

Where Women Make the Difference.
The Effects of Corporate Board Gender-Quotas on Firms’
Performance Across Europe

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Abstract

This paper contributes to the literature on the effects of corporate board gender quotas on firms’ performance. It focuses on countries characterized by different degrees of gender imbalances, such as those in Continental and Southern Europe. The empirical analysis is based on accounting data taken from Bureau Van Dijk’s Amadeus for the 2004-2013 period. We use a triple difference estimator with ex-ante matching, where identification comes from the sharp discontinuity around the time when the legislation was passed in the respective countries. We consider an extensive set of firm outcomes, including total factor productivity (TFP), which has not yet been considered in the literature. We find great heterogeneity across countries, with more positive effects in Southern European countries than in Continental ones. We then focus on Italy and provide some possible explanations for these results on the basis of detailed information on the characteristics of the board members of Italian targeted firms.

Keywords: Gender quota, firm performance, productivity, discrimination

JEL Codes: J1, J3

1. Introduction

Most industrialized countries have registered a significant increase in female educational attainment and labor market participation in recent decades. However, such improvements have not translated into more female representation in economic leadership positions, even in countries, like the Scandinavian ones, which have already achieved good results in terms of overall gender equality in the labor market.

In April 2015, the average share of women on the boards of the largest publicly listed companies in the EU-28 Member States reached 21.2%. Nonetheless, only in eight EU Member States (France, Latvia, Finland, Sweden, UK, Denmark, Italy and Germany) did women account for at least one quarter of board members. The figures are even more dismal when one considers top executive positions: only 3.6% of the largest listed companies in Europe had a female chief executive officer.

In order to speed up the increase in female representation in top leadership positions and the cultural change needed to favor women's access to top jobs, both international organizations and national governments have considered the possibility of taking legislative action, in some cases of a temporary nature, to promote gender-balanced representation on corporate boards.

Norway was the first country to move in this direction. It did so in 2003 by enacting a law mandating that each gender should represent at least 40% of the members of the board of public limited companies. In the EU, the issue of women on boards has been high on the political agenda since 2010, when the European Commission adopted the *Strategy for Equality between Women and Men 2010-2015*. One of its key actions in the field of gender balance in decision-making was "to monitor progress towards the aim of 40% of members of one sex in committees and expert groups established by the Commission" (European Commission, 2011). A concrete step forward was taken in November 2012, when the Commission proposed a Directive establishing a "procedural quota", which set the objective of a minimum of 40% of each sex among non-executive directors by 2020. On 20 November 2013, the European Parliament voted with a strong majority to back the proposed Directive, confirming the broad consensus on increasing the gender balance on corporate boards in the EU. The Directive, favored by the majority of Member States, is currently being discussed by the European Council.

Following the European Commission's actions, a lively debate arose both in the EU and within many of its Member States on the usefulness of legal actions to obtain more female representation in the highest job positions. There is no consensus on the potential benefits of such actions (Smith, 2004).

The supporters of gender quotas believe that they will help to crack the glass ceiling that prevents productive high skilled women from reaching leadership positions, with beneficial effects on firm performance (European Commission, 2012 and 2014). Furthermore, such laws may produce spillover effects also on other gender disparities in the labor market. More women on the board could push for the hiring or promotion of new women also for other managerial positions within firms, or it could create an environment more favorable to women's employment (for example, through more flexible working time schedules, policies to reconcile work and family life, etc.). Finally, there could also be more incentives for young women to graduate in fields (such as management, finance, economics and law) which are more valuable for business careers (Bertrand et al., 2014).

The opponents of gender quotas claim that if boards are already set to maximize firm value – or any other measure of firm performance – the introduction of a binding constraint in terms of the number of women among board members should necessarily lead to a sub-optimal output (Demsetz and Lehn, 1985). For the US, Adams and Ferreira (2009) show that the average effect of gender diversity on firm performance is negative, suggesting that mandating gender quotas for directors can reduce firm value. For Spain, Minguez-Vera and Adina (2011) find that women's presence on boards generates a negative impact on firm performance, which may be due to less risky strategies implemented by women directors. In addition to the direct effect on firm performance, the incumbent male board members may not welcome the newly hired women, especially if they believe that they obtained their jobs only because of the law and not for their skills. This may cause conflicts within the board, with consequent negative effects on firm strategy and management. Finally, some firms may try to avoid the law – or minimize its impact – by changing their legal status, reducing the size of the board or hiring women only for non-executive positions.

Despite the different views on the effect of mandated gender quotas on firm performance, it is indubitable that they are the most effective tool with which rapidly increase the number of women on corporate boards (Walby, 2013). For this reason, following the Norwegian example and the EU

recommendations, a number of EU countries (Spain in 2007; Belgium, France, Italy and Netherlands in 2011 and Germany in 2016) have recently passed national laws with mandated gender quotas for private companies, albeit with different rules in terms of targeted firms, size of the gender quota, and severity of sanctions for non-compliers. These legislative actions provide researchers with a set of extraordinary quasi-natural experiments to study the causal effect of gender quotas on company performance, circumventing both endogenous sorting of firms with different female representation and reverse causality. Moreover, the progressive adoption of mandated female board quotas in different countries offers fertile ground for investigating country-specific effects of this type of legislation.

In this paper, we extend previous research on the effects of gender quotas on firm performance by testing whether results obtained so far in the economics literature are valid for EU countries that have adopted gender quotas following the Norwegian example.

There is a growing body of economic literature analyzing the relationship between women in leadership positions and company performance. Earlier studies on gender board diversity, mainly based on cross-sectional data, find that female representation has either positive (Carter et al., 2003; Erhardt et al., 2003; Smith et al., 2006) or null effects (Carter et al., 2010; Francoeur et al., 2008; Rose, 2007; Marinova et al., 2010, Gregory-Smith et al., 2014) on firm's performance. However, given the cross-sectional nature of the data used in these studies, such estimates are difficult to interpret as causal effects. In fact, they may be biased by potential unobserved heterogeneity (there may be unobservable firms' characteristics that simultaneously determine both the share of women and firms' performance), or by reverse causality (when firm performance influences the share of women hired on boards).

More convincing empirical evidence is provided by recent analysis which exploits the exogenous introduction of gender quotas in Norway and shows that, after the legislative action in 2003, the stock price of the affected firms and Tobin's Q significantly dropped in the following years, consistently with the idea that firms choose boards to maximize value (Ahern and Dittmar, 2012). Matsa and Miller (2013) find that Norwegian firms affected by the reform reduced workforce less than unaffected firms did, raising relative labor costs and employment levels and reducing short-term profits. These effects are stronger among firms without female board members before the reform, and they are present even for boards with older and more experienced members after the reform. Bertrand et al., (2014) show that a

large number of public limited companies changed their status to private after 2003. Furthermore, Ahern and Dittmar (2012) point out that, among companies listed on the stock exchange prior to the reform, the likelihood of delisting at any time between 2003 and 2009 was larger among those with a smaller initial share of women on their board, which were those companies that found it more demanding to comply with the law.

Overall, papers on the Norwegian experience which explore the effect of gender quotas by taking into account the endogenous nature of boards' composition generally find a negative relationship between female board representation and firms' outcomes, at least in the short run.¹

However, broadening the evaluation of gender quotas effects beyond the Norwegian borders is necessary to ensure external validity of the results found in the literature so far. Although the evidence on Norway is rich and useful for its policy implications, the cultural and institutional features of this country cast some doubts on the possibility of automatically extending these results to other countries with quite different cultural and institutional characteristics. Norway is one of the best performing countries in the world in terms of gender equality. It is therefore interesting to see whether results on the effects of mandated gender quotas are confirmed in countries, like the Southern European ones, starting from much worse initial conditions in terms of women's employment and equal opportunities, and characterized by a different gender culture and attitudes to women's and men's roles in society and in the labor market. The reasons for the under-representation of women in power and decision-making are multifaceted and complex, and a crucial role is played by cultural factors and gender-related stereotypes. Consequently, analysis of the impact of female quotas in countries strongly differing with regard to their gender culture appears particularly important.

In this paper, we contribute to the literature on gender quota by providing, in a comparative perspective, an analysis of the effects of mandated female board representation on firm performance in four EU countries: two countries from Continental Europe (Belgium and France), and two countries from

¹ Going beyond firm performance, Bertrand et al. (2014) exploit the Norwegian gender quota to test for the presence of spillover effects on labor market opportunities of women, focusing on those more likely affected by the reform (i.e., women on boards and, more in general, highly qualified women) and on the education and family choices of young women. They find that, at least in the short run, the reform had very little impact on women in firms beyond its direct effect on the newly appointed female board members.

Southern Europe (Italy and Spain). Belgium and France share with Norway a similar attitude towards gender roles, while Italy and Spain are characterized by a much higher overall gender imbalance. We focus on heterogeneous effects across countries and, in the case of Italy, we discuss a number of channels that may explain such effects.

