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Does Gender Diversity Influence Business Efficiency? An Analysis from the Social Perspective of CSR

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Abstract: Gender-related corporate social responsibility (CSR) practices are receiving increasing attention from all stakeholders, as the commitment to achieving equal opportunities for women has become a top priority. However, the reality is that women remain under-represented at the most senior corporate level, and there is a lack of knowledge about many of the implications this situation entails. This study aimed to provide the first analysis of the direct effect and the indirect effect (through leverage) of board gender diversity on business efficiency. The stochastic frontier approach was used to estimate efficiency. Possible determinants were studied using a fixed effects model with instrumental variables to correct for endogeneity problems. A sample of 91 Spanish listed companies was selected. Data were gathered for the period 2004 to 2015. This period is of great interest because it spans two different contexts in terms of gender legislation. The key findings are that promoting gender diversity is important to boost efficiency and that it is vital to consider possible indirect effects such as the role of leverage.

Keywords: gender diversity; corporate social responsibility; board of directors; stochastic frontier; technical efficiency; business performance

1. Introduction

In recent decades, interest from investors and governments in strengthening corporate governance has intensified, particularly in the wake of major corporate failures. Essentially, the core of corporate governance is a board of directors that fulfils its duties of supervising the management, safeguarding the interests of shareholders, and ensuring legal compliance [1]. Ultimately, the aim of these duties is to enhance organizational efficiency [2]. Unsurprisingly, therefore, major efforts have been devoted to studying board characteristics and their influence on business performance, with gender representing a key consideration [3].

On the spectrum of diversity, gender has received extensive attention, given the lack of women at the top levels of corporate management and the belief that they are important to ensure the effectiveness of corporate governance [4]. These gender issues have resulted in initiatives appearing increasingly often in corporate social responsibility (CSR) programs [5] and have been cited in sustainability reports as contributing to an organization's social impact [6]. It is worth noting that the GRI (Global Reporting Initiative) Standards, which offer the most widely used reference for preparing sustainability reports, include as part of their social dimension gender diversity and equal opportunities in relation to the governance bodies of organizations [6]. Consequently, the European Commission drafted a proposal for a Directive of the European Parliament and of the Council on improving the gender balance by setting a minimum objective of a 40% presence of the under-represented sex among the nonexecutive directors of companies listed on stock exchanges [7]. Despite these efforts, the gender gap persists

at the most senior level of European organizations, with an average of 26.7% female board members among the major listed companies in the European Union [8].

In Spain, the setting of the current study, this percentage was 23.66% in 2018 [9]. Although this figure is close to the European average, it is still some distance from the percentage stipulated by the aforementioned legislation, even though Spain was the second country in the world to establish mandatory gender quotas [10]. The active participation by political forces in this matter is also noteworthy. These efforts have resulted in the Good Governance Code of Listed Companies [11]. Legislation was also passed so that by 2015 there would be minimum representation of 40% of both genders on the boards of directors of companies required to present annual accounts [12]. The aim was to foster gender diversity in the work environment [13]. Spain therefore offers an interesting context for studies of corporate social responsibility (CSR) in relation to issues of gender in corporate governance.

There is still a pressing need to shed light on the relationship between the gender diversity of the board of directors and business performance, given the mixed findings reported in the extensive literature on this topic [14]. This lack of consensus may be explained by, among other things, two important considerations. First, most studies have focused on analyzing the direct relationship between gender diversity and business performance. However, numerous indirect effects should be considered when studying this relationship [15–17]. Prime examples include the firm's debt management and risk [18]. Second, scholars have typically used profitability ratios [19–21] or measures of market capitalization [22,23], even though technical efficiency, despite rarely having been used in gender studies, is actually one of the most accurate and least ambiguous measures for the analysis of an organization's performance [24]. To the best of our knowledge, just five studies have used technical efficiency as a performance measure to explain a range of corporate governance mechanisms, including the issue of gender [13,25–28], although gender diversity formed the core of the analysis in only one of the cited studies [13].

For all of the above reasons, the aim of this study was to analyze the extent to which the social dimension of CSR—specifically, the gender component of the social dimension of CSR, operationalized as female representation and gender diversity of the board of directors—affects the technical efficiency of Spanish listed companies. Technical efficiency is measured using stochastic frontier analysis (SFA) [29,30]. The analysis examines both the direct and indirect influence (through leverage) of female representation and gender diversity on technical efficiency. Although Gallego-Álvarez and García-Sánchez [13] specifically examined the relationship between gender diversity in the most senior corporate positions and technical efficiency (measured using SFA) in Spain, they studied the period prior to the enactment of gender legislation (*Ley Orgánica 3/2007*). In contrast, this study covered a longer period (2004–2015). It is thus the first of its kind to consider the new legal framework. Hence, it is the first study to examine the possible effect of this new legislation on female representation at the most senior levels of Spanish firms and the influence of this legislation on the impact that female representation has on organizational management and performance. It is also the first study to move beyond the direct relationship by considering the possible indirect relationship between gender diversity and efficiency.

These research aims were pursued using data on a sample of 91 firms. Fixed effects estimation with instrumental variables was performed to provide consistent estimators by correcting for problems of endogeneity. A key conclusion is that better female representation and greater gender diversity in corporate governance structures are important for reducing corporate inefficiency.

This study thereby contributes in several ways to the extensive literature on the linkages between gender diversity at the most senior corporate level and business performance. First, the performance measure and its calculation method have not typically been used in research on gender. Second, the study shows the importance of analyzing the management of leverage as a possible pathway for the indirect relationship between gender diversity and performance in terms of technical efficiency.

This study has four further sections following this introduction. Section 2 consists of two subsections providing the theoretical foundations of the focal relationship. The first subsection offers

an overview of the reasons why gender diversity influences performance. The second subsection reviews the studies that have examined the link between different characteristics of boards of directors and efficiency calculated using frontier techniques. Section 3 presents the characteristics of the sample, defines the variables, and reports the data sources. Section 4 describes the estimation method and then presents and discusses the results. Section 5 states the conclusions and limitations of the study and offers suggestions for future lines of research.

2. Theoretical Background

2.1. Gender Diversity of the Board of Directors and Business Performance: An Overview

This study is based on the idea that the structure of the board of directors, specifically its gender diversity, affects business performance. This assertion is supported by extensive literature that offers numerous arguments for the influence of women in management. These arguments are often based on a range of theories and on the differences between men and women, and the influence of women on corporate boards is assessed using a variety of indicators of firm performance [14].

One of the most commonly used theoretical foundations to explain board gender diversity is agency theory [31], which is based on the notion that more heterogeneous boards are more independent. Thus, control is greater, and the costs associated with agency problems will therefore be lower [23,32,33]. However, scholars such as Farrel and Hersh [34], Bonn and Yoshikawa [35], and Hillman and Shropshire [36] have highlighted the importance of resource dependence theory [37] with respect to the relationship between diversity and performance. Their argument is based on the idea that the board of directors acts as a liaison between the firm and the outside world. Therefore, board gender diversity offers a source of competitive advantage by enabling access to key resources [38] through a bigger, better network of contacts, which is particularly important to boost the value of the firm [39]. As mentioned earlier, gender diversity may be thought of as an indicator of a greater focus on the interests of all those who bear a relation to the firm, and not just those of shareholders. Therefore, stakeholder theory [40,41] is also relevant to this study. In short, the presence of more women on the board of directors enhances the independent judgment of its members, thereby reducing agency costs and addressing the interests of stakeholders [42]. This situation increases relational capital and enables firms to secure critical resources to ensure their competitive success [37] and boost their performance [43]. In light of these arguments and the work of other scholars [10,19,21,39,44], this study used a multitheoretical approach, based on the notion that phenomena described by different theories can affect the relationships between board gender diversity and firm performance.

Other studies have focused on the characteristics that distinguish men and women. These distinguishing characteristics lead to expected behaviors in each case that exert different effects, not only on governance but also on the implications of this governance. The distinctions between men and women include differences in certain values. For example, benevolence and universality are more common among women, which explains why women make decisions that are more stakeholder oriented [45]. Moreover, female entrepreneurs tend to opt for participatory, rather than authoritative, management [46]. In addition, there are also differences in the characteristics that affect corporate decisions related to financing or investment. Men are more self-sufficient than women, who display greater risk aversion than men. These differences explain why women directors are less likely to issue debt, provide greater return on capital, and make fewer corporate acquisitions [18]. Other studies provide further support for the relationship between women-led management and lower debt and women's more conservative stance toward risk [47,48].

