
The Impact of Regulating Board Gender Diversity on The Trickle-Down Effect: An Attention-Based View

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ABSTRACT

Research question/issue: Using an attention-based perspective of the firm, this study explores whether regulatory targets mandating women's representation on corporate boards change the coordination of board and senior management appointment outcomes.

Research findings/insights: Using a natural experiment design, in which British publicly traded firms encountered an exogenous regulatory shock on board gender composition, we uncover that regulation caused a disconnect of outcomes between the corporate board and senior management team, and, as a consequence, the trickle-down effect from appointing women at board level was removed after regulatory targets were implemented.

Theoretical/academic implications: The study adds to literature on attention, providing empirical evidence that lower levels of attentional coherence are observed between the corporate board and senior management team after a major exogenous shock in the firm's external environment. Departing from neo-institutional research investigating women in leadership and corporate governance, this study puts forward the attentional approach to explore the wider impact of legislating women's representation on corporate boards.

Practitioner/policy implications: Shifting board level attention towards the target of external regulatory requirements, and away from the internal environment, has an adverse impact on positive trickle-down effects once observed from appointing women to board level positions.

Keywords

Gender diversity, Regulation, Corporate board, Trickle-down effect, Attention.

1. INTRODUCTION

A growing body of research has found evidence that regulatory interventions on board gender diversity, such as mandated or voluntary gender quotas, have produced an overwhelmingly positive increase in the representation of women on corporate boards (e.g., Sojo et al., 2016; Wang & Kelan, 2013; Grosvold & Brammer, 2011; Seierstad & Opsahl, 2011). A number of studies in non-regulated environments also show relationships between increases to women's representation at board level and subsequent appointments of women at senior management level, known as 'the trickle-down effect' (Gould, Kulik, & Sardeshmukh, 2018). Researchers have attempted to explain why non-mandatory regulation influences the appointment of women to board level positions (e.g., Terjesen & Sealy, 2016; Grosvold & Brammer, 2011). However, the question of whether shifting board level attention towards external regulatory demands also diminishes attention away from the internal environment, has been mostly unexplored. As a result, the impact such regulation has on the integration of attention and action between boards and their senior management teams is unknown. Might a shift in board level attention towards external regulatory requirements, and away from the internal environment, have an adverse impact on intra-firm appointment outcomes that have historically produced a positive 'tickle-down effect' from appointing women to board level positions?

The attention-based view of the firm (Ocasio, 1997) was proposed as a means to explain top management decision making and adaptation. Building upon work in the Carnegie School tradition (Cyert & March, 1963; March & Simon, 1958; Simon, 1947), Ocasio defines attention as "noticing, encoding, interpreting, and focusing time and effort by organisational decision makers" on issues (e.g., problems, opportunities, and threats) internal and external to the firm, as well as the possible actions (e.g., strategic choices) available to help top managers resolve issues (Ocasio, 1997, p. 189). Firms are overloaded with internal and external stimuli that give information about potential issues (Barnett, 2008; Simon, 1947). Due to limited attentional

resources, board members must apply heuristic principles or cognitive shortcuts to simplify decision making practices (Hayward, Rindova, & Pollock, 2004; Puffer & Weintrop, 1991), and, as a consequence, board level attention is limited to salient stimuli internal or external to the firm (Rerup, 2009; Ocasio, 1997). Board level attention toward internal and external stimuli thus reflects a biased interpretation of the firm's environment (Hoffman & Ocasio, 2001), as board level attention is directed toward "events, developments, and trends that an organisation's members collectively recognize as having some consequence to the organisation" (Dutton & Dukerich, 1991, p. 518).

An important stimulus for board level attention is a major exogenous shock in a firm's external environment (Ocasio, 2011; Nigam & Ocasio, 2010; Hoffman & Ocasio, 2001). A major exogenous shock could include, for example, changes in institutional logics (Thornton & Ocasio, 1999); regulations (Barreto & Patient, 2013; Rerup, 2009; Cho & Hambrick, 2006; Hung, 2005); and industrial environments (Nadkarni & Barr, 2008). Board members interpret major exogenous shocks by paying attention to salient dimensions of the shock, such as whether the shock represents an opportunity or threat to the firm (Ocasio, 1997), which then guides subsequent board level strategic choices and action (Cho & Hambrick, 2006; Hung, 2005). Given that the attention-based view is well suited for exploring exogenous shocks in a firm's external environment, it is somewhat surprising that little-to-no research has adopted Ocasio's (1997) attention-based view of the firm when exploring regulation and its impact on the appointment of women within a firm. Furthermore, interestingly, literature is yet to empirically investigate how an external shock, such as change in regulation, influences the integration of attention and action between the two groups that form the top management teams of a firm, namely the corporate board of directors and senior management team.

