

## ILR Review

### Where women make a difference. Gender quotas and firms' performance in three European countries

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Abstract:	The authors study the effect of corporate board gender quotas on firm performance in France, Italy and Spain. The identification strategy exploits the exogenous variation in mandated gender quotas within country and over time and uses a counterfactual methodology. Using firm-level accounting data and a difference in difference estimator, the authors find that gender quotas had either a negative or an insignificant effect on firm performance in the countries considered with the exception of Italy, where they find a positive impact on productivity. The authors then focus on Italy. Using a novel dataset containing detailed information on board members' characteristics, they offer possible explanations for the positive effect of gender quotas. The results provide an important contribution to the policy debate about the optimal design of legislation on corporate gender quotas.

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3 Most industrialized countries have registered a significant increase in female educational  
4 attainment and labour market participation in recent decades. However, such improvements  
5 have not translated into more female representation in economic leadership positions. Female  
6 representation in corporate boards has been traditionally low, with marginal changes over  
7 time. The EU-28 average share of women on the boards of the largest publicly listed  
8 companies was 9 per cent in 2003, and it grew just to 10 per cent in 2007. In order to speed  
9 up the increase in female representation in top leadership positions and the cultural change  
10 needed to favour women's access to top jobs, legislative action have been taken to promote  
11 gender-balanced representation on corporate boards. Norway was the first country to  
12 introduce corporate board gender quotas in 2003. A number of EU countries have recently  
13 passed similar national laws. Also thanks to these initiatives, in April 2016 the EU-28  
14 average share of women on the boards of the largest publicly listed companies reached 23.3  
15 per cent.  
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19 The legislative actions on gender quotas provide researchers with a set of quasi-natural  
20 experiments to study the causal effect of gender quotas on company performance. Moreover,  
21 the progressive adoption of mandated female board quotas in different countries offers fertile  
22 ground for investigating country-specific effects of this type of legislation.  
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25 In this paper, we exploit this exogenous variation in mandated gender quotas within  
26 country and over time and use a counterfactual methodology to provide an analysis of the  
27 effects of female board representation on firm performance in France, Italy and Spain. Using  
28 accounting data taken from Bureau Van Dijk's Amadeus, we estimate the effect of gender  
29 quotas on firm profitability and productivity, on the number of employees and on leverage. In  
30 the case of Italy, thanks to the availability of detailed information taken from a novel matched  
31 firm-board member dataset, we discuss potential channels for the effects of gender quotas.  
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35 Further evidence on the effects of female representation on firm performance is particularly  
36 relevant, since there is no consensus on the potential benefits of such actions on firm  
37 performance (Smith 2014) and findings in the literature, mostly based on US firms, are mixed  
38 (Post and Byron 2015). Some studies find that female representation is either positively  
39 (Erhardt, Werbel, and Shrader 2003; Smith, Smith, and Verner 2006) or negatively (Adams  
40 and Ferreira 2009; Minguez-Vera and Martin 2011) correlated with firm's performance.  
41 Other studies find no correlation (Carter, D'Souza, Simkins, and Simpson 2010; Francoeur,  
42 Labelle, and Sinclair-Desgagne 2008; Rose 2007; Marinova, Plantenga, and Remery 2010;  
43 Gregory-Smith, Main, and O' Reilly 2014). More recent analysis exploits the exogenous  
44 introduction of gender quotas in Norway for identification, finding a negative effect of quotas  
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3 on stock price and Tobin's Q (Ahern and Dittmar 2012), on short-term profits (Matsa and  
4 Miller 2013) and on return on assets (Bohren and Staubo 2016). Overall, such heterogeneous  
5 results may depend on differences across studies in both methodologies and in contextual  
6 factors, like the time period or the country analysed (Adams, de Haan, Terjesen, and van Ees  
7 2015).

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11 In this paper, we add to the literature by analysing the effects of gender quotas on firm  
12 performance in three countries never studied before. We argue that heterogeneous effects  
13 across countries may be partly related to cross-country differences in the design of the law.  
14 Our paper provides an important contribution to the policy debate about the optimal design of  
15 legislation on corporate gender quotas, specifically regarding the size of the target group and  
16 the presence of sanctions for non-compliance.  
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### 22 **Institutional setting**

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24 Norway was the first country in the world to introduce mandatory gender quotas in corporate  
25 boards, doing so in 2003. With regard to legislative actions targeted on private (non-state  
26 owned) companies, Spain was the first EU country that introduced, in 2007, a quota to secure  
27 the presence of women on corporate boards. It was followed by Belgium, France, Italy and  
28 the Netherlands in 2011. Germany has recently passed a similar legislation, which is in force  
29 as of 2016.  
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34 In the following empirical analysis, we will concentrate on the EU countries that have  
35 promoted gender quotas through specific legislative actions by 2014. Due to data constraints,  
36 our analysis will focus on France, Italy and Spain.<sup>1</sup>  
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40 In Spain, a gender quota on corporate boards was introduced within a wider law on equal  
41 opportunities (the 2007 *Ley de Igualdad*). The law (Article 75) establishes a quota of at least  
42 40 per cent of each gender on the boards of all publicly limited companies with more than  
43 250 employees. It was to be reached by 2015. The law does not establish sanctions to punish  
44 non-compliers, but it states that gender diversity in the boardroom will be positively  
45 evaluated by the Public Administration when awarding public contracts.  
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49 In January 2011, a law on female board representation was adopted in France, following  
50 the recommendations of the so called Grésy Report (Masselot and Maymont 2014). The law  
51 sets a 40 percent quota for all listed companies and companies with more than 500 employees  
52 and revenues higher than 5 million euros over the three previous consecutive years. The  
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56 <sup>1</sup> Source: EC (2012), EC (2014), [www.catalyst.org/legislative-board-diversity](http://www.catalyst.org/legislative-board-diversity) (as of August 2014) and  
57 bloomberg.com. We exclude the Netherlands because the number of potential control firms is too small with  
58 respect to affected firms and Belgium because the number of treated firms is very low.  
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3 targeted companies had to meet the target by 2016. However, for listed firms an *ad interim*  
4 regulation required a share of 20 per cent of women by the end of 2013. The law establishes  
5 that the appointment of board representatives in breach of the law can be considered invalid  
6 and subject to annulment.  
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9 Italy adopted a legislative action to promote gender balance on corporate boards in August  
10 2011. The law applies to publicly listed companies and state owned companies, which are  
11 required to appoint at least 33 percent of either gender on their boards. Since the initial share  
12 of women on boards was very low, the law sets an intermediate 20 percent goal for the first  
13 board renewal. The sanctions for non-complying firms include first an admonishment by the  
14 listed-company regulatory body, then (after four months), a fine of up to one million euros,  
15 and finally (after a further three months) annulment of the board. The mandatory gender  
16 quota is temporary and it should expire in 2022.  
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22 Official data provided by the European Commission show that the largest increase in the  
23 share of women on boards between 2010 and 2016 was recorded in Italy (25.5 percentage  
24 points) and France (24.8 percentage points).<sup>2</sup> Figure 1 shows these data for the three countries  
25 analysed and for the EU28 average. In France and Italy the proportion of women on boards  
26 increased quite sharply after the introduction of the legislation (identified by the vertical  
27 lines) and it is well above the EU average in all countries. Although the average proportion in  
28 the EU28 is increasing as well, no clear discontinuity can be observed in this case. Similarly,  
29 there is no sharp increase in the share of women on boards after the introduction of gender  
30 quotas in Spain, where the same share is below the EU average.  
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37 Regression analysis (available in the online Appendix 1) confirms that gender quotas  
38 caused a statistically significant increase, ranging between 5.9 and 10.9 percentage points, in  
39 the share of women on boards.  
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FIGURE 1

### Theoretical background

Boards of directors hold two main roles: monitoring management and providing resources to firms (resource dependence theory). Both functions are related to firm performance. From a theoretical perspective, then, the effect of gender quotas on firm performance depends on how quotas influence the dual role of boards.

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<sup>2</sup> Data 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). The companies covered are the largest publicly listed companies (max.50) in each country (members of the primary blue-chip index).

