
Does board gender diversity influence firm financial performance? Evidence from French SMEs

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Abstract: The issue of board gender diversity has attracted the interest of researchers as well as policymakers in recent years. Despite extensive literature examining the relationship between board gender diversity and firm financial performance, the evidence is mixed and based extensively on large firms. This study reassesses this issue by analysing a sample of French small and medium-sized enterprises (SMEs) over the period 2009-2014. We empirically controlled the direction and significance of this relationship by using panel data and the two-stage least squares (2SLS) method. In contrast to existing studies, in our work among French SMEs, we do not find a significant relationship between board gender diversity and firm financial performance. This study aims to shed light on the business case for board gender diversity.

Keywords: boards of directors; firm performance; women; gender; diversity.

1. Introduction

In recent years, the issue of board gender diversity has been a focal point of political debate and academic research (Terjesen et al., 2009). Previously considered an ethical imperative for equal opportunities and a social justice issue (on the basis that it is wrong to exclude individuals on the grounds of gender, skin colour, sexual orientation, etc. regardless of their ability), board gender diversity is increasingly perceived as a key value driver for organizations. The latter is known as the ‘business case for diversity’. Specifically, the contention is that workforce diversity creates a competitive edge for an organization (Robinson and Dechant, 1997).

Despite a large body of literature examining the relationship between women on corporate boards and firm financial performance, the evidence is mixed. Based on this observation, Post and Byron (2015) conducted a meta-analysis of the literature. In essence, they find that a firm’s institutional context (its legal, regulatory and social-cultural framework) has a significant effect on the relationship between board gender diversity and firm performance. Specifically, they find that female board representation is positively and significantly related to accounting returns but not market performance. This effect is stronger in countries with high shareholder protection (such as the US or UK).

If we look closely at the studies included in the meta-analysis by Post and Byron (2015), we notice that these studies focus on large public companies. However, in the European Union (EU), small and medium-sized enterprises (SMEs) account for approximately 70% of employment and 65% of sales (European Commission, 2014).¹ In France, SMEs represent 99.8% of companies, 48.7% of employment, and 43.9% of added value.² Yet, to the best of our knowledge, only two studies (Martín-Ugedo and Mínguez-Vera, 2014; Mínguez-Vera and Martín, 2011) deal specifically with the relationship between women on corporate boards and firm financial performance among SMEs. This is rather surprising given the weight of SMEs in the European economy and the issue of board gender diversity. Furthermore, the results are mixed. While Mínguez-Vera and Martín (2011) find a negative relationship between the representation of women on corporate boards and firm performance, Martín-Ugedo and Mínguez-Vera (2014) find a positive relationship. Therefore, the business case for board gender diversity among SMEs is puzzling from an empirical standpoint.

The present study makes several contributions to the corporate governance literature. First, this study makes a theoretical contribution to the field of corporate governance by analysing board diversity within the framework of agency theory (Jensen and Meckling, 1976). According to this perspective, the monitoring function of the board of directors (BoD) plays a pivotal role in mitigating principal-agent conflicts and, ultimately, firm performance. Board gender diversity has the potential to strengthen this monitoring function as female directors act more independently and can have a significant effect on the dynamics of the board (Adams and Ferreira, 2009). Therefore, in our study, we rely on the agency theory to explain how female directors may affect firm performance due to their contributions. The study also makes a contribution to the diversity and governance literature by providing a better understanding of the relationship between women on corporate boards and firm financial performance among SMEs. In these firms, the monitoring function of the board of directors may be very different and more direct than in large corporations. Therefore, the effect of the presence of women on corporate boards may be different. In the same vein, and consistent with Mínguez-Vera and Martín (2011) and Martín-Ugedo and Mínguez-Vera (2014), we specifically focus on SMEs, which is an area that is currently still not represented in the literature. As Toumi et al. (2016) point out, small businesses are of particular interest given their importance in many European

¹ European Commission (2014) A recovery on the horizon? Annual report on European SMEs 2013/2013.

² According to the French Ministry of Finance.

<http://www.economie.gouv.fr/cedef/chiffres-cles-des-pme>.

countries. This study offers new insights regarding the relationship between board gender diversity and firm financial performance. Finally, from an empirical standpoint, we conducted our analysis by applying a panel data methodology using two-stage least squares (2SLS), as suggested by [Campbell and Mínguez-Vera \(2008\)](#), in order to take into account unobservable heterogeneity and endogeneity between board gender diversity and firm performance.

The purpose of this study is, therefore, to reassess the relationship between board gender diversity and firm financial performance specifically amongst SMEs, as these firms are likely to differ from larger businesses. Therefore, the nature of the relationship may be different.

The structure of our study is as follows. The literature review and the hypothesis developed in this study are presented in section 2. Section 3 describes the data and the variables used in the study. Section 4 highlights the empirical models. Concluding remarks are given in section 5.

