european corporate governance institute

ecgi

Closing the Gap: Board Gender Quotas and Hiring Practices

Finance Working Paper N° 520/2017
Revised December 2021

Daniel Ferreira
London School of Economics, CEPR and ECGI
Edith Ginglinger
Université Paris Dauphine, PSL and ECGI
Marie-Aude Laguna
Université Paris-Dauphine, PSL
Yasmine Skalli
Université Paris-Dauphine, PSL

© Daniel Ferreira, Edith Ginglinger, Marie-Aude Laguna and Yasmine Skalli 2021. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

This paper can be downloaded without charge from:
https://doi.org/10.67929/ecgi-fin-520-2017

european corporate governance institute

ECGI Working Paper Series in Finance

Closing the Gap: Board Gender Quotas and Hiring Practices

Working Paper N° 520/2017

December 2021

Daniel Ferreira
Edith Ginglinger
Marie-Aude Laguna
Yasmine Skalli

This paper updates and replaces a previous version which circulated under the title: "Board Quotas and Director-Firm Matching." We thank Renée Adams, Ulf Axelson, Jean-Noël Barrot, Virginie Beck-Friis (Leyders Associates), Helen Bollaert, Eric de Bodt, Sabri Boubaker, Catherine Casamatta, Thomas Chemmanur, Mark Chen, Francesca Cornelli, Zsuzsanna Fluck, Laurent Germain, Espen Eckbo, Slava Fos, Mariassunta Giannetti, Alberta di Giuli, Moqi Groen-Xu, Maria Guadalupe, Camille Hébert, Harrison Hong, Raj Iyer, Mathias Kronlund, Adriana Lleras-Muney, Igor Makarov, Ian Martin, Bill Megginson, Roni Michaely, Daniel Paravisini, Guillaume Pijourlet, Sébastien Pouget, Manju Puri, Estefania Santacreu-Vasut, Paola Sapienza, Antoinette Schoar, Bogdan Stacescu, David Stolin, Karin Thorburn, Grzegorz Trojanowski, Michela Verardo, Shan Zhao, seminar participants at LSE, Paris-Dauphine, Essex, Exeter, Cardiff, Lancaster, Lille, UC Milano, Toulouse, and the University Paris-Diderot, and many conference participants for comments. Edith Ginglinger, Marie-Aude Laguna, and Yasmine Skalli acknowledge support from the ANR (10- IDEX0001-02 PSL).

© Daniel Ferreira, Edith Ginglinger, Marie-Aude Laguna and Yasmine Skalli 2021. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

Abstract

We study the impact of board gender quotas on firms' hiring and retention practices. Female director tenure increases following the introduction of a quota in France in 2011, with stronger effects among less gender-diverse firms and firms that use networks for hiring. Female directors hired after the quota are more independent, more experienced, more internationally diverse, and no less academically qualified than those hired before the quota. The gender gaps in most director characteristics also narrow. The evidence suggests that board gender quotas force firms to change their hiring practices, which allow firms to tap into a deeper talent pool.

Keywords: Corporate Boards, Gender Quotas, Corporate Governance, Labor Markets, Matching, Turnover

JEL Classifications: G34, G38, J70, J63

Daniel Ferreira*
Professor of Finance
London School of Economics, Department of Finance
Houghton Street
London, WC2A 2AE, United Kingdom
phone: +44 207 955 7544
e-mail: d.ferreira@lse.ac.uk

Edith Ginglinger
Professor of Finance
Université Paris Dauphine
Place du Maréchal de Lattre de Tassigny
75775 Paris cedex 16, France
e-mail: edith.ginglinger@dauphine.fr

Marie-Aude Laguna
Associate Professor of Finance
Université Paris-Dauphine
Place du Maréchal de Lattre de Tassigny
75775 Paris cedex 16, France
phone: +33 144 054 536
e-mail: Marie-Aude.Laguna@dauphine.fr

Yasmine Skalli
Researcher
Université Paris-Dauphine
Place du Maréchal de Lattre de Tassigny
75775 Paris cedex 16, France
e-mail: yasmineskalli@hotmail.fr

*Corresponding Author

Closing the Gap: Board Gender Quotas and Hiring Practices*

Daniel Ferreira
London School of Economics, CEPR and ECGI

Edith Ginglinger
Université Paris–Dauphine, PSL

Marie-Aude Laguna
Université Paris–Dauphine, PSL

Yasmine Skalli
Université Paris–Dauphine, PSL

November 2021

Abstract

We study the impact of board gender quotas on firms' hiring and retention practices. Female director tenure increases following the introduction of a quota in France in 2011, with stronger effects among less gender-diverse firms and firms that use networks for hiring. Female directors hired after the quota are more independent, more experienced, more internationally diverse, and no less academically qualified than those hired before the quota. The gender gaps in most director characteristics also narrow. The evidence suggests that board gender quotas force firms to change their hiring practices, which allow firms to tap into a deeper talent pool.

* This paper updates and replaces a previous version which circulated under the title: "Board Quotas and Director-Firm Matching." We thank Renée Adams, Ulf Axelson, Jean-Noël Barrot, Virginie Beck-Friis (Leyders Associates), Helen Bollaert, Eric de Bodt, Sabri Boubaker, Catherine Casamatta, Thomas Chemmanur, Mark Chen, Francesca Cornelli, Zsuzsanna Fluck, Laurent Germain, Espen Eckbo, Slava Fos, Mariassunta Giannetti, Alberta di Giuli, Moqi Groen-Xu, Maria Guadalupe, Camille Hébert, Harrison Hong, Raj Iyer, Mathias Kronlund, Adriana Lleras-Muney, Igor Makarov, Ian Martin, Bill Megginson, Roni Michaely, Daniel Paravisini, Guillaume Pijourlet, Sébastien Pouget, Manju Puri, Estefania Santacreu-Vasut, Paola Sapienza, Antoinette Schoar, Bogdan Stacescu, David Stolin, Karin Thorburn, Grzegorz Trojanowski, Michela Verardo, Shan Zhao, seminar participants at LSE, Paris-Dauphine, Essex, Exeter, Cardiff, Lancaster, Lille, UC Milano, Toulouse, and the University Paris-Diderot, and many conference participants for comments. Edith Ginglinger, Marie-Aude Laguna, and Yasmine Skalli acknowledge support from the ANR (10-IDEX0001-02 PSL). Email addresses: d.ferreira@lse.ac.uk; Edith.Ginglinger@dauphine.fr; Marie-Aude.Laguna@dauphine.fr; yasmineskalli@hotmail.fr.

1. Introduction

The introduction of mandatory gender quotas is one of the most radical regulations constraining the rights of shareholders to choose their representatives on corporate boards. Beginning with Norway, many European countries have recently passed similar gender quota laws, including Italy, Belgium, France, The Netherlands, Spain, and Germany. This trend has spread beyond Europe, with India, Israel, and, more recently, the state of California also enacting board gender balancing laws.

The market for corporate directors may exhibit search and matching frictions, such as search costs, information asymmetries, geographic distance, and network effects. In the face of such frictions, firms' choices of hiring practices – *search technologies*, in the terminology of Diamond and Maskin (1979) – can have significant consequences. The introduction of gender quotas disrupts the equilibrium outcomes of directorial labor markets, which may force firms to adopt different search technologies. The adoption of new search technologies can then lead firms to change the composition of their boards, resulting in boards that are not only more gender diverse, but also different in other dimensions.[1]

In this paper, we study how board quotas affect firms' hiring and retention practices. We consider the introduction of a mandatory gender balance law in France in 2011. We find that the departure rate of female directors falls after the introduction of the quota, while the departure rate of male directors does not change. After the quota, the median female director has 78% longer tenure than the median male director; before the quota, this difference was 14%. This finding suggests that firms use retention of female directors as a tool for adjusting to the quota. We also document an increase in the arrival rate of female directors and a decrease in the arrival rate of male directors. These findings suggest that, perhaps because of search frictions, firms find it costly to comply with the quota law.

Our research design uses only male-female differences that are not explained by firm-level variables (such as size or performance). We can perfectly control for any fixed or time-varying firm characteristic by using firm-year fixed effects.[2] Thus, time-varying trends in the demand for particular director attributes or aggregate changes in labor supply cannot explain the observed changes in gender differences.

---

[1] Although it is difficult to measure the value implications of individual board characteristics, some recent works find significant value effects of changes in board composition (Giannetti, Liao, and Yu, 2015; Hauser, 2018; Jenter, Schmid, and Urban, 2018).

[2] Our approach is similar to that of, e.g., Jiang, Wan, and Zhao (2016), who use within-board variation to study the voting behavior of corporate directors in China. See also Fos and Tsoutsoura (2014).

If there were no frictions in the directorial labor market, how should firms adjust to board quotas? In that case, firms could replace male directors with newly hired female directors without changing any other relevant board characteristic. In particular, if the directorial labor market is frictionless, the introduction of quotas should not affect the departure rate of female directors. The fact that, after the quota, firms retain female directors for longer suggests that firms face (perceived or real) search costs associated with the hiring of new female directors.

Firms whose search technologies rely more on networks in which women are underrepresented may face higher search costs when hiring female directors after the quota. Consistent with this interpretation, we find that the quota effect on the gender departure gap is more substantial for firms that are farther from the quota threshold and those with a larger the proportion of elite Grandes Ecoles graduates on the board. The latter is in line with Nguyen (2012) and Kramarz and Thesmar (2013), who argue that a Grande Ecole degree is a good proxy for membership in elite business networks in France.[3]

We also show how director characteristics change after the quota. We begin by documenting the existence of significant gender gaps in director characteristics in France. Before the introduction of the quota, female directors were significantly younger, less independent, less experienced, and less likely to have studied at an elite school than male directors. A natural concern is that quotas could widen such gaps by forcing firms to hire even less qualified female directors. Our evidence reveals that the opposite has happened: After the quota, most director characteristic gaps have either narrowed or remained unchanged. We find that, after the introduction of the quota, boards become not only more gender-diverse, but also more independent. Post-quota female directors are more independent, more experienced, and more internationally diverse than those hired before the quota. Most other gender gaps – qualification, expertise, age, and board assignments – have been narrowed or remained unchanged. These results are in line with those of Bertrand, Black, Jensen, and Lleras-Muney (2019) on the qualifications of female directors hired on Norwegian boards following the introduction of a gender quota. Moreover, we show that the career prospects of female directors have improved. Before quotas, the number of positions held by women was a quarter lower than that of their male

[3] The labor market for directors in France is particularly interesting because of its reliance on one particular network – *Grandes Ecoles* graduates – whose (mainly male) members are disproportionally represented on corporate boards. Although different in nature, the *Grandes Ecoles* have strong similarities with the most prestigious and elitist fraternities in the United States, such as the *Phi Betta Kappa* honor society. Yet, French Grande Ecoles networks are more visible and easier to measure than most of their foreign counterparts. Moreover, as shown by Kramarz and Thesmar (2013) and Bertrand, Kramarz, Schoar, and Thesmar (2018), this overrepresentation of Grandes Ecoles may have real adverse effects on firms' governance and profitability.

counterparts. After the quotas, the gender gap completely closed in a few years. Overall, we observe a push towards "closing the gender gaps" in board director characteristics.[4]

All in all, our evidence suggests that firms find it challenging to hire female directors after the quota, even though post-quota female directors display smaller gaps in observable characteristics relative to male directors. One possible explanation for this puzzle is that the introduction of a quota forces firms to abandon search technologies that under-recruit qualified women. An alternative search technology could allow firms to tap into a deeper talent pool, thus explaining the selection of more qualified female directors after the quota.[5] However, changing search technologies could be costly, explaining why some firms may instead prefer to retain female directors for longer.

A particular example of search technology is the practice of recruiting directors mostly through boards' social networks. Because there are few women in networks of *Grandes Ecoles* graduates, reliance on such a network naturally leads to the underrepresentation of women on boards. In principle, the use of such networks may be both rational and efficient: Employers may find it easier to evaluate candidates who are similar to themselves (see Cornell and Welch, 1996). However, the use of networks may also be a consequence of search frictions (see Mailath, Samuelson, and Shaked, 2000).[6] We find that both male and female directors appointed after the quota are less likely to be *Grandes Ecoles* graduates, leading to a significant drop in the proportion of *Grandes Ecoles* graduates on French boards. Furthermore, around the quota, companies began to recruit more and more women directors internationally. These facts suggest that the quota may have created

[4] The counter-intuitive effects of gender quotas on the quality of newly hired female directors echo the findings in the literature that studies gender quotas in politics. Contrary to the expectations of quota critics, Besley, Folke, Persson, and Rickne (2017) show evidence that gender quotas in political elections in Sweden did not affect the competence of elected women. Baltrunaite, Bello, Casarico, and Profeta (2014) similarly show that gender quotas in Italy improved the average educational attainment of elected politicians.

[5] This argument has been used in the literature on affirmative action policies: "Whereas the policy is costly when it distorts the selection of the best-qualified individual, this need not be the case when the initial selection is suboptimal. If the best-qualified candidates fail to be selected or fail to apply, then the introduction of affirmative action may reduce if not eliminate these costs" (Niederle, Segal, and Vesterlund, 2013, p. 1).