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3 A first theory assumes that boards are chosen to maximize firm value by managers and  
4 shareholders perfectly informed about potential directors' skills. In this context, a gender  
5 quota imposing a constraint on this choice may lead to a decline in firm value (and  
6 performance) because women may be appointed directors even when they are not the most  
7 talented or appropriate candidates for carrying out the twofold boards' functions (Demsetz  
8 and Lehn 1985).  
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12 Agency theory provides a different perspective. With regard to the monitoring function,  
13 this theory argues that entrenched managers who have captured the board will appoint  
14 directors that maximize their private benefits, rather than firm value. In this context, gender  
15 quotas may impose external discipline on managers because female directors tend to be more  
16 often independent than males (Adams and Ferreira 2009; Bianco, Ciavarella, and Signoretti  
17 2015; Bohren and Staubo 2016) and, accordingly, tougher monitor of firm executives.  
18 However, if existing male directors were appointed to entrench the manager, it is not clear  
19 why would a gender quota prevent from appointing female directors that are friendly to the  
20 management. The validity of this channel would require explaining why firms choose to hire  
21 independent directors without relationship with top management to comply with the law. In  
22 this respect, a reason may be that in some cases firms actually do not choose to hire  
23 independent women but are forced to do so because there are not enough non-independent  
24 (affiliated and insiders) female candidates for board positions. This reasoning may be more  
25 convincing for countries with stronger gender related prejudices making top jobs inaccessible  
26 to women and where women do not belong to the management friendly 'old boys club'  
27 (Adams and Ferreira 2009).  
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38 Notice, however, that even when gender quotas favour an increase of the share of directors  
39 acting independently, effective monitoring requires independent directors to have sufficient  
40 information relevant to management supervision, and firm's entrenched executives may be  
41 unwilling to share this information with them (Adams and Ferreira 2007).  
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45 The resource dependence theory views directors as providers of key resources such as  
46 advice and counsel to the firm (Hillman and Dalziel 2003). Gender quotas may help bringing  
47 more resources to the firm in presence of statistical or taste-based gender discrimination.  
48 Discriminating managers and shareholders appointing directors may be induced to perceive  
49 women as being less talented than men, and this prejudice will influence appointment  
50 decisions, also when male and female candidates are equally qualified. As a result, women  
51 may be underrepresented in top executive positions despite their equal (or superior) ability. In  
52 this case, when firms are forced to appoint female directors, firm value may increase because  
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3 the availability of greater average managerial talent from women fosters better corporate  
4 decisions. Indeed, one of the main reasons why policy-makers are concerned about the  
5 relative underrepresentation of women on boards is their belief that gender quotas may help  
6 to crack the glass ceiling that prevents productive high-skilled women from reaching  
7 leadership positions, with beneficial effects on firm performance (European Commission  
8 2012, 2014). On the other hand, however, if several firms are required to add many women to  
9 their boards and qualified women are in short supply, the risk is that of having the same  
10 women seated in many boards (the so-called golden skirts; Huse 2011) or appointing low-  
11 qualified directors.  
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17 Gender quotas may help bringing resources to the firm also through an increase in board  
18 diversity. Some studies have provided evidence on differences in corporate styles between  
19 male and female directors (Huang and Kisgen 2013; Faccio, Marchica, and Mura 2016), and  
20 most of the literature on board diversity suggests that diversity can have positive effects on  
21 firm performance. Female directors can bring new skills and talents, varied viewpoints, non-  
22 traditional approaches and improve gender-diverse market understanding (Milliken and  
23 Martins 1996; Anderson, Reeb, Upadhyay, and Zhao 2011; Hillman 2015; Kim and Starks  
24 2016). However, board diversity may also encourage social categorization, limit  
25 communication, reduce cohesiveness, and cause conflicts within the board, with negative  
26 effects on board effectiveness (Adams et al. 2015). Overall, therefore, it is not clear how the  
27 greater diversity triggered by mandated gender quotas will impact on firm performance.  
28 However, if barriers to female leadership stem from prejudice against women in top  
29 positions, the pre-quota level of diversity will most likely be sub-optimal.  
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38 Finally, also from a resource dependence perspective, board members' independence is  
39 another channel through which gender quotas may affect firm performance. If the share of  
40 independent directors among the appointed female board members is high, new external  
41 resources are brought to the firm, with potential positive effects on board advising. However,  
42 in order to provide strategic advice to the management, independent directors need internal  
43 information, but firm's management may be reluctant to share this information with them  
44 (Adams and Ferreira, 2007), with negative effects on firm performance. Bohren and Staubo  
45 (2016) find evidence consistent with this argument for Norway.  
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51 Overall, different economic theories predict a relationship between gender quotas and firm  
52 performance, but such relationship is not unambiguously determined and it depends on firm's  
53 objectives or preferences. Furthermore, the actual effects may depend on the initial level of  
54 firm performance, with gender quotas being more effective in countries/firms starting with  
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3 relatively large inefficiencies with respect to ability allocation in the corporate sector. Finally,  
4 the institutional design of the law may influence the effect of mandated gender quotas on firm  
5 performance. Mandated gender quotas should be more effective in increasing the presence of  
6 high qualified women on boards if the law applies to a relatively small group of firms. In this  
7 case, the positive shock in the demand of women for board positions should be smaller than  
8 when the law applies to a larger target group. Hence, it is more likely that the increasing  
9 demand could be satisfied by the existing excess of supply of highly qualified women,  
10 without having the same women seated in a number of boards or accepting less qualified  
11 female candidates.  
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17 More in general, the introduction of gender quotas imposes an adjustment process to make  
18 the firm's governance structure compliant with the policy. Entering women may have  
19 characteristics different from those of retained board members (both males and females). The  
20 sign of the impact of this broad reorganization ultimately depends on the characteristics of the  
21 pool of women from which the new directors are selected. However, we may expect larger  
22 improvements in average board characteristics in countries characterized by negative  
23 attitudes towards women in top leadership positions where, even when highly skilled women  
24 are available, they are prevented from entering corporate boards. In those contexts, any effect  
25 of board quota policies on firm performance does not stem from the gender itself, but rather  
26 from the change in average board characteristics generated by the board restructuring process  
27 required to comply with the law.  
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### 37 **Data and empirical strategy**

#### 38 **Data and outcome variables**

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40 We use accounting data taken from Bureau Van Dijk's Amadeus for the 2004-2014 period  
41 for France, Italy and Spain.<sup>3</sup> For each country, since gender quotas laws usually apply to  
42 large companies, we extracted all the public limited companies with sales of at least ten  
43 million euros in one of the years between 2010 and 2014. We excluded agricultural, mining  
44 and quarrying and state-owned companies, private firms, partnerships, non-profit  
45 organizations and companies with unknown status. The final dataset consists of more than  
46 four hundred thousand observations.  
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54 <sup>3</sup> In force of EU regulation 1606/2002, all listed companies are required to prepare their consolidated financial  
55 statements in accordance with the International Financial Reported Standards (IFRS) from 2005 onward. Italy,  
56 France and Spain adopted these rules. As a robustness check, we performed the econometric analysis for the  
57 period after this reform and the results do not change. In addition, fixed effects control for the differences  
58 between treated and untreated firms in the accounting rules.  
59

We consider different indicators of firm performance: the number of employees, an indicator of profitability (ROA), an indicator of leverage<sup>4</sup>, and two productivity indicators, namely labour productivity (value added per employee) and total factor productivity (TFP). Applying the procedure suggested by Akerberg, Caves, and Frazer (2015), we estimated the TFP by two-digit industry, using value added as output, the number of employees and fixed tangible assets as inputs and intermediate inputs as a proxy for unobserved productivity.

### Identification

The main issue that we have to address in order to identify the causal effect of gender quotas on firm performance is the choice of a suitable counterfactual methodology. We start our empirical analysis using a fixed-effect difference in difference (DD) estimator. Given that the requisites for the application of gender quotas are different among the three countries, we define the treated firms differently for France, Italy and Spain. In view of this, we could not estimate this model on pooled data for all the countries combined but rather we estimate for each country the following DD model:

$$Y_{it} = \alpha + \beta_1^{DD} TREATED_i \times Post_t + \tau_t + \mu_i + \theta X_{it} + \varepsilon_{it} \quad (1)$$

where “*it*” denotes the *i*-th firm at time *t*. *Y* is a measure of firm performance, *TREATED* is a dummy for the treated firms, *Post* is a dummy for the years after the implementation of gender quotas,  $\tau_t$  and  $\mu_i$  are, respectively, time and firm fixed effects, *X* is a vector of time-varying firms’ characteristics and  $\varepsilon$  is the error term.  $\beta_1^{DD}$  is the parameter of interest.

We define as treated those firms who had the requisites for the application of the legislation on gender quotas just before the law was passed, namely all the publicly listed firms in 2011 in Italy, all the firms publicly listed in 2011 and those unlisted with at least 500 employees and revenues of more than 50 million euros over the three years preceding 2011 in France and all the public limited companies with at least 250 employees in 2007 in Spain.

Given that there is no a natural control group to which the “treated” firms should be compared (Ferreira 2015), we follow the literature on pre-treatment matching in panel fixed effect estimation and carefully select our control samples. As a first strategy, within each country we select the control group among the non-treated public limited firms. We exclude private firms because we are concerned about the impact of shocks that hit private and non-private firms differently. In order not to have identification of our coefficients rely on

<sup>4</sup> (Non current liabilities + loans) / Shareholders funds \* 100.



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3 residual unobserved heterogeneity, we restrict our sample of treated firms to a common  
4 support. Then, within each control group, we selected firms using Abadie, Drukker, Herr, and  
5 Imbens (2004) semiparametric matching approach. For each treated firm, we identified the  
6 closest five firms in the control group on the basis of the value of a number of observable  
7 characteristics one year before the introduction of the law, allowing for replacement and with  
8 an exact matching by one digit industry.<sup>5</sup>

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11 For each country, in column (1) of Table A2 available in the online Appendix we show the  
12 average characteristics one year before the treatment separately for the treated and for the  
13 control group. The control sample is very similar to the treated sample in Italy, while there  
14 are some differences in the case of France and Spain. Given our estimation strategy, which  
15 relies on a fixed-effect identification, differences in means in one year should not affect the  
16 results if the parallel trends assumption is valid.

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18 As an alternative strategy in defining a suitable counterfactual sample, we work around the  
19 thresholds set by the gender quota law in Spain and France. This strategy, a kind of adapted  
20 regression discontinuity design to panel data with observations before and after the treatment,  
21 allows us to estimate a local treatment effect of the law, but with a cleaner identification.

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23 For France, we focus only on unlisted companies. For these firms, we define two  
24 bandwidths on the basis of the distributions of the number of employees and revenues. In the  
25 first case, we consider as treated those firms with less than 700 employees and less than 140  
26 million revenues over the three previous consecutive years. As controls, we considered those  
27 firms with a number of employees between 350 and 700 and revenues between 30 and 140  
28 million over the three previous consecutive years (Narrow Bandwidth). In the second case,  
29 treated firms are those with less than 750 employees and less than 170 million revenues over  
30 the three previous consecutive years. Controls are those firms with a number of employees  
31 between 325 and 750 and revenues between 30 and 170 million over the three previous  
32 consecutive years (Large Bandwidth).

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34 For Spain, we first define a bandwidth of 25 employees around the threshold (250  
35 employees), and consider as treated or controls those firms with a number of employees  
36 between 225 and 275 in 2007. We then increase the bandwidth to 50 employees.

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38 Columns (2) and (3) in Table A2 show that working around the thresholds we are able to  
39 select more similar treated and control samples than before for Spain and France.

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57 <sup>5</sup> We match treated to control firms using (log) sales, (log) total assets, (log) number of employees (excluding  
58 Spain), (log) TFP, (log) cost per employee, (log) material costs, (log) value added for employees.

