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Paper title: Gender Diversity and Say-on-Pay: Evidence from UK

Remuneration Committees

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ABSTRACT

Manuscript type: Empirical

Research question/issue: We examine whether the presence of women on the remuneration committee has an influence on say-on-pay voting.

Research findings/insights: Based on panel data from the UK's FTSE 350 firms from 2003 to 2015, we find that firms with women on the remuneration committee reduce shareholders' dissent via say-on-pay. However, only firms with a critical mass of more than 30% women on this committee are more likely to have less shareholders' dissent via say-on-pay (i.e. the presence of 30% women or less on this committee is not sufficient).

Theoretical/academic implications: Our results provide empirical evidence that the gender diversity of directors on the remuneration committee plays a significant role in shaping shareholders' dissent via say-on-pay in the UK. Our results also provide empirical support for some of the previous studies that draw on critical mass theory that imply that women are more effective monitors when they make up a critical mass of more than 30%.

Practitioner/policy implications: Our results could provide regulators with evidence in favour of improving women's representation on UK remuneration committees. In addition, our results could help shareholders and nomination committee members understand the importance of having women on UK remuneration committees, as they are more likely to avoid suboptimal pay and align directors' remuneration packages more closely with shareholders' expectations. Finally, our results could also attract the attention of main stakeholders and the media, especially given their increasing attention both to gender diversity and say on pay.

INTRODUCTION

Gender diversity on boards has gained tremendous attention from policymakers, institutional investors and academics. Policymakers believe that women are under-represented on corporate boards (Adams, 2016; Adams et al., 2015; Terjesen, Aguilera & Lorenz, 2015) and that women are facing many challenges hindering them to access corporate boards (Gabaldon et al., 2016). Therefore, they have issued regulations to improve female representation on corporate boards (Terjesen, Aguilera & Lorenz, 2015). Some of these regulations have been in the form of mandatory quotas (for example, in Norway and France), and others in the form of soft recommendations (for example, in the United Kingdom (UK) and the United States (US)). Additionally, in the 1990s some institutional investors already promoted the idea of having more women on corporate boards, but several institutional investors have recently increased their actions targeting firms whose boards have little gender diversity (Marquardt & Wiedman, 2015) with the aim of enhancing their female representation on corporate boards (Kumar & Zattoni, 2016). Women's representation in the boardroom has seen some improvement in recent years. However, previous empirical studies about the economic benefits of board gender diversity on firm outcomes (including firm performance) are still limited or their results are unclear, and so scholars have called for more studies to better understand this area (see for example Kirsch, 2017; Sila, Gonzalez & Hagendorff, 2016). Coherently, Kumar and Zattoni (2016) stated, 'more research is needed to better understand the characteristics of female directors, the interests they represent, the contribution they provide to board and to firm performance, and so on'. This paper contributes to this debate by investigating whether gender diversity on the remuneration committee is associated with greater shareholder satisfaction via say-on-pay voting.

Recent financial crises and scandals have created public anger and unrest regarding remuneration packages which have led to calls for the reform of remuneration policies. The

UK was the first country to introduce a mandatory non-binding shareholder vote on the remuneration package in late 2002 (Stathopoulos & Voulgaris, 2015). This voting approach is known as the 'say-on-pay', a tool which can be used by shareholders to express dissent about the recommendations made in remuneration reports (Mallin, 2016; Mangan & Magnan, 2012). Since then, many research studies have investigated the antecedents and the consequences of say-on-pay voting (for recent reviews see Stathopoulos & Voulgaris, 2015 and Obermann & Velte, 2018). Among some of these antecedents that most affect shareholder dissent via say-on-pay voting are higher CEO remuneration, firm performance and firm size, and weak boardroom governance (Alissa, 2015; Conyon, 2016; Conyon & Sadler, 2010; Ferri & Maber, 2013; Gregory-Smith & Wright, 2014).

In this paper, we focus on the effect of women on the remuneration committee as previous studies have shown women are more likely to be effective monitors (Adams & Ferreira, 2009; Carter, Simkins & Simpson, 2003), more ethical (Cumming, Leung & Rui, 2015) and more likely to reduce information asymmetry (Abad et al., 2017; Srinidhi, Gul & Tsui, 2011). In addition, there are presently limited studies on the effect of women on the remuneration committee (Kirsch, 2017; Obermann & Velte, 2018). Coherently, scholars have called for additional studies on the role of women on the remuneration committee and then on executive remuneration, including CEO pay with the aim to understand if they help to avoid suboptimal pay, and hence reduce shareholders' dissent (Kirsch, 2017; Filatotchev & Wright, 2017; Strobl, Rama & Mishra, 2016). In particular, we build on agency and critical mass theories with the aim to study if the presence of women or only of a critical mass of more than 30% women on the remuneration committee are more likely to decrease shareholder dissent voting on executive remuneration arrangements proposed by the management (i.e. say-on-pay). We believe that this research question is important both with respect to theorizing but also with respect to the measures used in analyses on say on pay.

We focus on the role of say on pay as a mechanism that aims to reduce agency problems and to promote the efficiency of corporate governance by providing an additional tool for shareholders' interventions in firms' governance via the "voice" channel rather than the "exit" channel (Hillman et al., 2011; Mangen & Magnan, 2012; Stathopoulos & Voulgaris, 2015). Amongst the various corporate governance mechanisms that institutional investors may choose to utilise to engage with their investee companies, voting is considered the least costly for shareholders (Goranova & Ryan, 2014). Moreover, voting gives the shareholders a means of conveying their disapproval on the proposed executive remuneration by voting against or abstaining (Goranova & Ryan, 2014). Whilst previous studies tend to show that shareholders vote with incumbent management (Armstrong, Gow & Larcker, 2013; Conyon & Sadler, 2010; Del Guercio & Hawkins, 1999, Listokin, 2010; Smith, 1996), in contrast to this a recent study by Sauerwald, Van Oosterhout & Van Essen, (2016) argues that shareholders' dissent can be viewed as an effective corporate governance mechanism even though it may not affect the voting outcome directly. According to some studies, shareholders are publicly making known their views with their dissent voting indicating that they are not satisfied with the present management and thereby leading to a negative evaluation of firm's corporate governance (Hillman et al., 2011; Sauerwald, Van Oosterhout & Van Essen, 2016). Coherently, previous studies identify several negative effects of dissenting shareholders on firm outcomes such as the decrease of firm value, the replacement of the CEO and of other board members and even the takeover of the firm in the long-term (for recent reviews see Goranova & Ryan, 2014 and Obermann & Velte, 2018).

To avoid such negative consequences, previous studies on say-on-pay show, for example, that companies significantly change their remuneration practices to adhere to better corporate governance standards when criticized by their active shareholders via say-on-pay (Ferri & Malber, 2013). At the same time, previous studies show that boards do not appear to respond

to shareholder dissatisfaction systematically; however, they do respond selectively and swiftly (Alissa, 2015). Furthermore, previous studies identify not only outcomes at firm level but also several other outcomes that dissenting shareholders generate at investor and environmental level (for recent reviews see Goranova & Ryan, 2014 and Obermann & Velte, 2018).

None of these previous studies has investigated the associations between gender diversity and say-on-pay voting. Following a few previous studies (Daily et al., 1998; Conyon & Peck, 1998), we focus on the characteristics of the remuneration (compensation) committee, as it makes the vast majority of decisions related to executive remuneration. First, we build on agency theory to posit that the greater the presence of women on the remuneration committee, the lower the proportion of shareholder dissent votes via say-on-pay. However, several studies on board diversity failed to show unanimously a clear positive effect of women on firm outcomes and thus highlight the need for additional studies on this topic (for a recent review see Kirsch, 2017). Among the possible explanations that might help to explain why, scholars draw on critical mass theory (Kanter, 1977) by arguing that this relationship may not be linear as a result of tokenism issues (i.e. the presence of women is normalized only if women make up a critical mass). In our paper, we build on the critical mass theory and add to the literature by arguing that only firms with a critical mass of more than 30% women directors sitting on their remuneration committees are more likely to have less shareholders' dissent votes via say-on-pay.

We use a large sample of the UK's FTSE 350 non-financial firms between 2003 and 2015 to test our two hypotheses which our results support. The first hypothesis aims to test whether the presence of women on the remuneration committee reduces shareholders' dissent via say-on-pay and the second hypothesis aims to study whether only firms with a critical mass of more than 30% women on the remuneration committee are more likely to have less

shareholders' dissent via say-on-pay. Our results also hold after controlling for endogeneity concerns (Antonakis et al., 2014; Wintoki, Linck & Netter, 2012).

Overall, the paper aims to contribute both to the stream of literature on women on boards and key sub-committees and to the stream of literature on shareholder dissent voting via say-on-pay as it provides new insights into the role of women on the remuneration committee, and to their impact on shareholder dissent votes. The rest of the paper is organised as follows: Section 2 discusses the institutional background. Section 3 outlines the theoretical background and hypotheses development, Section 4 explains the data and methods, Section 5 reports the results of the study, Sections 6 and 7 provide a discussion and conclusions respectively.

INSTITUTIONAL BACKGROUND

In recent years two high profile areas of corporate governance are executive remuneration and board diversity, specifically the use of say-on-pay in the former and gender diversity in the latter. This paper brings together these two aspects with the UK having led developments in both these areas. On the one hand, the UK follows a self-regulatory (soft-law) corporate governance enforcement (comply or explain approach). In 2002, the UK was the first country to introduce legislation requiring all UK quoted companies to grant their shareholders an advisory and non-binding vote on executive remuneration (known as the say-on-pay). After concerns emerged that an advisory shareholder vote on the remuneration report was not enough, the UK Department of Business, Energy and Industrial Strategy (BEIS, 2013) recommended that remuneration policy should be subject to a binding shareholder vote and should state the directors' projected remuneration for the coming three years.

On the other hand, after many concerns about the slow progress of gender diversity in the UK's publicly listed firms, the UK government assigned Lord Davies of Abersoch to commence an independent review (Davies Report, 2011) of the current number and position

of female directors on UK corporate boards. Specifically, the aim of the review was to identify obstacles that prevented women from reaching the boardroom and make recommendations for the government and FTSE 350 firms about what they should do to increase female representation in boardrooms (Davies Report, 2011).

The Davies Report (2011) recommended that FTSE 100 firms should achieve at least 25% female representation on their boards by 2015. Subsequent Davies Reports (2012, 2013, 2014 and 2015) reviewed the progress of implementing the Davies Report (2011) recommendations regarding female representation on UK corporate boards. For example, the Davies Report (2015) showed that FTSE 100 boards were 'well on (the) way to achieving the 25% target' by the end of 2015, and more specifically, FTSE 100 boards achieved 23.5% female representation in 2015. In addition, it showed that women on UK boards are experienced but are not over-committed and recruitment consultants are widely used by nomination committees in the UK in order to help with the recruitment of women with a good profile over time. More recently, the Hampton-Alexander Review (2016) was a continuation of the previous work of the Davies Reports to enhance the role of women in UK boardrooms. One of its recommendations was that all FTSE 100 companies should aim to have at least 33% female representation on their boards by 2020, including their executive teams. Regarding the evolution of the appointment of women on UK boards, a recent study on gender diversity on European boards (EWOB, 2016) - that examines the participation of women directors on the boards and key sub-committees at STOXX 600 companies over the period spanning 2011-2015 - shows that the level of women board memberships on UK boards increased over time but it is still below the European average. However, the UK has seen the greatest improvement in terms of reducing all-male boards. In addition, the percentage of women on audit and remuneration committees rank above the respective

European averages. Finally, the disclosure about the appointment of new directors is very good in the UK compared to other EU countries.

THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

The board of directors plays a critical role in mitigating agency problems (Fama & Jensen, 1983; Jensen & Meckling, 1976). Agency theory has been used frequently, alone or in combination with other theories, by scholars to investigate whether women directors help boards and sub-committees in monitoring the managers of the firm (see for example Adams & Ferreira, 2009; Carter, Simkins & Simpson, 2003; for recent reviews see Kirsch, 2017 and Terjesen, Sealy & Singh, 2009).

A large literature supports the co-existence of the "nature" and "nurture" perspectives and argues that these two perspectives are complementary when it comes to explaining differences and similarities between women and men (for a recent review see Eagly & Wood, 2013). In addition, a recent study by Ryan (2017, p. 771) finds that "distinctions between the sexes that may have previously been presumed to be due to "nurture" may now also be demonstrably related to "nature". Coherently, a common view among scholars is that women and men are both natured and nurtured differently throughout their lives (Ashcraft, 2005; Ely & Padavic, 2007; Eagly & Wood, 2013; Zanoni et al., 2009). In particular, the "nature" perspective refers to innate biological structures and processes (biology explains all gender differences), whereas the "nurture" perspective refers to sociocultural influences (women and men are socialized in distinct ways) (Eagly & Wood, 2013). From the "nature" perspective, scholars argue that women and men behave differently as, for example, their brain structure and hormones that activate behaviours are different (Wood & Eagly, 2012). While from the "nurture" perspective, scholars argue that women and men behave differently as cultural differences (for example via unconscious biases, norms and stereotypes) and socialization (for example via parental socialization, peer group, teachers, and children's social context)

affect the behaviour of women and men during their life differently (see Ashcraft, 2005; Ely & Padavic, 2007; Eagly & Wood, 2013; Zanoni et al., 2009). In this vein, previous studies show that women and men are socialized in distinct ways, starting in early childhood (for example, boys and girls grow up seeing a world populated by male political and business leaders, which tells these children something about who they can and cannot be, as well as who they should and should not be). Moreover, women are surrounded by adults, notably teachers and parents, who are biased against their intellectual abilities (Gunderson et al. 2012; Lavy & Sand 2018; Riegle-Crumb & Humphries 2012). A large literature in organizational studies points out how socialization continues in adulthood, as organizations deal differently with women and men in a number of ways (Ashcraft 2005; Zanoni et al. 2009; Ely & Padavic 2007). To sum up, both nature and nurture stories offer understandings of gender and organizations that complement one another (Eagly & Wood, 2013). Given that a common view is that women and men are different, the appointment of women directors should make the composition of boards more diverse, which is thought to affect board effectiveness, and by extension, firm outcomes. Research in corporate governance argues that women directors improve monitoring for several reasons (for recent reviews see Kirsch, 2017, Terjesen, Aguilera & Lorenz, 2015 and Terjesen, Sealy & Singh, 2009). For example, women on boards are more likely than male directors to be independent directors and are thus more effective monitors (Adams, 2016; Adams & Ferreira, 2009; Carter, Simkins & Simpson, 2003).

First, it has been argued that women are more independent as they are not beholden to a group think mentality that might accompany an old-boys-network (Adams, 2016). Second, women are more diligent than men that help to improve monitoring (Kirsch, 2017). In particular, several papers show that women are more ethical, risk-adverse, more prepared and long-term oriented than men (Cumming, Leung & Rui, 2015; Franke, Crown & Spake, 1997;

Pan & Sparks, 2012). For example, Pan and Sparks (2012) contend that women directors are firmer than male directors when it comes to implementing moral standards on the board. Furthermore, women directors are more likely to consider dubious business transactions unethical (Franke, Crown & Spake, 1997). Cumming, Leung & Rui (2015) also find that women directors are less likely to commit fraud. Women directors are also stronger when it comes to implementing their fiduciary duties (Post & Byron, 2015).

Additionally, women directors have been found to come to meetings better prepared than their male counterparts (Huse & Solberg, 2006). Moreover, women usually spend more time considering decisions than men and this might help to reduce negative consequences for multiple stakeholders (Hillman, 2015). Here the main assumption is that women use both sides of their brain when making decisions, suggesting that decisions made by women entail a broader consideration of implications for multiple stakeholders (Eagly, Wood & Diekmann, 2000; Tavris, 1993). Men use only one side, and this is the reason why the decision making by men may be quicker, but it may be also more singularly focussed (Tavris, 1993). Third, several papers argue that the presence of women offers diversity of opinion that changes the boardroom dynamics (Adams & Ferreira, 2009; Carter, Simkins & Simpson, 2003). Gender diverse-boards also tend to produce good-quality decisions due to their different cognitive frames (Hillman, 2015; Post & Byron, 2015).

Furthermore, a few recent studies show that women can increase the effectiveness of board sub-committees. Among them, Srinidhi, Gul & Tsui (2011) find that firms with more women on audit committees exhibit higher earnings quality which increases investor confidence in firms' financial statements. Similarly, Thiruvadi & Huang (2011) reveal that the presence of women on audit committees helps their firms to lower discretionary accruals.

Given that both the nature and nurture perspectives provide evidence in support of the existence of gender differences and that previous studies show that the presence of women

on board and key sub-committees increases monitoring, we assume that firms with more women on remuneration committees will be more likely to have less shareholders' dissent via say-on-pay.

Shareholders' dissent on say-on-pay is usually measured as the total number of shareholders' against votes on the remuneration report divided by the total number of votes cast (Conyon & Sadler, 2010). In particular, say on pay votes offer shareholders an opportunity to provide positive or negative feedback directed to executive directors about the appropriateness of their remuneration arrangements (Conyon, 2016; Mallin, 2016). Among the reasons for voting against the remuneration report, there might be concerns about remuneration arrangements (such as over generous arrangements, poor performance linkage, undue ratcheting up of pay, pay arrangements being focussed too much on the short term, multiple application of the same performance target, concerns about various components of remuneration, including inappropriate discretionary payments, generous pension arrangements, too much vesting at threshold or median performance) and concerns about the level of disclosure in the AGM notice about remuneration reports (such as poor disclosure and the lack of retrospective disclosure on bonus awards).

Shareholders' dissent on the remuneration report is usually considered a relatively "low-cost" opportunity for shareholders to provide negative feedback on executive remuneration to directors on a regular basis. Negative feedback is a signal of weak corporate governance in a firm and suboptimal pay (Conyon, 2016, Mangen & Magnan, 2012) and can be associated with several negative consequences, including negative abnormal returns, that decrease shareholder value (Obermann & Velte, 2018). More recently, scholars argue that CEO power, boardroom information problems (including groupthink and a status quo preference due to boardroom homogeneity) and conflicts of interest between stakeholders and influential shareholders in pay setting can lead to suboptimal pay and increase executive pay problems.

In this vein, “say on pay may not only fail to remedy suboptimal pay but also legitimize it” (Mangen & Magnan, 2012, p.1).

Consistent with this view, prior research has shown that boardroom gender diversity can help to mitigate these concerns. On the one hand, previous studies show that gender diversity on boards has a positive relationship with the proportion of executive directors’ remuneration linked to company performance such as equity-based pay (Adams & Ferreira, 2009, Lucas-Pérez et al, 2015) and that women on remuneration committees decrease the chances of extremely high executive remuneration, lead to lower CEO pay and reduce excess CEO remuneration (Bugejia, Matolcsy & Spiropoulos, 2015 and Usman et al., 2018). On the other hand, previous studies show that a negative relation exists between disclosure quality and information asymmetry (Brown & Hillegeist, 2007; Heflin, Shaw & Wild, 2005) and that women on boards reduce information asymmetry by increasing the quantity and quality of information (Abad et al., 2017; Nalikka, 2009; Srinidhi, Gul & Tsui , 2011), by promoting more effective board communications to investors (Joy, 2008) and by engaging in activities that reduce information asymmetry (Upadhyay & Zeng, 2014). In addition, previous studies show that firms with more women on boards encourage more effective communication between the board and its stakeholders (Terjesen, Sealy & Singh, 2009) and that women directors are better listeners than male directors, more likely to raise tough questions on remuneration matters and more willing ‘to put someone’s welfare before their own’ (Konrad, Kramer & Erkut, 2008).

Therefore, we posit that if an increase in the presence of women on remuneration committees encourages more effective monitoring and decreases concerns about executive remuneration arrangements, for example both by increasing the proportion of executive directors’ remuneration linked to company performance and by reducing excess CEO remuneration, and reducing information asymmetry by increasing the level of disclosure and board

communications to investors, then shareholders are then more likely to be satisfied with the remuneration reports and hence there will be less shareholder dissent and they are more likely to vote in favour of remuneration reports via say-on-pay.

Hypothesis 1. An increase in the presence of women on the remuneration committee is associated with a reduction in the proportion of shareholder dissent votes via say-on-pay.

Several studies on board diversity based on the critical mass theory contend that, until women or men in a group reach a certain threshold, they are more likely to be marginalised (Joecks, Pull & Vetter, 2013; Kanter, 1977; Konrad, Kramer & Erkut, 2008; Torchia, Calabrò & Huse, 2011). Kanter (1977) first developed the critical mass theory. She argued that women or men minorities within a large, more dominating group tend to be marginalised or seen as tokens.

Due to their lower numbers, minorities begin to seem untrustworthy to the larger, more dominating group which, in turn, reduces their power in decision making as the focus of the group members is only on the different genders and stereotyping (Kanter, 1977). However, this tokenism perception towards minorities diminishes when the number of minorities grows to a certain threshold (i.e. critical mass).

At this point, the minorities are no longer seen as tokens, more trust is gained, and their influence on decision making and firm's outcomes increases as the focus of the group members is not on the different genders and stereotyping but now on the different skills and abilities that women carry in the group (Konrad, Kramer & Erkut, 2008; Liu, Wei & Xie, 2014). According to Kanter (1977), a critical mass of women consists of 20-40% women. In the context of a corporation's governance, a number of recent studies show that only a critical mass of more than 30% women directors on boards that translates into an absolute value of about three women on boards increases firm outcomes (Ahmed et al, 2017; Dahlerup, 2006 & 1988; Joecks, Pull & Vetter, 2013; Liu, Wei & Xie, 2014; Torchia, Calabrò & Huse, 2011).

Coherently, we posit that only a critical mass of more than 30% women directors on the remuneration committee may have an impact on say-on-pay dissent voting.

If the presence of 30% women directors or less on the remuneration committee largely dominated by male directors may have no impact on say-on-pay dissent voting, we argue that only when a critical mass of more than 30% women directors sit on the remuneration committee, women may have more influence in decision making as they are not seen as tokens or nor their views ignored by the male dominated group. Therefore, the combination of female and male attributes will more likely increase group discussion, reduce information asymmetry and will increase the performance of the remuneration committee. Coherently, the more acceptable to shareholders the remuneration policy and then the lower the shareholders' dissent votes via say-on-pay. Therefore, we posit the following:

Hypothesis 2. The presence of women forming a critical mass of more than 30% on the remuneration committee is associated with a reduction in the proportion of shareholder dissent votes via say-on-pay.

