

**Where Women Make the Difference.  
The Effects of Corporate Board Gender-Quota on Firms'  
Performance Across Europe**

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**Abstract**

This paper contributes to the literature on the effects of corporate board gender quota on firms' performance. We focus on countries characterized by strong gender cultural differences, such as those in Continental and Mediterranean Europe. The empirical analysis is based on accounting data taken from Bureau Van Dijk's Amadeus for the 2004-2013 period. We use a matching differences-in-differences estimator, where identification comes from the sharp discontinuity around the time when the legislation was passed in the different countries. We consider an extensive set of firm outcomes, including total factor productivity (TFP). We find that, overall, gender quota had a negative effect on value added per employee and on firm profitability and a positive effect on employment and on TFP. However, these aggregate results hide great heterogeneity across countries, with more positive effects on productivity in Southern European countries than in Continental ones. We then focus on Italy and provide some 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 over the last decades. However, such improvements did not translate in more female representation in economic leadership positions, even in countries, such as 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%. However, only in eight EU Member States (France, Latvia, Finland, Sweden, UK, Denmark, Italy and Germany) women account for at least a quarter of board members. Figures are even more dismal when looking at top executive positions: only 3.6% of the largest listed companies in Europe have a female chief executive officer (European Commission, 2015).

Although female representation in top leadership positions is progressively increasing, in order to speed up this process and the cultural change needed to favor women access to top jobs, some international organizations and national governments have considered the possibility to take legislative action to promote gender-balanced representation on corporate boards.

In the EU, the issue of women on boards is high in the political agenda since 2010, when the European Commission stated in its *Strategy for Equality between Women and Men*. 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 an objective for 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 to increase 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.

Ever since 2003, before the adoption of the EU Directive, Norway moved in the direction of increasing female representation in top leadership positions passing a law stating that each gender should represent at least 40% of the members of the board of publicly limited liability companies.

A lively debate vamped 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 general consensus on the potential benefits of such actions. 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, 2013).

Furthermore, such laws may produce spillover effects also on other gender disparities in the labor market. More women on the board could push for hiring or promoting new women also for other managerial positions within firms, or could create a more favorable environment for women employment (for example, through more flexible working time schedules, policies to reconcile work and family life, etc.). Finally, there could be also 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 number of women among board members should necessarily lead to a sub-optimal output. Furthermore, the “old” board members may not welcome the newly hired women, mainly if they believe that they got their jobs only because of the law and not for their skills; this may cause conflicts within the board, with subsequent 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 undoubted that they are the most effective tool to increase rapidly 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) have recently passed national laws with mandated gender quotas for private companies, albeit with different rules in terms of target firms, size of the gender quota and severity of sanctions for non-compliers. These legislative actions provide researchers a set of extraordinary quasi-natural experiments to study the causal effect of gender quotas on company performance circumventing endogenous sorting of firms with different female representation and reverse causality. Moreover, the progressive adoption of mandated female board quotas in different countries offers a fertile ground to investigate country-specific effects of this type of legislation.

There is a growing body of economic literature analyzing the relationship between women in leadership and company performance. Earlier studies on board diversity, mainly based on cross-sectional data, find that board diversity 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 can be hardly interpreted 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 influence the share of women hired on boards).

More convincing evidence comes from recent empirical evidence obtained exploiting the exogenous introduction of gender quotas in Norway, which 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), using a differences-in-differences estimator, find that treated firms reduce workforce less than control firms, rising relative labor costs and employment levels and reducing short-term profits. The effects are strongest among firms without female board members before the reform, and are present even for boards with older and more experienced members after the reform. Bertrand et al., (2014) show that a large number of publicly limited liability 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 anytime between 2003 and 2009 was larger among those with a smaller initial share of women on their board, which were those finding more demanding to comply with the law.

Overall, papers exploring the effect of gender quotas taking into account the endogenous nature of boards generally find a negative relationship between female board representation and firms' outcomes, at least in the short run.<sup>1</sup>

However, broadening the evaluation of gender quotas effects beyond the Norwegian borders is necessary to ensure external validity of the results found so far in the literature. 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 to extend automatically these results to other countries, characterized by quite different cultural and institutional characteristics. The fact that, in one of the best performing country in the world in terms of gender equality, the legislation on gender quota did not have strong (and positive) impact on firm performance, may be due to the lack of a pool of qualified female candidates large enough, at least in the short run, for the new available board positions. In such a country in fact, almost all the available highly qualified women might already be employed elsewhere. It is thus interesting to see whether the effects of mandated gender quotas are more positive and pervasive in countries, such the Southern European ones, starting from much worse

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<sup>1</sup> 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 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.

initial conditions in terms of women employment and equal opportunities and characterized by a different gender culture and view on women's and men's role in society and in the labor market.

In this paper, we contribute to the literature on gender quota providing, in a comparative perspective, an analysis of the effect of mandated female board representation on firm performance in a number of EU countries. Extending the literature on the Norwegian gender quota, we focus on heterogeneous effects across countries.

The reasons behind the under-representation of women in power and decision-making are multifaceted and complex, but a crucial role is played by cultural factors and gender-related stereotypes. In view of this, the analysis of the impact of female quotas in countries characterized by strong gender cultural differences, such as those from Continental and Mediterranean Europe, appears particularly relevant.

