Director fit matters: Evidence from board gender quota in France

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Abstract

There are three opposing perspectives regarding the contribution of board gender diversity to the firm's financial performance: positive impact, negative impact, and no relationship. Scholars have suggested several factors explaining these contradictory results. However, a significant omission is how the board's social dynamics shapes the contribution of female directors to board decision-making, and ultimately to the firm's financial performance. Our study attends to this issue by employing the theories of similarity-attraction, social identity, and person-group fit. Using board gender quota law in France as an exogenous policy shock, we find a differential negative cross-country impact of women on corporate boards on financial performance (measured either by Tobin's Q or return-on-assets) after the introduction of the gender quota. This impact is explained by the fit between new female directors and existing directors, which is defined as the similarity between them in terms of demographics (age and nationality), human capital (top executive, functional and industrial background), and social capital (educational and elite school background). Overall, our results suggest that a decrease in fit of the female directors following the gender quota contributed to a negative effect of women on boards on financial performance. We shed new light on the challenge of leveraging board gender diversity by offering a new explanation for the contradictory empirical results related to women on corporate boards and financial performance.

Keywords: *Board gender diversity*; *Gender quota*; *Firm performance*; *France*,

The relationship between women on corporates board (WOCB) and financial performance (FP) is a prominent issue in the corporate governance literature (e.g., Kirsch, 2018; Zattoni et al., 2023). After two decades of research, there is still no clear answer as to whether board gender diversity is beneficial for the firm's financial performance (Kirsch, 2018; Nguyen et al, 2020). From a theoretical perspective, upper echelons theory, agency theory, and resource dependence theory argue for the business case of WOCB, while critical mass theory, configurational theory and contingency theory put forward counter-arguments, highlighting the contingent nature of the WOCB-FB relationship. Empirical research mirrors these diverse perspectives. For instance, Kirsch (2018) or Nguyen et al. (2020) document three opposing streams: positive impact, negative impact, and no role for WOCB in a firm's FP.

To promote gender equality, several countries, such as Norway and Belgium, adopted a "*hard*" approach of implementing a board gender quota by relying on penalties or financial sanctions.[1] France followed their footsteps by introducing in January 2011 the *Copé-*

[1] A country may adopt a "hard" or "soft" approach in introducing board gender quotas. The former refers to binding instruments forcing firms to achieve a quota of female directors under the penalty of sanctions such as

Zimmermann law, which imposes on companies a quota of 20% of women directors on corporate boards by 2014 and 40% by 2017. In this context, empirical research has investigated the WOCB-FP relationship in such "*hard*" gender quota environments and suffered from the same indecisive conclusion. Some studies reported a negative effect of WOCB on FP on the law's announcement and in the following years (Ahern and Dittmar, 2012; Matsa and Miller, 2013; Yang et al.,2019). Some others provided evidence of positive effects (Greene et al., 2020) or no role for WOCB in a firm's FP (Eckbo et al., 2022; Dale-Olsen et al., 2013). The empirical research in France shows similar inconclusive results, with studies reporting both a positive relationship (Sarang et al., 2023; Sabatier, 2015) and a negative relationship (Comi et al., 2020; Labelle et al., 2015).

These contradictory results can be explained by endogenous factors, such as prior performance (Conyon & He, 2017) and industry type (Frink et al., 2003), or exogenous factors such national culture (Hoobler et al., 2018), and specific features of gender quota law in the country (Comi et al., 2020). However, scholars have omitted the fact that a board of directors is a social group, in which gender diversity enhances decision-making, but also triggers social categorization that leads to negative consequences due to bias and lack of cohesion within the board (Havrylyshyn et al., 2022).

Therefore, our study aims to attend to this omission by examining the WOCB-FP relationship in the French context based on the theories of similarity-attraction (Byrne, 1971) and social identity (Ashforth & Mael, 1989; Tajfel & Turner, 1986), and by the person-group fit literature (Seong et al., 2015). We extend the literature by adopting the perspective that people categorize themselves and others according to social categories based on different attributes. People resist out-group members' influence and devalue their inputs during group decision-making. With corporate boards typically being homogeneous groups of corporate elites (Singh et al., 2008), the effective integration and contribution of newly appointed female directors may largely depend on their alignment with the existing members in terms of certain characteristics. Thus, women directors' contribution to the firm's financial performance depends on whether they fit with the incumbents. Fit is defined here as the similarity in three dimensions: demographics (age and nationality), human capital (top executive, functional and industrial background), and social capital (education and elite school background) (Johnson et al., 2013; Zattoni et al., 2022).

We employ a difference-in-differences (DiD) estimation approach to study changes in the impact of WOCB on financial performance after the gender quota in France relative to firms unaffected by the quota law. Our main sample is comprised of the French firms listed in the SBF 120 (treatment group), which we compare with firms in the S&P 500 (control group). We chose the US as the control group because in contrast to European countries that are culturally and institutionally closer to France, there were no requirements for companies to have women on boards in the US before California implemented gender quotas in 2018. We use a sample of US firms matched by size, industry, and return on assets (ROA) prior to the implementation of the quota law and keep this sample for the post-law period. The study period is from 2006 to 2017. Our methodology is similar to that of Ginglinger and Raskopf (2023), who used the adoption of board gender quotas in France as a natural experiment and considered a matched US sample comparable to the French sample. They justify their methodology and the use of a control group of US firms on two grounds: during the same time period, most European countries implemented board gender quotas or adopted soft laws; French and US boards share similar characteristics (Ferreira et al., 2018).

The results of the univariate and multivariate analyses lead us to conclude that the decrease in *fit* of the WOCB following the gender quota in France contributes to a decrease in the

delisting (in Norway) or nullity of appointments (in Belgium); the latter is non-binding and requires firms to explain their governance practices (as in Denmark, Ireland, Greece or the UK).

impact of WOCB on FP. Specifically, we provide evidence that changes in the demographic, social, and human capital fit of WOCB negatively impacted ROA and Tobin's q. The contribution of our work is three-fold. First, we shed new light on the discussion about WOCB-FP by offering a new explanation for the contradictory empirical results related to this relationship. We find that the WOCB-FP relationship following enactment of the gender quota depends on the *fit* between new female directors and incumbent directors. This result goes further than the extant studies (e.g., Ahern & Dittmar, 2012), which consider the attributes of expertise and experience but do not take into consideration the complex nature of the relationships between board members generated by their *fit*. Second, as most existing empirical studies rely principally on the Norwegian context, our study adds to the empirical literature by providing insights about the WOCB-FP relationship in France, which has not been studied as extensively. Third, by using the implementation of the gender quota law as a quasi-natural experiment, our empirical approach addresses the endogeneity concern that is inherent in studies of the WOCB-FP relationship.

The remainder of the article is as follows. We first present the theoretical framework and hypotheses before describing the research design (sample construction and variables). We then present estimation methods and empirical results. The paper ends with a discussion and concluding remarks.

Theoretical framework and hypotheses development

Theoretical perspectives on WOCB and FP

Different theoretical perspectives provide diverse points of view about the contribution of WOCB to FP. The theories most used to study the WOCB-FB relationship include upper echelons theory, agency theory, resource dependence theory, critical mass theory, and configurational theory/contingency theory (Kirsch, 2018; Nguyen et al., 2020).

From the perspective of upper echelon theory, Graham et al. (2017) suggest that firms should recruit female directors because WOCB can help in making more balanced and better decisions. Women have different norms, behavior, beliefs and perspectives that can be beneficial for decision-making strategy. For example, the participation of women in boards can help avoid too risky projects as they are generally more risk-averse (Byrnes et al., 1999) and less overconfident (Barber & Odean, 2001). These differences contribute to improving governance practices and decision-making and ultimately the firm's performance (Joecks et al., 2013). Similarly, agency theory and resource dependence theory consider women directors useful resources for the firm. They are more vigilant in monitoring the firm (Adams and Ferreira, 2009), bring important advice, counsel, and legitimacy, and help the firm establish connections with influential figures in the community (Hillman et al., 2007). Thus, WOCB can help improve FP through their ability to better advise and monitor managers and thereby minimize agency costs (Reguera-Alvarado et al., 2017). They also contribute by bringing their skills in risk management, regulatory/legal/compliance, political/government, human resources, sustainability and/or corporate governance, which male directors do not necessarily possess (Kim and Starks, 2016).

Other theories provide a more nuanced perspective on the link between WOCB and FP, discussing the conditions for a positive relationship. First, according to critical mass theory, a sub-group of people may be able to affect the decisions of the group as a whole only when it reaches a certain critical mass in terms of size (Torchia et al., 2011). More specifically, when there are one or two female directors, they are simply tokens or presences. Only when there are three or more of them can female directors have a positive impact on firm performance (Liu et al., 2014). Second, both contingency theory and configurational theory suggest that the

impact of WOCB on FP is dependent upon the context/situation and the relationship should not be studied in isolation from other factors such as board characteristics. For example, Pandey et al. (2022), based on a sample of 204 non-financial firms listed on the Bombay Stock Exchange, found that the impact of WOCB on FP depends on other board and firm characteristics. In some configurations, WOCB are associated with stronger firm financial performance, while in others the relationship is negative.

WOCB and FP in hard gender quota environment

Mirroring the plurality of theoretical perspectives on the WOCB-FB relationship, empirical research is inconclusive regarding this issue, with studies reporting mixed findings, including positive, negative, or no relationship (for a review see Kirsch, 2018; Nguyen et al., 2020). In the context of a hard gender quota environment, the empirical results are also contradictory. Ahern and Dittmar (2012) found a significant drop in the stock price on the announcement of the quota law in Norway and a large decline in Tobin's q over the following years. Similarly, Matsa and Miller (2013) reported a decrease of 4% in the ratio of operating profits to assets among firms affected by quota constraints, while Yang et al. (2020) revealed a negative effect of mandated female representation on firm performance, which is measured by operating income divided by assets, return-on-assets, market-to-book ratio, and Tobin's q. In the US, Greene et al. (2020) also found a negative market reaction following the first mandated board quota in the State of California.

The above results are contested by other empirical studies, which argue that WOCB can contribute to economic gains of the firm. The work of Campbell and Mínguez-Vera (2008) suggested that investors in Spain did not penalize companies with a gender-diverse board. The increase in female board membership generates gains in terms of firm value. Similarly, Allen and Wahid (2024) suggested non-negative (if not positive) consequences to California firms arising from SB826, countering the claims that board gender quotas are detrimental to firm value. Ferrari et al. (2022) and Gordini and Rancati (2017) shared a similar point of view, providing evidence of the significant impact of WOCB on Italian listed firms' financial indicators such as Tobin's q.