DATA AND METHODS

Data

This paper uses unbalanced panel data from the UK's FTSE 350¹ non-financial firms² over the period spanning from 2003–2015. After excluding financial firms and firms with missing voting data, our final sample comprised 2,935 firm-year observations. Data on shareholder voting on executive remuneration were obtained from Manifest Information Services Ltd. Data on remuneration committee characteristics (such as the number of women, the size of the remuneration committee and the proportion of independent non-executive directors), CEO remuneration, board size and other board characteristics were collected from the BoardEx database. Institutional ownership data were obtained from the Thomson Reuters

Eikon database, whilst financial data (such as total sales, return on assets and stock returns) came from the Thomson Reuters Datastream.

Model

We use the following panel data model to investigate the impact of the presence of women on remuneration committees on shareholders' dissent via say-on-pay.

$$Dissent_{it} = \alpha + \beta_1 women_{it} + \beta_{2-17} Controls_{it} + \epsilon_{it} \quad (1)$$

The dependent variable in model (1) is the say-on-pay dissent voting (*Dissent*), which is measured as the total number of shareholders' against votes on the remuneration report divided by the total number of votes cast (Conyon & Sadler, 2010). Following Conyon (2016), we performed a logistic transformation to *Dissent* in the above model and then estimate using OLS. The OLS estimator alone, without performing the logistic transformation to *Dissent*, is inappropriate, as it predicts probabilities outside the range of zero to one (Greene, 2012). Thus, we transfer *Dissent* in our model to: $Logit\ Dissent_{it} =$

$\ln\left(\frac{Dissent_{it}}{1-Dissent_{it}}\right)$. An alternative way to overcome the aforementioned problem is to use the logistic model of the generalised linear model. Therefore, we created another measure for the shareholder dissent vote following Gregory-Smith, Thompson & Wright (2014) and used a cut-off of 10% dissent. Therefore, we define *Dissent* in the above model as an indicator variable of 1 if the dissent voting is greater than 10% ($Dissent > 10\%$), 0 otherwise.

The main independent variables in our model are about the ratio of women directors on remuneration committees. *Women* are measured as the total number of women directors on the remuneration committee divided by the remuneration committee's size. In addition, we build on Kanter (1977) and a number of recent studies on women on boards that show that only a critical mass of more than 30% women directors on boards increases firm outcomes (Ahmed et al, 2017; Dahlerup, 2006 & 1988; Joecks, Pull & Vetter, 2013; Liu, Wei & Xie, 2014; Torchia, Calabrò & Huse, 2011). Coherently, we generated several dummies to study

the impact of the critical mass of more than 30% women on the remuneration committee.

Hence, $Women_{\leq 20\%}$ is an indicator variable of 1 if the remuneration committee has at least

one woman up to 20% women, 0 otherwise. $20\% < Women_{\leq 30\%}$ is an indicator variable of 1

if a remuneration committee has a proportion of women in the remuneration committee that is

more than 20% up to 30%, 0 otherwise. $Women_{> 30\%}$ is an indicator variable of 1 if the

proportion of women on the remuneration committee is more than 30%, 0 otherwise.

Additionally, our model uses a set of control variables, including CEO remuneration,

corporate board and remuneration committee characteristics and firm characteristics. *Log*

CEO pay is defined as a natural log of the total CEO remuneration, which is the sum of cash

remuneration and equity-linked pay. As for remuneration committee characteristics, *woman*

as remuneration committee chairperson is measured as an indicator of 1 if a woman is the

chair of the remuneration committee, 0 otherwise. *Remuneration committee size* is defined as

the total number of directors on the remuneration committee. *Remuneration committee*

independence is calculated by the proportion of independent non-executive directors on the

remuneration committee.

Corporate board controls include women on boards, board size, board independence and CEO

duality and CEO tenure. *Women on boards* are the proportion of women from the total board

size. *Board size* is measured by the total number of directors on the board, and *board*

independence is measured as the proportion of independent non-executive directors on the

board. *CEO duality* is measured by an indicator variable of 1 if the CEO is both the CEO and

Chair of the firm, 0 otherwise. *Log CEO tenure* is the natural logarithm of the number of

years a CEO has served on the board. These corporate governance controls have been widely

used by previous studies (Alissa, 2015; Conyon & Sadler, 2010; Ferri & Maber, 2013).

Firm characteristic controls include firm size, firm performance and institutional ownership.

We have included a natural log of the firms' total sales as a proxy for *firm size* (Alissa, 2015;

Conyon, 2016; Ferri & Maber, 2013; Gregory-Smith, Thompson & Wright, 2014).

Additionally, we have included two financial performance measures: one is an accounting measure of the *return on assets (ROA)*, and the other is a market measure of the *stock return* (stock appreciation plus dividends). These two measures have been widely used by some prior studies (Alissa, 2015; Carter & Zamora, 2009; Conyon & Sadler, 2010; Ferri & Maber, 2013). Additionally, we include *market-to-book value (MBV)* to control for future expected financial performance (Sauerwald, Van Oosterhout & Van Essen, 2016). The MBV is measured as the average equity market value divided by the total book value of equity. Institutional ownership is measured as the percentage of shares held by institutional investors holding more than 3% of the firm's equity (Alissa, 2015; Conyon, 2016; Ferri & Maber, 2013).

We also use leverage and price volatility to control for firms' risk (Conyon & Sadler, 2010; Ferri & Maber, 2013). *Leverage* is defined as total debts divided by total assets, and the *price volatility* is measured as a share's average annual price movement to a high and low from a mean price for each year. Moreover, we account for specific time events during the study period, including *post-2007* (to control for the impact of the financial crisis), *post-2010* (to control for the impact of the UK Stewardship Code), *post-2011* (to control for the impact of the UK Davies Report) and *post-2013* (to control for the impact of the UK say-on-pay mandatory and binding voting). Finally, our regression model contains another two control dummy variables: year and industry.

RESULTS

Descriptive Statistics

Table 1 shows the overall summary of the patterns of the main variables of the FTSE 350 non-financial firms from 2003 to 2015 (2,935 firm-year observations) by year and industry.

Appendix A presents frequency/additional data for key variables - over 38% of our sample firms have no women on the board whilst over half have no women on the remuneration committee. The majority (74.81%) of remuneration committees have four or fewer members in total. Descriptive statistics and Pearson's correlation matrix are provided in Tables 2 and 3.

Table 1 shows the summary by year and indicates that the level of shareholders' dissent on the remuneration report continued to be low over the sample period. In particular, about 5.77% of investors tended to vote against the remuneration reports over the sample period. This is consistent with previous studies in the UK, such as those of Alissa (2015) and Conyon & Sadler (2010). Moreover, 16.6% of firms received more than 10% shareholders' dissent on the remuneration report via say-on-pay voting during the sample period. The dissent level was slightly higher than average in 2003, but it went down to a level below 5% until 2007. Again, in 2008, the dissent level showed an apparent increase until 2015. In terms of remuneration committee and board characteristics, women directors represented 14.9% of the total number of directors on the remuneration committee, whereas at the board level, women directors had a mean of 10.4% for the entire period.

Regarding the proportion of women on the remuneration committees, firms without any woman account for 51.47% of the total sample, firms with at least 1 woman but no more than 20 % women account for 2.59% of the total sample, firms with a proportion of women more than 20% up to 30% account for 34.59% of the total sample, whereas firms with more than 30% women account for 11.35%. The remuneration committee size is around four members, whereas the board size is about nine members. The average percentage of independent non-executive directors on the board and the remuneration committee is about 56% and 94%, respectively. Additionally, 13% of the firms tend to combine the posts of CEO and Chair. The total average CEO pay is approximately £2.557 million. The presence of women on the

board and the remuneration committee saw a steady increase until 2011 and a sharp increase from 2012 until 2015. In addition, Table 1 reports the overall summary of the patterns of the main variables across different industries. The oil and gas industry has the highest percentage of shareholders' dissent votes on executive remuneration, whereas the utility industries have the lowest percentage of dissent votes. Female directors are more concentrated in the utilities industries.

Table 2 shows the difference between firms with low shareholder dissent voting and firms with high shareholder dissent voting. Firms with low dissent voting tend to have more women on their remuneration committees, more institutional ownership, lower CEO pay, a smaller board size and less CEO duality. Table 3 shows the correlation matrix that indicates no severe multicollinearity problems. We also compute the variance inflation factors (VIFs) of independent variables for each regression; all values are below a recommended threshold value of five. Overall, multicollinearity is not a problem in our analyses.

Regression Results

Table 4 contains the results for the regression explaining the shareholders' dissent via say-on-pay voting.

Our results show that there is a significant negative relationship between the presence of women on the remuneration committee and say-on-pay dissent voting for both the OLS model where we use the '*log dissent*' ($\beta = -0.668$, $t = -2.62$) and the logit model where we use the '*dissent > 10*' ($\beta = -1.275$, $t = -2.66$). Consistent with results from previous studies (Alissa, 2015; Carter & Zamora, 2009; Conyon & Sadler, 2010; Ferri & Maber, 2013; Gregory-Smith, Thompson & Wright, 2014), our results show that shareholders' dissent is significantly higher in firms with higher CEO remuneration. Therefore, Hypothesis 1 is supported, which backs our assumption that the presence of women directors on the remuneration committee aligns the executives' remuneration with shareholders' interests.

Hence, shareholders are more likely to be satisfied. In Models (3-4), instead of year dummies, we control for different time events captured during the study period, including the financial crisis (2007), the Stewardship Code (2010), the Davies Report (2011) and the say-on-pay mandatory and binding voting (2013). The results remain unchanged.

Regarding control variables, we find that institutional ownership, board size and remuneration committee size have mixed results in relation to dissent votes. CEO duality is positively associated with a higher number of shareholders' dissent votes. Previous studies such as Conyon (2016) and Sauerwald, Van Oosterhout & Van Essen (2016) have shown that CEO duality leads to more shareholders' dissent. In addition, the log of net sales has mixed results with shareholders' dissent votes. Firm performance (as measured by ROA) has a marginal significant negative relationship with higher dissent votes under the logit model, but not under the OLS model. Firm risk (as measured by price volatility) is positively associated with higher dissent votes.

We further investigate whether only firms with a critical mass of more than 30% women on the remuneration committee are more likely to have less shareholders' dissent (Hypothesis 2).

We differentiate between firms that have at least one woman up to 20% women, firms with a proportion of women more than 20% up to 30% and firms that have more than 30% women on their remuneration committees (see Table 5 for a summary of the results). Models (1-2) of Table 5 show that only firms with a critical mass of more than 30% women on their remuneration committees have a significant relationship with shareholders' dissent for both '*log dissent*' and '*dissent > 10*' ($\beta = -0.468$, $t = -3.43$ and $\beta = -0.803$, $t = -3.02$, respectively). Thus, Hypothesis 2 is supported, which backs the view that low representation of women on the remuneration committee largely dominated by male directors have no impact on say-on-pay dissent voting, as they might be not trusted, may be marginalised or seen as a token. To sum up, our results show that only firms with a critical mass of more than 30% women on

their remuneration committee are more likely to improve remuneration policy and to reduce shareholders' dissent via say-on-pay.