2. Literature review and hypothesis

2.1. Overview of agency theory

In essence, agency theory ([Eisenhardt, 1989](#); [Ross, 1973](#);) is concerned with the conflicts of interest arising between an agent acting as a representative and the principal. Theoretically, a potential for conflicts of interest originates from the separation of ownership and control in organizations ([Berle and Means, 1932](#); [Fama and Jensen, 1983](#)). In this configuration, managers (the agents) might act in their own self-interest by maximizing their personal wealth and power to the detriment of the owners (the principals) ([Fama, 1980](#); [Jensen and Meckling, 1976](#)). In summary, according to [Fama and Jensen \(1983\)](#), the board of directors may be regarded as the “apex of the firm’s decision control system” (p.311).

‘Agency costs’ appear when managers pursue their own interests at the expense of the interests of shareholders ([Fama and Jensen, 1983](#)). From an agency theory standpoint, the board of directors is set up in order to monitor managers on behalf of shareholders ([Eisenhardt, 1989](#); [Jensen and Meckling, 1976](#)). Through the monitoring of management, boards serve as fiduciaries of shareholders, allowing shareholders’ interests to be safeguarded ([Johnson et al., 1996](#); [Zahra and Pearce, 1989](#)).

According to [Hillman and Dalziel \(2003\)](#), the monitoring conducted by the BoD might reduce agency costs inherent in the separation of ownership and control, which in turn may improve firm performance ([Fama, 1980](#); [Mizruchi, 1983](#)). In a recent study, [Post and Byron \(2015\)](#) stress that firms with a greater proportion of female directors on their boards are more likely to make stronger efforts to monitor management and have a greater tendency to ensure that CEO and executives are implementing the right strategy.

2.2. Agency theory in SMEs

Given that the majority of SMEs are closely held and owner-managed ([Bennedsen and Wolfenzon, 2000](#); [Hart, 1995](#)), it is reasonable to assume that agency problems are less likely to be present. Indeed, the owners have a direct and detailed insight of the firm’s operations ([Cowling, 2003](#)). Even if there is a manager in charge of the firm, shareholders have a direct link with him or her and are, therefore, well informed. In SMEs, the monitoring and oversight of corporate decisions is managed through the direct relationship between owners and managers. As a result, there is less need for the monitoring function of the board and many SME boards exist on paper only (e.g., [Huse, 2000](#)).

Since most SMEs are closely held and owner-managed ([Bennedsen and Wolfenzon, 2000](#); [Hart, 1995](#)), there is a concentration of ownership and a unification of ownership and management. Within this framework, [Carney \(2005\)](#) argues that managers suffer less pressure from outside investors or monitors who demand accountability and transparency. Furthermore,

within the SME population, family businesses are the predominant form of organization ([van den Heuvel et al., 2006](#)). Theoretically, agency problems should be less prevalent due to the high concentration of family ownership, that induce that the controlling shareholders already have sufficient incentives, power, and information to monitor the managers ([Jensen and Meckling, 1976](#)). However, this configuration of ownership structure can trigger other types of cost such as: asymmetric altruism, free-rider problems and family entrenchment ([Schulze et al., 2001](#); [Schulze et al., 2003](#)). Consequently, agency theory is likely to apply to SMEs.

2.3. Agency theory relative to board gender diversity

According to [Terjesen et al. \(2009\)](#), agency theory is one of the key theories that may explain how board gender diversity might contribute to board effectiveness and, ultimately, to firm performance.

From an agency theory perspective, women on corporate boards are hypothesized to have a significant influence on the dynamics of the boardroom. [Carter et al. \(2003\)](#) and [Virtanen \(2012\)](#) argue that female directors are, compared to their male counterparts, more likely to take active roles on the boards on which they serve. Specifically, numerous studies demonstrate that female directors are more likely to: (a) attend more meetings ([Adams and Ferreira, 2009](#)) for which they are generally better prepared ([Huse and Solberg, 2006](#)); (b) raise more questions than their male counterparts ([Carter et al., 2003](#)); and (c) debate issues ([Ingley and van der Walt 2005](#)). Consequently, women on corporate boards seem to boost the overall functioning of the BoD. Furthermore, as female directors have different educational and professional backgrounds than their male counterparts ([Dang et al., 2014](#)), they bring different resources to the board that significantly influence board decision-making. It is argued that this has an impact on firm performance ([Hillman and Dalziel, 2003](#)). Therefore, a great deal of research has been focused on the ‘business case for gender diversity’ and how it affects an organization’s overall financial performance ([Dang and Nguyen, 2016](#); [Terjesen et al., 2009](#)). Finally, one specific feature of female directors is that they are generally more independent than male directors ([Dang et al., 2014](#); [Nekhili and Gatfaoui, 2013](#)). [Carter et al. \(2003\)](#) suggest that a more diverse board may be a good monitor of managers because of its independent status. They will act independently; consequently, they are supposed to act in the best interests of the shareholders ([Adams and Ferreira, 2009](#); [Carter et al., 2003](#)).

