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ABSTRACT

Why So Few Women on Boards of Directors? Empirical Evidence from Danish Companies 1997-2007

This paper analyzes the determinants of women on the boards of directors based on a panel sample of all Danish companies in the private sector with more than 50 employees. The share of women on the boards of directors was 12 percent in 2007 and has only slowly increased during the period 1997-2007. We test three hypotheses on female board representation which we denote the female-led hypothesis, the tokenism hypothesis, and the pipeline hypothesis, respectively. Based on fixed effects estimation we find that the female-led hypothesis cannot be supported. Firms with a female chairman of the board of directors tend to have significantly fewer other non-staff board members. We find clear evidence of a tokenism behavior in Danish companies. Having one non-staff woman on the board is negatively related to the chance of hiring another woman for the board of directors. Finally, the pipeline hypothesis is partly confirmed. The share of women among the group of CEOs and VPs from other firms in the industry is positively related to having a women on the board.

JEL Classification: G34, J16, L25

Keywords: board of directors, gender gap, female-led, tokenism, pipeline

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1 Introduction

In many countries more than half of all university graduates are women and they have been full-time members of the labour force for decades. But women still seem to have large difficulties in getting to the top of the hierachy in companies. In 2012, only about 15 percent of the members of the boards of directors in EU countries were women, see EU Commission (2012). For the US, the picture is about the same. The largest US companies had a female proportion around 15 percent, see Terjesen, Sealy and Singh (2009). The female representation in boardrooms seems to increase very slowly, despite the increasing educational level of women and despite an increasing proportion of women who succeed in climbing at least a few steps up on the career ladder in the firms. However, the proportion of women in top management positions, i.e. CEO, CFO or COO positions of large firms or other top executive positions, is low, see Smith, Smith and Verner (2013). From an economic point of view this evidence may reflect a loss of talent and human capital investments and may cause an efficiency loss for the firms. There may also be other arguments for a larger proportion of women reaching top positions and getting on boards of directors like fairness and equal opportunity arguments. Since 2006, a number of European countries have implemented regulations on the gender composition of the boards of the largest companies with Norway being the forerunner in this area: Norway introduced a binding quota for all listed Norwegian firms which was fully implemented in 2008. In 2012, the EU Commission considered implementing binding quotas for all large EU companies at the EU level, see Smith (2013). The proposal has not yet been implemented but in most countries there is a heated debate on the question: Why have so few women succeeded in getting on the boards of directors even in countries where equal opportunity policies and affirmative actions have been in force for decades? In this paper, we aim to answer the question based on an empirical study of all large Danish companies in the private sector.

The contribution of this paper is to test on a large representative employer-employee panel data set of more than 5,000 Danish companies in the private sector alternative hypotheses on why so few women get on the boards of directors. In the existing empirical studies on this topic, which are most often based on survey data covering a relatively limited number of respondents, a number of hypotheses have been formulated explaining the lack of women on the boards of directors. The richness of the data set available for this study allows us to test these hypotheses on the actual changes of the gender composition of the boards during an 11-year period.

In Section 2 earlier empirical studies of the determinants of women's representation on boards of directors are shortly described, Section 3 puts up the hypotheses to be tested in this study, Sections 4 and 5 describe the data and offer some main descriptives of the management boards and boards of directors in Denmark. Section 6 describes the estimation strategy. In Section 7, the empirical results and alternative endogeneity

and robustness checks are presented, and finally Section 8 discusses the results and concludes the study.

2 Earlier empirical studies

There is a considerable variation across countries with respect to the traditions or formal regulation of board composition and nomination processes. Formerly, in most countries it was the norm that the CEO and other members of the executive board were full members of the board of directors. In this case, theories and empirical evidence concerning female board members are by definition closely related to theory and evidence relating to female promotion rates into top executive positions. In Denmark, as in many continental European countries, this is not considered good corporate governance any longer, and the executive managers are seldom members of the board of directors (two-tier system). Another institutional aspect relates to the size of the company. Publicly listed companies which are typically larger companies have to comply with a number of regulations, including regulations with respect to independence of the board of directors, while smaller companies which are often family-owned companies, are less regulated and often board members are in family relations with the owners. Further, there may be regulation on the number of board members elected by the employees of the firm (in this study denoted 'staff members of the board'). In Denmark, firms with more than 35 employees are obliged to have staff members on their boards. The staff members are elected among the employees and may stem from all parts of the organization, including he lowest hierachic levels, i.e. staff members may be manual workers. Thus, staff members on the boards of directors are very different from 'insider board members' in a US company who are either present or former executive officers in the company, see for instance Farrell and Hersch (2005). The number of staff representatives depends on the size of the board. Since the proportion of women among the staff board members is considerably larger than among other board members in large listed companies, see EU (2013), the size of the company may influence the gender composition of the board.[1] The determinants of being elected as a female staff board member is expected to be a different process compared to be appointed as a board member elected on the general assembly by the stakeholders of the company or appointed by the nomination committee. We mainly focus on the determinants of the gender composition of the latter group in this study, i.e. the focus is on non-staff board members who are appointed by the owner or the nomination committee.

A number of empirical studies analyzes the competences of male and female board members. Most of these studies are based on surveys on a limited number of individuals, either female board members, members of nomination committees or other groups of agents who are responsible for appointing new board members.

[1] For small non-listed companies which are not included in the data in EU (2013) this may not be the case. For Denmark, the proportion of females among staff members is lower than for non-staff members in non-listed (and typically smaller) firms. See the Section 4 on description of the data.

Further, one of the key questions discussed in the literature is which competences are relevant for board membership. According to a study by Burke (1997a) based on a survey of Canadian female directors, the most important qualifications are 'strong track record, business contacts, an understanding of business and advanced education' (Burke, 1997a, p. 123) and being known personally by the CEO of the company or other board members (Burke, 1997b). The same type of competences are stressed in the studies by Singh and Vinnicombe (2004) who analyze UK FTSE-100 companies and Sheridan and Milgate (2005) who use a survey of male and female Australian directors in publicly listed companies. The Australian female directors also stress the importance of 'visibility in the public' and 'family relations to the owner of the company' as important determinants of their board membership. Dunn (2012) estimates a model of the probability of hiring a woman to an only-male board based on Canadian data. Women who are hired to boards which earlier had no women tend to have specialists competences (professional bankers, lawyers, government bureaucrats, and public relation experts). When extending the estimation to all new hires in the sample, including boards which already have women on boards, Dunn concludes that experience as a business manager is the most important background for women. These results are parallel to the results for US Fortune 500 firms reported in the study by Peterson and Philpot (2007).

Singh and Vinnicombe (2004, p. 485) note that despite it seems to be very important for potential female board members to hold a top executive position or to have served earlier as a director, 'there are many male directors in the FTSE 100 index who do not appear to have had CEO status before their appointments as NEDs' (i.e. become a non-executive director, NED, in a board other than the board of the company where he is presently executive officer). This evidence may be taken as an indication of higher barriers (or recruitment standards) for women than for men and may reflect direct or indirect and unconscious types of discrimination against women, see Oakley (2000). Burke (1997b) notes that the empirical evidence of the importance of personal networks with other (probably male) CEOs and board members and a track record in general indicates that this is a way of reducing uncertainty about a woman's actual competences, i.e. this may reflect classical statistical discrimination mechanisms as discussed below. As a consequence of this mechanism and combined with the increasing efforts in many companies to increase board diversity, the relatively few women who succeed in getting into top executive positions or becoming directors in large companies become a highly demanded group of women who are often acting in a number of boards. These women tend to get more board offers than their male peers and they may be in a position where they are able to self-select into the most attractive and/or best performing companies, see Farrell and Hersch (2005).