Other research rather emphasizes the insignificant WOCB-FB relationship. For example, Dale-Olsen et al. (2013) found that the impact of the reform in Norway on firm performance was negligible. Return on total assets and operating revenues and costs did not experience changes due to imposed gender quotas. In a more recent study, Eckbo et al. (2022) replicated the work of Ahern and Dittmar (2012) and observed that the valuation effect of Norway's quota law was statistically insignificant, arguing that the drop identified previously was probably due to firm characteristics and the macroeconomic environment (for example, the financial crisis).

In the case of France, the conclusion also remains an open issue. Sarang et al. (2023) reported that women directors helped to reduce the cost of equity for French firms. The positive relationship between WOCB and FP, which was measured by return on equity, return-on-assets, Tobin's q, was confirmed in the study of French firms listed in the CAC40 by Sabatier (2015). By contrast, Comi et al. (2020) found a negative impact of WOCB on firm profitability in a multi-country study of Belgium, France, Italy and Spain. Labelle et al. (2015) supported this result in their cross-country analysis of countries adopting soft and hard gender quotas.

Leveraging the potential of board gender diversity: issues and challenges

The literature has provided some explanations for the contradictory results of the WOCB-FB relationship, arguing that such a relationship depends on a number of factors. The endogenous factors include prior performance (Conyon & He, 2017), industry type (Frink et al., 2003),

and critical mass of WOCB (Torchia et al., 2011). The exogenous factors include the degree of cultural egalitarianism in the focal firm's country (Hoobler et al., 2018), the design of the law across the countries studied (Comi et al., 2020), and the national context of gender parity and shareholder protection of the focal firm (Post & Byron, 2015). In addition, the methodology used in empirical analysis also influences results (Yang et al., 2019)

In this paper, we argue that the effectiveness of WOCB depends on their inclusion and integration in board activities. Scholars have pointed out that the board of directors is a dynamic social group, in which members interact with one another and engage in social categorization and intergroup bias (Zhu et al., 2014). The contributions of women directors are only useful if they are included in board decision-making. This perspective is largely absent from the literature on WOCB-FP, which is a significant omission (Havrylyshyn et al., 2022)

Considering the board of directors as a social group, diversity can lead simultaneously to two different pathways that influence whether women directors can truly contribute to generating positive outcomes for the firm (Havrylyshyn et al., 2022). On the one hand, it can lead to more diverse perspectives, and thus richer group discussion and improved decision-making. On the other hand, it can trigger social categorization that causes bias and reduced cohesion within the board and ultimately have a negative impact on governance. In other words, there are two perspectives related to the presence of WOCB: (i) the business case for board gender diversity; new members can contribute to positive group attitude and performance only when they are similar to the incumbents (Kristof, 1996) or (ii) a high level of heterogeneity within an organization or group may even lead to an increase in conflicts and turnover rate, a decrease on the level of social integration, and ultimately lower performance (Williams & O'Reilly, 1998). The WOCB-FB relationship therefore depends on the number of female directors, as well as social interactions and relationships between board directors.

Given these challenges – one related to improving board gender diversity and the other to the useful contributions of women directors to the firm's performance – it is useful to consider when and how some boards are more likely to benefit from the inclusion of female members, especially in the context of gender quota law. In the next section, we mobilize similarity-attraction theory (Byrne, 1971) and social identity theory (Ashforth & Mael, 1989; Tajfel & Turner, 1986), and person-group fit literature (Seong et al., 2015) to theorize how board gender diversity can lead the board to recalibrate differently according to the fit between new female directors and existing directors. These theories have rarely been used in research on the WOCB-FP relationship (Kirsch, 2018; Nguyen et al., 2020).

The fit between new female directors and existing directors: impact of board gender diversity on financial performance

According to the theories of similarity-attraction (Byrne, 1971) and social identity (Ashforth & Mael, 1989; Tajfel & Turner, 1986), and the person-group fit literature (Seong et al., 2015), current directors prefer to work and surround themselves with people who are similar to them. This perspective is empirically supported by the study of Gregorič et al. (2017), which found that the diversity level of male board members influences the number of female directors on boards, implying that the incumbents exhibit resistance toward diversity.

New directors, including female directors, are often recruited based on their fit with the board incumbents along three dimensions: demographics, human capital, and social capital (Johnson et al., 2013). Demographics include factors such as age, gender, and nationality; human capital characteristics are skills and experience that directors bring to the decision-making process, which often come from previous occupations; social capital is derived from directors' social relationships originating from their ties with other firms and their social standing. The fit between the new entrants and the existing members of the board means that

there is a compatibility between them regarding these characteristics (Johnson et al., 2013; Kristof, 1996).

However, the introduction of gender quotas disrupts this director selection process. In order to comply with the gender quota, some companies have appointed female directors regardless of their knowledge and experience (Ahern & Dittmar, 2012). Although the supply of qualified female director candidates can be high enough to avoid the appointment of unqualified female directors (Eckbo et al., 2022), gender quota laws may lead to the recruitment of new female directors who are not necessarily similar to the incumbents. For example, evidence from Norway and Spain shows that, on average, they have significantly less experience (as CEO, for example) and tend to be younger than existing male directors (Ahern & Dittmar, 2012; Bertrand et al., 2019; Bøhren & Staubo, 2014). In contrast, their education exceeds that of male directors after the gender quota, but not before (Bertrand et al., 2019). They are also more visible in the media than their male counterparts (de Anca & Gabaldon, 2014). In California, there is no observable decline in quality of newly appointed female directors following the Senate Bill 826, but their age, network size, achievements, and professional activities are of a lower level than the female directors recruited before the regulation (Allen and Wahid, 2024).

Therefore, it appears that the adoption of a board gender quota leads to upheavals within the board. New female directors are likely to have demographic characteristics, human and social capital that differ from those of existing directors. We propose the following:

Hypothesis 1: All else being equal, the fit between new female directors and the incumbents in terms of demographics, human capital, and social capital changes after board gender quotas.

WOCB have an impact on the FP of the firm, whether it is positive or negative, as documented in the literature (Kirsch, 2018; Nguyen et al., 2020). Following the implementation of gender quota law, a higher number of WOCB will modify this relationship, in one way or another. Specifically, the literature highlights that gender quotas entail costs to meet the quota requirements. Bøhren and Staubo (2014) document evidence of high costs associated with making boards compliant with gender quota, which they label "*compliance costs*": (a) costs for searching for new directors; (b) increased compensation costs for these new directors; and (c) reduced private benefits for owners. There are also costs related to the trade-off between monitoring and advice within the board when women directors are recruited to comply with the law. In other words, as female directors have the status of independent director more often than their male counterparts, there is a shift in boards' skills from advice to monitoring when more women are in the board, leading to inefficiencies at both the organization and board levels (Bøhren & Staubo, 2014).

In addition, the lack of female candidates in the pipeline for board appointments is the most frequently cited reason to explain the under-representation of WOCB (Gabaldon et al., 2016). As such, if demand exceeds supply, firms subject to the gender quota face problems in optimizing new female directors' appointments (Greene et al., 2020). Therefore, firms that are not already in compliance will have difficulty finding female candidates, as the best candidates are already taken or are busy with their existing directorships. There is no guarantee that these new directors are as qualified as the incumbents (Ferreira, 2015), and these suboptimal appointments can be detrimental to firms' performance (Ahern & Dittmar, 2012).

On the other hand, a higher number of WOCB can be beneficial for the firm's FP in several ways. For example, Allen and Wahid (2024) found that following the implementation of Senate Bill 826 in California, there was an increase in the number of female directors with

financial expertise. Compared to their male counterparts, they had greater qualifications, network size, achievements, and professional activities in both the pre- and the post-regulation periods. Similarly, Martínez-García et al. (2022) found that after the introduction of quota law in Spain, boards seek to appoint new female directors having human capital attributes that are useful for reducing uncertainty and bringing new resources to the firm.

Based on insights from this discussion, we assert the following:

Hypothesis 2: All else being equal, the relationship between WOCB and FP changes after the introduction of board gender quotas.

As mentioned previously, the similarity-attraction theory (Byrne, 1971), social identity theories (Ashforth & Mael, 1989; Tajfel & Turner, 1986), and person-group fit literature (Seong et al., 2015) support the argument that board incumbents collaborate better with new directors who are similar to them. Boards can be seen as "groups of diverse individuals who have different biases and prejudices and whose behavior is affected by social constraints and power relations" (Ferreira, 2010, p. 225). They are an interdependent group of people, whose ability to communicate and coordinate is critical for task execution and performance, and therefore is sensitive to interpersonal difficulties (Forbes & Milliken, 1999). Variety in director characteristics can enhance strategic decisions yet can also lead to social categorization processes and may evoke some of the negative consequences such as conflict, lower satisfaction, and social isolation (Tasheva et al., 2019). Thus, the fit among board members, i.e. the interpersonal compatibility of board members, is fundamental to ensure cohesion and performance via congruence and attraction.

Among the attributes often described in the literature, human capital, social capital, and demographic characteristics are often considered essential in influencing a group's attitude and behavior, and consequently its performance and that of the organization (Tsui & O'Reilly, 1989). According to Tasheva et al. (2019), human capital includes skills, knowledge, expertise obtained through education and experience; social capital represents the resources and opportunities available through the individual's networks of relationships; and demographic characteristics include age, gender, race, ethnicity and nationality.

Several studies have put forward evidence suggesting that the similarity among board directors in terms of these attributes contributes to the firm's performance. For example, Adam et al. (2018) showed that performance of US firms increased when director skill sets exhibited more commonalities. Havrylyshyn et al. (2022) revealed that a board contributed better to firm performance when men and women directors were previously colleagues on other boards.

Based on these insights, we propose the following hypothesis:

Hypothesis 3: All else being equal, the fit between new women directors and incumbent directors in terms of demographics, human capital, and social capital influences the relationship between WOCB and FP after the board gender quotas.

Data and descriptive statistics

Sample construction

Our initial sample includes all the firms listed in the SBF 120 (*Société des Bourses Françaises*) Index. The control sample includes all the firms listed in the S&P 500 Index, the counterpart in US stock exchanges. Our analysis period extends from 2006 to 2017. Following standard practice (e.g., Sila et al., 2016), we exclude financial firms (SIC codes

6000–6799) and utilities (SIC codes 4900–4999) from the initial sample, essentially because of their special financial structure, regulatory requirements, and accounting standards. The final French sample comprises 822 firm-year observations and 10,368 director-year observations, while the US sample comprises 2,317 firm-year observations and 21,813 director-year observations

Financial and governance data are retrieved from *Compustat* and from *Bloomberg* using the Bloomberg Server API. When these databases have missing data, we manually collect missing information from Bloomberg or from companies' websites. The data regarding the functional and industry background of each director was manually collected by reviewing the director's biography and career history.

Variable definitions

Dependent variables. Consistent with the existing literature (e.g., Adams & Ferreira, 2009; Sila et al., 2016), this study uses Tobin's q and return-on-assets (ROA) to measure the dependent variable. Tobin's Q is calculated using Chung and Pruitt's (1994) method, more specifically, the ratio of the sum of the market value of a firm and the book value of its debt to the total value of its assets. We also use ROA because Tobin's Q can be seen as a proxy for growth opportunities rather than a measure of performance (Wintoki et al., 2012).