[6] A related but different explanation for the importance of networks is the hypothesis that elitist firms may have a higher propensity to stereotype women as being less competent at board work. Bordalo, Coffman, Gennaioli, and Shleifer (2019) provide evidence that people tend to overestimate the performance of men in male-type domains (see also Bordalo, Coffman, Gennaioli, and Shleifer (2016) and Jouini, Karenhke, and Napp (2018) for theories of stereotypes). See also Reuben, Sapienza, and Zingales (2015) on stereotypes and the under-representation of women in science.

incentives for firms to change their search technologies, from networks to executive search firms, regardless of director gender. We briefly discuss some additional anecdotal evidence in line with this interpretation at the end of the article.

By considering the consequences of the introduction of the quota on director characteristics and turnover, we hope to learn how the market for corporate directors functioned *before* the quota. As the quota disrupts the existing equilibrium, observing how firms and directors react to this shock helps us learn something about the old equilibrium. A different question is what the characteristics of the new equilibrium will be. Because the transition period is very long, we cannot answer this question with confidence; director characteristics and turnover rates may still change over the years as they adjust to the new equilibrium, making it difficult to estimate long-run causal effects credibly.

Our work relates to contemporaneous studies on gender quotas, as Bertrand, Black, Jensen, and Lleras-Muney (2019), who show that the introduction of a gender quota on the boards of Norwegian companies improved some observable characteristics of female appointees, such as CEO experience and education. Similarly, Ferrari, Ferraro, Profeta, and Ponzato (2018) find a similar effect of gender quotas in Italy and show that post-quota directors are generally more educated (see also, Comi, Grasseni, Origo, and Pagani, 2020). In addition to showing related results for France, our main contribution is to estimate the effect of the quota on female director retention rates and to investigate the importance of director networks on recruitment and retention decisions. Our work also differs in methodology and focus: We use within firm-year variation to estimate the effect of the quota on a wider range of variables studied in the corporate board literature, such as independence, industry expertise, number of positions, participation in key committees, and nationality, among others. Importantly, our objective is not only to analyze the competence / quality of the directors recruited after the quotas, but to analyze the impact of quotas on companies' recruitment practices.

In recent work, Hwang, Shivdasani, and Simintzi (2020) and Greene, Intintoli, and Kahle (2020) both study the effect of the California quota on stock returns and argue that observed negative effects are explained by firms not having access to a sufficiently large pool of qualified female candidates.[7] Von Meyerinck, Niessen-Ruenzi, Schmid, and Solomon (2019) find similar performance effects of the quota, but attribute most of that effect to investors learning about Californian legislators' regulatory preferences On the other hand, Ferrari,

[7] Hwang, Shivdasani, and Simintzi (2020) document an expertise mismatch between female and male directors and find no increase in the number of positions or in core committee positions for female directors. They interpret their results in terms of mismatch and search frictions mainly driven by female under-supply effects.

Ferraro, Profeta, and Ponzato (2018) find that the announcement and introduction of quotas in Italy had a positive impact on stock returns. Although such results are not exactly comparable to ours or those of Bertrand, Black, Jensen, and Lleras-Muney (2019), they highlight the extent to which more evidence is needed before concluding whether board quotas have negative or positive effects on the qualifications of female directors and the functioning and practices of boards.

Our results relate to the literature on the effect of affirmative action policies on gender differences. For example, Niederle, Segal, and Vesterlund (2013) show experimental evidence that the introduction of female "quotas" for winners in a competitive tournament increases the supply of qualified female participants. Another study that shows evidence of possible frictions in the selection of men versus women is Kaplan and Sorensen (2016). They find no significant differences between men and women with respect to observable characteristics. Nonetheless, after controlling for these characteristics, women are still less likely to be hired as CEO than men.

This paper contributes to a recent literature on the labor market for corporate directors, with a focus on director appointments and match formation (see e.g., Akyol and Cohen, 2013; Denis, Denis, and Walker, 2015; Matveyev 2016; Fahlenbrach, Kim, and Low, 2017; Adams, Akyol, and Verwijmeren, 2018; Becher, Walkling, and Wilson, 2017; Cai, Nguyen, and Walkling, 2017). Our main contribution to this literature is to show how the market for corporate directors functioned before the introduction of the quota, which disrupted the existing equilibrium. Our findings suggest that search frictions are important features of this market.

This paper also contributes to a recent literature on board diversity (Adams and Ferreira, 2009; Adams and Funk, 2012; Adams and Kirchmaier, 2016; Schmid and Urban, 2016; Schwartz-Ziv, 2017; Kim and Starks, 2016; Carter, Franco and Gine, 2017; Bernile, Bhagwat, and Yonkers, 2018; Giannetti and Zhao, 2017), in particular to the literature on the consequence of quotas in Norway (mostly) and in other countries (Nygaard, 2011; Ahern and Dittmar, 2012; Matsa and Miller, 2013; Bøhren and Staubo, 2014, 2015; Bertrand, Black, Jensen, and Lleras-Muney, 2019; Eckbo, Nygaard and Thorburn, 2019; Reberioux and Roudaut, 2019; von Meyerinck, Niessen-Ruenzi, Schmid, and Solomon, 2019; Hwang, Simintzi, and Shivdasani, 2019; Greene, Intintoli, and Kahle, 2020). More broadly, this paper is related to the literature on male-female differences in behavior and labor market outcomes for executives and other high-skill workers (e.g., Bertrand, Goldin, and Katz, 2010; Huang and Kisgen, 2013; Tate and Yang, 2015; Faccio, Marchica, and Mura, 2016; Azmat and Ferrer, 2017; Duchin, Simutin, and Sosyura, 2018; Hebert, 2018; Bennedsen, Tsoutsoura, Simintzi, and Wolfenzon, 2018; Del Carpio and Guadalupe, 2018; Egan, Matvos, and Seru, 2018; Keloharju, Knüpfer, and Tåg, 2019). Our paper is also related to the vast literature on CEO and director turnover, which

focuses mostly on the links between performance and turnover. Our focus is, however, quite different; by construction, our measure of residual turnover is free from the effect of performance and other firm-level variables.[8]

2. Institutional Background

In this section, we describe some of the institutional details that are relevant for our analysis: Board gender quotas in France (Subsection 2.1), board regulations in France (Subsection 2.2), and French business elites (Subsection 2.3).

2.1 Board gender quotas

In France, the Zimmermann-Copé law, adopted on January 27, 2011, requires a minimum of 20% of women on company boards from January 2014 on, rising to 40% on January 1, 2017. When a firm has a dual board (a supervisory board and a management board), the law applies only to the supervisory board. Within boards, the quota applies to all members—insiders and outsiders—with one exception: Directors representing employees, who are usually union representatives.

The law applies to all listed companies and to non-listed companies employing at least 500 employees[9] or with revenues of at least EUR 50 million. The legal forms that are subject to this law are limited liability corporations (*Sociétés Anonymes*), limited partnerships that include at least one general partner plus some limited partners who buy shares in the entity (known as "*commandite par actions*" corporations), and Societas Europaea (the European company statutes). All listed companies have to adopt one of these three legal forms. Non-listed companies can opt for other legal forms, which are not subject to quotas (SARL, *sociétés à responsabilité limitée*, which have no boards, or SAS, *sociétés anonymes simplifiées*, in which boards are optional). Because we consider only large listed firms in France, the quota applies to all of them. Notice that delisting is not sufficient to avoid the quota; we find no evidence of delisting to adopt a different legal form.

[8] See, e.g., Warner, Watts, and Wruck (1988), Weisbach (1988), Denis and Denis (1995), Parrino (1997), Huson, Parrino, and Starks (2001), Fee and Hadlock (2004), Yermack (2004), Bushman, Dai, and Wang (2010), Kaplan and Minton (2012), Peters and Wagner (2014), Jenter and Kanaan (2015), Cornelli and Karakas (2015), Bates, Becher, and Wilson (2016), Fahlenbrach, Low, and Stulz (2017), and Bonini, Deng, Ferrari, and John (2017).

[9] A new bill passed on August 5, 2014, lowering the threshold from 500 to 250 employees from January 1, 2020.

The quota bill was first proposed and commented on the media in March 2009. It was submitted to the French National Assembly on December 3, 2009, and adopted in a first reading on January 20, 2010. The parliamentary debates continued from 2010 to January 2011, when the law was formally approved. We choose 2010 as the event year since by early 2010, firms would already know that the quota had been passed its first reading. Most results are similar if we use 2009 or 2011 instead.

For several years now, many European countries have had several high-profile policy debates about quotas on company boards. Norway was the first country to adopt such a law in 2003, which was implemented in 2008, requiring a minimum of 40% of board directors from each gender. On November 14, 2012, the European Commission adopted a proposal for a directive setting a minimum objective of having 40% of the under-represented gender in non-executive board-member positions in listed companies in Europe by 2020. This directive is still under debate. Meanwhile, several countries adopted regulations requiring greater representation of women on boards. The two countries closest to France are Italy and Belgium. Both countries passed a one-third quota law, which became effective from 2015 (Italy) and 2017 (Belgium). Even Germany, initially reluctant to consider quotas, adopted in December 2014 a law establishing a gender quota of 30%, which became effective in 2016 for the largest listed companies.

2.2 Boards in France

Under French law, the size of the board may range from three to 18 members. French firms can adopt either a unitary board or a dual board, with a supervisory board and a management board. The maximum term for a director is six years, but directors can serve on multiple consecutive terms. Thus there is no biding constraint on a director's tenure.

According to the AFEP-MEDEF code, independent directors should account for at least half the members of the board in widely-held companies. In closely-held companies, independent directors should account for at least a third of the board. After twelve years on the board, independent directors lose their independent status. The governance code recommends that the outside directors meet periodically without the executive directors. An outside director should not hold more than five directorships in listed corporations, including foreign corporations. An executive director should not hold more than three directorships in listed corporations, including foreign corporations. This limit does not apply to directorships held in subsidiaries and holdings.

French law does not cover the number or composition of board committees, which are determined by each board. However, French firms typically have at least three committees: audit, nomination, and compensation.

2.3 French Business Elites

The higher education system in France has two separate blocks: universities and elite establishments called *Grandes Ecoles.* In contrast with universities, where entrance after high school is guaranteed by law, Grandes Ecoles are highly selective and their students represent only 5% of the total of those who enroll in higher education each year. In addition to excellent high school records, the selection entrance at Grandes Ecoles is based upon an examination that requires two years of intensive preparation (*Classes Préparatoires aux Grandes Ecoles*).

In France, the majority of business and governmental elites (administrative, scientific, and executive) are former students of the Grandes Ecoles. For instance, around two-thirds of the chief executives in France's largest firms graduated from the Grandes Ecoles (for more details, see Dudouet and Joly, 2010). Due to historical reasons, these business elites not only benefit from a highly selective education but also pervasive political and social connections. After World War II, numerous former civil servants (from the Ministry of Finance or the Ministry of Industry) who graduated from the Grandes Ecoles began to be hired at top-level management positions by big companies (especially state-owned and privatized companies) (for more details, see Bertrand, Kramarz, Schoar, and Thesmar, 2018).

A second distinctive feature of Grandes Ecoles is the under-representation of women among the student body. According to Albouy and Wanecq (2003), among graduates from *Grandes Ecoles* who were born during the 1949-1958 period, 2,432 are male and 546 are female (respectively 1,829 and 732 among graduates who were born during the 1959-1968 period). Ecole Polytechnique (the top engineering Grande Ecole) did not accept female candidates until 1972 and had in 2015 less than 20% female students. Moreover, between 1989 and 2009, the proportion of female graduates from the Ecole Nationale d'Administration was only around 25-30% (Larat, 2015).

3. Data

We analyze an unbalanced panel of corporate directors over the period 2003 to 2017 using data from Management Diagnostic's BoardEx database. The sample consists of 5,189 firm-year observations for 706 unique French firms. For comparison, we also use 94,013 firm-year observations for 14,162 individual U.S. firms.[10] Most firms are publicly listed, but BoardEx also has data on some large private companies.

[10] Other European countries are less useful as "quota-free" comparators. In addition to the fact that several other European countries have introduced quotas, the European Commission published in 2012 a proposal for a directive on improving the gender balance among directors, which is still

Table 1 presents selected summary statistics of firm characteristics for two subsamples: Before and after 2010 (see Appendix A1 for the definition of all variables used in this section). The average firm size (book assets) in France is similar before and after 2010. French firms display significantly lower returns on assets after 2010. Such differences underscore the importance of controlling for time-varying firm effects.

Table 1 reveals that French boards are larger and have a lower proportion of independent directors (i.e., non-executive directors who are classified as independent by BoardEx) than U.S. boards. Changes in board size and independence in both countries largely reflect changes in sample composition: There are many more firms in the BoardEx sample in more recent years, including a large number of private U.S. companies recently added to the database. Before 2010, both France and the U.S. had similar proportions of female directors: 9% and 8%, respectively. After 2010, there is a significant change: France now has 24% of female directors, while the U.S. has 10%.

We use data at the directorship level. The unrestricted sample includes 52,010 director-firm-year observations for France and 713,162 director-firm-year U.S. observations. In our analysis, we use only outside (i.e., non-executive) directors; thus, we exclude 11,535 director-firm-year observations for France and 158,373 director-firm-year observations for the U.S. in which the director is an executive of the firm. We also exclude observations with missing values for age and tenure, which leaves us with a sample of 36,817 director-firm-year observations for France and 525,799 observations in the U.S. sample. Because of missing data, the sample is smaller when we use some selected outcome variables.