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3 The inclusion of the firm fixed-effect  $\mu_i$  in equation (1) allows to address potential bias  
4 related to the correlation between treatment and time-invariant heterogeneity. For instance,  
5 consider the propensity of a firm to have or avoid shared ownership, which is an unobserved  
6 trait of a particular firm that probably can influence also its response to a gender quota. As  
7 long as this trait is constant over time, it is controlled for in our estimates.  
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11 An additional threat for identification is that time-varying firm characteristics may affect  
12 treatment assignment. In fact, DD fixed-effect estimates are consistent if the assignment of  
13 firms to the policy is strictly exogenous in year  $t$ , i.e. it is not correlated with the past, present  
14 of future error term  $\varepsilon_{ist}$ . Note, however, that the eventual bias is small and negligible  
15 whenever we can assume contemporaneous exogeneity, which is a reasonable assumption in  
16 our setting.  
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19 Using a pre-treatment base year to define the treatment and keeping it constant partly  
20 prevents the problem of selection into and out of treatment, providing us with a set of  
21 conservative results from our estimations, similar to an intention to treat estimator. Of  
22 course, year fixed effects allow to control for any change affecting all the firms in any given  
23 year.  
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25  
26 The main challenge of interpreting  $\beta_1^{DD}$  as the causal impact of gender quotas on outcome  
27 variables is the absence of pre-treatment parallel trends in the outcomes between treated and  
28 control firms. We test for the presence of parallel pre-treatment trends using the following  
29 equation on pre-quota observations (Muralidharan and Prakash 2017):  
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$$31 \quad Y_{it} = \alpha + \gamma_1^{DD} TREATED_{it} \times Trend + \gamma_2 Trend_t + \theta X_{it} + \varepsilon_{it} \quad (2)$$

32  
33 where the variable *Trend* is a linear trend that takes the value of 1 from 2004 until the year  
34 before the introduction of the policy, while the other variables are defined as in equation (1).  
35 A not statistically significant estimation of the coefficient of the interaction term  $\gamma_1^{DD}$  will  
36 eventually confirm the existence of the parallel trends (see Tables A3-A5 in the online  
37 Appendix).  
38

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40 Overall, our careful identification strategy, together with specific institutional features in the  
41 three countries considered, allow us to address the main identification issues related to the  
42 use of gender quotas by law as a natural experiment to identify the effect of female directors  
43 on firm performance (Ferreira, 2015).  
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46 In this regard, a relevant issue is the precise definition of the timing of the shock. In the case  
47 of France and Italy, the political debate related to the introduction of gender quotas in  
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3 corporate boards was limited and centred around the formal approval of the law.  
4 Furthermore, in none of the two countries the law was substantially changed in the years  
5 following the reform. In France, the law was submitted in December 2009 to the National  
6 Assembly, which adopted it at first reading a month later. The political debate continued until  
7 the law was formally approved at the end of January 2011. Similarly, in Italy the law was  
8 first proposed in May 2009 and the Italian Parliament started discussing the proposal in  
9 February 2011, but the political debate preceding approval of the law lasted only a few  
10 months.<sup>6</sup> This implies that the exact date of the quota shock is well defined both in France  
11 and Italy. Furthermore, the relatively short “event window” that characterized the  
12 introduction of gender quotas both in Italy and France should minimize the threat of  
13 confounding effects, such as other governance-related reforms that could have taken place  
14 simultaneously with the introduction of gender quotas.

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16 Finally, the introduction of gender quotas in both countries was accompanied by severe  
17 sanctions for non-compliers, and firms were required to adjust immediately when they had to  
18 renew their boards formally.

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20 The picture is somehow different in the case of Spain. Although also in this country the  
21 political debate was centred around the formal approval of the law and the latter was not  
22 changed after approval, the 40% gender quota on corporate boards was passed within a wider  
23 law on equal opportunities and without severe sanctions for non-compliers (and weak  
24 incentives for compliers). Such soft implementation was likely influenced by the public  
25 debate both before and after the implementation of the law, which had seen a strong  
26 opposition both from employers’ associations and the organization of executive women  
27 (*Organización de Mujeres Empresarias y Gerencia Activa*).

28  
29 These differences in the institutional setting and in the design of the law can explain  
30 differences in trends in the share of female directors across countries outlined before (see  
31 Figure 1): while a sharp discontinuity is registered right after the implementation of gender  
32 quotas in France and Italy, a smaller change is registered in Spain.

33  
34 Another concern may be self-selection into treatment and non-treatment. The main issue is  
35 that firms may have changed their status to avoid the law. We take into account this issue in  
36 our identification strategy by fixing the potential pool of treated firms one year before the  
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52 <sup>6</sup> A simple Google search provides evidence of low public interest in the topic before 2011. The number of news  
53 related to “*quotas de femmes*” in France and “*quote rosa*” (gender quotas) in Italy between January 2009 and  
54 December 2010 was, respectively, 439 and 615. It increased to 1590 in France and 2510 in Italy between  
55 January 2011 and December 2012. If we add the words “*conseils d’administration*” in France and “*cda*”  
56 (corporate boards) in Italy, the number of news are 27 in Italy and 52 in France in 2009-2010 and 163 in Italy  
57 and 157 in France 2011-2012. The relatively large drop registered is due to the fact that in those years in both  
58 countries there was also a lively debate on gender quotas in politics.

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3 introduction of gender quotas. Similarly, we selected the sample of control firms on the basis  
4 of their observable characteristics before the implementation of the law. We then estimated  
5 our models keeping constant the treatment status in our sample.  
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8 Notice also that the design of the law makes selection into treatment potentially difficult in  
9 France, where treated firms are defined on the basis of specific thresholds of two indicators  
10 (revenues and number of employees) over three consecutive years. While adjustments in  
11 terms of employees may be profit maximizing, cutting revenues may be more costly than  
12 complying with the law.  
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14

15 In Italy the law applies to publicly listed companies, and official data on the number of  
16 delisting companies over the 2004-2014 period do not show any structural break since 2012  
17 (see Figure 2). Moreover, conversion to ordinary shares and voluntary requests to delist, the  
18 causes of delisting more related to avoidance of gender quotas, are rare events (involving one  
19 or two companies in few years) and without significant changes after the introduction of  
20 gender quotas.  
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## 27 FIGURE 2

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30 The Spanish gender quota applies to all large firms, and reducing the number of employees  
31 should be relatively easier than changing legal status. However, the lack of sanctions for non-  
32 compliers did not create strong incentives to change the number of employees to avoid the  
33 law. Indeed, Amadeus data show that the number of employees in firms around the 250  
34 threshold is stable around the year of introduction of gender quotas.  
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38 A related issue is manipulation of the board size to minimize the impact of the law: firms  
39 may reduce the number of board members to limit the number of women they have to hire to  
40 comply with the law. Comparable data on the major thirty listed firms by market  
41 capitalization in each country show that, albeit board size has declined in all the three  
42 countries over the 2005-2016 period, none of them displays significant changes in the  
43 average board size right after the implementation of gender quotas (Linciano, Ciavarella,  
44 Signoretti, and Della Libera 2017).  
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49 Overall, then, we believe that for France and Italy our identification strategy and the features  
50 of the national laws allow us to address the main existing threats to identification when the  
51 introduction of gender quotas is used as a natural experiment. In contrast, despite our accurate  
52 definition of the control group, the following estimates for Spain should be interpreted with  
53 more caution, since the soft implementation of gender quotas in this country caused a  
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3 relatively low compliance and no sharp discontinuity in the share of female directors after the  
4 formal introduction of gender quotas in 2007.  
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## 10 11 **Results**

### 12 **Empirical results**

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14 Tables 1 to 3 present our main results. In the first panel of each table, we show DD estimates  
15 based on equation (1). We report the estimated coefficients of the interaction term  
16  $TREATED_i \times Post_t$ , highlighting (in bold) estimates that satisfy the parallel trends  
17 assumption (see Tables A3-A5).  
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19

20 For each country, in each column we show results for the outcome variables considered.  
21 With the exception of ROA, that can take negative values, the dependent variables are  
22 expressed in natural logarithm, thus the coefficient of the treatment dummy could directly be  
23 interpreted as a percentage variation. All specifications include firm and year fixed-effects. In  
24 the case of value added per employee, we also control for the logarithm of capital per  
25 employee, while both ROA and leverage equations include controls for firm size, i.e. the  
26 logarithm of sales and logarithm of employees. Standard errors are clustered at the firm level.  
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32 The first set of estimates in Table 1 refers to France. DD estimates show that gender quotas  
33 had an overall negative effects on productivity, employment and profitability and a positive  
34 effect on leverage, but the parallel trends assumption holds only for two out of the five  
35 outcomes considered, namely ROA and leverage (panel A). However, these results may be  
36 influenced by the sharp discontinuity between the treated and the control group generated by  
37 the definition of the targeted firms on the basis of both employment and revenues. In order to  
38 reduce heterogeneity between the two groups along these dimensions, in panels B and C we  
39 report DD estimates obtained restricting the sample to firms within the bandwidth defined  
40 before. Local DD estimates reveal that the restricted control group is much more comparable  
41 to the treated one, as shown by the fact that the parallel trend assumption now holds for  
42 almost all the outcome variables, except for TFP with the wider bandwidth (column 2 in  
43 panel C). Local DD estimates confirm that gender quotas in France caused negative and  
44 statistically significant effects on productivity, with more valid results when the latter is  
45 measured in terms of value added per employee.  
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54 We find that gender quotas significantly increase the financial leverage. To understand better  
55 this result, we tested each component of the debt-to-equity ratio and we found that gender  
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quotas had a positive effect on debts as well. From a theoretical point of view, a higher debt may imply greater external financial examination and greater commitment by managers to reduce their discretion in the use of resources (Jensen 1986), but it may also favour financial risk-taking, making firm performance more sensitive to external economic and financial shocks (Faccio et al. 2016). In this perspective, it has been suggested that women on average display more risk aversion and less overconfidence compared to men (Niederle 2016), but there is little or no difference in risk aversion between men and women when considering managers and professional business persons (Croson and Gneezy 2009; Niessen and Ruenzi 2017). Then, gender quotas effects on leverage should not be related to gender differences in risk aversion. In spite of this, with our data we cannot test whether the increase in debt is motivated by the desire to increase monitoring to reduce agency costs or by other motives.

TABLE 1

In the case of Italy, we never reject the null hypothesis of parallel trends, except for leverage. When considering productivity, DD estimates suggest a positive and significant impact of gender quotas on productivity, measured both by valued added per employee (+4.7%) and TFP (+6.2%) (see Table 2).<sup>7</sup>

Gender quotas do not seem to have had an impact on the number of employees, while they tend to increase firm's leverage and debt. Since we control for firm size, this result is not due to the fact that larger firms have greater borrowing capacity. This finding, however, although is in line with recent evidence on Italy based on alternative data and identification strategies (Rossi, Cebula, and Barth 2017), is more suggestive than conclusive given that our estimates fail to pass the test of parallel trends.