2.4. Empirical evidence for the relationship between board gender diversity and firm performance among SMEs

[Post and Byron \(2015\)](#) performed a meta-analysis based on the results of 140 studies representing more than 90,000 firms in 35 countries. They conclude that board gender diversity is positively related to accounting measures of performance and this relationship is even stronger in countries in which shareholders have greater power. However, the relationship between board gender diversity and market measures of performance is practically non-existent. The results, therefore, provide some assurance with respect to the positive effect of board gender diversity on firm performance.

Although the relationship between board gender diversity and firm performance has attracted the attention of scholars worldwide, only two empirical studies have specifically examined the link between board gender diversity and firm performance among SMEs. This is a rather small amount of evidence given the importance of SMEs to the European economy and the importance of women’s representation on corporate boards worldwide. We discuss these two studies below.

[Mínguez-Vera and Martin \(2011\)](#) investigated the relationship between the gender diversity of the board and the financial performance of a sample of Spanish SMEs over the period 1998-2003 (N = 479,434). They find that women on corporate boards generate a negative and

significant impact (at the 1% level) on firm performance (measured by the return on equity [ROE]). In order to confirm the accuracy of this result, the authors also use the return on assets (ROA) as another, alternative, measure of firm performance which yielded the same result. Overall, they reach the same conclusion. One of the reasons put forward by the authors to explain this result is that female directors are more likely to implement less risky firm strategies. This appears to confirm the view that women tend to be more sensitive to risk and are more likely to adopt long-term strategies than male counterparts (cf. [Byrnes et al., 1999](#)). In the second study, [Martín-Ugedo and Mínguez-Vera \(2014\)](#) analyse non-financial Spanish SMEs over the period 2003-2008 and find that board gender diversity has a positive and significant impact on ROA, regardless of the measure of board gender diversity used.

The implications of the aforementioned investigations regarding the relationship between women on corporate boards and firm performance make it difficult to reach a conclusion. First, the reported results are mixed. Second, the econometric approach, data, and time periods considered are different, so the results are not easily comparable. Therefore, we argue that it is necessary to analyse the relationship between board gender diversity and firm performance (measured by Tobin's Q in this study) among SMEs specifically.

2.5. Hypothesis developed

Agency theory posits the need to align the interests of shareholders and managers. One oft-recommended solution is to increase the number of women on boards ([Adams and Ferreira, 2009](#); [Carter et al., 2010](#)). Indeed, board gender diversity can help to mitigate agency problems by monitoring and resolving conflicts of interest between managers and shareholders ([Adams and Ferreira, 2009](#)), which can, in turn, increase the quality of information available on the board or improve the decision-making made by the board (for instance, in investment decisions). Female directors may monitor management more effectively than their male counterparts ([Adams and Ferreira, 2004](#); [Huse and Solberg, 2006](#)), and might act as a control mechanism regarding management action. Consequently, agency costs arising from the separation of ownership and management might be reduced ([Adams and Ferreira, 2009](#); [Carter et al., 2010](#)). Regarding SMEs, as with independent directors, we argue that female directors may protect the assets of the firm and hold the managers accountable to the firm's various key stakeholders in order to promote the success of the firm and its survival ([Gabrielsson and Huse, 2005](#)).

In summary, as suggested by [Carter et al. \(2010\)](#), agency theory provides a solid indication that a link between board gender diversity and firm financial performance may exist. We argue that this also applies among SMEs. However, the nature of the relationship remains unclear, with the limited amount of empirical evidence ([Martín-Ugedo and Mínguez-Vera, 2014](#); [Mínguez-Vera and Martín, 2011](#)) regarding the relationship not providing a clear direction. Consequently, we state our hypothesis in a null format. Thus, we propose the following:

Hypothesis: All else being equal, board gender diversity is not related to the financial performance of a firm.

3. Methodology

3.1. Data and sample procedure

In the financial literature, the term 'small and medium-sized enterprise' is generally defined differently from one country to another (and even among financial institutions), taking into account different quantitative and firm characteristic variables (e.g., total assets or number of employees). Given the scope of this study, the focus is restricted to the definition suggested by

the European Commission (2003).³ Specifically, the European Commission defines SMEs “as enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or annual balance sheet total not exceeding EUR 43 million”. Within this framework, there are three categories of SME, defined as follows:

Table 1 Ceilings used for differentiating SMEs by size class

Enterprise category	Headcount	Turnover (€)	Balance sheet (€)
Medium-sized	< 250	≤ 50 million	≤ 43 million
Small	< 50	≤ 10 million	≤ 10 million
Micro	< 10	≤ 2 million	≤ 2 million

