the endogeneity problem in different forms like *Dynamic Endogeneity*, *Simultaneity*, and *Unobserved Heterogeneity*. If the endogeneity problem, which is very common in this type of relation, is not appropriately addressed, the parameter estimates become unreliable and biased. In the present paper, we address this issue appropriately by using the system generalized method of moments (GMM) while modelling the relation between WDs and firms' FP. Therefore, the findings of this study are more reliable and unbiased and can be useful for effective policy making on governance issues.

Second, Indian companies have adopted the new accounting and financial reporting system (called IND-AS) from the financial year 2016–17 to harmonize with the international financial reporting system (IFRS) to bring more clarity in financial reporting practices with several structural changes. Eventually, during our study period (2017–2021), both mandatory appointment of WDs on Indian boards and the adoption of IND-AS have taken place. Also, the new Companies Act, 2013, has given immense attention on corporate governance and suggested several new initiatives to strengthen the system of governance. Consequently, the SEBI formed the Uday Kotak panel on corporate governance in 2017, and several new initiatives are taken from 2018 onward as per the recommendations of the panel.

Hence, our study captures three important dimensions during 2017–2021: (i) the new financial reporting system, (ii) mandatory appointment of female directors on boards and (iii) significant new corporate governance initiatives for Indian firms. Hence, our study contributes to the literature by proving meaningful insights on the role of gender diversity and other corporate governance parameters on financial performance of Indian firms in the light of newly adopted accounting and financial reporting practices.

Third, few prior studies which have looked into the role of WDs on FP of Indian firms, have mostly used return on assets (ROA), return on equity (ROE) and Tobin's Q as performance parameters. Here, in addition to ROA, ROE and Tobin's Q, we also use economic value added (EVA) as indicators of corporate performance to understand the role of WDs on economic value creation for companies. The EVA is considered as modern technique to measure the economic profit earned by a firm, and it has gained huge popularity among companies as an improved technique for measuring financial performance for companies. To the best of our knowledge, the role of WDs on economic value creation by firms has not been investigated before particularly in the Indian context. This is another unique contribution of this study.

Fourth, the Covid 19 pandemic had impacted global economy severely and India was no exception. Financial performances of most Indian firms were negatively impacted due to the nationwide lockdown and uncertainties about production, revenue and earnings. This study considers both the pre and post Covid 19 pandemic period in examining our central research question using a year dummy. Therefore, our study also captures whether the covid 19 pandemic has actually impacted the financial performance of Indian firms, while modelling this relation. This is another valuable and unique contribution of this study to the literature.

We design the paper as follows. Section two highlights the review of existing literature. Section three describes the data, sample, and methodology used in the study. Section four explains the findings of the study, and finally, section five concludes the paper with the relevant policy implications.

Literature review

Several theories have been put forward to explain the role of women directors on the overall governance and performances of companies: *Resource dependence theory*, *Agency theory*, *Signaling theory* and *the Gender role theory*. The *resource dependence theory* argues that women directors bring different set of knowledge, expertise and skills to create effective linkages with external parties (Singh et al. 2016; Hillman et al. 2001). Also, female directors may bring heterogeneous opinions in boardrooms and create competitive advantage to the firm while dealing with external parties (Bank of America Merrill Lynch 2018). Studies also argue that gender diversity on board enhances creativity and innovation and better understanding of customer base and the business environment (Forbes 2018; Arfken 2004).

Agency theory advocates independent board structure for transparent and effective governance of firms and improving their financial performances (Fama and Jensen 1983). Agency theorists argue that female directors are more independent and they effectively contribute in proper policy formulation and effective governance of firms, and thereby help improving their financial performances (Adams and Ferreira 2009; Francoeur et al. 2008). *Signalling theorists* argue that female directors' appointment on boards' signals about the adherence of gender equality and robustness of governance mechanism and thereby improves reputation and market valuation of the companies (Ferdinand et al 2011; Miller and Triana 2009). *Gender role theory* argue that the behaviour, attitude and effectiveness of individuals vary across gender (Eagly 1987). Schulbert (2006) finds that women are risk averse and hence, they are unable to generate phenomenal returns. On the side, Perryman et al. (2015) and Lenard et al. (2014) observe that female directors play instrumental role in lowering risk and improving firm performance.



Several studies argue that the presence of WDs on corporate boards influence corporate decision making, financial performance, market valuation, and financial reporting practices (Barua et al. 2010; Huang and Kisgen 2013). The presence of WDs on boards might create diverse teams, bring different perspectives, and yield improved business performance through better decision making (Burgess and Tharenou 2002). Some studies indicate that the presence of WDs on corporate boards enhances firm performance (Coffey and Wang 1998; Webb 2004). However, the Catalyst report (2007) and the Credit Suisse report (2014) do not find any linkage between corporate performance and gender diversity parameters. On a different note, Adams and Ferreira (2009) argue that the average impact of GD on financial performance is negative, because diverse gender boards have over monitoring tendencies. Diverse boards lead to different views and opinions, lack of consensus to arrive at decisions, and, therefore, inversely influence corporate performance (Erhardt et al. 2003). Interestingly, Smith et al. (2006) show that when firms select WDs from their employees, the firm performance is better, while performance reduces when firms choose WDs from outside. Also, the linkage between GD and financial performance depends on the performance indicators used (Rose 2007; Smith et al. 2006).

Overall, mixed results are evident on the linkage between GD and financial performance. Comi et al. (2019) examined the effect of corporate board gender quotas on firm performance in France, Italy, and Spain using firm-level accounting data and a difference-in-difference estimator. They find either a negative or an insignificant effect of gender quota on firm performance for France and Spain, while this impact is positive for Italian firms. Garcia et al. (2020) argue that women directors help improving corporate reputation. However, stakeholders value general attributes of women more than their cognitive attributes like multiple directorships, educational qualifications etc.