To study the impact of gender quotas, we use accounting data taken from Bureau Van Dijk's Amadeus for the 2004-2013 period. We select all the EU countries that have recently passed a law with mandated corporate gender boards (i.e., Belgium, France, Italy, the Netherlands and Spain). In order to enlarge the set of the potential control group, we also selected a couple of countries, namely Germany and Portugal, which have not adopted such type of legislation yet, but that share with the Continental and Mediterranean group treated countries common features in terms of socio-economic and institutional characteristics.

To estimate the causal effect of the legislation on gender quotas on firm performance we use a differences-in-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. Furthermore, given the large set of potential control firms available, in our preferred specifications we use an ex-ante matching algorithm to select, for each treated firm, the set of five control firms which are more similar in terms of observed characteristics.

We consider an extensive set of firm outcomes in order to get a complete picture on the effects of these reforms on firm performance. More specifically, other than 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).

Our aggregate results are in line with the literature on the Norwegian quota. Using the empirical approach discussed above, we find that firms subject to legislation on gender quotas on average registered a positive effect on employment by around 12 percentage points and a reduction of value added per employee of around 2 percentage points. Our estimates also show that the growth in

employment caused total labor costs to grow by about the same size, hence leaving the labor cost per employee roughly unchanged. Finally, the introduction of gender quota seems to have a negative effect on profitability. However, our estimates on TFP, which should represent a better measure of firm efficiency in using both capital and labor compared to standard labor productivity, provide a quite different picture: the introduction of mandatory gender quotas actually slightly increase TFP. These results are robust to changes in sample selection and to alternative definitions of the control group.

However, these aggregate results hide great heterogeneity across countries, with more positive effects on productivity (at least in terms of TFP) in Southern European countries than in Continental ones. Given these results and the initial levels of gender imbalances, which point to Italy as one of the EU countries with the largest gender differences in employment and equal opportunities, we focus on this specific country and explore the relationship between changes in board composition brought by mandated gender quotas and changes in firm performance. To this aim, 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, position in current board, year of work experience in managerial positions and as board member). Overall our analysis shows that gender quotas actually helped to crack the glass ceiling in Italian targeted firm without reducing the quality of women on boards: 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. Furthermore, we find that the attribute that seems to matter most for firm productivity is past work experience in managerial positions, confirming that the latter is an important characteristic to influence board behavior and board decisions, and hence firm performance.

The rest of the paper is organized in 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 quota 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 legislative measures to voluntary initiatives and the diffusion of good practices by both governments and businesses. Recent studies point out that the latter are usually perceived by firms as a more flexible and less invasive mechanism than national laws, but their effects in terms of increasing share of women on the boards have been so far uneven and slow. By contrast, legal quotas seem to

be the most effective and fastest mechanism to increase gender diversity in corporate boards (Walby and Armstrong, 2012).

After a long debate on the necessity of fixed and binding gender quotas across the EU Member States, in November 2012 the European Commission proposed a law to ensure that women get a fair chance in the recruitment processes 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<sup>2</sup>. One year later, the European Parliament voted in favor of this proposal with an overwhelmed majority, but further steps are needed 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 introducing gender quotas in corporate boards by law in December 2003, in the last decade a growing number of EU Member States have adopted legislation with similar prescriptions, albeit with different mechanism. In the different countries, the target firms are identified considering the size of the firm (in some cases excluding small and medium sized firms) 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, in order to give the target firms enough time to adjust to the new requirements in terms of gender composition of their board. In some countries, a phased application with sequentially higher quotas was established, also depending on the type of targeted company. Finally, there are differences among country legislations according to the presence and type of sanctions for non-compliers. In this perspective, 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 boards of directors of these companies had hardly changed (it was around 17% at the end of 2005), so the Norwegian government introduced severe sanctions for firms not reaching the target quota by 2008. Statistics shows 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%.

Limiting our attention to legislative actions targeted to private companies, the first EU country to follow Norway in introducing a quota to secure the presence of women on corporate boards was Spain

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<sup>2</sup> 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 less than 250 employees). Furthermore, individual EU Member States will have to put in place appropriate sanctions for non-compliers. The law will automatically expire in 2028.

in 2007, followed by Belgium, France, Italy and the Netherlands in 2011. Similar legislation is currently under debate in Germany.<sup>3</sup>

In Spain, the government committed to have at least 40% of each gender on the boards of all publicly listed companies with more than 250 employees 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 January 2011, a law on female board representation was adopted in France. The law requires that all listed companies and companies with more than 500 employees or revenues higher than 5 million euros to have at least 40% of each gender on their boards. The target 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.

In Belgium, a federal law was adopted in 2011 establishing a share of at least 33% of each gender on the executive boards of larger 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.

The Netherlands introduced a gender quota in 2011. The regulation establishes a 30% of each gender on both executive and supervisory boards of listed and unlisted companies with more than 250 employees (or turnover criteria). There are no penalties but, as in the Spanish case, complying companies have a potential priority status for government contracts.

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

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<sup>3</sup> Our analysis is limited to private companies. However, note that in most of the countries considered the legislation apply 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 it happened in Norway, the legislation is applied first to state owned companies, and later to private companies. Outside the EU, Iceland adopted in 2010 a legal initiative requiring that all public and private limited companies with more than 50 employees to have at least 40% of each gender on their board by the year 2013. The law does not establish penalties for non-compliers.

Table 1 reports the EU Member States that have already passed a law prescribing gender quotas in private firms and 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.