Source: European Commission, 2003

The initial sample in our study was drawn from SMEs listed on *Euronext* Paris for the period 2009-2014, and specifically on *Compartment C* (market capitalization of EUR 150 million or less) and *Alternext* (an unregulated market designated for SMEs), since, given their size criteria, these two segments are more likely to contain SMEs. Consistent with [Hermalin and Weisbach \(1998\)](#), we restricted our analysis to non-regulated industries to the extent that the boards of directors of these regulated firms are likely to be different from the boards of directors of non-regulated firms (e.g. [Baysinger and Zardkoohi, 1986](#); [Subrahmanyam et al., 1997](#)). Consequently, financial (SIC code 6000-6999) and utilities (SIC code 4900-4999) firms were excluded from the sample. Finally, consistent with [Martín-Ugedo and Mínguez-Vera \(2014\)](#), we excluded all companies for which we do not have all the relevant information (financial or governance).

As a result, the final sample consisted of a unbalanced panel of 126 firms for which information is available, representing 550 firm-year observations. The use of an unbalanced panel partially mitigates potential selection and survivor bias.

We obtained data for directors (gender) and other corporate governance variables from the French database *Artenia DataCG* (IODS) and from firms’ annual reports. Financial data came from the *Thomson ONE Banker* database.

3.2. Variables

Firm performance. Consistent with [Campbell and Mínguez-Vera \(2008\)](#) and [Martín-Ugedo and Mínguez-Vera \(2014\)](#), firm financial performance was operationalized as market-based performance using Tobin’s Q. Our proxy for Tobin’s Q is the approximation put forward by [Chung and Pruitt \(1994\)](#) and determined as follows: $Q = (MVE + PS + DEBT) / TA$.

where *MVE* is the product of a firm’s stock price and the number of common shares outstanding, *PS* represents the liquidating value of outstanding preferred shares, *DEBT* is the value of short-term liabilities, the net of short-term assets plus the book value of long-term assets, and *TA* represents the book value of total assets.

The reason for choosing Tobin’s Q over other performance measures, especially stock returns or accounting profitability measures (e.g., return on assets or return on equity), is due to the *ex-ante* nature of Tobin’s Q ([Lang and Stulz, 1994](#)).

In order to check normality, the Jarque-Bera test was employed, a hypothesis test taking into account the skewness and kurtosis of a random variable ([Gujarati and Porter, 2010](#)). Given that the results of the Jarque-Bera test showed a positive skewness exceeding the critical value at the 5% level, we used a natural logarithmic transformation for Tobin’s Q. Therefore, in this study, the exact form of Tobin’s Q is the log of Tobin’s Q.

³ Commission Recommendation 96/280/EC of 3 April 1996, updated in 2003/361/EC of 6 May 2003, enacted from 1 January 2005: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32003H0361>.

Board gender diversity. Board gender diversity was measured in several ways. First, consistent with [Carter et al. \(2003\)](#) and [Campbell and Mínguez-Vera \(2008\)](#), we used a dummy variable ($WOCB_1$), which equals 1 if there is at least one female director on a corporate board and 0 otherwise. Second, consistent with [Adams and Ferreira \(2009\)](#) and [Mínguez-Vera and Martín \(2011\)](#), we employed a variable relating to the percentage of women on corporate boards ($WOCB_2$) calculated as the number of female directors divided by the total number of directors. Finally, consistent with [Mínguez-Vera and Martín \(2011\)](#) and [Martín-Ugedo and Mínguez-Vera \(2014\)](#), we used [Blau's \(1977\)](#) index of heterogeneity ($WOCB_3$), measured as $(1 - \sum p_i^2)$, where p_i is the percentage of board members in each category i (in this case, male and female directors). The Blau index can range from 0 (when there is no female director on a corporate board) to 0.50 (which occurs when there is an equal number of female and male directors).

As mentioned previously, the information related to the board of directors was first provided by *Artenia DataCG*. We supplemented missing data by collecting information from the annual reports manually. Consistent with [Ahern and Dittmar \(2012\)](#) and [Hillman et al. \(2007\)](#), we identified the directors' gender in four steps. First, we used the annual report, which often provides this information (in the biography section). Second, we searched for gender-specific pronouns, such as 'she' or 'he'. Similarly, we looked for the following titles: 'Mr' and 'Mrs'. Third, we used the first name of the director to determine his or her gender (e.g., Jacques = male and Sophie = female). Fourth, we 'Googled' the names of directors when we could not be sure of the gender from the name alone.

Control variables. Following prior studies, such as [Bebchuk and Cohen \(2005\)](#) and [Bhagat and Bolton \(2008\)](#), we checked for firm and board characteristics that may affect both Tobin's Q and board gender diversity.