To study the impact of gender quotas, we use accounting data taken from Bureau Van Dijk's Amadeus for the 2004-2014 period. To estimate the causal effect of the legislation on gender quotas on firm performance we use a triple-differences estimator, where identification comes from the sharp discontinuity around the time when the legislation was passed in the different countries. We identify the treated firms according to the country-specific date of the introduction of mandated female board representation. The potential control groups include also firms from Germany and Portugal, which had not adopted such type of legislation in the period that we consider, but which share with the treated countries common features in terms of socio-economic and institutional characteristics.

Furthermore, in our preferred specifications we use an ex-ante matching algorithm to select, for each treated firm, the set of the control firms more similar in terms of observed characteristics.

We consider an extensive set of firm outcomes in order to obtain a complete picture of the effects of these reforms on firm performance. More specifically, as well as the performance indicators commonly used in the literature, we extend the analysis to productivity measures, paying specific attention to both labor productivity (measured by the value added per employee) and total factor productivity (TFP).

The results show heterogeneity across countries. More specifically, for France we find similar results as those obtained for Norway, with negative effects on both profitability and productivity and a positive effect on the number of employees. We find similar results for Belgium although in this case estimates are not statistically significant. The picture is completely different when we look at Southern European countries: our results indicate that gender quotas had a positive effect of firms' performance in Italy, while the effects are generally positive but non significant for Spain.

Given these results and the initial levels of gender imbalances across Continental and Southern European countries, which point to Italy as one of the EU countries with the largest gender differences in employment and equal opportunities, we focus on this country and explore the relationship between changes in board composition brought about by mandated gender quotas and firm performance. To this

end, for each board member in the sample of Italian publicly listed companies in the Amadeus data-set, we collected detailed information on his/her main characteristics (gender, age, education, field of degree, work experience in managerial positions and as board member).

Overall, our analysis suggests that gender quotas actually helped to crack the glass ceiling in Italian targeted firms without reducing the quality of women on boards: firms complied with the law by hiring new highly-educated women, mostly graduates in fields such as law, management and economics, and with the same amount of work experience in managerial positions as the incumbents.

The rest of the paper is organized into six sections. In Section 2, we present the institutional setting related to the introduction of mandated gender quotas in the EU and provide empirical evidence on the impact of gender quotas on female board representation. Section 3 describes the data and the empirical strategy. Section 4 reports our main results, and in Section 5 we extend the analysis with further estimates on Italy. The last Section concludes.

2. Institutional setting

The reduction of the gender gap in corporate boards can be pursued in a number of ways, ranging from voluntary initiatives and the diffusion of good practices by both governments and businesses to legislative measures. Recent studies point out that the former are usually perceived by firms as a more flexible and less invasive mechanism than national laws, but their effects in terms of increasing the share of women on boards have so far been uneven and slow. By contrast, legal quotas seem to be the most effective and fastest mechanism with which to increase gender diversity in corporate boards (Walby and Armstrong, 2012).

After a long debate on the necessity of binding gender quotas across the EU Member States, in November 2012 the European Commission proposed a law to ensure that women have a fair chance in the recruitment of potential board members through the adoption of a transparent and fair selection procedure (a so-called “procedural quota”) rather than introducing a fixed quantitative quota.² One year

² If a publicly listed company in Europe does not have 40% of women among its non-executive board members, the new law will require it to introduce a new selection procedure for board members, which gives priority to qualified female candidates. However, the law only applies to the supervisory boards or non-executive directors of publicly listed companies, with the exception of small and medium firms (i.e., with fewer than 250 employees).

later, the European Parliament voted in favor of this proposal with an overwhelmed majority, but further steps are required to make it an official Directive enforceable by the EU Member States.

In the meantime, following the leading example of Norway, which was the first country in the world to introduce gender quotas in corporate boards by law, doing so in December 2003, in the past decade a growing number of EU Member States have adopted legislation with similar prescriptions, albeit with different mechanisms and rules. In the various countries, the target firms are identified by considering the size of the firm (in some cases excluding small and medium sized ones) and/or its type of ownership (state-owned versus private or private listed versus private unlisted). The size of the gender quota varies between 30% and 40%. In almost all cases, companies were given a period of time to meet the required quota so that they could adjust gradually to the new requirements in terms of the gender composition of their boards. In some countries, a phased application with sequentially higher quotas was established, also depending on the type of targeted company. Finally, national legislations also differ in the presence and type of sanctions for non-compliers. In this regard, the experience of Norway provided useful indications. Gender quotas for public limited companies were introduced at the end of 2003 without sanctions for non-compliers. After two years, the fraction of women on the boards of directors of these companies had changed little (it was around 17% at the end of 2005). Consequently, the Norwegian government introduced severe sanctions for firms not reaching the target quota by 2008. Statistics show that at the end of that year the share of women on boards of public limited companies in Norway actually reached the target of 40%.

With particular regard to legislative actions targeted on private companies, Spain was the first EU country to follow Norway by introducing, in 2007, a quota to secure the presence of women on corporate boards. It was followed by Belgium, France, Italy and the Netherlands in 2011. Germany has recently passed similar legislation, which is in force as of 2016.³

Furthermore, individual EU Member States will have to put in place appropriate sanctions for non-compliers. The law will automatically expire in 2028.

³ Our analysis is limited to private companies. However, in most of the countries considered the legislation applies also to state owned companies. The latter are the only type of companies subject to gender quotas also in a number of other EU countries (Austria, Denmark, Finland and Ireland). In some cases, as in Norway, the legislation is applied first to state owned companies, and later to private companies. Outside the EU, in 2010 Iceland adopted a legal initiative to promote gender quotas on boards.

Table 1 reports the EU Member States that have already passed a law prescribing gender quotas in private firms, and it summarizes the main features of these laws. As a benchmark, in the last row of the table we also report the same information for Norway.

TABLE 1

In the following empirical analysis, we will concentrate on the effects of quotas on a subsample of the countries that have promoted gender quotas by law, namely Belgium, France, Italy and Spain. We include German firms in the control group because Germany was unaffected by the law in the period under analysis, and we exclude the Netherlands because the number of potential control firms was too small with respect to affected firms.⁴

Given that we shall take into account the country-specific definition of the targeted firms to identify treated firms, we now turn to a more detailed description of the legislations in effect in the affected countries.

In Spain, in 2007 the government adopted a law establishing a quota of at least 40% of each gender on the boards of all publicly listed companies with more than 250 employees to be reached by 2015. The law does not establish measures to punish non-compliers, but it states that gender diversity in the boardroom will be positively evaluated by the Public Administration when awarding public contracts.

In Belgium, a federal law adopted in 2011 established a share of at least 33% of each gender on the executive boards of large publicly listed companies by 2016. Moreover, the quota is applicable to companies with less than 50% shares listed on the stock exchange and to small and medium-sized listed companies within year 2018. The legislation includes a temporary loss of financial and non-financial benefits by board members of non-compliers companies.

In January 2011, a law on female board representation was adopted in France. The law requires all listed companies and companies with more than 500 employees or revenues higher than 5 million euros to

⁴ The Amadeus dataset contains around 400 public limited companies in the Netherlands, of which around 350 are subject to the national legislation on gender quotas; hence, fewer than 50 firms may be considered as potential controls.

have at least 40% of each gender on their boards. The targeted companies have to meet the 40% target by the year 2016, within 6 years from the introduction of the law. However, an *ad interim* regulation required a share of 20% of women by the end of 2013. The law establishes that the appointment of board representatives in breach of the law can be considered as invalid and subject to annulment.

Italy adopted a legislative action to promote gender balance on corporate boards in 2011. The law applies to all listed companies, and it requires at least 20% representation of each gender on boards and supervisory boards on their first renewal, within 12 months, starting from June 2011. The quota must be augmented to 30% on the second and third renewal, by 2015. The sanctions for non-complying firms include, first an admonishment by the listed-company regulatory body, then (after four months), a fine of up to one million euros, and finally (after a further three months) annulment of the board.

Overall, although in most countries the target quota has still to be met, official data provided by the European Commission actually confirm that most of the EU countries that adopted a specific legislation for gender quotas experienced the largest increase in the share of women on boards between 2010 and 2015.⁵

Figure 1 shows data on proportions of women on boards for the EU countries that have adopted gender quotas and for the EU28 average. Apart from Spain, in all countries with mandatory quotas the proportion of women on boards increased sharply after the date of the introduction of the legislation (identified by the vertical lines in the country-specific figures) and it is well above the EU average in all countries. Moreover, although the average proportion in the EU28 is increasing as well, pointing to a general trend towards more women in top positions, no clear discontinuity can be observed in this case.

FIGURE 1

⁵ In 2003, the European Commission established a database to monitor the numbers of men and women in key decision-making positions in order to provide reliable statistics for use in monitoring the current situation and trends through time. Up-to-date data covering female board representation are available online at: http://ec.europa.eu/justice/gender-equality/gender-decision-making/database/business-finance/supervisory-board-board-directors/index_en.htm.