We shall take into account the country-specific definition of the target firms in the following empirical analysis.

TABLE 1

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 (or that are having an intense public debate on the issue) have experienced the largest increase in the share of women on boards between 2010 and 2015.<sup>4</sup>

Figure 1 shows data on proportions of women on boards for the EU countries that adopted gender quotas and for the EU28 average. Apart from Spain, where the law does not establish measures to punish non-compliers, 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 beyond the EU average in all countries except Spain. Moreover, although the average proportion in the EU28 is increasing as well, pointing at a general trend towards more women in top positions, no clear discontinuity can be observed in this case.

FIGURE 1

The impact of gender quota legislation on women representation can be described through the following regression based on the European Commission state-year panel:

$$P_{s,t} = \alpha + \beta TREATED_{s,t} + \sum_{t \in T} \gamma_t YEAR_t + \sum_{s \in S} \delta_s COUNTRY_s + e_{s,t} \quad (1)$$

Where  $P_{s,t}$  is the share of women on boards in state  $s$  and year  $t$ ,  $TREATED_{s,t}$  is a dummy for state/period observations with a gender quota legislation,  $YEAR_t$  are year dummies controlling for

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<sup>4</sup> 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 that can be used to monitor 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](http://ec.europa.eu/justice/gender-equality/gender-decision-making/database/business-finance/supervisory-board-board-directors/index_en.htm).

trends in female representation that are common to all countries,  $COUNTRY_s$  are country dummies controlling for fixed differences between countries and  $e_{s,t}$  is the error term. We estimated equation (1) with controls for state-specific trends as well to consider the possibility of nonparallel evolution in the proportion of women on boards in the absence of gender quota. Both specification are estimated with weighted least square as well, using states' population as weights.

Estimates of  $\beta$  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. Moreover, given that we considered treated countries only those where quota are mandatory, the estimated effect of legislative actions is evaluated with respect to both countries where more female representation gender quota is encouraged by softer methods, such as guidelines and recommendations, and to countries adopting no measure to favor gender diversity at all.

TABLE 2

### 3. 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, defined above, on several measures of firm performance.

To this end, we use accounting data taken from Bureau Van Dijk's Amadeus for the 2004-2013 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 all the EU countries which have recently passed a law with mandated corporate gender boards (i.e., Belgium, France, Italy, the Netherlands and Spain). In order to enlarge the set of the potential control group, we also selected a couple of countries, namely Germany and Portugal, which have not adopted such type of legislation yet, but that share with the so called "treated" countries common features in terms of socio-economic and institutional characteristics.<sup>5</sup> For each country, we extracted all the public and private companies with sales of at least ten millions of Euro in one of the years between 2010 and 2013. We then excluded from the analysis state owned companies, partnerships, non-profit organizations and companies with unknown status. Despite of this, our sample amounts to around 94% of all firms in the Amadeus dataset for these countries.

In light of the legislation discussed in Section 2, we define the TREATED firms on a country basis. More specifically, we consider as treated all the publicly listed firms in Belgium and Italy, all the

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<sup>5</sup> Socio-economic classifications usually cluster Belgium, France, Germany and the Netherlands in the group of the so-called Continental countries, while Italy, Portugal and Spain in the group of the Southern countries. The two clusters are characterized by quite different welfare regimes. For more details, see Esping-Andersen (1990).

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, all large private and public limited companies the Netherlands<sup>6</sup> and all the public limited companies with at least 250 employees in Spain.

Overall, our sample comprises around 146 thousands companies for seven countries (see Table 3). Around half on them are public limited companies. The number of treated companies varies by country because of some heterogeneity in the timing and application of the law. For Germany and Portugal there are no treated firms because, as mentioned above, in the time span covered by the data they did not have a law imposing gender quotas.

### TABLE 3

As mentioned above, we are interested in evaluating the impact of gender quotas on firm performance and the use of Amadeus data provides a number of possible indicators. Among the outcomes considered, the more interesting regards the Total Factor Productivity (TFP), as it allows to evaluate the increase in productivity that is not accounted for by inputs like capital and labor. In detail, given the well-known problem of the potential endogeneity issue of the traditional estimation of TFP as a residual in the estimation of firm production function, we estimated the TFP following the estimation procedure suggested by Levinsohn and Petrin (2003). According to this method, the key issue of the correlation between unobservable productivity shocks and inputs is solved using intermediate inputs as a proxy for these unobservable shocks<sup>7</sup>. Following this semi-parametric approach, we estimated the TFP by two-digit industries for each country, using value added as output and number of employees and fixed tangible assets as inputs.

Moreover, as measure of performance in our estimates, we consider also the labour productivity, (namely value added per employee), one profitability indicator (ROA), other than the number of employees and labour cost measures (total labor cost and labor cost per employee).

Except for ROA, we take the logarithm of all the dependent variables. Note that the use of a relatively large set of outcomes should offer a rather complete picture on the potential effects of these reforms on firm performance.

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<sup>6</sup> In the Netherlands, small and medium-sized companies (SMEs) are not subject to the law. A certain company is considered a SME if it meets at least two of the following three criteria: total assets < 17.5 millions of Euros; net annual turnover < 35 millions of Euros; annual average number of employees < 250.

<sup>7</sup> 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 it's not observed. According to this method, the unobservable productivity term is expressed as a function of two observed inputs: capital and intermediate inputs.