In the recent past, very few studies have examined the role of WDs on corporate performance on emerging economies' context like India. Jyothi and Mangalgi (2019) examined this linkage for Indian firms during 2005 to 2015 using panel regression model, and find that percentage of women has a significant and positive impact on firm performance. Kumar et al (2020) investigate the effect of female directors on financial outcomes of Indian firms using fixed and random effect Tobit regression. They find that the women directors do not make much impact in most Indian boards due to their small presence on companies' boards. However, WDs play a moderating role to reduce variations in profits and stock returns. Due to the concentrated ownership pattern of Indian firms, Khosa (2017) finds that Indian group affiliated firms select WDs from their own families, and thus, has a significant implication on the effectiveness of those WDs on corporate performances. Using Blau's diversity

index on 54 Indian firms, Sanan (2016) does not find any significant association between gender diversity of Indian boards and their financial performances. Ratnawati (2019) documents that the presence of WDs on the boards of Indonesian companies impact risk through lower volatility of ROA. However, for Malayasian firms, Abdullah, Ku, Ismail and Nachum (2015) exhibit that imposing gender equality on corporate boards could harm firms and economies. For Chinese firms, Khidmat, Khan and Ullah (2020) show that gender diversity, education diversity and foreign national diversity have a positive and significant effect on firm performance for both the accounting and market measures.

On the role of various governance variables on corporate performance, prior studies show mixed results. The board of directors (BODs) is a vital mechanism to mitigate agency problems. Some scholars argue that larger boards help improve monitoring, effective decision making, and improving corporate performance (Anderson and Reeb 2003; Coles et al. 2008). Other scholars argue that larger boards lead to free riding, ineffective board monitoring and, poor performance (Jensen 1993). Also larger boards suffer from conflict creation due to communication and cohesiveness problems (O'Reilly et al. 1989). Instead, smaller boards contribute more to business success (Jensen 1993). However, there is wide variation in board sizes in companies across nations and across companies.

Mixed evidence is also evident on the linkage between CEO duality and corporate performance. While scholars like Braun and Sharma (2007) and Elsayed (2007) find no association, Rechner and Dalton (1991) show that firms with non- dual CEO, outperform firms with CEO duality. The implications of CEO duality are likely to be different in emerging economies like India, where the concentrated ownership structure exists, compared to the developed economies where equity is held widely. When one single person enjoys the powers of a CEO as well as a chairperson, she/he can influence decision making and corporate performance significantly. In the case of dual CEO role, a single person can control the board which can significantly impact corporate performance. Banik and Chatterjee (2021) document that firms with separate CEO and chairperson, outperform firms with CEO duality with reference to top 500 NSE listed firms.

Independent directors (IDs) are likely to help in the useful resolution of agency problems between managers and shareholders and protect shareholders' interests (Fama and Jensen 1983). However, the IDs do not necessarily contribute to effective board monitoring and enhancing business performance (Banik and Chatterjee 2021). Some scholars argue that IDs monitor boards persuasively, replace underperforming CEOs, improve earnings quality, and finally contribute to business value creation (Chatterjee 2021; Peasnell et al. 2005). Firms with a higher proportion of IDs face lesser



financial pressures, and are less prone to bankruptcy risk (Daily et al. 2003). Theoretically, IDs play a significant role on corporate boards. However, the reality is different, as far as the Indian firms are concerned. So far, In India, the role of IDs is not satisfactory in dealing with several governance issues. Top executives or promoters practically handpick the IDs, not necessarily based on their professional expertise, but on other criteria. Most often, IDs agree with senior management's decisions, if not always. In essence, the role of IDs in the overall governance of companies is limited.

Under the concentrated ownership patterns like in India, promoters and associated family members hold the controlling equity in companies, and hold top managerial positions. Promoters directly oversee companies' managing and controlling functions (Anderson and Reeb 2003) and exercise full control over the paid executive directors (Fama and Jensen 1983; Jensen and Meckling 1976). This active monitoring over the business creates a positive boost to business performance (Banik and Chatterjee 2021; Morck,

from 2019 onward all the sample firms have at least one WD on their boards.

To examine the impact of Covid 19 pandemic on firms' performances, we consider a year dummy which assumes value 1 for the years 2020 and 2021, and 0 otherwise. Hence, the period 2017 to 2019 considers pre Covid 19 scenario and 2020 and 2021 captures the Covid 19 pandemic period. We have used this year dummy across models. We derive the governance variables, GD variable and accounting variables from the *PROWESS* database maintained by Centre for Indian Economy (CMIE). Wherever necessary, we use the published corporate governance reports of the sample companies available in *PROWESS* database. Table 1 provides definitions of the variables used in this study.

Research methodology

To examine whether gender diversity (GD) impacts firm performance (FP), our baseline model is:

$$\begin{aligned} (\text{Performance})_{it} = & \alpha_i + \beta_0(\text{GD})_{it} + \delta_1(\text{board size})_{it} + \delta_2(\text{board independence})_{it} \\ & + \delta_3(\text{CEO duality})_{it} + \delta_4(\text{promoter share})_{it} + \delta_5(\text{capex})_{it} + \delta_6(\text{lev})_{it} \\ & + \delta_7(\text{firm size})_{it} + \delta_8(\text{firm age})_{it} + \delta_9(\text{MB ratio})_{it} \\ & + \text{Industry dummies} + \text{Year dummy} + \varepsilon_{it} \end{aligned} \quad (1)$$

Shelfier, and Vishny 1988). Morck et al. (1988) show that family controlled firms perform better than firms with less family control. However, Bhagat et al. (2004) and Slovin & Sushka (1993) find no such linkage between promoter holding and firm performance. Logically, the urge for long term wealth creation and a very high stake in companies motivate promoters to enhance business performance.