Independent variables. The representation of WOCB is measured by the ratio of female directors to the total number of directors (e.g., Adams & Ferreira, 2009). In our difference-in-difference setting, *France* is a dummy variable that equals 1 if the firm is listed in the SBF 120 (the treatment group), and 0 if the firm is listed on the S&P 500 (the control group). *Post* is a dummy variable that equals 1 if the year is 2011 or later, and 0 otherwise.

Consistent with Zhu et al. (2014), we construct measures of similarity across different dimensions. Specifically, we consider the following dimensions: gender, age, nationality, top executive experience, functional background, industry background, education, highest degree obtained, and school's prestige (Westphal & Zajac, 2013; Zhu et al., 2014). To construct our fit measures, we first compare each female director with each of the remaining board members in a certain dimension and attribute the value of 1 in case of fit, and 0 otherwise. Then, we take the average fit for each woman (or the proportion of the remaining board members that are similar), and finally we average across all women to obtain measures at the firm level.

We define *Demographic fit* as the average fit of age and nationality (Johnson et al., 2013). Specifically, *Age fit* is obtained by first finding the proportion of the remaining board members of a similar age for each female director, and then averaging across all female directors. We consider the age to be similar age when the difference is less than one standard deviation, which in our sample is 8 years (Westphal & Zajac, 2013; Zhu et al., 2014). We calculate *Nationality fit* as the average across all female director of the proportion of the rest of the board members having the same nationality.

Human capital fit is the mean between the director's top executive, function and industry fit (Johnson et al., 2013). More specifically, consistent with Zhu et al. (2014), a director's top executive experience is measured via a dummy variable equal to 1 if a director is/was a top executive, and 0 otherwise. We define a top executive to be a CEO, a chairman, a VP (Vice-President), an executive director, or a member of an Executive Board. We calculate *Top executive fit* as the average across all female directors of the proportion of the remaining board members who have the same top executive experience.

We calculate *Function fit* as the average across all female directors of the proportion of the remaining board members having the same functional background. More specifically, inspired by Hambrick and Mason (1984) and categories used by Hambrick et al. (1996), a director's functional background is measured using the following scale: 0, if "top executive" (see above)

is equal to 1; 1, if the director's main function is in the output function (i.e., sales, marketing or R&D – research and development); 2, if the director's main function is in the throughput function (i.e., production, operation, process engineering or accounting); 3, if the director's main function is in the peripheral function (i.e., finance, law, labor relations or HRM – Human Resource Management).

We calculate a director's *Industry fit* as the average across all female directors of the proportion of the remaining board members having the same industry background. Specifically, consistent with Zhu et al. (2014), we measure a director's primary industry background (using a 4-digit SIC code) using his/her history data on Bloomberg based on two criteria: (a) if the director has C-suite positions in a company, we choose that industry as the director's primary industry background; (b) otherwise, we look at the industry in which a director has worked most years of his/her career.

Social capital fit is the mean of education and prestige school fit (Johnson et al., 2013). We calculate *Education fit* as the average across all female directors of the proportion of the rest of the board members having the same level of education. *Education* is coded into four categories using the following scale: no diploma or degree (0); bachelor's degree (1); master's degree (2); and Ph.D. degree or equivalent (e.g., lawyer) (3) (Zhu et al., 2014).

We calculate *Prestige school fit* as the average across all female directors of the remaining of the board members having the same level of elite school. Two directors are considered similar if both attended an elite school. *Elite school* is a dummy variable that equals 1 if the director graduates from the French so-called "Grandes écoles" (if the director is French) or Top 20 US and European universities, based on Shanghai Ranking 2010 (if the director is not French) (Miller & Xu, 2020; Nguyen, 2012; Westphal & Stern, 2006) – see Appendix A for details.

Control variables. We control for firm and board characteristics that may influence a firm's financial and economic performance.

Regarding firm characteristic variables, we include *Firm size*, *Leverage*, *R&D*, *CAPEX intensity*, *Market-to-book*, and *Family firm.* Firm size (measured by the natural logarithm of total assets) controls for the firm's complexity (Adams & Ferreira, 2009; Sila et al., 2016). *Leverage* is calculated as the ratio of total debt to total assets. It is an important governance mechanism underlying FP, because managers are required to generate cash flow in order to pay the interest and debt principal (Shleifer & Vishny, 1997). *R&D intensity* is measured as the ratio of R&D to sales. Higher R&D is usually associated with superior financial performance (Eberhart et al., 2004). *CAPEX intensity*, or capital intensity, is measured as the ratio of capital expenditures to assets from the previous year. It is known to be positively and significantly related to FP (Dezsö & Ross, 2012). *Market-to-book*, which is measured as the ratio of market capitalization to total assets, is included to control for a firm's investment opportunities (Hutchinson & Gul, 2004). Finally, *Family firm* is a dummy variable that equals 1 if the firm is a family firm, and 0 otherwise. Consistent with Sraer and Thesmar (2007), a firm is considered a family firm if the founder or a member of the founder's family is a blockholder (holds at least 20% of the voting rights) of the company. In the French context, 70% of listed companies are family firms which often outperform publicly held firms (Sraer & Thesmar, 2007).

Regarding board characteristics, we include *Board size* (measured as the logarithm of the number of directors on the board) because theoretical and empirical literature suggests that board size in one way or another influences FP (Wintoki et al., 2012; Yermack, 1996). *Board independence* is calculated as the proportion of outside – non-executive – directors on the board (e.g., Adams & Ferreira, 2009). *CEO duality* is measured using a dummy variable equal to 1 if the CEO is also the chair, and 0 otherwise. Many studies (e.g., Bennouri et al., 2018)

have shown that CEO duality influences FP. Finally, *Board tenure* is measured as the average tenure, in years, of all directors. This variable is also known to be associated with FP (Huang & Hilary, 2018).

Finally, all variables, except for the dummy variables, are winsorized at the 1% and 99% levels to reduce the potentially spurious effects of outliers. Appendix A provides a summary of the variables used in this study and their definition.

Empirical estimation and results

Descriptive statistics and univariate analysis

Although the *Copé-Zimmermann* law was introduced in 2011, companies were required to reach target quotas only by 2014 (quota of 20%) and 2017 (quota of 40%). To understand how female representation changed over time, before and after the quota law, we employ a graphical analysis. Fig. 1 shows that the proportion of WOCB in France started to drastically increase after 2010. Until 2010, the trend on the proportion of WOCB in the US and France was parallel, although the proportion of WOCB in France was lower. After 2010, the increase in the proportion of WOCB in France clearly outpaced the increase in the US. Fig. 2 shows that while the proportion of new women on corporate boards is similar in the two countries before 2010, French firms were clearly hiring a much larger proportion of women when compared with US firms after the quota was introduced.

Fig. 1. Average proportion of women on boards

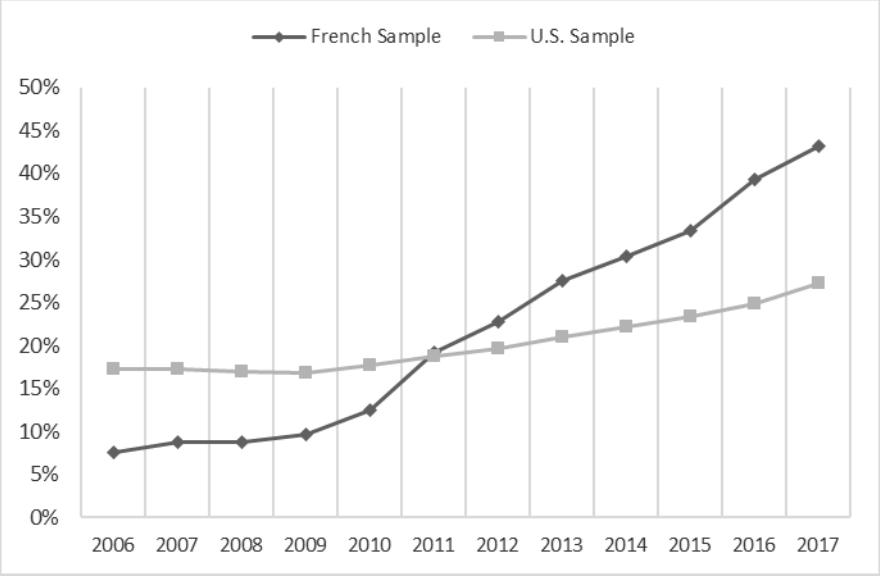
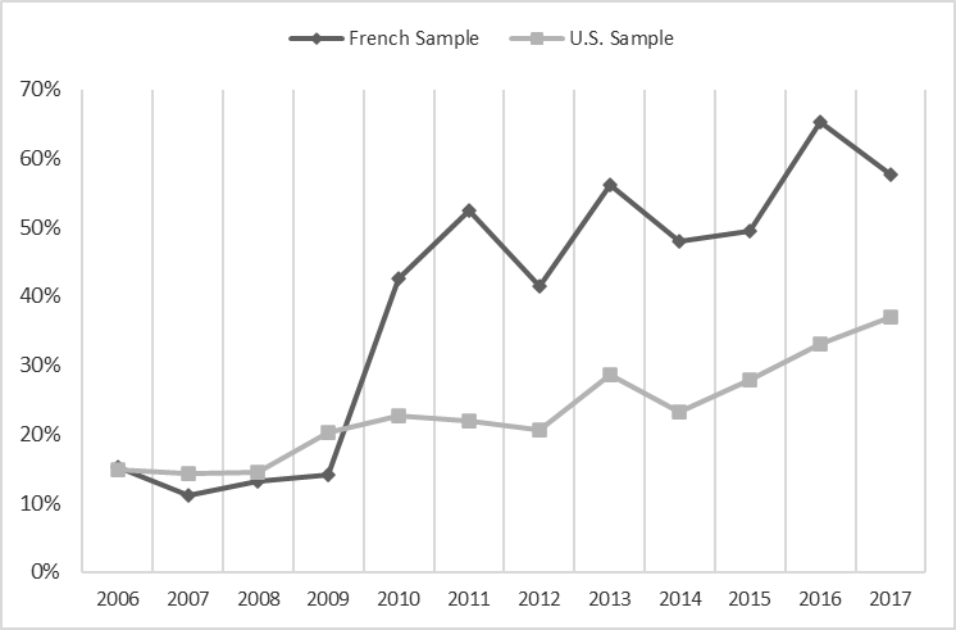


Fig. 2. Average proportion of new women directors on new board members.