TABLE 2

For Spain, the parallel trends hypothesis is verified only for leverage, but the estimated effect is weakly statistically significant only for the profitability indicator (Table 3, panel A). When turning to local DD estimates, the parallel trends assumption is now verified in almost all the

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<sup>7</sup> The positive effect on productivity coupled with the negative (although non significant) effect on profitability can be explained by a positive effect of gender quotas on labour cost. Estimates with labour cost as outcome variable show a positive effect of mandatory quotas. Notice that the positive effect on productivity is not trivial as compared to the effect of other reforms. For instance, Cappellari, Dell'Aringa, and Leonardi (2012) found that an apprenticeship reform implemented in Italy in 2003 caused a 1.7% increase of (log) TFP.

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3 specifications, particularly with the narrow bandwidth (panel B). However, we find no  
4 statistically significant effects of gender quotas on any of the indicators of firm performance  
5 considered, with the exception of a negative effect on ROA when using the narrow  
6 bandwidth.<sup>8</sup> These results seem to indicate that the introduction of gender quotas in Spain had  
7 no significant effects on firm performance. This lack of effects may be explained by the  
8 design of the law and its effects on compliance: gender quotas in Spain were introduced  
9 without severe sanctions for non-compliers, and we observe no sharp discontinuity in the  
10 share of female directors after the formal introduction of gender quotas in 2007. Hence, the  
11 lack of significant effects may be due to the fact that the gender quota did not actually  
12 increase the share of female directors.  
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TABLE 3

### Discussion

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25 At this stage of the analysis, it is interesting to explore the potential reasons for the  
26 different effect of gender quotas in the three countries.  
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29 A factor to be considered is variation in corporate governance across countries. All the  
30 three countries share a predominant model of concentrated ownership, implying the presence  
31 of a shareholder who, alone or in concert, holds a share of voting rights large enough to  
32 control the company (OECD 2015). Family businesses represent the majority of listed  
33 companies in all three countries (Faccio and Lang 2002; Sraer and Thesmar 2007). Some  
34 differences emerge in terms of board structure, with a one-tier system (one administrative  
35 body) in Spain, and the possibility to choose between a one-tier and a two-tier system (a  
36 supervisory body and a management one) in France and Italy.<sup>9</sup> However, according to recent  
37 data based on the STOXX Europe 600 index, the one-tier board model predominates also in  
38 the latter countries.  
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45 As regards board size and independence, the average size of the board is very similar in the  
46 three countries (13 in France and Spain and 14 in Italy). The share of independent directors is  
47 between 40 and 45 percent in France and Italy, while it is around 33 percent in Spain (ECGS  
48 2014).  
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51  
52 <sup>8</sup> Estimated coefficients change a lot both in size and in statistical significance between the different bandwidth  
53 estimators. We relate these changes and the large negative coefficient obtained in the ROA equation using the  
54 narrow bandwidth estimator (+24%) to estimates' sensitivity to outliers. In view of this, we believe that results  
55 for Spain should be taken with caution.

56 <sup>9</sup> In Italy firms can also choose a third model, with a board of directors and a board of statutory auditors  
57 appointed by the shareholders' meeting. Furthermore, the relevant EU regulation (EC/2157/2001) stipulates that  
58 a European public limited liability company shall have the choice of a one or two-tier system.  
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3 Overall, differences across countries are small, particularly between Italy and France,  
4 which share a very similar corporate governance and board structure. In view of this,  
5 differences in corporate governance across countries should not be the channel explaining  
6 heterogeneous effects of gender quotas on firm performance. Furthermore, as long as  
7 corporate governance did not change with gender quota laws and only for the treated group,  
8 this should not be an issue with our estimation strategy.<sup>10</sup>

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12 Another factor to consider is the timing of adoption of gender quotas over the business  
13 cycle. However, differences in the business cycle when gender quota laws were passed  
14 should not be an issue in our case, since two out of the three countries considered in the  
15 analysis (France and Italy) introduced gender quotas in the same year.<sup>11</sup>

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19 Other potential mechanisms behind the observed heterogeneous effects of gender quota  
20 boards on firm performance may be related to the theoretical arguments discussed in the  
21 theoretical background section. Unfortunately, the available data do not allow us to test  
22 directly the application of the competing theories described in all the countries considered.

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26 We can get a further insight considering that mandatory gender quotas, like any regulation  
27 that forces firms to change their current behaviour, are expected to affect firms' performance  
28 negatively, unless there is an excess of supply of highly qualified (female) managers ready to  
29 sit on boards (Ferreira 2015). Excess of supply is more likely when firms make their choices  
30 also on the basis of either statistical or taste-based discrimination and/or when gender quotas  
31 are targeted on a small sample of firms. According to the World Economic Forum's Global  
32 Gender Gap Index, in 2014 Italy showed a considerably worse performance than France and  
33 Spain in terms of overall gender imbalances and of women's economic participation and  
34 opportunity. European Commission data show that in 2007 the share of women on boards in  
35 Italy was 3 per cent, half of that registered in Spain and one third of that in France.  
36 Furthermore, in Italy the gender quota law applies to a very small pool of firms (around 300,  
37 less than 5 percent of large Italian companies in 2012). Consequently, excess of supply  
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<sup>10</sup> The main difference between the two countries stands in the board's term limits: while in Italy corporate boards are usually renewed every three years, the French Corporate Governance Code of Listed Corporations recommends the use of staggered renewal. French best practice standards also recommend the annual election of directors. Hence, differences in the term limits across countries can explain the more gradual increase in the share of female directors in Italy. However, the more gradual increase in Italy, if any, should be associated with smaller effects, which contrasts our empirical findings.

<sup>11</sup> The fact that gender quotas were passed during the Great recession in France and Italy might affect our estimates of the impact of the law. However, considering our careful selection of the control groups, this should not be an issue with our DD strategy as long as the control firms are affected by the Great Recession similarly to the treated firms.



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3 should be more likely in Italy than in other countries with less gender imbalance and with a  
4 broader application of gender quotas.<sup>12</sup>  
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6 In this regard, Italy is an interesting case study because it presents some of the features that,  
7 according to the existing literature, may favour a positive impact of gender quotas on firm  
8 performance through an improvement of the quality of the board. In view of this, in the next  
9 Section we conduct a more thorough analysis of the Italian case.  
10  
11

### 12 13 14 **Further evidence on Italy**

15 We collected further data on Italy to provide some evidence on a number of potential  
16 channels which may help explaining the positive effects of mandatory gender quotas on firm  
17 productivity. We selected the sub-sample of publicly listed companies over the 2004-2013  
18 period and merged it with information on the names of the board members provided by  
19 CONSOB (Italian Stock Exchange Commission). We then tried to collect the CV of each  
20 board member using several sources. For each board member, we identified gender, age,  
21 education, years of work experience in managerial positions and as board member. We  
22 collected comparable information on 2,420 board members in 173 publicly listed companies  
23 in Italy over the 2004-2013 period. The evolution of the share of women on boards in this  
24 sample of firms closely resembles that reported in the institutional setting section based on  
25 European Commission data (see Figure 3).<sup>13</sup>  
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### 35 **FIGURE 3**

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38 Using this detailed information, we investigate the characteristics of the newly appointed  
39 female members. Moreover, since it might be that the law induced the target firms to  
40 reorganize the entire board, changing also some of its male members, we check if average  
41 male characteristics changed after the introduction of gender quotas as well.  
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45 Figure 4 shows the evolution of the main characteristics of board members over the period  
46 considered. The main change has been the sharp increase in the share of women with a  
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50 <sup>12</sup> The very low number of treated firms is compatible with an excess of supply even if the potential pool of  
51 qualified female candidates in Italy is likely lower than in France or Spain. Eurostat data show that in 2012 the  
52 share of women aged 25-64 with tertiary education is 22% in Italy, 37% in France and 38% Spain. However,  
53 even in the extreme case that all the listed Italian firms have no women on board and each of them has to hire 4  
54 women (one third of a board with 12 directors), the corresponding labor demand would be less than 0.5% of the  
55 available Italian women with a university degree.

56 <sup>13</sup> The sharp discontinuity observed in 2012 is entirely driven by firms with an initial share of women on board  
57 below the gender quota ('below the quota' in the Figure). Much smaller changes and no discontinuity is detected  
58 for the small sub-sample of firms (20 out of 173) with a share of women above the quota before the introduction  
59 on the law.  
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3 college degree, particularly with a degree in law, economics or management, which should be  
4 the fields of study most likely to provide managerial skills (panel B). This has occurred  
5 without any significant decline in women's mean age (panel A) or women's work experience  
6 in managerial positions (panel C). By contrast, there has been a decline in average women's  
7 work experience as board members (from around 9 years in 2010 to less than 7 years in 2013,  
8 panel D).

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FIGURE 4

Table 4 presents board members' statistics by gender for appointed members (panel A), exiting members (panel B), and retained members (panel C).<sup>14</sup> 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. In the last row of the table, we report also the share of firms changing their board composition in each sub-period.

TABLE 4

In all three groups, no statistically significant difference in female characteristics emerges 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 women with a degree grew significantly after the introduction of the gender quotas (12 percentage points), and there was an even greater increase in the share of newly-appointed women with a degree in law, economics or management (18 percentage points more). The average age of newly appointed women did not decrease significantly and we do not observe statistically significant changes in their amount of managerial experience. Finally, 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 4.8 years) while retaining those with more board experience (on average, 10.2 years).

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<sup>14</sup> The group of new directors partly overlaps with that of the exiting ones due the presence of directors moving from one board to another. In order to have three separate groups, we considered as new directors only those who were appointed for the first time, while we classified the moving directors with the exiting ones. The low number of moving directors, especially among women, prevented us from considering this group as a separate category.