Research design

Data and sample

The initial sample for this study comprises of the top 500 firms listed in the National Stock Exchange of India Ltd. (NSE). All these firms are required to follow the mandatory quota of appointing at least one WD on their boards as per the regulatory guidelines. From these, we removed the government-owned firms, financial firms, and firms with missing corporate governance reports and /or missing accounting variables. Finally, we get 364 firms from financial year 2017 to 2021, resulting in 1820 firm-year observations. These companies represent 29 industry sectors, according to the first two-digit NIC classification. Out of 364 firms, there are 64 firms which did not have any WD on their boards in 2017 and 57 firms did not have any WD in 2018. However,

The study uses percentage of women directors on boards (PWD) as GD measure. Additionally, other governance variables (viz., board size, board independence, CEO duality and promoter's share) are used as moderating variables while examining the GD –FP relation. Based on prior research, we use capital expenditure (capex), financial leverage (lev), firm size, firm age and market to book (MB) ratio as control variables.

System GMM model

In the governance–performance relation, Wintoki et al. (2012) identified three different sources of endogeneity: *simultaneity* (when simultaneously two variables impact each other), *dynamic endogeneity* (when the present value of a variable is influenced by its lagged value) and *unobserved heterogeneity* (when the relation between two or more variables is influenced by an unobservable factor). Maddala and Lahiri (2009) argue that OLS model never consistently estimates the coefficient of lagged dependent variable due to heterogeneity, and it suffers from upward biases. Also, it suffers from omitted variable biasedness. The fixed effect model can consider the omitted variables and can partially handle the endogeneity issue. However, it also suffers from downward biasness unless the T (time period) is large. Therefore, for modelling GD-FP relation, neither the Pooled OLS nor



Table 1 List of variables with definitions *Source:* Authors' compilation. *Explained in the methodology section

Variable	Definition / Measurement
<i>Corporate Governance Variables</i>	
B. Size	Board size, indicating total number of directors on the board of a company
CEO Duality	= 1 when same person occupies the positions of CEO and chairman of the board, and 0 otherwise
B. Indep	Board independence, indicating percentage of independent directors on the board of a company
Prom. Share	% of equity shares held by promoters
<i>Gender Diversity Measures</i>	
PWD	Percentage of women directors. Number of women directors on a company's board to total number of directors on that board, multiplied by 100
IWD	Intensity of women directors (WDs). Dummy variable. = 1 when % of WDs is greater than the median % of WDs of the sample firms; 0 otherwise
<i>Firm Performance Indicators</i>	
ROA	EBIT divided by total assets multiplied by 100
ROE	Return on Equity. Calculated as profit after tax divided by shareholder's fund multiplied by 100
Tobin's Q	
EVACE*	Calculated as summation of market capitalization divided by total assets. Economic Value Added (EVA) as a percentage of Capital Employed
<i>Control Variables</i>	
Firm Size	Natural logarithm of total assets of a company
Capex	Total capital expenditure of the company scaled by its total sales
Leverage	Long term debt divided by total assets. This variable indicates the degree of financial leverage
Firm Age	Age of a firm since its incorporation
MB Ratio	The ratio of market value of equity of a company over its book value of assets
Year dummy	This variable is a proxy for growth opportunity of the firm. = 1 for FY years 2020 and 2021, and 0 otherwise

the fixed effect model can yield efficient parameter estimates and use of these models may lead to spurious relations.

Due to the existence of lagged dependent variables, the standard panel models (like the fixed-effect or the random effect) model yield biased and inconsistent results as they are unable to address the endogeneity problem (Hsiao 2014; Maddala and Lahiri 2009). Thus, for modeling GD and FP relation, the dynamic Generalised Method of Moments (GMM) can be most effective. The GMM technique addresses the endogeneity problem by using instruments of lagged dependent variable and endogenous variables with appropriate lags.

The GMM takes two forms viz., the difference GMM and the system GMM. While the difference GMM considers only the difference equations, the system GMM considers both the level equation as well as the difference equation. Further, when the period (T) is small and the persistence of the dependent variable is highly correlated with the autoregressive term, the system GMM yields more efficient results (Blundel and Bond (1998). Therefore, the system GMM provides consistent and efficient parameter estimates by properly tackling the endogeneity problem and is robust to the biases.

The system GMM model was developed by Arellano and Bover (1995) and Blundel and Bond (1998). Under the system GMM, both a level equation and a difference equation are considered as follows:

$$P = L \cdot P\alpha + G\beta + C\eta + E \quad (2)$$

$$\Delta P = L \cdot \Delta P\alpha + \Delta G\beta + \Delta C\eta + \Delta E \quad (3)$$

where, L denotes one period lag operator; ΔP is the (N-I)*1 vector of the differenced financial performance measure across I firms and N observations; α is a 1*1 scalar of the coefficient for the lagged time differenced firms' financial performance measure L ΔP across N observations; ΔG is a (N-I) * J matrix of the J differenced governance variables across N observations and I firms; β represents J*1 vector of the coefficients for the J differenced governance variables; ΔC denotes (N-I)*H matrix of the H differenced firm control variables across N observations and I firms; η is a H*1 vector of the coefficients of the H differenced control variables; and finally, ΔE represents (N-I)*1 vector of error terms across I firms and N observations.

Firm level performance parameters

For measuring firm level performance, we have used ROA and ROE as accounting based measures and also the Tobin's Q ratio as market based measure. In addition, to measure the economic value creation by firms, we have used the Economic Value Added (EVA), which has got



Table 2 Summary statistics *Source:* Authors' own

Variables	Mean	Median	Std. Dev
PWD (%)	11.85	10.53	5.47
ROA (%)	9.11	6.49	11.85
ROE (%)	15.99	13.89	23.76
Tobin's Q	2.72	0.1.87	2.92
B. SIZE	13.58	13.00	3.64
EVACE (%)	-12.75	9.84	4.43
CEO Duality	0.022	0.00	0.14
B. Independence	0.50	0.50	0.123
Prom. Share	49.29	52.79	21.67

immense importance as a superior performance measure than the conventional measures (Banik and Chatterjee 2021; Chen and Dodd 1997).