The descriptive statistics for our sample are presented in Table 1. The average proportion of WOCB in France before the gender quota was 8.7%, increasing to 30.7% following the implementation of the law, while the ratio was 17.2%, increasing to 22.7% in the US sample.[2] The average firm in our sample has total assets of $8.8 billion before 2010, and $9.08 billion after 2010. The mean ROA is 4.59% and 3.85%, before and after 2010 respectively, and the mean Tobin's q is 1.589 before 2010 and 1.569 after. About 21% of the firms are classified as family firms before 2010, and 25% after 2010. The average firm has a proportion of 51.4% of boards filled with independent directors, 50.3% from elite schools, and 75.6% are top executives before 2010 (these numbers are 58.9%, 47.3% and 68.3% after 2010). About 10% of the directors are new directors before 2010 and 12.3% after. The average proportion of new women directors increased from 1.2% to 6.1% after the introduction of the quota law.

Table 1 also shows the average values for the *fit* variables in 2010, the year before the introduction of the quota law, and in 2017. The numbers suggest a decrease in the average demographic, human capital, and social capital fit of the women on boards from 2010 to 2017. More specifically, the average value of *Demographic fit* decreased from 37.8% to 35.9%, the average value of *Human capital fit* decreased from 26.9% to 24.1%, and the average value of *Social capital fit* decreased from 47.3% to 38.4%.

Table 1. Descriptive statistics

Firm level variables	Before (338 firm-year obs.)		After (544 firm-year obs.)		t-test
	Mean	Std. Dev.	Mean	Std. Dev.	
Proportion of women	.087	.084	.307	.119	29.9***
Average tenure	5.618	3.5	6.267	3.098	2.8**
Proportion independent	.514	.227	.589	.208	5.1***
Prop. top executive	.764	.172	.687	.176	-6.4***
Proportion elite school	.493	.208	.471	.198	-1.6
No. indep. women	.959	.952	3.805	1.709	28.1***
Board size	10.837	3.575	12.325	3.005	6.7***
Duality	.544	.499	.537	.499	-0.2

[2] For the sake of simplicity and to focus on the French sample, we do not include the summary statistics for the US sample in Table 1. But we compare some key metrics between these two samples in Figure 1-3.

Table 1. Continued

Firm level variables	Before (338 firm-year obs.)		After (544 firm-year obs.)		t-test
	Mean	Std. Dev.	Mean	Std. Dev.	
Family firm	.21	.408	.246	.431	1.3
Market-to-book	2.24	1.881	2.365	2.157	-0.9
Firm size	8.808	1.421	9.269	1.273	5.0***
Leverage	.249	.149	.245	.14	-0.4
ROA	4.591	6.127	3.852	4.786	-2.0**
R&D intensity	.023	.054	.022	.047	0.1
Capex intensity	.052	.051	.041	.035	3.9***
Tobin's Q	1.589	.92	1.569	.877	0.35
Director Level Variable	Before (3,663 director obs.)		After (6,705 director obs.)		t-test
	Mean	Std. Dev.	Mean	Std. Dev.	
Female	.088	.284	.309	.462	26.2***
Top executive	.756	.429	.683	.465	-7.8***
Tenure	5.643	6.157	6.228	6.631	4.4***
Type admin.	1.618	.776	1.587	.843	-1.9*
Age	58.663	10.117	58.855	9.688	-0.9
Education	1.846	.659	1.942	.556	7.4**
Elite school	.503	.5	.473	.499	-2.9***
Function	2.525	.692	2.53	.656	-0.2
New member	.1	.3	.123	.328	3.5***
New woman	.012	.109	.061	.24	11.8***
Fit variables	Before (338 firm-year obs.)		After (544 firm-year obs.)		t-test
	Mean	Std. Dev.	Mean	Std. Dev.	
Demographic fit	0.378	0.024	0.359	0.011	-0.720
Human capital fit	0.269	0.018	0.241	0.008	-1.455*
Social capital fit	0.473	0.0183	0.384	0.010	-4.247***

This table displays the mean and standard deviation for the variables used in the analysis. The sample consists of 882 firm-year observations and 10,368 director-year observations for the companies in the SBF 120 from 2006 to 2017. All variables are defined in Appendix A or in the text. All continuous control variables are winsorized at 1st and 99th percentiles.

Table 2 presents the correlation coefficients for the variables used in the empirical analysis. The coefficients suggest a significant positive association between proportion of women and Tobin's q, but the correlation with ROA is insignificant, even though the two performance measures are strongly correlated. The correlation coefficients do not indicate a strong positive association between fit and financial performance. Although the correlation between some of the control variables is statistically significant, the variance inflation factor (VIF) is no greater than 5 for all variables, indicating that multicollinearity is not a concern.

Table 2. Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(1) Tobin's q	1.00																		
(2) Proportion of women	**0.05**	1.00																	
(3) Demographic fit	-0.01	**0.14**	1.00																
(4) Human capital fit	**0.19**	**0.09**	**0.56**	1.00															
(5) Social capital fit	-0.04	**0.08**	**0.29**	**0.21**	1.00														
(6) Average tenure	**0.11**	-0.01	**0.04**	**0.16**	-0.01	1.000													
(7) Proportion independent	**0.19**	0.01	**0.15**	**0.65**	0.02	**0.08**	1.00												
(8) Proportion top executive	**-0.28**	-0.01	**-0.20**	**-0.69**	0.00	**-0.13**	**-0.73**	1.00											
(9) Proportion elite school	**-0.06**	**0.04**	**0.02**	**-0.13**	**-0.05**	**-0.10**	**-0.09**	**0.27**	1.000										
(10) No. indep women	-0.01	**0.84**	**0.15**	**0.15**	**0.04**	**-0.02**	**0.20**	**-0.09**	**0.08**	1.00									
(11) Board size	**-0.23**	**0.18**	**0.15**	**-0.06**	**0.12**	**-0.07**	**-0.26**	**0.28**	**0.15**	**0.39**	1.00								
(12) Duality	**-0.16**	**0.06**	**-0.10**	**-0.45**	0.00	**-0.08**	**-0.49**	**0.55**	**0.13**	0.01	**0.23**	1.00							
(13) Family firm	**-0.05**	**0.10**	**-0.07**	**-0.29**	**0.03**	**0.17**	**-0.39**	**0.44**	**0.05**	**-0.02**	**0.17**	**0.24**	1.00						
(14) Market-to-book	**0.34**	**0.07**	0.00	**0.12**	-0.01	**0.04**	**0.12**	**-0.17**	**-0.05**	**0.07**	**-0.05**	**-0.11**	**-0.06**	1.00					
(15) Firm size	**-0.24**	**0.18**	**0.21**	**0.27**	**0.07**	**-0.05**	**0.28**	**-0.22**	**0.10**	**0.34**	**0.38**	**-0.08**	**-0.03**	**-0.02**	1.00				
(16) Leverage	**-0.03**	**0.09**	**0.05**	**0.05**	**0.05**	**-0.02**	0.00	**-0.03**	0.00	**0.11**	**0.09**	**-0.02**	**-0.09**	-0.01	**0.09**	1.00			
(17) ROA	**0.56**	-0.02	0.02	**0.20**	-0.00	**0.13**	**0.19**	**-0.27**	-0.01	**-0.02**	**-0.12**	**-0.16**	**-0.08**	**0.17**	**-0.10**	**-0.14**	1.00		
(18) R&D intensity	**0.17**	**-0.08**	**-0.04**	-0.00	**-0.08**	**0.06**	**0.07**	-0.01	**0.03**	**-0.06**	**-0.15**	0.01	0.02	**0.13**	**-0.15**	**-0.22**	**-0.04**	1.00	
(19) Capex intensity	0.00	**-0.11**	**-0.03**	**-0.03**	**-0.07**	-0.02	-0.01	-0.00	**-0.03**	**-0.08**	**-0.09**	0.00	**-0.02**	-0.02	-0.01	-0.00	**0.03**	**-0.08**	1.00
VIF	(1) 1.91	(2) 5.85	(3) 1.75	(4) 3.77	(5) 1.52	(6) 1.15	(7) 3.83	(8) 3.92	(9) 1.18	(10) 7.46	(11) 2.50	(12)1.54	(13) 1.48	(14) 1.16	(15) 1.69	(16) 1.11	(17)1.60	(18) 1.17	(19)1.06

This table reports the Pearson correlation coefficients among variables. Correlation coefficients with significance at 1% and 5% levels (two-tailed) are bolded. All variables are defined in Appendix A or in the text. All continuous control variables are winsorized at 1st and 99th percentiles.

Empirical method

Prior empirical literature presents mixed and inconclusive results regarding the WOCB-FP relationship—see Kirsch (2018), Nguyen et al. (2020) and Post & Byron (2015) for a comprehensive review of the literature). In part, this inconsistency can be attributed to failure to address endogeneity issues inherent in this relation (Adams, 2016).

A way of addressing endogeneity is using quasi-experimental methods and the DiD approach (e.g., Yang et al., 2019), which is applicable when an unexpected and exogenous shock affects a treatment group but does not affect a comparable control group. By comparing the two groups before and after the event, we can infer the cross-sectional differences brought up by the event. Our empirical strategy is to use the mandatory quota regulation in France as an exogenous shock in a design akin to DiD. Therefore, we control for endogeneity by accounting for the differential effect of WOCB on FP between a sample of French firms (the treatment group) and a sample of US firms (the control group) brought up by the regulation. As stated above, many European countries have implemented gender quota laws. In the US, only the state of California requires a certain number of women on boards, a requirement that has been in effect since 2018. A limitation of this method is that it relies on the assumption of a common trend for the outcome variable for both groups (Yang et al., 2019). The analysis presented in Appendices B and C shows that our methodology is valid. Appendix B presents the trends for our outcome variables in France (the treatment group) and in the US (the control group). The graphs show that for most years in the time period covered in our sample, the trends for Tobin's q and ROA are similar in France and in the US. Yang et al. (2019) mention that different trends could be attributed to the financial crisis affecting countries in different ways. For our sample of large companies in France and in the US, we do not find dramatic differences in trends in firm performance. In Appendix C, we test the common trend assumption on ROA and Tobin's q in our samples of French and US firms. The results for both ROA and Tobin's q indicate a common trend before 2010, but not after 2010.

To further address concerns regarding comparability between French and US firms, we follow Ginglinger and Raskopf (2023) by excluding 2010 and matching each French firm to a US firm on a yearly basis for 2007, 2008, and 2009. This is done through propensity score matching based on three criteria: size, industry, and ROA using the nearest neighbor method. For the years after 2009, we retain only the firms matched in 2009.

To account for serial correlation in the time-series of within-firm variation in DiD estimations, we cluster standard errors at the firm level in all regressions (Bertrand et al., 2004). We also estimate the models with firm fixed effects to rule out time invariant firm characteristics and time trends, and the propensity score matching (PSM) procedure to alleviate sample selection bias from structural differences between companies in the two countries.