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3 Interestingly, for newly appointed men we observe an increase in their age and in their  
4 average experience as board members (although partly compensated by similar increases in  
5 the average age of exiting men).  
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8 The comparison between new, exiting and retained directors shows that the latter,  
9 regardless of gender, have on average more board experience than both the new and the  
10 exiting ones. These differences are statistically significant in all the three sub-periods  
11 considered, but the gap has been increasing after the introduction of gender quotas especially  
12 for women.<sup>15</sup> Retained women are also less likely to be highly educated than both new and  
13 exiting ones, but only the new ones display a statistically significant higher share of those  
14 with a degree in economics, management and law.<sup>16</sup>  
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19 Altogether, these results confirm that previous managerial experience, especially as board  
20 members, is the first factor used to retain members within the board. Education level and the  
21 type of tertiary education degree are used by firms to select women under the constraint of  
22 gender quotas, when they have necessarily to enlarge the pool of potential candidates to those  
23 with lower managerial – and board – experience. This evidence is also compatible with the  
24 fact that, before the introduction of gender quotas, female appointments was mainly driven by  
25 family linkages (Bianco et al. 2015). Indeed, a further analysis based on the surnames of  
26 board members shows that while for males the share of board members sharing the same  
27 surname, therefore probably belonging to the same family, was around 11 percent on average,  
28 without large variations during the 2004-2013 period, for females the same share was 24.6  
29 percent in 2004 and decreased to 13.7 percent in 2013. This evidence suggests that firms  
30 seem to be trying to actually find good candidates that can potentially add value, going  
31 beyond traditional selection mechanisms based on discretionary family-based co-optation.  
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40 Overall, we can conclude that the introduction of the legislation on mandatory gender  
41 quotas in Italy did not produce a deterioration in the characteristics of board members, both  
42 females and males. This can be partly related to the fact that gender quotas have been  
43 introduced in a context characterised by the presence of negative attitudes towards women in  
44 top leadership positions where, even when highly skilled women were available, they were  
45 prevented from entering corporate boards. Gender quotas, forcing companies to appoint more  
46 women to boards, helped previously excluded highly qualified women reach board positions.  
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52 <sup>15</sup> Compared to retained female members, newly appointed women have on average 3 years less of experience  
53 as board members in 2004-2008, 5.9 years less in 2009-2011 and almost 6.5 years less in 2012-2013.  
54 Corresponding differences for men are, respectively, 2.5 years less, 4 years less and 2.7 years less. All these  
55 differences are statistically significant at 1% level.

56 <sup>16</sup> Compared to the retained female members, in 2012-2013 the share of those with these degrees is 24  
57 percentage points higher for the newly appointed women (and the difference is statistically significant), 8%  
58 higher (but not statistically significant) for the exiting ones.  
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3 Moreover, the limited number of targeted companies implies an excess of supply of such  
4 qualified women.  
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6 An additional board characteristic that could help to explain the effect of gender quotas on  
7 productivity is independence. In Italy, the share of independent directors grew from 37.6 per  
8 cent in 2011 to almost 48 per cent in 2014. The majority of women on boards serve as  
9 independent directors and the majority of newly-appointed women are independent  
10 (Linciano, Ciavarella, and Signoretti 2015). As we explained in the theoretical background  
11 section, however, it is not obvious that independence produces positive effects on firm  
12 performance. Unfortunately, we are not able to analyse directly the correlation between  
13 independence and firm performance because the available data do not provide individual  
14 information on independence. However, the poor performance of Italy in terms of gender  
15 inequality in economic participation and opportunity, suggests that the new appointed women  
16 have low social and business connections with the existing management, making it more  
17 likely that they act independently.  
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25 Finally, to interpret the positive effects we found for Italy, we may also consider that the  
26 introduction of gender quotas was accompanied by supporting measures intended to make  
27 information on available potential women easily accessible to targeted companies. Searchable  
28 databases were implemented both at the European and at the national level to help companies  
29 identify senior women executives and professionals meeting strict criteria in terms of skills  
30 and previous work experience ready to seat on their boards. Such initiatives apply strict  
31 criteria based on skills to select potential female candidates to be actually included in their  
32 databases, reducing information asymmetries about the productivity and skills of available  
33 qualified women.  
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## 42 **Conclusion**

43 We studied the effect of corporate board gender quotas on firm performance in France, Italy  
44 and Spain. We find no effect of gender quotas on firm profitability and either a not  
45 statistically significant (in Spain) or a negative effect on productivity (in France). In contrast,  
46 in Italy we find that gender quotas significantly increase firm productivity by around 5-6 per  
47 cent, depending on the productivity indicator considered.  
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51 Our results point out that the effect of gender quotas is heterogeneous across countries. We  
52 show that these heterogeneous effects may be partly related to cross-country differences in  
53 the design of the law in terms of presence of severe sanctions and size of the target group.  
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3 Gender quotas in Spain were introduced without severe sanctions for non-compliers, with  
4 subsequent much smaller changes in the share of women on boards compared to France and  
5 Italy and no significant change in firm performance.  
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8 Among the three countries considered, Italy is the only one in which gender quotas apply to  
9 a small pool of firms, making excess of demand less likely than in France or Spain, where the  
10 law applies to all large companies. This is coupled with a poor performance of Italy in terms  
11 of women's economic participation and opportunity and with a before-quota lower  
12 representation of women in top executive positions than in France and Spain. This implies  
13 that there are many qualified women excluded from corporate boards before gender quotas  
14 available to cover board positions, making short supply of female candidates even less likely.  
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17 Additional detailed information on Italian board members' characteristics shows that the  
18 positive effects on productivity are associated with a significant increase in the quality of the  
19 newly appointed female directors. Moreover, we observe some changes also in the quality of  
20 newly appointed men, with an increase in their age and in their average experience as board  
21 members. Gender quotas seem then to have triggered in Italy a thoroughly restructuring of  
22 the board, with the injection of more educated and/or experienced members, regardless of  
23 their gender. Further analysis based on the surnames of the board members suggest a shift in  
24 the selection process of women on boards from family linkages to more meritocratic quality-  
25 based criteria. In this respect, the creation of searchable databases containing the CVs of  
26 women meeting strict criteria in terms of managerial skills could have helped companies to  
27 comply with the mandated gender quota with no costs in terms of firm performance.  
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30 Overall, our comparative analysis points out that the actual effect of gender quotas on firm  
31 performance crucially depends on both the design of the law and the institutional and social  
32 context in which the law is implemented. Furthermore, such reforms may induce companies  
33 to revise more thoroughly their board composition or selection process, thus making more  
34 difficult to disentangle the effects of different channels that may all positively affect firm  
35 performance.  
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## References

- Abadie, Alberto, David Drukker, Jane Leber Herr, and Guido Imbens. 2004. Implementing matching estimators for average treatment effects in Stata. *Stata Journal* 4(3): 290-311.
- Ackerberg, Daniel A., Kevin Caves, and Garth Frazer. 2015. Identification properties of recent production function estimators. *Econometrica* 83(6): 2411-51.
- Adams, Renée B., and Daniel Ferreira. 2007. A theory of friendly boards. *The Journal of Finance* 62(1): 217-50.
- Adams, Renée B., and Daniel Ferreira. 2009. Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics* 94(2): 291-309.
- Adams, Renée B., Jacob de Haan, Siri Terjesen, and Hans van Ees. 2015. Board diversity: Moving the field forward. Editorial. *Corporate Governance: An International Review* 23(2): 77-82.
- Ahern, Kenneth R., and Amy K. Dittmar. 2012. The changing of the boards: the impact on firm valuation of mandated female board representation. *Quarterly Journal of Economics* 127(1): 137-97.
- Anderson, Ronald C., David M. Reeb, Arun Upadhyay, and Wanli Zhao. 2011. The economics of director heterogeneity. *Financial Management* 40(1): 5-38.
- Bianco, Magda, Angela Ciavarella, and Rossella Signoretti. 2015. Women on corporate boards in Italy: The role of family connections. *Corporate Governance: An International Review* 23(2): 129-44.
- Bøhren, Øyvind, and Siv Staubo. 2016. Mandated gender balance and board independence. *European Financial Management* 22(1): 3-30.
- Cappellari, Lorenzo, Carlo Dell'Aringa, and Marco Leonardi. 2012. Temporary Employment, Job Flows and Productivity: A Tale of Two Reforms. *The Economic Journal* 122(562): F188-F215