EVA™ is a registered trademark of Stern Stewart and Co. We have computed EVA as follows:

$$EVA = (ATNOP)_t - (TCE)_t \times WACC$$

where ATNOP = the after tax net operating profit at time t. WACC = weighted average cost of capital and TCE = Total capital employed at time t.

The WACC is derived as follows:

$$WACC = (K_e \times W_e) + (K_d \times W_d)$$

where K_e denotes cost of equity capital and K_d is the cost of debt capital. W_e and W_d are the proportion of equity and proportion of debt in the total capital, respectively.

While the cost of debt (K_d) indicates the after tax cost of debt, we have estimated the cost of equity (K_e) using the capital asset pricing model (CAPM) as follows:

$$K_e = R_f + \beta (R_m - R_f)$$

Where, R_f = Risk free rate. The 10-year Treasury gold bond yield rates of the Reserve Bank of India, is taken as the risk free rate. R_m = Market return based on the NIFTY 500 index. B = Market risk or systematic risk.

Since EVA is likely to vary significantly across different sizes of sample firms, we have used EVA as a percentage of capital employed (denoted as EVACE), instead of considering the absolute values of EVA.

Results and discussions

Summary statistics

Table 2 reveals that, on average, WDs represent about twelve percent of the boards. The mean value of the percentage of

Table 3 Darbin-Wu Hausman Test of Endogeneity *Source:* The authors

	ROA	ROE	Tobin's Q	EVACE
DWH test statistic	32.856***	42.759***	53.967***	63.856***
p-Value	0.0002	0.0003	0.0026	0.0026

H0: Regressors are exogenous. * < 0.10; ** < 0.05; and *** < 0.01

The DWH test is based on the levels of firm performance, gender diversity and governance variables, control variables, and the instruments are the lags of the these variables. Here the null hypothesis is (H_0): Regressors are exogeneous

WDs (11.85%) is closer to its median value (10.53%), indicating symmetric distribution of the sample firms across the percentage of WDs on boards. However, there are boards which have about 27 percent WDs (unreported). The mean values of ROA, ROE, and Tobin's Q are higher than their respective median values, indicative of positively skewed sample firms concerning financial performance. The average sample firms are profit making across conventional measures (ROA, ROE and Tobin's Q). However, average sample firms report negative economic value creation during our study period. The mean EVACE is negative, and it is significantly lower than the median EVA, indicating a negatively skewed sample in regards to economic value addition, and also with a high standard deviation. The average board size is 14, and about 50 percent of the boards are independent. Only two percent of the sample firms have CEO duality. The mean of promoters' shareholding is 49 percent. However, there are firms with very high promoter shareholding (90 percent) and zero promoter shareholding in our sample (unreported).

Regression results

Before applying GMM, we first check whether endogeneity problem exists in our gender diversity—firm performance relation. Here we use the Darbin–Wu–Hausman (DWH) test of endogeneity (Durbin 1954; Hausman 1978; Wu 1973), and Table 3 presents the results of this test.

The results of Table 3 rejects the null hypothesis across all four performance indicators, signifying that endogeneity is a significant concern in the gender diversity and firm performance relation. Therefore, pooled OLS or fixed effects methods will not provide efficient and reliable parameter estimates in this relation. If the endogeneity issue is not addressed properly, the results may be spurious and biased. Hence, the use of system GMM is considered appropriate in modelling this relation.

Table 4 presents the results of system GMM estimation. Here model 1-4 consider the ROA, ROE, Tobin's Q and EVA as performance parameters respectively. The gender diversity measure is the percentage of women directors on boards (PWD).



Table 4 Results of system GMM estimation *Source:* Authors' computation

Explanatory Variable	Dependent Variable (DV)			
	ROA(Model 1)	ROE(Model 2)	TOBIN'S Q (Model 3)	EVACE(Model 4)
Lagged DV	0.474** (0.024)	0.290** (0.035)	0.327 (0.272)	0.158** (0.027)
PWD	0.034*** (0.002)	0.029*** (0.002)	-0.062 (0.018)	0.016** (0.047)
B. Size	-0.112 (0.261)	-0.868 (0.278)	-0.052 (0.128)	0.018 (0.305)
CEO Duality	-0.039 (0.307)	-0.026** (0.042)	-0.077** (0.016)	-0.015** (0.036)
B. Indep	-0.384 (0.178)	-0.941 (0.259)	0.019 (0.205)	0.195 (0.296)
Prom. Share	0.182*** (0.006)	0.259** (0.019)	0.011* (0.060)	0.083** (0.027)
Capex	0.178 (0.149)	0.253** (0.039)	0.001** (0.055)	0.004 (0.156)
Leverage	-0.097* (0.081)	-0.054 (0.126)	-0.091* (0.092)	0.003 (0.214)
Firm Size	-0.667 (0.248)	0.198 (0.378)	-0.103 (0.409)	0.069 (0.143)
Firm Age	-0.061 (0.239)	-0.088 (0.268)	0.004 (0.270)	0.011 (0.294)
MB Ratio	0.172 (0.156)	0.198** (0.015)	0.024*** (0.011)	0.006** (0.046)
Year Dum	-0.142** (0.049)	-0.151** (0.037)	-0.152*** (0.012)	-0.026** (0.050)
Industry Dum	Y	Y	Y	Y
Intercept	11.321** (0.019)	10.985** (0.020)	2.011** (0.025)	4.280** (0.047)
AR(1)	-1.86**	-1.49	-1.44	-1.69
AR(2)	0.011	0.661	0.586	0.479
Hansen test: p value	0.182	0.204	0.306	0.347
Prob. F	0.000	0.002	0.000	0.000

* < 0.10, ** < 0.05, *** < 0.01. Values within parentheses indicate P values

Table 4 shows that the coefficients of the lagged dependent variables are positive and significant across all performance measures except the Tobin's Q. This implies that the prior year's values of these measures positively impact their respective current year values. This indicates the existence of *dynamic endogeneity* in GD – FP relation. However, the lagged Tobin's Q does not influence its current year value, as the coefficient is statistically insignificant.