The extent to which attention is directed towards an external exogenous shock could vary across a firm's top management team. The corporate board, comprising of executive

directors (e.g., CEO, COO, CFO) and independent nonexecutive directors, must monitor the internal operations of a firm (Baysinger & Hoskisson, 1990) whilst simultaneously scanning and attending toward changes in the firm's external environment (Hambrick, 2007). The senior management team, comprising of operational directors (divisional heads, and functional heads), reflect a group of managers who have control the internal operations of firm, such as setting organisational goals, developing plans, and strategic decision making (Martin, 2011). The corporate board and senior management team are therefore likely to vary in the specific goals, interests, and identities relevant to their positions within a firm's structure, and this could shape the allocation of attentional focus towards a given external shock in a firm's environment (Rerup, 2009; Barnett, 2008; Ocasio, 1997). An exogenous regulatory shock that specifically targets the corporate board could, therefore, drive heterogenous attention and action between the board and senior management team, as top managers attend towards aspects of the shock that are most salient their structural position within a firm (Barretto & Patient, 2013). Based upon attentional literature, regulation on board gender diversity could have the unintended impact of causing incoherence between corporate board and senior management attention towards appointing women in leadership roles, and, as a consequence, trickle-down effects from appointing women at board level are likely to diminish.

Thus, this study employs an exogenous shock, or natural experiment, methodology to answer the following research question: *what impact does regulation on women's representation at board level have on the coordination of board and senior management appointment outcomes?* The context of our study is the United Kingdom's FTSE¹ index between 2007-2014 during this period of time, in 2011, the British Government implemented a 'soft-law' regulatory target stipulating that large public firms should have twenty-five percent of their board positions held by women. This natural experiment, thus, serves as a context in

¹ Financial Times Stock Exchange – the London-based prime-listing of all publicly listed companies

which corporate boards were abruptly confounded with new external regulatory goals, expectations, and norms concerning the appointment of women at board level. By measuring the representation of women at board level and senior management, we are able to explore for the first time how changing a board's attention focus towards external regulatory stimuli influences the outcomes of appointment practices between the corporate board and senior management team.

2. THEORETICAL BACKGROUND

2.1 Board level attention

It is well recognised that the corporate board of the firm is responsible for a firm's key strategic decisions (Thompson, 1967). In particular, the corporate board is directly involved in making decisions in response to external changes, shocks, or critical events in a firm's environment. Early Carnegie School approaches, namely The Behavioural Theory of the Firm (Cyert & March, 1963), argue that cognitive limitations force board members to demonstrate selective attention when attempting to understand their environments, meaning that corporate boards must attend towards specific parts of the firm's internal and external environment. The attention of the corporate board, therefore, is derived from heuristics, shortcuts, or subjective representations that provide a lens through which board members can interpret salient dimensions or aspects exogenous shocks in the external environment, guiding subsequent strategic choices and action.

In literature on attention, Ocasio's (1997) attention-based view has proven to be a highly influential theory to explain how board members attend to a firm's internal and external environment. In following early Carnegie school approaches (Cyert & March, 1963; March & Simon, 1958; Simon, 1947), the attention-based view argues that top management attention is influenced by both cognition and social structure. Ocasio's (1997) original formulation of the