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3 Carter, David A., Frank D'Souza, Betty J. Simkins, and W. Gary Simpson. 2010. The gender  
4 and ethnic diversity of US boards and board committees and firm financial performance.  
5 *Corporate Governance: An International Review* 18(5): 396-414.  
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7  
8 Croson, Rachel, and Uri Gneezy. 2009. Gender differences in preferences. *Journal of*  
9 *Economic Literature* 47(2): 448-474.  
10  
11 Demsetz, Harold, and Kenneth Lehn. 1985. The structure of corporate ownership: Causes and  
12 consequences. *Journal of Political Economy* 93(6): 1155-77.  
13  
14 ECGS – Expert Corporate Governance Services. 2014. ECGS Survey: Composition and  
15 remuneration of boards of directors. Paris.  
16  
17 Erhardt, Niclas L., James D. Werbel, and Charles B. Shrader. 2003. Board of director  
18 diversity and firm financial performance. *Corporate Governance: An International Review*  
19 11(2): 102-11.  
20  
21 European Commission (2012) Women in economic decision-making in the EU: Progress  
22 Report. Luxembourg: Publications Office of the European Union  
23  
24 European Commission (2014) Gender balance on corporate boards. Europe is cracking the  
25 glass ceiling.  
26  
27 Faccio, Mara, and Larry H.P. Lang. 2002. The ultimate ownership of Western European  
28 corporations. *Journal of Financial Economics* 65(3): 365-95.  
29  
30 Faccio, Mara, Maria-Teresa Marchica, and Roberto Mura. 2016. CEO gender, corporate risk-  
31 taking, and the efficiency of capital allocation. *Journal of Corporate Finance* 39: 193-209.  
32  
33 Ferreira, Daniel. 2015. Board diversity: Should we trust research to inform policy?.  
34 *Corporate Governance: An International Review* 23(2): 108-11.  
35  
36 Francoeur, Claude, Réal Labelle, and Bernard Sinclair-Desgagne. 2008. Gender diversity in  
37 corporate governance and top management. *Journal of Business Ethics* 81(1): 83-95.  
38  
39 Gregory-Smith, Ian, Brian G.M. Main, Charles A. O'Reilly. 2014. Appointments, pay and  
40 performance in UK boardrooms by gender. *The Economic Journal* 124(574): F109-F128.  
41  
42 Hillman, Amy J. 2015. Board diversity: Beginning to unpeel the onion. *Corporate*  
43 *Governance: An International Review* 23(2): 104-7.  
44  
45 Hillman, Amy J., and Thomas Dalziel. 2003. Boards of directors and firm performance:  
46 integration agency and resource dependence perspective. *Academy of Management Review*  
47 28(3): 383-396.  
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3 Huang Jiekun, and Darren J. Kisgen. 2013. Gender and corporate finance: Are male  
4 executives overconfident relative to female executives? *Journal of Financial Economics*  
5 108(3): 822-39.  
6  
7  
8 Huse, Morten. 2011. The 'Golden Skirts': Changes in board composition following gender  
9 quotas on corporate boards. Paper presented at the ANZAM Australian and New Zealand  
10 Academy of Management; 2011-12-07 - 2012-12-09.  
11  
12 Jensen, Michael C. 1986. Agency costs of free cash flow, corporate finance and takeovers.  
13 *American Economic Review* 76(2): 323-29.  
14  
15 Kim, Daehyun, and Laura T. Starks. 2016. Gender diversity on corporate boards: Do women  
16 contribute unique skills? *American Economic Review: Papers & Proceedings* 106(5): 267-  
17 71.  
18  
19 Linciano, Nadia, Angela Ciavarella, and Rossella Signoretti. 2015. Report on corporate  
20 governance of Italian listed companies. CONSOB publication.  
21  
22 Linciano, Nadia, Angela Ciavarella, Rossella Signoretti, and Eugenia Della Libera. 2017.  
23 Report on corporate governance of Italian listed companies. CONSOB publication.  
24  
25 Marinova, Joana, Janneke Plantenga, and Chantal Remery. 2010. Gender Diversity and Firm  
26 Performance: Evidence from Dutch and Danish Boardrooms. Discussion Paper Series 10-  
27 03. Utrecht, The Netherlands: Tjalling C. Koopmans Research Institute-Utrecht School of  
28 Economics.  
29  
30 Masselot, Annick, and Anthony Maymont. 2014. Balanced Representation between Men and  
31 Women in Business Law: The French 'Quota' System to the Test of EU Legislation. Centre  
32 for European Law and Legal Studies (CELLS) Working Papers No 2. Leeds, UK: Centre  
33 for European Law and Legal Studies.  
34  
35 Matsa, David A., and Amalia R. Miller. 2013. A Female Style in Corporate Leadership?  
36 Evidence from Quotas. *American Economic Journal: Applied Economics* 5(3): 136-69.  
37  
38 Milliken, Frances J., and Luis L. Martins. 1996. Searching for common threads:  
39 Understanding the multiple effects of diversity in organizational groups. *Academy of*  
40 *Management Journal* 21(2): 402-33.  
41  
42 Miguez-Vera, Antonia, and Adina Martin. 2011. Gender and management on Spanish  
43 SMEs: An empirical analysis. *The International Journal of Human Resource Management*  
44 22(4): 2853-73.  
45  
46 Muralidharan, Karthik, and Nishit Prakash. 2017. Cycling to school: Increasing secondary  
47 school enrollment for girls in India. *American Economic Journal: Applied Economics* 9(3):  
48 321-50.  
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2  
3 Niederle, Muriel. 2016. Gender. In John H. Kagel and Alvin E. Roth (Eds.), *Handbook of*  
4 *Experimental Economics*, second edition, pp. 481-553. Princeton: Princeton University  
5 Press.  
6  
7  
8 OECD (2015) OECD corporate governance factbook. Paris: OECD Publication.  
9  
10 Niessen-Ruenzi, Alexandra, and Stefan Ruenzi. 2018. Sex matters: Gender bias in the mutual  
11 fund industry. *Management Science*. Published online April 30, 2018.  
12  
13 Post, Corinne, and Kris Byron. 2015. Women on boards and firm financial performance: A  
14 meta-analysis. *Academy of Management Journal* 58(5): 1546-71.  
15  
16 Rose, Caspar. 2007. Does female board representation influence firm performance? The  
17 Danish evidence. *Corporate Governance: An International Review* 15(2): 404-13.  
18  
19 Rossi, Fabrizio, Richard J. Cebula, and James R. Barth. 2017. Female representation in the  
20 boardroom and firm debt: empirical evidence from Italy. *Journal of Economics and Finance*  
21 42(2): 315-38.  
22  
23  
24 Smith, Nina. 2014. Gender quotas on boards of directors. *IZA World of Labor* 7: 1-10.  
25  
26 Smith, Nina, Valdemar Smith, and Mette Verner. 2006. Do women in top management affect  
27 firm performance? A panel study of 2,500 Danish firms. *International Journal of*  
28 *Productivity and Performance Management* 55(7): 569-93.  
29  
30 Sraer, David, and David Thesmar. 2007. Performance and behavior of family firms: Evidence  
31 from the French stock market. *Journal of the European Economic Association* 5(4): 709-51.  
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Table 1. *The effect of gender quotas on firm performance in France*

	(1) Labour productivity	(2) TFP	(3) Nr of employees	(4) ROA	(5) LEVERAGE
A) DD					
Treated x post	-0.020* [0.011]	-0.031*** [0.012]	-0.115*** [0.016]	<b>-0.553*</b> <b>[0.283]</b>	<b>0.060*</b> <b>[0.037]</b>
Observations	36,577	36,577	36,577	36,537	34,699
R-squared	0.070	0.035	0.097	0.075	0.016
Number of firms	5,008	5,008	5,008	4,999	4,980
B) "Local" DD: Narrow Bandwidth					
Treated x post	<b>-0.129***</b> <b>[0.032]</b>	<b>-0.134***</b> <b>[0.033]</b>	-	<b>-1.432</b> <b>[1.247]</b>	<b>0.354**</b> <b>[0.163]</b>
Observations	1,968	1,968		1,968	1,834
R-squared	0.138	0.064		0.124	0.044
Number of firms	224	224		224	223
C) "Local" DD: Wide Bandwidth					
Treated x post	<b>-0.103***</b> <b>[0.023]</b>	<b>-0.107***</b> <b>[0.024]</b>	-	<b>-1.576</b> <b>[0.956]</b>	<b>0.261**</b> <b>[0.124]</b>
Observations	2,992	2,992		2,991	2,803
R-squared	0.117	0.059		0.115	0.026
Number of firms	341	341		341	340

*Notes.* Dependent variables in col. 1-3 and 5 are in logarithm. Each DD specification include controls for firm and year fixed effects. The Labour productivity equation in column 1 includes a control for (ln)capital per employee. The ROA (col. 4) and leverage (col. 5) equations include controls for (ln)sales and (ln)employees. We do not estimate the equation for the number of employees (column3) with "local" DD because it is the running variable.

We report in bold characters DD estimates that pass the test of parallel trends. Clustered standard errors at the firm level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 2. *The effect of gender quotas on firm performance in Italy*

	(1) Labour productivity	(2) TFP	(3) Nr of employees	(4) ROA	(5) LEVERAGE
A) DD					
Treated x post	<b>0.045*</b> [0.027]	<b>0.062**</b> [0.030]	<b>-0.025</b> [0.041]	<b>-0.585</b> [0.449]	0.216*** [0.053]
Observations	9,603	9,603	9,603	9,594	9,262
R-squared	0.195	0.015	0.054	0.103	0.036
Number of firms	1,125	1,125	1,125	1,125	1,117

*Notes.* See Table 1.

Table 3. *The effect of gender quotas on firm performance in Spain*

	(1) Labour productivity	(2) TFP	(3) Nr of employees	(4) ROA	(5) Leverage
A) DD					
Treated x post	0.008 [0.010]	0.005 [0.010]	0.011 [0.013]	-0.471** [0.240]	<b>0.081**</b> <b>[0.038]</b>
Observations	70,746	70,746	70,746	70,670	68,619
R-squared	0.048	0.025	0.042	0.152	0.019
Number of firms	7,608	7,608	7,608	7,607	7,559
B) "Local" DD: bandwidth 25 employees					
Treated x post	<b>-0.045</b> <b>[0.042]</b>	<b>-0.045</b> <b>[0.044]</b>	-	<b>-2.648*</b> <b>[1.030]</b>	-0.087 [0.141]
Observations	2,555	2,555		2,550	2,297
R-squared	0.079	0.020		0.101	0.033
Number of firms	276	276		276	272
C) "Local" DD: bandwidth 50 employees					
Treated x post	-0.012 [0.028]	-0.013 [0.029]	-	<b>-0.883</b> <b>[0.699]</b>	0.040 [0.105]
Observations	4,635	4,635		4,624	4,202
R-squared	0.077	0.016		0.140	0.021
Number of firms	494	494		494	486

Notes. See Table 1.

Table 4. Board members' characteristics by gender (Italy)

		<i>A) New</i>				
		2004- 2008	2009- 2011	2012- 2013	Differences	
		(1)	(2)	(3)	(2)-(1)	(3)-(2)
Age	M	54.94	54.63	57.46	-0.31	2.83 ***
	F	46.73	50.78	48.8	4.05	-1.98
Degree	M	0.85	0.86	0.84	0.01	-0.02
	F	0.7	0.71	0.88	0.01	0.17 ***
Degree in economics, management, law	M	0.59	0.63	0.61	0.04	-0.02
	F	0.4	0.48	0.71	0.08	0.23 ***
Managerial experience	M	11.37	12.71	14.28	1.34 *	1.57
	F	5.4	9.27	8.42	3.87 *	-0.85
Board experience	M	7.61	7.73	10.45	0.12	2.72 ***
	F	5.9	4.75	3.83	-1.15	-0.92
		<i>B) Exiting</i>				
		2004- 2008	2009- 2011	2012- 2013	Differences	
		(1)	(2)	(3)	(2)-(1)	(3)-(2)
Age	M	56.92	57.98	59.42	1.06 *	1.44 *
	F	48.88	48.37	53.72	-0.51	5.35 **
Degree	M	0.87	0.81	0.85	-0.06 ***	0.04
	F	0.78	0.74	0.86	-0.04	0.12
Degree in economics, management, law	M	0.61	0.59	0.6	-0.02	0.01
	F	0.58	0.51	0.55	-0.07	0.04
Managerial experience	M	12.27	13.46	12.94	1.19	-0.52
	F	3.92	5.47	9.62	1.55	4.15 *
Board experience	M	8.58	10.54	12	1.96 ***	1.46 **
	F	5.83	6.16	4.76	0.33	-1.4
		<i>C) Retained</i>				
		2004- 2008	2009- 2011	2012- 2013	Differences	
		(1)	(2)	(3)	(2)-(1)	(3)-(2)
Age	M	57.39	58.51	59.32	1.12 ***	0.81 **
	F	48.23	49.71	51.13	1.48	1.42
Degree	M	0.81	0.82	0.84	0.01	0.02
	F	0.61	0.65	0.72	0.04	0.07
Degree in economics, management, law	M	0.54	0.55	0.57	0.01	0.02
	F	0.31	0.36	0.47	0.05	0.11 **
Managerial experience	M	12.33	13.26	14.91	0.93 **	1.65 ***
	F	10.01	10.06	12.32	0.05	2.26
Board experience	M	10.08	11.91	13.16	1.83 ***	1.25 ***
	F	8.94	10.6	10.18	1.66 **	-0.42
		<i>% firms changing the board</i>				
		2004- 2008	2009- 2011	2012- 2013	Differences	
		-1	-2	-3	(2)-(1)	(3)-(2)
		60.37	49.15	63.54	-	14.39***
						11.22**