The increasing pressure for diversity which is present in many countries may be one of the factors explaining that the proportion of 'only-male' boards has been decreasing in these countries, see Farrell and Hersch (2005) and Dunn (2012). However, very often this means that once the target is met with one woman on the

board, there are no further hires of women to the board, i.e. the one woman is supposed to fulfil the diversity requirement with respect to representation of women, often called tokenism behaviour. Farrell and Hersch (2005) estimate a model of the gender of new hires in US Fortune 500 and Service 500 companies in the 1990s. They find that the likelihood of hiring a woman for a board is significantly smaller if there is already one or more women on the board. Further, if a woman leaves the board, it increases the chance that she is substituted by another woman, and not a male board member. These empirical findings seem to support the token theory that women on boards of directors with exactly one female board member act as 'tokens' for all women instead of being considered board members on a par with all other (male) board members.

3 Hypotheses on gender composition of boards of directors

The lack of women in the boardrooms may be explained by a number of alternative theories ranging from theories of pure discrimination - for instance due to powerful male business leaders who may have disutility of having women on the board - to theories which explain the low female representation by lack of female competences or lack of female interest in demanding top management positions. Singh and Vinnicombe (2004) offer an extensive survey of the theories on women directors in corporate boards.

In this section, we aim to list and group the different theories in a few overall categories and to operationalize the theories into a few hypotheses which we are able to test empirically. The classical economic discrimination theory, see for instance Becker (1957), simply states that individuals from minority groups may face discriminatory behaviour simply because firms, customers or colleagues dislike to engage with the minority group. This classical discrimination behaviour is seldom used to explain the low representation of women in the boardroom but the notion of 'old boys network' may basically reflect the same mechanisms. Or as stated by Singh and Vinnicombe (2004, p. 479): '..senior women do not easily gain access to the boardroom where an elite group of male directors maintain their power'. Singh and Vinnicombe also stress in the same paper (p. 480) that these discriminatory mechanisms 'may be unintentional, subtle forms of discrimination.'

The sociological and management literature often explains the lack of women on boards by 'gender stereotyping' and 'homosocial reproduction' theories, see Schein (1973) and Kanter (1977). The 'Think Manager-Think Male' hypothesis says that there is a tight relation between sex role stereotypes and the characteristics which are requested in order to become a successful manager, i.e. there are different hiring standards for men and women, see Schein (1973). The recruiting agents and even the potential female top managers or board members themselves tend to have gender stereotype views on what it takes to be in top management positions. This may give rise to the (statistical) discrimination effects described above. It may

also affect women's perception of their own chances of getting board positions and their self-confidence with respect to filling the positions as a board member. The same behaviour is observed in recent experimental research on gender differences in competitive behaviour. Niederle and Vesterlund (2007) show that women are more reluctant to engage in a competitive tournament incentive scheme than their male counterparts, even though female ability and performance equalize male ability and performance. Women may dislike competition more than men mainly because they may be less self-confident than men with respect to their own abilities. In line with these considerations, we expect that female-led companies, i.e. companies with a high share of women in the executive board or management board and especially firms which have women in the nomination committee, or a female chairman will tend to be less subject to gender stereotype views compared to firms with no females on the nomination committee. We denote this hypothesis the 'female-led' hypothesis.

During the latest decades, the number of companies with no women on the board has reduced significantly in many countries, see for instance Catalyst (2007) for the US Fortune 500 companies and Singh and Vinnicombe (2004) for UK FTSE companies. But very often only one woman is observed for years (among the board members who are not elected staff members), and it seems to be much more seldom to get the second woman on the board than the first one. This is often explained by the token theory, see Kanter (1977). The 'token' board member is seen as representing the 'minority' in general, i.e. in this case women, and they are not to the same extent as other board members considered as a board member with broad board competences. Therefore only one woman is hired and the chance of hiring the second woman for the board is lower than for the first female hire. In the cases where more women eventually enter the board, this may change the perception of women, see Kanter (1977), but here causality may of course also run the other way around: Only companies with fairly neutral gender views among the recruiting agents or the nomination committee may have more women on their boards. Thus, according to this hypothesis we may expect that companies which already have exactly one woman on the board have a lower probability of having a second (or more) woman on the board (among the elected non-staff members). This hypothesis is denoted the 'tokenism hypothesis'.

The concept of discrimination basically refers to a situation where equally productive workers are treated differently. Therefore, an important question is: Are women as competent as men when it comes to competences relevant for the tasks that a board of directors is responsible for? The role of the board is usually described by two main tasks: advising the management board, and monitoring, hiring, and firing the management board, see for instance Adams and Ferreira (2007). A reformulation of the question above is: which competences are important for being a competent board member who is able to act as an advising and monitoring agent in the boardroom for the CEO, COO, CFO, and rest of the management board? It is

fairly obvious that the 'classical human capital' competences, i.e. having a university degree or having a long experience and tenure as managers at lower levels may not be sufficient competences for serving on a board of a large company. Instead it may be more important that the board members are powerful individuals who are able to match the competences of the CEO and management board. Therefore, in order to be in the pipeline of qualified board members, the individual should have relevant experience as a top executive or otherwise be a powerful individual who is able to have impact on the decisions of the management board. Adams and Ferreira (2009, page 297) state that 'For gender diversity to have an impact on board governance, it is not sufficient that female directors behave differently than male directors. Their behaviour should also affect the working of the board.' Nielsen and Huse (2010) reach the same conclusion based on a study of Norwegian companies. If the individual shall be able to act as a valuable board member and be able to impact the board decisions, the professional image and esteem of the board member is important, see Nielsen and Huse (2010). Assuming that the main relevant competence as a board member is to be in a CEO position or to possess this type of job experience, it is plausible to assume that the proportion of females in the boardroom is positively affected by the size of the 'pipeline' of females in top management positions.

If the typical female pipeline to the boardroom flows through the executive suite, a next relevant question to pose is whether it is the same hiring standards which potential male and female board members face? Or are the hiring standards higher for women? Theories on statistical discrimination may explain that because female members in the boardroom and in top management positions are a minority, they are also subject to a larger uncertainty about their qualifications and competences, and this uncertainty may explain higher hiring standards for women, despite they may be as productive (i.e. competent) as their male peers, see for instance Bjerk (2008). If women tend to socialize less than men with the recruiting agents (e.g. the members of the nomination committee) for instance because they are not participating in the same social networks as their male peers, this increases the 'risk' and uncertainty related to hiring a women for the board. Therefore, it may be rational for the nomination committee to set higher hiring standards for female board members. One way of setting a higher hiring standard or alternatively to reduce the 'risk' related to appointing a woman for the board, is to hire a woman who has already succeeded in getting to the top of a company, either as a CEO or on a management board or being a member of other boards of directors. If these mechanisms are taking place to a larger extent for women than for men, we should expect that the impact of the potential male and female 'pipelines' is different, i.e. that the size of the coefficient of the male 'pipeline' variable (share of males among the potential board members) is larger than for females.

Summing up, we test three main hypotheses on why so few women are observed on boards of directors in Danish companies. (i) There are few companies who are female-led, i.e. have a female chairman of the board of directors and female members of the nomination committee, (ii) female board members act as tokens and

the chance of hiring more than 1 female board member is much lower than the chance of hiring the first female board member, and (iii) the pipeline of potential female board members is 'thin' because there are few qualified women for board positions and/or (iiia) the hiring standards are higher for the female 'pipeline' compared to the male 'pipeline'.