Endogeneity Our main hypothesis is that women may be seen as effective monitors as they improve remuneration arrangements and decrease information asymmetry, and thereby, shareholders are more likely to be satisfied with remuneration reports if women are present on remuneration committees. While our results so far support this hypothesis, one could argue that the jump from causation to causality is premature and that the interpretation of our results suffers from endogeneity concerns, including unobserved heterogeneity (time-varying unobservable effects either due to omitted variables such as shareholders' engagement behind the scenes or macro-level shocks), simultaneity and selection bias (Antonakis et al., 2014; Cameron & Trivedi, 2005). An alternative explanation can account for the results (i.e. the "good governance" story): firms with better governance and fewer agency problems are more likely to appoint women to their remuneration committees, and, at the same time, are also more likely to design compensation plans that shareholders are more satisfied with. In other words, women tend to join the boards of firms that receive lower dissent voting or/and firms with good corporate governance and firm characteristics. For now, it is unclear whether gender differences on remuneration committees are causing the governance differences (as our paper claims) or whether governance differences are causing the gender differences on remuneration committees (as the "good governance" story suggests).

In order to tease out what is causing what, first we attempt to control for causality by analyzing the determinants of women's appointment on boards and remuneration committees using three estimators: the OLS, the fixed-effect (FE) and the probit model. Following previous studies, we have used several control variables used in the main analysis (see for example Marquardt & Wiedman, 2016; Sila, Gonzalez & Hagendorff, 2016; Terjesen, Aguilera & Lorenz, 2015). On the one hand, Table 6 shows that there is no evidence that

past³ shareholder dissent voting affects the presence of women on boards (Models 1, 2 & 3) and on remuneration committees (Models 4, 5, 6, 7, 8 & 9). On the other hand, Table 6 shows that women directors are more likely to join boards of firms that have a larger firm size, larger board size, higher board independence and better performance. In addition, it shows that women directors are more likely to be on the remuneration committees of firms that already have a higher proportion of women on boards, longer CEO tenure and better performance. Overall, our results confirm the results of previous studies that show that governance and firm's characteristics affect the appointment of women on boards and on remuneration committees in the UK (Gregory-Smith, Main & O'Reilly III, 2014)⁴.

i. Two-step GMM

The relationship between the representation of women on remuneration committees and say-on-pay dissent voting may be endogenous due to unobserved heterogeneity (time-varying unobservable effects either due to omitted variables or macro-level shocks) and simultaneity (see for example the "good governance" story mentioned previously). According to Abad et al. (2017), the OLS has shortcomings in that it cannot solve the problems of the unobserved heterogeneity and the simultaneity (where the dependent and independent variables are combined in simultaneous explanation; for example, it can be argued either that women cause low dissent or that low dissent attracts more women). Therefore, we use the two-step GMM estimator as it has been commonly used to control for endogeneity problems (see for example Abad et al., 2017) and as it has been commonly recognised to be superior to the other estimators to control for the endogeneity using panel data (for further details see for example Cameron & Trivedi, 2005; Roodman, 2009; Wintoki et al., 2012). In particular, the two-step GMM estimation overcomes the endogeneity bias by estimating a system of two simultaneous equations (Abad et al., 2017). Our assumption in the GMM is that all the independent and control variables used in our main models except the year dummy variables

are endogenous. Coherently, the first equation uses all variables used in our main models except the year dummy variables in levels (first differences instruments) and the other uses these variables in first differences (lagged with respect to instruments).

Tables 7 and 8 present the results of the two-step GMM. The results show that the relationship between women on remuneration committees and say-on-pay dissent voting is still significant which supports our previous findings. Tables 7 and 8 also report the results of specification tests for the validity of the two-step GMM estimation procedure. If the assumptions of the specification are valid, then residuals in first differences (AR(1)) should be correlated, but there should be no serial correlation in second differences (AR(2)). Results of these tests confirm that this is indeed the case. The Hansen test of over-identifying restrictions and the autocorrelation also shows that our two-step GMM specification tests are valid. The values of the Wald test indicate the importance of the joint significance of the instruments in explaining the variations in the dependent variable. Overall, the evidence reported in Tables 7 and 8 supports our predictions, once we use the GMM estimator to account for endogeneity concerns. In addition, the evidence reported in Table 8 shows that only firms with a critical mass of 30% women are more likely to improve remuneration policy and to reduce shareholders' dissent via say-on-pay for both '*log dissent*' ($\beta = -0.537$, $t = -3.05$) and '*dissent > 10*' ($\beta = -0.108$, $t = -2.27$).

ii. Propensity score matching

The two-step GMM is superior in controlling the unobserved heterogeneity and simultaneity problems, but not the problem of selection bias (Wintoki et al., 2012). In this context, it may be that other covariates affect the appointment of women directors on the board and then on the remuneration committee (i.e. women tend to self-select the board(s) that they want to join based on firms' characteristics and good corporate governance). Thus, we use propensity score matching (Rosenbaum & Rubin, 1983; Guo & Fraser, 2015) that helps to mitigate

concerns about selection bias by matching firms in the control group (e.g., remuneration committees without women) and firms with the treatment group (e.g., remuneration committees with women) but with otherwise similar observable characteristics. In other words, after matching, differences in shareholders' dissent could be attributed to whether or not women are appointed on remuneration committees, rather than to differences in the other covariates.

We run the propensity score matching using the `psmatch2` command in Stata. In particular, we match firms with (treatment group) and without (control group) gender diverse remuneration committees by using the single nearest neighbour algorithm (1- NN) with a common support and a caliper of 0.01 (and with no replacement) using all board and firm characteristics included in our previous estimations.

Specifically, we use a procedure consisting of the following steps. First, we run a logistic propensity score model which estimates the probability that a firm will have a gender diverse remuneration committee conditional on the observable governance and firm characteristics included in our main previous models. Second, we identify matched pairs with the smallest propensity score differences. More specifically, we identify the firms with non-gender diverse remuneration committees whose propensity score is close to the firms with gender diverse remuneration committees but with otherwise similar characteristics. Third, we omit unmatched pairs if the difference in the propensity scores is greater than 0.1%. After we match, our probability models meet the balancing property required for propensity score matching and reduce the absolute bias that after matching is below the target of 5%⁵. Table 9 shows the average treatment effect (ATT) results for propensity score matching models.

We find that the difference in the shareholders' dissent voting outcomes is statistically significant for both *Log dissent* and *Dissent > 10%*. Overall, these results are consistent with our previous findings.

iii. Further tests

We also examine the robustness of our main results to different sub-time samples, including pre- and post- Davies Report (2011) and pre- and post- say-on-pay mandatory and binding voting (2013), to control for the effect of regulatory changes relating to women on boards and say on pay respectively. The results of these tests are reported in Table 10. We only report key variables for brevity, but all models include every control variable used in previous tests. We found that the presence of women on remuneration committees exerts a negative impact on shareholders' dissent voting pre- and post- the Davies Report (2011) (see Panel A of Table 10), however; this negative relationship becomes more significant post-the Davies Report (2011). This may indicate that the impact of women directors on say-on-pay voting may be contingent upon time and different types of pressures and procedures the governance bodies are performing. Specifically, this may suggest that pre-Davies Report (2011) women were under-represented on boards and on remuneration committees and that after the publication of the Davies Report (2011), the number of women on boards increased dramatically. Alternatively, the number of women on boards and on remuneration committees may not have changed significantly after the Davies report, but women on boards on remuneration committees may have had more power in influencing compensation setting. This may suggest that women on boards and key sub-committees after the Davies report have had more confidence in understanding their role and hence more power in influencing firms' practices, including remuneration policy. In Panel B, we test the impact of gender diverse remuneration committees on say-on-pay dissent voting pre- and post- say-on-pay mandatory and binding voting (2013). Overall, the results remain unchanged by that time split and support our predictions.

DISCUSSION

This paper extends the current literature by examining whether gender diversity on remuneration committees has an effect on say-on-pay voting. Overall, our study has practical implications in that greater board gender diversity not only supports fairness, but also seems to have potential economic benefits in relation to executive remuneration. Specifically, we show the importance of the presence of women on the board and, more particularly, on the remuneration committee. Given that executive remuneration is an especially contentious area and the focus of shareholder and media attention, our findings indicate that the presence of more women directors on a remuneration committee seems to align executive remuneration more closely with shareholders' expectations and there is less shareholder dissent via say-on-pay voting.

Recently, Green and Homroy (2018) demonstrate the economic significance of the proportion of women on boards and key subcommittees in the largest European firms. Overall, they find that firms benefit from female directors only when they sit on sub-committees. Coherently, the evidence of the relationship between women on UK remuneration committees and say-on-pay voting should make the presence of women on remuneration committees more desirable to both practitioners and policymakers. Therefore, UK regulators should enhance gender diversity on remuneration committees with the aim to increase the diversity on this sub-committee to a critical mass of more than 30% women. Some firms may have diversified boards but may not use that diversity to its full potential benefit. For example, women directors may be under-represented on remuneration committees. Therefore, the UK Corporate Governance Code should recommend that female representation is improved in remuneration committee membership at least to a critical mass of more than 30% women. Regarding the optimal gender quota, several differences exist around the world and it is not the aim of this study to contribute to the literature about the best gender quota on the board,

the remuneration committee or other sub-committees. In general, we suggest favouring diversity of opinion as we do not advocate remuneration committees composed only of women or of men (i.e. uniform remuneration committees in which all members are of the same gender). In addition, to avoid box ticking, policymakers could not only issue soft law recommendations in relation to gender diversity but also, they could go deeper by scrutinising and possibly regulating the recruitment process of directors to the board and its remuneration committees as boardroom heterogeneity can be beneficial during pay setting (Mangen & Magnan, 2012). Furthermore, other mechanisms might be in place such as the presence of active shareholders, the presence of external advisors and even the media coverage that might favour the adoption of good corporate governance practices that might work as substitute or complementary mechanisms to the role of women on boards and key sub-committees. Future studies can provide further evidence on the interplay between these mechanisms.

Our study has some limitations; we use aggregated shareholders' voting data instead of individual shareholders' voting data due to the lack of availability of these data. Investigating shareholder heterogeneity may explain differences in voting decisions, for example, the variations in voting decisions between pension funds and hedge funds. Therefore, future studies could examine whether the relationship between say-on-pay dissent voting and women directors on remuneration committees will change by the type of investor. We do not analyse whether gender diverse boards and firms with more women on the remuneration committee have better performance and this is an area that could be investigated in future studies. Moreover, our study is limited to the UK. However, the characteristics of women on corporate boards vary across countries and governance systems, and therefore, it is important to understand the relationship between the presence of female directors on remuneration committees and how the effects of shareholder dissent via say-on-pay voting impacts other countries. Our study has examined determinants of the say-on-pay dissent voting when

women directors are present on remuneration committees. Future studies could also investigate the response of female directors on remuneration committees following high shareholders' dissent voting and whether their response leads to changes in executives' remuneration.

Future studies could conduct cross-sectional analysis that decomposes firms into groups with high and low executives' remuneration. Future research might also consider examining different remuneration characteristics as shareholders may not be concerned about the level of total pay but may be concerned about the composition or the form of payment (e.g., the proportion of stock-based remuneration and the pay gap between the CEO and other executives) or about the performance elements (e.g. financial versus non-financial key performance indicators).