It should also be noted that fostering gender diversity in corporate governance is associated not only with advantages but also disadvantages in terms of value creation for the firm. Although the advantages relate to better monitoring of management, given the greater independence of the board and the more exhaustive and complex decision-making processes, the disadvantages stem from the fact that this greater complexity creates more opportunity for conflict and weaker cohesion [13].

However, it is essential to consider the factors that affect the role of women on corporate boards, which may enhance or hinder their influence. Specifically, Adams and Funk [45] noted that the differences between genders disappear in predominantly masculine contexts because women end up adapting their behavior to that of men. Post and Byron [14] reported that female representation on the board of directors has a more positive effect on firm performance in contexts with greater shareholder protection because such contexts can encourage board members to exploit the full range of knowledge, values, and experiences. Similarly, although many studies have centered on a direct relationship, women can also enhance the firm's financial performance indirectly through actions that are not captured by the most commonly used financial indicators (e.g., commitment to ethical and social values) [15].

Finally, given the range of theories applied to the study of board gender diversity, the factors that influence the role of women, and the types of effects (direct or indirect), the literature on the relationship between gender diversity and performance unsurprisingly presents mixed evidence [14]. Numerous studies have failed to show a significant relationship [19,22,49]. Furthermore, other studies have reported a negative influence [50–52], while many others have shown a positive effect [3,23,32,53].

Based on all of the above, the following hypotheses were proposed:

Hypothesis 1 (H1). *Board gender diversity positively and directly affects firm performance by enhancing the effectiveness of corporate governance.*

Hypothesis 2 (H2). *To the extent that there are differences between men and women in terms of their risk- and debt-related corporate decisions, board gender diversity exerts an indirect effect on performance through leverage.*

2.2. The Relationship between the Board of Directors and Efficiency Estimated Using Frontier Techniques: A Literature Review

Few studies have examined the relationship between firms' gender diversity and technical efficiency. In a study in Spain, Gallego-Álvarez and García-Sánchez [13] investigated the presence of women among the shareholders, management, and senior executives of 96 firms across several sectors and its relationship with business performance between 2004 and 2006. They considered accounting measures, market value, and technical efficiency in their analysis. After endogeneity had been corrected for, their results failed to show a clear relationship between board gender diversity and the performance of the analyzed firms. For the same sample of Spanish firms, García-Sánchez [25] explored the other board characteristics, besides gender diversity, that affect business performance. The main findings of the study included the existence of a nonlinear relationship between board activity (measured in terms of number of meetings) and business performance. However, the specialization of the board through committees, as well as the presence of women on the board, was found to increase technical efficiency. This efficiency was observed to be worse when there was a greater number of directors on the board. Finally, the results showed the existence of a nonsignificant relationship between performance and the other corporate variables considered in the study, namely ethnic diversity, board size, and board independence.

In an international setting, notable studies of gender diversity and business efficiency include those by Hanousek and Shamshur [26], Bibi and Balli [27], and Uribe-Bohorquez and Martínez-Ferrero [28]. For the period 2000 to 2013, Hanousek and Shamshur [26] studied a panel of firms from 14 countries in Central and Eastern Europe, finding that the gender of executive directors influences firms' efficiency, with this relationship affected by the level of corruption in the environment. Linked to this conclusion, another notable finding was that women executive directors behave differently from men in corrupt environments, which the authors explained by gender differences in the inclination to engage in illegal activities. In light of these findings, the authors concluded that in highly corrupt contexts, this corruption has a greater negative effect on the efficiency of female-led firms because of women's weaker inclination toward such behavior, which places them at a disadvantage in such environments.

Bibi and Balli [27] focused on microfinance institutions in five South Asian countries to analyze the influence of certain corporate governance mechanisms on the financial and social efficiency of these firms. Their analysis examined several characteristics, including gender diversity, for which the authors did not find a significant causal relationship between the proportion of female board members and either measure of efficiency.

Uribe-Bohorquez and Martínez-Ferrero [28] analyzed 31 stock indices for America, Europe, the Middle East, Africa, and Asia between 2006 and 2015 to study board independence. They observed a positive relationship between this variable and corporate performance. This relationship was found to be stronger when firms operated in countries with stricter demands in terms of legal compliance. To analyze this relationship, they used board characteristics, including gender diversity, as control variables. Their primary conclusions included the observation that the presence of women board members led to a degree of heterogeneity that negatively affected the efficiency of the analyzed firms.

Based on all of the above, the following hypothesis was formulated:

Hypothesis 3 (H3). *Board gender diversity is crucial to explain corporate performance, and it is expected to increase the efficiency with which firms use their resources.*

Although few studies have considered gender diversity as a mechanism of corporate governance to measure its impact on business efficiency, some studies have centered on other board characteristics. The studies discussed here are those that have examined board independence, ethnic diversity, size, and activity. Studies that have focused on other mechanisms such as ownership structure were not considered because they fell outside the scope of this research.

Considering these characteristics by sector, financial institutions represent one of the most widely studied sectors, followed by the manufacturing and tourism sectors. For the banking sector, a notable study is that of Salim and Arjomandi [1], who concluded that technical efficiency may increase with the size of the board and board activity, with no influence from board independence or board meetings. Tanna and Pasiouras [54] reported positive and robust evidence of the relationship of several efficiency measures with board independence, with the effect of board size also proving positive but not robust. Choi and Hasan [55] observed the presence of foreigners on the boards of banks to be associated with greater efficiency. On the contrary, the relationship between board independence and efficiency was not observed to be significant. Finally, Yamori and Harimaya [56] compared cooperative financial institutions and listed banks, observing that board independence had a positive effect on measures of efficiency only in the case of cooperatives. In relation to nonbanking financial institutions, Hsu and Petchsakulwong [57] showed that board independence and activity had a positive effect on several efficiency measures, whereas board size had no effect. For the manufacturing industry, Su and He [58] concluded that boards are more effective at driving efficiency when they have a larger number of independent members. Chian and Lin [59] verified that smaller boards have greater efficiency, while also providing evidence that CEO duality boosts corporate performance. In the hotel sector, notable studies include those by Guetat and Jarboui [60] and Jarboui and Guetat [61], who showed the relevance of board independence and CEO nonduality in enhancing the efficiency of the Tunisian hotel sector.

As this review shows, previous studies have focused on a single country to measure the relationship between the board structure and technical efficiency. The same is true of analyses from a multisector perspective. For example, Bernardi and Oliveira [62] studied the impact of the compensation received by CEOs and directors on technical efficiency. Bozec and Dia [63] concluded that both board independence and board size positively influence business efficiency, provided the firm is subject to market discipline.

3. Sample and Variable Selection

3.1. Data and Data Sources

The sample in this study consisted of 91 Spanish listed companies over the period 2004 to 2015. The selection criterion consisted of collecting all available data on the boards of directors of Spanish

listed firms from the reports produced annually by Spencer Stuart [64]. Thus, data on 127 firms were gathered. These data were supplemented with selected financial variables from Osiris [65]. In the data cleaning process, financial firms (banks and insurance companies) were removed. Their distinctive characteristics mean that they report their accounts in a different format from other firms, preventing unification with the rest of the sample. During this process, firms that did not have data for at least four years were also removed because the lack of observations could lead to difficulties in the econometric analysis.

3.2. Variable Definitions

3.2.1. Dependent Variable: Technical Efficiency

Most studies of the relationship between gender diversity and business performance use accounting ratios, notable examples of which include return on assets, return on equity [14,21,51], and Tobin's Q, which reflects the market value of the company stock [22,23,32]. However, the use of these measures has major disadvantages. For example, accounting ratios are subject to possible accounting manipulation [66], while Tobin's Q is subject to volatility [28] and only offers a good measure of value creation for stockholders in efficient, wide markets. Also, there are very few listed companies [67].