4 Data

The study is based on an unbalanced panel (employer-employee) data set of all privately owned or listed Danish firms with at least 50 employees observed during the period 1997-2007. It contains information retrieved from Danish administrative registers supplied by Statistics Denmark. The data set is supplemented with variables from a private Danish data account register (Experian). Experian collects information on economic performance, names on board members, and other relevant data based on annual company reports to the authorities. Register data from Statistics Denmark includes an extensive amount of information both at the individual level (for all employees in the company) and the firm level, which can be merged by using an employer-employee link variable.

Since the data stemming from Statistics Denmark are collected for administrative purposes, there are a number of firm units which are not 'real' companies having a real production and staff but they may exist in the registers for other purposes (e.g. taxation). We exclude companies with extreme values, defined as either a negative value of net capital or an extreme relationship between firm's revenue and employment in order to get rid of holding companies etc. This means that the effective sample is reduced to 17,437 observations covering around 5,000 different firms during the 11-year period from 1997 to 2007 (a large number of firms are close to the cut-off criterion of having more than 50 employees and therefore drop out of the sample in some years). The sample consists of listed as well as non-listed firms. In Denmark, there are approximately 300 listed firms. The selection criterion implies that most of the listed firms are selected into the sample but most of the firms included in the data are not listed firms.

The data set contains information on the gender of the CEOs and the VPs (i.e. CFO, COO and other members of the management board). We define a group of potential top executive managers ('pool of potentials') which are defined as individuals in the company in occupational positions just below the management board, i.e. individuals who may be potential VPs or CEOs.[2]

[2]The exact definition using Statistics Denmark's 'DISCO-codes' is: CEO=Executive director (RAS-DISCO code 121, 1210). VP=Vice-President (DISCO 122, 123, 1221-1239). Pool of potentials=Potential top executive. (First digit of DISCO code is 1 but not included in the groups of top or vice directors). In order to remove outliers or errors in the DISCO codes, we restrict the CEO group to individuals who are observed with annual earnings in top 10 of the firm. The VP-group is restricted to individuals who are observed among the top 25. The definition of the occupational groups and the sample selection in this study is different from the sample in Smith et al. (2013), mainly because we do not include companies with less than 50 employees in the present study when defining the group of potential top executives.

Further, we calculate the share of women in the companies with a university degree (and same figure for all employees), the share of white-collar and blue-collar occupations, the share of 1st and 2nd generation immigrants, board size dummies, firm size dummies, industry affiliation dummies; a dummy for being newly established, and dummies for positive firm export and import. The Experian register contains information on the names of the chairman and the other board members (which may be split into staff members elected among the employees in the company and non-staff members who are appointed by the nomination committee or the owners). The information on names is used to construct gender variables on board composition by using a program that defines all Danish female and male names. In a few cases names can be given to both girls and boys. These observations (including the firms where they are board members) are excluded from the sample.

The key variables relate to the three alternative hypotheses to be tested, i.e. the 'female-led', the 'tokenism', and the 'pipeline' hypotheses. The variable representing a 'female-led' company is a dummy which assumes the value of 1 if the chairman is a woman. We do not have information on the gender composition of the nomination committee and in many firms there is no nomination committee. But whether or not there is a nomination committee, the chairman of the board of directors typically will be the most powerful person with respect to appointing new board members. In order to test the token-theory, we define two indicator variables for having exactly 1 female non-staff board member and 2 or more female non-staff members, respectively. Finally, the pipeline variable is proxied by the share of women among all CEOs and VPs

within the industry. As alternatives, we define the 'pipeline' as the lagged female share in the pool of potentials. The pipeline for males is defined in a parallel way. There is no simple way to define the relevant pipeline for board members, see the discussion above about relevant board competences. Therefore, we apply alternative specifications in order to shed light on which types of pipelines seem to affect board composition.

5 Descriptive statistics

Table 1 shows the overall size and board compositions of firms in the sample for the year 2007 which is the last year analyzed. In total, there are 2,211 firms included in the sample in 2007. In total, 60 percent of the firms (1,315 of the 2,011 firms) do not have women on their board of directors, 27 percent have exactly 1 woman, and 13 percent have more than 1 woman on the board of directors. On average the female share of non-staff board members is 10 percent. This figure is not very different from the female share among CEOs and VPs in Danish companies in 2007 where the female share of the CEOs was 7 percent (13 percent if VPs are also included), see Smith et al. (2013).[3] About half of the firms have small boards of directors with 4

[3]The data set used in Smith et al. (2013) includes more and smaller companies than the data set used in this study, and therefore the proportion of females among the CEOs is larger. In the data set used in the present study the female share among

members or less. These firms are small companies and the majority does not have to have staff employees on their boards. The share of women increases with board size up to a size of about 11-12 members where on average 16 percent of the board members are women, i.e. 1-2 female non-staff board members is the norm if there are 11-12 non-staff board members.

[Insert Table 1 about here]

The share of female board members has been increasing slowly during the period 1997-2007, see Table 2. In 1997, there were only 6.7 percent females among the non-staff board members. The share of companies having a female chairman has also increased, more than doubled, from less than 2 percent to 4 percent between 1997 and 2007. The same holds for the pipeline of potential female board members stemming from executive top positions. In 1997, there was only 0.5 percent of all the companies in the sample which had a female CEO, a figure that has more than tripled, to 1.8 percent in 2007. Also the share of women in positions just below the CEO-level has increased, but not to the same extent as the proportion of women in the companies which holds a university degree. In 1997, the female share among employees with a university degree in the sample was 21 percent, increasing to 32 percent in 2007. This figure is more than three times larger than the female share among the VP-CEO group and the pool of potentials.

[Insert Table 2 about here]

Table A1 summarizes the main variables for the full pooled sample and for three subgroups of companies which are the subgroups of companies that we use in the estimations: companies with a female chairman, companies with only one woman on the board of directors and firms with a relatively high proportion of women in their 'pipeline' denoted 'above VP_CEO firms' and defined as firms above the median with respect to the relative share of women in the VP-CEO 'pipeline'. Only 3 percent of the companies have a female chairman. These companies tend to have a larger female share of employees, be smaller companies and not listed on the stock exchange, and have less import and export compared to the full sample. In the full sample, the share of women on boards is 11 percent and 9 percent among non-staff board members. In firms with a female chairman on the board of directors or "token firms" with exactly one female non-staff board member, the share of female board members is considerably higher, 39 and 16 percent, respectively. However, this is due to a larger female share among elected staff board members while the female share among non-staff board members is roughly constant around 8 percent. Firms with a share of women in the 'pipeline' above the

CEOs is only 2 percent.

median are not very different from companies with a share below the median in any of the listed parameters in Table A1. The same tendency holds for 'token firms' which do not seem to deviate much from other firms in the sample with respect to the listed variables.

6 Estimation strategy

To test the female-led, tokenism, and pipeline hypotheses, we implement both a simple OLS and a FE estimation approach where we are able to exploit the fact that we observe the same firms during a number of years, and therefore we can control for time-constant unobserved firm characteristics, u_i. Specifically, we separately estimate the following linear models of the female share of board members:

$$share\_w\_board_{it} = \alpha + \gamma w\_chairman_{it} + z_{it}^{'}\omega + x_{it}^{'}\beta + \eta_{it} + u_i + v_{it} \tag{1}$$

$$Pr\left\{\triangle share\_w\_board_{it} > 0\right\} = \alpha + \gamma token_{it-1} + z_{it}^{'}\omega + x_{it}^{'}\beta + \eta_{it} + u_i + v_{it} \tag{2}$$

$$share\_w\_board_{it} = \alpha + \gamma w\_pipeline_{it-1} + z_{it}^{'}\omega + x_{it}^{'}\beta + \eta_{it} + u_i + v_{it} \tag{3}$$

In the first specification (1) the left-hand side variable, share of women on the board of directors, does not include the chairman. In specifications (2) and (3) the left-hand side variables are defined as the female share of all board members, including the chairman. This difference in the computation of the proportion of women on the board is due to the simultaneity of the dependent variable and the key indicator in (1). Each specification presents a different hypothesis of interest represented by the variables (i) whether the chairman is a woman, (ii) whether there was at least one female non-staff member of the board of directors last year, and (iii) the share of women in past years' 'pipeline' to the board, respectively. In model (2) the left-hand-side variable is a dummy variable indicating whether 1 or more further female non-staff board members are appointed during the year. For simplicity we estimate the model as a linear probability model.