Moreover, our argument assumes that all shareholders actively engage with their investee companies' remuneration reports. In other words, they read the remuneration report, and fully understand its contents. However, we cannot be sure that this is the case. Specifically, our argument cannot measure whether low shareholder dissent voting suggests shareholders who do not care to read the remuneration reports, or to vote on them. Also, our argument cannot investigate if low shareholder dissent voting reveals shareholders who follow the voting recommendations of compensation consultants, or institutional investors. Additionally, our argument cannot predict whether the shareholders who do not vote on remuneration reports are, for example, institutional investors, and they may do this as they have business ties with their investee firms. All these limitations can offer valuable research potential for future studies. Furthermore, our argument cannot predict which women's attributes are good and which attributes are risky, to boards and remuneration committees. Thus, our study cannot generalise that all female directors are active directors and beneficial to the firm whilst all male directors are detrimental to appoint to the board. We suggest that future studies could

focus on positive and negative attributes of women and/or of men on boards and key sub-committees.

In addition, we agree that there are differences among board directors in terms of power; powerful directors are typically the more influential on boards and on remuneration committees than less powerful directors. In our paper, following previous studies (Alissa, 2015; Conyon & Sadler, 2010; Ferri & Maber, 2013) we have controlled for CEO power using CEO duality and log CEO tenure. However, due to the research design of this study and data availability, we were not able to control for other power differences among board members.

Referring to some previous studies (Adams & Ferreira, 2009; Carter, Simkins & Simpson, 2003), we base our argument that most women directors are seen as out-group members and more independent than male. However, by definition women can be or become part of an in-group. Previous studies show that differences exist across countries due to cultural bias, firms' characteristics and different gender quota regulations. We recommend future studies to investigate the determinants of women directors either as in-group versus out-group members and their evolution over time in this regard.

Furthermore future studies could further investigate this topic by using a different research design with the aim to shift the attention from votes on executive directors' remuneration packages to the processes that lead to the (re)design of (optimal versus suboptimal) executive directors' remuneration packages. For example, future studies could investigate the actions of the remuneration committee members at their meetings by analyzing minutes from remuneration committee meetings (for an example see Schwartz-Ziv, 2017) and by using interviews with remuneration committee members' and/or shareholders.

Finally, while we tried to mitigate concerns about reverse causality, unobserved heterogeneity, simultaneity, selection bias and the impact of several related regulations using a number of robustness tests, as usual with such studies a word of caution is needed.

CONCLUSION

This paper examines whether the presence of women directors on remuneration committees has an influence on say-on-pay voting. Based on a sample from the UK's FTSE 350 firms from 2003 to 2015, our results indicate that firms with more women on their remuneration committee attract less dissent via say-on-pay voting, suggesting that women play an important role in monitoring the content of remuneration reports and helping to align these reports with the interests of shareholders. Additionally, we find that only in firms which have a critical mass of more than 30% women on the remuneration committee is there a significant negative impact on shareholders' dissent. To account for endogeneity, we further estimate the previous analysis using two-system GMM and propensity score matching respectively. The two-system and post-matching results show that our previous findings about women on remuneration committees and say-on-pay dissent voting remain unchanged.

NOTES

¹ The FTSE 350 index includes the largest companies in the UK and represents approximately 97% of the UK's market capitalisation.

² Financial firms are heavily regulated and have different financial reporting formats. In addition, financial firms are known for their high executive remuneration. Thus, we exclude them as they may skew the results (Bugeja, Matolcsy & Spiropoulos, 2015).

³ Past say-on-pay dissent voting is measured as the average of shareholder dissent between year one (t-1) and year five (t-5). The idea behind measuring say-on-pay dissent voting over a longer period is to avoid outliers within a shorter period that is not reflective of firms' corporate governance.

⁴ Our data are at firm level and not at individual level; therefore this study cannot determine if there is gender selection bias in appointments to boards and key sub-committees. A recent study by Gregory-Smith, Main and O'Reilly III (2014) using a sample of UK FTSE350 companies between 1996 and 2011 shows that the appointment of women as non-executive directors are not gender neutral which means that the probability to appoint a female as a non-executive director is lower than the probability to appoint a man.

⁵ The covariate balance tables are not reported here. Available upon request.

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Table 1 Summary of sample by year and industry (%)

	No. of resolutions on remuneration report	% dissent on remuneration report	% dissent >10% on remuneration report	Remuneration committee size	No. women on remuneration committees	% women on remuneration committees	Remuneration committee chair = women	% women on boards
Panel A: summary by year								
2003	178	6.26	19.66	3.87	0.32	7.97	0.039	5.2
2004	208	4.56	10.58	3.68	0.31	8.00	0.034	5.46
2005	228	4.16	9.65	3.72	0.37	9.22	0.048	6.19
2006	235	4.57	12.34	3.76	0.43	11.20	0.081	7.13
2007	232	3.54	9.48	3.9	0.47	11.60	0.099	7.77
2008	238	6.15	18.07	3.88	0.45	11.20	0.118	7.66
2009	239	6.71	19.25	3.87	0.44	11.20	0.138	7.62
2010	238	6.74	19.75	3.97	0.50	12.30	0.139	8.62
2011	238	7.63	21.01	3.96	0.56	13.50	0.130	10.4
2012	228	6.51	20.52	4.07	0.76	18.30	0.162	13.1
2013	232	5.7	17.67	4.19	0.97	22.60	0.189	15.8
2014	227	5.87	17.18	4.17	1.13	26.20	0.172	18.9
2015	212	6.51	20.75	4.09	1.23	29.80	0.108	20.8
Total	2935	5.77	16.61	3.93	0.61	14.90	0.114	10.4
Panel A: summary by industry								
Basic Materials	245	6.08	18.03	3.74	0.34	7.80	0.090	6.96
Industrials	830	4.68	13.13	3.94	0.52	12.30	0.095	7.78
Health Care	149	6	15.44	3.94	0.71	17.60	0.114	13.8
Oil & Gas	183	9	25.68	3.83	0.45	10.30	0.093	7.39

Consumer Services	870	6.46	19.54	3.81	0.74	19.00	0.129	12.7
Consumer Goods	177	5.94	18.08	3.94	0.48	12.40	0.124	6.91
Technology	311	5.4	15.76	4.32	0.74	16.10	0.087	13.2
Telecommunication	57	6.06	14.04	4.11	0.72	16.30	0.193	13.7
Utilities	113	2.81	4.42	4.2	0.86	21.10	0.248	15.7
Total	2935	5.77	16.61	3.93	0.61	14.90	0.114	10.4

Table 2 Descriptive statistics

	All firms						Firms with low shareholder dissent voting						Firms with high shareholder dissent voting					
	Mean	Median	SD	Min	Max	N	Mean	Median	SD	Min	Max	N	Mean	Median	SD	Min	Max	N
Log dissent	-3.81	-3.79	1.69	-9.21	0.996	2913	-4.3	-4.06	1.37	-9.21	-2.21	2395	-1.33	-1.46	0.669	-2.21	1.37	518
Dissent >10%	16.6	0	37.2	0	1	2934	0	0	0	0	0	2416	0.992	1	0.0876	0	1	518
Women %	14.9	0	17.3	0	75	2934	15.1	0	17.6	0	75	2416	13.8	0	15.9	0	66.7	518
Women ≤20%	0.0259	0	0.159	0	1	2934	0.0248	0	0.156	0	1	2416	0.0311	0	0.174	0	1	514
20% < Women ≤30%	0.346	0	0.476	0	1	2934	0.344	0	0.475	0	1	2416	0.354	0	0.479	0	1	514
Women >30%	0.113	0	0.317	0	1	2934	0.118	0	0.323	0	1	2416	0.0914	0	0.289	0	1	514
Women on board %	10.40	10	10.29	0	57.14	2934	10.40	10	10.30	0	57.1	2416	10.40	10.6	10.1	0	50	518
Remuneration committee chairperson = woman	0.111	0	0.314	0	1	2934	0.118	0	0.323	0	1	2416	0.0965	0	0.296	0	1	518
Log CEO pay)	7.41	7.39	0.897	3.76	11.10	2930	7.36	7.35	0.864	3.76	11.10	2416	7.64	7.62	1.01	4.30	10.90	514
Institutional ownership %	35.6	34.1	20.7	0	99.7	2907	35.8	34.4	20.8	0	99.7	2392	34.9	33.1	20.2	0	95	515
Board size	9.06	9	2.37	5	18	2921	9.04	9	2.32	5	18	2404	9.19	9	2.58	5	17	517
Remuneration committee size	3.93	4	1.05	2	9	2930	3.93	4	1.02	2	9	2416	3.98	4	1.21	2	9	518
Board independence %	55.7	57.1	13.5	0	92.9	2934	55.2	55.6	13.5	0	92.9	2416	58	60	13.1	0	86.7	518
Remuneration committee independence %	94.4	100	13.1	25	100	2925	94.4	100	13.2	25	100	2408	94.4	100	12.4	25	100	517
CEO duality	0.13	0	0.337	0	1	2934	0.125	0	0.33	0	1	2416	0.156	0	0.364	0	1	518
Log CEO tenure	1.17	1.34	1.11	-2.3	3.67	2892	1.18	1.34	1.11	-2.3	3.67	2391	1.12	1.28	1.11	-2.3	3.39	501
Log total sales	14.2	14.1	1.52	8.41	19.7	2914	14.2	14.1	1.5	8.85	19.7	2404	14.3	14.2	1.62	8.41	19.6	510
MBV	3.73	2.61	11.6	-114	198	2896	3.54	2.63	10.4	-114	195	2385	4.62	2.58	16	-111	198	511
Stock return %	15.9	11.7	46	-96.7	410	2929	15.6	12.2	43.3	-96.7	398	2413	16.8	9.23	56.9	-92.4	410	516
ROA %	6.4	5.8	8.6	-67	79	2922	6.57	5.88	8.3	-61.6	79	2405	5.61	5.26	9.75	-67.2	58.9	517
Leverage %	23.1	22.3	16.8	0	96.4	2921	23.2	22.3	17	0	96.4	2405	22.4	22.2	15.9	0	82	516
Price volatility %	27.8	26.3	8.87	11.5	62.4	2542	23.2	22.3	17	0	96.4	2405	29.2	27.1	10.4	12.3	59.9	445

Note that Log dissent is total number of against votes divided by total number vote cast on remuneration report (transferred using logit dissent = $\ln(\text{dissent}/(1-\text{dissent}))$). Dissent >10% is an indicator of 1 if shareholders' dissent is greater than 10%, 0 otherwise. Women is proportion of women from total remuneration committee size. Women ≤20 % is an indicator variable of 1 if the remuneration committee has at least one woman up to 20% women, 0 otherwise. 20% < Women ≤30% is an indicator variable of 1 if a remuneration committee has a proportion of women in the remuneration committee that is more than 20% up to 30%, 0 otherwise. Women >30% is an indicator variable of 1 if the proportion of women on the remuneration committee is more than 30%, 0 otherwise. Women on board is proportion of women from total board size. Remuneration committee chairperson = woman is measured as an indicator of 1 if a woman is the chair of the remuneration committee, 0 otherwise. Log CEO pay is sum of natural logarithm of CEO total remuneration, which include cash, and equity linked remuneration. Institutional ownership is proportion of ownership hold by institutional investors holding more than 3% of firm's equity. Board size is total number of directors in the board. Board independence is proportion of independent nonexecutive directors in the board. Remuneration committee size is total number of directors in the remuneration committee. Remuneration committee independence is proportion of independent nonexecutive directors in remuneration committee. CEO duality dummy is 1 if CEO combine the posts of CEO and chair, 0 otherwise. Log CEO tenure is the natural logarithm of the number of years a CEO has served on the board. Log sales is natural log of firms' total sales. ROA is firms' income before extraordinary items divided by total assets. Stock returns is stock price appreciation plus dividends. MBV is average equity market value divided by total book value of equity. Leverage is the total debt to total assets. Price volatility is a stock's average annual price movement to a high and low from a mean price for each year.