Notes. M refers to male and F to female. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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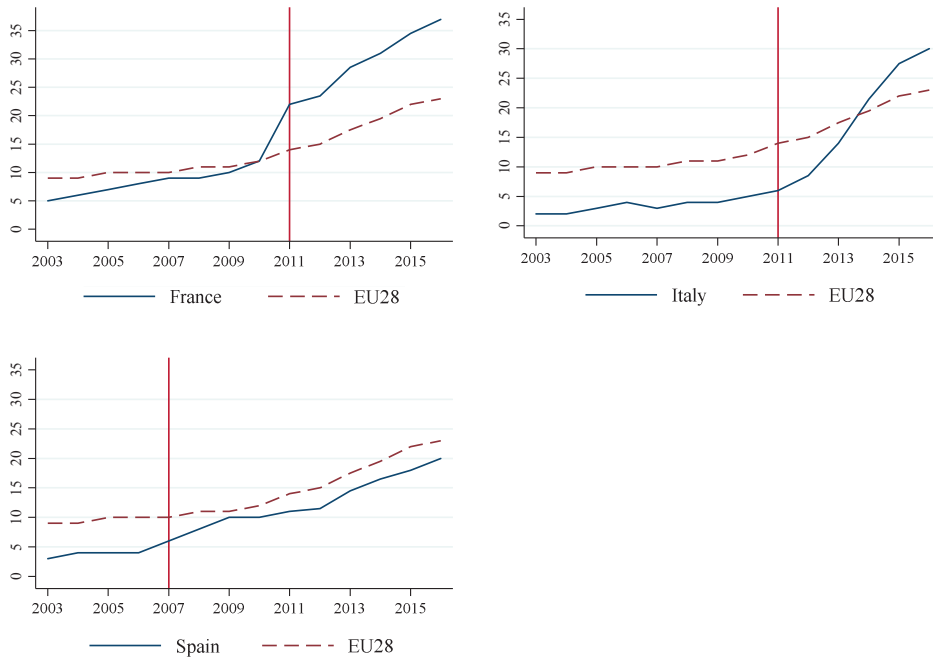


Fig. 1. Female proportion on boards of directors

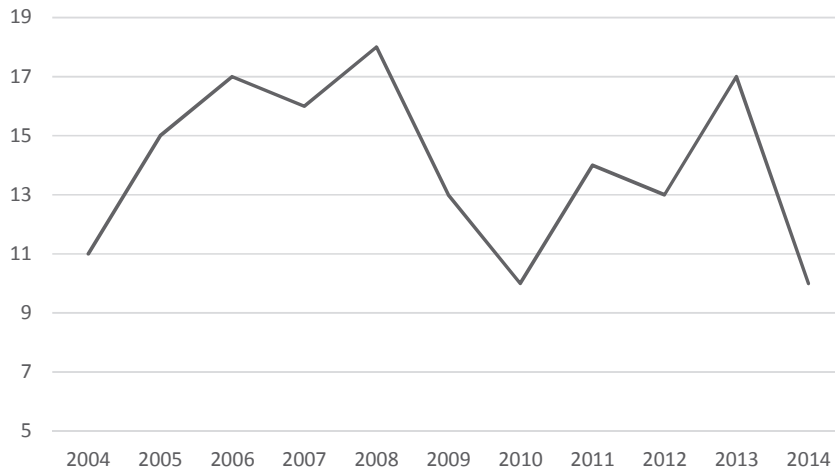


Fig. 2. Number of delisting companies – Italy (2004-2014)  
Source. Borsa Italiana

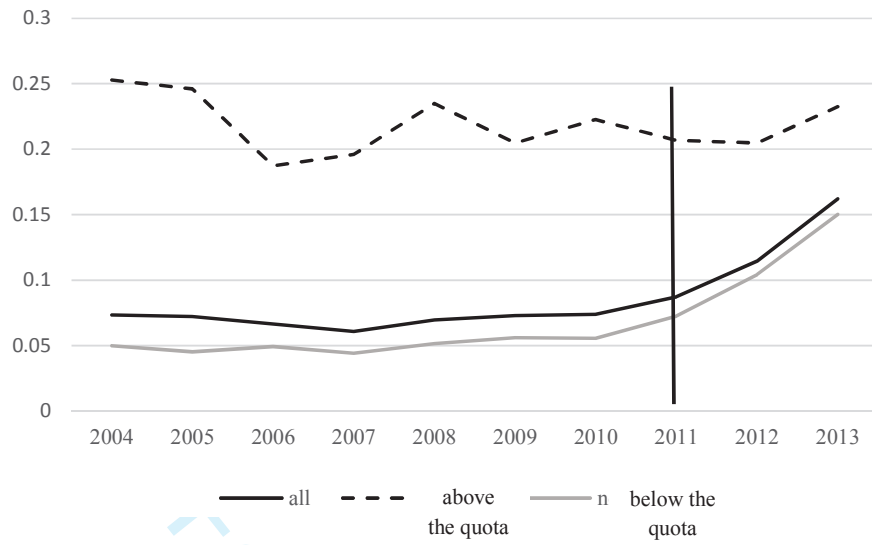


Fig. 3. *Share of women on boards – Italy (2004-2013)*

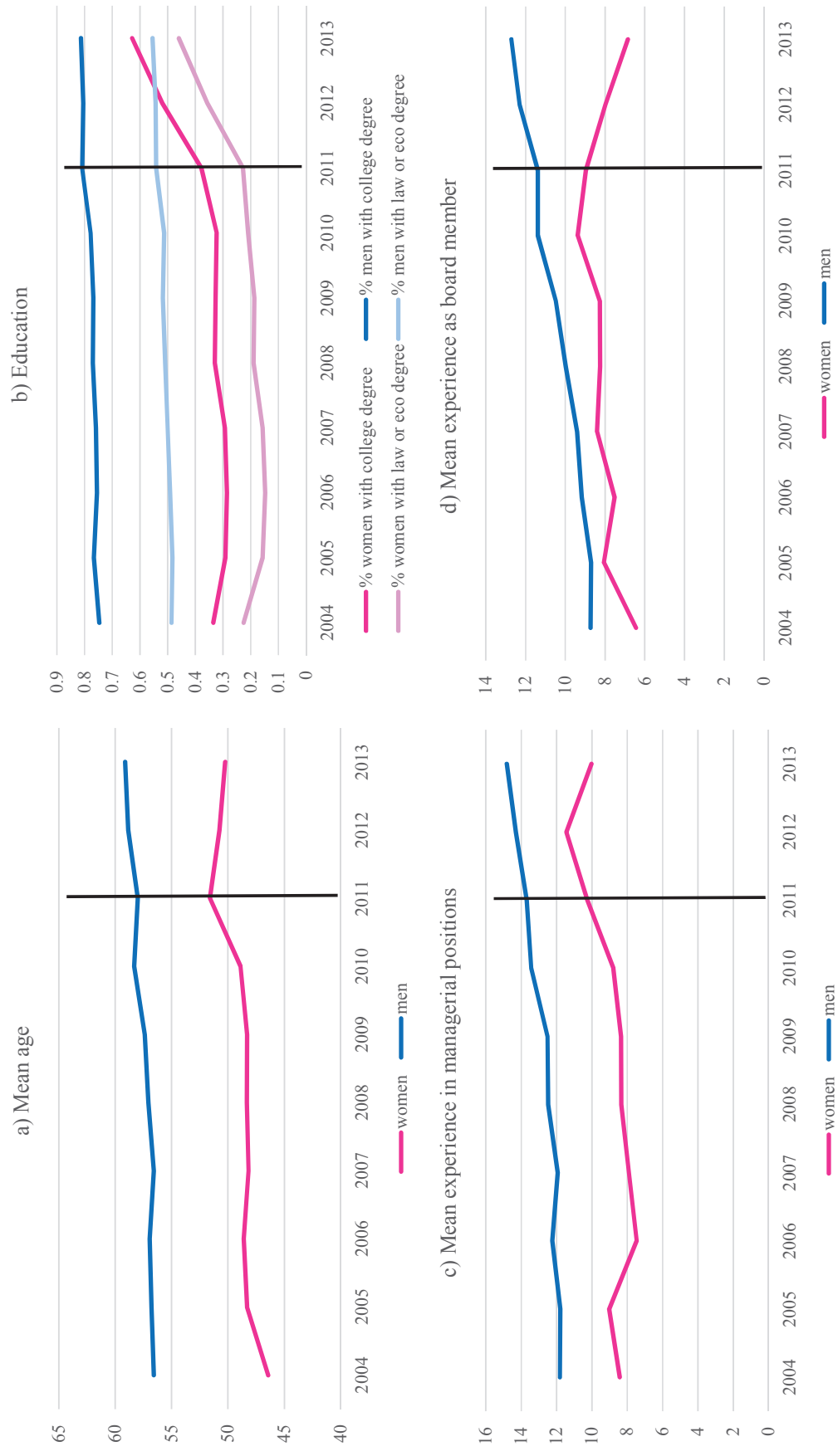


Fig. 4. Boards characteristics by gender, 2004-2013 (Italy)

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## Appendix 1

### Effect of gender quota legislation on board composition

The relationship between gender quota legislation and women's representation can be analysed 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 estimate 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 are estimated also with weighted least squares, using countries' populations as weights. Standard errors are adjusted for heteroscedasticity.