Change in the proportion of women on boards

The univariate analysis indicates that the proportion of WOCB significantly increased in France, and at a larger rate than in the US. To validate these findings, we estimate a DiD model where the dependent variable indicates if a board member is a new woman. Specifically, we estimate the following model:

$$New\ women_{i,t} = a + b_1 \times Post + b_2 \times France + b_3 \times Post \times France + c \times Control\ variables_{i,t} + e_{i,t} \quad \textbf{[1]}$$

where i denotes firms in the sample, and t refers to time period. $e_{i,t}$ is a random error term. In Eq. [1], we control for board and firm characteristics that could affect the decision to appoint female directors.

The results presented in Table 3 provide evidence that the gender quota has a significant impact on the director appointment process. In Column (1), the coefficient on the interaction term of *France* and *Post* is positive and statistically significant at the 1% level. This result shows that the odds of hiring a new female director are significantly higher in France after the gender quota law when compared with the odds in US in the same period. In Column (2), we add the variable *Proportion of women* to the model. The results help us draw a complete picture: the odds of hiring a new female director after the Copé-Zimmermann law increase in France, but decrease as the proportion of WOCB increases, as indicated by the negative coefficient of the three-way interaction term. This result suggests that the odds of hiring women directors increase in France after the law, but firms with a higher proportion of women directors are less likely to hire new female directors for compliance, since they are closer to the levels required by the regulation.

Table 3. Probability of appointing new female directors

	(1)	(2)
Post	0.765***	-0.095
	(0.000)	(0.742)
France	-0.095	-0.465
	(0.629)	(0.132)
Post * France	1.063***	1.888***
	(0.000)	(0.000)
Proportion of women		4.176***
		(0.000)
Proportion of women * Post		1.247
		(0.140)
Proportion of women * France		5.907***
		(0.000)
Proportion of women * Post * France		-8.442***
		(0.000)
Independent director	0.500***	0.499***
	(0.000)	(0.000)
Board size	0.046***	0.057***
	(0.007)	(0.001)
Duality	-0.018	-0.097
	(0.848)	(0.311)
Family firm	-0.239*	-0.379***
	(0.081)	(0.009)
Market-to-book	0.009	0.004
	(0.146)	(0.502)
Firm size	-0.008	-0.044
	(0.839)	(0.278)
Leverage	-0.125	-0.164
	(0.633)	(0.550)
Return-on-assets	-0.001	0.001
	(0.878)	(0.892)
R&D intensity	0.577	1.184
	(0.524)	(0.210)
Capex intensity	1.028	1.431
	(0.326)	(0.160)
Constant	-4.832***	-5.279***
	(0.000)	(0.000)
Year controls	Yes	Yes
FF-38 industry controls	Yes	Yes
Wald chi^2	391.6	576.6
Pseudo R^2	0.0430	0.0619
Observations	32,181	32,181

The sample includes director-year observations. The dependent variable, *New women*, is a dummy variable that takes value 1 if the new director is a female and 0 otherwise. The sample includes French firms listed in the SBF 120 (the treatment group) and, alternately, matched US firms listed in the S&P 500 (the control group). *France* is a dummy variable that takes value 1 if the firm is in the treatment group. listed in the SBF 120 (the treatment group), and 0 if the firm is listed in the S&P 500 (the control group). *Post* is a dummy variable that takes value 1 if fiscal year is after 2010, and 0 otherwise. The results are from Probit models that estimate the probability that the new director is female before and after the regulation (fiscal year 2010) using a DiD design. Column (1) includes all the controls without the independent variable *Proportion of women*. Column (2) includes the triple-difference interaction effect from *Post*, *France* and *Proportion of women*. Industry controls use the Fama and French's (1997) 38 industry classification. Standard errors are clustered at the firm level. Robust p-value in parentheses. *, **, and *** denote statistical significance at 10%, 5% and 1% respectively.

Change in the fit of WOCB

The descriptive statistics presented in Table 1 indicate that the fit of WOCB decreased after the quota regulation. In Table 4 we confirm this conclusion. This table reports DiD estimates of the ordinary least square regressions of *fit* measures on proportion of WOCB, with industry and year controls. The results show that the coefficient on the triple interaction term with *Post*, *France* and *Proportion of women*, is negative and statistically significant at the 1% level in the model with *Demographic fit*, at the 15% level in the model with *Human capital fit*. The results are not statistically significant in the model with *Social capital fit*, but the p-value is close to 10%. These results imply that as companies increase the proportion of WOCB to comply with gender quota, the fit of WOCB decreases. Consequently, our findings suggest a negative effect of the gender quota on boards' ability to appoint female directors with social capital, human capital and demographic characteristics fitting incumbent board members. Therefore, as the Copé-Zimmermann law requires firms to bring in more female directors to their board, we observe a decrease in the level of fit of the WOCB over the years after the law was passed. Our results also suggest that the fit of WOCB increases with board size and board independence and decreases when the proportion of board members who hold top executive functions is higher.

These results provide support to Hypothesis 1, which predicts that the fit of WOCB changes after the gender quota. Our findings suggest that the average fit of WOCB decreases as companies increase the number of female directors to reach the proportion set by the gender quota. The results in Table 3 also suggest that the change is more pronounced for *Demographic fit* and *Social capital fit* than for *Human capital fit*.

Table 4. Fit of women before and after the gender quota.

	Demographic fit (1)	Human capital fit (2)	Social capital fit (3)
Proportion of women * Post * France	-0.739***	-0.332**	-0.228
	(0.000)	(0.030)	(0.105)
Proportion of women * France	0.769***	-0.194	0.253
	(0.002)	(0.373)	(0.121)
Proportion of women * Post	-0.945***	-1.130***	-0.427***
	(0.000)	(0.000)	(0.000)
Proportion of women	1.211***	1.704***	0.599***
	(0.000)	(0.000)	(0.000)
Average tenure	0.002	0.003	-0.001
	(0.361)	(0.117)	(0.615)
Proportion independent	0.099**	0.481***	0.135***
	(0.026)	(0.000)	(0.001)

Table 4. Continued

	Demographic fit (1)	Human capital fit (2)	Social capital fit (3)
Proportion top executive	-0.106***	-0.192***	0.100***
	(0.003)	(0.000)	(0.000)
Proportion elite school	0.044	-0.014	-0.069**
	(0.219)	(0.691)	(0.030)
No. indep. women	-0.041***	-0.070***	-0.033***
	(0.000)	(0.000)	(0.000)
Board size	0.019***	0.028***	0.011***
	(0.000)	(0.000)	(0.000)
Duality	0.001	-0.029**	-0.001
	(0.936)	(0.031)	(0.887)
Family firm	-0.055*	-0.013	-0.026
	(0.055)	(0.579)	(0.242)
Market-to-book	-0.001	-0.001	-0.001
	(0.294)	(0.172)	(0.142)
Firm size	0.014**	0.004	0.001
	(0.034)	(0.408)	(0.864)
Leverage	0.052	0.041	0.037
	(0.161)	(0.228)	(0.206)
Return-on-assets	-0.001	-0.000	-0.000
	(0.413)	(0.788)	(0.588)
R&D intensity	0.098	0.090	-0.142
	(0.515)	(0.531)	(0.283)
Capex intensity	0.013	0.087	-0.023
	(0.948)	(0.659)	(0.859)
Constant	-0.303***	-0.335***	0.022
	(0.000)	(0.000)	(0.648)
Year controls	Yes	Yes	Yes
FF-38 industry controls	Yes	Yes	Yes
Observations	3,139	3,139	3,139
R-squared	0.252	0.661	0.127

This table reports results from DiD estimations. The dependent variable is *Demographic fit* in Model (1), *Human capital fit* in Model (2), and *Social capital fit* in Model (3). The sample includes French firms listed in the SBF 120 (the treatment group) and, alternately, matched US firms listed in the S&P 500 (the control group). *France* is a dummy variable that takes value 1 if the firm is in the treatment group. *Post* is a dummy variable that takes value 1 if fiscal year is after 2010, and 0 otherwise. Description of all the variables can be found in Table 1. *p*-values based on robust standard errors clustered at the firm level are reported in parentheses. *, ** and *** denote statistical significance at 10%, 5% and 1% respectively.

Proportion of WOCB and FP

To test whether the prediction from Hypothesis 2 that gender quota adoption changes the WOCB-FP relationship is true, we estimate the following model:

$$Financial\ performance_{i,t+1} = a + b_1 \times Proportion\ of\ women_{i,t} + b_2 \times Proportion\ of\ women_{i,t} \times Post + b_3 \times Proportion\ of\ women_{i,t} \times France + b_4 \times Proportion\ of\ women_{i,t} \times Post \times France + c \times Control\ variables_{i,t} + e_{i,t+1} \quad \textbf{[2]}$$

In Eq. [2], the three-way interaction term (or triple-difference) captures the differential effect of WOCB on FP in France after the gender quota when compared to the US. The model controls for board and firm level characteristics that could impact the effect of female directors on FP. For a sample of French firms, Bennouri et al. (2018) show that certain attributes in female directors affect the WOCB-FP relationship. To control for these attributes,

we include variables for the proportion of women who are top executives, with degrees from elite schools, and are independent. Finally, we include measures of demographic, human capital, and social capital fit to also capture the potential impact of female directors on board activity.

Table 5 presents the results of the regressions estimating the model in Eq. [2] with Tobin's q and ROA as measures of FP. We estimate the models with firm fixed effects in Columns (1) and (3), to control for time invariant firm characteristics, and matched sample analysis using the PSM procedure, in Columns (2) and (4), to alleviate sample selection bias. To perform PSM, first we match firms from the French sample with firms from the US sample using a standard one-to-one nearest neighborhood method where the dependent variable is the proportion of women on board and the independent variables are the firm and board level control variables used in Table 3, including year and Fama-French 38 industry controls. Second, using propensity scores that represent the predicted probability that firms will have WOCB based on these factors, we estimate the model in Eq. [2] for the matched sample.

The results show that the three-way interaction term with *Post*, *France*, and *Proportion of women* is negative and statistically significant at the 1% level in the models with ROA, but is not statistically significant in the model with Tobin's Q. These results indicate that the effect of WOCB on FP is negative and significant after the enactment of the Copé-Zimmermann law when compared with the US sample.

The results of the estimation of the model uses Tobin's q lagged one year ahead and contemporaneous ROA. In un-tabulated results,[3] we do not find a statistically significant association between *Proportion of women* and *ROA* lagged one year ahead. This impact on the contemporaneous financial performance may be explained by the short-term nature of accounting measures, while Tobin's q captures long-term value.

Regarding the control variables, we notice that *Firm size* is negatively and significantly correlated with FP (either Tobin's q or ROA). This finding is consistent with previous studies (e.g., Adams & Ferreira, 2009), suggesting that larger firms are more complex to run and more difficult to be monitored. The impact of demographic, human capital and social capital fit is either statistically not significant or has a positive or negative impact on ROA. However, these estimations could be affected by endogeneity issues, which we will address in the next section using the DiD design.