To estimate the causal effect of mandatory gender quotas on firm performance we use a reduced form approach and estimate the following model:

$$Y_{ijts} = \alpha + \beta TREATED_{jt} + \tau_t + \mu_i + \sum_j t * \gamma_j + \sum_s t * \delta_s + \theta X_{ijst} + \varepsilon_{ijst} \quad (2)$$

where “*ijts*” denotes the *i*-th firm in country *j* at time *t* and in industry *s*. *Y* is one of our dependent variables measuring firm performance., *TREATED* is a dummy equal to one if the firm is subject to the gender quota reform,  $\tau_t$  and  $\mu_j$  are, respectively, time and firm fixed effects,  $\sum_j t * \gamma_j$  and  $\sum_j t * \delta_s$  are, respectively, country and industry-specific time trends, *X* is a vector of time-varying firms’ characteristics and  $\varepsilon$  is an error term. The inclusion of fixed-effects and both country-specific and industry-specific time trends should ensure that our comparisons across treatment groups over time is not influenced by group-specific characteristics. Furthermore, with this specification, identification comes from the sharp discontinuity around the time when the legislation was passed.

In our preferred specification, we use an ex-ante matching approach to select a control group more similar to the treated group. More specifically, for each treated firm in each country we identify the closest five firms based on industry, assets, employees and operating profits in 2007 using Abadie et al.’s (2004) matching algorithm as in Matsa and Miller (2013). We then test the robustness of our main results using alternative definitions of the control group.

#### 4. Main results

Table 4 presents the main fixed-effects 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 total labour costs (*loglabcost*, col. 4), the logarithm of the labor cost per employee (*logcostemp*, col. 5), and ROA (col. 6). All columns include, other than firm fixed effects, year fixed effects and both country and industry-specific time trends, the latter computed at the 2-digit level of the NACE classification. In the case of the value added per employee, we also control for the logarithm of capital per employee. Standard errors reported in squared brackets are clustered at the firm level. Given the aim of our analysis, we focus our attention on estimates of the coefficient of the *TREATED* dummy.

Our estimates point out that the introduction of gender quotas by law has positive effects on TFP, employment and labour cost and a negative effect on labour productivity and profitability. According

to our estimates, firms subject to legislation on gender quotas registered a positive effect on total factor productivity of 1.5 percentage points, on employment by around 12.5 percentage points, facing a reduction of value added per employee of around 2.1 percentage points.

Our estimates also show that the growth in employment caused total labor costs to grow by about the same size, hence leaving the labor cost per employee roughly unchanged. Finally, the introduction of gender quota seems to have a negative and significant effect on ROA.

Our results are coherent with those found by Matsa and Miller (2013) in the case of Norway: firms affected by the legislation imposing gender quotas in corporate boards undertook less substantial workforce reductions, increasing relative labor costs and employment levels and reducing short-term profits. Differently from previous studies, we also show that, if there is any negative effect on productivity, this is circumscribed to labor productivity, while the results on TFP, that indicates a better measure of the efficiency in the use of both capital and labor by firms, suggest a positive role of the reform on productivity.

#### TABLE 4

We then explore the existence of heterogeneous effects of mandatory gender quotas across countries. We may in fact expect a different impact of the legislation on gender quota, with potentially more positive results in countries starting from relatively worse conditions in terms of gender equality. Indeed, official international rankings reported in Table 5 point out the existence of great heterogeneity in gender imbalances across these countries, with a relatively better performance in the Continental ones (i.e., Belgium, France and Germany), compared to the Southern ones (i.e., Italy, Portugal and Spain). Among the seven countries considered, Italy is at the bottom of the ranking for all the indicators reported in the Table.

#### TABLE 5

In Table 6 we report our main estimates by country. Our estimates for Italy and Spain seem very interesting. More specifically, these two Southern countries show a positive effect of the reform on TFP. Furthermore, the positive impact on both the number of employees and total labor costs is confirmed. On the other hand, we find a negative and statistically significant effect on ROA.

On the contrary, results for France and Belgium confirm the negative effect of the law on the productivity measures of the firms. In particular for France, the coefficients of the dummy TREATED are negative and statistically significant for labor productivity as well as for TFP, number of employees, labor cost and ROA.

TABLE 6

There is clearly a different effect of gender quota in the two sets of countries. Differences in gender equalities discussed above suggest the existence of a rather strong cultural prejudice against women in the labor market, which is stronger against women in key labor market positions. Therefore, 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 were selected. The introduction of gender quota in this setting can increase the quality of the board and positively affect the organization's efficiency and productivity. 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 samples because, before the reform, the share of women on boards was higher than in the South (See Table 5, column three). As it happened in Norway, it then could be that firms in these two countries had to recruit women with a much broader and potentially less qualified background (Matsa and Miller,2013).

## **5. Further evidence on Italy**

The institutional setting outlined above and our main estimates in the previous Section point to Italy as an interesting case study for a number of reasons. First, after the introduction of gender quotas by law in 2011 the share of women among board members in private companies has been dramatically increasing in few years (See Section 2), providing a sharp exogenous discontinuity with respect to previous trends; second, the rate of compliance has been exceptionally high and few firms tried to avoid the law by changing their legal status (i.e., 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 provide some preliminary evidence on whether and how gender quota laws actually changed not only the share of women on boards in targeted firms in Italy, but also the main characteristics of appointed women in terms of age, education and work experience. Furthermore, we investigate whether there is a relationship between such characteristics and the above documented changes in firms' performance.