In light of these considerations and the fact that the production process lays the foundation for corporations [28], in this study, technical efficiency was used to measure business performance in relation to board gender diversity of the most important Spanish companies. This measure was chosen because it is more complete and less ambiguous than the accounting ratios and Tobin's Q measures mentioned earlier [68]. Conceptually, technical efficiency may be associated with the capacity to produce at a lower cost, based on the relationship between a company's outputs and the inputs needed to produce those outputs. Accordingly, a firm is more efficient if it can produce more outputs using the same or a smaller quantity of inputs [69].

Of all the models used to analyze efficiency, frontier techniques have received most attention from the research community in relation to corporate governance [1,26,28]. Specifically, the parametric technique of SFA and the nonparametric technique of data envelopment analysis (DEA) [70] are the most widely used. Both techniques, which are used when the production function is unknown, are based on the estimation of a hypothetical frontier delineated by the combination of inputs and outputs of the most efficient firms and the evaluation of the potential inefficiencies or x-inefficiencies [71,72] derived from the distance between the efficient behavior function and the observed values for each firm [73].

Specifically, in this study, the efficiency measure was obtained using SFA, as established by Gallego-Álvarez and García-Sánchez [13], Hanousek and Shamshur [26], Choi and Hasan [55], and Su and He [58]. This choice was justified for the following reasons. This technique requires the specification of a functional form that separates the error term from the inefficiency term by allowing a certain degree of random variability in the frontier that is outside the firm's control. In contrast, DEA considers any deviation from the frontier an inefficiency, is less rigorous than SFA, and yields results that can lead to biased frontiers when working with small samples [73]. Accordingly, obtaining the frontier using SFA consists of estimating a stochastic function, in this case for production, to which two error terms must be added, as defined by the following expression:

$$y_{it} = f(X_{it})e^{v_{it}}e^{-\mu_{it}}. \quad (1)$$

Here, for firm i at time t, y_{it} is the observed *output*, X_{it} is the vector of *inputs*, v_{it} is the random error, and μ_{it} is the stochastic inefficiency (*eff*). The stochastic frontier is determined by the expression $y_{it} = f(X_{it})e^{v_{it}}$, so efficient production is achieved when $e^{-\mu_{it}} = 1$, with the absolute inefficiency occurring when $e^{-\mu_{it}} = 0$. We adopted a Cobb–Douglas function, justified by its ease of estimation and

interpretation [74]. Taking logs, the previous function can be transformed to the following linear panel data equation:

$$\log Y_{it} = \beta_{0t} + \sum_{p=1}^{n} \beta_p \log X_{itp} + v_{it} - u_{it} \quad \text{donde } u_{it} \geq 0. \tag{2}$$

From this equation, it may be deduced that any use of resources that results in a lower level of production to that of the frontier implies inefficiency. This effect only occurs in one direction with respect to the frontier. Hence, μ_{it} may only take positive values. The factors that make up the existing randomness may exert a favorable or an adverse influence on the output of the firm. In addition, the time dimension of the panel forced us to consider variation in inefficiency over time. Accordingly, the estimation of the frontier parameters followed the proposal of Battese and Coelli [75], whereby inefficiency was modeled as a function of time. Therefore, as per those authors' indications, it was assumed that the error and inefficiency terms were independent and identically distributed, were independent from one another, and followed a normal and truncated normal distribution, respectively, such that $\upsilon \sim N(0, \sigma_{\upsilon}^2)$; $\mu \sim N^{+}(0, \sigma_{u}^2)$. The maximum likelihood method was used for the estimation. This procedure is regularly used to obtain the efficiency frontier [56,58,61] because it provides consistent and asymptotically efficient estimators. The assumption of temporal variability was checked by comparing the models estimated using the two possible variants, namely that inefficiency was either constant or variable over time [75].

It is crucial to address possible problems of endogeneity derived from the two-way causality between the output and inputs [26], which is why instead of using the contemporary values of the inputs, the first lag was used. Despite its importance, endogeneity has not been considered in many studies that have examined efficiency using the SFA. Examples include the studies by Gallego-Álvarez and García-Sánchez [13], Yamori and Harimaya [56], Su and He [58], Jarboui and Guetat [61], and Sheu and Yang [68]. Hence, the equation to be estimated may be stated as follows:

$$\log Y_{it} = \beta_{0t} + \sum_{p=1}^{n} \beta_p \log X_{it-1p} + v_{it} - u_{it} \quad \text{donde } u_{it} \geq 0. \tag{3}$$

In reference to the variables used in this estimation, the output (y_{it}) was sales. This measure has been used in various studies that have calculated the efficiency using frontier techniques. Examples include the studies by Hanousek and Shamshur [26], Su and He [58], and Sheu and Yang [68]. The inputs (x_{it}) were total assets, number of employees, and an indicator of stock turnover, which was represented by the ratio of operating income to average inventory. The first two inputs were included because they represent key resources in revenue generation and have been regularly used to determine business efficiency [26]. The third input indicates how well the inventory is put to use in generating operating income. Although no examples of its use in previous studies have been found, its inclusion was deemed necessary as a measure of how well the business functions because the management of inventory has major consequences for both liquidity and risk [76].

Finally, consistent with Hanousek and Shamshur [26], the parameters of the production function were estimated in interaction with a dummy sector variable to control for specific factors in each sector. Accumulated annual dummies were also included to control for the effects that influence the output over time, following the indications of Hanousek and Shamshur [26], Yamori and Harimaya [56], and Su and He [58].

3.2.2. Independent Variables: Gender Diversity

We followed the indications of authors such as Palomo-Zurdo and Gutiérrez-Fernández [16], Campbell and Mínguez-Vera [23], Liu and Wei [44], and Darmadi [51] by using a range of indicators to measure the gender diversity of the board of directors to ensure the robustness of our results. The following indicators were used:

- The most commonly used indicator in research on gender is the percentage of women (*p_wom*). Like authors such as Isidro and Sobral [15], Low and Roberts [21], and Adams and Ferreira [50], we calculated the ratio of female board members to total board members of the sampled firms.
- Following Carter and D'Souza [19] and García-Sánchez [25], we used the number of women board members (*wom*) because the potential influence of two women on a large board might be greater than the influence of one woman on a small board.
- Campbell and Mínguez-Vera [23] argued that the first two measures are insufficient to measure gender diversity, instead proposing the use of the Blau [77] index (*blau*):

$$B = 1 - \sum_{i=1}^{n} P_i^2 \quad (4)$$

  Here, B is the Blau index, and P_{it} is the proportion of women on the board of company i in year t. Accordingly, higher values of this index mean greater diversity of the board. Authors who have used this index to analyze the gender diversity of the board of directors and its influence on profitability or business efficiency include Reguera-Alvarado and de Fuentes [10] and Uribe-Bohorquez and Martínez-Ferrero [28].
- According to numerous scholars, having only one woman on the board of directors is merely symbolic [78], whereas two constitutes a presence [79], and three is a critical mass [80]. Therefore, following the approach described by Liu and Wei [44], we included three dummy variables that took the value 1 when, respectively, there was at least one female board member (*dum1*), two female board members (*dum2*), or three female board members (*dum3*), and 0 otherwise.
- To evaluate the effect of the European Commission Directive [7] on business performance, a dummy variable was included that took the value 1 when women represented at least 40% of the members of the board and 0 otherwise (*dum40*). Despite never having been used in prior studies, this indicator was included to test the effect of this type of government measure on business efficiency.

Given the possible business performance benefits of having women on the board of directors [14,22,45], the sign in the specified equation was expected to be positive.

3.2.3. Control Variables

To avoid possible biases when analyzing the relationship between gender diversity and business performance, other variables that might affect the dependent variable must be considered. Thus, a range of characteristics of the board and the firm were included as explanatory variables.

The first board characteristic included in the study was the number of board members (*board_s*). This measure of the size of the board was included to shed light on the possible relationship between this attribute of corporate governance and business performance, given the contradictory evidence that has been found in this regard. Whereas some authors have reported the advantages of having a larger board [1,39], most studies have shown a negative relationship between the two variables as a result of the agency problems that arise in large groups [81–83]. Therefore, a negative sign was expected to be observed in the analysis of this relationship.