attention-based view posited that attention is influenced by three principles: *focused attention*; *situated attention*; and *structural distribution of attention*. The principle of *focused attention* assumes that board level attention is constrained by a limited capacity to process external stimuli, and subsequent firm action reflects where the attention of the board was directed. For example, Yadav and colleagues (2007) observed that board level attention towards ‘the future’ caused a subsequent positive shift in long term firm innovation activity. Building on literature from social psychology (Cialdini, Reno & Kallgreen, 1990; Cialdini, Kallgreen, & Reno, 1991), the principle of *situated attention* states that the social context in which the board is embedded shapes attention and subsequent action. For example, Hung (2005) noted how board level embeddedness within the national government increases firm attention and action towards national regulation. Thirdly, the principle of *structural distribution of attention* states that the context individuals find themselves in, and how they attend to it, depends on how attention is distributed and controlled across actors who participate within a firm’s procedural and communication channels. For example, work by Ocasio and colleagues has shown how communication practices within a firm can facilitate the integration of attention across levels, units, and groups within a firm’s structure (Ocasio, Laamanen, & Vaara, 2018; Joseph & Ocasio, 2012). Together, the core principles of the attention-based view demonstrate how both cognition and social structure influence board attention, and how board attention is coordinated across the firm through communication channels.

Recent additions to the attention-based view have further developed the processes underlying variation in the way that actors focus their attention on a given exogenous shock in the firm’s environment. The concept of attention selectivity, or *attention selection*, describes the process of selecting stimuli to which one will attend in contrast to others (Ocasio, 2011). Literature on attention selection suggests that salient and relevant information attracts the attention of actors and thus stands out in the immediate context (Li et al., 2013). However, the

saliency of external stimuli can vary depending on the distance of an external shock from the social context in which an actor is embedded (Barreto & Patient, 2013; Rerup, 2009). Thus, the perceived saliency of an external shock event can vary across a firm's sub-systems (units, levels, sub-groups) which could ultimately drive heterogenous (or homogenous) attention and action between levels, units, and groups within a firm.

To explicate how the external shock of regulation on board gender diversity influences the outcomes of appointment practices, we use literature on attentional selection to outline how a firm's corporate board selectively attend toward new issues in the external environment, and away from routine internal patterns of attention that previously coordinated the appointment practices of the board and senior management team. Drawing from prior work on the attention-based view, we consider two aspects of attentional selection: the coherence of attention and the specialisation of attention. The *coherence of attention*, also referred to as the integration of attention (Joseph & Wilson, 2017), reflects the joint attention towards a given issue between firm divisions, functions, or groups. The *specialisation of attention* reflects the selective focusing of attention on new issues within a given division, function, or group. We shall consider how a change in regulation influences these patterns of attentional selection, and how this affects the appointment of women within the corporate board and senior management team.

2.2 Attentional coherence: the trickle-down effect.

Attentional coherence refers to how similar or compatible attention selection is across levels, units, groups, and people within a firm. The coherence of attention between groups is largely achieved through the integration of a firm's communication channels and the communication between firm members (Ocasio, Laamanen, & Vaara, 2018; Joseph & Ocasio, 2012). Attentional coherence between firm sub-systems (e.g., units, levels, sub-groups) helps firms avoid ambiguity in decision-making activities, thus providing consistency in action across a

firm sub-system (Ocasio & Joseph, 2018; Kaplan & Tripsas, 2008). At high levels of attentional coherence, there is a ubiquitous understanding between firm members regarding what initiatives should be given effort and resources. Thus, with attentional coherence, different areas of a firm's sub-structure are more likely to channel resources to shared salient issues. The coordination of attention to specific issues thus facilitates the alignment of attention and action between levels, units, functions, and sub-groups within a firm.

Attentional coherence is more likely to occur in the absence of external shocks in the firm's environment. In the absence of significant change in the external environment, the corporate board is more likely to attend towards issues internal to the firm, increasing the level of attentional coherence between the corporate board and senior management team (Rerup, 2009). Thus, in the absence of an external regulation, board level attention and action should be informed by salient issues internal to the firm.

A number of empirical studies, all of which have been conducted in non-regulated environments, have found evidence of a positive trickle-down effect after women are appointed to board level positions (Gould, Kulik, & Sardeshmukh, 2018; Skaggs, Stainback, & Duncan, 2012; Masta & Miller, 2011; Bilimoria, 2006; Cohen, Broschak, & Haveman, 1998; Pfeffer, Davis-Blake, & Julius, 1995). The trickle-down effect refers to a top-down process where the appointment of women to board level positions leads to the subsequent appointment of women lower down in the corporate hierarchy. This effect is the product of an endogenous process in which the attention and action of the corporate board and senior management team are aligned when appointing women to leadership positions. Thus, the trickle-down effect is consistent with the concept of attentional coherence (Rerup, 2009).