The impact of gender quota legislation on women representation can be analyzed using the following regression based on the European Commission country-year panel:

$$P_{j,t} = \alpha + \beta TREATED_{j,t} + \sum_{t \in T} \gamma_t YEAR_t + \sum_{j \in J} \delta_j COUNTRY_j + e_{j,t} \quad (1)$$

where $P_{j,t}$ is the share of women on boards in country j and year t , $TREATED_{j,t}$ is a dummy for country/period observations with a gender quota legislation, $YEAR_t$ are year dummies intended to control for shocks that are common to all countries, $COUNTRY_j$ are country dummies controlling for time invariant differences between countries, and $e_{j,t}$ is the error term. We estimated equation (1) with controls for country-specific time trends as well, in order to consider the possibility of nonparallel evolution in the proportion of women on boards in the absence of a gender quota. Both specifications were estimated also with weighted least squares, using countries' populations as weights.

The estimates of β reported in Table 2 suggest that gender quota legislation caused a statistically significant increase, ranging between 4 and 7 percentage points, in the share of women on boards.

TABLE 2

3. The effects of gender quotas on firms: data and empirical strategy

The aim of the empirical analysis is to assess the effect of the introduction of the legislation on gender quotas in private corporate boards on several measures of firm performance.

To this end, we use accounting data taken from Bureau Van Dijk's Amadeus for the 2004-2014 period. Amadeus is a database of comparable financial information for public and private companies, and it contains comprehensive information on around 21 million companies across Europe. For our analysis, we selected four EU countries that have recently passed a law with mandated corporate gender boards (i.e. Belgium, France, Italy and Spain). For each country, since gender quotas laws usually apply to large companies, we extracted all the companies with sales of at least ten million euros in one of the years between 2010 and 2014. We then excluded from the analysis agricultural, mining and quarrying and state-owned companies, partnerships, non-profit organizations and companies with unknown status,

keeping only public limited companies in our samples. After this selection, our dataset consists of more than four hundred thousand observations.

In light of the legislation discussed in Section 2, we define the treated firms on a country basis. More specifically, starting from the year in which gender quotas in boards were introduced, we consider as treated all the publicly listed firms in Belgium and Italy, all the publicly listed firms and the unlisted ones with at least 500 employees and revenues over 50 million euros over the three previous consecutive years in France, and all the public limited companies with at least 250 employees in Spain.

To identify the causal effect of mandatory gender quotas on firm performance, as in Matsa and Miller (2013) we use a “triple-difference” (or a Difference-in-difference-in-differences, DDD) estimator, which compares changes in the outcome variable(s) between treated and untreated firms in a country with national legislation on gender quotas with the corresponding differential in a comparable country without such legislation. A DDD estimator makes it possible to take account of two sources of potential confounding trends: changes in performance of all companies in the treated country (due to changes in country-specific business conditions or policies adopted when legislation on gender quotas was passed and that may potentially affect all firms in that country) and changes in the performance of the (potentially) treated firms across countries (which have nothing to do with gender quotas).

Given the economic and institutional characteristics of the treated countries and the definition of the treated companies used in the empirical analysis, we selected Germany, which did not pass any legislation on gender quotas in corporate boards over the period considered, as our preferred control country. In order to test the sensitivity of our results to the choice of the control country, we also perform some robustness checks using Portugal as an alternative control country, particularly in the case of Spain.⁶

⁶ Germany is the ideal comparison country for Belgium and France, since they all belong to the so-called Continental EU countries and are characterized by similar welfare regimes according to standard socio-economic classifications (see Esping-Andersen 1990 for more details). Furthermore, Germany is a good comparison country also in the case of Italy, due to its geographical proximity and to the fact that in Italy gender quotas apply only to publicly listed companies (and we may expect Italian companies quoted on the national stock exchange market to be rather comparable with those quoted on the German one). Only in the case of Spain, which is both geographically and institutionally distant from Germany, and where gender quotas were formally applied to a relatively large and heterogeneous pool of companies (i.e. all large public limited companies), does this choice seem questionable. One may argue that, among potential untreated countries, Portugal may be much more comparable than Germany in terms of socio-economic and institutional conditions.

In light of the identification strategy discussed above, for each treated country we estimate the following model:

$$Y_{ijts} = \alpha + \beta_1 TC_j \times TREATED_i \times Post_t + \beta_2 TC_j \times Post_t + \beta_3 TREATED_i \times Post_t + \tau_t + \mu_i + \sum_s t \times \delta_s + \theta X_{ijst} + \varepsilon_{ijst} \quad (2)$$

where “ $ijts$ ” denotes the i -th firm in country j at time t and in industry s . Y is a measure of firm performance, TC is a dummy for the treated country, $TREATED$ is a dummy for the treated firms, $Post$ is a dummy for the years after the implementation of gender quotas in the treated country, τ_t and μ_i are, respectively, time and firm fixed effects, $\sum_s t \times \delta_s$ are industry-specific time trends, X is a vector of time-varying firms’ characteristics and ε is the error term.⁷ In this specification, the parameter β_1 captures the causal effect of the gender quota on firm performance. It may be interpreted as the change in the differential in firm performance between treated and untreated firms in the treated country, compared to the corresponding change in the same differential between firms that would have been treated and untreated had a similar law been introduced in the other (untreated) country (Imbens and Wooldridge, 2009).

We consider a large set of indicators of firm performance, capturing productivity, profitability and labor costs. More specifically, as in previous studies we use the number of employees, labor cost per employee and an indicator of profitability (ROA). In addition, we consider two productivity indicators: labor productivity (measured by value added per employee) and total factor productivity (TFP), which makes it possible to evaluate the increase in productivity not accounted for by changes in inputs like capital and labor.⁸

We estimated TFP following the procedure suggested by Levinsohn and Petrin (2003). According to this method, the key issue of the correlation between unobservable productivity shocks and inputs is

⁷ For example, in the case of Italy TC is equal to 1 for Italian companies (and 0 for German ones), $TREATED$ is equal to 1 for publicly listed companies (in Italy and Germany), $Post$ is equal to 1 for all the years after 2011 (when the gender quota law was passed in Italy).

⁸ Except for ROA, which includes some zeros, we take the logarithm of all the dependent variables.

solved using intermediate inputs as a proxy for these unobservable shocks.⁹ Using a semi-parametric estimator, for each country we estimated the TFP by two-digit industry, using value added as output and the number of employees and fixed tangible assets as inputs.

As far as we know, this is the first study that considers both labor productivity and TFP as measures of firm performance that may be affected by the introduction of gender quota laws. TFP is a particularly interesting indicator in this context: if we assume that new female board members have a corporate leadership and managerial style different from that of old male ones (Matsa and Miller, 2013) and that this may be reflected in a different (re-)organization of available inputs, the adoption of gender quotas should affect TFP.

To balance the number of treated and control companies and restrict our sample to a common support in order not to have identification of our coefficients rely on residual unobserved heterogeneity,¹⁰ we carefully selected smaller control groups using Abadie et al.'s (2004) semiparametric ex-ante matching approach. We found control groups among the non-treated firms in the same country (*Control 1*), and among the potentially treated (*Control 2*) and the potentially non-treated (*Control 3*) groups in Germany. We applied the same definition of each national law to define the potential German treatment group (*Control 2*). For each treated firm in each country, we identified the closest five firms in each control group based on industry, assets, sales and operating profits in 2007, well before implementation of the reforms in Italy, Belgium and France, allowing for replacement. We used 2007 also for Spain, where the reform was enacted in 2008.¹¹ If a control firm was matched with more than one treated firm, we kept in our sample just one observation for each control firm.

Finally, as is usually done with balance sheet variables, we excluded companies with missing information on the relevant variables and cut the tail below the bottom 5% and above the top 5% of the TFP distribution for each country.

⁹ The production function is assumed to be Cobb-Douglas, and the error term has two components, one is uncorrelated with input choice, the other impacts the firm's decisions and is not observed. According to this method, the unobservable productivity term is expressed as a function of two observed inputs: capital and intermediate inputs.

¹⁰ The main outcomes considered in the whole sample are always higher for the treated companies with some exceptions in France and Spain, where the mandatory gender quota in boards was more widely enforced.

¹¹ As a robustness check, we selected the control firms in 2004 in the comparison between Spain and Germany and in 2006 in the comparison between Spain and Portugal (because the first year for which we had information on Portuguese firms was 2006). The results obtained with this exercise were qualitatively similar.

As can be seen in Table 3, after applying the procedure described above, almost all the outcomes variables are pretty well balanced in the vast majority of the samples.

TABLE 3

4. Results

In this section, we present the results on the effect of gender quotas on firm performance obtained using the empirical strategy described above. For each treated country (Belgium, France, Italy and Spain), Table 4 presents the main DDD estimates of our preferred specification of equation (2) for the measures of firm performance considered: the logarithm of value added per employee (*loglabprod*, col. 1), the logarithm of TFP (*logtfp*, col. 2), the logarithm of the number of employees (*logemployees*, col. 3), the logarithm of the labor cost per employee (*logcostemp*, col. 4), and ROA (col. 5). All columns include, other than firm fixed effects, year fixed effects and industry-specific time trends, these last computed at the 2-digit level of the NACE classification. In the case of value added per employee, we also control for the logarithm of capital per employee. Standard errors are clustered at the firm level. Given the aim of our analysis, we focus on estimates of the β_1 coefficient of equation (2), named *TC_treated_post* in Table 4 (where TC is the name of the treated country in each panel), but we also report estimates for, respectively, β_2 (*TC_post*) and β_3 (*treated_post*).¹² With this specification, β_1 should capture the effect of the introduction of gender quotas on firm performance, taking account of differences among untreated firms across countries (β_2) and between treated and untreated firms in the untreated country (β_3).