Overall, Table 5 shows that the French board gender quota has a negative and significant effect on the WOCB-FP relationship. Therefore, the results support Hypothesis 2.

Table 5. WOCB and FP – Tobin's q and ROA

	Tobin's q (1)	ROA (2)
Proportion of women * Post * France	-0.343	-9.939***
	(0.361)	(0.001)
Proportion of women * Post	0.688***	2.376
	(0.007)	(0.263)
Proportion of women * France	-0.341	8.811**
	(0.481)	(0.029)
Proportion of women	-0.002	-5.851*
	(0.996)	(0.060)
Demographic fit	0.128	-1.538**
	(0.145)	(0.035)
Human capital fit	0.124	0.670
	(0.217)	(0.424)

[3] The results are available upon request from the authors.

Table 5. Continued

	Tobin's q	ROA
	(1)	(2)
Social capital fit	-0.107	-0.961
	(0.305)	(0.269)
Average tenure	-0.003	0.258***
	(0.636)	(0.000)
Proportion independent	0.055	2.590*
	(0.736)	(0.055)
Proportion top executive	-0.440***	-4.997***
	(0.004)	(0.000)
Proportion elite school	0.090	0.745
	(0.398)	(0.401)
No. indep. women	-0.043	0.270
	(0.145)	(0.273)
Board size	0.025**	0.054
	(0.015)	(0.521)
Duality	-0.000	-0.170
	(0.993)	(0.598)
Family firm	0.047	-0.523
	(0.612)	(0.501)
Market-to-book	0.019***	0.031
	(0.000)	(0.104)
Firm size	-0.580***	-2.157***
	(0.000)	(0.000)
Leverage	0.882***	-12.207***
	(0.000)	(0.000)
ROA	0.023***	
	(0.000)	
R&D intensity	-0.276	-2.691
	(0.684)	(0.635)
Capex intensity	-0.372	24.017***
	(0.095)	(0.408)
Constant	7.009***	27.145***
	(0.000)	(0.000)
Year controls	Yes	Yes
FF-38 industry controls	Yes	Yes
Observations	3,139	3,139
R-squared	0.244	0.120
Number of firms	315	315

This table reports results from DiD estimations. The dependent variable is firm financial performance, measured by *Tobin's q* and *ROA*. The sample includes French firms listed in the SBF 120 (the treatment group) and, alternately, matched US firms listed in the S&P 500 (the control group*). France* is a dummy variable that takes value 1 if the firm is in the treatment group. *Post* is a dummy variable that takes value 1 if fiscal year is after 2010, and 0 otherwise. All models are estimated with firm and year fixed effects. Description of all the variables can be found in Appendix A. *p*-values based on robust standard errors clustered at the firm level are reported in parentheses. *, ** and *** denote statistical significance at 10%, 5% and 1% respectively.

Fit of WOCB and FP

Having established that the gender quota changes the influence of WOCB on FP, we next check if this change is associated with the change in fit. In section 5.4., we show that the fit of WOCB decreases after the gender quota. If the differential effect of fit on FP after the gender quota is significant, then the effect of WOCB on FP could be attributed, at least in part, to the change in fit. The confirmation of this assumption would support Hypothesis 3, which

predicts that fit influences the effect of the gender quota on the WOCB-FP relationship. To test this prediction, we estimate the follow model:

$$\begin{aligned} Financial\ performance_{i,t+1} = {} & a + b_1 \times Proportion\ of\ women_{i,t} + \\ & + b_2 \times Fit_{i,t} + b_3 \times Fit_{i,t} \times Post + b_4 \times Fit_{i,t} \times France \\ & + b_5 \times Fit_{i,t} \times Post \times France + c \times Control\ variables_{i,t} + e_{i,t+1} \end{aligned} \quad \textbf{[3]}$$

In Eq. [3], the three-way interaction term indicates the effect of WOCB's fit on FP after gender quota relative to the US. A negative coefficient on this term indicates that the change in fit negatively impacts FP after the gender quota.

Table 6 shows the results for the model estimated with Tobin's q and ROA as the dependent variable. Columns (1), (2) and (3) show a negative differential impact on Tobin's q from *Demographic fit* at the 10% level and from *Social capital fit* at the 5% level. The impact from *Human capital fit* is not statistically significant. In general, these results suggest a more significant negative effect of the changes in *Demographic fit* and *Social capital fit* on Tobin's q. The differential impact of fit on ROA is negative and significant at the 1% level for the three dimensions of fit, as presented in Columns (4), (5) and (6).

The results suggest that the association between fit of WOCB and FP decreases after the gender quota. Since we find that the fit of WOCB decreases after the gender quota, as shown in Table 4, we conclude that the negative effect of gender quota on FP is due to a decrease in the fit of the new female directors.

Table 6. Impact of the fit of WOCB on FP – Tobin's q and ROA.

	Tobin's q			ROA		
	(1)	(2)	(3)	(4)	(5)	(6)
Demographic fit * Post * France	-0.294*			-3.399***		
	(0.082)			(0.001)		
Demographic fit * Post	0.244			1.235		
	(0.122)			(0.333)		
Demographic fit * France	0.089			2.432*		
	(0.662)			(0.058)		
Human capital fit*Post*France		-0.187			-4.433***	
		(0.313)			(0.001)	
Human capital fit*Post		0.229			0.590	
		(0.114)			(0.544)	
Human capital fit * France		0.146			2.415	
		(0.441)			(0.118)	
Social capital fit * Post * France			-0.447**			-3.819***
			(0.029)			(0.003)
Social capital fit * Post			0.287			0.598
			(0.270)			(0.742)
Social capital fit * France			0.695**			3.282*
			(0.021)			(0.084)
Proportion of women	0.151	0.167	0.158	-3.729	-3.778	-3.542
	(0.760)	(0.741)	(0.747)	(0.203)	(0.199)	(0.227)
Demographic fit	-0.025	0.098	0.068	-2.246	-1.401*	-1.312*
	(0.906)	(0.454)	(0.595)	(0.100)	(0.076)	(0.088)
Human capital fit	0.133	-0.000	0.150	0.647	0.259	0.550
	(0.338)	(0.998)	(0.281)	(0.523)	(0.843)	(0.578)
Social capital fit	-0.111	-0.119	-0.470	-0.930	-0.939	-1.642
	(0.484)	(0.452)	(0.123)	(0.327)	(0.325)	(0.382)

Table 6. *Continued*

	Tobin's Q		ROA	Tobin's q		ROA
	(1)	(2)	(3)	(1)	(2)	(3)
Constant	7.076***	7.128***	7.161***	26.758***	26.950***	26.872***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,139	3,139	3,139	3,139	3,139	3,139
R-squared	0.246	0.246	0.248	0.123	0.123	0.123
Number of firms	315	315	315	315	315	315

The dependent variable is *Tobin's q* in columns (1) to (3) and *ROA* in Columns (4) to (6). All variables are defined in the Appendix A. All models are estimated with firm and year fixed effects. p-values based on robust standard errors clustered at the firm level are reported in parentheses. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively.

In Table 7, we look at the different components of the three dimensions of fit. It is possible that not all types of fit necessarily enhance performance; in some cases, less fit might even be advantageous. The results indicate that the coefficients for the three-way interaction with fit in age, nationality, function, education, and prestige school are negative and statistically significant at the 1% level or below, suggesting that changes in these components of fit had a negative impact on the contribution of WOCB to FP. This negative effect of *Age fit* on FP is in line with the findings in Ahern and Dittmar (2012) for the Norwegian case, where the youth of new female directors appointed is noted. The coefficient of fit on industry background is not statistically significant, indicating that changes in this measure of fit did not impact the relationship between WOCB and FP.

Overall, the results suggest that the decrease in the contribution of WOCB to FP performance can be explained, at least partially, by the decrease of the fit of the new female directors appointed, especially regarding changes in demographic and social capital fit. These results provide support to Hypothesis 3.

Table 7. Impact of the fit of WOCB on FP for different dimensions (Tobin's Q).

	Age	Nationality	Function	Top Executive	Industry	Education	Prestige school
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Fit dimension * Post * France	-0.357**	-0.413***	-0.334*	-0.041	0.181	-0.333*	-0.518**
	(0.022)	(0.009)	(0.089)	(0.744)	(0.597)	(0.075)	(0.011)
Fit dimension * Post	-0.073	0.422**	0.210	0.453***	0.342***	0.193	0.321*
	(0.614)	(0.016)	(0.197)	(0.001)	(0.003)	(0.431)	(0.093)
Fit dimension * France	0.107	-0.014	0.317	-0.059	-0.499*	0.693***	0.154
	(0.548)	(0.939)	(0.161)	(0.836)	(0.088)	(0.006)	(0.510)
Proportion of women	0.723	1.004*	0.750	0.977*	1.012*	0.761	0.876*
	(0.172)	(0.059)	(0.150)	(0.070)	(0.060)	(0.144)	(0.083)
Age fit	-0.058	-0.142	-0.140	-0.134	-0.140	-0.138	-0.140
	(0.656)	(0.117)	(0.125)	(0.142)	(0.126)	(0.130)	(0.125)
Nationality fit	0.207*	0.058	0.218*	0.253**	0.253**	0.221*	0.238*
	(0.090)	(0.709)	(0.076)	(0.043)	(0.039)	(0.066)	(0.062)
Function fit	-0.205	-0.132	-0.369*	-0.162	-0.197	-0.247	-0.164
	(0.231)	(0.424)	(0.098)	(0.369)	(0.261)	(0.136)	(0.332)
Top executive fit	-0.081	-0.018	-0.083	-0.246	-0.056	-0.061	-0.062
	(0.525)	(0.892)	(0.515)	(0.448)	(0.665)	(0.643)	(0.631)

Table 7. *Continued*

	Age	Nationality	Function	Top Executive	Industry	Education	Prestige school
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Industry fit	0.228	0.119	0.307	0.166	0.057	0.336**	0.191
	(0.126)	(0.495)	(0.107)	(0.528)	(0.749)	(0.019)	(0.276)
Education fit	-0.036	-0.026	-0.036	-0.025	-0.025	-0.335*	-0.032
	(0.801)	(0.856)	(0.803)	(0.861)	(0.862)	(0.091)	(0.826)
Prestige school fit	-0.035	0.001	-0.041	-0.007	-0.005	-0.067	-0.197
	(0.807)	(0.995)	(0.785)	(0.963)	(0.971)	(0.645)	(0.330)
Constant	2.477***	2.587***	2.572***	2.639***	2.580***	2.494***	2.542***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,139	3,139	3,139	3,139	3,139	3,139	3,139
R-squared	0.548	0.550	0.548	0.550	0.550	0.549	0.549
Number of firms	315	315	315	315	315	315	315

The dependent variable is Tobin's q. All variables are defined in Appendix A. All models are estimated with firm and year fixed effects. *p*-values based on robust standard errors clustered at the firm level are reported in parentheses. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively.