Specifically, in Equ. [1], we first include the size of the firm (approximated using the natural logarithm of total assets) ([Hillman et al., 2007](#)). Firm size is a key driver of firm value and firm performance. However, firm size is also associated with higher costs of monitoring to the extent that larger firms are more complex to lead. Consistent with the existing literature, we expected a negative relationship between size and firm financial performance (e.g. [Adams and Ferreira, 2009](#); [Carter et al., 2010](#)). Second, we include *leverage* (calculated as the ratio of long-term debt divided by total assets; cf. [Bhagat and Bolton, 2008](#)). According to [Shleifer and Vishny \(1997\)](#), leverage is an important governance mechanism to force managers to generate enough cash flow in order to pay the interest and the principal. This will then mitigate agency conflicts resulting from cash flow. As a result, we expected a negative relationship between leverage and firm financial performance ([Campbell and Mínguez-Vera, 2008](#)). Finally, we included the economic performance of the firm measured by the ROA (calculated as the annual net income divided by the book value of total assets at the end of the year) ([Carter et al., 2010](#)). The underlying assumption here is that firm financial performance is correlated with firm economic performance ([Carter et al., 2003](#); [Campbell and Mínguez-Vera, 2008](#)). Consistent with these studies, we expected a positive relationship between a firm's economic performance and its financial performance.

In Equ. [2], we included *firm size* and *board size* as our control variables. According to [Hillman et al. \(2007\)](#), firm size is positively associated with female representation on boards of directors. Numerous studies have confirmed this link (e.g., [Adams and Ferreira, 2009](#); [Carter et al., 2010](#)). Consequently, we expected a positive relationship between female representation on corporate boards and firm size. Furthermore, we included *board size* (calculated as the number of directors on the board) ([Yermack, 1996](#)) in the model as larger boards are more likely to appoint female directors simply due to the greater number of positions available. This view is supported by empirical evidence (e.g., [Adams and Ferreira, 2009](#); [Campbell](#)

and Mínguez-Vera, 2008). Consequently, we expected a positive relationship between female representation on corporate boards and board size.

3.3. Empirical models and estimation methods

3.3.1. Empirical models

Consistent with Campbell and Mínguez-Vera (2008), we estimated the following model:

$$\begin{cases} \ln(Q)_{i,t} = \alpha + \beta_1 (\text{WOCB})_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t} & [1] \\ (\text{WOCB})_{i,t} = \alpha + \beta_1 \ln(Q)_{i,t} + \beta_2 Z_{i,t} + \varepsilon_{i,t} & [2] \end{cases}$$

where i denotes firms in the sample ($i = 1, 2, \dots, 126$); t refers to time period ($t = 2009, 2010, \dots, 2014$); X_i and Z_i are vectors of control variables and instruments influencing the dependent variables, and ε_i is the error term.

3.3.2. Estimation methods

Consistent with Campbell and Mínguez-Vera (2008), we used panel data methodology as it provides a more reliable analysis than single cross-sectional data. Indeed, it is more powerful in verifying unobservable heterogeneity and omitting variable biases.

To test the existence of any correlation between unobservable heterogeneity and the explanatory variables, we used the Hausman test (Mínguez-Vera and Martin, 2011). In essence, this test examines the equality of the coefficients of the fixed effects and the random effects estimations. The null hypothesis suggests that the coefficients of both models are similar. If this hypothesis is rejected, the coefficients will differ markedly among themselves, with only the intragroup estimation (fixed effects) being consistent (Campbell and Mínguez-Vera, 2008).

In this study, we used simultaneous equations, which are commonly used in the corporate governance literature (e.g., Beiner et al., 2006; Bhagat and Bolton, 2008) in order to take into account the potential endogenous relationships between variables. Endogeneity generally arises when there are reverse relationships between the variables. For instance, while good corporate governance may lead to improved firm value, companies that are performing poorly may also try to improve their corporate governance situation in an effort to improve performance. Specifically, a reverse relationship could exist between board gender diversity and firm performance (Adams and Ferreira, 2009). Female directors may create value but it is also possible that profitable firms are more willing to ‘take the risk’ of appointing female directors. Demsetz and Villalonga (2001) and Campbell and Mínguez-Vera (2008), among others, removed the endogeneity problem by using systems of simultaneous equations. Consequently, consistent with Campbell and Mínguez-Vera (2008), we carried out the estimation with panel data using 2SLS.

Finally, as advocated by Gujarati and Porter (2010), we used robust standard errors in all our specifications.

Based on previous literature (e.g., Campbell and Mínguez-Vera, 2008), in Equ. [1] the vector $X_{i,t}$ represents the following control variables: leverage, ROA and firm size, while in Equ. [2] the control variables, $Z_{i,t}$, are board size and firm size.