TABLE 4

Our estimates show that the introduction of gender quotas by law caused quite heterogeneous effects on firm performance across the EU countries considered. As regards Continental countries, for France our results confirm the negative effects on firm profitability emerged for Norway: the *treated_post_TC*

¹² Full estimates are available upon request.

coefficient is negative and statistically significant when considering ROA as outcome. Moreover, column (1) of panel A shows that gender quotas affected negatively also firm productivity in terms of labor productivity. As for Norway, the *TC_treated_post* coefficient is positive when considering the number of employees as outcome.¹³ We observe also a reduction in the unitary labor cost. For Belgium, the coefficients of both profitability and productivity are negative, although they are not statistically significant.

The picture is completely different when we look at the two Southern countries (Italy and Spain). First, gender quotas do not seem to have had any negative effect on firm profitability: the *treated_post_TC* coefficient is not statistically significant in either of the two countries when considering ROA as outcome variable (see column 5 of panel C and D); second, the effect of gender quotas on both measures of productivity is positive for both countries (columns 1 and 2 of panel C and D), although it is statistically significant only in the case of Italy. We also observe a positive effect on unitary labor cost for Italy. For Spain, when Portugal is used as the untreated country the lack of statistical significance of the *treated_post_TC* coefficient is confirmed (see Table A1 in the Appendix).¹⁴

Overall, our results have two important implications. The first is that the institutional design of the law is a crucial factor in influencing both the rate of compliance and its potential effects on firm performance. Among the four EU countries considered in our empirical analysis, Spain is the only one where gender quotas have been introduced without sanctions for non-compliers. In Section 2, we showed that Spain is the only treated country in which the share of females on boards did not increase significantly immediately after the introduction of gender quotas; here we add that such reform did not significantly affect firm performance either.

The second implication of our results is that the effect of gender quotas on firm performance depends on the country in which they are introduced. In this perspective, we may conclude that previous

¹³ The positive effect on the number of employees may be related to the fact that in France, as well as in Spain, the gender quota law establishes that target firms are selected also considering the number of employees. Then, the treated and control samples of these countries are not well balanced when considering the number of employees (see Table 3). In view of this, the results on number of employees for Spain and France should be taken with some caution. As a robustness check, we estimated equation (2) considering as treated only publicly listed firms also in France and Spain and results are qualitatively similar although not always statistically significant.

¹⁴ We also estimated equation (2) aggregating data in country, treatment, year and NACE two digits cells and we obtained similar results.

empirical evidence on other countries, particularly on Norway, is not automatically extendable to countries characterized by different socio-economic, cultural and institutional conditions.

In light of these results, it is then interesting to determine why such cross-country heterogeneity in firm performance occurs also by comparing countries – such as Italy and Belgium – where the design and timing of the law is very similar. In this regard, our results seem to confirm the suggestions by both Ahern and Dittmar (2012) and Matsa and Miller (2013) that the effects of the quota may be smaller in Norway than in other countries with a less progressive gender culture or less public commitment to gender parity.

Table 5 reports the official World Economic Forum and European Commission international rankings of the countries analyzed regarding overall gender imbalance, economic participation and opportunity, and the share of women on boards in 2007. The figures in the Table confirm the existence of great heterogeneity in gender imbalances across countries, with a relatively better performance in the Continental ones (i.e. Belgium, France and Germany) compared with the Southern ones (i.e. Italy, Portugal and Spain). Among the six countries considered, Italy is at the bottom of the ranking for all the indicators reported in the Table.

TABLE 5

These differences in gender equalities suggest the existence of a rather strong cultural prejudice against women in the labor markets of the Southern European countries, which is stronger against women in key executive positions. We may therefore expect that, whenever men are considered as the only potential candidates for the board, even when more qualified women are available, boards will be of lower quality than if the best men and women are selected.

Accordingly, the introduction of gender quotas may increase the quality of the board and positively affect the organization's efficiency and productivity in countries characterized by strong gender imbalances and where, even when highly skilled women are available, they are prevented from entering corporate boards.

Furthermore, whenever the proportion of women suitable for a top executive position is low, there exists a limited pool of female candidates. Hence, companies subject to gender quotas will either overburden the small number of qualified women (the so-called ‘golden skirts’) or accept less experienced and less qualified candidates. This argument seems more relevant in France and Belgium because, before the reform, the share of women on boards was higher than in the South (See Table 5, column three). As happened in Norway, it may be that firms in these two countries had to recruit women with much broader and potentially less qualified backgrounds (Ahern and Dittmar, 2012). In addition, when gender quotas are introduced in countries starting from a significant underrepresentation of women on boards, where most corporate boards have a very small number of female directors, the mandated increase in the number of women may result in the development of a critical mass that may contribute positively to firm performance.¹⁵

In order to explore such issues and potential explanations further, in the next section we move to a more thorough analysis of the Italian case, as a model of a EU country characterized by sizable gender unbalances.

5. Further evidence on Italy

As mentioned in Section 2, mandated gender quotas on corporate boards were introduced in Italy by law in 2011, but they became effective in August 2012. The law applies to publicly listed companies and state owned companies, which are required to appoint at least 33% of either gender on their boards. Since the law’s main objective is to remove stereotypes and change cultural/social norms preventing women from reaching top jobs, it is temporary and should “naturally” expire in 2022. The rationale for this choice is that, given that corporate boards usually last for three years, the law should “force” appointment decisions by a certain targeted company for around three times when it has to renew the main governance bodies. Since the initial share of women on boards was very low, the law set an intermediate goal (equal to 20% of women on boards) for the first board renewal. Severe sanctions apply

¹⁵ Torchia et al. (2011), using a sample of Norwegian firms, find that there is a positive relationship between the critical mass of women directors (at least three women) and the level of firm organizational innovation.

to non-compliers, including a monetary fine of up to one million euros and termination of the elected boards of companies that persist in not complying with the mandated gender quotas.

The institutional setting and our main estimates in the previous section point to Italy as an interesting case study for a number of reasons. First, since the introduction of gender quotas by law, the share of women among board members in private companies has dramatically increased in a few years (see Section 2), exhibiting a sharp exogenous discontinuity with respect to previous trends. Second, the rate of compliance has been exceptionally high, and few firms have tried to avoid the law by changing their legal status (i.e. by delisting). Finally, the introduction of gender quota laws seems to have generated positive effects on productivity, without significantly affecting employment levels (see Section 4).

In this section, we shall test the robustness of our results on the effects of gender quotas law in Italy and provide some preliminary evidence on a number of potential channels, particularly related to the quality of the newly appointed (female) board members, that may explain such results.

To this end, starting from the sample of firms used in the empirical analysis discussed in the previous section, we selected the sub-sample of the Italian publicly listed companies over the period 2004-2013 and merged it with information on the names of the board members provided by CONSOB (Italian Stock Exchange Commission). We then tried to collect the CV of each board member using a number of sources, namely official corporate documents published on companies' websites, business journals, and information directly provided by board members on their professional profiles posted on LinkedIn. For each board member we identified, other than gender, the following personal characteristics: age, education (whether he/she had a college degree and in which major), years of work experience in managerial positions, and years of work experience as board member. The great heterogeneity in CV formats and in the quantity and quality of the information that they contain made this work particularly complex and time consuming. Nonetheless, we were able to collect comparable information on 2,328 board members in 192 publicly listed companies in Italy over the 2004-2013 period.

The 2004-2013 evolution of the share of women on boards in this sample of firms closely resembles that reported in Section 2 based on EC data (see Figure 2). The share of women on the boards of these companies was roughly stable – around 6-8% of total board members – until 2011, the year of

introduction of the gender quotas law for publicly listed companies in Italy. It then reached almost 12% in 2012 (the law became effective in August 2012) and surged to almost 17% in 2013.

FIGURE 2

Note that all the companies in this restricted sample are subject to the 2011 law on the gender quota; hence, they are all potentially treated according to the definition that we used in the previous section. However, for this restricted sample of firms we know the share of females on board in each year and the main characteristics of each board member.

Hence, as a robustness check of the estimates discussed in the previous section, we estimate the effect of the share of female board members on the same indicators of firm performance previously used as follows:

$$Y_{its} = \alpha + \beta \%females_{its} + \tau_t + \mu_i + \sum_s t \times \delta_s + \theta X_{its} + \varepsilon_{its} \quad (3)$$

where $\%females_{its}$ is the percentage of female board members in firm i in year t and sector s , while all the other variables have the same meaning as in equation (2). In this specification, firm fixed effects capture time invariant firm characteristics that may affect both the share of women on the board and firm performance. However, they cannot control for all forms of endogeneity, particularly for potential reverse causality. To address this source of endogeneity, we use an Instrumental Variables (IV) approach. Following Ahern and Dittmar (2012), we use as instruments the firm's percentage of female board members at the beginning of the period interacted with year dummies. This set of instruments captures firms' efforts to meet the 2011 gender quota requirements conditional on the initial female board representation: firms with a low proportion of women on the board before the gender quotas law faced a larger constraint compared to firms with a relatively high share of female directors.