Table 3 Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	20	21
Log dissent	1																						
Dissent >10%	0.82*	1																					
Women%	-0.02	-0.03	1																				
Women≤20 %	0.036	0.011	0.49*	1																			
20<Women≤30%	-0.03	-0.03	0.59*	-0.25	1																		
Women>30%	-0.006	0.02	0.21*	-0.08*	-0.036	1																	
Women on boards%	0.025	0.003	0.737*	0.367*	0.47*	0.19*	0.08*	1															
Remuneration committee chairperson = woman	-0.025	-0.027	0.361*	0.226*	0.21*	-0.04*	-0.01	0.283*	1														
Log CEO pay	0.13*	0.13*	0.11*	0.08*	0.06*	0.09*	0.02	0.189*	0.074*	1													
Institutional ownership	-0.00	-0.01	0.00	0.02	-0.01*	-0.07*	-0.03	-0.054*	0.033	-0.23*	1												
Board size	0.05*	0.02	0.05*	0.07*	0.04*	0.07*	0.03	0.159*	-0.036	0.36*	-0.39*	1											
Remuneration committee size	0.02	0.01	0.14*	0.09*	0.25*	0.23*	0.11*	0.231*	0.061*	0.17*	-0.07*	0.29*	1										
Board independence	0.09*	0.08*	0.22*	0.16*	0.12*	0.07*	0.03	0.316*	0.085*	0.21*	-0.02	0.05*	0.26*	1									
Remuneration committee independence	-0.01	-0.00	0.07*	0.05*	0.004	0.04*	0.01	0.021	-0.03	-0.04*	0.03	-0.07*	-0.10*	0.37*	1								
CEO duality	0.01	0.03	-0.11*	-0.09*	-0.04*	-0.04*	-0.01	-0.165*	-0.068*	-0.08*	-0.09*	0.01	-0.16*	-0.25*	-0.01	1							
Log CEO tenure	-0.021	-0.018	0.0124	0.0187	0.003	0.03	-0.03	-0.0198	-0.0290	0.069*	0.070*	0.031	0.0096	-0.0790*	0.018	0.0001	1						
Log total sales	0.06*	0.02	0.19*	0.12*	0.13*	0.11*	0.02	0.297*	0.094*	0.38*	-0.39*	0.53*	0.28*	0.34*	0.03	-0.12*	-0.096*	1					
MBV	0.02	0.04	0.03	0.02	0.01	0.01	0.006	0.031	-0.008	0.05*	-0.00	0.03	0.00	-0.01	-0.01	0.01	0.079*	-0.02	1				
Stock return	0.01	0.01	-0.06*	-0.06*	-0.03*	-0.01	-0.01	-0.078*	-0.03	0.02	0.09	-0.07*	-0.07*	-0.07*	0.01	0.03*	0.093*	-0.11*	0.08*	1			
ROA	-0.05*	-0.04*	-0.02	0.01	-0.02	0.02	0.010	0.018	-0.032	0.11*	-0.08*	-0.01	-0.00	-0.04	0.00	0.03	0.007	-0.09*	0.14*	0.07*	1		
Leverage	-0.02	-0.02	0.04*	-0.02	0.05*	0.03	0.038	0.065	-0.001	0.01	-0.09*	0.14*	0.06*	0.03	0.00	-0.01	-0.075	0.20*	0.03	-0.11*	-0.21*	1	
Price volatility	0.08*	0.08*	-0.18*	-0.11*	-0.10*	-0.10*	-0.04	-0.251*	-0.051*	-0.21*	0.20*	-0.21*	-0.19*	-0.12*	0.03	0.13*	-0.027	-0.32*	-0.04	0.16*	-0.19*	-0.16*	1

Note that Log dissent is total number of against votes divided by total number vote cast on remuneration report (transferred using logit dissent = $\ln(\text{dissent}/(1-\text{dissent}))$). Dissent >10% is an indicator of 1 if shareholders' dissent is greater than 10%, 0 otherwise. Women is proportion of women from total remuneration committee size. Women≤20 % is an indicator variable of 1 if the remuneration committee has at least one woman up to 20% women, 0 otherwise. 20%<Women≤30% is an indicator variable of 1 if a remuneration committee has a proportion of women in the remuneration committee that is more than 20% up to 30%, 0 otherwise. Women >30% is an indicator variable of 1 if the proportion of women on the remuneration committee is more than 30%, 0 otherwise. Women on board is proportion of women from total board size. Remuneration committee chairperson = woman is measured as an indicator of 1 if a woman is the chair of the remuneration committee, 0 otherwise. Log CEO pay is sum of natural logarithm of CEO total remuneration, which include cash, and equity linked remuneration. Institutional ownership is proportion of ownership hold by institutional investors holding more than 3% of firm's equity. Board size is total number of directors in the board. Board independence is proportion of independent nonexecutive directors in the board. Remuneration committee size is total number of directors in the remuneration committee. Remuneration committee independence is proportion of independent nonexecutive directors in remuneration committee. CEO duality dummy is 1 if CEO combine the posts of CEO and chair, 0 otherwise. Log CEO tenure is natural logarithm of number of years a CEO serve on board. Log sales is natural log of firms' total sales. ROA is firms' income before extraordinary items divided by total assets. Stock returns is stock price appreciation plus dividends. MBV is average equity market value divided by total book value of equity. Leverage is the total debt to total assets. Price volatility is a stock's average annual price movement to a high and low from a mean price for each year. *p<.05

Table 4 Impact of women directors on the remuneration committee on say-on-pay dissent voting

	Model (1) OLS Log dissent	Model (2) Logit Dissent>10	Model (3) OLS Log dissent	Model (4) Logit Dissent>10
Women	-0.668*** (-2.62)	-1.275*** (-2.66)	-0.686*** (-2.67)	-1.256*** (-2.61)
Women on boards	0.480 (0.97)	0.637 (0.73)	0.397 (0.78)	0.597 (0.67)
Remuneration committee chair = women	-0.199** (-1.98)	-0.0997 (-0.51)	-0.216** (-2.15)	-0.118 (-0.61)
Log CEO pay	0.628*** (12.09)	0.572*** (5.79)	0.584*** (11.37)	0.536*** (5.52)
Institutional ownership	0.155 (0.80)	-0.105 (-0.31)	0.105 (0.54)	-0.168 (-0.50)
Board size	0.00119 (0.07)	-0.0376 (-1.10)	0.00702 (0.40)	-0.0359 (-1.07)
Remuneration committee size	0.0161 (0.52)	0.0306 (0.49)	0.0216 (0.70)	0.0373 (0.61)
Board independence	0.662** (1.97)	1.219** (2.03)	0.548 (1.62)	1.090* (1.82)
Remuneration committee independence	-0.144 (-0.50)	0.152 (0.29)	-0.0825 (-0.28)	0.179 (0.34)
CEO duality	0.250** (2.31)	0.493*** (2.68)	0.265** (2.44)	0.496*** (2.71)
Log CEO tenure	-0.0775** (-2.43)	-0.0634 (-1.16)	-0.0740** (-2.32)	-0.0605 (-1.12)
Log total sales	0.0169 (0.50)	-0.0892 (-1.48)	0.0262 (0.77)	-0.0801 (-1.35)
Stock return	-0.143 (-1.49)	-0.0636 (-0.39)	-0.0964 (-1.14)	-0.102 (-0.72)
ROA	-0.636 (-1.41)	-1.799** (-2.47)	-0.860* (-1.90)	-1.919*** (-2.60)
MBV	0.000549 (0.19)	0.00535 (1.15)	0.00130 (0.44)	0.00569 (1.17)
Leverage	0.313 (1.39)	0.00150 (0.00)	0.305 (1.34)	0.0176 (0.04)
Price volatility	0.0132*** (2.72)	0.0196** (2.36)	0.0142*** (2.90)	0.0203** (2.48)
Post 2007			-0.0296 (-0.33)	0.353** (2.33)
Post 2010			0.425*** (3.54)	0.0758 (0.36)
Post 2011			-0.272** (-2.20)	-0.0635 (-0.28)
Post_2013			-0.0102 (-0.09)	-0.00142 (-0.01)
Year dummies	Yes	Yes	No	No
Industry dummies	Yes	Yes	Yes	Yes
Constant	-9.339*** (-14.63)	-6.278*** (-5.69)	-9.240*** (-14.63)	-6.613*** (-5.89)
N	2409	2423	2409	2423
R2/Pseudo R2	0.163	0.066	0.145	0.059

Note that Log dissent is total number of against votes divided by total number vote cast on remuneration report (transferred using logit dissent = $\ln(\text{dissent}/(1-\text{dissent}))$). Dissent >10% is an indicator of 1 if shareholders' dissent is greater than 10%, 0 otherwise. Women is proportion of women from total remuneration committee size. Women on board is proportion of women from total board size. Remuneration committee chairperson = woman is measured as an indicator of 1 if a woman is the chair of the remuneration committee, 0 otherwise. Log CEO pay is sum of natural logarithm of CEO total remuneration, which include cash, and equity linked remuneration. Institutional ownership is proportion of ownership hold by institutional investors holding more than 3% of firm's equity. Board size is total number of directors in the board. Board independence is proportion of independent nonexecutive directors in the board. Remuneration committee size is total number of directors in the remuneration committee. Remuneration committee independence is proportion of independent nonexecutive directors in remuneration committee. CEO duality dummy is 1 if CEO combine the posts of CEO and chair, 0 otherwise. Log CEO tenure is natural logarithm of number of years a CEO serve on board. Log sales is natural log of firms' total sales. ROA is firms' income before extraordinary items divided by total assets. Stock returns is stock price appreciation plus dividends. MBV is average equity market value divided by total book value of equity. Leverage is the total debt to total assets. Price volatility is a stock's average annual price movement to a high and low from a mean price for each year. Post-2007 to control for the impact of the financial crisis. Post-2010 to control for the impact of the UK Stewardship Code. Post-2011 to control for the impact of the UK Davies Report. Post-2013 to control for the impact of the UK say-on-pay mandatory and binding voting. Robust standard errors in parentheses (at firm level). *p<.10, **p<.05, ***p<.01

Table 5 Critical mass of women directors on the remuneration committee and the impact on shareholders' dissent voting