Discussion and conclusion

Summary of main findings and contributions

Our work studies the impact of WOCB on FP in France, using the Copé-Zimmermann law as a quasi-natural experiment. Based on a DiD research design with French firms in the treatment group and US firms in the control group, we find a negative differential impact of the proportion of WOCB on both Tobin's q (market based performance measure) and ROA (accounting measure of operational performance) after the gender quota in France. We also document that the demographic, social capital, and human capital fit of the women on boards in France decreased after the quota was implemented, and this change in fit negatively impacted FP. The results are stronger for the ROA measure than for the Tobin's q measure. This analysis leads us to conclude that the decrease in fit explains some of the negative impact of the gender quota on financial performance. This effect is more pronounced for demographic and social fit than for human capital fit.

Thanks to our results, we make several contributions to the literature. First, empirical research is inconclusive regarding the impact of WOCB on FP (e.g., Ahern & Dittmar, 2012; Yang et al., 2019). From a theoretical perspective, scholars have argued that increasing the representation of women on boards can bring diverse perspectives, experiences, and skills, leading to better decision-making and governance, and ultimately better financial performance. At the same time, others have pointed out that the contribution of WOCB to the firm's FP is contingent upon contextual factors such as board size, the number of independent directors (Pandey et al., 2022), and the number of female directors (Torchia et al., 2011). However, what is missing in the discussion is the role of board dynamics as a social group in shaping the WOCB-FP relationship (Havrylshyn et al., 2022). We do not know how the characteristics of the directors themselves influence the contribution of WOCB. By attending to this particular issue, our work makes a theoretical contribution by reconciling the heterogeneity of previous findings and offering fit as a possible explanation. We highlight that diversity within corporate boards is a double-edged sword by providing empirical evidence that the fit, or lack of fit, of female directors with the incumbents may explain the positive or

negative impact of increasing women's representation on boards. It is important to note that compared to extant studies investigating the attributes of board members (e.g., Ahern & Dittmar, 2012; Ferreira et al., 2017), we delve deeper by considering the complex nature of the relationships between board members' attributes, rather than simply comparing their attributes before and after the quota implementation. In short, our work sheds new light on the diverse findings regarding the WOCB-FP relationship by providing new insights into the understanding of the role of director characteristics and the need to examine them in the broader social context of the board.

Second, we also contribute to the empirical literature that studies the French context. The work of Sabatier (2015) is one of the few studies that consider this particular setting. It uses ROA as the measure of financial performance, but has a limited sample size (CAC40-listed companies) and a short period of study (from 2008 to 2012). Sarang et al. (2023) also examine French companies, but focus only on cost of equity rather than financial performance. The works of Comi et al. (2020) and Labelle et al. (2015) investigate the WOCB-FP relationship comparatively across multiple countries, including France. The former measure financial performance by ROA and labor productivity, while the latter use only ROA. From a methodological point of view, our work goes further than these studies by having a larger sample size and a longer period of study. We also use not only ROA but also Tobin's q, which have been considered more accurate measures of financial performance (Adams and Ferreira, 2009; Sila et al., 2016).

Importantly, the above studies examine the link between WOCB and FP from a linear perspective, testing the direct relationship between the two variables. However, France is a particular institutional context with a strong historical and cultural heritage. As mentioned above, it is a highly elitist society, in which it is difficult to climb up the corporate ladder if one does not graduate from a Grande école (Bourdieu, 1996). The contribution of female directors to the firm's performance depends necessarily on a number of factors. Our work is the first to offer the perspective that the WOCB-FP relationship is not straightforward in the French context. Integrating the specificities of the French culture, we demonstrate that the fit of new female directors with the incumbents on a board is particularly important. Based on our results, we provide evidence to support the argument that the influence of board diversity on board or firm results is conditioned by variables that are themselves conditioned by the national context (Zattoni et al., 2022).

Third, we contribute by addressing the endogeneity concern that remains unsolved in the studies of the WOCB-FB relationship. Endogeneity in studies of WOCB arises because board characteristics are endogenously selected by firms and determined by the firm's characteristics and environment (e.g., Ahern & Dittmar, 2012; Sila et al., 2016). In particular, there are two main sources of endogeneity in WOCB studies that may render the results invalid if not properly addressed: reverse causality, and omitted variables. On the one hand, the direction of causality between WOCB and financial performance is unclear because rather than WOCB increasing firm value, higher value firms may hire more women. Alternatively, women with better skills and more experience may self-select better performing firms (Adams & Ferreira, 2009). On the other hand, omitted variables that affect WOCB representation, FP, or both could bias the estimates. Some of these variables proxy for factors that are unobservable or difficult to measure. For example, managerial ability could influence director appointment decisions or firm value: powerful managers often appoint directors who are less likely to hold them accountable (Sila et al., 2016).

Prior empirical studies use several approaches to address the endogeneity problem. As in many other studies in corporate finance, several studies on WOCB use the instrumental variable approach. However, finding an exogenous instrumental variable for board diversity (that satisfies the orthogonal condition and is not correlated with the error term) is challenging. Sila et al. (2016) use the system GMM method. As explained in Roodman (2009), this method also has limitations, as it relies on the assumption of orthogonality of

internal instruments, which can become weaker as the number of lags and explanatory variables increases.

We make a methodological contribution by offering a solution to solve the endogeneity concern, which is to employ quasi-experimental methods and the DiD approach. This solution can be mobilized when there is an exogenous shock affecting a treatment group but not a comparable control group. In the current context, where gender quotas are not mandatory across all countries, this solution is applicable in future studies.

However, it should be noted that this methodology has certain limitations, which are relevant to our study. One is the constraint of the cross-national DiD design. While a standard DiD design often uses firms from the same nation or region to account for potential confounding factors such as regulatory disparities, economic conditions, and cultural differences (Yang et al., 2019), our focus diverges. Our treatment group consists of publicly traded firms in France, mandated to adhere to the Copé-Zimmermann law. Ideally, our control group would encompass private firms exempt from this law or firms from EU nations without such a gender quota regulation. However, sourcing fit variable data for private firms proved challenging. Moreover, throughout our focal research span (2006-2017), many EU nations instituted various gender quota regulations, as detailed in our literature review. Consequently, we adopted US firms, which were without a gender quota law until 2018 and had readily available fit variable data through the Bloomberg terminal, as our control group.

Another constraint of the DiD approach adopted in our study pertains to the extended post-treatment duration. In typical DiD frameworks, the post-treatment phase immediately follows the external shock. A primary concern with elongated durations is the potential emergence of other unanticipated interventions or events influencing the outcome variable. Such factors can introduce confounding variables, thereby biasing the DiD estimator. Notably, an extended post-treatment period is prevalent in Gender Diversity Reform studies, as observed in Fauver et al. (2022), primarily due to the inherent long grace periods associated with most related policies.

In light of the aforementioned limitations, we undertook parallel trend tests and other robustness tests, as described in this paper. These measures confirm the validity of our DiD approach in addressing our research questions and yielding reliable results. Future studies should adopt similar measures to handle the limitations inherent to this methodological approach.

Policy and managerial implications

Governments across different countries have adopted gender quotas to increase diversity in corporate boards. While gender quotas may impact board effectiveness, concerns have been raised about the potential impact on board dynamics, including conflicts arising from perceived differences in qualifications or experiences among directors, and the appointment of female directors that potentially undermines the principle of meritocracy. In this context, our results are relevant for companies, investors, and policy makers. Through the lens of the theories of similarity-attraction and social identity and the person-group fit literature, which put forward the hitherto unexplored notion of fit between women directors and the incumbents, we contribute to the understanding of the factors that could damage the effect of gender quotas. Specifically, while it is important to foster women's representation in corporate boards through gender-balancing quotas (Sarang et al., 2022), it is also essential to ensure the similarity between new female members and the incumbents in terms of social capital, human capital, and demographics.

Policy makers can evaluate the economic effects of legal measures to enhance equality on boards by investigating the degree of fit between newly recruited WOCB and the incumbents. In doing so, they should be able to identify whether the ultimate impact of these measures is on board functioning or simply on recognizing gender equality. Importantly, it should be noted that gender is only one source of diversity. Imposing gender quotas on corporate boards

helps increase the number of female directors, but there might be other sources of diversity, such as social capital, human capital, and demographics. These diversities operate along the different dimensions of fit in influencing the effectiveness of policy measures. Policy makers should go further than promoting equality between men and women to recognize equality between social groups within boards (for example, between ethnic groups or age groups).

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Appendix A. Variables' definition

Variable	Definition
	Panel A – Dependent variables
Tobin's q	[share price at end of calendar year * number of common stock outstanding at end of calendar year + liquidating value of the firm's preferred stock + current liabilities−current assets + book value of long-term debt] / book value of total assets (Chung & Pruitt, 1994).
ROA	Ratio of operating income to total assets.
	Panel B – Independent variables
Proportion of WOCB	Total number of WOCB divided by the total number of directors (Adams and Ferreira, 2009).
France	Dummy variable that equals 1 if the country is France, 0 if US. The sample includes French firms listed in the SBF 120 (the treatment group) and, alternately, matched US firms listed in the S&P 500 (the control group). France is a dummy variable that takes value 1 if the firm is in the treatment group.
Post	Dummy variable that equals 1 if the year is 2011 or later, 0 otherwise.
Gender	Dummy variable that equals 1 if the director is female, 0 otherwise.
Demographic fit	Mean of Age fit and Nationality fit.
Age fit	First, for each female director we find the proportion of the remaining board directors who have similar age. Then, we take the average across all female directors. Age: director's age by the fiscal year. We code directors as having similar age when the age difference is less than one standard deviation.
Nationality fit	First, for each female director we find the proportion of the remaining board directors who have the same nationality. Then, we take the average across all female directors.
Human capital fit	Mean of Top executive fit, Function fit and Director industry fit.
Top executive fit	First, for each female director we find the proportion of the remaining board directors who have the same value of the top executive experience variable. Then, we take the average across all female directors. Director's top executive fit is equal to 1 if a director is/was a top executive, 0 otherwise. Top executives encompass: CEO, chairman, VP (Vice-President), executive director or member of Executive Board.
Function fit	First, for each female director we find the proportion of the remaining board directors who have the same functional background. Then, we take the average across all female directors. Director's function background is a numerical variable equal to: 0, if "top executive" (see above) is equal to 1; 1; if the director's main function is in the output function (i.e., sales, marketing or R&D); 2, if the director's main function is in the throughput function (i.e., production, operation, process engineering or accounting); 3, if the director's main function is in the peripheral function (i.e., finance, law, labor relations or HRM).
Director industry fit	First, for each female director we find the proportion of the remaining board directors who have the same industry background. Then, we take the average across all female directors. Director's primary background (using 4-digit SIC code), two criteria: (a) if the director has C-suite positions in a company, we choose that industry as the director's primary industry background; (b) otherwise, we look at the industry in which a director has worked most years of his/her career.
Social capital fit	Mean of Education fit and Prestige school fit.