In addition to size, the type of board members who make up the board is also important. According to Jensen and Meckling [84], nonexecutive board members are those who have the capacity to reduce agency problems. Therefore, the study considered the number of proprietary directors (*p_prop_dir*) as a percentage of the total number of board members to investigate the influence of the presence of proprietary board members on business performance. These directors are elected among the shareholders with a stake of more than 5% of capital, so they have broad scope to influence the control of the company and, consequently, its performance. Therefore, a positive relationship between the two variables was expected.

The number of independent board members (*p_ind_dir*) was also considered. Independent directors play a key role in corporate governance given their greater objectivity when evaluating the company. This objectivity stems from having a more detached view than the management team and the major shareholders. Accordingly, they are in a better position to perform their supervisory functions and to influence business performance [31,63,73]. However, external board members are unfamiliar with the way the company functions, which means that they might not always make the right decisions [51,85]. Therefore, it was unclear what the sign of this relationship would be.

To address the independence of the board as a corporate governance mechanism, in addition to the percentage of independent directors, CEO duality is commonly used [63,86]. This dummy variable took the value 1 when the CEO and the chair of the board was the same person and 0 otherwise (*dual*). The existence of duality may reduce the independence of the board and therefore the performance of the company because it makes little sense for an individual to propose and implement strategic decisions that the same individual must then evaluate [3,63]. However, some authors have found that duality can increase business performance because of the potential for clear leadership without being constrained by the board [87,88]. Therefore, it was unclear what the sign of this relationship would be.

Finally, company characteristics were included as control variables. Leverage (*lev*) was included as a corporate governance mechanism that can affect the board [28] and therefore business performance [13,23]. The same occured with solvency (*solv*) and working capital (*work_cap*). Although these variables have not typically been used in the cited studies, their inclusion here was considered important because of their role as indicators of the operating structure of the firm and its financing and investment decisions, respectively [76]. Finally, return on assets (*roa*) was also included in the study because of its importance for efficiency, as explained by Salim and Arjomandi [1] and Hanousek and Shamshur [26].

4. Method and Results

4.1. Determinants of Technical Efficiency: Econometric Estimation

Once the measure of distance to the efficiency frontier for each firm (i.e., inefficiency) had been obtained, the next stage was to analyze the determinants of the differences between the efficiency of a given company and the efficiency of the companies with the best performance. Consistent with the aim of this study, the analysis centered on the effect of gender diversity. The analysis considered both the direct effect and the indirect effect through the firm's financial structure. Therefore, inefficiency was regressed onto two groups of explanatory variables: gender diversity variables and control variables. Variables in the first group were used to estimate an equation for each of the seven measures to test the robustness of the results when using different gender diversity indicators. The control variables were divided into those that relate to characteristics of the board (*board*) and those that relate to characteristics of the firm (*firm*). Therefore, the following static linear equation was estimated:

$$eff_{it} = \beta_0 + \beta_1\, gen_{it} + \sum_{p=2}^{5} \beta_p board_{itp} + \sum_{p=6}^{9} \beta_p firm_{itp} + \beta_{10}\, gen_{it} * lev_{it} + \tau_t + \varphi_j + \eta_i + \varepsilon_{it}. \quad (5)$$

Here, for firm i at time t, eff_{it} is the distance to the efficiency frontier, gen_{it} represents each measure of gender diversity, $board_{itp}$ and $firm_{itp}$ refer to the four variables representing characteristics of the board and the company, respectively, and gen_{it}*lev_{it} are the interaction terms between each gender diversity indicator and leverage. These terms were included to test the possible indirect effect of gender via leverage. The inclusion of the interaction term indicates that the partial effect of *lev* on *eff* should be determined by the coefficient of *lev* summed with β_{10}*gen. Hence, the joint significance of the two coefficients in each estimated equation was also evaluated. The terms τ_t and φ_j represent the fixed time and sector effects for each period t and sector (j = 1, ..., 6), respectively. These fixed effects were included using time and sector dummies to control for factors derived from the heterogeneity

between sectors that remain constant over time and to control for the factors that influence all firms over time, such as the legal context, which is of particular interest in this study. Finally, η_i represents the individual unobservable effect, and ε_{it} is the error term.

To estimate static models with panel data, fixed effects or random effects estimators can be used depending on the existence or absence of correlations between the individual unobservable effect and the explanatory variables, respectively. For this purpose, the Hausman test is used. Thus, to decide which estimator to use in this study, the first step was to perform this test. The results indicated that the fixed effects model should be used. However, as a test of robustness, the estimates from the random effects model are also presented.

It is crucial for the analysis not to overlook problems of endogeneity, which arise in the relationship of interest due to the omission of variables, two-way causality, or measurement error [4]. Numerous studies have stressed the need to correct these problems of endogeneity given the inverse causality between the measure of performance and the governance measures (see, e.g., Sheu and Yang [68], who calculated technical efficiency using SFA). Therefore, in this study, we performed the estimation with instrumental variables. Specifically, we instrumentalized each explanatory variable with its first lag, following the indications of Arellano and Bond [89]. It should be clarified that the instruments must meet the condition of exogeneity [90]. This condition was confirmed with the Hansen test, which is reported for each estimate. However, some authors have failed to consider endogeneity problems. Examples include Bibi and Balli [27] and Su and He [58], who also used fixed and random effects estimators with time dummies.

4.2. Results and Discussion

In this section, we first characterize the sample (Table 1). The table has three parts: the first presents descriptive statistics for all variables, the second shows the arithmetic mean of inefficiency and some of the board variables by sector, and the third shows the arithmetic mean of inefficiency for the entire sample and by sector for different gender diversity situations.

Given the focus of this study, two findings should be noted from the first part of the table. First, the average distance to the efficiency frontier of the analyzed firms was 0.1948. Thus, the average efficiency was 0.8052. However, the high dispersion with respect to the average value explains the considerable underlying differences between firms. These differences are reflected by the fact that the most efficient companies had a distance to the frontier of 0.0288, whereas the most inefficient firms had a distance of 0.8976. Second, as regards gender diversity, the average number of women on each board of directors was approximately 1 (1.0737), as the number of female directors was less than 2 in 75% of observations of this indicator. Given that the average board size was approximately 11 directors (11.49), female representation was clearly low, with an average percentage of women board members of less than 10% (9.32%). However, comparing these numbers with a previous study [13] reveals positive progress in female representation on the boards of directors of Spanish listed companies, which may reflect the impact of gender equality regulations [12].

Regarding the second part of the table, there were substantial differences between sectors in terms of inefficiency. The most inefficient sector was oil and energy, with a distance to the frontier of 0.2859. This distance was more than double that of the most efficient sector (financial and real estate services), which had a distance of 0.1325. The differences in the gender diversity measures were less noticeable. The consumer services sector had the highest proportion of female board members (12.03%), whereas the rest had similar proportions.

Table 1. Descriptive analysis.