To this am, we selected the sample of 254 Italian publicly listed companies in the Amadeus data-set 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 web-sites, business (Italian) 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 has a college degree and in what major), position in current board (i.e., whether he/she is the CEO or President), years of work experience in managerial positions and years of work experience as board member. The great heterogeneity in CVs format, and in the quantity and quality of the information they contain, made this activity particularly complex and time consuming. Nonetheless, we could collect comparable information on 3164 board members in 243 publicly listed companies in Italy over the 2004-2013 period. Once we drop observations with missing values on relevant measures of company performance, we are left with a final sample of 2379 board members in 172 publicly listed companies over the period considered.

The 2004-2013 evolution of the share of women on boards in this sample of firms nicely resembles that reported in Section 2 and based on EC data: the share of women on the boards of these companies has been roughly stable – around 7-8% of total board members – until 2011, year of introduction of the gender quotas law for publicly listed companies in Italy. It then reached almost 11% in 2012 (the law became effective in August 2012) and surged to almost 17% in 2013 (Figure 2).

## FIGURE 2

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 that are more likely to provide managerial skills (panel b). This occurred without any significant decline in women's mean age (panel a) or women work experience in managerial position (panel c). On the contrary, there has been a significant decline in average women work experience as board member (from around 9 years in 2010 to 6 years in 2013, panel d). According to this evidence, the 2011 gender quota law introduced in Italy does not seem to have negatively affected the quality of women of boards; if any, it helped to reduce gender differences by education and to actually break the glass ceiling that prevented many women from seating in the boards of publicly listed companies. Furthermore, the increase in the share of women with a college degree, a time-invariant characteristic for this age group (women board members are on average between 45-50 years old), implies that

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. 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 seat in 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).

### FIGURE 3

Once highlighted the main changes in women board members after the introduction of gender quotas, we investigate whether and how these changes are correlated with firm performance.

Given the positive and statistically significant effect of gender quotas on TFP found in the previous Section, we concentrate on this performance indicator. Using individual data on board members, we compute indicators of average characteristics of board members by gender and regress such characteristics on the logarithm of TFP. Table 7 reports the main OLS estimates. Columns from 1 to 6 differ for the indicator (at the firm level) of women on board considered (namely, a dummy capturing whether the CEO or the president is a woman (col. 1); mean age of women board members (col. 2), share of women with a college degree (col. 3); share of women with a college degree in either law, economics or management (col. 4); average number of years of work experience in managerial positions (col. 5); average number of years of work experience as board members (col. 6). In column 7 we include all the average characteristics of women on boards, while in the last column we add similar controls for characteristics of men on boards. All specifications include further controls for firm size, industry, year fixed-effects and industry-specific time trends. Standard errors are clustered at the firm level.

Overall, estimates in the Table show a positive and statistically significant correlation between women work experience and firm productivity. Such result remains (and become more statistically significant) when we control for other female board members characteristics and after controlling for the average characteristics of men on boards. Quite interestingly, in the case of men, the characteristics that are positively (and significantly) correlated with firm productivity are age (that in the case of men may be correlated with work experience) and the share of men with a college degree in either law, economics or management.

### TABLE 7

In order to control for other firm time-invariant characteristics, in Table 8 we replicate these estimates using a fixed-effect estimator. Even after controlling for firm time-invariant characteristics (as captured by the firm fixed-effects), we find that the average work experience in managerial positions of the board members, regardless of their gender, is positively and statistically associated with firm productivity. Given previous work experience in top positions, past experience as board member seems less relevant for firm productivity.

## TABLE 8

We are aware that these estimates may be biased by potential endogeneity (best performing firms may attract higher quality women to seat in their boards) and further estimates are needed to be sure that these results can be interpreted as causal effects. Nonetheless, even in a descriptive manner, they may be useful to explain the diverging trends in firm performance after the introduction of mandatory gender quotas in Italy compared to Norway.

While in both countries the newly hired women were on average highly educated and often held a degree in fields providing managerial skills, only in Italy they had on average the same amount of work experience in top managerial positions as the incumbent ones. Our results confirm that, even if women are equal to men in their level of formal education, prior experience as top executive is an important attribute to influence board behavior and board decisions, and hence firm performance (Smith, 2014). From this point of view, it is crucial that there are enough women experienced to fill quotas on boards once mandatory gender quotas are in place. This may be more likely in countries, such as Italy, starting with a relative poor performance in terms of gender equality and in which very few women seated on boards of private companies before the introduction of mandatory gender quotas.

## 6. Conclusion

Mandatory gender quotas on corporate boards have been proved to be the most effective tool to increase rapidly the number of women on corporate boards. Following the Norwegian example and the EU recommendations, a number of EU countries (Spain, Belgium, France, Italy and the Netherlands) have recently passed national laws with mandated gender quotas for private companies, albeit with different rules in terms of target firms, size of the gender quota and severity of sanctions for non-compliers.

In this paper, we investigated the effect of corporate board quota legislation in the EU, focusing on several measures of firm performance and on the existence of heterogeneous effects across countries. The spread of legislative actions provide researchers a set of extraordinary quasi-natural experiments to study the causal effect of gender quotas on company performance, while the progressive adoption of mandated female board quotas in different countries offers a fertile ground to investigate country-specific effects of this type of legislation.