Each dependent variable is regressed on our variable of interest, a set of standard controls z_{it} (dummies for year and industry) and firm characteristics x_{it} (share of women among all employees in the firm, share of women with different educational levels, share of women with different occupations, share of women being 1st and 2nd generation immigrants, share of total workers with different educational levels, share of workers with different occupations, share of workers being 1st and 2nd generation immigrants, firm size, export dummy, import dummy, and an indicator for being a newly established firm, for boards with ≤ 4 and $5-6$ board

members). We include the 'share-of-women-variables' to control for other potential time-varying 'female-friendly' aspects of the company which are not captured by the inclusion of the fixed effect. Further, these variables may capture a 'firm legitimacy effect' in the sense that firms with a large share of female employees, and/or a large share of women in higher level positions may want to signal a willingness to have females on the board of directors, see Bilimoria (2006). The error term is composed of a time-invariant firm effect u_i and a time-varying term v_{it}, which we assume to be purely idiosyncratic. We apply a Fixed Effects (FE) specification which deals with the potential correlation between our variables of interest and time-invariant component. In model (1) we include an indicator variable for the year of change in chairman gender (from male to female) η_{it} which controls for the fact that the year of change of gender of chairman is a mixed year with both a male and female chairman. The same is done in models (2) and (3). The inclusion of η_{it} allows us to provide a DID estimate for the parameter of interest in the specification (1).

However, endogeneity might still be an issue for our FE estimates in case of reverse causality or correlation between our variables of interest and unobserved time-varying firm fixed effects. Thus, we cannot claim that our results represent causal effects since we do not have valid instruments at hand or other ways of identifying causal effects. However, we partly cope with such issues in the regression (1) by performing some endogeneity checks: for instance we check whether the inclusion of either 1-year lag or lead in $w\_chairman$ affects our main results substantially.

7 Results

The following paragraphs present findings from the implemented estimation strategy. Tables 3 to 6 report our main results while endogeneity tests and robustness checks are presented in Table 7 and in the Appendix (Tables A1-A5).

7.1 Main results

Table 3 reports our main results on the female-led hypothesis. The first three columns refer to the OLS estimates, whereas the rest are FE (firm-specific) estimates. In columns (1) - (6) the dependent variable is the share of women among all board members. Columns (7) - (8) are based on the same specification as column (6), except for the dependent variable which is split into the female share among staff members (7) and female share among non-staff members (8).

[Insert Table 3 about here]

The coefficient on *w_ chairman* is significantly positive in columns (1) - (2), indicating that firms with a female chairman also seem to have more women on the board of directors beside the female chairman. However, when more controls are added in the OLS estimations, the significance of the female chairman dummy disappears. The coefficient on *w_ chairman* turns negative and significant when controlling for time-invariant unobserved heterogeneity in the FE estimation in columns (4) - (6). Not surprisingly, the explanatory power lowers in the FE approach as it captures the within-firm dimension only. The inclusion of all controls does not substantially affect the size and significance of our key parameter in the FE regressions. Since the FE coefficients are our favorite estimates (we are interested in within-firm effects), we find that the presence of a woman as a chairman is associated with a reduction in the share of women on the board by about 7 percentage points (column 6). Columns (7)-(8) indicate that the coefficient in column (6) is consistently solely due to non-staff board members which are the board members where the chairman may influence the appointment. Thus, we do not confirm the female-led hypothesis. On the contrary, we find that a female chairman is related to fewer other female board members. The coefficient is sizable, a change to a female chairman in previous year is related to a reduction in the chance of another female board member by 9 percent. Though one should be careful not to take this as causal evidence, the result may fit with a tokenism story which is discussed below.

Interestingly, the within-firm proportion of women among the employees in the firm carries a positive and significant coefficient, see column (6), meaning that firms with a larger share of female employees are more likely to have a female board member. Columns (7) - (8) show that this positive coefficient is consistently related to the chance that there are female staff members elected to the board of directors while this variable has no relation to the share of women among non-staff board members. There are no significant associations between the share of women holding a university degree and the share of (both staff and non-staff) women on boards. The size of the board seems to matter. Smaller boards with less than 7 board members have significantly fewer female non-staff members than larger boards with 7 or more board members. Since we also control for the size of the company, this correlation cannot reflect only firm size, i.e. larger firms tend to have larger boards and a larger proportion of women on the board for instance because they are more prone to follow the soft law guidelines of good corporate governance and the public pressure for gender diversity, see Farrell and Hersch (2005) and Dunn (2012). One hypothesis might be that larger boards have been extended in order to increase diversity without having to reduce the number of male board members.

Table 4 has the same structure as Table 3 but now the key right-hand side variable is the indicator for having 1 woman on the board. If the token theory shall not be rejected, we have to find a significantly negative coefficient of this indicator. This is clearly the case, and the FE results are very robust in columns (4) - (6) at a level of -0.2, i.e. having a female non-staff board member last year is related to a reduction in

the chance of at least one more woman on the board in the present period by about 20 percentage points. Columns (7) - (8) show that the 'token-effect' only refers to female non-staff members while the chances for female staff members to get on the board of directors is not significantly related to the presense of other female non-staff members. However, Table 4 also shows that having more than 1 female non-staff board member is associated with even lower chances (about 43 percent according to column (8)) for another female non-staff board member compared to a board with exactly 1 woman on the board.

[Insert Table 4 about here]

The 'pipeline' hypothesis is tested in Table 5 where we include the lagged share of women in the pool of potentials in the industry, see the upper panel of Table 5. The first hypothesis to be tested is that the female share in the 'pipeline' of potential top executives in the industry is positively related to the female share of women on the board of directors. The pool of potential top managers in the industry is not related to the share of female board members according to all FE models in Table 5. Alternatively, we define the female 'pipeline' as the share of women among CEOs and VPs in the industry. The lower panel of Table 5 shows that now the size of the 'pipeline' has a significantly positive coefficient (0.23), implying that an increase in the female share of CEOs and VPs in the industry of 10 percentage points is related to an increase in the share of women non-staff board members by 2 percent. The size of the coefficient may not be large - there is a much lower relation than a 1 to 1 relation between the female 'pipeline' and the female share of non-staff board members which may of course reflect that our 'pipeline' proxy is not very precise.

[Insert Table 5 about here]

In order to compare with the male recruitment to the board of directors, we estimate models for male board members parallel to the models for females in Table 5. If the hiring standards for men are lower in the recruitment to boards of directors, one should expect to find a (more) positive coefficient than for females of the the variable *share_men_POP (t-1)*, i.e. the male proportion in the pipeline of the pool of potential top managers in the industry. This does not seem to be the case. As for women, the male coefficient in the upper panel of Table 6 in column (8) is insignificant and negative. However, the coefficient for the pipeline variable defined as the male share of CEOs and VPs in the industry is significantly positive and almost has the same size as for females. Our interpretation of this result is that the relevant pipeline for boards of directors (non-staff members) is CEOs and VPs. I.e. the road to the board of directors seems to go via the management suites!