Variables	Arithmetic Mean	Standard Deviation	25th Percentile	50th Percentile	75th Percentile	Minimum	Maximum
eff	0.1948	0.1132	0.1218	0.1743	0.2376	0.8976	0.0288
p_wom	0.0932	0.1014	0	0.0769	0.1538	0	0.5714
wom	1.0737	1.1926	0	1	2	0	6
blau	0.1484	0.1454	0	0.1420	0.2603	0	0.5
dum1	0.6868	0.4640	0	1	1	0	1
dum2	0.4258	0.4946	0	0	1	0	1
dum3	0.3003	0.4586	0	0	1	0	1
dum40	0.0080	0.0894	0	0	0	0	1
dual	0.6647	0.4723	0	1	1	0	1
p_prop_dir	0.4207	0.2088	0.2727	0.4285	0.5833	0	0.9166
p_ind_dir	0.3587	0.1684	0.25	0.3333	0.5	0	0.8888
board_s	11.49	3.3793	9	11	14	4	22
lev	173.86	174.3722	57.84	119.79	226.14	0.57	985.01
roa	4.1466	10.4389	0.66	4.1	7.79	−50.69	71.21
work_cap	218765.1	969323.6	−16688	45843	202890	−4100000	9100000
solv	77.4773	99.52982	25.46	48.81	88.84	−92.6	927.93

Arithmetic mean of variables by sector

Variables	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6
eff	0.1325	0.1893	0.2031	0.2859	0.1793	0.1629
p_wom	0.0923	0.0906	0.1203	0.0820	0.0882	0.0781
wom	0.8688	0.8666	1.3733	1.0833	1.1494	0.9682
blau	0.1356	0.1481	0.1888	0.1264	0.1412	0.1334
board_s	10.3770	9.7688	12.24	13.6574	11.7279	12.3015

Arithmetic mean of inefficiency by criteria

Criteria	Entire sample	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6
wom = 0	0.2125	0.1101	0.1936	0.2917	0.2448	0.2144	0.1697
wom >= 1	0.1860	0.1420	0.1867	0.1818	0.3085	0.1586	0.1593
p_wom < perc50	0.2241	0.1101	0.2003	0.2273	0.2425	0.2154	0.1788
p_wom => perc50	0.1736	0.1325	0.1808	0.1874	0.311	0.1519	0.1459

Source: Compiled by the authors using Stata. Sectors: financial and real estate services (1); consumer goods (2); consumer services (3); oil and energy (4); basic materials, industry, and consumption (5); and technology and telecommunications (6).

Finally, the third part of the table shows the average inefficiency variation between companies according to the following board gender diversity criteria: only male members (*wom* = 0) or at least one female board member (*wom* = 1); and proportion of women below the median (p_*wom* < perc50) or proportion of women at or above the median (p_*wom* ≥ perc50). This analysis revealed the major differences in inefficiency when firms are compared based on these two groups of criteria. Regarding the first, the average inefficiency of firms with at least one female board member (0.1860) was lower than that of firms with only male board members (0.2125). This situation was true of most sectors. Comparing the average inefficiency of companies according to the second group of criteria shows that firms with a number of women directors at or above the median had lower levels of inefficiency, with a difference of more than five percentage points (0.1736 vs. 0.2241).

Following this review of the descriptive statistics, the next section of the discussion focuses on the results of the regressions shown in Tables 2 and 3 for the estimation using fixed and random effects, respectively. Problems of multicollinearity were ruled out, as reflected by the correlation matrix, and both tables confirm the validity of the instruments.

Table 2. Dependent variable: inefficiency (fixed effects estimator).

Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p_wom	−0.0510 *						
wom		−0.0030 **					
blau			−0.0282 **				
dum1				−0.0049 *			
dum2					−0.0115		
dum3						−0.0079	
dum40							0.0088
dual	−0.0011	−0.0006	−0.0004	0.0022	0.0007	−0.0001	−0.0003
p_prop_dir	0.0231 **	0.0233 **	0.0236 ***	0.0272 ***	0.0221 **	0.0229 ***	0.0207 **
p_ind_dir	0.0058	0.0060	0.0068	0.0061	0.0036	0.0041	0.0052
board_s	−0.0012 *	−0.0013 **	−0.0012 **	−0.0013 *	−0.0015 **	−0.0014 **	−0.0010 *
lev	−0.00003 ***	−0.00003 ***	−0.00003 ***	−0.00002 ***	−0.00002	−0.00002 **	−0.00002 ***
gen*lev	0.0003 *	0.00001 **	0.0001 *	-7.75×10^{-6}	0.00008	0.00005 **	0.00002
roa	0.00006	0.00006	0.00006	−0.00001	0.0001	0.00004	0.00005
work_cap	-3.25×10^{-9} *	-3.14×10^{-9} *	-2.89×10^{-9}	2.80×10^{-10}	-3.41×10^{-9}	-1.92×10^{-9}	-1.34×10^{-9}
solv(log)	−0.0054 *	−0.0068 ***	−0.0060 **	−0.0096 ***	−0.0047	−0.0084 ***	−0.0087 ***
Obs,	656	656	656	602	656	656	656
R^2(within)	0.9800	0.9817	0.9816	0.9829	0.9767	0.9827	0.9840
F (P-val)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hansen (P-v)	0.5672	0.4521	0.4531	0.1730	0.3722	0.2454	0.1495
Hausman (P-v) (FE-RE)	0.0001	0.0002	0.0001	0.0000	0.0845	0.0001	0.0018

Source: Compiled by the authors using Stata. *** significant at the 99% level, ** significant at the 95% level, * significant at the 90% level. R^2(within): coefficient of determination of the transformed model (within group). F (p-val): *p* value of the test of model significance. Hansen (P-v): *p* value of the Hansen test, taking the first lags of the independent variables as instruments, as well as the first lag of the cash flow and return on equity variables to meet the test requirement of inclusion of at least one external instrument. Hausman (P-v): *p* value of the Hausman test. The reporting of time and sector dummies is omitted.

Table 3. Dependent variable: inefficiency. Random effects estimator. Robustness testing.

Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
p_wom	−0.0499 **						
wom		−0.0030 **					
blau			−0.0277 **				
dum1				−0.0056 **			
dum2					−0.0112 *		
dum3						−0.0078	
dum40							0.0082
dual	−0.0010	−0.0005	−0.0004	−0.0002	−0.0006	−0.00006	−0.0003
p_prop_dir	0.0239 **	0.0240 **	0.0242 ***	0.0245 ***	0.0230 **	0.0236 ***	0.0213 **
p_ind_dir	0.0069	0.0070	0.0077	0.0082	0.0049	0.0051	0.0059
board_s	−0.0011 **	−0.0012 **	−0.0011 **	−0.0007	−0.0013 **	−0.0013 ***	−0.0009 **
lev	−0.00003 ***	−0.00003 ***	−0.00003 ***	−0.00002 **	−0.00002 **	−0.00003 ***	−0.00002 ***
gen*lev	0.0002 **	0.00001 ***	0.0001 **	-5.45×10^{-6}	0.00008 **	0.00005 ***	0.00002
roa	0.00007	0.00006	0.00006	−0.00002	0.0001	0.00005	0.00005
work_cap	-2.74×10^{-9} *	-2.65×10^{-9} *	-2.37×10^{-9} *	1.43×10^{-10}	-2.77×10^{-9} *	-1.55×10^{-9}	-1.03×10^{-9}
solv(log)	−0.0060 **	−0.0072 ***	−0.0065 **	−0.0084	−0.0053	−0.0087 ***	−0.0090 ***
Obs,	662	662	662	662	662	662	662
Wald (P-v)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hansen (P-v)	0.7438	0.6870	0.6821	0.3184	0.6433	0.5061	0.4704

Source: Compiled by the authors using Stata. *** significant at the 99% level, ** significant at the 95% level, * significant at the 90% level. Wald (P-v): *p* value of the test of model significance. Hansen (P-v): *p* value of the Hansen test, taking the first lags of the independent variables as instruments, as well as the first lag of cash flow and return on equity to meet the test requirement of inclusion of at least one external instrument. The reporting of time and sector dummies is omitted.

Starting with Table 2, it should first be noted that the first four gender diversity measures were significant and exerted a negative influence on inefficiency (see Equations (1) to (4)). Accordingly, when there is an increase in the proportion of women on the board (*p_wom*), number of women

directors (*wom*), and gender diversity (*blau*), and when the board goes from having only men to at least one woman (*dum1*), technical efficiency increases.

These results do not concur with those of a similar study conducted previously [13]. This was the only study of gender diversity that was found to have used the same dependent variable as in the present study. In the earlier study, a nonsignificant relationship was found. A possible explanation for this discrepancy in the results is the significantly lower female representation on the boards of directors considered in the earlier study. This discrepancy may owe to the difference in the gender legislation context of each study. The context in the present study was more favorable to a stronger presence of women directors, potentially leading to a noticeable effect of gender diversity. Similarly, the statistical significance of *dum1* contradicts Kanter's theory [78]. The results indicate that the first female board member is more than a symbolic gesture and actually adds value to the firm.