The GD (i.e., PWD) positively impacts ROA and ROE; but does not influence Tobin's Q, implying that gender diversity has a positive influence on accounting returns but no impact on market performance indicator. This finding is similar to the findings of Post and Byron (2015). The PWD is also positively associated with the EVACE in model 4, indicating that higher percentage of women directors on boards help creating economic value for firms. Overall, we argue that GD in terms of percentage of WDs on boards help improving the financial performance of Indian companies.

Among other governance variables, the coefficients of board size and board independence are statistically insignificant across all performance measures. This implies that large boards and independent boards do not necessarily help improving financial performance of Indian firms.

CEO duality negatively impacts ROE and Tobin's Q, signifying that firms with separate CEO and chairperson outperform firms where CEO duality exists. Also, firms with separate CEO and chairperson create more economic value than firms where same person holds the position of

CEO and chairperson. Models 1–4 reveal that firms with higher promoter shareholding perform better across all financial measures, both conventional as well as economic value added. Indian companies have mainly concentrated ownership structure with high promoter shareholding. This high stake in companies motivates them to perform better for long term value creation. This finding is particularly relevant in the Indian context, where promoters occupy senior managerial positions and lead the companies from the front, and play active roles in the companies' functions. As regards CEO duality and promoter's shareholding, Banik and Chatterjee (2021) found similar results for Indian firms.

For control variables, firms with higher financial leverage underperform in terms of ROA and Tobin's Q. However, these coefficients are significant at the 10 percent level. Capital expenditure (Capex) positively impacts ROE and Tobin's Q. Thus, firms that invest more in capital asset creation, generate greater ROE and Tobin's Q. However, the capex doesn't influence the ROA and EVACE. Firms with higher growth opportunities, garner greater ROE and Tobin's Q and also create greater economic value. However, the growth opportunities do not have any material impact on ROA. Firm size and firm age do not show any significant impact on any performance measure across models.

Finally, our results show that the coefficient of year dummy is negative and statistically significant across models (1 to 4). This signifies that the covid 19 pandemic has



Table 5 Results of System GMM Estimated based on Intensity of Women Directors
Source: Authors' computation

	ROA(Model 5)	ROE(Model 6)	Tobin's Q(Model 7)	EVACE(Model 8)
Lagged DV	0.337** (0.049)	0.273**(0.041)	0.163(0.158)	0.274** (0.027)
IWD	0.017**(0.027)	0.148**(0.040)	0.117**(0.015)	0.117*** (0.010)
B. Size	-0.164(0.231)	-0.058(0.175)	0.028(0.116)	0.036(0.103)
CEO Duality	-0.026(0.284)	-0.017(0.132)	-0.043** (0.042)	-0.029** (0.029)
B. Indep	-0.037(0.253)	-0.036(0.185)	0.026(0.196)	0.116(0.275)
Prom. Share	0.054** (0.042)	0.154** (0.026)	0.024** (0.037)	0.164** (0.024)
Capex	0.046(0.114)	0.075** (0.026)	0.012** (0.042)	0.002(0.254)
Leverage	-0.083** (0.062)	-0.046(0.118)	-0.082** (0.063)	0.004(0.275)
Firm Size	-0.428(0.214)	0.116(0.327)	-0.143(0.326)	0.053(0.145)
Firm Age	-0.047(0.175)	-0.062(0.163)	0.003(0.264)	0.010(0.362)
MB Ratio	0.163(0.117)	0.116** (0.042)	0.037*** (0.028)	0.005** (0.032)
Intercept	11.426** (0.025)	16.735** (0.047)	2.537** (0.029)	3.836** (0.031)
Year dum	-0.163*(0.038)	-0.147** (0.022)	-0.139*(0.064)	0.018** (0.047)
Industry Dum	Y	Y	Y	Y
AR(1)	-1.78**	-1.42	-1.62	-1.64**
AR(2)	0.027	0.0535	0.526	0.272
Hansen test:p value	0.175	0.272	0.325	0.386
Prob. F	0.000	0.002	0.000	0.000

* < 0.10, ** < 0.05, *** < 0.01. Values within parentheses indicate P values

negatively influenced the financial performance of the Indian firms measured across different performance parameters. The prolonged nationwide lockdown and uncertainties about production, operations and earnings are responsible factors behind the adverse financial performance of Indian firms during the covid 19 pandemic scenario.

Under GMM, the validity of the instruments is a vital factor for ensuring the consistency of estimators. To check the validity of the models, we have used the Hansen test and autocorrelation test. According to Arellano and Bond (1991), the second-order residuals' serial correlation must be zero. However, the first-order residuals' serial correlation may not be zero. In our models 1–4, the Arellano–Bond test statistics report no autocorrelation in the errors.

Also, we employ Hansen test to examine the validity of the instruments. The Hansen test examines the over identifying restrictions. Our results across models 1–4 show that the null hypothesis (indicating that the moment conditions are correctly met) is not rejected. Therefore, the instruments are valid in our GMM models.