IV estimates are reported in Table 6. They confirm most of the results found previously, particularly in regard to the positive effect of gender quotas on both indicators of productivity. These results are

coherent with those discussed before also in terms of their size. If we consider the average annual change observed in the share of females on boards between 2011 and 2013 (3.8%), such change caused an around 8% increase in both labor productivity and TFP. Compared to the estimates reported in Section 4, in this case we also find statistically significant effects on profitability and on the number of employees. Given our estimated coefficients, the observed annual change in the share of female board members over the 2011-2013 period increases the ROA by 1.1 points, while it reduces the number of employees by around 9%.

TABLE 6

Overall, since most of the change in the share of females on boards in Italy happened after the introduction of the new legislation on gender quotas, IV estimates provide further evidence on the positive effects of gender quotas on firm performance, particularly on productivity. From a methodological point of view, the different estimates' precision in the case of the number of employees and of ROA may be related to the identification strategy: it has been argued that the pre-quota share of females on boards is not exogenous and it may be correlated with specific trends in firm performance unrelated to the quota, thus casting some doubt on the validity of the instrument (Matsa and Miller 2013).¹⁶ Furthermore, the timing of compliance may be endogenous, and even when gender quota laws are mandatory and should be applied when the board officially expires, early compliers may face adjustment costs different from those of late compliers, and they may differ along other unobservable dimensions. Consequently, identification based on potential treated firms, which are all the firms subject to the legislation on mandatory gender quotas, may be preferable to identification based on observed female shares and the actual timing of compliance, mainly when no truly exogenous instruments for the share of female board members are available.

¹⁶ Matsa and Miller (2013) also find different results when they estimate the effect of gender quotas on the log assets with a DDD estimator compared with a within-Norway regression model in which they control for the initial share of women.

We now exploit the detailed information on board composition and board members characteristics to formulate some hypotheses regarding the potential channels through which the positive effects on firm performance of the legislation on gender quotas have been obtained for Italy. More specifically, we seek to understand whether such channels might be related to the characteristics of the newly appointed female members. Moreover, it might be that the law induced the targeted firms to reorganize the entire board, changing also (some of) its male members. If so, improvements in firm performance may be related to changes in the overall quality of the board members rather than to the gender of the newly appointed women.

Figure 3 shows the evolution of the main characteristics of board members over the period considered. The main change since the introduction of mandatory gender quotas has been the sharp increase in the share of women with a college degree (from around one third in 2004-2010 to almost two thirds in 2013), particularly with a degree in law, economics or management, which should be the fields of study most likely to provide managerial skills (panel b). This has occurred without any significant decline in women's mean age (panel a) or women's work experience in managerial positions (panel c). By contrast, there has been a significant decline in average women's work experience as board members (from around 9 years in 2010 to 7 years in 2013, panel d).

FIGURE 3

In order to furnish more insight into the changes in board members' characteristics after the 2011 gender quotas law, Table 7 presents board members' statistics by gender for appointed members (panel A), exiting members (panel B), and retained members (panel C). We report average characteristics separately for two pre-treatment periods (2004-2008 and 2009-2011) and for the post-quota years (2012-2013) to distinguish changes in board composition related to the quota from longer-term trends already in place before the introduction of the law.

TABLE 7

The first feature to be noted is that no statistically significant difference emerges for females between the two pre-quota periods, while some characteristics of the newly appointed women changed significantly after the 2011 law. More specifically, the share of new women with a degree grew significantly after the introduction of the gender quota with respect to the before-quota period (eleven percentage points, p-value 0.06), and there was an even greater increase in the share of firstly-appointed women with a degree in law, economics or management (25 percentage points more, p-value 0.0005). The average age of newly appointed women did not decrease significantly after the reform. Furthermore, we do not observe a decrease in their amount of managerial experience: new female board directors appointed in 2012-2013 had on average around one year more of managerial experience with respect to the pre-quota period, although the difference is not statistically significant. Finally, as expected, we observe a slight decrease in board experience for entering women. However, it seems that this natural reduction due to the entrance in the boards of women never previously appointed had been compensated by the dismissal from boards of women with less board experience (on average 3.9 years) while retaining those with more board experience (on average, 10.3 years).

Compared to the pre-quota period, for the 2012-2013 period we do not observe similar changes in the main characteristics of either exiting women, except for experience as board members, as stated above, or newly appointed men, except for an increase in their age (compensated, however, by a similar increase in the average age of exiting men) and in their average experience as board members (around 2.4 years more). It might be that more experienced men directors were appointed to compensate for the lower experience as board members of the new female directors. However, since average experience as board members has been increasing after the reform also for exiting men (around 1.2 years more), it may also be the case that newly appointed men substituted exiting male directors with similar experience in the same position, while retained male members had more experience on average (13.3 years) than both new and exiting men.

In addition to the evidence presented in Table 7, we looked at the surnames of board members before and after the introduction of gender quotas. While for males the share of board members sharing the same surname (then, probably belonging to the same family) was around 11% on average, without large variations during the 2004-2013 period, for females the same share was 24.6% in 2004 and decreased

to 13.7% in 2013. This evidence is in line with gender quotas contributing to a women selection process more based on individual skills rather than on discretionary family-based cooptation mechanisms.

Overall, according to this evidence we can conclude that the introduction of gender quotas in Italy did not produce, as opposed to Norway, a deterioration in the characteristics of board members, both females and males. More specifically, it does not seem to have negatively affected the quality of women on boards. If anything, it helped to reduce gender differences by education, to favor the appointment of highly skilled women possessing degrees in fields providing competences well suited to those required by board positions. Joined with the positive effects of gender quotas found for Italy, this evidence is in line with Kim and Starks (2016) who show that adding women directors to corporate boards provides additional expertise missing in the incumbent boards, resulting in enhanced board advisory effectiveness and, in turn, in a higher firm value.

From this point of view, gender quotas were more effective in breaking the glass ceiling in Italy than in Norway, where either the same women had to sit on a number of different boards (Huse, 2011) or companies had often to select as new board members young women with high education but with no experience in top positions (Ahern and Dittmar, 2012).

6. Conclusion

In the last decade, a number of national governments adopted legislative actions to promote gender-balanced representation on corporate boards. Norway was the first country to do so. In 2003 it passed a law requiring that each gender should represent at least 40% of the members of the boards of public limited companies. More recently, also a number of EU countries have passed similar laws, albeit with different rules in terms of targeted firms, size of the gender quota, and severity of sanctions for non-compliers.

In this paper, we have used these legislative actions as a set of quasi-natural experiments to study the causal effect of gender quotas on company performance, circumventing both endogenous sorting of firms with different female representation and reverse causality. Moreover, the progressive adoption of board quotas in different countries has enabled us to provide fresh evidence on country-specific effects of this type of legislation.

In both the economic literature and the political debate there is no general consensus on the potential benefits of legislative actions imposing gender quotas on boards. However, the soundest empirical evidence obtained so far by exploiting the exogenous introduction of gender quotas by law in Norway generally showed a negative relationship between female board representation and firms' performance, at least in the short run (Ahern and Dittmar, 2012; Matsa and Miller, 2013). Still, Norway has a very progressive attitude to gender equality, occupying the first positions in several international rankings regarding overall gender balance, economic participation and opportunity. These considerations argue against interpreting the Norwegian results as automatically valid for other countries characterized by quite different cultural, socio-economic and institutional conditions.

Accordingly, in this paper we have extended previous research on the effects of gender quotas by testing whether results obtained for Norway are extendable to EU countries which adopted gender quotas following the Norwegian example. Indeed, using data from Bureau Van Dijk's Amadeus for the 2004-2014 period and a triple-difference estimator, we have found that gender quotas have caused quite heterogeneous effects on firm performance across the EU countries considered. For France, our results resemble quite well those obtained in the literature on Norway: we have found a negative and significant effect on firm profitability and on labor productivity and a positive effect on the number of employees. For Belgium, the effects on firm performance are negative although not statistically significant. In contrast, for Italy we have found a positive effect on both measures of productivity and no effect on firm profitability, while for Spain the positive coefficients on firm performance are not statistically significant. A more thorough empirical analysis of the Italian case has confirmed our main results.

Our findings have two important implications. First, the absence of a quota effect for Spain, where law enforcement does not rely on penalties for non-compliers, suggests that the specific institutional design of the law matters, and especially the presence of effective enforcement devices.

Second, the evidence presented in this paper highlights the importance of country-specific gender culture. It confirms that effects of the quota, as speculated in previous studies, may be positive in countries characterized by a gender culture much less progressive than that of Norway.