[Insert Table 6 about here]

7.2 Sensitivity analysis

Our sensitivity analysis consists of a number of separete endogeneity and robustness checks for the female chairman (female-led), tokenism, and pipeline hypotheses.

We run checks to exclude most of the endogeneity that may eventually affect the estimates concerning the female-led firm hypothesis. Table 7 reports such checks: in the first three columns we include the first lag of the chairman gender variable whereas the last three columns report estimates from the specifications including the first lead of this variable. We find that the estimates of the key variable 'female chairman' is robust to the inclusion of the lag and lead variables. In addition, the lead of the chairman gender never turns to be significantly different from zero. We take this evidence as an indication that our estimates are not significantly affected by any kind of anticipation effects or plausible bias due to simultaneity.

[Insert Table 7 about here]

In order to evaluate the robustness of our estimates, we rerun the FE models on a number of different sub-samples of firms: service and non-service industries; exporting and non-exporting firms; differently sized (small, medium and large) firms; companies listed and non-listed on the national stock market; below- and above-median firm age, industry share of pool of potentials, and industry share of employees holding VP or CEO positions. In general the coefficients of the female chairman variable are negative and in most cases significant, ranging from]0, -0.12]. The coefficient is insignificant in the sub-samples of firms with at least 500 employees and listed companies. This may reflect the fact that both listed and large companies are more inclined to pursue a policy of gender diversity among directors compared to the majority of enterprises, irrespective of the chairman gender.

All robustness checks for the token hypothesis (Table A3) are consistent with the main findings. No significant differences emerge from the comparison between service and non-service industries, exporting and non-exporting firms, and below- and above-median VP_CEOs share. We find larger negative parameters on *token* for *(a)* medium firms with respect to small and large ones; *(b)* listed compared to non-listed companies; *(c)* younger versus older firms; *(d)* above-median industry share of pool of potentials with respect to its sample counterpart.

Robustness checks reported in Tables A4 and A5 present weak evidence of the pipeline hypothesis for women and men, respectively. Examining these results for women, slightly significant estimates are found

for the subgroups of firms (a) with 100-500 employees, (b) not listed on the Danish stock market, and (c) belonging to industries with below median POP share. In the case of men, estimates are significant at the ten percent level only for firms that are not involved in exporting activities, or within industries with shares of pool of potentials and VP_CEOs lower than the respective median values recorded for the entire sample in use.

8 Conclusions and discussion

In this study we analyze the determinants of females on the board of directors based on a representative panel sample which covers all Danish companies in the private sector with more than 50 employees, i.e. more than 5,000 companies which are observed during the 11-year period from 1997 to 2007. The share of women on boards of directors was 12 percent in 2007. The figure is slightly lower, 10 percent, if staff board members who are elected among all employees in the firm are excluded. The share of women on boards of directors (excl. staff members) has been increasing during the period 1997 to 2007, from 7 to 10 percent.

We test three hypotheses on the determinants of the female share of board members. First, we test the hypothesis that having females in powerful positions in the company might have an impact on the recruitment of women to the board of directors, i.e. a hypothesis on the 'impact' of female-led companies. Specifically we test whether having a female chairman on the board of directors in the previous period presents a positive association with the share of women on the board in the present period. Our results cannot document this hypothesis. On the contrary, we find by applying fixed effect panel estimations that companies with a female chairman tend to have about a 9 percent lower share of women on the board among the non-staff members when controlling for a number of observed firms characteristics and unobserved time-constant heterogeneity between firms. As expected, the presence of a female chairman is not related to the female share among staff board members.

Secondly we test the tokenism hypothesis, saying that if there is already one woman on the board of directors (either the chairman or another board member among the non-staff board members), the probability of hiring another woman for the board in the subsequent period is lower. The tokenism hypothesis cannot be rejected. We find a robust and significantly negative coefficient for companies having exactly one woman on the board when controlling for observed and unobserved time-constant heterogeneity. The effect only relates to female non-staff members where the 'token' coefficient is -12 percent while the coefficient is insignificant for non-staff members. We also find that the chance of hiring one further women to the board of directors is significantly lower than the chance of hiring one more male board member if there are already 2 or more women on the board.

Finally, we test whether the share of female board members is related to the 'pipeline' of potential female board members and which of the female 'pipelines' seems to be the most relevant pipeline for board positions. When estimating simple OLS regression models which do not control for unobserved fixed firm effects, there is a positive relation between the share of women employed in the company and the share of women on the board of directors. However, the significant coefficients disappear when estimating a fixed effects model, except for a few interesting results: When splitting the board members into board members elected by the employees in the company (staff members) and board members appointed by the nomination committee or elected by the owner or the stakeholders at the general assembly (non-staff), we find a significant and positive coefficient of the female share among all employees in the firm for staff members and a positive and significant coefficient of the lagged share of women among top executives (CEO or VP) in the industry. Our interpretation is that a relevant pipeline for staff board members is the proportion of women among the employees and for the non-staff board members the relevant pipeline is female top executives within the industry. The share of women among potential top executives (i.e. executives who have not yet reached positions on the management board level as VPs or CEOs) is not significant, i.e. this result confirms the hypothesis that women have to reach top executive positions before being really 'at risk' to get a position on the board of directors, unless they have other network or family relations to the owners of the company. In order to test a hypothesis that the hiring standards for males may be lower, i.e. also men who are in the pool of potential top managers but have not yet reached top executives positions, we test exactly the same pipeline models for men. Our results show exactly the same results as for the female pipeline models, i.e. the relevant male share of the pipeline for board members also seems to be CEOs and VPs in the companies while the pipeline of managers at lower management levels is not positively related to the male share of board members.

The results in the present study indicate that the route to more women on boards seems to pass the executives lounges, i.e. an important way to increase the female proportion among non-staff board members is that more women reach top executive positions. The past moderate increase in the female share of non-staff board members may reflect an outside pressure for diversity as specified in the soft law rules on good corporate governance. According to our results, there is a risk that this pressure often only will imply that one non-staff woman will get on the board but then the process of more gender diversity stops as expected by the token theory. Furthermore, it does not seem to start a process of more gender diversity on the board of directors to have a female chairman on the board. On the contrary, we find a negative correlation between having a female chairman and the share of other women on the board among the non-staff members which may reflect that the female chairman, though probably powerful in many cases, may also act as a token.

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Table 1: Descriptive statistics - by size of board in year 2007

	Number of firms by number of women on board				Female board members, average numbers		
Size of board	All	No women	1 woman	2 or more women	All	Non-staff	Female share among non-staff board members
≤4	1,126	788	276	62	0.36	0.34	0.11
5-6	767	430	214	123	0.63	0.41	0.09
7-8	172	68	53	51	1.09	0.69	0.12
9-10	83	16	37	30	1.52	0.63	0.09
11-12	37	5	10	22	2.16	1.37	0.16
13-14	15	5	2	8	1.87	1.20	0.11
15+	11	3	2	6	2.09	1.27	0.11
All firms	2,211	1,315	594	302	0.61	0.43	0.10

Table 2: Descriptive statistics - female share by hierachical level

Year	1997	2002	2007
Chairman of board of directors	0.0190	0.0310	0.0416
Board of directors (excl. staff members)	0.0665	0.0938	0.1010
Board of directors (incl. staff members)	0.0940	0.1137	0.1197
CEO	0.0052	0.0170	0.0176
CEO plus VP-level	0.0633	0.0795	0.0986
Pool of Potentials (high level positions)	0.0734	0.0679	0.0919
Employees with a university degree	0.2119	0.2888	0.3203