Similarly, the finding that female representation on boards of directors contributes positively to efficiency, as reflected by the results, is consistent with numerous studies that have shown that fostering gender diversity at the most senior corporate level is important to enhance performance [3,23,25,32,44,53], although the vast majority have used measures of profitability and market value. Therefore, the analysis provides results that support the theories that underpin this study. More specifically, board gender diversity is an indispensable way of reducing costs derived from agency problems by promoting board independence (agency theory). Furthermore, gender diversity can send highly positive signals to the outside world, improving firms' access to key resources (resource dependence theory). Gender diversity can also be interpreted as being oriented to all stakeholders (stakeholder theory).

No other gender diversity variable was significant. Therefore, it may be concluded that there would be no difference in inefficiency reduction between having at least one (*dum1*), two (*dum2*), three (*dum3*), or 40% women directors (*dum40*). However, this result should be interpreted with caution because the number of sampled firms with at least two, three, or 40% female board members was low with respect to the number of firms with at least one female director (see Table 1 for data on the arithmetic mean of *dum1*, *dum2*, *dum3*, and *dum40*). This feature of the sample may have influenced the results.

Having analyzed the direct influence of the gender diversity measures on inefficiency, we now turn to the other focus of this study, namely the indirect effect of gender diversity through leverage. The results show that the interaction term (*gen*lev*) was positive and significant in most estimates (see Equations (1) to (3) and Equation (6) in Table 2). In other words, an increase in leverage together with a stronger presence of women on the board of directors results in lower efficiency. Equation (1) indicates that for each unit increase in leverage, there was an independent decrease in inefficiency of 0.00003 units on average (coefficient of *lev*), keeping all other variables constant. However, in terms of the total variation of this coefficient, summing the previous value of the coefficient to the coefficient of the interaction term leads to a reversal in the direction of the effect on inefficiency. Specifically, if the proportion of women board members reached the maximum value of 100%, the increase in inefficiency for a unit increase in *lev* would be 0.02997 units, keeping all other variables constant. These observations reflect the importance of considering the indirect effect (through financial structure) of gender diversity on business performance. These findings can be justified by the different approaches of men and women to corporate finance, which in turn can be explained by women's supposedly greater aversion to risk and leverage [18,47]. Therefore, a possible explanation for these findings is that women's more conservative approach to risk and leverage might mean that the influence of women on the board would lead to greater difficulty for the firm to achieve an optimal financial structure, which would increase technical inefficiency.

After discussing the results in relation to the central focus of the study, we now briefly reflect upon the results in relation to the control variables. Table 2 shows that the proportion of proprietary external directors and the size of the board were statistically significant in all estimates, with a positive and negative influence on inefficiency, respectively. Thus, a higher proportion of proprietary board

members results in worse efficiency. This relationship can be explained by their focus on actions that pursue the interests of certain stakeholders, such as shareholders, which may be to the detriment of others. The opposite occurs with the size of the board, with an increase in efficiency when there are more board members. This result can be explained by resource dependence theory because larger boards are made up of more experts and will make better decisions [39,51]. Regarding company characteristics, besides *lev*, which has already been discussed, solvency was found to have a significant influence on inefficiency, such that more solvent firms are also more efficient. Finally, the robustness testing reported in Table 3 consisted of estimating the same equations as in Table 2 using a different estimator. These regressions confirm the main conclusions derived from Table 2, discussed earlier. Therefore, it may be affirmed that the positive direct effect of gender diversity on efficiency is robust to estimation by different indicators and procedures.

Finally, we should note that, in general, the hypotheses proposed in this study have been corroborated. Specifically, the results support both the direct positive effect of female board member representation on efficiency (H1 and H3) and the indirect negative influence of this female board member representation on efficiency through leverage (H2). This finding highlights the importance of considering the possible indirect effects of gender measures on business performance.

5. Conclusions

Achieving gender equality at the most senior corporate level continues to present a challenge for institutions and society as a whole. Therefore, it is crucial to continue investigating the reasons that explain the importance of gender quality. Despite the abundance of studies on this topic, there are still numerous unanswered questions, the answers to which correspond to the clarification of the role of women in effective corporate governance. This study offers the first evidence of the direct effect and the indirect effect (through leverage) of board gender diversity on technical efficiency. Technical efficiency, which is rarely used in studies such as this, was calculated using SFA. This study is also novel in that the evidence provided relates to listed companies in a geographical setting (Spain) and period conditioned by the improvement of the legal context with respect to gender equality in the work environment. The estimation was performed using fixed effects with instrumental variables, providing consistent estimates.

The results show the positive and robust effect of female board representation on the efficiency of these firms. These results contrast with those of a similar analysis of Spanish listed firms performed during the period prior to the regulations on gender equality, which failed to show a significant causal relationship. This difference in findings may be indicative of the positive effect of these regulations on enhancing gender diversity in Spanish firms. Ultimately, this stronger gender diversity may translate into more effective governance, with major implications for the improvement of efficiency. Furthermore, the study shows the indirect effect of gender diversity on efficiency through leverage, highlighting the possible differences between men and women with respect to decisions that affect the financial structure of the firm.

Therefore, we conclude that this study provides added value with respect to existing research. This added value should be emphasized. Notably, this study is the first to examine how gender diversity influences the technical efficiency of Spanish listed companies both directly and indirectly. The results confirm the importance of considering both pathways and not only the direct influence, as has occurred in the vast majority of previous studies. Furthermore, the study also offers the first analysis of the gender diversity–technical efficiency relationship in Spain over a period that spans the approval and implementation of legislation aimed at promoting gender diversity on boards of directors. Accordingly, this study was conducted in a novel way, considering a context that is conducive to gender equality in management and governance. Judging by the results of this study and the comparison with a previous study, this legislation does indeed seem to have enhanced the role of women on boards of directors.

Finally, it should be noted that this study has several limitations. These limitations primarily relate to the availability of data, as well as the lack of analysis of other indirect effects such as corporate social responsibility or ethical values, which fell outside the scope of the study. These areas represent the main topics to be addressed by research in the future.

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References

1. Salim, R.; Arjomandi, A.; Seufert, J.H. Does corporate governance affect Australian banks' performance? *J. Int. Financ. Mark. Inst.* **2016**, *43*, 113–125. [CrossRef]
2. Organization for Economic Cooperation and Development (OECD). OECD Corporate Governance Factbook 2017. Available online: http://www.oecd.org/daf/ca/corporate-governance-factbook.htm (accessed on 25 March 2019).
3. García-Meca, E.; García-Sánchez, I.; Martínez-Ferrero, J. Board diversity and its effects on bank performance: An international analysis. *J. Bank Financ.* **2015**, *53*, 202–214. [CrossRef]
4. Adams, R.B. Women on boards: The superheroes of tomorrow? *Leadersh. Q.* **2016**, *27*, 371–386. [CrossRef]
5. Grosser, K.; Moon, J. CSR and feminist organization studies: Towards an integrated theorization for the analysis of gender issues. *J. Bus. Ethics* **2019**, *155*, 321–342. [CrossRef]
6. Global Reporting Initiative. GRI Standards. Available online: https://www.globalreporting.org/standards (accessed on 11 January 2020).
7. European Commission. Proposal for a Directive of the European Parliament and of the Council on Improving the Gender Balance among Non-Executive Directors of Companies Listed on Stock Exchanges and Related Measures. EUR-Lex. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52012PC0614 (accessed on 22 January 2019).
8. European Union. Report on Equality between Women and Men in the EU. Available online: https://ec.europa.eu/info/policies/justice-and-fundamental-rights/gender-equality (accessed on 17 October 2019).
9. Atrevia-IESE. Mujeres en los Consejos del Ibex-35, 5º Informe. Atrevia, Madrid. Available online: https://media.iese.edu/research/pdfs/ST-0466.pdf (accessed on 17 October 2019).
10. Reguera-Alvarado, N.; de Fuentes, P.; Laffarga, J. Does board gender diversity influence financial performance? Evidence from Spain. *J. Bus. Ethics* **2017**, *141*, 337–350. [CrossRef]
11. National Securities Market Commission (CNMV). Good Governance Code of Listed Companies. Available online: https://www.cnmv.es/DocPortal/Publicaciones/CodigoGov/Good_Governanceen.pdf (accessed on 19 January 2019).
12. Ley Orgánica 3/2007, de 22 de Marzo, para la Igualdad Efectiva de Mujeres y Hombres [Law 3/2007, of 22 March, for the Equality of Women and Men]. Boletín Oficial del Estado, núm 71, de 23 de Marzo de 2007, pp. 12611–12645. Available online: https://www.boe.es/buscar/doc.php?id=BOE-A-2007-6115 (accessed on 23 January 2019).
13. Gallego-Álvarez, I.; García-Sánchez, I.M.; Rodríguez-Domínguez, L. The influence of gender diversity on corporate performance. *Rev. Contab.* **2010**, *13*, 53–88. [CrossRef]
14. Post, C.; Byron, K. Women on boards and firm financial performance: A meta-analysis. *Acad. Manag. J.* **2015**, *58*, 1546–1571. [CrossRef]
15. Isidro, H.; Sobral, M. The effects of women on corporate boards on firm value, financial performance, and ethical and social compliance. *J. Bus. Ethics* **2015**, *132*, 1–19. [CrossRef]
16. Palomo-Zurdo, R.; Gutiérrez-Fernández, M.; Fernández-Torres, Y. The gender issue at the boards of directors of co-operative banks. *CIRIEC-Esp Rev. Econ. Publica Soc. Coop.* **2017**, *89*, 137–166. [CrossRef]