Table 2 compares outside director characteristics between France and the U.S. by gender.[11] The average number of board seats held by male directors is virtually identical in both countries (2.13 board seats), which suggests that the markets for corporate directors in these countries share some similarities. However, among French boards, female directors hold fewer board seats (1.87 seats) than do male directors, while among U.S. boards, the reverse is true; female directors hold an average of 2.78 seats.

Relative to male directors, female directors are younger and more likely to be formally independent. There is a gender gap in top executive experience, which is slightly more pronounced in France than in the U.S. sample. The gender gap in industry expertise is larger in France (6 percentage points) than in the U.S. (2 percentage points).

---

on the council agenda. Some European countries, such as the UK, have also adopted soft laws in their corporate governance codes.

[11] Table IA.1, in the Internet Appendix, replicates Table 2 with the unrestricted sample.

In France, female directors are also less likely than their male counterparts to be a graduate from a set of nine elite Grandes Ecoles.[12] The difference is substantial: While 38% of all male directors come from this small set of schools, only 22% of female directors hold similar degrees. This fact is not surprising, given that Grandes Ecoles (especially Ecole Nationale d'Administration and most engineering schools) have a relatively small proportion of female students. In our sample, the school with the lowest representation of female directors is Ecole Polytechnique, with slightly less than 7% of female directors among its graduate-directors.[13] By contrast, in the U.S., 28% of all directors hold an Ivy League degree, with no difference between male and female directors. The difference between France and the U.S. reflects the highly selective and unique nature of the French higher education system, in that more prestigious schools tend to have more significant gender imbalances.

4. Gender Gaps in Turnover

How do firms adjust to board gender quotas? To comply with the law, firms need to change their recruitment and retention policies. In this section, we investigate the effect of the quota on director arrival and departure rates. In 3.1, we define these rates and explain how they relate to board gender quota targets. In 3.2, we offer some predictions under different assumptions about the functioning of the market for directors. In 3.3, we show our empirical results.

4.1 Arrival and Departure Rates

To clarify the mechanics of how firms adjust to board quota policies, here we derive an expression for the change in the policy variable (the proportion of women on the board) as a function of the gender gaps (i.e., differences) in director arrival and departure rates.

Let $\omega_0 = \frac{W}{W+M}$ denote the proportion of women on the board at year $t = 0$, where W is the number of women, and M is the number of men on the board. At year $t = 1$, we have

[12] We consider the following schools as elite *Grandes Ecoles*: Ecole Polytechnique Paris, Corps des Mines, Mines Paristech, Centrale Paris, Ecole des Ponts Paristech, Telecom Paristech, Supelec, HEC Paris, and ENA.

[13] Tables IA.2 to IA.5, in the Internet Appendix, show detailed descriptive statistics of director characteristics for graduates of Grandes Ecoles, Ecole Polytechnique, Ecole Nationale d'Administration, and Ecole des Hautes Etudes Commerciales (HEC) de Paris.

$$\omega_1 = \frac{W + N_w - E_w}{W + M + N_w - E_w + N_m - E_m}, \tag{1}$$

where N_w and N_m are the numbers of newly appointed women and men, respectively, and E_w and E_m are the number of women and men, respectively, who exited the board. Define the *net arrival rates* for men and women, respectively, as

$$\eta_m = \frac{N_m - E_m}{M} \tag{2}$$

and

$$\eta_w = \frac{N_w - E_w}{W}. \tag{3}$$

We can then write ω_1 in terms of net arrival rates and the initial proportion of women:

$$\omega_1 = \frac{(1 + \eta_w)W}{W + M + \eta_m M + \eta_w W} = \frac{(1 + \eta_w)\omega_0}{1 + \eta_m(1 - \omega_0) + \eta_w \omega_0}. \tag{4}$$

The change in the proportion of women is then

$$\omega_1 - \omega_0 = \frac{\omega_0(1 - \omega_0)(\eta_w - \eta_m)}{1 + \eta_m + \omega_0(\eta_w - \eta_m)}. \tag{5}$$

Finally, define the *(gender) arrival rate gap* and the *(gender) departure rate gap* as:

$$\alpha = \frac{N_m}{M} - \frac{N_w}{W} \tag{6}$$

and

$$\delta = \frac{E_m}{M} - \frac{E_w}{W}. \tag{7}$$

Thus, we have

$$\omega_1 - \omega_0 = \frac{\omega_0(1-\omega_0)(\delta-\alpha)}{1+\eta_m+\omega_0(\delta-\alpha)}. \quad (8)$$

In sum, for an initial level of the policy variable, ω_0, this variable increases only if the departure rate gap is larger than the arrival rate gap (i.e., if $\delta > \alpha$). Equation (8) also shows that firms can increase the speed of adjustment to a quota in three non-mutually exclusive ways: (i) a smaller arrival rate gap, (ii) a larger departure rate gap, and (iii) a lower net arrival rate for men.

In Subsection 3.3, we obtain estimates of the effect of the quota on α and δ (and also on η_m in some specifications). We use these estimates to make inferences about how firms choose to adjust to the quota shock.

4.2 Predictions

Consider first, as a benchmark, a frictionless labor market for directors, with sufficiently large numbers of both men and women who are qualified for board work. In particular, suppose there is a slack labor market for female directors. For an initial value of the policy variable ω_0, it is thus possible to adjust to any desired target $\overline{\omega} > \omega_0$ by replacing the required number of men with newly hired women. Alternatively, firms can fire men without replacement, reduce the departure rate of women, or both. However, if a firm does not want to change the size of its board nor the average tenure for incumbent directors, replacing men with newly hired women is the most efficient method of complying with the quota. We assume that this is the case in our frictionless benchmark. After the quota, we should then see a decrease in the arrival rate gap, driven both by lower arrival rates for men and by higher arrival rates for women. If there is sufficient time for adjustment, firms should also not change the male departure rate, so the departure gap should be unchanged. In sum, in the frictionless benchmark, after the quota, we expect (i) a decrease in the arrival rate gap and (ii) no change in the departure rate gap.

In contrast with this frictionless benchmark, some firms may face – real or perceived – increasingly higher costs of hiring female directors. That is, the labor market for female directors may be tight. In this case, firms that either cannot or do not wish to hire more female directors can still adjust to the quota by decreasing the departure rate of female directors. In this case, we predict (i) a decrease in the arrival rate gap and (ii) an increase in the departure rate gap.

Comparing the empirical predictions of these two extreme cases, note first that, in both cases, the arrival gap decreases. In a slack labor market for female directors, all adjustments work through arrival rates, and thus the departure gap should not change. In a tight labor market for female directors, firms may instead choose to decrease the female departure rate and increase the male departure rate (board size would decrease so that the quota could be met without having to hire new women), implying an increase in the departure gap. But the arrival rate of women should not change; the lower arrival of men should fully explain any change in the arrival gap.

We expect reality to lie somewhere between these two extremes. Less-constrained firms should adjust more through the arrival gap and less through the departure gap. Our null hypothesis is that of a slack market, so that the change in the departure gap (δ) due to the quota is zero. The alternative hypothesis is that the quota has a positive effect on the departure gap. We would expect to see more constrained firms to experience both larger increases in the departure gap and lower decreases in the arrival gap.

4.3 Empirical Results

We consider two outcome variables: a departure indicator and an arrival indicator. The departure indicator takes the value of one at year t if the director is no longer listed as a director of the same firm in year $t+1$. The arrival indicator takes the value of one at year t if the director is not listed as a director of the same firm in year $t-1$. In the year in which a firm leaves the sample (typically 2017), director departure information is missing. Similarly, in the year in which a firm first appears in the sample, director arrival information is missing. Thus, the sample is mechanically reduced when we use departure and arrival data. In Table 3, we show average departure and arrival rates for directors, before and after (including) 2010, for both France and the U.S. samples. Both departure and arrival rates are higher in France than in the U.S. sample. Average departure and arrival rates do not differ meaningfully before and after 2010.

Let y_{dft} be a director-level outcome variable (e.g., the departure indicator or the arrival indicator) for director d in firm f at fiscal year t and let w_d take the value of 1 if director d is female and zero otherwise. We use y and w to denote the random variables associated with these variables. We define the *gender gap in variable* y as

$$g_y \equiv E(y|w=0) - E(y|w=1). \tag{9}$$

In words, the gender gap is the difference between the mean value of y for male and female directors. We can estimate g_y by a simple regression of y_{dft} on w_d and a constant, or equivalently, by the difference in means between the two groups.

Figure 1 shows the evolution of departure rates by gender in France; the difference between the two lines is the departure rate gap. To avoid composition effects, in this figure, we use a balanced panel of firms with available data from 2006 to 2016. Some patterns are visible. First, male departure rates are higher than female departure rates, both before and after the quota. That is, the departure gender gap is positive. Second, before the quota, male and female departure rates seem to co-move; such co-movement is no longer visible after the quota. Third, if anything, before 2010, the gender gap was narrowing with time, with men and women experiencing very similar departure rates in 2009. Fourth, male departure rates show no clear trend, both before and after the quota, until the last year for which we observe arrivals, 2016, when the male departure rate shoots up significantly (2017 is the year when the second stage of the quota became effective).



Figure 1: Departure Rates in France

Male departure rates are plotted in light grey. Female departure rates are plotted in black. The sample is based on a balanced panel of firms with data since 2006.

Figure 1 also shows that female departure rates fall significantly upon the announcement of the quota (2010) and remain at lower levels since then (again, there is a slight trend up in 2016, mirroring the pattern for men). Overall, Figure 1 strongly suggests that female departure rates fall significantly after 2010, while male departure rates remain stationary until the end of 2015. The departure rate gap increases substantially after 2010.

Figure 2 shows the evolution of arrival rates. Female arrival rates are higher than male arrival rates; the arrival rate gap is negative. Before 2010, the arrival gap is mostly stable. The gap widens significantly in

2010 and then gradually narrows. Throughout the quota period, female arrival rates remain at levels mostly above those from the pre-quota period. Note that, by definition, arrival rates are higher in periods of high board turnover. Unless board turnover rates permanently increase, we should expect female arrival rates to return to their pre-quota level once firms reach their targets. Arrival rates for men decrease after the quota, but the difference is economically small.

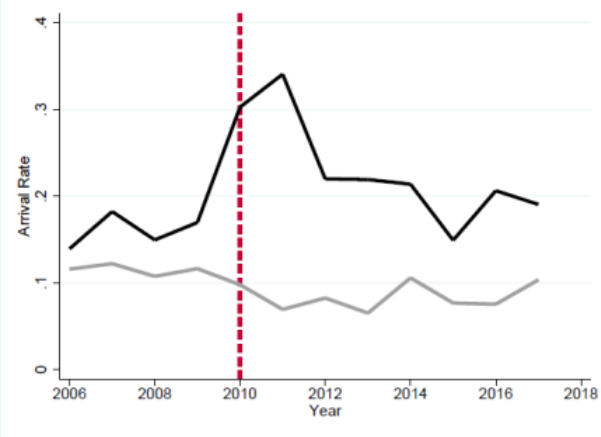


Figure 2: Arrival Rates in France

Male arrival rates are plotted in light grey. Female arrival rates are plotted in black. The sample is based on a balanced panel of firms with data since 2006.

In sum, the descriptive analysis shows that the quota period is associated with larger departure rate gaps and (more negative) arrival rate gaps. The increase in the departure rate gap indicates the existence of a tight labor market for female directors, where firms have difficulties in recruiting female directors. On the other hand, the female arrival rate also increases, suggesting that, despite the challenges in hiring women, the increased demand for new female directors is accompanied by an increase in the pool of female director candidates.

This descriptive analysis is informative but has some limitations. One such limitation is the possibility that the observed gender gaps are a consequence of endogenous matching of firms and directors. For example, suppose that firms with typically low turnover ratios are also more likely to hire female directors. Then, the lower departure rates for female directors would not be a consequence of a desire to retain female directors; it is simply that some firms have low board turnover. One could use firm fixed effects to address this issue partially, but it is likely that characteristics that are relevant for matching, such as firm performance, change over time (see, e.g., Table 1). We thus use firm-year fixed effects α_{ft} to eliminate all sources of variation at the firm-year level. Such an approach means that our estimates of the residual gender gaps (i.e., after

accounting for firm-year effects) are free from any time-varying endogenous matching considerations at the firm level, including matching on firm performance, size, age, and other characteristics.

Because we only use within firm-year variation, our estimated gender gaps measure differences between male and female directors in the same firm and at the same time. These gender gaps are meaningful because they reflect true differences between male and female directors, which are free from firm-level selection issues. Of course, this does not mean that gender "causes" these gaps. Our goal is not to attribute the gaps to an underlying cause, but instead to estimate the potential impact of the quota on the magnitude of such gaps.