Based upon literature on attentional coherence, we argue that, in the absence of a shock in the external environment, corporate board and senior management team recruitment

decisions are motivated by attention towards similar salient issues internal to the firm, which contributes towards a positive trickle-down effect when women are appointed to board level positions.

Hypothesis 1: In the absence of external regulatory shock, there will be coherence in the attentional focus of the corporate board and senior management team, such that an increase in representation of women at board level will improve women's representation in senior management positions.

2.3 The specialisation of attention: targeted regulation at board level.

An important stimulus for corporate boards is external regulatory change (Hoffman & Ocasio, 2001; Nigam & Ocasio, 2010; Cho & Hambrick, 2006). As such, the introduction, or removal, of regulation reflects a major exogenous shock in the firm's external environment, causing a shift in the strategic context faced by board members. Regulation, thus, amounts to an environmental shift that causes the attention of the corporate board to be directed towards the external environment (Thornton & Ocasio, 1999; Hung, 2005; Rerup, 2009). For instance, after regulatory change in the aviation industry, board level attention and action shifted towards an entrepreneurial orientation, which reflected the new deregulated external environment (Cho & Hambrick, 2006). Therefore, in response to new regulatory requirements, the board may shift its attention towards the expectations of the external regulator, causing the attention and action of the board to be orientated in line with external regulatory demands.

Across countries, national regulation on board gender diversity takes one of two forms, either hard law regulation or soft law regulation (Terjesen, Aguilera, & Lorenz, 2015; Aguilera et al. 2012; Abbott & Snidal, 2000) Hard law regulation can be defined as a legally binding quota set by a national government with penalties for non-compliance, this coercive pressure ensures a firm's corporate board must follow regulatory requirements. Alternatively, soft law

regulation can be defined as a non-binding target set by a national government. Under such conditions normative pressure encourages a firm's corporate board to comply with voluntary targets. In response to the introduction regulation, through normative and coercive pressures, board members must attend towards, and subsequently act upon the expectations of external regulation in order to satisfy customers, shareholders, and other important stakeholders alike.

The shift in attention towards regulatory demands may not be ubiquitous amongst a firm's top management team. An important source of heterogeneity in top management team attention to an external shock is the structural position of the group within the firm, as groups located in structurally distinct areas of a firm act upon specific goals, interests, and identities linked to those positions and, as a result, the corporate board and senior management team could show "differentiated attention to different aspects of the organisations environment" (Ocasio, 1997). This pattern of selective attention reflects the specialisation of attention. The specialisation of attention is defined here as the selective focusing of the attention of actors on discrete segments of the external environment. Thus, the extent to which a given group devotes attention to an external regulatory shock will vary depending upon whether the interests of a particular group are more directly and immediately affected by the focal external shock (Barreto & Patient, 2013).

Regulation on board gender diversity serves as a mechanism for specialising corporate board attention, as regulation highlights a salient external issue (i.e., a lack of board gender diversity) and a solution to resolve the issue (i.e. reaching a mandated percentage of women at board level). The specialisation of board level attention towards the external regulatory demands is likely to create an attentional incoherence between the board and senior management team, as senior management team attention and action regarding gender diversity will remain driven by issues internal to the firm. Supporting this argument, interviews have suggested that whilst Australian regulation on board gender diversity has prompted action at

board level, women remain poorly represented in management positions where appointment decisions are driven by processes internal to the firm, such as firm cultures that perpetuate the underrepresentation of women in senior positions (Klettner, Clarke, & Boersma, 2016).

We, therefore, argue that an external regulatory shock, that sets mandated targets on appointments of women to corporate boards, should cause incoherence in the attention and action between the corporate board and senior management team. Given that the board is the focus of most regulatory interventions, the distance between the shock and board is very small, and, as a consequence, we expect members of the corporate board to show high levels of attention towards external regulatory change. The senior management team, however, is of greater distance from the focus of this regulatory shock, meaning that the senior managers are less likely to attend toward, and subsequently act upon, board gender regulation. Therefore, after regulatory change, board level attention and action shifts to the external environment, meaning that there is a lack of coherence between the appointment practices of the corporate board and senior management team.

Hypothesis 2: After regulatory shock, there will be incoherence in the attentional focus of the corporate board and senior management team, meaning that increases in representation of women at board level will no longer improve the representation of women in senior management positions.