Role of intensity of women directors on boards

Following the government's guidelines, each Indian firm is likely to have minimum one WD on board. However, the real gender diversity depends on what percentage of the board members are women. Companies focusing more on gender diversity, female directors represent a significant portion of their boards. While some companies have only one WD on their boards just to comply with the regulations, some

other companies have more number of WDs on their boards to promote gender diversity. To examine whether higher or lower presence of WDs on boards have any significant impact on financial performance, we form a dummy variable called *intensity of women directors* (IWDs). Firms having percentage of women directors (PWD) greater than the median PWD of the sample firms, are categorized as firms with *high intensity of women directors* and takes the value 1; and firms having PWD lower than the median PWD, are classified as *low intensity of women directors* and takes the value 0. This dummy variable is considered in our GMM estimation and Table 5 presents the results. In our sample, about 57 percent firms have *high intensity of women directors* and about 43 percent firms have *low intensity of women directors*. Here models 5–8 consider the ROA, ROE, Tobin's Q and EVA as performance parameters respectively. The gender diversity measure here is the *intensity of women directors* (IWDs).

Table 5 reveals that the coefficient of IWD is positive and significant across all four measures of financial performance. This finding simply signifies that higher intensity (or presence) of women directors on company boards help improving financial performance of companies, both under the conventional measures (ROA, ROE and Tobin's Q) as well as modern technique (EVACE). Hence, we argue that just the mere presence of one female director on each corporate board is important for regulatory compliance only. But firms which maintain higher proportion of female directors on their boards, actually report superior financial performance and generate greater economic profits.



The impact of other explanatory variables on performance parameters are similar to that of models 1–4. CEO duality negatively impacts Tobin's Q and EVACE. Also, with the increase in promoters' share, firm performance improves across all performance measures in our models. However, board size and board independence do not show any material influence on any of the performance measures.

Among the control variables, while firm size and firm age do not influence financial performance, firms with lower financial leverage report better performance in terms of higher ROA and Tobin's Q. With the increase in capex, firms report better performance with regards to ROE and Tobin's Q. Finally, firms whose growth opportunities are higher, generate higher ROE and Tobin's Q and create more economic profits. Finally we find the existence of industry effect on financial performance across models.

Similar to models 1–4, the results show no autocorrelation in the error terms as per the Arellano–Bond test statistics across models 5–8. The Hansen test also exhibits that the moment condition is correctly specified and the instruments are valid.

Conclusion and policy implications

The paper examines whether board gender diversity enhances financial performance of Indian firms after implementing mandatory quota system of women directors' appointment, and in the light of newly adopted financial accounting and reporting system. The study exhibits some interesting findings and relevant policy implications for Indian firms. Our findings suggest that board gender diversity has a strong impact on firm performance and their economic value creation. However, the mere presence or absence of just one female director on boards does not impact firm performance. Thus, we find partial support of the *Agency theory* and *resource dependency theory* for Indian firms. Female directors bring different set of expertise, and their commitment to effective leadership and board monitoring functions help improving financial performance of Indian firms.

We argue that the mandatory appointment of just one woman director on board makes no difference. We find that firms which have higher intensity or presence of female directors on their boards, exhibit superior performance and economic value creation. The presence of women directors as a significant portion of the board and their active role in the functioning and governance of companies makes the difference. However, most Indian companies have not gone beyond the minimum requirement of one WD on their boards and therefore, it is more of a tokenism rather than nurturing the culture of gender diverse boards (Kumar et al 2020; *The Economic Times*, Feb 19, 2018). While prescribing

governance policies, the policymakers should take note of the fact that women with adequate relevant experience and relevant background should be appointed on boards, and not just the minimum required numbers (Joecks et al. 2013).

We find that larger boards do not necessarily improve firm performance. Also, independent directors do not necessarily add value to corporate performance and value creation. In fact, in India, independent directors' appointment and their role in corporate decision-making are not beyond questions. Although the Companies Act, 2013 has imposed significant accountability and responsibilities on independent directors regarding their roles on corporate boards, the selection of independent directors and their real independence remains under question. The corporate governance architecture depends highly on how independent directors play their roles on boards.

Firms with separate CEO and chairperson outperform firms with CEO duality. We argue that CEO duality should not be permitted in India. Following the Uday Kotak Panel's recommendations, recently the SEBI took the initiative to separate the posts of CEO and chairman for the top 500 listed firms based on their market capitalization from April 1, 2020. However, the deadline is now extended till April 1, 2022. (*The Economic Times*, P.1, January 14, 2020). This policy is important not only from the financial performance point of view, but also from the smooth governance and transparent functioning of corporate boards. Finally, we argue that a higher promoter's stake is a decisive factor for Indian companies, as promoters are motivated to drive corporate performance for long term value creation. However, regulators should watch that promoters do not violate broader governance norms because of their high control. In this context, the Indian Government has already initiated the increase of public shareholding in the listed firms from 25 to 35% (*The Annual budget*, 2019). We also find that the covid 19 pandemic has negatively influenced the financial performance of the Indian firms.

Apart from financial performance, there exists a cultural aspect here. This cultural aspect depends on the corporate culture of the companies. When women directors play active roles in framing companies' policies and addressing governance issues, a culture of giving importance to women colleagues perhaps percolates down to the lower levels as well, and a healthy gender diversity balance is created in real sense.

Limitations and future research

Like every other study, our study has a few limitations. First, among the corporate governance variables that we moderated for on the linkage between GD and FP, we find significant support for gender diversity, CEO duality and



promoters' share. However, we do not find significant support for board size and board independence. We believe that there are other corporate governance parameters such as board diligence, institutional ownership and shareholder activism that can moderate the association between GD and FP. Future studies could consider these possible variables in order to get a wider picture of this relation. Second, as we understand from literature that various attributes of female directors (like education, experience, political connection, expertise, age and social interlocking) are extremely important to understand the role of WDs on corporate boards. However, this study does not consider these attributes and future researches could consider these attributes in order to focus other relevant aspects of gender diversity.