We first consider the effect of the quota on departure rates. The dependent variable, y_{dft}, is an indicator that equals 1 if director d leaves firm f at the end of fiscal year t, and zero for all $t' < t$. We consider the effect of the board quota by introducing an indicator variable p_t, which takes the value of 1 for $t \geq 2010$, and zero for $t < 2010$, and interacting it with w_d. We thus have the following specification:

$$y_{dft} = \alpha_{ft} + a_1 w_d + a_2 w_d p_t + a_3 p_t + \boldsymbol{\beta x}_{dt} + u_{dft}, \tag{10}$$

where $\boldsymbol{x}_{dt}$ is a vector of director-level covariates. Note that p_t is absorbed by the fixed effects and, therefore, a_3 is not directly recoverable. The effect of the quota on the (residual) gender gap in departure rates is given by:

$$g^{BA} \equiv E(g|p = 1, \alpha, \boldsymbol{x}) - E(g|p = 0, \alpha, \boldsymbol{x}) = -a_2, \tag{11}$$

which can be directly estimated from (10). An estimator for g^{BA} is a before-after estimator of the average effect of the quota on the departure rate gap.[14] A before-after estimator is all we need if we assume that gender gaps have no time trends. Figure 1 suggests that this is a conservative assumption. If anything, the departure rate gap was declining before 2010; a counterfactual continuation of this trend would imply that (11) underestimates the effect of the quota on the departure rate gap.

[14] Because we are comparing male and female directors, g^{BA} can also be interpreted as a difference-in-differences estimator of the effect of the quota on female director departures, under the assumption that trends for male and female directors would have been similar in the absence of the quota.

Because we cannot rule out the possibility that some of the gender gaps change over time independently of the introduction of the quota, in the Internet Appendix, we also run regressions in which we use U.S. firms as a control group (see Table IA.6 and Table IA.7 in the Internet Appendix). The advantage of using U.S. firms is that, until very recently, with the unique case of California, there has been no realistic threat of legal action against those U.S. firms that do not promote gender balance on boards. In contrast, in most leading European countries, such legal actions were taken or seriously discussed during our sample period. The obvious drawback is that U.S. firms may operate in a very different environment. Differences in gender gap trends between France and the U.S. may exist because of differences in competition, regulation, governance practices, and business cultures, among other reasons.

Table 4 shows estimates of the effect of the quota on the departure rate gap. In Columns 1 to 4, we run more saturated versions of the model in (10), from no controls to a full set of controls increasingly. In Column 3, we add a measure of director tenure (number of years on the board) and a fourth-order polynomial of age.[15] In Column 4, we add five additional director-level covariates: the number of other directorships, and indicators for family independence, formal independence, membership in core committees, and industry expertise. The number of observations now falls because of some missing data. Columns 1 to 4 show estimates of the effect of the quota on the departure rate gap that range from 3.7 to 5.2 percentage points. In addition, in Figure 3, we estimate the departure rate gap using model (10) for each year taken separately between 2003 and 2016. We observe that the difference in departure rates between men and women was small prior to 2010 and increases drastically from 2010, in line with the raw results presented in Figure 1. Such differences in departure rates imply economically significant differences in expected tenure. Using the estimates from Column 1, we find that, before the quota, the (median) male and female director tenures were very similar: 4.2 and 4.8 years, respectively (a tenure gap of -0.6 years). The quota reduces the tenure gap by 2.2 years: After the quota, the median male director tenure falls to 3.6 years, while the median female director tenure increases to 6.4 years. That is, after the quota, the median female director has 78% longer tenure than the median male director; before the quota, this difference was 14%.

Table 5 shows estimates of the effect of the quota on the arrival rate gap. The dependent variable, y_{dft}, is an indicator that equals 1 if director d joins firm f in fiscal year t, and zero otherwise. We find estimates

[15] Fourth-order polynomials – or quartics – of age are typically used in labor economics when studying gender effects (see, e.g., Goldin, 2014). Alternative specifications for tenure and age yield very similar results.

of the effect of the quota on the arrival rate gap that range from 8.3 to 10.0 percentage points. Interestingly, we observe in Figure 4 that the arrival rate gap decreases slightly from 2007, before a drastic fall in 2010.

We conclude that the quota appears to (i) increase the departure gap (i.e., relatively more female retention than male retention) and (ii) decrease the arrival gap (i.e., relatively more female arrivals than male arrivals). The evidence thus rejects the frictionless benchmark, which predicts that all adjustments should occur gradually through arrivals, with no change in departure rates.

The evidence fits with the hypothesis that firms faced (real or perceived) constraints when hiring female directors and thus needed to use improved retention rates in addition to hiring new female directors. To test this hypothesis more directly, we use the number of women on the board before the quota as a proxy for how constrained firms are. The idea is that firms with more women on boards before the quota are less constrained and thus have less of a need to adjust through departure rates. In Table 6, columns 1 to 4, we re-run our departure and arrival regressions after splitting the sample into two: firms with above-median distance to the quota (more constrained) and firms with below-median distance to the quota (less constrained). These regressions retain only firms that are present both before and after the quota, which reduces the size of the sample. For brevity, we report only two specifications for each regression type.[16] From Columns 1 and 2, we see that the quota has virtually no effect on gender departure gaps for the less constrained firms, as hypothesized: the point estimates are less than one percentage point and statistically indistinguishable from zero. In contrast, for the set of more constrained firms, the effect of the quota is quite large, with estimates varying from 8.4 to 12.5 percentage points. The difference between the effects in each group is statistically significant. These results strongly suggest that (some) firms used retention rates as a tool for complying with the quota.

Columns 3 and 4 replicate the same regressions for arrival rates. As expected, firms with more women on boards did not have to increase their arrival rates of women as much. The results for arrivals highlight one difficulty of using distance-to-threshold as a measure of constraints: By definition, firms that are far from the threshold (40% women on the board) need to hire more women and thus will have high arrival rates. In contrast, those firms that are closer to the threshold do not need to do much more. That is, the distance-to-the-threshold variable conflates labor market constraints and the size of the required adjustment.

As an alternative measure of constraints that is not contaminated by the size of the required adjustment, we consider a measure of *board elitism*. There is evidence that networks based on shared educational

[16] The Internet Appendix shows additional specifications for these tests (see Table IA.8 to Table IA.11).

backgrounds affect the selection of executives and directors in France (Nguyen (2012); Kramarz and Thesmar (2013)). Thus, here we measure board elitism by the proportion of *Grandes Ecoles* graduates on the board. Columns 5 and 6 show the estimates of the effect of the quota on the departure gap for high-elitism (more constrained) and low-elitism (less constrained) firms. We defined the set of high-elitism firms as those whose proportion of Grande Ecoles graduates on their boards is above the sample median. We find that more elitist firms (more constrained) use retention as a tool for adjusting to the quota. Less elitist firms (less constrained) display lower or insignificant changes in the departure rate gap. Interestingly, Columns 7 and 8 show that less constrained firms adjust more through arrivals (i.e., they hire more women) than their more constrained counterparts. The differences between the two groups are not statistically significant, but the economic differences are meaningful. This result is in line with the hypothesis that some firms find it more challenging to hire female directors and thus adjust more through departures than through arrivals.

5. Gender Gaps in Director Characteristics

In the previous section, we show that some firms increased female director retention after the quota. Increased retention is an indication of difficulties in hiring new female directors. In this section, we investigate how gender gaps in director qualifications change around the quota.

We group director characteristics into three sets: Measures of director independence (formal independence, family independence, foreign nationality), measures of experience and qualifications (top executive experience, industry experience, age, MBA degree, and Grande Ecole degrees), and variables measuring board assignments (number of directorships and membership of core committees). [17] Gender gaps are defined as in (9).

Table 7 presents comparisons of characteristics (means, before and after) for female directors (Panel A) and male directors (Panel B). Table 8 shows before and after comparisons of gender gaps in characteristics (defined as the difference between male and female characteristics).

[17] A related question is the effect of the quota on director compensation. French boards are similar to U.S. boards: They typically offer the same compensation package to all outside board members. Committee appointments (including chair assignments) and attendance thus fully explain observed within-board variation in outside director compensation (see Adams and Ferreira, 2008). After one controls for such factors, director compensation has no additional information about the value of directors, making an analysis of compensation uninformative (we do consider though the effect of the quota on committee appointments). For an analysis of director fees in France, see Reberioux and Roudaut (2019). For an analysis of director compensation by gender in the UK, where compensation packages are not standardized, see Gregory-Smith, Main, and O'Reilly (2014).

We first consider the differences in measures of director independence. Before 2010, 33% of all female directors were classified as formally independent. After 2010, this number jumps to 57%. As an alternative measure of independence, we find that before the quota, 80% of all female directors were not directly related to the families that control their firms. After the quota, this number increases to 92%. Finally, we use nationality as a proxy for independence, with non-French nationals being less likely to be closely associated with the firm's management. We find that, before the quota, 9% of all female directors are foreign nationals; this number increases substantially to 21% after the quota.

Based on these three (admittedly imperfect) measures, it is clear that female directors have become significantly more independent after the quota. But perhaps a general trend towards more independent boards, and not the quota, could explain these results. To address this possibility, we consider what happened to the independence of male directors in the same period. From Panel B, we see that male formal independence remains essentially unchanged (the point estimate decreases by two percentage points after the quota). After the quota, male directors are two percentage points more likely to be related to the family that controls the firm. Moreover, after the quota, men are as likely to be foreign nationals as before. In sum, there is no clear trend in increasing independence among men.

What about the differences between men and women? We define the gap in independence measures by the difference in the value of such measures between male and female directors. From Table 8, we see that, before 2010, male directors were more independent than female directors: The formal independence gap was 13 percentage points, the family independence gap was 15 percentage points, and the foreign nationality gap was nine percentage points. After the quota, all of these gaps have either disappeared or reversed: The formal independence gap becomes negative and large (-13 percentage points), the family independence gap shrinks to a single percentage point (neither statistically nor economically different from zero), and the foreign nationality gap reverses to -3 percentage points. All gap changes (differences between post-2010 and pre-2010 values) are economically significant and statistically precise. Overall, the combined effect of vanishing or reversing gaps in independence and the higher proportion of women on boards implies that post-quota boards are significantly more independent than pre-quota boards.

Next, we consider differences in professional experience and qualifications. Table 7 shows that post-quota female directors are seven percentage points more likely to have top executive experience (either as CEO or an executive suite position) than pre-quota female directors. Table 8 shows that the gender gap in senior executive experience was 25 percentage points before the quota; after the quota, this gap shrinks to 14 percentage points.

In terms of same industry experience, post-quota female directors are six percentage points more likely to have this type of experience than pre-quota female directors. The gender gap in industry experience shrinks from ten percentage points to six percentage points (although not statistically precise). The gender gap in age was just over five years before the quota, and there is no economically or statistically significant change in this gap after the quota. The average age of female directors increases by half a year, but this change is not statistically significant.

Concerning educational qualifications, there was virtually no gender gap in MBA degrees to begin with, and this gap does not change significantly after the quota. In contrast, female directors are less likely to be a graduate from a set of nine elite Grandes Ecoles. The difference is substantial: 14 percentage points before and 15 percentage points after the quota. This fact is not surprising, given that Grandes Ecoles (especially Ecole Nationale d'Administration and most engineering schools) include (even until recently) only a small proportion of female graduate students. Interestingly, the proportion of both female and male directors with Grandes Ecoles degrees falls in the period after the quota, suggesting the firms have become less likely to rely on Grandes Ecoles networks for recruiting directors.

We conclude that some experience gaps have narrowed after the quota, while education gaps did not change.

We now consider differences in board assignments. Before the quota, there were significant gender gaps in both the number of board seats and the likelihood of sitting on core board committees: Men held 0.59 more board positions and were 13 percentage points more likely to be members of core committees than women. Interestingly, the gender gap in board seats vanishes after the quota, mainly because male directors now hold fewer seats on average. More surprising is the fact that the gender gap in appointments to core board committees decreases by six percentage points. This fact suggests that boards have not relegated their female directors to unimportant tasks after the quota. In addition, an increase in responsibility may be used as a retention tool.

Tables 9 to 12 show our regression estimates for the effect of the quota on the gender gaps in director characteristics. As our goal is to investigate the hypothesis that quotas may increase gender gaps in independence, qualifications, and experience, our approach, however imperfect, can produce evidence to cast doubt on this hypothesis. For each characteristic, we present results for three different specifications: (i) a regression of the characteristic on the female indicator, a post-quota indicator, and the interaction between the two, (ii) firm-year fixed effects with French data only, and, in the Appendix, (iii) firm-year fixed effects with the U.S. as a control group (see Table IA.12 and Table IA.13 in the Internet Appendix). When interpreting the results, we

maintain the assumption that trends in differences between male and female director characteristics are either absent or absorbed by the control group.

Table 9 reports the estimates of the effect of the quota on proxies for director independence. Column 1 shows that, without any controls, the gender gap in formal independence was 12.6% before the quota, and that, after the quota, this gap narrows by 25.4 percentage points. Column 2 shows that these conclusions remain unchanged if we use within firm-year variation only: The quota reduces the gender gap in independence by 23.3 percentage points.

We find similar results for family independence. The quota reduces the family independence gap by 13.9 percentage points in Column 3 and 10.2 percentage points in Column 4. In both cases, the gender gap vanishes after the quota. After the quota, the foreign nationality gap is reduced by roughly 13 percentage points. It is also worth noting that the few companies that started to recruit women as early as 2007 (see Figure 5) recruited women who were on average more independent. Indeed, in Figure 6, we clearly see that the gender gap in formal and international independence decreases slightly from 2007, with a much more drastic and significant fall from 2010. Overall, using within firm-year variation makes little difference to our conclusions: female independence levels significantly increase after the quota.