Appendix A. *Continued*

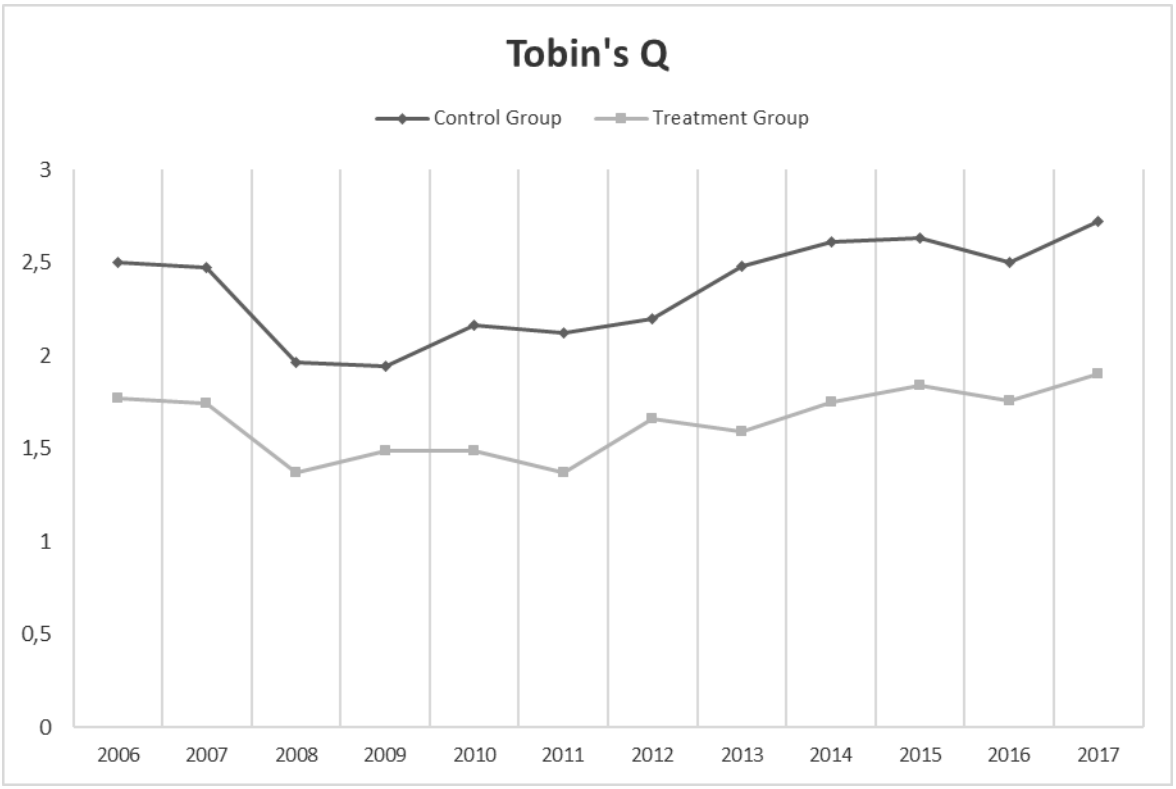
Variable	Definition
Education fit	First, for each female director we find the proportion of the remaining board directors who have the same level of education. Then, we take the average across all female directors. Education was coded into four categories: no diploma or degree (0); bachelor's degree (1); master's degree (2); and Ph.D. degree or equivalent (e.g., lawyer) (3).
Prestige school fit	First, for each female director we find the proportion of the remaining board directors who have the same value for the variable "elite school". Then, we take the average across all female directors. Following Nguyen (2012), we limited the French *Grandes Écoles* to the following: • Engineering schools: École Polytechnique, MINES ParisTech,[4] École des Ponts ParisTech, CentraleSupélec;[5] and ISAE-SUPAERO;[6] • Business schools: HEC (HEC School of Management), ESSEC (*École supérieure des sciences économiques et commerciales*) and ESCP Business School; • Three French elite institutions: École Nationale d'Administration (ENA); École normale supérieure, rue d'Ulm (Paris); and Sciences Po, Paris. This variable was coded using a dichotomous scheme, with 1 indicating that a board member had graduated from one of these *Grandes Écoles*, and 0 otherwise. Top 20 US (based on Shanghai Ranking 2010): Harvard University, University of California, Berkeley; Stanford University; Massachusetts Institute of Technology (MIT) and California Institute of Technology; Princeton University; Columbia University; University of Chicago; Yale University; Cornell University; University of California, Los Angeles; University of California, San Diego; University of Pennsylvania; University of Washington and University of Wisconsin – Madison; The Johns Hopkins University; University of California San Francisco; University of Michigan – Ann Arbor; University of Illinois at Urbana-Champaign and University of Minnesota Twin Cities. Top 20 Universities in Europe (based on Shanghai Ranking 2010): University of Cambridge; University of Oxford; University College London; Swiss Federal Institute of Technology Zurich and The Imperial College of Science, Technology and Medicine; Pierre and Marie Curie University – Paris 6; University of Copenhagen; Karolinska Institute; The University of Manchester and University of Paris Sud (Paris 11); Utrecht University; University of Zurich; University of Munich; The University of Edinburgh and King's College London; University of Heidelberg; University of Bristol; Uppsala University; Leiden University and University of Helsinki.

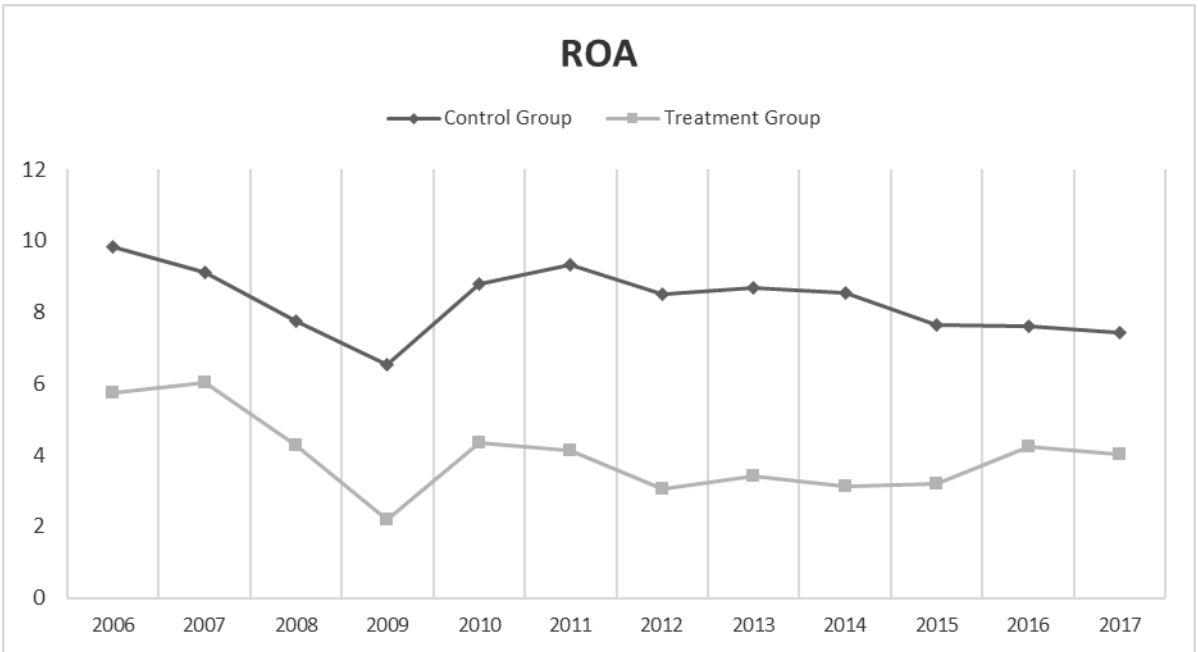
[4] *École des mines de Paris* also known as *Les Mines*.
[5] *CentraleSupélec* is the merger between two *Grandes Écoles* in France: *École Centrale Paris* (also known as *École Centrale* or *Centrale*) and *Supélec* (*École supérieure d'électricité*).
[6] *Institut supérieur de l'aéronautique et de l'espace* (ISAE-SUPAERO).

Appendix A. *Continued*

Variable	Definition
	Panel C – Control variables
Firm characteristics	
Firm size	Natural logarithm of total assets.
Leverage	Ratio of total debt to total assets.
R&D intensity	R&D-to-sales ratio (Honoré et al., 2015).
CAPEX intensity	Ratio of capital expenditures to assets from the previous year.
Market-to-book	Ratio of market capitalization to total assets.
Family firm	Dummy variable that equals 1 if the firm is a family firm, 0 otherwise. Any firm whose founder or a member of the founder's family is a blockholder (at least 20% of the voting rights) of the company is considered a family firm.
Board characteristics	
Board size	The logarithm of the number of directors on the board (Wintoki et al., 2012).
Board independence	The proportion of outside – non-executive – directors on the board.
CEO duality	Dummy variable that equals 1 if the CEO is also the Chairman of the board, 0 otherwise (Wintoki et al., 2012).
Board tenure	The average tenure – in years – of all directors.

Appendix B. Trend analysis – Tobin's Q and ROA in France and in the US over the sample period





Appendix C. Statistical tests of the common trend assumption on ROA and Tobin's q in France and the US

	ROA Before 2010		ROA After 2010		Tobin's q Before 2010		Tobin's q After 2010	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
France	98.99	0.807	-687.52	0.000	-40.77	0.293	74.53	0.005
Year	-0.45	0.000	-0.27	0.000	-0.07	0.000	0.05	0.000
France*Year	-0.05	0.799	0.34	0.000	0.02	0.300	-0.04	0.005
Constant	920.49	0.000	551.15	0.000	144.73	0.000	-103.70	0.000
Observations	1,423	1,423	2,423	2,423	1,423	1,423	2,423	2,423
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table reports results from random-effects GSL regressions to test the common trend assumption on ROA and Tobin's q in our samples of French and US firms. The variable *France* defines the treatment and control groups. The variable *Year* represents the sample years, taking values from 2006 to 2017. Columns (1) and (2) present results on the ROA trend between France and the US before 2010. The p-value implies that we do not reject the null hypothesis that the trend is different before 2010 (p-value is 0.799 on the interaction term *France*Year*). Following the same analysis, the ROA Columns (3) and (4) show that the change between the treatment group and control group is significantly different after 2010 (p-value is 0.000). Columns (5) and (6) show that the change in Tobin's q between the treatment and control group is NOT significantly different before 2010 (p-value is 0.3). Columns (7) and (8) show that change in Tobin's q between the treatment and control group is significantly different after 2010 (p-value is 0.000).