Table 3: Main results - Female-led hypothesis

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
female chairman	0.0373***	0.0317**	0.0157	-0.0697***	-0.0689***	-0.0698***	0.0121	-0.0890***
	(0.0139)	(0.0145)	(0.0135)	(0.0184)	(0.0195)	(0.0196)	(0.0154)	(0.0220)
share of women with a university degree	-	-	0.0510	-	-	-0.0124	0.0455	-0.0223
	-	-	(0.0561)	-	-	(0.0550)	(0.0621)	(0.0583)
share of women	-	-	0.2015***	-	-	0.1000***	0.1962***	0.0148
	-	-	(0.0160)	-	-	(0.0353)	(0.0559)	(0.0358)
$\leq$4 board members	-	-	-0.0358***	-	-	-0.0129	-0.0324**	-0.0163**
	-	-	(0.0070)	-	-	(0.0086)	(0.0142)	(0.0082)
5-6 board members	-	-	-0.0179***	-	-	-0.0034	0.0034	-0.0139**
	-	-	(0.0061)	-	-	(0.0068)	(0.0129)	(0.0066)
Standard controls	no	yes	yes	no	yes	yes	yes	yes
Firm characteristics	no	no	yes	no	no	yes	yes	yes
R-squared	0.0013	0.0150	0.0745	0.0047	0.0073	0.0122	0.0110	0.0137
Firms	5,159	5,159	5,159	5,159	5,159	5,159	5,159	5,159
Observations	17,350	17,350	17,350	17,350	17,350	17,350	17,350	17,350

Note: In (1) - (6) the dependent variable is the share of women on the board. In (7) and (8) the dependent variable is the share of staff and non-staff women on the board, respectively. Whereas OLS estimates are reported in (1) - (3), (4) - (8) report within-firm (FE) estimates. The share of staff or non-staff women on the board does not include the chairman. Significance levels: ***1%, **5%, *10%.

Table 4: Main results - Tokenism hypothesis

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 non-staff woman on the board (t-1)	-0.0190***	-0.0192***	-0.0252***	-0.2024**	-0.2031**	-0.2048**	-0.0024	-0.1965**
	(0.0058)	(0.0059)	(0.0060)	(0.0185)	(0.0187)	(0.0186)	(0.0128)	(0.0170)
more than 1 non-staff woman on the board (t-1)	-0.0276***	-0.0321***	-0.0557***	-0.3990***	-0.4042***	-0.4092***	0.0265	-0.4272***
	(0.0093)	(0.0093)	(0.0088)	(0.0356)	(0.0361)	(0.0360)	(0.0244)	(0.0353)
share of women with a univesity degree	-	-	0.1231*	-	-	-0.0300	0.0620	-0.0391
	-	-	(0.0716)	-	-	(0.1571)	(0.0902)	(0.1393)
share of women	-	-	0.1153***	-	-	0.3346***	0.2630***	0.0812
	-	-	(0.0156)	-	-	(0.1075)	(0.0802)	(0.0856)
≤4 board members	-	-	-0.0791***	-	-	-0.0712***	-0.0191	-0.0562***
	-	-	(0.0084)	-	-	(0.0230)	(0.0164)	(0.0178)
5-6 board members	-	-	-0.0438***	-	-	-0.0480**	-0.0130	-0.0415***
	-	-	(0.0084)	-	-	(0.0200)	(0.0155)	(0.0152)
Standard controls	no	yes	yes	no	yes	yes	yes	yes
Firm characteristics	no	no	yes	no	no	yes	yes	yes
p-value test "1 non-staff woman on the board"="more than 1 non-staff woman on the board"	0.3895	0.1970	0.0011	0.0000	0.0000	0.0000	0.1820	0.0000
R-squared	0.0016	0.0108	0.0334	0.0544	0.0631	0.0697	0.0140	0.1003
Firms	3,113	3,113	3,113	3,113	3,113	3,113	3,113	3,113
Observations	9,423	9,423	9,423	9,423	9,423	9,423	9,423	9,423

Note: In (1) - (6) the dependent variable is a dummy variable indicating whether the share of women on the board enlarges. In (7) and (8) the dependent variable is a dummy variable indicating whether the share of staff and non-staff women on the board enlarges, respectively. Whereas OLS estimates are reported in (1) - (3), (4) - (8) report within-firm (FE) estimates. Significance levels: ***1%, **5%, *10%.

Table 5: Main results - Pipeline hypothesis, Women

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
share_women_POP (t-1)	0.4379***	-0.2119	-0.1695	0.0085	-0.0995	-0.1052	-0.3305	-0.0409
	(0.1090)	(0.1728)	(0.1640)	(0.0984)	(0.1405)	(0.1398)	(0.2412)	(0.1413)
share of women with a university degree	-	-	-0.0201	-	-	-0.0226	0.0631	-0.0521
	-	-	(0.0665)	-	-	(0.0585)	(0.1018)	(0.0585)
share of women	-	-	0.2074***	-	-	0.1394***	0.3960***	0.0087
	-	-	(0.0189)	-	-	(0.0452)	(0.0888)	(0.0428)
≤4 board members	-	-	-0.0334***	-	-	-0.0048	-0.0149	-0.0062
	-	-	(0.0077)	-	-	(0.0097)	(0.0201)	(0.0087)
5-6 board members	-	-	-0.0199***	-	-	-0.0060	0.0171	-0.0139*
	-	-	(0.0065)	-	-	(0.0079)	(0.0182)	(0.0073)
Standard controls	no	yes	yes	no	yes	yes	yes	yes
Firm characteristics	no	no	yes	no	no	yes	yes	yes
R-squared	0.0055	0.0271	0.0960	0.0001	0.0095	0.0162	0.0188	0.0208
Firms	3,112	3,112	3,112	3,112	3,112	3,112	3,112	3,112
Observations	9,423	9,423	9,423	9,423	9,423	9,423	9,423	9,423
share_women_VP_CEO (t-1)	-0.0892	0.0861	-0.0281	0.1414	0.1764	0.1701	-0.0863	0.2263**
	(0.0764)	(0.1188)	(0.1174)	(0.0893)	(0.1129)	(0.1145)	(0.1748)	(0.1142)
share of women with a university degree	-	-	-0.0195	-	-	-0.0211	0.0661	-0.0510
	-	-	(0.0665)	-	-	(0.0586)	(0.1019)	(0.0584)
share of women	-	-	0.2075***	-	-	0.1394***	0.3969***	0.0085
	-	-	(0.0189)	-	-	(0.0451)	(0.0889)	(0.0428)
≤4 board members	-	-	-0.0336***	-	-	-0.0051	-0.0147	-0.0066
	-	-	(0.0077)	-	-	(0.0097)	(0.0201)	(0.0087)
5-6 board members	-	-	-0.0199***	-	-	-0.0061	0.0175	-0.0142
	-	-	(0.0065)	-	-	(0.0078)	(0.0181)	(0.0073)
Standard controls	no	yes	yes	no	yes	yes	yes	yes
Firm characteristics	no	no	yes	no	no	yes	yes	yes
R-squared	0.0004	0.0270	0.0959	0.0009	0.0100	0.0166	0.0184	0.0218
Firms	3,112	3,112	3,112	3,112	3,112	3,112	3,112	3,112
Observations	9,423	9,423	9,423	9,423	9,423	9,423	9,423	9,423

Note: In (1) - (6) the dependent variable is the share of women on the board. In (7) and (8) the dependent variable is the share of staff and non-staff women on the board, respectively. Whereas OLS estimates are reported in (1) - (3), (4) - (8) report within-firm (FE) estimates. Significance levels: ***1%, **5%, *10%.