Table 10 shows that the gender gap in top executive experience is reduced by 8.4 to 10.7 percentage points after the quota. In contrast, we find no statistically significant effect of the quota on the gender gaps in industry expertise and age.

Concerning educational qualifications (Table 11), we again find no evidence of a gender gap in MBA degrees. For Grande Ecole degrees, we find no change in the gender gap, which is about 14%. Yet, importantly, firms have become less likely to hire both male and female directors with Grande Ecole degrees after 2010. This result suggests that quotas might have forced companies to review their hiring practices and expand their networks. Thus, in terms of the overall impact of the quota, Figure 7 clearly shows a drastic drop in the proportion of Grandes Ecoles graduates from 2010 (between 21% and 27% compared to the levels observed in 2003). This drop is both attributable to a composition effect (women directors are less from the Grandes Ecoles) and the recruitment of men who have not graduated from Grandes Ecoles (although the latter effect is less pronounced).

Overall, we conclude that the quota is associated with a substantial decrease in the gender gap in top executive experience. No other gender gaps in experience and education changed significantly after 2010.

Results from Table 12 confirm that the gender gap in board seats in France is fully closed after the quota (see also Figure 8 for more details). After controlling for firm-year fixed effects, there is no evidence of a change in the gender gap in core committee assignments.

6. Discussion and Conclusions

Some view the introduction of mandatory gender quotas on corporate boards as a significant intrusion on a company's right to select its leadership. It is thus essential to study the impact of such a policy on the way that firms recruit and retain their directors. From a theoretical perspective, the effect of board quotas on hiring and retention policies is ambiguous. On the one hand, companies may be forced to recruit and retain less qualified candidates in order to comply with the law. On the other hand, companies may be forced to switch to a different search technology, which may lead to an improved ability to identify suitable candidates. The evidence in this paper is more consistent with the latter hypothesis.

The effect of board quotas on firm policies is likely to vary across different contexts. In more competitive labor markets, with few institutional and cultural barriers to women in business, one would expect quotas to have virtually no effect on how firms select their directors. By contrast, in thin markets, especially where director selection is made through networks (such as male-dominated schools), firms may have to change their practices substantially to comply with the law.

One story that can rationalize the evidence in this paper is as follows. It might be that some firms used search technologies that excluded several potentially qualified individuals from the pool of candidates. This practice does not mean that firms discriminated against women per se; discrimination may happen indirectly and incidentally as a consequence of existing hiring norms. Slow-changing hiring practices may thus represent a real search friction. Large, mature, and profitable firms, such as those in our sample, may survive or even thrive despite such practices. It may also be that hiring through social connections is ultimately beneficial to firms because of the connections themselves, even if firms pass up opportunities to hire better-qualified candidates. The introduction of the quota then forces firms to abandon such practices and replace them with more inclusive – and perhaps more efficient – practices.

This explanation is consistent with some existing anecdotal evidence. The business media has reported many instances of changes in hiring practices as a consequence of the quota. Here are a couple of examples:

*"The transformation induced by the Copé-Zimmermann Law had several consequences, amongst which more professional recruitment methods. Careful selection of candidates replaced old friendly cooptation." (*Le Nouvel Economiste, January 2016).

"*From 2011, when Hubert Sagnières (CEO of Essilor) received a large number of unsolicited applications and recommendations for joining the board (particularly women), he wished to ensure the independence of the hiring decision by using a headhunter*." (Source: Les Echos Business, March 2016).

Although the use of search firms is just one aspect of the recruitment process, it is a good indicator of the professionalization of this process. After 2010, some executive search firms have created separate departments for female directors. For example, Leyders Associates introduced "*Femmes au Cœur des Conseils,*" which has a database of more than one thousand women as potential candidates for board positions.[18]

The quota may also have affected the supply side of the director labor market. Before the quota, most women knew that opportunities to be on boards were rare. After the quota, many more women chose to train to become a director. For example, since 2010, the *Institut Français des Administrateurs*, a non-profit organization of directors, offers a degree "*Le Certificat Administrateur de Sociétés*" (executive education over six months) aimed at people who would like to become a director. Over the period 2010-2016, 54% of the participants have been women.

The debate on the effect of quotas on firm performance is still unsettled (see e.g., Eckbo, Nygaard, and Thorburn, 2019). The impact of quotas on firms' recruitment policies has received much less attention, but it is of significant importance, regardless of their performance implications. Coordinated changes in hiring practices may have trickle-down effects that percolate through the whole economy, with significant implications for the labor market for business professionals. Although it is difficult to measure such externalities with confidence, identifying the effects of the policy on the labor demand side is a necessary first step.

[18] See Akyol and Cohen (2013) for a study of the role of search firms in the appointment of outside directors.

A1 Variable Definitions

Firm characteristics	(Source: Compustat)
Firm Size	Total assets in billions of euro (France) or dollars (U.S.).
Return on Assets (ROA)	Operating income before depreciation scaled by total assets.
Board characteristics	(Source: BoardEx)
Board Size	The number of board members.
Proportion of independent directors	The ratio of independent directors on the board.
Proportion of women on board	The ratio of female directors on the board.
Director Characteristics	(Source: BoardEx)
Age	Director age in years.
Time on board	Director tenure in years.
Female	Indicator equal to one if the director is female, zero otherwise.
Family Independence	Indicator equal to one if the director does not share his/her last name with at least one other director, zero otherwise.
Formal Independence	Indicator equal to one if the director is reported as independent, zero otherwise.
Number of directorships	Number of current board seats in listed firms held by the director.
Core Committee Member	Indicator equal to one if the director is member of the audit, compensation, nomination, strategy, executive or governance committee, zero otherwise.
Industry Expertise	Indicator equal to one if the sector of the firm where the director is a board member is the same of at least one firm in his/her employment history.
Post 2010	Indicator equal to zero if the year of turnover is <2010, one if the year of turnover is ≥ 2010.
MBA	Indicator equal to one if a director has a MBA degree, zero otherwise.
Grande Ecole	Indicator equal to one if a director has a degree from Ecole Polytechnique Paris, Corps des Mines, Mines ParisTech, Centrale Paris, Ecole des Ponts ParisTech, Telecom ParisTech, Supelec, HEC Paris or ENA.
Ivy League	Indicator equal to one if a director has a degree from an Ivy League University.
Top Executive Experience	Indicator equal to one if the director has or had at least one c-suite position and/or CEO position in his/her employment history.
Foreign Nationality	Indicator equal to one if the director who holds a board seat in France (resp, in the U.S.) is not a French (resp, U.S.) citizen.

References

Adams, R.B., A. Akyol, Verwijmeren, P. 2018. Director Skill Sets. Journal of Financial Economics 130, 641-662.

Adams, R.B., Ferreira, D., 2008. Do Directors Perform for Pay? Journal of Accounting and Economics 46, 154–171.

Adams, R.B., Ferreira, D., 2009. Women in The Boardroom and their Impact on Governance and Performance. Journal of Financial Economics 94, 291–309.

Adams, R.B., Funk, P., 2012. Beyond the Glass Ceiling: Does Gender Matter? Management Science 58, 219–235.

Adams, R.B., Kirchmaier, T., 2016. Women on Boards in Finance and STEM Industries. American Economic Review 106, 277-281.

Ahern, K.R., Dittmar, A.K., 2012. The Changing of the Boards: The Impact on Firm Valuation of Mandated Female Board Representation. Quarterly Journal of Economics 127, 137–197.

Albouy, V., Wanecq, T., 2003. Les Inégalités Sociales D'accès Aux Grandes Ecoles. Economie et Statistiques 361, 27–52.

Akyol, A., Cohen, L., 2013. Who Chooses Board Members? Advances in Financial Economics 16, 43–75.

Azmat, G., Ferrer, R., 2017. Gender Gaps in Performance: Evidence from Young Lawyers. Journal of Political Economy 125, 1306-1355.

Baltrunaite, A., Bello, P., Casarico, A., Profeta, P., 2014. Gender Quotas and the Quality of Politicians. Journal of Public Economics 118, 62 – 74.

Bates, T.W., Becher, D.A., Wilson, J.I., 2016. Performance-Based Turnover on Corporate Boards. Working paper.

Becher, D.A., Walkling, R.A., Wilson, J.I., 2017. Board Changes and the Director Labor Market: The Case of Mergers. Drexel University Working Paper.

Bennedsen, M., Simintzi, E., Tsoutsoura, M., Wolfenzon, D. 2018. Do Firms Respond to Gender Pay Gap Transparency? Working paper.

Bernile, G., Bhagwat, V., Yonkers, S. 2018. Board Diversity, Firm Risk, and Corporate Policies. Journal of Financial Economics 127, 588-612.

Bertrand, M., Kramarz, F., Schoar, A., Thesmar, D., 2018. The Cost of Political Connections. Review of Finance 22, 849–876

Bertrand, M., Black, S.E., Jensen, S., Lleras-Muney, A., 2019. Breaking the Glass Ceiling? The Effect of Board Quotas on Female Labor Market Outcomes in Norway. Review of Economic Studies 86, 191–239.

Bertrand, M., Goldin, C., Katz, L.F., 2010. Dynamics of the Gender Gap for Young Professionals in the

Financial and Corporate Sectors. American Economic Journal: Applied Economics 2, 228–255.

Besley, T., Folke, O., Persson, T., Rickne, J., 2017. Gender Quotas and the Crisis of the Mediocre Man: Theory and Evidence from Sweden. American Economic Review 107, 2204 – 2242.

Bonini, S., Deng, J., Ferrari, M., John, K., 2017. On Long-Tenured Independent Directors. New York University working paper.

Bordalo, P., Coffman, K., Gennaioli, N., Shleifer, A., 2016. Stereotypes. Quarterly Journal of Economics 131, 1753-1794.

Bordalo, P., Coffman, K., Gennaioli, N., Shleifer, A., 2019. Beliefs about Gender. American Economic Review 109, 739-773.

Bushman, R., Dai, Z., Wang, X., 2010. Risk and CEO turnover. Journal of Financial Economics 96, 381-398.

Bøhren, Ø., Staubo, S., 2014. Does Mandatory Gender Balance Work? Changing Organizational Form to Avoid Board Upheaval. Journal of Corporate Finance 28, 152–168.

Bøhren, Ø., Staubo, S., 2015. Mandatory Gender Balance and Board Independence. European Financial Management 22, 3-30.

Cai, J., Nguyen, T., Walkling, R.A., 2017. Director Appointments – It is Who You Know. Drexel University Working Paper.

Carter, M.E., Franco, F., Gine, M., 2017. Executive Gender Pay Gaps: The Roles of Female Risk Aversion and Board Representation. Contemporary Accounting Research 37, 1232-1264.

Comi, S., Grasseni, M., Origo, F., and Pagani, L. 2020. Where Women Make a Difference: Gender Quotas and Firms' Performance in Three European Countries. ILR Review 73, 768-793.

Cornell, B., Welch, I., 1996. Culture, Information, and Screening Discrimination. Journal of Political Economy 104, 542-571.

Cornelli, F., Karakas, O., 2015. CEO Turnover in LBOs: The Role of Boards. London Business School and Cambridge University working paper.

Del Carpio, L., Guadalupe, M., 2018. More Women in Tech? Evidence from a Field Experiment Addressing Social Identity. Working paper.

Denis, D.J., Denis, D.K., 1995. Performance Changes Following Top Management Dismissals. Journal of Finance 50, 1029–1057.

Denis, D.J., Denis, D.K., Walker, M.D., 2015. CEO Assessment and the Structure of Newly Formed Boards. Review of Financial Studies 28, 3338-3366.

Diamond, P., Maskin, E., 1979. An Equilibrium Analysis of Search and Breach of Contract, I: Steady States. Bell Journal of Economics 10, 282-316.

Doldor, E., Vinnicombe, S., Gaughan, M., Sealy, R., 2012. Gender Diversity on Boards: The Appointment Process and the Role of Executive Search Firms. Equality and Human Rights Commission Research report 85.

Duchin, R., Simutin, M., Sosyura, D., 2018. The Origins and Real Effects of the Gender Gap: Evidence from CEOs' Formative Years. Working paper.

Dudouet F.-X., Joly, H., 2010. Les Dirigeants Français Du Cac 40: Entre Elitisme Scolaire et Passage par l'État. Sociologies Pratiques 2, 35-47.

Eckbo, B.E., Nygaard, K., Thorburn, K.S., 2019. Board Gender-Balancing and Firm Value. Working Paper.

Egan, M., Matvos, M., and Seru, A., 2018. When Harry Fired Sally: The Double Standard in Punishing Misconduct. Working paper.

Faccio, M., Marchica, M., Mura, R., 2016. CEO Gender, Corporate Risk-Taking, and the Efficiency of Capital Allocation. Journal of Corporate Finance 39, 193-209.

Fahlenbrach, R., Low, A., Stulz, R.M., 2017. Do Independent Director Departures Predict Future Bad Events? Review of Financial Studies 30, 2313–2358.

Fahlenbrach, R., Kim, H., Low, A., 2017. The Importance of Network Recommendations in the Director Labor Market. EPFL and Nanyang Business School Working Paper.

Fee, C.E., Hadlock, C.J., 2004. Management Turnover across the Corporate Hierarchy. Journal of Accounting and Economics 37, 3–38.