3.4. Descriptive statistics and correlation analysis

Table 2 presents descriptive statistics of all the variables. The most important figures in Table 2 are the mean (median) percentage of women on French SMEs’ board of directors: 14.65% (12.50%). In addition, 51.30% of our sample firms had one or more female directors. In comparison, for instance, Mínguez-Vera and Martin (2011) report approximately 11% of board seats on Spanish SMEs’ are held by female directors. These figures suggest inequalities between the number of men and women on the corporate boards of SMEs.

Table 2 Summary statistics

	Mean	Median	Standard deviation
Ln (Q)	-0.259	-0.343	1.185
WOCB ₁	0.513	1.000	0.500
WOCB ₂ (%)	14.650	12.500	18.327
WOCB ₃	0.183	0.198	0.190
Firm size	2.777	2.899	0.709
Leverage (%)	14.039	9.913	16.567
Return on assets	-5.419	0.594	34.587
Board size	4.913	5.000	1.593

Table 3 provides the correlation matrix. As a rule of thumb, a correlation of 0.70 may indicate a multicollinearity issue. Table 3 indicates that the highest correlation coefficient is 0.94 (in bold) between the dummy variable of women on corporate boards (WOCB₁) and the Blau index of diversity (WOCB₃). As we used these two measures alternately as our coefficient of primary interest, this high correlation is not an issue. In order to confirm this result, we generated the variance inflation factor (VIF). The highest observed VIF value in our study variables is 1.08, which is well below the conventional cut-off of 10.0 (Chatterjee and Hadi, 2012). Consequently, we concluded that multicollinearity had little impact on our further analyses.

Table 3 Correlation matrix

	1	2	3	4	5	6	7	8
1. Ln (Q)	1.000							
2. WOCB ₁	-0.020	1.000						
3. WOCB ₂	-0.072	0.780***	1.000					
4. WOCB ₃	-0.035	0.940***	0.772***	1.000				
5. Firm size	-0.237***	0.039	-0.046	0.042	1.000			
6. Leverage	0.006	0.109**	0.109**	0.157***	0.021	1.000		
7. Return on assets	-0.129***	-0.045	0.017	-0.017	0.019	-0.002	1.000	
8. Board size	0.195***	0.173***	-0.024	0.083	0.082	-0.096**	-0.171***	1.000
VIF	1.07	1.05	1.01	1.04	1.01	1.03	1.03	1.08

4. Empirical results

The results of Equ. [1] and [2] are presented in Table 4. In model 1 of Table 4, we present the effect of the presence of women on corporate boards (WOCB₁) on firm performance, while in model 2 we report the effect of the percentage of women on corporate boards (WOCB₂). Finally, model 3 shows the effect of the Blau index of diversity on firm performance (WOCB₃). All of the estimations were carried out using fixed effects, since the Hausman test was significant.

Overall, the results from Table 4 show that the coefficients related to women on corporate boards are not different from zero, which suggests that there is no evidence of a significant link between firm performance and board gender diversity among French listed SMEs. Our null hypothesis cannot be rejected at the 10% level. Consequently, our hypothesis is supported.

Our results contrast with the work of Mínguez-Vera and Martín (2011) and Martín-Ugedo and Mínguez-Vera (2014), who find a negative and a positive relationship between board gender diversity and firm performance among Spanish SMEs, respectively. In contrast, our results are consistent with some studies on large and quoted firms (e.g., Carter et al., 2010; Rose, 2007) that find no significant relationship between firm financial performance and women on corporate boards.

As far as the control variables are concerned, we notice that, consistent with previous studies (e.g., [Adams and Ferreira, 2009](#); [Martín-Ugedo and Mínguez-Vera, 2014](#)), firm size has a negative and significant effect (at the 1% level) on firm financial performance in all three models. This result suggests that smaller SMEs are more profitable than larger ones. In contrast, unlike existing studies, the leverage and ROA were not significantly correlated with Tobin's Q (at the 10% level). This is contrary to our expectations.

If we look at the control variables in Equ. [2], we find that board size is positively and significantly related to women on corporate boards (at the 1% level). This is consistent with [Campbell and Mínguez-Vera \(2008\)](#) and [Mínguez-Vera and Martin \(2011\)](#). This suggests that larger boards are more likely to have women sitting on them. Furthermore, we find that the size of a firm is not significantly correlated with female representation on corporate boards. To explain this surprising result, *a priori*, we argue that the size of firms in our sample (measured by the natural logarithm of total assets) is relatively low. According to [Table 2](#), SMEs in our sample have a size equal to 2.78 against 13.57 and 14.59, respectively, for [Mínguez-Vera and Martin, 2011](#) and [Martín-Ugedo and Mínguez-Vera, 2014](#). Similarly, the non-significant relationship between the representation of women on corporate boards and Tobin's Q is probably explained by the relatively poor performance of the firms in our sample. Specifically, the Tobin's Q of the firms in our sample is equal to 0.26 (logarithmic value). This figure implies, therefore, that the SMEs in our sample have a Tobin's Q below 1. This suggests that the market value of the company is less than the total asset value, indicating that it is undervalued.