1. METHOD

4.1 Sample and data

To test our hypotheses, we focused on the 209 publically listed firms that were consistently listed on the FTSE 350 Index during the period of 2007 to 2014. We removed firms with no registered employees from our analyses, such firms were mostly from the investment sector,

resulting in a total sample of 181 large public firms, with a total of 1448 organisation-year observations.

The period of 2007 to 2014 was chosen because the timeframe reflects a “natural experiment” containing an exogenous external shock, whereby regulatory targets for board gender diversity were set across the FTSE 350 Index. Specifically, we exploit an intervention by the U.K. government in 2011, in which a highly visible soft-law voluntary target was set for all organisations listed on the FTSE 350 Index. The pre-intervention period (2007 to 2010) was characterised by a lack of external regulatory pressure placed on FTSE 350 firms to increase the number of women on corporate boards. However, in February 2011, to address the lack of gender diversity, the U.K. government announced targets that required FTSE 350 organisations to aim for a minimum of twenty-five percent female representation on their boards by 2015. During the post-intervention period (2011-2014) companies were under external regulatory pressure to increase female representation at board level. Through the use of this natural experiment, we utilised the random variation caused by the implementation of regulation on board gender composition, which allowed us to investigate the impact regulation has on the coordination of board and senior management appointment practices.

A problem frequently encountered by researchers utilising secondary data on corporate boards is the issue of endogeneity (Adams, 2016). Our use of a natural experiment resolves the issue of endogeneity. Our natural experiment uses regulatory change as an external exogenous shock, independent of company level factors, which allows us to observe the relationship between the appointment outcomes of a firm before and after the intervention. The use of this method, as advocated by Reeb and colleagues (2012) and Adams (2016), allows us to conclude that any change in firm outcomes before and after the implementation of regulation is due to the external exogenous shock, rather than reflecting an endogenous relationship between variables.

The demographic data on a firm's corporate board and senior management team was retrieved from BoardEx. Additional company-level data relating to financial performance, firm size and firm characteristics were obtained from Fame UK; COMPUSTAT; and company reports.

4.2 Variables of interest

The trickle-down effect. The trickle-down effect was measured by modelling the relationship between the representation of women at board level and senior management. The outcome variable was female representation in senior management. This measure was calculated as the proportion of women in senior management, by dividing the number of female senior managers by the total number of senior managers within a company. The predictor variable for the analysis was female representation at board level. This measure was also calculated as a proportion, by dividing the number of female board members by the total number of board members within a company. The use of a proportion, rather than raw count data, is a commonly used approach when analysing female representation in senior leadership (Adams & Ferreira, 2009; Terjesen, Couto, & Francisco, 2016). To investigate a lagged trickle-down effect, we used the predictor variable with a time lag of 1 year. In our analyses, the relationship between the outcome and predictor variables indicated the strength of the trickle-down effect within an organisation, a positive coefficient indicated that an increase in the number of women at board level was also associated with an increase in the representation of women in senior management positions.

4.3 Natural experiment.

To discern the impact of the natural experiment, we investigated the variation in the 'trickle-down effect' before and after the implementation of regulation, to do this we partitioned our data into two time periods: (1) pre-regulation period (2007-2010) and (2) post-regulation period (2011-2014). We then estimated the interaction between our variables of interest (i.e., the

trickle-down effect) with the time intervention, the resulting interaction revealed the impact regulation had on the appointment outcomes of the corporate board and senior management team.

4.4 Control variables.

We control for firm specific variables that are likely to influence the trickle-down effect:

Firm performance. Firm performance is often conceptualised using both market-based measures of performance, Tobin's Q, as well as accounting measures of performance, return on assets (ROA). Tobin's Q is a ratio of an organisation's market value to its book value of assets. ROA is the ratio of an organisation's net income to its book value of assets. A large body of research has identified a relationship between measures of organisational performance and gender diversity within leadership positions (see, for a review, Kirsch, 2018). Therefore, we included two measures of firm performance, Tobin's Q and ROA, within our model to account for any relationship between an organisation's performance and gender diversity within leadership teams.

Firm size. Prior research has reported that smaller organisations provide women with fewer opportunities for career advancement, as such organisations have fewer provisions set aside for improving gender diversity in senior management (Judge et al., 1995). As a result, larger organisations, relative to smaller organisations, have a larger proportion of women in senior management positions (Nkomo & Cox, 1989). We account for a firm's size using the log total number of employees. A positive relationship was expected between firm size and gender diversity in senior leadership.