Ferrari, G., Ferraro, V., Profeta, P., and Pronzato, C. 2018. Do Board Gender Quotas Matter? Selection, Performance and Stock Market Effects. IZA Discussion Paper No. 11462.

Ferreira, D., Ginglinger, E., Laguna, M-A., Skalli, Y. 2017. Board Quotas and Director-Firm Matching. CEPR Discussion Paper No. DP12117.

Fos, V., and Tsoutsoura, M., 2014. Shareholder Democracy in Play: Career Consequences of Proxy Contests. Journal of Financial Economics 114, 316-340.

Giannetti, M., Liao, G., Yu, X., 2015. The Brain Gain of Corporate Boards: Evidence from China. Journal of Finance 70, 1629-1682.

Giannetti, M., Zhao, M., 2017. Board Ancestral Diversity and Firm Performance Volatility. Working paper.

Goldin, C., 2014. A Grand Gender Convergence: Its Last Chapter. American Economic Review 104, 1091–1119.

Greene, D., Intintoli, V., and Kahle, K.M. 2020. Do Board Gender Quotas Affect Firm Value? Evidence from California Senate Bill No.826. Journal of Corporate Finance 60.

Gregory-Smith, I., Main, B. G., and O'Reilly, C. A., 2014. Appointments, Pay and Performance in UK Boardrooms by Gender. The Economic Journal 124, 109 –128.

Harford, J., 2003. Takeover Bids and Target Directors' Incentives: The Impact of a Bid on Directors'

Wealth and Board Seats. Journal of Financial Economics 69, 51–83.

Hauser, R., 2018. Busy Directors and Firm Performance: Evidence from Mergers. Journal of Financial Economics 128, 16-37.

Hebert, C., 2018. The Minority Effect: Gender Stereotypes and Entrepreneur Financing. Working paper.

Huang, J., Kisgen, D.J., 2013. Gender and Corporate Finance: Are Male Executives Overconfident Relative to Female Executives? Journal of Financial Economics 108, 822–839.

Huson, M.R., Parrino, R., Starks, L.T., 2001. Internal Monitoring Mechanisms and CEO Turnover: A Long Term Perspective. Journal of Finance 56, 2265-2297.

Hwang, S., Shivdasani, A., Simintzi, E., 2019. Mandating Women on Boards: Evidence from the United States. Working paper.

Jenter, D., Kanaan, F., 2015. CEO Turnover and Relative Performance Evaluation. Journal of Finance 70, 2155–2184.

Jenter, D., Schmid, T., Urban, D., 2018. Does Board Size Matter? Working paper.

Jiang, W., Wan, H., Zhao, S., 2016. Reputation Concerns of Independent Directors: Evidence from Individual Director Voting. Review of Financial Studies 29, 655-696.

Jouini, E., Karehnke, P., Napp, C., 2018. Stereotypes, Underconfidence and Decision-Making with an Application to Gender and Math. Journal of Economic Behavior and Organization 148, 34-45.

Kaplan, S.N., Minton, B.A., 2012. How Has CEO Turnover Changed? International Review of Finance 12, 57-87.

Kaplan, S. N., Sorensen, M., 2016. Are CEOs Different? Characteristics of Top Managers. Working paper.

Keloharju, M., Knüpfer, S., Tåg, J., 2019. What Prevents Women from Reaching the Top? Working paper.

Kim, D., Starks, L. T., 2016. Gender Diversity on Corporate Boards: Do Women Contribute Unique Skills? American Economic Review 106, 267–71.

Kramarz, F., Thesmar, D., 2013. Social Networks in the Boardroom. Journal of the European Economic Association 11, 780–807.

Larat, F., 2015. Le dernier maillon dans la chaîne des inégalités ? Les particularités du profil des élèves de l'ÉNA. Revue française d'administration publique 153, 103-124.

Mailath, G.J., Samuelson, L., Shaked, A., 2000. Endogenous Inequality in Integrated Labor Markets with Two-Sided Search. American Economic Review 90, 46-72.

Matsa, D.A., Miller, A.R., 2013. A Female Style in Corporate Leadership? Evidence from Quotas. American Economic Journal: Applied Economics 5, 136–169.

Matveyev, E., 2016. The Labor Market for Corporate Directors. University of Alberta Working Paper.

Nguyen, B.D., 2012. Does the Rolodex Matter? Corporate Elite's Small World and the Effectiveness of Boards of Directors. Management Science 58, 236–252.

Niederle, M., Segal, C., Versterlund, L., 2013. How Costly Is Diversity? Affirmative Action in Light of Gender Differences in Competitiveness. Management Science 59, 1-16.

Nygaard, K., 2011. Forced Board Changes: Evidence from Norway. Working paper.

Parrino, R., 1997. CEO Turnover and Outside Succession: A Cross-sectional Analysis. Journal of Financial Economics 46, 165-197.

Peters, F.S., Wagner, A.F., 2014. The Executive Turnover Risk Premium. Journal of Finance, 69, 1529-1563.

Reberioux, A., Roudaut, G., 2019. The Role of Rookie Female Directors in a Post-Quota Period: Gender Inequalities within French Boards. Industrial Relations 58, 423-483.

Reuben, E., Sapienza, P., Zingales, L., 2014. How Stereotypes Impair Women's Careers in Science. Proceedings of the National Academy of Sciences 111, 4403-4408

Schmid, T., Urban, D., 2016. Women on Corporate Boards: Good or Bad? Working paper.

Schwartz-Ziv, M., 2017. Gender and Board Activeness: The Role of a Critical Mass. Journal of Financial and Quantitative Analysis 52, 751-780.

Tate, G., Yang, L., 2015. Female Leadership and Gender Equity: Evidence from Plant Closure. Journal of Financial Economics 117, 77-97.

Warner, J. B., Watts, J.B., Wruck, K.H., 1988. Stock Prices and Top Management Changes. Journal of Financial Economics 20, 461-492.

Weisbach, M.S., 1988. Outside Directors and CEO Turnover. Journal of Financial Economics 20, 431-460.

Wiersema, M., Mors, M. L., 2016. What Board Directors Really Think of Gender Quotas. Harvard Business Review, digital article.

Yermack, D., 2004. Remuneration, Retention, and Reputation Incentives for Outside Directors. Journal of Finance 59, 2281-2308.

Figure 3 – Gender Gap in Departure Rates

This figure shows year-by-year point estimates of the gender gap in departure rates between 2004 and 2016, using the same regression model as in Column (2) of Table 4, which includes firm-year fixed effects. 2003 is the reference year with an estimated male departure rate of 13.02%, and a gender gap (male – female) estimated at 1.03% that year. Confidence intervals at the 5% level are plotted in light grey, and standard errors are clustered at the company level.

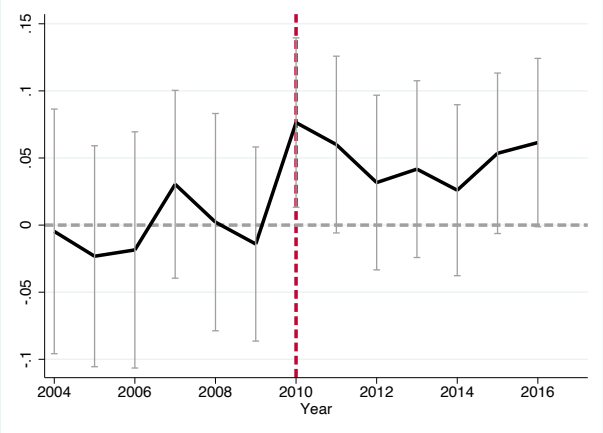


Figure 4 – Gender Gap in Arrival Rates

This figure shows year-by-year point estimates of the gender gap in arrival rates between 2004 and 2017, using the same regression model as in Column (2) of able 5, which includes firm-year fixed effects. 2003 is the reference year with an estimated male arrival rate of 10.02%, and a gender gap (male – female) estimated at 1.86% that year. Confidence intervals at the 5% level are plotted in light grey, and standard errors are clustered at the company level.

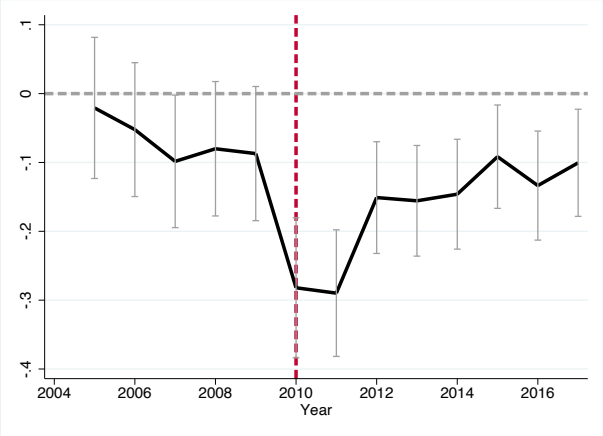


Figure 5 – Number of Women

This figure shows year-by-year point estimates of the additional number of women on boards between 2004 and 2017 compared to 2003, using a regression model which includes firm and year fixed effects. 2003 is the reference year, and the average number of women on boards was 0.25 that year. Confidence intervals at the 5% level are plotted in light grey and standard errors are clustered at the company level.

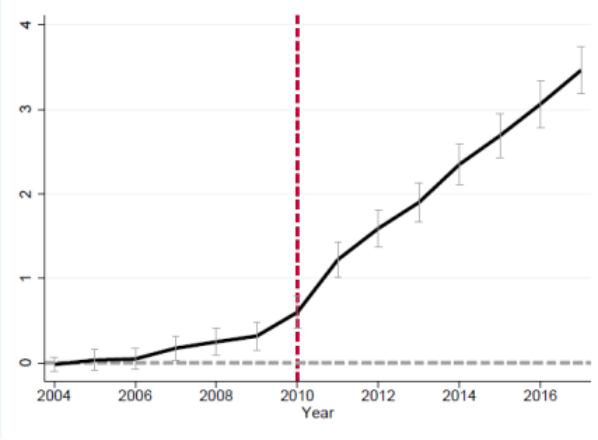
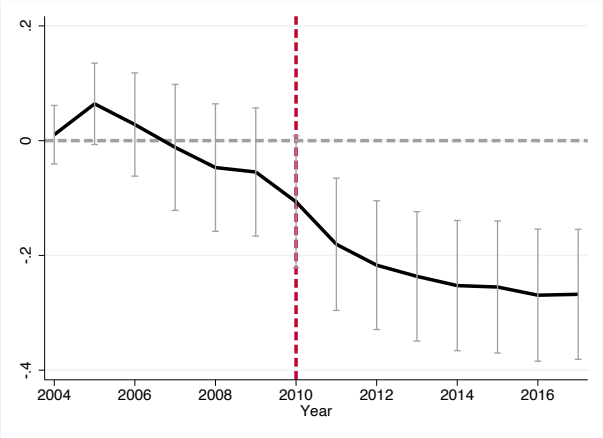
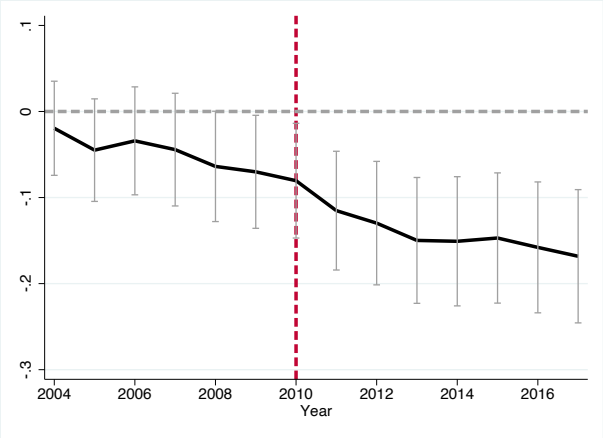


Figure 6 – Gender Gaps in Director Independence

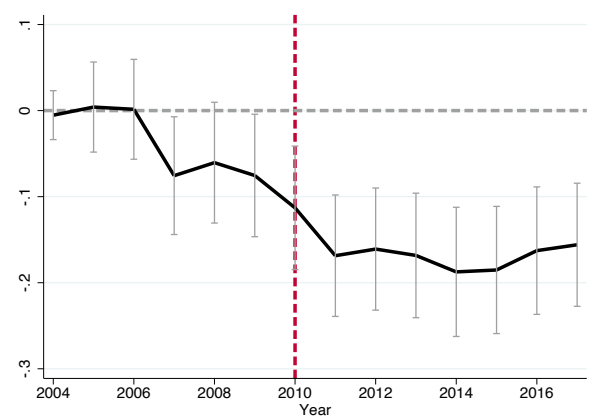
This figure shows year-by-year point estimates of the gender gap in director independence between 2004 and 2017, using the same regression model as in Column (2) of Table 9, which includes firm-year fixed effects. 2003 is the reference year with a gender gap in formal independence estimated at 13.82% (44% of male directors were formally independent that year), a gender gap in family independence estimated at 14.93% (93% of male directors were family independent that year), and a gender gap in foreign nationality estimated at 12.44% (18% of male directors were international that year). Confidence intervals at the 5% level are plotted in light grey, and standard errors are clustered at the company level.