The empirical analysis, based on accounting data taken from Bureau Van Dijk's Amadeus for the 2004-2013 period, shows that, overall, the introduction of gender quotas by law had positive effects on TFP and employment and a negative effect on labor productivity and profitability. Our estimates also show that the growth in employment caused total labor costs to grow by about the same size, hence leaving the labor cost per employee roughly unchanged.

However, such aggregate results hide heterogeneous effects across countries, particularly between the Continental (i.e. France and Belgium) and the Southern ones (i.e., Italy and Spain). More specifically, only for the two Southern countries we find a positive effect of the reform on TFP (and also a positive effect on labor productivity in the case of Italy). On the contrary, results for France and Belgium highlight a negative effect of the law on both productivity measures, particularly in the case of France. We think that such heterogeneous effects may be interpreted in light of the great heterogeneity in gender imbalances across these countries: 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 were selected. The introduction of gender quota in this setting can increase the quality of the board and positively affect the organization's efficiency and productivity. This explanation may apply to Southern countries. On the contrary, 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.

Preliminary analysis based on the sample of publicly listed companies in Italy for which we could collect detailed information on the characteristics of the board members confirms that the pool of female candidates qualified for the new positions is crucial for firm performance. In the case of Italy, firms complied with the law by hiring more educated women with roughly the same amount of work experience in managerial positions as the incumbent ones. Furthermore, we find that the attribute that seems to matter most for firm productivity is past work experience in managerial positions, confirming that the latter is an important characteristic to influence board behavior and board decisions, and hence firm performance.

From a policy point of view, our results suggest that the introduction of gender quotas by law are more effective the larger are gender differences in the labor market and, hence, the larger is the pool of women qualified to fill quotas on boards. Furthermore, while gender quotas may also help to close the gap in gender differences in education among the board members, education per se is not a precise signal of the quality of the available women, since prior work experience in managerial positions seems to be the board members characteristics that is more (positively) correlated with firm performance. This result calls for a policy action even one step below on the career ladder within the firm, in order to reduce the gender gap also in managerial positions right below the boards. Only if women can be promoted and access top jobs within the firm, they can gain the necessary work experience to subsequently apply for board seats and to positively contribute to board decisions and ultimately to 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	
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 n 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: our elaboration on EC (2012), EC (2013) and <a href="http://www.catalyst.org/legislative-board-diversity">www.catalyst.org/legislative-board-diversity</a> (as of August 2014)						
Note: gender quota laws only for state owned companies in Austria, Denmark, Finland and Ireland						

Table 2 - Regression estimates of gender quota law on the proportion of women on boards of directors

VARIABLES	(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

Standard errors in parentheses

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

Table 3 - Sample of firms by country and status

	N firms		
	All	Public limited companies	Treated
Belgium	8961	7500	112
France	39612	34644	5914
Germany	32145	2028	0
Italy	32885	15059	251
Netherlands	7815	394	346
Portugal	4704	3282	0
Spain	19906	10281	8596
Total	146028	73188	15219

Table 4 - The effect of gender quotas on firm performance  
Public limited companies. Fixed effects estimates

VARIABLES	(1) loglabprod	(2) logtfp	(3) logemployees	(4) loglabcost	(5) logcostemp	(6) roa
treated	-0.021** [0.010]	0.015* [0.009]	0.125*** [0.011]	0.113*** [0.008]	-0.012 [0.007]	-0.593*** [0.173]
Constant	2.704*** [0.068]	5.354*** [0.007]	5.514*** [0.008]	9.093*** [0.007]	3.579*** [0.006]	7.074*** [0.118]
Year fixed effects	YES	YES	YES	YES	YES	YES
Country-specific time trends	YES	YES	YES	YES	YES	YES
Industry-specific time trends	YES	YES	YES	YES	YES	YES
Firm-level controls	YES	NO	NO	NO	NO	NO
Observations	55,643	55,643	55,643	55,643	55,643	55,602
R-squared	0.216	0.037	0.037	0.157	0.058	0.048
Number of firms	9,591	9,591	9,591	9,591	9,591	9,587

Clustered standard errors at the firm level in brackets

\*\*\* 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
Spain	29	84	6
Portugal	39	44	3

Source: World Economic Forum, 2014 and EC, 2014

Table 6 - The effect of gender quotas on firm performance – Estimates by country  
Public limited companies. Fixed effects estimates

a) ITALY

VARIABLES	(1) loglabprod	(2) logtfp	(3) logemployees	(4) loglabcost	(5) logcostemp	(6) roa
treated	0.078* [0.045]	0.103** [0.049]	-0.055 [0.071]	0.068 [0.042]	0.123** [0.060]	-0.455 [0.548]
Constant	1.152*** [0.121]	5.919*** [0.028]	6.086*** [0.033]	9.782*** [0.027]	3.695*** [0.036]	5.496*** [0.261]
Year fixed effects	YES	YES	YES	YES	YES	YES
Country-specific time trends	YES	YES	YES	YES	YES	YES
Industry-specific time trends	YES	YES	YES	YES	YES	YES
Firm-level controls	YES	NO	NO	NO	NO	NO
Observations	6,929	6,929	6,929	6,929	6,929	6,928
R-squared	0.634	0.051	0.035	0.171	0.026	0.115
Number of firms	836	836	836	836	836	836