Declarations

Conflict of interest The authors state that there is no conflict of interest.

References

- Abdullah, S.N., K.N.I. Ku Ismail, and L. Nachum. 2015. Does having women on boards create value? The impact of societal perceptions and corporate governance in emerging markets. *Strategic Management Journal* 37 (3): 466–476.
- Adams, R.B., and D. Ferreira. 2009. Women in the Boardroom and Their impact on governance and performance. *Journal of Financial Economics* 94 (2): 291–309.
- Anderson, R.C., and D.M. Reeb. 2003. Founding family ownership and firm performance. *Journal of Finance* 58 (3): 1301–1328.
- Arellano, M., and S. Bond. 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies* 58: 277–297.
- Arellano, M., and O. Bover. 1995. Another look at the instrumental variable estimation of error components models. *Journal of Econometrics* 68(13): 29–51.
- Arfken, D.E. 2004. The ultimate glass ceiling revisited: The presence of women on corporate boards. *Journal of Business Ethics* 50 (2): 177–186.
- Banik, A., and C. Chatterjee. 2021. Ownership pattern and governance-performance relation: evidence from an emerging economy. *Global Business Review* 22 (2): 422–441.
- Bank of America Merrill Lynch. (2018). *Women: The X-factor*. https://mlaem.fs.ml.com/content/dam/ML/bulletin/PDFs/ml_women-the-X-factor-BAML-Report.pdf
- Barua, A., L. Davidson, D. Rama, and S. Thiruvadi. 2010. CFO gender and accruals quality. *Accounting Horizons* 24 (1): 25–39.
- Barua, A., Davidson, L., Rama, D. and Thiruvadi, S. 2010. CFO Gender and Accruals Quality. *Accounting Horizons* 24(1): 25-39, <https://doi.org/10.2308/acch.2010.24.1.25>
- Bhagat, S., B. Black, and M. Blair. 2004. Relational investing and firm performance. *Journal of Financial Research* 27: 1–30.
- Bilimoria, D., and J.V. Wheeler. 2000. Women corporate directors: Current research and future directions. In *Women in management: Current research issues*, ed. R.J. Burke and M.C. Mattis, 138–163. SAGE Publications.
- Blundell, R., and S. Bond. 1998. Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics* 87: 115–143.
- Braun, M., and A. Sharma. 2007. Should the CEO also be chair of the board? An examination of family-controlled public firms. *Family Business Review* 20 (2): 111–126.
- Burgess, Z., and P. Tharenou. 2002. Women board directors: Characteristics of the few. *Journal of Business Ethics* 37 (1): 39–49.
- Catalyst. (2007). 2007 Catalyst Census: Fortune 500 average number and percentage of women board directors and women corporate officers by industry. Retrieved from http://www.catalyst.org/system/files/C_appendix7.pdf
- Chatterjee, C. 2021. Ownership pattern, board composition, and earnings management: Evidence from top Indian companies. *International Journal of Disclosure and Governance* 18 (2): 179–192.
- Chen, S., and J. Dodd. 1997. Economic Value Added (EVA TM): An empirical examination of a new corporate performance measure. *Journal of Managerial Issues* 9 (3): 318–333.
- Coffey, B., and J. Wang. 1998. Board diversity and managerial control as predictors of corporate social performance. *Journal of Business Ethics* 17: 1595–1603.
- Coles, J., N. Daniel, and L. Naveen. 2008. Boards: Does one size fit all? *Journal of Financial Economics* 87: 329–356.
- Comi, S., M. Grasseni, F. Origo, and F. Pagani. 2019. Where Women Make a Difference: Gender Quotas and Firms' Performance in Three European Countries. *Industrial and Labour Relations Review* 73 (2): <https://doi.org/10.1177/0019793919846450>
- Credit Suisse Research Institute. (2014). The CS Gender 3000: Women in Senior Management. Available at.
- Credit Suisse Research Institute. (2019). *The global wealth report 2019*. <https://www.credit-suisse.com/ch/en/about-us/research/research-institute.html>.
- Daily, C., D. Dalton, and A. Cannella. 2003. Corporate governance: Decades of dialogue and data. *Academy of Management Review* 28 (3): 371–382.
- Deloitte. (2018). *Women in the board room, a global perspective* (sixth ed.). Deloitte Global Center for Corporate Governance
- Durbin, J. 1954. Error variables. *Review of the Institute of International Statistics* 22: 23–32. <https://doi.org/10.2307/1401917>
- Eagly, A. H. (1987). *Sex differences in social behavior: A social-role interpretation*. Lawrence Erlbaum.
- Elsayed, K. 2007. Does CEO duality really affect corporate performance? *Corporate Governance* 16 (6): 269–290.
- Erhardt, N.L., J.D. Werbel, and C.B. Shrader. 2003. Board of director diversity and firm financial performance. *Corporate Governance: An International Review* 11 (2): 102–111.
- Faccio, M., M.T. Marchica, and R. Mura. 2016. CEO gender, corporate risk-taking, and the efficiency of capital allocation. *Journal of Corporate Finance* 39: 193–209.
- Fama, E., and M. Jensen. 1983. Separation of Ownership and Control. *The Journal of Law and Economics* 26: 301–325.
- Ferdinand, G.A., S. Bin, and N.C. Anthony. 2011. Does board gender diversity improve the informativeness of stock prices? *Journal of Accounting and Economics* 51: 314–338.
- Francoeur, C., R. Labelle, and B.S. Desgagné. 2008. Gender diversity in corporate governance and top management. *Journal of Business Ethics* 81 (1): 83–95.
- Garcia, J., M. Llorence, and E. Meca. 2020. Female directors and corporate reputation. *Business Research Quarterly*. <https://doi.org/10.1177/2340944420972717>
- Hausman, J. 1978. Specification tests in econometrics. *Econometrica* 46 (6): 1251–1271.
- Hillman, A.J., and T. Dalziel. 2003. Boards of directors and firm performance: Integrating agency and resource dependence perspectives. *Academy of Management Review* 28 (3): 383–396.