(a) Formal Independence



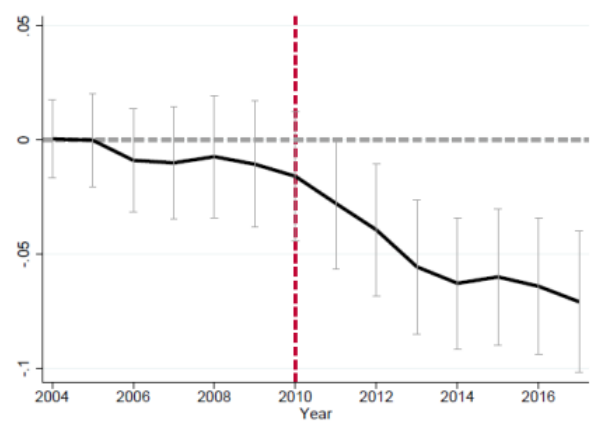
(b) Family Independence



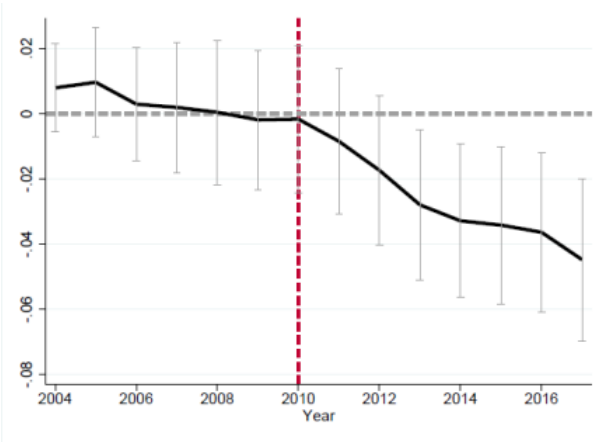
(c) Foreign Nationality

Figure 7 – Grandes Ecoles Graduates

This figure shows year-by-year point estimates of the mean proportion of "Grandes Ecoles" and "Ecole Polytechnique and/or Ecole Nationale d'Administration" graduates within boards between 2004 and 2017, using a regression model which includes firm and year fixed effects. 2003 is the reference year with 33.27% Grandes Ecoles graduates and 16.85% Ecole Polytechnique and/or Ecole Nationale d'Administration on boards that year. Confidence intervals at the 5% level are plotted in light grey, and standard errors are clustered at the company level.



(a) Grandes Ecoles



(b) Ecole Polytechnique (X) and/or Ecole Nationale d'Administration (ENA)

Figure 8 – Gender Gaps in Number of Directorships

This figure shows year-by-year point estimates of the gender gap in the number of directorships held by directors between 2004 and 2017, using the same regression model as in Column (2) of Table 9, which includes firm-year fixed effects. 2003 is the reference year with a gender gap estimated at 0.55 directorships (male directors held 2.09 directorships on average that year). Confidence intervals at the 5% level are plotted in light grey, and standard errors are clustered at the company level.

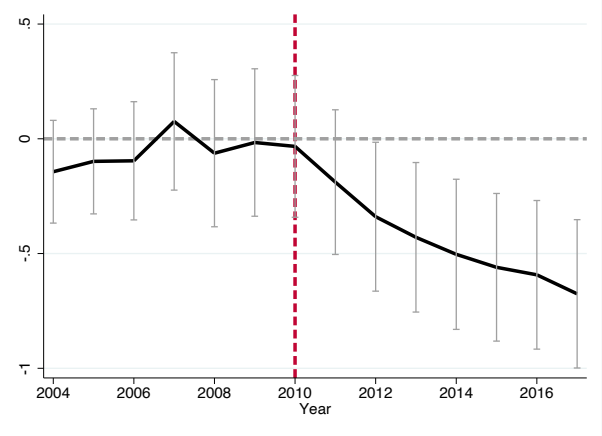


Table 1 – Firm and Board Characteristics

This table shows selected firm and board characteristics across French and U.S. companies with available board data in BoardEx for two subsamples: Before and after 2010. The sample period is 2003-2017. Accounting data are from Compustat North America and Compustat Global. Total assets and Return on Assets are winsorized at the 1% and 99% levels. Total sample size is 5,189 firm-year observations in France and 94,013 firm-year observations in the U.S. For the U.S., some financial data on BoardEx firms are missing, as BordEx covers many private U.S. companies. All variable definitions are described in Table A1. Diff. denotes the difference between means for after and before 2010. Small discrepancies are due to rounding.

	Mean	Before 2010	After 2010	Diff.	t-stat
			Panel A. France		
Total assets (EUR Billion)	12.00	12.96	11.72	-1.22	-1.294
Return on assets	0.07	0.09	0.05	-0.04	-8.401
Board size	10.04	10.78	9.67	-1.11	-5.406
Board independence	0.33	0.32	0.35	0.03	2.322
Proportion of female directors	0.19	0.09	0.24	0.15	24.333
Grande Ecole	0.22	0.25	0.20	-0.05	-5.738
			Panel B. USA		
Total assets (USD Billion)	5.64	4.55	6.64	2.09	11.901
Return on assets	0.03	0.03	0.02	-0.01	-1.622
Board size	7.59	8.00	7.34	-0.66	-19.180
Board independence	0.55	0.67	0.47	-0.20	-61.223
Proportion of female directors	0.09	0.08	0.10	0.02	15.886
Ivy League	0.23	0.22	0.23	0.01	6.911

Table 2 –Director Characteristics

This table details director characteristics in France and the U.S.. The sample includes only outsiders (non-executive directors), and all observations with missing information for director age and tenure are excluded. The sample period is 2003-2017. All variable definitions are described in Table A1. Diff. denotes the difference between means for male and female directors (Men – Women). Small discrepancies are due to rounding.

	N	Mean	Median	Min	Max	SD	Women	Men	Diff.	t stat.
				Panel A. France						
Age	36,817	58.37	59	18	94	10.69	54.01	59.52	5.51	15.670
Time on Board	36,817	6.01	4.20	0	61.3	6.09	4.41	6.43	2.02	8.932
Family Independence	36,817	0.93	1	0	1	0.26	0.89	0.93	0.04	3.210
Formal Independence	36,817	0.46	0	0	1	0.50	0.53	0.44	-0.09	-5.116
Number of directorships	35,247	2.07	1	1	17	1.63	1.87	2.13	0.26	6.375
Major Committee Member	32,659	0.69	1	0	1	0.46	0.63	0.70	0.07	5.049
Industry Expertise	36,817	0.22	0	0	1	0.41	0.17	0.23	0.06	5.160
MBA	28,292	0.16	0	0	1	0.37	0.15	0.16	0.01	0.606
Grande Ecole	28,292	0.35	0	0	1	0.48	0.22	0.38	0.16	10.052
Ivy League	28,292	0.08	0	0	1	0.27	0.05	0.09	0.04	4.142
Top Executive Experience	36,817	0.50	0	0	1	0.50	0.36	0.53	0.17	10.846
Foreign Nationality	28,798	0.19	0	0	1	0.48	0.18	0.17	-0.01	-0.790
				Panel B. U.S.A.						
Age	525,799	60.97	62	21	103	9.68	58.16	61.34	3.18	34.043
Time on Board	525,799	7.14	5.10	0	65.8	6.88	6.10	7.27	1.17	17.458
Family Independence	525,799	0.98	1	0	0	0.14	0.98	0.98	0.00	-1.859
Formal Independence	525,799	0.82	1	0	1	0.39	0.87	0.81	-0.06	-17.636
Number of directorships	468,819	2.20	1	1	50	4.34	2.78	2.13	-0.65	-8.127
Major Committee Member	476,295	0.88	1	0	1	0.33	0.90	0.87	-0.03	-11.830
Industry Expertise	525,799	0.27	0	0	1	0.44	0.25	0.27	0.02	4.864
MBA	471,562	0.35	0	0	1	0.48	0.33	0.35	0.02	3,793
Grande Ecole	471,562	0.00	0	0	1	0.04	0.00	0.00	0.00	4.371
Ivy League	471,562	0.28	0	0	1	0.45	0.28	0.28	0.00	-0.537
Top Executive Experience	525,799	0.50	1	0	1	0.50	0.40	0.52	0.12	19.923
Foreign Nationality	274,939	0.07	0	0	1	0.50	0.06	0.08	0.02	7.004

Table 3 – Departure and Arrival Rates

This table reports director departure and arrival rates among French and U.S. companies with available board data in BoardEx for two subsamples: Before and after 2010. The sample includes only outside (non-executive) directors, and all observations with missing information for director age and tenure are excluded. Diff. denotes the difference between coefficients associated with the period After 2010 and the period Before 2010 (After 2010 – Before 2010). t-stats are clustered at the firm level. The sample period is 2003-2017. All variable definitions are described in the Table A1. Small discrepancies are due to rounding.

	N	Mean	Before	After	Diff.	t-stat.
			Panel A. France			
Arrival Rate	32,551	0.12	0.12	0.12	0.00	0.852
Departure Rate	32,803	0.12	0.13	0.12	-0.01	-1.153
			Panel B. USA			
Arrival Rate	456,715	0.09	0.09	0.09	0.00	2.899
Departure Rate	458,870	0.09	0.09	0.09	-0.01	-6.444

Table 4 – The Effect of the Quota on Director Departure Rates

This table reports OLS estimates of the treatment effects of the quota ("Post 2010'') on an indicator of whether a director leaves the firm at the end of the fiscal year. The relevant treatment effects are "Female X Post 2010'' for models; the effect on gender gaps (male – female) is the negative of these estimates. Observations are defined at the firm-year-director level. The sample includes only outsiders (non-executive directors), and all observations with missing information for director age and tenure are excluded. "Additional director controls'' include dummy variables set equal to one if the director shares the same name of at least one director within the same board, if the director is an independent director, if the director is a member of at least one major committee (e.g., compensation, nomination, or audit committees), and the total number of directorships held by the director. "Tenure'' is the number of years since the director first joined the board. The sample period is from 2003 to 2017. Standard errors are clustered at the firm level and t-statistics are reported in brackets. Boldface indicates statistical significance at 10% or better.

	(1)	(2)	(3)	(4)
Female X Post 2010	**-0.0461**	**-0.0520**	**-0.0418**	**-0.0368**
	[-4.364]	[-4.520]	[-3.514]	[-3.060]
Post 2010	**0.0192**			
	[3.262]			
Female	-0.0146	-0.0067	-0.0054	-0.0095
	[-1.517]	[-0.653]	[-0.508]	[-0.858]
Constant	0.1191	0.1302	-1.5051	-1.1637
	[23.132]	[156.821]	[-3.965]	[-2.395]
Observations	32,551	32,551	32,551	28,463
R-squared	0.0041	0.2266	0.2337	0.2315
Firm-Year FE	NO	YES	YES	YES
Tenure + 4^{th} order age polynomial	NO	NO	YES	YES
Additional director controls	NO	NO	NO	YES

Table 5 – The Effect of the Quota on Director Arrival Rates

This table reports OLS estimates of the treatment effects of the quota ("Post 2010'') on an indicator of whether a director joins the firm in the current fiscal year. The relevant treatment effects are "Female X Post 2010'' for models; the effect on gender gaps (male – female) is the negative of these estimates. Observations are defined at the firm-year-director level. The sample includes only outsiders (non-executive directors), and all observations with missing information for director age and tenure are excluded. "Additional director controls'' include dummy variables set equal to one if the director shares the same name of at least one director within the same board, if the director is an independent director, if the director is a member of at least one major committee (e.g., compensation, nomination, or audit committees), and the total number of directorships held by the director. The sample period is from 2003 to 2017. Standard errors are clustered at the firm level and t-statistics are reported in brackets. Boldface indicates statistical significance at 10% or better.