The estimates of  $\beta$  reported in Table A1 suggest that gender quotas caused a statistically significant increase, ranging between 5.9 and 10.9 percentage points, in the share of women on boards.<sup>1</sup>

Table A1. Regression estimates of gender quotas law on the proportion of women on boards of directors

	(1)	(2)	(3)	(4)
Treated	10.335*** (1.242)	10.923*** (1.300)	6.395*** (1.609)	5.928*** (1.516)
Constant	22.866*** (2.059)	18.469*** (3.899)	-1,055.091*** (366.877)	-641.981 (1,585.043)
State trends	NO	NO	YES	YES
Weights	NO	YES	NO	YES
Observations	444	444	444	444
R-squared	0.778	0.835	0.913	0.932

Notes. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

<sup>1</sup> Note that the data provided by the EC is biased towards the largest firms, and large firms may react to gender quotas differently from small firms. However, in the section containing further evidence on Italy we show a qualitatively similar result for Italy where we have data on boards' composition for all treated firms before and after the introduction of mandatory gender quotas.

Table A2. Average characteristics for treatment and control groups

A) FRANCE									
	(1)			(2)			(3)		
	DD Whole sample			Local DD sample Very narrow Bandwidth			Local DD sample Narrow Bandwidth		
	Treated	Control	Diff. C-T (SE)	Treated	Control	Diff. C-T (SE)	Treated	Control	Diff. C-T (SE)
Log of sales	12.24 (1.28)	11.50 (1.08)	-0.73* (0.043)	11.37 (0.31)	11.13 (0.36)	-0.24*** (0.054)	11.49 (0.34)	11.17 (0.34)	-0.32*** (0.04)
Log of nr employees	6.80 (1.17)	5.93 (0.92)	-0.87*** (0.04)	6.34 (0.20)	6.34 (0.20)	-0.02 (0.02)	6.39 (0.20)	6.03 (0.209)	-0.36*** (0.02)
Log of labour productivity	4.20 (0.55)	4.22 (0.50)	0.015 (0.019)	3.94 (0.34)	3.95 (0.34)	0.016 (0.05)	3.96 (0.36)	3.99 (0.35)	0.02 (0.04)
Log of TFP	3.98 (0.86)	3.93 (1.16)	0.04 (0.035)	3.80 (0.10)	3.70 (1.62)	-0.099 (0.22)	3.84 (0.74)	3.79 (1.50)	-0.05 (0.16)
ROA	4.71 (10.14)	5.05 (8.76)	0.33 (0.34)	2.85 (11.9)	3.72 (12.4)	0.87 (1.9)	2.53 (10.5)	4.32 (11.5)	1.79 (1.37)
Log of gearing	3.79 (1.27)	3.47 (1.42)	-0.32*** (0.05)	3.94 (1.40)	3.59 (1.27)	-0.34 (0.21)	3.86 (1.36)	3.59 (1.28)	-0.28 (0.17)
% manufacturing firms	0.367 (0.48)	0.367 (0.48)	0 (0.018)	0.389 (0.49)	0.465 (0.50)	0.075 (0.077)	0.47 (0.50)	0.47 (0.50)	-0.021 (0.06)
Nr of firms in 2011	4040	808	-	54	170	-	92	249	-
B) ITALY									
	DD Whole sample								
	Treated	Control	Diff. C-T (SE)						
Log of sales	12.47 (1.85)	12.10 (1.59)	-0.36*** (0.13)						
Log of nr employees	6.77 (1.96)	6.41 (1.71)	-0.36** (0.14)						
Log of labour productivity	4.52 (0.73)	4.47 (.65)	-0.053 (0.055)						
Log of TFP	5.30 (2.88)	5.17 (2.66)	-0.13 (0.22)						
ROA	1.98 (8.54)	3.30 (6.83)	1.31** (0.60)						
Log of Gearing	4.46 (1.14)	4.48 (1.24)	0.02 (0.10)						
% manufacturing firms	0.3815 (0.48)	0.3815 (0.48)	0 (0.04)						
Nr of firms in 2011	173	865	-						
C) SPAIN									
	DD Whole sample			Local DD sample Bandwidth 25 employees			Local DD sample Bandwidth 50 employees		
	Treated	Control	Diff. C-T (SE)	Treated	Control	Diff. C-T (SE)	Treated	Control	Diff. C-T (SE)
Log of sales	11.54 (1.15)	10.69 (0.89)	-0.85*** (0.02)	10.74 (0.78)	10.88 (0.79)	0.13 (0.10)	10.81 (0.84)	10.73 (0.86)	-0.07 (0.07)
Log of nr employees	6.35 (0.68)	5.15 (0.37)	-1.20*** (0.013)	5.56 (0.002)	5.47 (0.002)	-0.092*** (0.003)	5.60 (0.06)	5.41 (0.05)	-0.19*** (0.005)
Log of labour productivity	4.06 (0.68)	4.18 (0.57)	0.12*** (0.018)	4.02 (0.50)	4.06 (0.49)	0.035 (0.06)	4.05 (0.55)	4.08 (0.56)	0.032 (0.05)
Log of TFP	3.87 (1.14)	3.94 (0.89)	0.076*** (0.02)	3.91 (0.088)	3.84 (0.078)	-0.069 (0.12)	3.95 (0.91)	3.91 (1.00)	-0.04 (0.08)
ROA	7.46 (11.23)	7.68 (8.54)	0.22 (0.27)	8.36 (10.01)	5.36 (9.37)	-3.00* (1.18)	7.85 (11.3)	6.98 (10.1)	-0.86 (0.94)
Log of gearing	3.67 (1.75)	3.46 (1.84)	-0.20*** (0.057)	3.75 (1.56)	4.00 (1.47)	0.24 (0.19)	3.74 (1.53)	3.83 (1.58)	0.08 (0.14)
% manufacturing firms	0.347 (0.476)	0.347 (0.476)	0 (0.014)	0.33 (0.47)	0.48 (0.50)	0.15** (0.06)	0.37 (0.48)	0.45 (0.50)	0.077 (0.044)
Nr of firms in 2007	1268	6340	-	112	164	-	195	339	-

Notes. Standard deviations in parentheses if not otherwise specified. Treated: firms to which gender quotas would have been applied in 2011 (2007 for Spain). Control: non-treated firms of the same country matched to the treated ones.

Table A3. Tests for parallel trends for DD estimates. France, 2004-2011

	(1) Labour productivity	(2) TFP	(3) Nr of employees	(4) ROA	(5) Gearing
A) DD parallel trend test					
Treated x trend	-0.004** [0.002]	-0.008*** [0.002]	-0.023*** [0.004]	-0.048 [0.062]	0.006 [0.008]
Trend	0.016*** [0.001]	0.018*** [0.001]	0.047*** [0.002]	-0.452*** [0.031]	-0.019*** [0.005]
Observations	27,526	27,526	27,526	27,518	26,213
Number of firms	0.057	0.030	0.101	0.059	0.015
R-squared	4,955	4,955	4,955	4,954	4,899
A) "Local" DD parallel trend test: bandwidth 30 employees					
Treated x trend	-0.006 [0.006]	-0.008 [0.006]	-0.003 [0.010]	-0.203 [0.248]	0.040 [0.039]
Trend	0.013*** [0.003]	0.014*** [0.003]	0.022*** [0.006]	-0.642*** [0.162]	0.017 [0.019]
Observations	1,546	1,546	1,546	1,546	1,453
Number of firms	0.082	0.033	0.060	0.086	0.033
R-squared	224	224	224	224	222
B) "Local" DD parallel trend test: bandwidth 50 employees					
Treated x trend	-0.007 [0.004]	-0.010** [0.005]	0.000 [0.008]	-0.149 [0.179]	0.016 [0.028]
Trend	0.013*** [0.003]	0.015*** [0.003]	0.017*** [0.004]	-0.663*** [0.125]	0.014 [0.014]
Observations	2,351	2,351	2,351	2,350	2,214
Number of firms	0.072	0.032	0.042	0.095	0.023
R-squared	341	341	341	341	339

Table A4. Tests for parallel trends for DD estimates. Italy, 2004-2011

	(1) Labour productivity	(2) TFP	(3) Nr of employees	(4) ROA	(5) Gearing
Treated x trend	-0.002 [0.007]	0.007 [0.007]	0.000 [0.010]	-0.185 [0.114]	0.042*** [0.013]
Trend	-0.013*** [0.003]	-0.004* [0.003]	0.038*** [0.004]	-0.371*** [0.040]	-0.020*** [0.006]
Constant	3.105*** [0.120]	5.208*** [0.012]	6.234*** [0.017]	6.279*** [0.187]	4.530*** [0.027]
Observations	6,798	6,798	6,798	6,798	6,572
Number of firms	0.172	0.001	0.071	0.044	0.008
R-squared	1,103	1,103	1,103	1,103	1,091

Table A5. Tests for parallel trends for DD estimates. Spain, 2004-2007

	(1) Labour productivity	(2) TFP	(3) Nr of employees	(4) ROA	(5) Gearing
B) DD parallel trend test					
Treated x trend	-0.024*** [0.004]	-0.023*** [0.004]	0.020*** [0.004]	-0.245*** [0.087]	0.023 [0.014]
Trend	0.045*** [0.002]	0.048*** [0.002]	0.026*** [0.002]	-0.500*** [0.052]	-0.037*** [0.008]
Observations	26,254	26,254	26,254	26,249	25,708
Number of firms	0.101	0.069	0.122	0.040	0.006
R-squared	7,608	7,608	7,608	7,607	7,505
C) "Local" DD parallel trend test: bandwidth 25 employees					
Treated x trend	-0.011 [0.014]	-0.014 [0.014]	0.011 [0.016]	-0.208 [0.390]	-0.097** [0.046]
Trend	0.033*** [0.010]	0.036*** [0.010]	0.040*** [0.008]	-0.351 [0.356]	0.048 [0.037]
Observations	948	948	948	948	859
Number of firms	0.043	0.036	0.102	0.016	0.016
R-squared	276	276	276	276	264
D) "Local" DD parallel trend test: bandwidth 50 employees					
Treated x trend	-0.025** [0.012]	-0.026** [0.012]	0.002 [0.011]	-0.362 [0.279]	-0.075** [0.035]
Trend	0.042*** [0.007]	0.045*** [0.008]	0.051*** [0.006]	0.007 [0.263]	0.012 [0.029]
Observations	1,854	1,854	1,854	1,854	1,683
Number of firms	0.043	0.043	0.132	0.021	0.017
R-squared	534	534	534	534	510