b) SPAIN

VARIABLES	(1) loglabprod	(2) logtfp	(3) logemployees	(4) loglabcost	(5) logcostemp	(6) roa
Treated	-0.072*** [0.020]	0.049** [0.020]	0.372*** [0.022]	0.270*** [0.018]	-0.102*** [0.013]	-0.283 [0.358]
Constant	3.225*** [0.085]	5.666*** [0.010]	5.931*** [0.011]	9.352*** [0.010]	3.420*** [0.006]	8.207*** [0.209]
Year fixed effects	YES	YES	YES	YES	YES	YES
Country-specific time trends	YES	YES	YES	YES	YES	YES
Industry-specific time trends	YES	YES	YES	YES	YES	YES
Firm-level controls	YES	NO	NO	NO	NO	NO
Observations	18,479	18,479	18,479	18,479	18,479	18,456
R-squared	0.099	0.066	0.148	0.212	0.133	0.088
Number of firms	2,821	2,821	2,821	2,821	2,821	2,820

c) FRANCE

VARIABLES	(1) loglabprod	(2) logtfp	(3) logemployees	(4) loglabcost	(5) logcostemp	(6) roa
treated	-0.031* [0.016]	-0.044*** [0.015]	-0.047*** [0.017]	-0.033** [0.014]	0.013 [0.012]	-0.811** [0.321]
Constant	3.150*** [0.068]	5.001*** [0.008]	5.127*** [0.009]	8.765*** [0.009]	3.638*** [0.006]	6.688*** [0.170]
Year fixed effects	YES	YES	YES	YES	YES	YES
Country-specific time trends	YES	YES	YES	YES	YES	YES
Industry-specific time trends	YES	YES	YES	YES	YES	YES
Firm-level controls	YES	NO	NO	NO	NO	NO
Observations	29,426	29,426	29,426	29,426	29,426	29,411
R-squared	0.129	0.041	0.043	0.169	0.095	0.033
Number of firms	5,796	5,796	5,796	5,796	5,796	5,793

d) BELGIUM

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	loglabprod	logtfp	logemployees	loglabcost	logcostemp	roa
treated	-0.276**	-0.190	0.146	0.109	-0.037	-0.226
	[0.127]	[0.120]	[0.123]	[0.128]	[0.038]	[1.701]
Constant	3.920***	6.059***	5.344***	9.207***	3.863***	7.631***
	[0.198]	[0.039]	[0.048]	[0.046]	[0.021]	[0.755]
Year fixed effects	YES	YES	YES	YES	YES	YES
Country-specific time trends	YES	YES	YES	YES	YES	YES
Industry-specific time trends	YES	YES	YES	YES	YES	YES
Firm-level controls	YES	NO	NO	NO	NO	NO
Observations	809	809	809	809	809	807
R-squared	0.171	0.138	0.350	0.426	0.243	0.181
Number of newid	138	138	138	138	138	138

Clustered standard errors at the firm level in brackets

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

Table 7 – Characteristics of the members of the boards and TFP  
 OLS estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CEO or president is a woman	0.111 [0.134]						0.054 [0.176]	0.076 [0.173]
women age		0.001 [0.002]					0.003 [0.004]	0.004 [0.004]
% women with college degree			-0.086 [0.124]				-0.114 [0.192]	-0.132 [0.187]
% women with college degree in LEM				-0.114 [0.124]			-0.164 [0.183]	-0.204 [0.184]
women experience in managerial positions					0.012* [0.006]		0.015** [0.007]	0.015** [0.007]
women experience on boards						0.010 [0.050]	-0.090 [0.060]	-0.103 [0.067]
men age								0.034** [0.014]
% men with college degree								0.035 [0.318]
% men with college degree in LEM								0.884** [0.347]
men experience in managerial positions								0.006 [0.008]
men experience on boards								-0.011 [0.016]
Constant	6.088*** [0.362]	6.065*** [0.389]	6.136*** [0.324]	6.095*** [0.333]	6.003*** [0.332]	6.099*** [0.359]	5.951*** [0.317]	3.495*** [0.757]
Observations	1,086	1,083	1,086	1,086	1,077	1,086	1,075	1,075
R-squared	0.584	0.583	0.583	0.584	0.589	0.583	0.594	0.617

Robust standard errors in brackets

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

Other controls are firm size, industry fixed effects (NACE 2 digits), year fixed effects and industry-specific time trends.

LEM is acronym of Law, Economics, Management

Table 8 – Characteristics of the members of the boards and TFP  
FE estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CEO or president is a woman	0.095 [0.163]						-0.070 [0.168]	-0.037 [0.169]
women age		0.003** [0.001]					0.001 [0.004]	0.001 [0.003]
% women with college degree			0.163 [0.099]				0.056 [0.228]	0.099 [0.233]
% women with college degree in LEM				0.145 [0.114]			-0.055 [0.155]	-0.064 [0.155]
women experience in managerial positions					0.019*** [0.006]		0.018*** [0.006]	0.018*** [0.006]
women experience on boards						0.087* [0.051]	-0.017 [0.069]	-0.017 [0.070]
men age								0.022** [0.011]
% men with college degree								0.333 [0.428]
% men with college degree in LEM								0.449 [0.339]
men experience in managerial positions								0.018* [0.010]
men experience on boards								-0.011 [0.016]
Constant	6.547*** [0.112]	6.531*** [0.115]	6.538*** [0.113]	6.556*** [0.112]	6.460*** [0.098]	6.540*** [0.116]	6.460*** [0.103]	4.664*** [0.676]
Observations	1,086	1,083	1,086	1,086	1,077	1,086	1,075	1,075
R-squared	0.087	0.091	0.090	0.089	0.094	0.089	0.096	0.112
Number of firms	170	170	170	170	170	170	170	170

Clustered standard errors at the firm level in brackets

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

Other controls are year fixed effects and industry-specific time trends.