Table 6: Main results - Pipeline hypothesis, Men

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
share_men_POP (t-1)	0.4379***	-0.2119	-0.1510	0.0085	-0.0995	-0.1061	-0.3367	-0.0399
	(0.1090)	(0.1728)	(0.1627)	(0.0984)	(0.1405)	(0.1400)	(0.2410)	(0.1414)
share of men with a university degree	-	-	0.0114	-	-	0.0009	0.0061	-0.0035
	-	-	(0.0112)	-	-	(0.0068)	(0.0114)	(0.0066)
share of men	-	-	0.2024***	-	-	0.1040**	0.3821***	-0.0133
	-	-	(0.0364)	-	-	(0.0513)	(0.0984)	(0.0493)
≤4 board members	-	-	0.0365***	-	-	0.0053	0.0163	0.0062
	-	-	(0.0076)	-	-	(0.0097)	(0.0202)	(0.0087)
5-6 board members	-	-	0.0212***	-	-	0.0061	-0.0167	0.0137*
	-	-	(0.0065)	-	-	(0.0078)	(0.0182)	(0.0072)
Standard controls	no	yes	yes	no	yes	yes	yes	yes
Firm characteristics	no	no	yes	no	no	yes	yes	yes
R-squared	0.0055	0.0271	0.0956	0.0001	0.0095	0.0166	0.0173	0.0226
Firms	3,112	3,112	3,112	3,112	3,112	3,112	3,112	3,112
Observations	9,423	9,423	9,423	9,423	9,423	9,423	9,423	9,423
share_men_VP_CEO (t-1)	-0.0892	0.0861	0.0106	0.1414	0.1764	0.1670	-0.0983	0.2294**
	(0.0764)	(0.1188)	(0.1165)	(0.0893)	(0.1129)	(0.1137)	(0.1750)	(0.1144)
share of men with a university degree	-	-	0.0115	-	-	0.0011	0.0062	-0.0033
	-	-	(0.0112)	-	-	(0.0068)	(0.0114)	(0.0066)
share of men	-	-	0.2026***	-	-	0.1043**	0.3825***	-0.0131
	-	-	(0.0364)	-	-	(0.0512)	(0.0984)	(0.0493)
≤4 board members	-	-	0.0366***	-	-	0.0056	0.0161	0.0066
	-	-	(0.0076)	-	-	(0.0097)	(0.0201)	(0.0086)
5-6 board members	-	-	0.0213***	-	-	0.0062	-0.0171	0.0140*
	-	-	(0.0065)	-	-	(0.0078)	(0.0182)	(0.0072)
Standard controls	no	yes	yes	no	yes	yes	yes	yes
Firm characteristics	no	no	yes	no	no	yes	yes	yes
R-squared	0.0004	0.0270	0.0956	0.0009	0.0100	0.0170	0.0170	0.0236
Firms	3,112	3,112	3,112	3,112	3,112	3,112	3,112	3,112
Observations	9,423	9,423	9,423	9,423	9,423	9,423	9,423	9,423

Note: In (1) - (6) the dependent variable is the share of men on the board. In (7) and (8) the dependent variable is the share of staff and non-staff women on the board, respectively. Whereas OLS estimates are reported in (1) - (3), (4) - (8) report within-firm (FE) estimates. Significance levels: ***1%, **5%, *10%.

Table 7: Endogeneity checks - Female-led hypothesis

Specification	(1)	(2)	(3)	(4)	(5)	(6)
female chairman	-0.1212***	-0.1676***	-0.1671***	-0.0987***	-0.0991***	-0.1004***
	(0.0323)	(0.0396)	(0.0393)	(0.0281)	(0.0322)	(0.0324)
female chairman (t-1)	0.0353	0.0717*	0.0694*	-	-	-
	(0.0266)	(0.0379)	(0.0373)	-	-	-
female chairman (t+1)	-	-	-	0.0171	0.0157	0.0135
	-	-	-	(0.0230)	(0.0226)	(0.0225)
Standard controls	no	yes	yes	no	yes	yes
Firm characteristics	no	no	yes	no	no	yes
R-squared	0.0108	0.0151	0.0211	0.0108	0.0151	0.0211
Firms	3,100	3,100	3,100	3,091	3,091	3,091
Observations	9,394	9,394	9,394	9,378	9,378	9,378

Note: The dependent variable is the share of non-staff women on the board, which does not include the chairman. All columns report within-firm (FE) estimates. Significance levels: ***1%, **5%, *10%.

Appendix

Table A1: Descriptive statistics, pooled sample

Sample	full		female chairman		1 non-staff woman on the board		above VP_CEO share (pipeline)	
	mean	st.dev.	mean	st.dev.	mean	st.dev.	mean	st.dev.
Firm board characteristics								
female chairman (dummy)	.0323	.1768	1	0	.0949	.2931	.0309	.1731
share of women on the board (all board members)	.1136	.1637	.3825	.1817	.2584	.1045	.1132	.1606
share of women among non-staff members on the board	.0918	.1620	.3875	.1779	.2593	.0951	.0883	.1573
token, 1 woman among non-staff members on the board (dummy)	.2170	.4122	.6376	.4811	1	0	.2128	.4093
Firm characteristics								
share of women, all employees	.3247	.2030	.4014	.2405	.3408	.2170	.3611	.1916
share of women with a university degree, among women	.0452	.0817	.0409	.0789	.0436	.0795	.0657	.1001
share of men with a university degree, among men	.7203	.2516	.6646	.2750	.6999	.2622	.7061	.2462
share of workers with a university degree	.0538	.0944	.0455	0832	.0503	.0917	.0813	.1185
$\leq$4 board members	.4468	.4972	.5577	.4971	.4753	.4995	.4197	.4935
5-6 board members	.3624	.4807	.2274	.4195	.3214	.4671	.3450	.4754
between 100 and 500 employees (dummy)	.4991	.5000	.4671	.4994	.4536	.4979	.5124	.4999
more than 500 employees (dummy)	.1210	.3261	.0426	.2022	.1049	.3065	.1337	.3403
listed on the stock market (dummy)	.0480	.2138	.0071	.0841	.0383	.1920	.0639	.2445
newly established (dummy)	.1440	.3511	.1865	.3899	.1377	.3447	.1547	.3616
importing (dummy)	.8557	.3515	.8046	.3969	.8419	.3649	.8762	.3293
exporting (dummy)	.7443	.4362	.6856	.4647	.7185	.4498	.7624	.4257
service sector (dummy)	.5273	.4993	.6039	.4895	.5498	.4976	.6669	.4713
Industry characteristics								
share_women_POP (share of women in pool of potentials within industry)	.0796	.0276	.0834	.0365	.0795	.0304	.0829	.0144
share_women_VP_CEO (share of female VPs or CEOs within industry)	.0804	.0375	.0768	.0446	.0797	.0396	.1099	.0246
Observations	17,437		563		3,783		8,378	