17. Sial, M.S.; Zheng, C.; Cherian, J.; Gulzar, M.A.; Thu, P.A.; Khan, T.; Khuong, N.V. Does corporate social responsibility mediate the relation between boardroom gender diversity and firm performance of Chinese listed companies? *Sustainability* **2018**, *10*, 3591. [CrossRef]
18. Huang, J.; Kisgen, D.J. Gender and corporate finance: Are male executives overconfident relative to female executives? *J. Financ. Econ.* **2013**, *108*, 822–839. [CrossRef]
19. Carter, D.A.; D'Souza, F.; Simkins, B.J.; Simpson, W.G. The gender and ethnic diversity of US boards and board committees and firm financial performance. *Corp. Gov.* **2010**, *18*, 396–414. [CrossRef]
20. Yeh, C.M.; Trejos, B. The influence of governance on tourism firm performance. *Curr. Issues Tour* **2015**, *18*, 299–314. [CrossRef]
21. Low, D.C.; Roberts, H.; Whiting, R.H. Board gender diversity and firm performance: Empirical evidence from Hong Kong, South Korea, Malaysia and Singapore. *Pac.-Basin Financ. J.* **2015**, *35*, 381–401. [CrossRef]
22. Rose, C. Does female board representation influence firm performance? The Danish evidence. *Corp. Gov. Int. Rev.* **2007**, *15*, 404–413. [CrossRef]
23. Campbell, K.; Mínguez-Vera, A. Gender diversity in the boardroom and firm financial performance. *J. Bus. Ethics* **2008**, *83*, 435–451. [CrossRef]
24. Hill, C.W.; Snell, S.A. Effects of ownership structure and control on corporate productivity. *Acad. Manag. J.* **1989**, *32*, 25–46. [CrossRef]
25. García-Sánchez, I.M. The effectiveness of corporate governance: Board structure and business technical efficiency in Spain. *Cent. Eur. J. Oper. Res.* **2010**, *18*, 311–339. [CrossRef]
26. Hanousek, J.; Shamshur, A.; Tresl, J. Firm efficiency, foreign ownership and CEO gender in corrupt environments. *J. Corp. Financ.* **2019**, *59*, 344–360. [CrossRef]
27. Bibi, U.; Balli, H.O.; Matthews, C.D.; Tripe, D.W.L. Impact of gender and governance on microfinance efficiency. *J. Int. Financ. Mark Inst. Money* **2018**, *53*, 307–319. [CrossRef]
28. Uribe-Bohorquez, M.V.; Martínez-Ferrero, J.; García-Sánchez, I.M. Board independence and firm performance: The moderating effect of institutional context. *J. Bus. Res.* **2018**, *88*, 28–43. [CrossRef]
29. Aigner, D.; Lovell, C.A.K.; Schmidt, P. Formulation and estimation of stochastic frontier production function models. *J. Econom.* **1977**, *6*, 21–37. [CrossRef]
30. Meeusen, W.; Van den Broeck, J. Efficiency estimation from Cobb-Douglas production functions with composed error. *Int. Econ. Rev.* **1977**, *18*, 435–444. [CrossRef]
31. Fama, E.F.; Jensen, M.C. Separation of ownership and control. *J. Law Econ.* **1983**, *26*, 301–325. [CrossRef]
32. Carter, D.A.; Simkins, B.J.; Simpson, W.G. Corporate governance, board diversity, and firm value. *Financ. Rev.* **2003**, *38*, 33–53. [CrossRef]
33. Jurkus, A.F.; Park, J.C.; Woodard, L.S. Women in top management and agency costs. *J. Bus. Res.* **2011**, *64*, 180–186. [CrossRef]
34. Farrell, K.A.; Hersch, P.L. Additions to corporate boards: The effect of gender. *J. Corp. Financ.* **2005**, *11*, 85–106. [CrossRef]
35. Bonn, I.; Yoshikawa, T.; Phan, P.H. Effects of board structure on firm performance: A comparison between Japan and Australia. *Asian Bus. Manag.* **2004**, *3*, 105–125. [CrossRef]
36. Hillman, A.J.; Shropshire, C.; Cannella, A.A. Organizational predictors of women on corporate boards. *Acad. Manag. J.* **2007**, *50*, 941–952. [CrossRef]
37. Pfeffer, J.S.; Salancik, G.R. *The External Control of Organizations: A Resource Dependence Perspective*; Stanford University Press: New York, NY, USA, 1978.
38. Leung, S.; Richardson, G.; Jaggi, B. Corporate board and board committee independence, firm performance, and family ownership concentration: An analysis based on Hong Kong firms. *J. Contemp. Account. Econ.* **2014**, *10*, 16–31. [CrossRef]
39. Kiel, G.C.; Nicholson, G.J. Board composition and corporate performance: How the Australian experience informs contrasting theories of corporate governance. *Corp. Gov.* **2003**, *11*, 189–205. [CrossRef]
40. Berman, S.L.; Wicks, A.C.; Kotha, S.; Jones, T.M. Does Stakeholder Orientation Matter? The Relationship between Stakeholder Management Models and Firm Financial Performance. *Acad. Manag. J.* **1999**, *42*, 488–506. [CrossRef]
41. Finegold, D.; Benson, G.S.; Hecht, D. Corporate boards and company performance: Review of research in light of recent reforms. *Corp. Gov. Int. Rev.* **2007**, *15*, 865–878. [CrossRef]