	(1)	(2)	(3)	(4)
Female X Post 2010	**0.1000**	**0.0835**	**0.0835**	**0.0832**
	[6.502]	[4.917]	[5.015]	[5.178]
Post 2010	**-0.0412**			
	[-6.765]			
Female	**0.0293**	**0.0446**	0.0091	0.0004
	[2.022]	[2.877]	[0.604]	[0.028]
Constant	0.1270	0.0993	0.9082	1.2866
	[21.818]	[81.974]	[2.129]	[2.664]
Observations	32,803	32,803	32,803	28,995
R-squared	0.0211	0.2329	0.2548	0.2603
Firm-Year FE	NO	YES	YES	YES
4^{th} order age polynomial	NO	NO	YES	YES
Additional director controls	NO	NO	NO	YES

Table 6 – The Effect of the Quota on Director Departures and Arrivals: Differences between more and less constrained firms

This table reports OLS estimates of the treatment effects of the quota ("Post 2010'') on director departures and arrivals for two separate groups of boards: "more constrained" and "less constrained." We use two different definition of constraints. In the first one, boards are considered more constrained if they have above median distance to the quota threshold before 2010. In the second definition, boards are considered more constrained in the first group if the proportion of their directors who graduated from an elite Grande Ecole is above the median (*high-elitism boards*). Only the treatment effects on the gender gaps in departure and arrival rates are shown. "Additional director controls'' include dummy variables set equal to one if the director is a graduate either from a Grande Ecole or from the Ivy League, if the director shares the same name of at least one director within the same board, if the director is an independent director, if the director is a member of at least one major committee (e.g., compensation, nomination, or audit committees), and the total number of directorships held by the director. "Tenure'' is the number of years since the director first joined the board. Observations are defined at the firm-year-director level. The sample includes only outsiders (non-executive directors) in France, and all observations with missing information for director age and tenure are excluded. The sample period is from 2003 to 2017. Standard errors are clustered at the firm level and t-statistics are reported in brackets. Boldface indicates statistical significance at 10% or better.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constraint measure	Distance to quota				Board elitism			
Variables	Departures		Arrivals		Departures		Arrivals	
(a) Quota effect on more constrained firms	**-0.1249**	**-0.0841**	**0.1539**	**0.1576**	**-0.0640**	**-0.0547**	**0.0762**	**0.0696**
	[-6.048]	[-3.908]	[5.793]	[5.899]	[-3.971]	[-3.249]	[3.665]	[3.299]
(b) Quota effect on less constrained firms	-0.0142	-0.0200	**0.0425**	0.0215	**-0.0295**	-0.0123	**0.1275**	**0.1020**
	[-1.091]	[-1.292]	[2.254]	[1.105]	[-2.176]	[-0.750]	[5.531]	[3.994]
Differences (a – b)	**0.1107**	**0.0641**	**0.1113**	**0.1362**	-0.0345	**-0.0424**	-0.0513	-0.0324
	[-4.535]	[-2.432]	[3.416]	[4.115]	[-1.629]	[-1.818]	[-1.628]	[-0.958]
Observations	26,445	24,837	26,715	25,355	32,551	28,463	32,803	28,995
R-squared	0.0056	0.2136	0.0235	0.2523	0.0053	0.2316	0.0214	0.2603
Firm-Year FE	NO	YES	NO	YES	NO	YES	NO	YES
Age polynomial	NO	YES	NO	YES	NO	YES	NO	YES
Tenure	NO	YES	NO	NO	NO	YES	NO	NO
Additional controls	NO	YES	NO	YES	NO	YES	NO	YES

Table 7 – Director Characteristics in France: Before and After 2010

This table details director characteristics among French Boards before and after 2010. Panel A includes all non-executive female board members. Panel B includes all non-executive male board members. All observations with missing information for director age and tenure are excluded. The sample period is 2003-2017. All variable definitions are described in Table A1. Diff. denotes the difference between coefficients associated with the period After 2010 and the period Before 2010 (After 2010 – Before 2010). Boldface indicates statistical significance at 10% or better. Small discrepancies are due to rounding.

	Before 2010	After 2010	Diff.	t stat.
Panel A. Female Directors				
Formal Independence	0.33	0.57	**0.24**	7.687
Family Independence	0.80	0.92	**0.12**	4.376
Foreign Nationality	0.09	0.21	**0.12**	5.930
Top Executive Experience	0.30	0.37	**0.07**	2.482
Industry Expertise	0.12	0.18	**0.06**	2.662
Age	53.54	54.08	0.54	0.624
MBA	0.14	0.16	0.02	0.638
Grande Ecole	0.27	0.21	-0.06	-1.593
Number of directorships	1.80	1.87	0.07	0.835
Core Committee Member	0.57	0.65	**0.08**	2.587
Panel B. Male Directors				
Formal Independence	0.45	0.43	-0.02	-1.176
Family Independence	0.95	0.93	**-0.02**	-3.734
Foreign Nationality	0.18	0.18	0.00	0.307
Top Executive Experience	0.55	0.52	**-0.03**	-2.626
Industry Expertise	0.22	0.24	**0.02**	2.028
Age	58.94	59.93	**0.99**	3.882
MBA	0.15	0.17	**0.02**	2.440
Grande Ecole	0.41	0.35	**-0.06**	-5.054
Number of directorships	2.39	1.93	**-0.46**	-9.058
Core Committee Member	0.69	0.71	0.02	1.450

Table 8 – Gender Gaps in Characteristics: Before and After 2010

This table gender gaps in director characteristics among French Boards before and after the 2010. Gender gaps are defined as the difference in means between male directors and female directors. All observations with missing information for director age and tenure are excluded. The sample period is 2003-2017. All variable definitions are described in the Table A1. Diff. denotes the difference between coefficients associated with the period After 2010 and the period Before 2010 (After 2010 – Before 2010); t-statistics are in parentheses. Boldface indicates statistical significance at 10% or better. Small discrepancies are due to rounding.

	Before 2010	After 2010	Diff.
Formal Independence	**0.13**	**-0.13**	**-0.25**
	(3.694)	(-7.663)	(-8.188)
Family Independence	**0.15**	0.01	**-0.14**
	(4.927)	(1.113)	(-5.213)
Foreign Nationality	**0.09**	**-0.03**	**-0.12**
	(4.120)	(-1.840)	(5.483)
Top Executive Experience	**0.25**	**0.14**	**-0.11**
	(7.841)	(9.005)	(3.476)
Industry Expertise	**0.10**	**0.06**	-0.03
	(3.995)	(5.410)	(1.325)
Age	**5.39**	**5.84**	0.45
	(5.803)	(17.545)	(-0.520)
MBA	0.01	0.01	0.00
	(0.389)	(1.119)	(0.076)
Grande Ecole	**0.14**	**0.15**	0.01
	(3.262)	(9.356)	(0.173)
Number of directorships	**0.59**	0.05	**-0.53**
	(6.339)	(1.404)	(-5.886)
Core Committee Member	**0.13**	**0.07**	**-0.06**
	(4.189)	(4.715)	(-1.949)

Table 9 – The Effect of the Quota on The Gender Gap in Independence

This table reports OLS estimates of the treatment effects of the quota ("Post 2010'') on the difference between male and female director characteristics (i.e., gender gaps). The relevant treatment effects are "Female X Post 2010''; the effect on gender gaps (male – female) is the negative of these estimates. Observations are defined at the firm-year-director level. The sample includes only outsiders (non-executive directors), and all observations with missing information for director age and tenure are excluded. The dependent variable is a dummy set equal to one if the director has a particular characteristic (formal independence, family independence, or foreign nationality) at the end of the fiscal year. The sample period is from 2003 to 2017. Standard errors are clustered at the firm level and t-statistics are reported in brackets. Boldface indicates statistical significance at 10% or better.

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Formal Independence		Family Independence		Foreign Nationality	
Female X Post 2010	**0.2542**	**0.2329**	**0.1390**	**0.1020**	**0.1193**	**0.1317**
	[8.188]	[6.559]	[5.213]	[4.244]	[5.483]	[4.858]
Post 2010	-0.0176		**-0.0212**		0.0032	
	[-1.176]		[-3.734]		[0.307]	
Female	**-0.1262**	**-0.1307**	**-0.1495**	**-0.1052**	**-0.0892**	**-0.0895**
	[-3.694]	[-3.337]	[-4.927]	[-3.806]	[-4.120]	[-3.292]
Constant	**0.4534**	**0.4468**	**0.9469**	**0.9307**	**0.1817**	**0.1816**
	[27.329]	[115.639]	[133.044]	[397.351]	[15.394]	[51.563]
Observations	36,817	36,817	36,817	36,817	28,798	28,798
R-squared	0.0109	0.2946	0.0092	0.3358	0.0028	0.2666
Firm-Year FE	NO	YES	NO	YES	NO	YES

Table 10 – The Effect of the Quota on The Gender Gap in Experience and Expertise

This table reports OLS estimates of the treatment effects of the quota ("Post 2010'') on the difference between male and female director characteristics (i.e., gender gaps). The relevant treatment effects are "Female X Post 2010''; the effect on gender gaps (male – female) is the negative of these estimates. Observations are defined at the firm-year-director level. The sample includes only outsiders (non-executive directors), and all observations with missing information for director age and tenure are excluded. The dependent variable is either a dummy set equal to one if the director has a particular characteristic (top executive experience or industry experience) or the director's age in years at the end of the fiscal year. The sample period is from 2003 to 2017. Standard errors are clustered at the firm level and t-statistics are reported in brackets. Boldface indicates statistical significance at 10% or better.

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Top Executive Experience		Industry Expertise		Age	
Female X Post 2010	**0.1068**	**0.0844**	0.0313	-0.0023	-0.4494	0.0103
	[3.476]	[2.313]	[1.325]	[-0.085]	[-0.520]	[0.012]
Post 2010	**-0.0350**		**0.0244**		**0.9873**	
	[-2.626]		[2.028]		[3.882]	
Female	**-0.2496**	**-0.2426**	**-0.0961**	**-0.0635**	**-5.3913**	**-6.2784**
	[-7.841]	[-6.328]	[-3.995]	[-2.368]	[-5.803]	[-6.826]
Constant	**0.5505**	**0.5305**	**0.2169**	**0.2318**	**58.9356**	**59.6741**
	[36.000]	[145.621]	[14.604]	[88.545]	[201.952]	[772.829]
Observations	36,817	36,817	36,817	36,817	36,817	36,817
R-squared	0.0198	0.2527	0.0048	0.3345	0.0454	0.2825
Firm-Year FE	NO	YES	NO	YES	NO	YES

Table 11 – The Effect of the Quota on The Gender Gap in Educational Qualifications

This table reports OLS estimates of the treatment effects of the quota ("Post 2010'') on the difference between male and female director characteristics (i.e., gender gaps). The relevant treatment effects are "Female X Post 2010''; the effect on gender gaps (male – female) is the negative of these estimates. Observations are defined at the firm-year-director level. The sample includes only outsiders (non-executive directors), and all observations with missing information for director age and tenure are excluded. The dependent variable is a dummy set equal to one if the director has a particular characteristic (an MBA degree or an elite Grande Ecole degree) at the end of the fiscal year. The sample period is from 2003 to 2017. Standard errors are clustered at the firm level and t-statistics are reported in brackets. Boldface indicates statistical significance at 10% or better.

	(1)	(2)	(3)	(4)
Variables	MBA		Grande Ecole	
Female X Post 2010	-0.0023	-0.0066	-0.0072	-0.0191
	[-0.076]	[-0.191]	[-0.173]	[-0.390]
Post 2010	**0.0212**		**-0.0556**	
	[2.440]		[-5.054]	
Female	-0.0127	-0.0011	**-0.1409**	**-0.1437**
	[-0.389]	[-0.030]	[-3.262]	[-2.805]
Constant	**0.1501**	**0.1621**	**0.4127**	**0.3797**
	[15.130]	[50.178]	[29.629]	[96.253]
Observations	28,292	28,292	28,292	28,292
R-squared	0.0008	0.2015	0.0226	0.2294
Firm-Year FE	NO	YES	NO	YES

Table 12 – The Effect of the Quota on The Gender Gap in Board and Committee Appointments

This table reports OLS estimates of the treatment effects of the quota ("Post 2010'') on the difference between male and female director characteristics (i.e., gender gaps). The relevant treatment effects are "Female X Post 2010''; the effect on gender gaps (male – female) is the negative of these estimates. Observations are defined at the firm-year-director level. The sample includes only outsiders (non-executive directors), and all observations with missing information for director age and tenure are excluded. The dependent variable is the number of board seats held by a director or a dummy set equal to one if the director is a member of a core board committee at the firm at the end of the fiscal year. The sample period is from 2003 to 2017. Standard errors are clustered at the firm level and t-statistics are reported in brackets. Boldface indicates statistical significance at 10% or better.

	(1)	(2)	(3)	(4)
Variables	Number of Directorships		Core Committee Member	
Female X Post 2010	**0.5332**	**0.4403**	**0.0581**	0.0333
	[5.886]	[4.357]	[1.949]	[0.981]
Post 2010	**-0.4622**		0.0181	
	[-9.058]		[1.450]	
Female	**-0.5858**	**-0.5097**	**-0.1253**	**-0.1215**
	[-6.339]	[-5.099]	[-4.189]	[-3.536]
Constant	2.3887	2.0984	0.6945	0.7098
	[37.053]	[229.804]	[52.624]	[226.920]
Observations	35,247	35,247	32,659	32,659
R-squared	0.0198	0.3063	0.0047	0.2215
Firm-Year FE	NO	YES	NO	YES

european corporate governance institute

about ECGI

The European Corporate Governance Institute has been established to improve *corporate governance through fostering independent scientific research and related activities.*

The ECGI will produce and disseminate high quality research while remaining close to the concerns and interests of corporate, financial and public policy makers. It will draw on the expertise of scholars from numerous countries and bring together a critical mass of expertise and interest to bear on this important subject.

The views expressed in this working paper are those of the authors, not those of the ECGI or its members.

european corporate governance institute

ECGI Working Paper Series in Finance

Editorial Board

Editor	Mike Burkart, Professor of Finance, London School of Economics and Political Science
Consulting Editors	Franklin Allen, Nippon Life Professor of Finance, Professor of Economics, The Wharton School of the University of Pennsylvania
	Julian Franks, Professor of Finance, London Business School
	Marco Pagano, Professor of Economics, Facoltà di Economia Università di Napoli Federico II
	Xavier Vives, Professor of Economics and Financial Management, IESE Business School, University of Navarra
	Luigi Zingales, Robert C. McCormack Professor of Entrepreneurship and Finance, University of Chicago, Booth School of Business
Editorial Assistant	Úna Daly, Working Paper Series Manager

www.ecgi.global/content/working-papers

european corporate governance institute

Electronic Access to the Working Paper Series

The full set of ECGI working papers can be accessed through the Institute's Web-site (www.ecgi.global/content/working-papers) or SSRN:

Finance Paper Series	http://www.ssrn.com/link/ECGI-Fin.html
Law Paper Series	http://www.ssrn.com/link/ECGI-Law.html

www.ecgi.global/content/working-papers