Additional detailed information on Italian board composition and on board members' characteristics allowed us to gain further insight into which specific channels may be related to the positive effects on

firm performance found for Italy. Indeed, descriptive evidence showed that Italian firms complied with the law by hiring new highly-educated women and with the same amount of work experience in managerial positions as the incumbent ones, although with a lower board experience. Furthermore, it appears that more experienced men directors were also appointed, probably to compensate for the lower board experience as board members of the new female directors.

The positive effects of gender quotas emerged for Italy, where the newly selected women are highly skilled and possess competences well suited to those required by board positions, is in line with Kim and Starks (2016) who show that adding women directors to corporate boards provides supplemental skills missing in the incumbent boards, resulting in enhanced board advisory effectiveness. This, in turn, is associated with a higher firm value. However, we cannot test this hypothesis directly with our data and further research is needed to provide more grounded empirical evidence on the channels that actually explain the positive effects of gender quotas in Italy.

Overall, our results suggest that in countries characterized by large gender imbalances gender quotas with severe sanctions for non compliers may actually help to crack the glass ceiling that prevents productive high skilled women from reaching leadership positions. Furthermore, if it is not a matter of scarcity of highly qualified women ready to sit on boards, the Italian experience also points out that the introduction of mandated gender quotas should be accompanied by supporting measures intended to make information on the available women easily accessible to targeted companies. In this regard, initiatives such as “Ready4board Women” in Italy (that preceded the introduction of gender quotas) and “Global Board Ready Women” world-wide (supported by the European Commission) – which provide searchable databases to identify and promote senior women executives and professionals who meet strict criteria in terms of skills and previous work experience – should help companies to comply with the mandated gender quota with no costs in terms of firm performance.

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TABLE 1. Legislation on gender quotas in the EU countries and Norway

Country	Target firms	Gender quota	Introduction date	Compliance date	Sanctions for non-compliers	Notes
Belgium	Publicly listed and state owned companies	33%	2011, September	2017-2018 for publicly listed companies	YES	Different compliance dates for other firms: 2011-2012 for state owned companies; 2018-2019 for small listed firms
France	Publicly listed companies + unlisted with at least 500 employees and revenues over 50 million Euros over the three previous consecutive years	40%	2011, January	2017	YES	
Germany	The top 100 publicly traded companies	30% (as of 2018, the proportion of women must be increased to 50%)	2015, March	2016, January	NO, but If the quota is not met, the companies will be required to fill any vacant positions with women or leave them empty	A further 3,500 medium-sized companies will have to determine their own quota for executive and supervisory board seats by January 2017
Italy	Publicly listed and state owned companies	33% (interim quota of 20% until 2015)	2011, June	2015	YES	It will expire in 2022
Netherlands	Large private and public limited companies (SMES=companies not meeting two of the following criteria: total assets<17,5 million; net annual turnover<35 million; annual avg employees<250)	30%	2011, June	2013	NO	It will expire on Jan. 2016
Spain	Public limited companies with 250+ employees	40%	2007, March	2015	NO	Gender diversity taken into account for state contracts
Norway	Public limited and state owned companies	40%	2003	2006	YES	

Source: authors' elaboration on EC (2012), EC (2013), www.catalyst.org/legislative-board-diversity (as of August 2014) and bloomberg.com

Note: gender quota laws only for state owned companies in Austria, Denmark, Finland and Ireland.

TABLE 2. Regression estimates of gender quotas law on the proportion of women on boards of directors.

	(1)	(2)	(3)	(4)
Treated	6.015*** (1.157)	7.137*** (0.760)	4.049** (1.711)	5.111*** (1.222)
State trends	NO	NO	YES	YES
Weights	NO	YES	NO	YES
Observations	509	509	509	509
R-squared	0.741	0.708	0.833	0.757

Notes: Standard errors in parenthesis.

*** p<0.01, ** p<0.05, * p<0.1

TABLE 3. Average outcomes for treatment and control groups

	BELGIUM				FRANCE			
	Treated	Control 1	Control 2	Control 3	Treated	Control 1	Control 2	Control 3
loglabprod	4.38 (0.79)	4.84 (0.83)	4.54 (0.88)	4.25 (0.50)	4.25 (0.73)	4.37 (0.71)	4.37 (0.65)	4.38 (0.66)
logtfp	5.81 (0.23)	6.00 (0.70)	5.37 (0.85)	5.21 (0.69)	5.30 (1.00)	5.30 (0.85)	5.50 (0.89)	5.37 (0.85)
logcostdip	5.09 (1.92)	4.71 (1.46)	6.12 (2.17)	5.87 (1.76)	3.85 (0.45)	3.90 (0.42)	3.88 (0.43)	3.91 (0.43)
logemployees	3.74 (0.23)	4.05 (0.38)	3.99 (0.47)	3.79 (0.42)	6.57 (1.35)	5.54 (1.33)	6.96 (1.62)	5.24 (1.31)
ROA	3.20 (9.08)	7.00 (8.12)	5.56 (5.44)	9.34 (9.37)	7.09 (9.13)	7.54 (10.60)	7.50 (8.65)	8.49 (10.90)
Nr of firms in 2007	10	77	52	59	538	1483	373	306
	ITALY				SPAIN			
	Treated	Control 1	Control 2	Control 3	Treated	Control 1	Control 2	Control 3
loglabprod	4.61 (0.87)	4.59 (0.88)	4.47 (0.75)	4.37 (0.64)	4.00 (0.67)	4.43 (0.76)	4.30 (0.50)	4.60 (0.95)
logtfp	6.12 (0.79)	5.89 (0.74)	5.36 (0.86)	5.43 (0.84)	5.62 (0.77)	5.43 (0.74)	5.50 (0.87)	5.29 (0.87)
logcostempl	6.76 (1.86)	6.00 (1.62)	6.55 (1.97)	6.14 (1.63)	6.53 (1.08)	4.45 (0.84)	6.88 (1.35)	4.40 (1.18)
logemployees	3.84 (0.62)	3.85 (0.63)	3.93 (0.45)	3.88 (0.43)	3.54 (0.48)	3.67 (0.36)	3.85 (0.36)	4.01 (0.59)
ROA	5.31 (8.86)	6.25 (9.58)	7.03 (9.35)	8.88 (9.30)	7.20 (11.30)	7.84 (9.79)	8.03 (8.84)	8.46 (11.10)
Nr of firms in 2007	166	594	196	311	1203	1822	478	228

Notes: Treated: firms to which gender quotas would have been applied in 2007. Control 1: firms of the same country matched to the treated ones, but not treated. Control 2: potentially treated firms in Germany in 2007. Control 3: potentially non-treated firms in Germany in 2007.

TABLE 4. The effect of gender quotas on firm performance. DDD estimates (Germany as control country).

A) BELGIUM

VARIABLES	(1) loglabprod	(2) logtftp	(3) logemployees	(4) logcostempl	(5) ROA
Belgium_treated_post	-0.136 (0.109)	-0.119 (0.113)	0.095 (0.115)	0.056 (0.067)	-2.558 (2.235)
Belgium_post	0.050 (0.039)	0.033 (0.048)	-0.126*** (0.048)	0.063*** (0.021)	-0.675 (1.410)
Treated_post	0.046 (0.057)	0.020 (0.058)	-0.021 (0.067)	0.010 (0.025)	-0.231 (1.691)
Constant	3.819*** (0.203)	5.510*** (0.031)	5.274*** (0.045)	3.859*** (0.020)	6.801*** (0.712)
Firm fixed effects	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES
Industry-specific time trends	YES	YES	YES	YES	YES
Firm-level controls	YES	NO	NO	NO	NO
R-squared	0.134	0.148	0.179	0.239	0.049
Observations	2,007	2,007	2,007	2,007	2,005
Number of firms	284	284	284	284	284

B) FRANCE

VARIABLES	(1) loglabprod	(2) Logtftp	(3) logemployees	(4) logcostempl	(5) ROA
France_treated_post	-0.048* (0.027)	-0.018 (0.026)	0.097*** (0.036)	-0.046*** (0.014)	-1.196* (0.691)
France_post	0.020 (0.021)	-0.030 (0.019)	-0.157*** (0.027)	0.067*** (0.011)	-0.576 (0.547)
Treated_post	0.022 (0.021)	0.020 (0.019)	-0.050* (0.030)	0.029*** (0.011)	0.840 (0.569)
Constant	3.518*** (0.058)	5.202*** (0.008)	5.876*** (0.011)	3.760*** (0.005)	6.775*** (0.194)
Firm fixed effects	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES
Industry-specific time trends	YES	YES	YES	YES	YES
Firm-level controls	YES	NO	NO	NO	NO
R-squared	0.099	0.054	0.076	0.155	0.045
Observations	22,123	22,123	22,123	22,123	22,123
Number of firms	3,041	3,041	3,041	3,041	3,041

TABLE 4. Continued.