Size of senior management team. The size of the senior management team could be associated with an increase in the representation of women in senior management. For instance, larger senior management teams could have a higher rate of turnover, which could increase

gender diversity due to an increasing number of vacancies to be filled (Pfeffer, 1983). We account for the size of an organisations senior management team by controlling for the number of employees in senior management positions.

Board-level controls. We accounted for several board controls that could influence an organisation's decision to improve gender diversity within its senior leadership. We controlled for board size (i.e., total number of directors) because larger boards tend to be less effective at decision making and monitoring (Linck, Netter, & Yang, 2008). We added CEO duality, a context where a single individual holds the position of chairman and chief executive officer, the presence of CEO duality could jeopardise the ability of a board to effectively monitor senior management, as the focal CEO wields high levels of power over board proceedings (Hayward & Hambrick, 1997; Zajac & Westphal, 1996). Finally, we controlled for Board independence, measured using the ratio of non-executive directors to overall board size, as boards that are more independent are better able to steer board decision processes in a way that favours company stakeholders, such as employees, customers, and shareholders (Linck, Netter, & Yang, 2008; Ryan & Wiggins, 2004).

4.5 Estimation technique.

The purpose of our study was to investigate how regulation on board gender composition influences the trickle-down effect. The longitudinal structure of our data allowed us to test hypotheses using ordinary least square estimation techniques for panel data. A Hausman test confirmed that fixed effect models were appropriate. The use of fixed effect models, which implicitly compare each organisation with itself, account for idiosyncratic and unobservable differences between organisations, and, therefore, we did not need to control for any differences between organisations as the model already captured between organisation heterogeneity. To account for heteroskedasticity all models used robust standard errors.

5. RESULTS

5.1 Descriptive statistics

Table 1 reports the correlation matrix and descriptive statistics for the whole sample across the period of 2007 to 2014. The descriptive statistics indicate that women held an average of 23.66% of senior management positions across companies listed on the FTSE 350 Index. The representation of women was lower at board level, with women accounting for 11.03% of board level positions. In line with the assumptions of attentional coherence between the corporate board and senior management team, the overall female representation in senior management was positively and significantly related to female representation at board level. The representation of women in senior management was also positively correlated with Tobins Q and ROA. The representation of women in senior management was negatively correlated with the number of employees.

[Insert Table 1 roughly here]

The descriptive statistics for the pre and post regulation periods are presented in Table 2. The external regulatory shock had a positive and significant effect on female representation at board level, with the average representation of women at board level increasing from 8.06% to 14.01%. However, such increases in female representation were not observed lower down in the corporate hierarchy, with the intervention having no impact on the representation of women in senior management. The descriptive statistics are consistent with our hypotheses, as the regulatory shock led to an increase in the number of women at board level, but such increases were not observed at the level of senior management. These findings are consistent with our argument that after regulatory change, board level attention and action shifts to the external environment, meaning that there is a lack of coherence between the outcomes of appointment practices of the corporate board and senior management team.

[Insert table 2 roughly here]

To test for the presence of multicollinearity, we followed the procedures outlined by Neter, Wasserman, and Kutner (1985). Variance inflation factors (VIFs) were used to test for collinearity within our dataset. None of the VIF scores exceeded a value of 10, the most commonly used threshold indicating collinearity problems, and the mean VIF for the full model was 2.00. These results suggested that multicollinearity did not significantly influence our results.

5.2 Results

Table 3 presents the results of the least squares fixed-effects panel regression models used to test our hypothesis. Model 1 represents our base model containing only control variables and shows that Tobin's Q is significantly positively associated with the proportion of women in senior management, whereas the size of the senior management team is significantly negatively associated with the proportion of women in senior management. The subsequent model, Model 3, included the interaction effects of the variables of interest. In general, the results provide strong support for hypothesis 1 and 2: the interaction between women on boards and the intervention period is negative and significant ($\beta = -0.067$, $p = .01$) indicating that the association between female board representation and female representation in senior management is weakened by the introduction of regulation on board gender composition. To explore this interaction effect further, we interpreted the average marginal effects. In support of hypothesis 1, the relationship between female board representation and female representation in senior management was significant and positive before the introduction of regulation on board gender composition ($\beta = 0.067$, $p = .003$), thus a trickle-down effect was observed prior to regulation. These results are in line with past findings in attentional literature (Rerup, 2009), lending support for our argument that, in the absence of a shock in the external