LEM is acronym of Law, Economics, Management

Figure 1. Female proportion on boards of directors

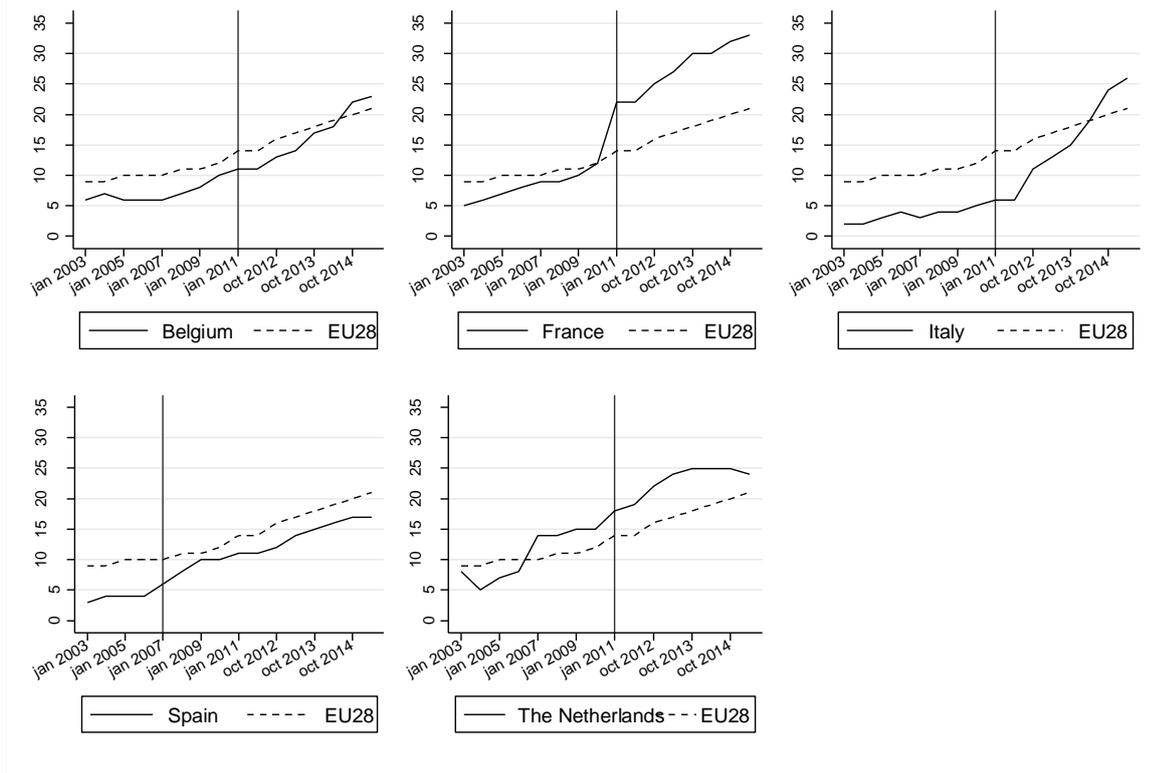


Figure 2 – Proportion of women on boards in Italy, 2004-2013

Amadeus sample of publicly listed companies matched with information on board members

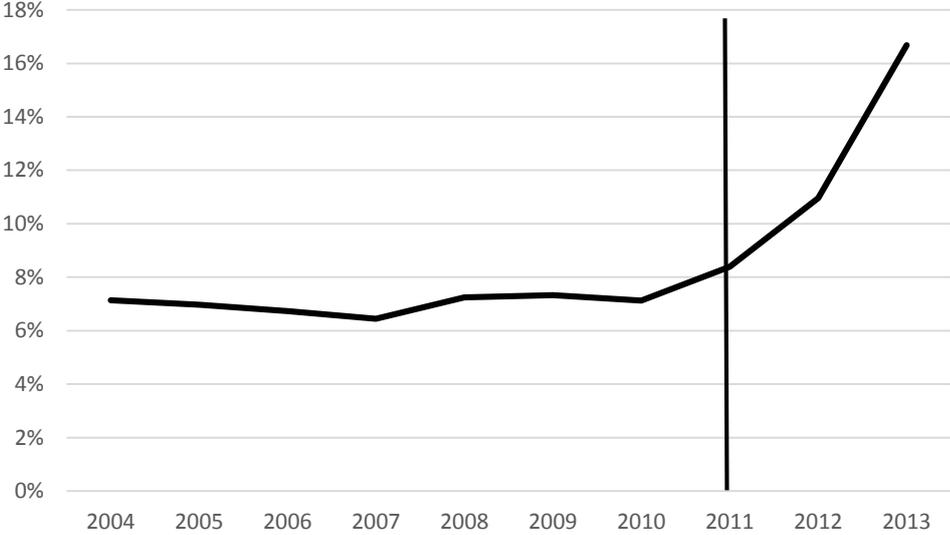


Figure 3 – Boards characteristics by gender, 2004-2011

Amadeus sample of publicly listed companies matched with information on board members