C) ITALY

VARIABLES	(1) loglabprod	(2) logtftp	(3) logemployees	(4) logcostempl	(5) ROA
Italy_treated_post	0.103** (0.043)	0.094** (0.042)	-0.005 (0.055)	0.064* (0.033)	0.085 (0.861)
Italy_post	-0.064*** (0.024)	-0.060*** (0.022)	-0.065** (0.028)	0.004 (0.015)	-0.871* (0.477)
Treated_post	-0.014 (0.031)	-0.027 (0.028)	-0.030 (0.033)	0.033** (0.013)	-0.313 (0.723)
Constant	2.501*** (0.172)	5.621*** (0.014)	6.133*** (0.019)	3.729*** (0.013)	5.959*** (0.251)
Firm fixed effects	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES
Industry-specific time trends	YES	YES	YES	YES	YES
Firm-level controls	YES	NO	NO	NO	NO
R-squared	0.334	0.065	0.070	0.050	0.063
Observations	11,674	11,674	11,674	11,674	11,673
Number of firms	1,397	1,397	1,397	1,397	1,397

D) SPAIN

VARIABLES	(1) loglabprod	(2) logtftp	(3) logemployees	(4) logcostempl	(5) ROA
Spain_treated_post	0.025 (0.031)	0.037 (0.027)	0.040 (0.037)	0.001 (0.022)	-0.391 (0.784)
Spain_post	-0.051* (0.028)	-0.086*** (0.024)	-0.138*** (0.030)	0.065*** (0.020)	-1.016 (0.665)
Treated_post	-0.010 (0.029)	-0.001 (0.024)	0.006 (0.034)	-0.016 (0.021)	0.164 (0.728)
Constant	3.500*** (0.052)	5.374*** (0.007)	5.382*** (0.009)	3.532*** (0.004)	8.379*** (0.160)
Firm fixed effects	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES
Industry-specific time trends	YES	YES	YES	YES	YES
Firm-level controls	YES	NO	NO	NO	NO
R-squared	0.097	0.063	0.072	0.155	0.081
Observations	34,855	34,855	34,855	34,855	34,855
Number of firms	4,134	4,134	4,134	4,134	4,134

Notes: Clustered standard errors at the firm level in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

TABLE 5. Indicators of gender imbalances

Country	Overall – Rank	Economic participation and opportunity - Rank	Share of women in the boards in 2007 (%)
Belgium	10	27	6
France	16	57	9
Germany	12	34	11
Italy	69	114	3
Portugal	39	44	3
Spain	29	84	6

Source: World Economic Forum, 2014 and EC, 2014.

TABLE 6. Fixed Effects IV estimates of the effect of the share of women on boards on firm performance (Italy).

VARIABLES	(1) loglabprod	(2) logtfp	(3) logemployees	(4) logcostempl	(5) ROA
%females	2.204*** (0.758)	2.257*** (0.796)	-2.410** (1.158)	2.090** (1.063)	31.590*** (11.958)
Firm fixed effects	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES
Industry-specific time trends	YES	YES	YES	YES	YES
Firm-level controls	YES	NO	NO	NO	NO
R-squared	0.583	0.056	0.042	0.015	0.156
Observations	887	887	887	887	887
Number of firms	173	173	173	173	173

Notes: Amadeus sample of publicly listed companies matched with information on board members; Set of instruments in the first stage is the initial share females on board interacted with year dummies. F-test from first stage regression is 7.68 (0.000). Clustered standard errors at the firm level in parentheses.

*** p<0.01, ** p<0.05, * p<0.1.

TABLE 7. Board members' characteristics by gender – New, exiting and retained members

		<i>A) New</i>			Differences		
		2004-2008	2009-2011	2012-2013	(2)-(1)	(3)-(2)	
		(1)	(2)	(3)			
Age	Male	55.17	55.24	57.24	0.07	2.00	***
	Female	46.75	49.63	48.40	2.88	-1.23	
Degree	Male	0.84	0.83	0.83	-0.02	0.00	
	Female	0.72	0.75	0.86	0.03	0.11	*
Degree in economics, management, law	Male	0.59	0.59	0.59	0.00	0.00	
	Female	0.45	0.45	0.70	0.00	0.25	***
Managerial exp	Male	11.42	12.67	13.61	1.25	0.95	*
	Female	5.03	7.46	8.53	2.43	1.07	
Board exp	Male	7.95	8.61	10.98	0.65	2.38	***
	Female	5.90	5.64	3.88	-0.26	-1.77	*

		<i>B) Exiting</i>			Differences		
		2004-2008	2009-2011	2012-2013	(2)-(1)	(3)-(2)	
		(1)	(2)	(3)			
Age	Male	56.11	57.33	59.59	1.23	2.25	***
	Female	49.44	48.19	52.16	-1.25	3.97	
Degree	Male	0.86	0.80	0.87	-0.05	0.06	**
	Female	0.77	0.71	0.84	-0.06	0.13	
Degree in economics, management, law	Male	0.60	0.57	0.59	-0.03	0.03	
	Female	0.51	0.45	0.48	-0.06	0.03	
Managerial exp	Male	11.57	13.25	13.23	1.69	-0.02	**
	Female	3.66	5.35	8.52	1.70	3.17	
Board exp	Male	8.48	10.44	11.69	1.97	1.24	*
	Female	6.40	7.17	3.88	0.77	-3.29	*

		<i>C) Retained</i>			Differences		
		2004-2008	2009-2011	2012-2013	(2)-(1)	(3)-(2)	
		(1)	(2)	(3)			
Age	Male	57.28	58.77	59.72	1.49	0.96	**
	Female	48.48	49.77	51.68	1.29	1.91	
Degree	Male	0.82	0.82	0.83	0.00	0.02	
	Female	0.63	0.65	0.73	0.02	0.08	
Degree in economics, management, law	Male	0.55	0.55	0.58	0.00	0.02	
	Female	0.36	0.39	0.46	0.03	0.07	
Managerial exp	Male	12.26	13.61	14.81	1.35	1.20	**
	Female	9.33	10.15	12.46	0.82	2.31	
Board exp	Male	9.74	11.89	13.28	2.15	1.39	***
	Female	8.54	9.94	10.26	1.40	0.32	

Notes: *** p<0.01, ** p<0.05, * p<0.1

FIGURE 1. Female proportion on boards of directors

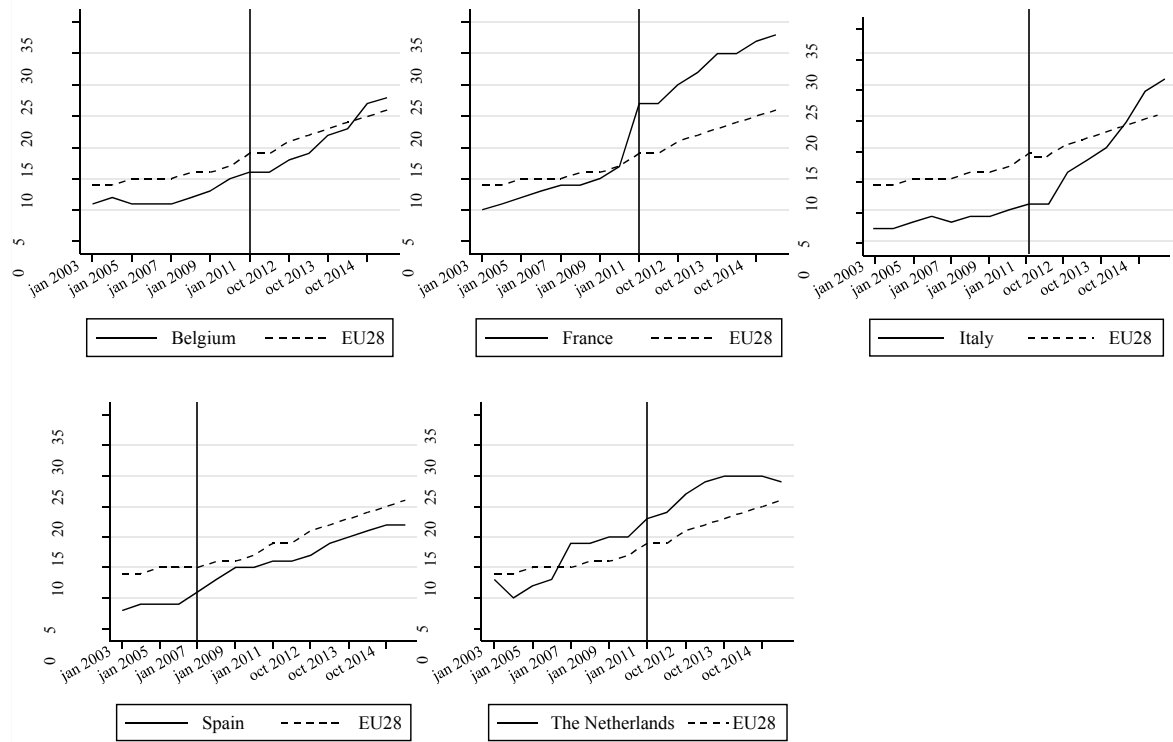


FIGURE 2. Share of women on boards – Italy (2004-2013)