	Model (1) OLS Log dissent	Model (2) Logit Dissent>10
Women≤20%	-0.0759 (-0.38)	-0.247 (-0.65)
20<Women≤30%	-0.0557 (-0.61)	-0.169 (-1.04)
Women>30%	-0.468*** (-3.43)	-0.803*** (-3.02)
Women on boards	0.398 (0.78)	0.604 (0.67)
Remuneration committee chair = women	-0.223** (-2.15)	-0.107 (-0.54)
Log CEO pay	0.588*** (11.49)	0.538*** (5.59)
Institutional ownership	0.0827 (0.43)	-0.193 (-0.57)
Board size	0.00289 (0.16)	-0.0416 (-1.23)
Remuneration committee size	0.0502 (1.48)	0.0891 (1.29)
Board independence	0.462 (1.36)	0.962 (1.60)
Remuneration committee independence	-0.0455 (-0.16)	0.216 (0.41)
CEO duality	0.277** (2.57)	0.515*** (2.83)
Log CEO tenure	-0.0755** (-2.37)	-0.0614 (-1.15)
Log total sales	0.0256 (0.75)	-0.0796 (-1.33)
Stock return	-0.0951 (-1.13)	-0.0982 (-0.69)
ROA	-0.838* (-1.88)	-1.881** (-2.54)
MBV	0.00145 (0.51)	0.00581 (1.22)
Leverage	0.340 (1.50)	0.0638 (0.16)
Price volatility	0.0148*** (3.03)	0.0213*** (2.59)
Post 2007	-0.0377 (-0.42)	0.345** (2.27)
Post 2010	0.427*** (3.56)	0.0805 (0.38)
Post 2011	-0.269** (-2.18)	-0.0607 (-0.27)
Post 2013	0.000897 (0.01)	0.00194 (0.01)
Year dummies	No	No
Industry dummies	Yes	Yes
Constant	-9.368*** (-14.79)	-6.846*** (-6.10)
N	2409	2423
R2/Pseudo R2	0.147	0.060

Note that Log dissent is total number of against votes divided by total number vote cast on remuneration report (transferred using logit dissent = $\ln(\text{dissent}/(1-\text{dissent}))$). Dissent >10% is an indicator of 1 if shareholders' dissent is greater than 10%, 0 otherwise. Women≤20 % is an indicator variable of 1 if the remuneration committee has at least one woman up to 20% women, 0 otherwise. 20<Women≤30% is an indicator variable of 1 if a remuneration committee has a proportion of women in the remuneration committee that is more than 20% up to 30%, 0 otherwise. Women >30% is an indicator variable of 1 if the proportion of women on the remuneration committee is more than 30%, 0 otherwise. Women on board is proportion of women from total board size. Remuneration committee chairperson = woman is measured as an indicator of 1 if a woman is the chair of the remuneration committee, 0 otherwise. Log CEO pay is sum of natural logarithm of CEO total remuneration, which include cash, and equity linked remuneration. Institutional ownership is proportion of ownership hold by institutional investors holding more than 3% of firm's equity. Board size is total number of directors in the board. Board independence is proportion of independent nonexecutive directors in the board. Remuneration committee size is total number of directors in the remuneration committee. Remuneration committee independence is proportion of independent nonexecutive directors in remuneration committee. CEO duality dummy is 1 if CEO combine the posts of CEO and chair, 0 otherwise. Log CEO tenure is natural logarithm of number of years a CEO serve on board. Log sales is natural log of firms' total sales. ROA is firms' income before extraordinary items divided by total assets. Stock returns is stock price appreciation plus dividends. MBV is average equity market value divided by total book value of equity. Leverage is the total debt to total assets. Price volatility is a stock's average annual price movement to a high and low from a mean price for each year. Post-2007 to control for the impact of the financial crisis. Post-2010 to control for the impact of the UK Stewardship Code. Post-2011 to control for the impact of the UK Davies Report. Post-2013 to control for the impact of the UK say-on-pay mandatory and binding voting. Robust standard errors in parentheses (at firm level). *p<.10, **p<.05, ***p<.01

Table 6 Determinants of women directors on the board and on the remuneration committee

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)
	OLS	FE	Probit	OLS	FE	Probit	Probit	Probit	Probit
	Women on boards		Women on boards dummy	Women on remuneration committees		Women on remuneration committees dummy	Women \leq 20%	20%<Women \leq 30%	Women>30%
Log dissent t-5	-0.00366 (-1.03)	-0.00304 (-0.74)	-0.131 (-1.00)	-0.00261 (-0.41)	0.00504 (0.69)	-0.112 (-0.93)	-0.160 (-0.94)	-0.0565 (-0.53)	0.0904 (0.54)
Women on boards t-1	0.805*** (46.15)	0.532*** (24.30)		0.0299 (0.72)	-0.01000 (-0.15)	0.644 (1.05)	-0.216 (-0.24)	-0.246 (-0.63)	3.342*** (5.62)
Women on boards dummy t-1			2.723*** (24.32)						
Women on remuneration committees t-1				0.792*** (37.78)	0.588*** (19.37)				
Women on remuneration committees dummy t-1						2.571*** (24.32)			
Women \leq 20% t-1							1.408*** (7.93)		
20%<Women \leq 30% t-1								1.961*** (29.29)	
Women>30% t-1									2.071*** (15.37)
Log CEO pay t-1				0.00244 (0.81)	-0.00347 (-0.74)	0.136** (2.35)	0.0870 (0.93)	0.0848* (1.76)	-0.00740 (-0.11)
Institutional ownership t-1	0.00404 (0.74)	-0.0166 (-1.60)	-0.00828 (-0.04)	-0.00664 (-0.65)	-0.0224 (-1.15)	-0.0104 (-0.05)	0.973*** (2.69)	-0.00953 (-0.05)	0.00444 (0.02)
Board size t-1	0.00142** (2.58)	0.00173 (1.57)	0.0553** (2.20)	-0.00152 (-1.48)	-0.000334 (-0.12)	-0.0567*** (-2.77)	-0.0473 (-1.32)	0.00305 (0.18)	-0.0667** (-2.54)
Remuneration committee size t-1				-0.000371 (-0.16)	-0.00386 (-0.89)	0.00146 (0.03)	0.357*** (4.31)	-0.0535 (-1.53)	0.110** (2.30)
Board independence t-1	0.0238** (1.99)	0.0355* (1.95)	0.913** (2.32)	0.0493** (2.14)	0.106** (2.18)	0.476 (1.17)	-1.466** (-2.06)	0.771*** (2.59)	-0.283 (-0.57)
Remuneration committee independence t-1				0.00355 (0.22)	-0.0189 (-0.68)	0.114 (0.39)	-0.668* (-1.74)	0.273 (1.02)	0.301 (0.68)
CEO duality t-1	-0.00698** (-2.49)	-0.00943* (-1.77)	-0.230* (-1.85)	-0.00778 (-1.37)	-0.0171 (-1.41)	-0.122 (-1.00)	-0.488* (-1.77)	-0.0383 (-0.36)	-0.0660 (-0.43)
Log CEO tenure t-1	0.000803 (0.77)	-0.000227 (-0.17)	0.0537 (1.39)	0.00435** (2.34)	0.00387 (1.46)	0.0771** (2.05)	-0.0472 (-1.68)	0.0544* (1.77)	0.0406 (0.83)
Log total sales t-1	0.00195** (2.14)	0.00107 (0.25)	0.126*** (2.97)	0.00209 (1.13)	-0.00167 (-0.21)	0.0776** (1.98)	0.233*** (3.11)	-0.000547 (-0.02)	0.0952** (2.22)
Stock return t-1	0.000456 (0.21)	0.000754 (0.30)	0.0182 (0.20)	-0.000192 (-0.04)	0.000879 (0.17)	-0.0278 (-0.32)	-0.178 (-1.24)	-0.112 (-1.47)	0.0922 (0.85)
ROA t-1	0.000526 (0.04)	-0.0122 (-0.58)	0.154 (0.27)	-0.0353 (-1.38)	-0.0414 (-0.98)	-0.219 (-0.46)	-1.410* (-1.66)	0.163 (0.37)	-0.816 (-1.37)
MBV t-1	-0.0000700 (-1.05)	-0.0000275 (-0.33)	0.00708** (2.25)	-0.000004 (-0.03)	0.0000871 (0.41)	0.00294 (1.05)	0.00215 (0.66)	0.00391 (1.27)	-0.00446 (-1.01)
Leverage t-1	0.00440 (0.62)	0.00850 (0.59)	-0.203 (-0.78)	0.00967 (0.74)	0.0361 (1.25)	0.0911 (0.38)	-0.0778 (-0.17)	-0.166 (-0.81)	0.289 (0.95)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.0479*** (-3.26)	0.0631 (1.01)	-2.796*** (-4.07)	-0.0419 (-1.25)	0.165 (1.39)	-2.679*** (-4.00)	-7.303*** (-7.22)	-1.981*** (-3.55)	-3.328*** (-4.10)
N	2447	2447	2447	2437	2437	2437	2437	2437	2437
R2/Pseudo R2	0.767	0.607	0.669	0.707	0.527	0.601	0.389	0.380	0.501

Note that Log dissent t-5 is measured as the average of shareholder dissent between year one (t-1) and year five (t-5). Women on board is proportion of women from total board size. Women on boards dummy is an indicator of 1 if the appointed director on board is a woman and 0 otherwise. Women is proportion of women from total remuneration committee size. Women on remuneration committees dummy is an indicator of 1 if the appointed director on remuneration committee is a woman and 0 otherwise. Women \leq 20% is an indicator variable of 1 if the remuneration committee has at least one woman up to 20% women, 0 otherwise. 20%<Women \leq 30% is an indicator variable of 1 if a remuneration committee has a proportion of women in the remuneration committee that is more than 20% up to 30%, 0 otherwise. Women >30% is an indicator variable of 1 if the proportion of women on the remuneration committee is more than 30%, 0 otherwise. Remuneration committee chairperson = woman is measured as an indicator of 1 if a woman is the chair of the remuneration committee, 0 otherwise. Log CEO pay is sum of natural logarithm of CEO total remuneration, which include cash, and equity linked remuneration. Institutional ownership is proportion of ownership held by institutional investors holding more than 3% of firm's equity. Board size is total number of directors in the board. Board independence is proportion of independent nonexecutive directors in the board. Remuneration committee size is total number of directors in the remuneration committee. Remuneration committee independence is proportion of independent nonexecutive directors in remuneration committee. CEO duality dummy is 1 if CEO combine the posts of CEO and chair, 0 otherwise. Log CEO tenure is natural logarithm of number of years a CEO serve on board. Log sales is natural log of firms' total sales. ROA is firms' income before extraordinary items divided by total assets. Stock returns is stock price appreciation plus dividends. MBV is average equity market value divided by total book value of equity. Leverage is the total debt to total assets. Price volatility is a stock's average annual price movement to a high and low from a mean price for each year. Post-2007 to control for the impact of the financial crisis. Robust standard errors in parentheses (at firm level). All independent variables are lagged one year.