environment, corporate board and senior management team recruitment decisions are motivated by coherent attention towards similar salient issues. In support of hypothesis 2, after the introduction of regulation on board gender composition there was no association between women at board level and women in senior management ($\beta = -0.001$, $p = .994$), thus the trickle-down effect dissipated after an exogenous regulatory shock. Such findings support our argument that, after regulatory change, board level attention and action shifts to the external environment, meaning that there is a lack of coherence between the appointment practices of the corporate board and senior management team.

[Insert Table 3 roughly here]

5.3 Robustness checks

We conducted a series of robustness checks to further validate our findings (for results, see, online appendix). First, we repeated our analyses by further lagging our dependent variable - by 2 and 3 years - and we obtained identical results to those reported in Table 3.

Second, we repeated our analysis using alternative measures of female representation at board level and senior management, using a count variable as a measure of female representation. The results are identical to the findings reported in Table 3. Furthermore, as an additional robustness check, we repeated our analysis by restricting the sample of women at board level to both independent directors and executive directors. Once again, the two models yielded results identical to those reported in Table 3.

Finally, to ensure our decision to omit organisations with no registered employees did not bias results, we repeated our analysis using all 209 organisations. The results of this analysis were, once again, consistent with the findings reported in Table 3. We, therefore, believe there is sufficient evidence to conclude our results are robust.

6. DISCUSSION

We set out to answer the question, what impact does regulation on women's representation at board level have on the coordination of board and senior management appointment outcomes? To answer this question, we used a natural experiment, in which the British government implemented regulatory targets on board gender composition, capturing variation in the trickle-down effect before and after an external regulatory shock. Our results suggest that regulation on board gender composition caused attentional differentiation between the corporate board and senior management team. Since the regulatory shock specifically targeted board level appointment outcomes, board level attention and action were influenced by the firm's external environment, thus creating a lack of coherence between the appointment outcomes of the corporate board and senior management team.

The findings provide an explanation for the occurrence of an increasingly studied phenomenon in literature: that the implementation of regulation on board gender diversity has no discernible impact on the representation of women in senior management (e.g., Bertrand et al., 2019; Klettner, Clarke, & Boersma, 2016). Using attentional literature as an orientating theoretical framework, our results suggest that external regulation on board gender diversity has the unintended consequence of focusing the board's attention so closely on the target of the external regulation (the board itself), that this is at the expense of attention that was previously also directed within the firm. Thus, the implementation of regulation on board gender diversity has the unintended consequence of loosening the once tightly coupled attentional processes that connected the appointment of women to board level and senior management teams, and, as a consequence, the 'trickle-down effect' from appointing women at board level is no longer observed.

Our study contributes to research on external shocks and top management attention. Scholars have examined how changes to a firm's external environment contribute towards a shift in the attention of a firm's corporate board. For instance, external changes to institutional logics (Thornton & Ocasio, 1999); regulation (Rerup, 2009; Cho & Hambrick, 2006; Hung, 2005); and industrial environments (Nadkarni & Barr, 2008), have been found to cause a subsequent shift in board level attention and subsequent strategic action of the firm. We extend this research by uncovering how targeted regulation can lead to heterogeneity in the attention and action of top management teams, extending prior work investigating variance in attention towards deregulation (Barreto & Patient, 2013). Our findings also provide an empirical evidence to support untested observations of higher (lower) levels of attentional coherence between firm subgroups in the absence (presence) of a major external shock in the firm's environment (Rerup, 2009).

This study also contributes to research on women in leadership. To our knowledge, this is the first study to use the attention-based view of the firm (Ocasio, 1997) to investigate gender composition of corporate boards and senior management teams. This reflects a move towards a socio-cognitive approach to studying and understanding the impact of regulation on gender diversity, moving away from commonly used macro-level approaches, such as the neo-institutional theory (Terjesen & Sealy, 2016; Terjesen, Aguilera, & Lorenz, 2015; Grosvold & Brammer, 2011). Our findings also highlight how the use of an attentional approach can help scholars gain a understanding of how shocks, or change events (Hoffman & Ocasio, 2001), in a firm's external environment can influence attention and actions within the firm, at the individual level.