Consequently, when considering the idiosyncratic characteristics of the firms in our sample, our results seem somewhat logical.

Table 4 2SLS estimates of the relationship between firm value and women on corporate boards

	Model 1		Model 2		Model 3	
	Ln (Q)	WOCB ₁	Ln (Q)	WOCB ₂	Ln (Q)	WOCB ₃
Constant	5.870*** (4.49)	-0.368 (-1.65)	5.827*** (4.46)	-0.038 (-0.65)	5.843*** (4.50)	-0.107 (-1.30)
Ln (Q)		0.047 (1.28)		0.013 (1.33)		
Leverage	-0.002 (-0.13)		-0.002 (-0.18)		-0.002 (-0.17)	
ROA	-0.003 (-0.81)		-0.004 (-0.80)		-0.003 (-0.81)	
Firm size	-1.535*** (-3.26)	0.050 (0.84)	-1.543*** (-3.31)	0.017 (1.15)	-1.541*** (-3.32)	0.028 (1.28)
Board size		0.153*** (5.02)		0.029*** (3.50)		0.044*** (4.07)
WOCB ₁	-0.069 (-0.36)					
WOCB ₂			0.245 (0.27)			
WOCB ₃					0.063 (0.10)	
N	550	550	550	550	550	550
R ²	0.080	0.123	0.080	0.070	0.079	0.093
F-statistic	4.96***	9.51***	5.04***	5.05***	6.10***	6.78***
Hausman test	16.92***	15.46***	16.58***	17.29***	16.48***	15.37***

The *t* values are in parentheses. Asterisks indicate significance at the 0.01 (***) level. Regressions are with robust standard errors.

5. Concluding remarks

The purpose of this study was to examine the business case for board gender diversity among French SMEs listed on *Euronext* Paris. Specifically, we examined the relationship between the female representation on corporate boards (measured in different ways) and firm financial performance (measured by Tobin's Q).

To achieve this, and consistent with [Campbell and Mínguez-Vera \(2008\)](#) and [Mínguez-Vera and Martín \(2011\)](#), we conducted our analysis by applying a panel data methodology (in order to control potential biases in the estimation procedure) and, more precisely, a simultaneous equations framework. Our sample consisted of an unbalanced panel of 126 SMEs firms listed on *Euronext* Paris (N = 550 firm-year observations) over the period 2009-2014.

In contrast to existing studies ([Martín-Ugedo and Mínguez-Vera, 2014](#); [Mínguez-Vera and Martín, 2011](#)), we do not find any significant relationship between women on corporate boards and financial performance among SMEs. However, our results are consistent with studies on large listed companies, such as [Rose \(2007\)](#) or [Carter et al. \(2010\)](#). Surprisingly, regarding the control variables in Equ. [2], we find that neither the size of a firm nor its financial performance is significantly correlated with the representation of women on corporate boards.

It is important to underline what our study does not find. First, we do not establish any significant negative link between board gender diversity and firm financial performance. As such, our study does not invalidate the business case hypothesis for board gender diversity (Robinson and Dechant, 1997). Second, we do not find any empirical evidence regarding the existence of a causal link between board gender diversity and firm financial performance, whether positive or negative. Models 1, 2 and 3 reveal that the coefficients for female representation on corporate boards are not significantly different from 0 (at the 10% level). This suggests that there is no evidence of a significant link between board gender diversity and the firm's financial performance.