*p<.10, **p<.05, ***p<.01

Table 7 Women directors on the remuneration committee and the impact on shareholders' dissent voting using two-step GMM

	Model (1) System GMM Log dissent	Model (2) System GMM Dissent>10 %	Model (3) System GMM Log dissent	Model (4) System GMM Dissent>10 %
Lag Log dissent	0.243*** (5.78)		0.0955 (0.56)	
Lag Dissent>10 %		0.114*** (3.04)		0.131*** (3.63)
Women	-0.657** (-2.03)	-0.174** (-2.23)	-0.838** (-2.49)	-0.179** (-2.08)
Women on boards	0.298 (0.47)	0.229 (1.32)	0.454 (0.64)	0.252 (1.32)
Remuneration committee chair = women	-0.253** (-2.14)	-0.0397 (-1.20)	-0.251* (-1.85)	-0.0351 (-1.00)
Log total CEO pay	0.300*** (4.47)	0.0656*** (3.58)	0.318*** (3.56)	0.0588*** (3.07)
Institutional ownership	0.463 (1.58)	0.0313 (0.50)	0.262 (0.84)	0.0300 (0.45)
Board size	0.00947 (0.44)	-0.00652 (-1.08)	0.0235 (0.92)	-0.00405 (-0.67)
Remuneration committee size	-0.0199 (-0.47)	0.000214 (0.02)	-0.0151 (-0.34)	0.000282 (0.03)
Board independence	0.280 (0.67)	0.169 (1.43)	0.215 (0.47)	0.131 (1.08)
Remuneration committee independence	-0.627* (-1.66)	-0.0661 (-0.68)	-0.259 (-0.63)	-0.0420 (-0.42)
CEO duality	0.100 (0.74)	0.0532* (1.66)	0.123 (0.82)	0.0478 (1.50)
Log CEO tenure	-0.0693* (-1.85)	-0.00273 (-0.30)	-0.0625 (-1.64)	-0.00573 (-0.63)
Log total sales	0.105*** (2.76)	-0.000543 (-0.05)	0.107** (2.45)	-0.00290 (-0.24)
Stock return	-0.190** (-2.05)	-0.00409 (-0.10)	-0.114 (-1.35)	-0.0283 (-1.06)
ROA	0.473 (0.86)	-0.224 (-1.49)	0.143 (0.24)	-0.259 (-1.61)
MBV	-0.00382 (-1.25)	0.000674 (0.78)	-0.000712 (-0.19)	0.000988 (1.09)
Leverage	0.514** (2.02)	0.00766 (0.11)	0.330 (1.21)	0.00457 (0.06)
Price volatility	0.0150*** (2.91)	0.00373*** (2.85)	0.0166** (2.32)	0.00313** (2.19)
Post 2007			0.342** (2.46)	-0.0818 (-1.47)
Post 2010			0.279* (1.90)	0.0762 (0.79)
Post 2011			-0.0581 (-0.36)	-0.0275 (-0.29)
Post 2013			0.0104 (0.08)	0.000405 (0.01)
Year dummies	Yes	Yes	No	No
Constant	-6.470*** (-8.33)	-0.413** (-2.22)	-8.113*** (-4.76)	-0.298* (-1.65)
Hansen test (p value)	0.401	0.991	0.175	0.939
AR1 (p value)	-0.000	-0.000	-0.006	-0.000
AR2 (p value)	0.644	0.639	-0.716	0.776
Wald (F-test)	0.000	0.000	0.000	0.000
N	2194	2216	2194	2216

Note that all independent variables are treated as endogenous except year dummy variables. Log dissent is total number of against votes divided by total number vote cast on remuneration report (transformed using logit dissent = $\ln(\text{dissent}/(1-\text{dissent}))$). Dissent >10% is an indicator of 1 if shareholders' dissent is greater than 10%, 0 otherwise. Women is proportion of women from total remuneration committee size. Women on board is proportion of women from total board size. Remuneration committee chairperson = woman is measured as an indicator of 1 if a woman is the chair of the remuneration committee, 0 otherwise. Log CEO pay is sum of natural logarithm of CEO total remuneration, which include cash, and equity linked remuneration. Institutional ownership is proportion of ownership hold by institutional investors holding more than 3% of firm's equity. Board size is total number of directors in the board. Board independence is proportion of independent nonexecutive directors in the board. Remuneration committee size is total number of directors in the remuneration committee. Remuneration committee independence is proportion of independent nonexecutive directors in remuneration committee. CEO duality dummy is 1 if CEO combine the posts of CEO and chair, 0 otherwise. Log CEO tenure is natural logarithm of number of years a CEO serve on board. Log sales is natural log of firms' total sales. ROA is firms' income before extraordinary items divided by total assets. Stock returns is stock price appreciation plus dividends. MBV is average equity market value divided by total book value of equity. Leverage is the total debt to total assets. Price volatility is a stock's average annual price movement to a high and low from a mean price for each year. Post-2007 to control for the impact of the financial crisis. Post-2010 to control for the impact of the UK Stewardship Code. Post-2011 to control for the impact of the UK Davies Report. Post-2013 to control for the impact of the UK say-on-pay mandatory and binding voting. Robust standard errors in parentheses (at firm level). *p<.10, **p<.05, ***p<.01

Table 8 Critical mass of women directors on the remuneration committee and the impact on shareholders' dissent voting using two-step GMM

	Model (1) System GMM Log dissent	Model (2) System GMM Dissent>10 %
Lag Log dissent	0.0827 (0.49)	
Lag Dissent>10 %		0.131*** (3.61)
Women<20%	0.0622 (0.29)	0.0441 (0.72)
20<Women<30	-0.115 (-1.02)	-0.00968 (-0.35)
Women>30 %	-0.537*** (-3.05)	-0.108** (-2.27)
Women on boards	0.508 (0.73)	0.229 (1.26)
Remuneration committee chair = women	-0.276** (-1.98)	-0.0443 (-1.25)
Log total CEO pay	0.326*** (3.67)	0.0586*** (3.07)
Institutional ownership	0.240 (0.77)	0.0235 (0.36)
Board size	0.0204 (0.81)	-0.00483 (-0.80)
Remuneration committee size	0.00875 (0.18)	0.00381 (0.31)
Board independence	0.166 (0.37)	0.108 (0.89)
Remuneration committee independence	-0.206 (-0.50)	-0.0280 (-0.28)
CEO duality	0.145 (0.97)	0.0514 (1.64)
Log CEO tenure	-0.0632* (-1.67)	-0.00598 (-0.65)
Log total sales	0.107** (2.42)	-0.00316 (-0.27)
Stock return	-0.118 (-1.39)	-0.0285 (-1.06)
ROA	0.153 (0.25)	-0.253 (-1.58)
MBV	-0.000406 (-0.11)	0.00106 (1.16)
Leverage	0.342 (1.25)	0.0123 (0.17)
Price volatility	0.0179** (2.47)	0.00336** (2.35)
Post 2007	0.331** (2.39)	-0.0747 (-1.32)
Post 2010	0.275* (1.87)	0.0796 (0.83)
Post 2011	-0.0485 (-0.30)	-0.0259 (-0.27)
Post 2013	0.0180 (0.14)	-0.000679 (-0.01)
Year dummies	Yes	Yes
Constant	-8.369*** (-4.86)	-0.322* (-1.78)
Hansen test (p value)	0.333	0.998
AR1 (p value)	-0.001	-0.000
AR2 (p value)	0.812	-0.632
Wald (F-test)	0.000	0.000
N	2194	2216

Note that all independent variables are treated as endogenous except year dummy variables. Log dissent is total number of against votes divided by total number vote cast on remuneration report (transferred using logit dissent = $\ln(\text{dissent}/(1-\text{dissent}))$). Dissent >10% is an indicator of 1 if shareholders' dissent is greater than 10%, 0 otherwise. Women<20 % is an indicator variable of 1 if the remuneration committee has at least one woman up to 20% women, 0 otherwise. 20%<Women<30% is an indicator variable of 1 if a remuneration committee has a proportion of women in the remuneration committee that is more than 20% up to 30%, 0 otherwise. Women >30% is an indicator variable of 1 if the proportion of women on the remuneration committee is more than 30%, 0 otherwise. Women on board is proportion of women from total board size. Remuneration committee chairperson = woman is measured as an indicator of 1 if a woman is the chair of the remuneration committee, 0 otherwise. Log CEO pay is sum of natural logarithm of CEO total remuneration, which include cash, and equity linked remuneration. Institutional ownership is proportion of ownership hold by institutional investors holding more than 3% of firm's equity. Leverage is the total debt to total assets. Board size is total number of directors in the board. Board independence is proportion of independent nonexecutive directors in the board. Remuneration committee size is total number of directors in the remuneration committee. Remuneration committee independence is proportion of independent nonexecutive directors in remuneration committee. CEO duality dummy is 1 if CEO combine the posts of CEO and chair, 0 otherwise. Log CEO tenure is natural logarithm of number of years a CEO serve on board. Log sales is natural log of firms' total sales. ROA is firms' income before extraordinary items divided by total assets. Stock returns is stock price appreciation plus dividends. MBV is average equity market value divided by total book value of equity. Leverage is the total debt to total assets. Price volatility is a stock's average annual price movement to a high and low from a mean price for each year. Post-2007 to control for the impact of the financial crisis. Post-2010 to control for the impact of the UK Stewardship Code. Post-2011 to control for the impact of the UK Davies Report. Post-2013 to control for the impact of the UK say-on-pay mandatory and binding voting. Robust standard errors in parentheses (at firm level). *p<.10, **p<.05, ***p<.01

Table 9 The Average Treatment Effect (ATT) Results For Propensity Score Matching Models

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
Log dissent	ATT	-3.69	-3.42	-0.271	0.118	-2.28**
Dissent > 10%	ATT	0.152	0.204	-0.526	0.030	-1.75*

The table presents the differences in Log dissent and Dissent > 10% based on propensity score estimates of remuneration committees with women vs remuneration committees without women. The average treatment effect on the treated (ATT) measures the difference between the two groups. *p<.10, **p<.05, ***p<.01

Table 10 Impact of women directors on the remuneration committee on say-on-pay dissent voting pre- and post-2011 and 2013

	Model (1) OLS Log dissent	Model (2) Logit Dissent>10	Model (3) OLS Log dissent	Model (4) Logit Dissent>10
Panel A	Pre-2011		Post-2011	
Women	-0.695* (-1.75)	-1.231* (-1.69)	-0.774** (-2.27)	-1.456** (-2.15)
Women on boards	0.314 (0.41)	0.849 (0.67)	-0.0867 (-0.13)	-0.134 (-0.11)
Remuneration committee chair = women	-0.0527 (-0.33)	0.348 (1.23)	-0.334** (-2.58)	-0.460 (-1.63)
Constant	-8.730*** (-10.47)	-5.526*** (-3.53)	-10.30*** (-11.39)	-9.218*** (-5.28)
N	1434	1443	971	976
R2/Pseudo R2	0.142	0.060	0.158	0.086
Panel B	Pre-2013		Post-2013	
Women	-0.881*** (-2.69)	-1.525** (-2.47)	-0.873** (-2.02)	-1.676* (-1.85)
Women on boards	0.760 (1.27)	1.228 (1.12)	0.0782 (0.09)	-0.335 (-0.19)
Remuneration committee chair = women	-0.0586 (-0.47)	0.181 (0.78)	-0.229 (-1.36)	-0.225 (-0.61)
Constant	-8.734*** (-11.44)	-6.648*** (-4.86)	-9.520*** (-7.14)	-11.23*** (-4.30)
N	1692	1702	563	568
R2/Pseudo R2	0.158	0.064	0.159	0.135

See previous tables for variables definition. Robust standard errors in parentheses.

*p<.10, **p<.05, ***p<.01

Appendix A Frequency Table

	Freq.	Percent	Cum.
Number women on remuneration committees			
0	1,510	51.47	51.47
1	1,085	36.98	88.45
2	304	10.36	98.81
3	32	1.09	99.9
4	3	0.1	100
Total	2,934	100	
Number women on boards			
0	1,133	38.62	38.62
1	1,016	34.63	73.24
2	543	18.51	91.75
3	193	6.58	98.33
4	39	1.33	99.66
5	8	0.27	99.93
6	2	0.07	100
Total	2,934	100	
Remuneration committee size			
2	95	3.24	3.24
3	1,032	35.17	38.41
4	1,068	36.4	74.81
5	517	17.62	92.43
6	164	5.59	98.02
7	37	1.26	99.28
8	17	0.58	99.86
9	4	0.14	100
Total	2,934	100	