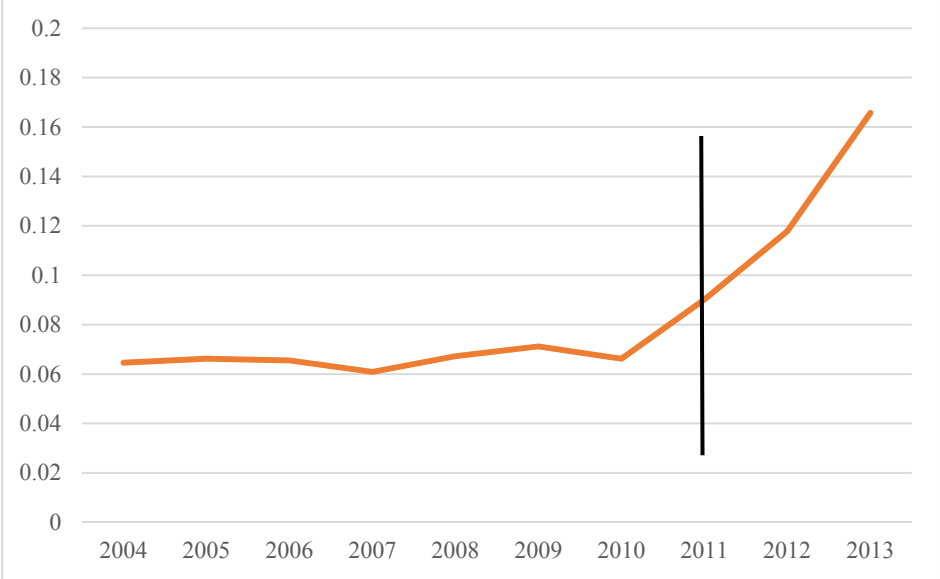
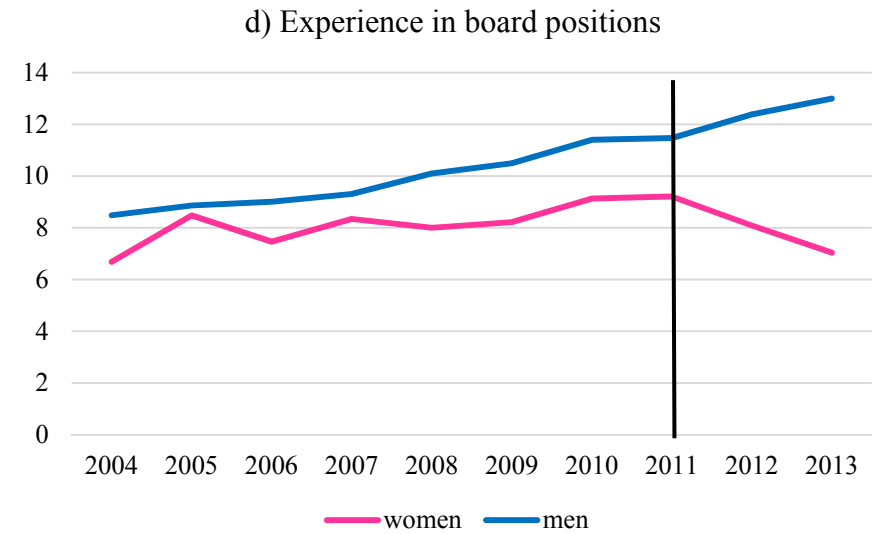
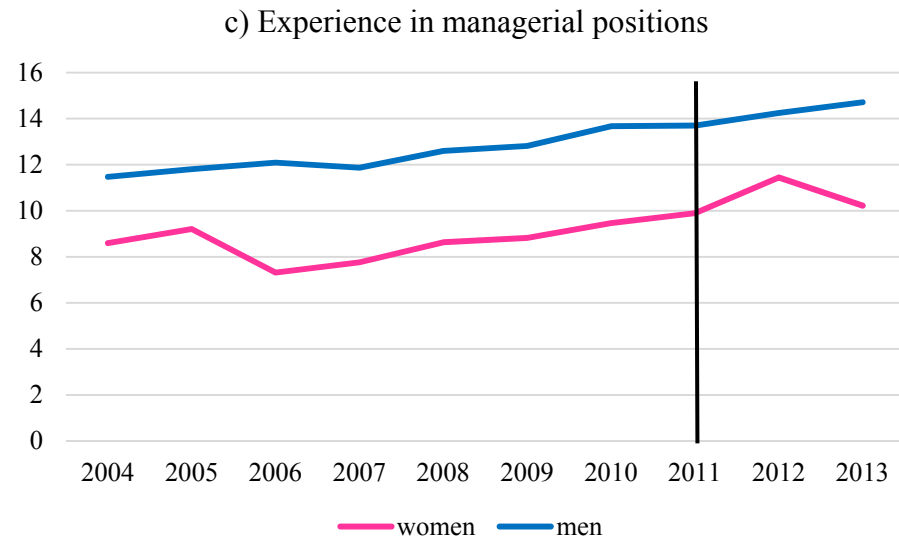
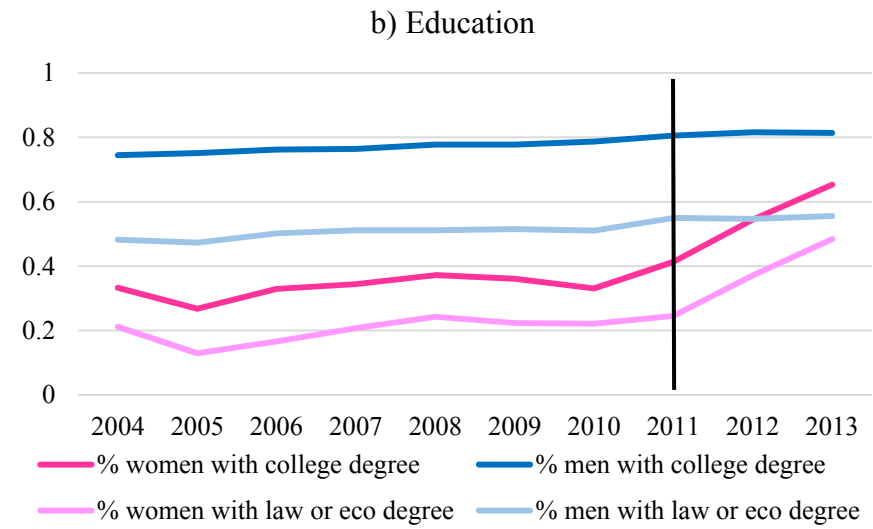
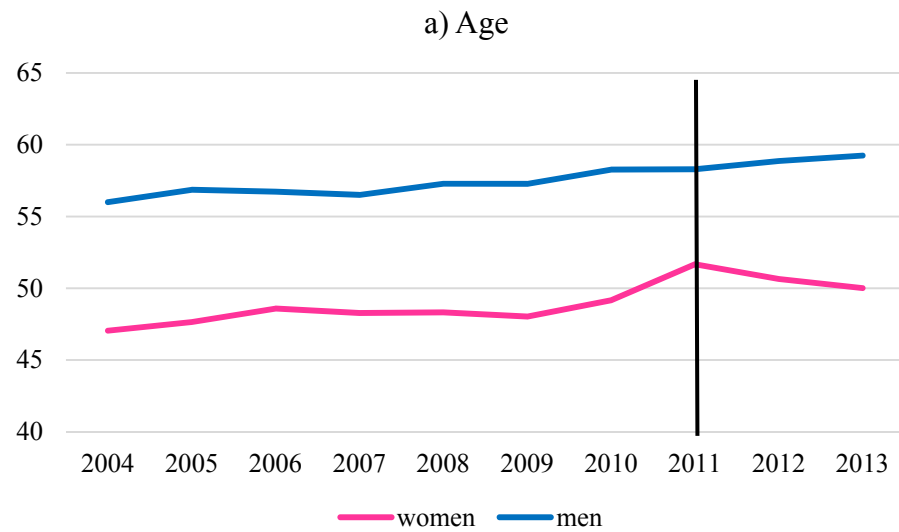


FIGURE 3. Boards characteristics by gender, 2004-2013 (Italy)



APPENDIX

TABLE A1. The effect of gender quotas on firm performance in Spain. DDD estimates (Portugal as control country).

VARIABLES	(1) loglabprod	(2) logtffp	(3) logemployees	(4) logcostempl	(5) ROA
Spain_treated_post	0.018 (0.025)	0.008 (0.026)	-0.037 (0.031)	0.003 (0.013)	0.129 (0.546)
Spain_post	-0.008 (0.017)	-0.043** (0.017)	-0.080*** (0.016)	0.024*** (0.009)	-1.715*** (0.321)
Treated_post	-0.004 (0.022)	0.025 (0.023)	0.084*** (0.026)	-0.018 (0.011)	-0.326 (0.462)
Constant	3.460*** (0.046)	5.283*** (0.007)	5.176*** (0.009)	3.364*** (0.004)	7.991*** (0.152)
Firm fixed effects	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES
Industry-specific time trends	YES	YES	YES	YES	YES
Firm-level controls	YES	NO	NO	NO	NO
R-squared	0.081	0.068	0.066	0.159	0.081
Observations	37,305	37,305	37,305	37,305	37,305
Number of firms	4,517	4,517	4,517	4,517	4,517

Notes: Clustered standard errors at the firm level in parentheses.

*** p<0.01, ** p<0.05, * p<0.1