- Hillman, A. J., G.D. Keim, and R.A. Luce. 2001. Board composition and stakeholder performance: Do stakeholder directors make a difference? *Business and Society* 40: 295–314.
- Hsiao, C. 2014. *Analysis of panel data*. Cambridge University Press.
- Huang, J., and D.J. Kisgen. 2013. Gender and corporate finance: Are male executives overconfident relative to female executives? *Journal of Financial Economics* 108 (3): 822–839.
- Huse, M., S. Nielsen, and I.M. Hagen. 2009. Women and employee-elected board members, and their contributions to board control tasks. *Journal of Business Ethics* 89: 581–597.
- Jensen, M.C. 1993. The modern industrial revolution, exit, and the failure of internal control systems. *Journal of Finance* 48: 831–880.
- Jensen, M.C., and W. Meckling. 1976. Theory of the firm: Managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics* 3: 305–360.
- Joecks, J., K. Pull, and K. Vetter. 2013. Gender diversity in the boardroom and firm performance: What exactly constitutes a ‘‘critical mass? *Journal of Business Ethics*. <https://doi.org/10.1007/s10551-012-1553-6>.
- Jyothi, P., and J. Mangalgiri. 2019. Would firm performance be better with women directors? *Evidence from India*. *Vision* 23 (2): 180–188.
- Khidmat, W.B., M.A. Khan, and H. Ullah. 2020. The effect of board diversity on firm performance evidence from Chinese Listed companies. *Indian Journal of Corporate Governance* 13 (1): 9–33.
- Khosa, A. 2017. Independent directors and firm value of group affiliated firms. *International Journal of Accounting & Information Management* 25 (2): 217–236.
- Kumar, A., N.K. Nigam, and K. Singh. 2020. Do women directors impact financial outcomes? *The Indian Evidence Indian Journal of Corporate Governance* 13 (2): 119–139.
- Lenard, M.J., B. Yu, B. York, and S. Wu. 2014. Impact of board gender diversity on firm risk. *Managerial Finance* 40 (8): 787–803.
- Maddala, G.S., and K. Lahiri. 2009. *Introduction to Econometrics*. Hoboken, NJ: Wiley Publications.
- Matsa, D., and A. Miller. 2012. A female style in corporate leadership? Evidence from Quotas. *American Economic Journal: Applied Economics* 5 (3): 136–169.
- Miller, T., and M.C. Triana. 2009. Demographic diversity in the boardroom: Mediators of the board diversity–firm performance relationship. *Journal of Management Studies* 46 (5): 755–786.
- Morck, R., A. Shleifer, and R. Vishny. 1988. Management ownership and market valuation: An empirical analysis. *Journal of Financial Economics* 20: 293–316.
- O’Reilly, C.A., D.F. Caldwell, and W.P. Barnett. 1989. Work group demography, social integration and turnover. *Administrative Science Quarterly* 34 (1): 21–37.
- Peasnell, K.V., P.F. Pope, and S. Young. 2005. Board monitoring and earnings management: Do outside directors influence abnormal accruals. *Journal of Business and Accounting* 32 (7–8): 1311–1346.
- Perryman, A.A., G.D. Fernando, and A. Tripathy. 2015. Do gender differences persist? An examination of gender diversity on firm performance, risk, and executive compensation. *Journal of Business Research*. <https://doi.org/10.1016/j.jbusres.2015.05.013>.
- Post, C., and K. Byron. 2015. Women on boards and firm financial performance: A meta-analysis. *Academy of Management Journal* 58 (5): 1546.
- Ratnawati, K. 2019. Board size and gender diversity on boardrooms and its impact of corporate risk taking: Evidence from Indonesia. *Asia Pacific Management and Business Application* 8 (2): 145–164.
- Rechner, P.L., and D.R. Dalton. 1991. CEO duality and organizational performance: A longitudinal analysis. *Strategic Management Journal* 12 (2): 155–160.
- Rose, C. 2007. Does female board representation influence firm performance? *The Danish Evidence*. *Corporate Governance* 15 (2): 404–413.
- Sanan, N.K. 2016. Board gender diversity financial and social performance of Indian firms. *Vision* 20 (4): 361–367.
- Schulbert, R. 2006. Analyzing and managing risks —On the importance of gender difference in risk. *Managerial Finance* 32 (9): 706–715.
- Singh, V., S. Terjesen, and S. Vinnicombe. 2008. Newly appointed directors in the boardroom: How do women and men differ? *European Management Journal* 26 (1): 48–58.
- Slovin, M.B., and M.E. Sushka. 1993. Ownership concentration, corporate activity and firm value: Evidence from the death of inside block holders. *Journal of Finance*, XLVIII 4: 1293–1321.
- Smith, N., V. Smith, and M. Verner. 2006. Do women in top management affect firm performance? A panel study of 2,500 Danish firms. *International Journal of Productivity and Performance Management* 55 (7): 569–593.
- Webb, E. 2004. An examination of socially responsible firms’ board structure. *Journal of Management and Governance* 8: 255–277.
- Wintoki, M.B., J.S. Linck, and J.M. Netter. 2012. Endogeneity and the dynamics of internal corporate governance. *Journal of Financial Economics* 105 (3): 581–606.
- Wu, D.M. 1973. Alternative tests of independence between stochastic regressors and disturbances. *Econometrica* 41(4): 733–750.

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