We consider the following reasons for the mixed evidence that our study provides. First, in a sample of French listed companies (SBF 120), Dang and Nguyen (2016) find that the impact of board gender diversity on firm performance differs across quantiles and depends on the measure of performance under consideration. In essence, they find that board gender diversity negatively affects Tobin's Q but has a positive effect on ROA when these variables are high and low, respectively. Table 2 shows that the SMEs in our sample are not, on average, very profitable, unlike the firms in the studies of Mínguez-Vera and Martín-Ugedo (2011) and Martín-Ugedo and Mínguez-Vera (2014). This may explain why the relationship is not significant at the 10% level. Second, in this study, we used Tobin's Q as our proxy for firm financial performance. This is consistent with existing studies in corporate governance (e.g., Anderson and Reeb, 2003 or Gompers et al., 2001). However, Mínguez-Vera and Martín-Ugedo (2011) and Martín-Ugedo and Mínguez-Vera (2014) used accounting measures of firm performance: ROE and ROA, respectively. Carter et al. (2010) argue that these measures assess different aspects of firm performance. Theoretically, as Tobin's Q is a market-based measure of firm performance, its metric encompasses a forecast of future cash flow produced by the firm as well as a market assessment of a firm's investment opportunity. Consequently, Bhagat and Bolton (2008) argue that Tobin's Q may be subject to investor anticipation. Specifically, if investors anticipate any effect of corporate governance on firm financial performance, long-term stock returns will not be correlated with governance, even if an actual correlation exists. On the other hand, ROA is an indication of the ability of a firm to generate accounting-based revenues in excess of actual expenses from a given portfolio of assets measured on a historical cost basis. ROA is, therefore, a measure of the accounting income produced for the shareholders (Carter et al., 2010). Furthermore, Venkatraman and Grant (1986) argue that Tobin's Q and ROA may, as measures of firm performance, be unrelated because of the conflicts between short-term and long-term economic goals. Consequently, Richard et al. (2009) question if Tobin's Q and ROA (or ROE) can be treated as equivalent, interchangeable measures of firm financial performance. Our contrasting results may be due to the non-convergence of accounting profitability and market performance as measures of firm performance. Third, there might be a threshold number of female directors needed before they can significantly influence a board's decisions and, ultimately, firm performance (Joecks et al., 2013; Rose, 2007). Critical mass theory (Granovetter, 1978; Kanter, 1977) suggests that the nature of group interactions depends upon size. When the size of the relevant subgroup reaches a certain threshold, or critical mass, the subgroup may influence the group's decision-making. Taking up this line of argument, Konrad et al. (2008) argue that when there are three or more female directors, they can exert a positive influence on firm decisions which, in turn, improves the firm's future performance (Joecks et al., 2013). In our sample, all firms have, on average, only one female director on their corporate boards, as a mean board size equals five board members.⁴ Consequently, the non-significance of our results may be due to the low number of female directors in our sample.

⁴ These figures are available from the authors upon request.

This study is, to the best of our knowledge, the first to examine the effect of corporate board gender diversity on SMEs in the French context. Some other studies (e.g., [Dardour et al. 2015](#); [Toumi et al., 2016](#)) have examined board gender diversity aspects within French listed firms. However, SMEs are important to the economic and industrial fabric because of their weight (the number of firms and the turnover generated) and also in terms of employment. Furthermore, we contribute to the literature by showing that the presence of women on corporate boards does not influence firm financial performance in a straightforward manner ([Triana et al., 2014](#)), as cultural bias ([Carrasco et al., 2015](#)), national institutional systems ([Grosvold and Brammer, 2011](#)) or sample specificities may mediate or moderate the relationship. The non-significance of our results may be explained by these factors.

Our results offer some managerial insights and policy implications. Findings from this study do not support the business case for board gender diversity in SMEs. However, we do not find any evidence of any negative effect either. Overall, our results suggest that the decision related to the appointment of female directors on corporate boards should be based on criteria other than future financial performance.

One policy implication from our study is, therefore, that more research is needed in order to understand the effect of board gender diversity on firm performance among SMEs, with particularly emphasis on any distinction between listed and non-listed SMEs. Furthermore, case studies could reveal interesting insights regarding, for instance, the appointment of female directors in SMEs or their influence on a firm's decision-making, since quantitative studies may not capture the whole picture ([Rose, 2007](#)). Further qualitative studies may complement existing studies and knowledge (e.g., [Hillman et al., 2007](#)) to better understand the motivations of companies to appoint women to boards. Less tangible elements, such as company culture, may play an important role. What about French national culture? To what extent is French culture a facilitating or a hindering factor? And what about high profile female managers? Studies have confirmed the existence of career barriers with respect to female career advancement in French organizations ([Naschberger et al., 2012](#)). In addition, differences among sectors may also be observed. Further studies could also be undertaken of larger companies because, as required under *Copé-Zimmerman* law enacted in 2011, listed companies should have 40% of women on their BoD by 2017. If there are more women on a board, do the results stay the same or do they change in a significant manner? Therefore, further research may help answer the puzzle.

As usual, our study also has several limitations. First, it is important to underline that our sample of SMEs may not represent all French SMEs, as only a minority of firms are publicly listed. [Rameix and Giami's \(2011\)](#) report stresses that few SMEs are listed publicly due to cost. Consequently, our results may not apply to all SMEs, in particular, those that are not listed. Second, in covering a period of six years, our analysis is based on a relatively short window of time. Further studies could cover a longer time span. Third, according to [Sraer and Thesmar \(2007\)](#), 70% of firms listed on *Euronext* Paris are family-owned and controlled. It is, therefore, possible that family ownership may influence the relationship between board gender diversity and firm financial performance in SMEs. We did not consider this facet because of the lack of reliable information on the ownership structure of the firms in our sample. While [Martín-Ugedo and Mínguez-Vera \(2014\)](#) find that family-owned firms do not exhibit any statistical influence on firm performance, in our opinion, this result needs further confirmation.

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