42. Freeman, R.E. A stakeholder theory of the modern corporation. In *Ethical Theory and Business*, 7th ed.; Beauchamp, T.L., Bowie, N.E., Eds.; Pearson Prentice Hall: New York, NY, USA, 2004; pp. 39–48.
43. Carson, C.M.; Mosley, D.C.; Boyar, S.L. Performance gains through diverse top management teams. *Team Perform. Manag. Int. J.* **2004**, *10*, 121–126. [CrossRef]
44. Liu, Y.; Wei, Z.; Xie, F. Do women directors improve firm performance in China? *J. Corp. Financ.* **2014**, *28*, 169–184. [CrossRef]
45. Adams, R.B.; Funk, P. Beyond the glass ceiling: Does gender matter? *Manag. Sci.* **2012**, *58*, 219–235. [CrossRef]
46. Paoloni, M.; Valeri, M.; Paoloni, P. Development perspectives of relational capital in women-led firms. *Int. J. Bus. Manag.* **2017**, *12*, 66–76. [CrossRef]
47. Bernasek, A.; Shwiff, S. Gender, risk, and retirement. *J. Econ. Issues* **2001**, *35*, 345–356. [CrossRef]
48. Sapienza, P.; Zingales, L.; Maestripieri, D. Gender differences in financial risk aversion and career choices are affected by testosterone. *Proc. Natl. Acad. Sci. USA* **2009**, *106*, 15268–15273. [CrossRef]
49. Marinova, J.; Plantenga, J.; Remery, C. Gender diversity and firm performance: Evidence from Dutch and Danish boardrooms. *Int. J. Hum. Resour. Manag.* **2016**, *27*, 1777–1790. [CrossRef]
50. Adams, R.B.; Ferreira, D. Women in the boardroom and their impact on governance and performance. *J. Financ. Econ.* **2009**, *94*, 291–309. [CrossRef]
51. Darmadi, S. Do women in top management affect firm performance? Evidence from Indonesia. *Corp. Gov.* **2013**, *13*, 288–304. [CrossRef]
52. Rubino, F.E.; Tenuta, P.; Cambrea, D.R. Board characteristics effects on performance in family and non-family business: A multi-theoretical approach. *J. Manag. Gov.* **2017**, *21*, 623–658. [CrossRef]
53. Singh, V.; Vinnicombe, S.; Johnson, P. Women directors on top UK boards. *Corp. Gov.* **2001**, *9*, 206–216. [CrossRef]
54. Tanna, S.; Pasiouras, F.; Nnadi, M. The effect of board size and composition on the efficiency of UK banks. *Int. J. Econ. Bus.* **2011**, *18*, 441–462. [CrossRef]
55. Choi, S.; Hasan, I. Ownership, governance, and bank performance: Korean experience. *Financ. Mark. Inst. Instrum.* **2005**, *14*, 215–241. [CrossRef]
56. Yamori, N.; Harimaya, K.; Tomimura, K. Corporate governance structure and efficiencies of cooperative banks. *Int. J. Financ. Econ.* **2017**, *22*, 368–378. [CrossRef]
57. Hsu, W.Y.; Petchsakulwong, P. The impact of corporate governance on the efficiency performance of the Thai non-life insurance industry. *Geneva Pap. Risk Insur. Issues Pract.* **2010**, *35*, S28–S49. [CrossRef]
58. Su, D.; He, X. Ownership structure, corporate governance and productive efficiency in China. *J. Prod. Anal.* **2012**, *38*, 303–318. [CrossRef]
59. Chian, M.H.; Lin, J.H. The Relationship between Corporate Governance and Firm Productivity: Evidence from Taiwan's manufacturing firms. *Corp. Gov.* **2007**, *15*, 768–779. [CrossRef]
60. Guetat, H.; Jarboui, S.; Boujelbene, Y. Evaluation of hotel industry performance and corporate governance: A stochastic frontier analysis. *Tour Manag. Perspect.* **2015**, *15*, 128–136. [CrossRef]
61. Jarboui, S.; Guetat, H.; Boujelbene, Y. Evaluation of hotels performance and corporate governance mechanisms: Empirical evidence from the Tunisian context. *J. Hosp. Tour Manag.* **2015**, *25*, 30–37. [CrossRef]
62. Bernardi, I.; De Oliveira, G. Does Corporate Governance Influence the Efficiency of Brazilian Companies? *Rev. Contab. Finanç.* **2013**, *25*, 145–160. [CrossRef]
63. Bozec, R.; Dia, M. Board structure and firm technical efficiency: Evidence from Canadian state-owned enterprises. *Eur. J. Oper. Res.* **2007**, *177*, 1734–1750. [CrossRef]
64. *Spencer Stuart (2004–2015): Spencer Stuart Index of Board of Directors*; Spencer Stuart: Madrid, Spain, 2018.
65. Bureau van Dijk Osiris [Data file]. Available online: https://www.bvdinfo.com/en-gb/our-products/data/international/osiris (accessed on 3 February 2019).
66. Barth, E.; Gulbrandsen, T.; Schøne, P. Family Ownership and Productivity: The Role of Owner-Management. *J. Corp. Financ.* **2005**, *11*, 107–127. [CrossRef]
67. Destefanis, S.; Sena, V. Patterns of corporate governance and technical efficiency in Italian manufacturing. *Manag. Decis. Econ.* **2007**, *28*, 27–40. [CrossRef]
68. Sheu, H.J.; Yang, C.Y. Insider ownership and firm performance in Taiwan's electronics industry: A technical efficiency perspective. *Manag. Decis. Econ.* **2005**, *26*, 307–318. [CrossRef]
69. Farrell, M.J. The measurement of productive efficiency. *J. Royal Stat. Soc. Ser. A* **1957**, *120*, 253–290. [CrossRef]

70. Charnes, A.; Cooper, W.W.; Rhodes, E. Measuring the efficiency of decision making units. *Eur. J. Oper. Res.* **1978**, *2*, 429–444. [CrossRef]
71. Leibenstein, H. Allocative Efficiency vs. "X-efficiency". *Am. Econ. Rev.* **1966**, *56*, 392–415.
72. Kaparakis, E.I.; Miller, S.M.; Noulas, A.G. Short-Run Cost Inefficiency of Commercial Banks: A Flexible Stochastic Frontier Approach. *J. Money Credit Bank* **1994**, *26*, 875–893. [CrossRef]
73. Chen, C.; Delmas, M.A.; Lieberman, M.B. Production frontier methodologies and efficiency as a performance measure in strategic management research. *Strateg. Manag. J.* **2015**, *36*, 19–36. [CrossRef]
74. Deng, Y.; Veiga, H.; Wiper, M.P. Efficiency evaluation of hotel chains: A Spanish case study. *SERIEs* **2019**, *10*, 115–139. [CrossRef]
75. Battese, G.E.; Coelli, T.J. Frontier Production Functions, Technical Efficiency and Panel Data: With Application to Paddy Farmers in India. *J. Product. Anal.* **1992**, *3*, 153–169. [CrossRef]
76. Llorente, J.I. *Análisis de Estados Económicos-Financieros*; Centro de Estudios Financieros: Madrid, España, 2010.
77. Blau, P.M. *Inequality and Heterogeneity: A Primitive Theory of Social Structure*; Free Press: New York, NY, USA, 1977; Volume 7.
78. Kanter, R.M. *Men and Women of the Corporation*; Basic Books: New York, NY, USA, 1977.
79. Kristie, J. The power of three. *Dir. Boards* **2011**, *35*, 22–32.
80. Torchia, M.; Calabrò, A.; Huse, M. Women Directors on Corporate Boards: From Tokenism to Critical Mass. *J. Bus. Ethics* **2011**, *102*, 299–317. [CrossRef]
81. Yermack, D. Higher market valuation of companies with a small board of directors. *J. Financ. Econ.* **1996**, *40*, 185–211. [CrossRef]
82. Hermalin, B.E.; Weisbach, M.S. Boards of directors as an endogenously determined institution: A survey of the economic literature. *Econ. Policy Rev.* **2003**, *9*, 7–26.
83. De Andres, P.; Azofra, V.; Lopez, F. Corporate boards in OECD countries: Size, composition, functioning and effectiveness. *Corp. Gov. Int. Rev.* **2005**, *13*, 197–210. [CrossRef]
84. Jensen, M.C.; Meckling, W.H. Theory of the firm: Managerial behavior, agency costs and ownership structure. *J. Financ. Econ.* **1976**, *3*, 305–360. [CrossRef]
85. Donaldson, L.; Davis, J.H. Stewardship theory or agency theory: CEO governance and shareholder returns. *Aust. J. Manag.* **1991**, *16*, 49–64. [CrossRef]
86. Sánchez-Marin, G.; Lozano-Reina, G.; Baixauli-Soler, J.S.; Lucas-Pérez, M.E. Say on pay effectiveness, corporate mechanisms, and CEO compensation alignment. *Bus. Res. Q.* **2017**, *20*, 226–239. [CrossRef]
87. Rechner, P.L.; Dalton, D.R. CEO duality and organizational performance: A longitudinal analysis. *Strateg. Manag. J.* **1991**, *12*, 155–160. [CrossRef]
88. Finkelstein, S.; D'Aveni, R.A. CEO duality is double-edged sword: How boards of directors balance entrenchment avoidance and unity command. *Acad. Manag. J.* **1994**, *37*, 1079–1108. [CrossRef]
89. Arellano, M.; Bond, S. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Rev. Econ. Stud.* **1991**, *58*, 277–297. [CrossRef]
90. Gujarati, D.N.; Porter, D.C. *Econometría*; McGraw-Hill: México, D. F., México, 2010.