TableA2: Robustness checks - Female-led hypothesis

Sample	service industries	non-service industries	exporting firms	non-exporting firms	50≤employees<100	100≤employees<500	employees≥500	
female chairman	-0.0880***	-0.0879**	-0.1090***	-0.0491	-0.0839**	-0.1073***	-0.0647	
	(0.0273)	(0.0369)	(0.0289)	(0.0312)	(0.0381)	(0.0291)	(0.0778)	
Standard controls	yes	yes	yes	yes	yes	yes	yes	
Firm characteristics	yes	yes	yes	yes	yes	yes	yes	
R-squared	0.0190	0.0148	0.0183	0.0303	0.0271	0.0231	0.0420	
Firms	2,899	2,372	3,837	1,838	3,258	2,416	469	
Observations	9,114	8,235	12,904	4,445	6,595	8,664	2,090	
Sample	listed	non-listed	below median firm age	above median firm age	below median POP share	above median POP share	below median VDCEO share	above median VDCEO share
female chairman	0.0163	-0.0919***	-0.0653**	-0.1229***	-0.1137***	-0.0604**	-0.1053***	-0.0667**
	(0.1101)	(0.0222)	(0.0257)	(0.0324)	(0.0299)	(0.0300)	(0.0292)	(0.0315)
Standard controls	yes	yes	yes	yes	yes	yes	yes	yes
Firm characteristics	yes	yes	yes	yes	yes	yes	yes	yes
R-squared	0.0360	0.0131	0.0103	0.0236	0.0229	0.0149	0.0151	0.0176
Firms	181	5,014	3,168	2,469	3,446	3,328	3,052	3,204
Observations	837	16,512	8,847	8,502	9,049	8,300	9,071	8,278

Note: The dependent variable is the share of non-staff women on the board, which does not include the chairman. All columns report within-firm (FE) estimates. Significance levels: ***1%, **5%, *10%.

Table A3: Robustness checks - Tokenism hypothesis

Sample	service industries	non-service industries	exporting firms	non-exporting firms	50≤employees<100	100≤employees<500	employees≥500	
1 non-staff woman on the board (t-1)	-0.2204***	-0.1679***	-0.1926***	-0.2433***	-0.2551***	-0.1912***	-0.2390***	
	(0.0159)	(0.0128)	(0.0117)	(0.0259)	(0.0263)	(0.0132)	(0.0260)	
more than 1 non-staff woman on the board (t-1)	-0.4809***	-0.3428***	-0.4269***	-0.5267***	-0.4525***	-0.5135***	-0.3701***	
	(0.0285)	(0.0259)	(0.0224)	(0.0459)	(0.0405)	(0.0277)	(0.0485)	
Standard controls	yes	yes	yes	yes	yes	yes	yes	
Firm characteristics	yes	yes	yes	yes	yes	yes	yes	
p-value test "1 non-staff woman on the board"="more than 1 non-staff woman on the board"	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0060	
R-squared	0.1340	0.1298	0.1243	0.1617	0.2284	0.1343	0.1422	
Firms	1,723	1,447	2,402	983	1,414	1,786	392	
Observations	4,907	4,516	7,191	2,232	2,485	5,438	1,500	
Sample	listed	non-listed	below median firm age	above median firm age	below median POP share	above median POP share	below median VDCEO share	above median VDCEO share
1 non-staff woman on the board (t-1)	-0.2577***	-0.1894***	-0.2521***	-0.1728***	-0.2075***	-0.3049***	-0.1834***	-0.1916***
	(0.0384)	(0.0106)	(0.0165)	(0.0136)	(0.0151)	(0.0177)	(0.0131)	(0.0174)
More than1 non-staff woman on the board (t-1)	-0.2214***	-0.4354***	-0.4833***	-0.4155***	-0.4685***	-0.5812***	-0.3871***	-0.4526***
	(0.0776)	(0.0201)	(0.0322)	(0.0258)	(0.0290)	(0.0329)	(0.0242)	(0.0346)
Standard controls	yes	yes	yes	yes	yes	yes	yes	yes
Firm characteristics	yes	yes	yes	yes	yes	yes	yes	yes
p-value test "1 non-staff woman on the board"="more than 1 non-staff woman on the board"	0.6330	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-squared	0.1641	0.1258	0.1666	0.1091	0.1447	0.1871	0.1651	0.1090
Firms	517	2,993	1,752	1,623	2,001	1,946	1,823	1,996
Observations	143	8,906	4,456	4,967	5,000	4,423	4,813	4,610

Note: The dependent variable is a dummy variable indicating whether the share of non-staff women on the board enlarges. All columns report within-firm (FE) estimates. Significance levels: ***1%, **5%, *10%.

Table A4: Robustness checks - Pipeline hypothesis, Women

Sample	service industries	non-service industries	exporting firms	non-exporting firms	50≤employees<100	100≤employees<500	employees≥500	
share_women_VP_CEO (t-1)	0.1792	0.2752	0.1766	0.2126	0.4060	0.2651*	0.0638	
	(0.1473)	(0.1893)	(0.1366)	(0.1624)	(0.2852)	(0.1493)	(0.2477)	
Standard controls	yes	yes	yes	yes	yes	yes	yes	
Firm characteristics	yes	yes	yes	yes	yes	yes	yes	
R-squared	0.0296	0.0280	0.0248	0.0527	0.0642	0.0282	0.0505	
Firms	1,723	1,447	2,402	983	1,414	1,786	392	
Observations	4,907	4,516	7,191	2,232	2,485	5,438	1,500	
Sample	listed	non-listed	below median firm age	above median firm age	below median POP share	above median POP share	below median VDCEO share	above median VDCEO share
share_women_VP_CEO (t-1)	0.2263	0.2327*	0.1991	0.1802	0.3129*	0.2747	0.1152	0.2070
	(0.3611)	(0.1209)	(0.1448)	(0.1513)	(0.1836)	(0.1763)	(0.1802)	(0.1380)
Standard controls	yes	yes	yes	yes	yes	yes	yes	yes
Firm characteristics	yes	yes	yes	yes	yes	yes	yes	yes
R-squared	0.0877	0.0220	0.0413	0.0206	0.0263	0.0344	0.0325	0.0299
Firms	517	2,993	1,752	1,623	2,001	1,946	1,823	1,996
Observations	143	8,906	4,456	4,967	5,000	4,423	4,813	4,610

Note: The dependent variable is the share of non-staff women on the board. All columns report within-firm (FE) estimates. Significance levels: ***1%, **5%, *10%.

Table A5: Robustness checks - Pipeline hypothesis, Men

Sample	service industries	non-service industries	exporting firms	non-exporting firms	50≤employees<100	100≤employees<500	employees≥500	
share_men_VP_CEO (t-1)	0.1960	0.2617	0.1722	0.2734*	0.4189	0.2637*	0.0790	
	(0.1467)	(0.1891)	(0.1376)	(0.1638)	(0.2897)	(0.1491)	(0.2428)	
Standard controls	yes	yes	yes	yes	yes	yes	yes	
Firm characteristics	yes	yes	yes	yes	yes	yes	yes	
R-squared	0.0337	0.0307	0.0266	0.0537	0.0768	0.0292	0.0567	
Firms	1,723	1,447	2,402	983	1,414	1,786	392	
Observations	4,907	4,516	7,191	2,232	2,485	5,438	1,500	
Sample	listed	non-listed	below median firm age	above median firm age	below median POP share	above median POP share	below median VDCEO share	above median VDCEO share
share_men_VP_CEO (t-1)	0.3003	0.2358*	0.2177	0.1720	0.3523**	0.2867	0.2394*	0.0862
	(0.3790)	(0.1207)	(0.1469)	(0.1517)	(0.1800)	(0.1963)	(0.1361)	(0.1964)
Standard controls	yes	yes	yes	yes	yes	yes	yes	yes
Firm characteristics	yes	yes	yes	yes	yes	yes	yes	yes
R-squared	0.1085	0.0239	0.0436	0.0234	0.0343	0.0302	0.0285	0.0352
Firms	517	2,993	1,752	1,623	2,001	1,946	1,823	1,996
Observations	143	8,906	4,456	4,967	5,000	4,423	4,813	4,610

Note: The dependent variable is the share of non-staff men on the board. All columns report within-firm (FE) estimates. Significance levels: ***1%, **5%, *10%.