Findings from this study have important practical implications. First, our results show that regulation on board gender diversity diminished the trickle-down effect from appointing women at board level positions. Specifically, our findings suggest that targeted regulation on

board gender composition causes a disconnect in attention between the corporate board and senior management team. In other words, the implementation of regulation shifts board level attention towards the external environment, and away from the firm's internal environment. Policymakers could resolve this issue by decreasing the *shock distance* between the senior management team and focal regulatory shock. For instance, this could be achieved through setting mandated quotas or targets on the representation of women in the senior leadership positions below board level – which subsequently became the case in the UK. Second, in governance environments where regulation on board gender diversity has been implemented by the national government (for a review, see, Terjesen, Aguilera, & Lorenz, 2015), our results suggests that the representation of women at board level could reflect a less accurate measure of firm's attention towards gender diversity, as board level appointments are motivated by attention towards a firm's external (rather than internal) environment. This could have important implications for shareholders, customers, researchers, as well as other important stakeholders alike, who traditionally have used board level gender diversity as a measure to establish if a firm engages in acceptable social and ethical corporate practice. Instead, our findings suggest that measuring the proportion of women in other senior positions below board level, such as within the senior management team, could be a more accurate measure of a within-firm orientation to promote gender diversity.

We want to acknowledge some limitations in our study which could inform future research. Our focus on the British context provided us with a natural experiment to observe the impact of an external regulatory shock. Yet, this reflects a limitation with our study. Here we only focus on the implementation of “soft law” regulation, where organisations are recommended to comply with voluntary targets, meaning we are unable to state whether constant findings would be observed in other countries, such as Norway and Germany, where “hard law” regulatory quotas have been implemented (Abbott & Snidal, 2000; Terjesen,

Aguilera, & Lorenz, 2015). In such contexts, where firm's are punished for non-compliance with quotas, boards should face increased coercive pressure to comply with the demands of external regulation, and, as a consequence, this may further exacerbate the disconnect in appointment outcomes between the corporate board and senior management team. Future research can investigate if our arguments hold in other national environments that have implemented alternative forms of regulation, such as "hard law" regulatory quotas.

Whereas prior research has adopted a neo-institutional approach to study the impact of regulation on board gender diversity, this study highlights how an attentional perspective can explain how an external regulatory shock influences the action of individuals within a firm. We show how the corporate board and senior management team vary in their attention towards regulation on board gender composition, and how this ultimately leads to heterogeneity between board level and senior management appointment outcomes. We hope this study can motivate more research exploring the extended impact of external regulatory shocks on board gender composition, and we hope our use of the attention-based view (Ocasio, 1997) provides new insights for research in this field.

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Table 1.
Correlations

Topic ID	Mean	SD	1	2	3	4	5	6	7	8
1 % Women snr. mgmt.	23.66	12.95								
2 % Women board	11.03	10.43	0.133							
3 Tobin' s Q	1.22	2.83	0.106	0.055						
4 Return on assets	13.79	30.99	0.052	-0.007	0.455					
5 Employees (log)	3.57	0.1	-0.089	0.213	-0.106	-0.024				
6 Snr mgmt. size	36.65	29.9	-0.032	0.27	-0.108	-0.077	0.411			
7 Board size	8.86	2.48	-0.017	0.258	-0.088	-0.077	0.316	0.48		
8 Board independence	0.65	0.12	-0.033	0.17	-0.048	-0.095	0.024	0.145	-0.035	
9 Dual CEO	0.03	0.18	-0.004	0.001	-0.005	-0.001	-0.001	0.083	0.075	0.172

Note: n = 1448. Correlations greater than or equal to 0.05 are significant at p < 0.05.

Table 2.

Summary statistics

	Pre-regulation (2007- 10)			Post-regulation (2011-14)			Difference	<i>p</i> - value
	Mean	Median	SD	Mean	Median	SD		
% Women snr. mgmt.	23.14	22.65	12.37	24.19	23.27	13.50	1.05	.122
% Women on board	8.06	7.14	9.54	14.01	14.29	10.44	5.95	<.001
Tobin's Q	1.01	0.70	1.31	1.42	0.79	3.77	0.40	.007
Return on assets	12.94	10.58	34.66	14.65	10.93	26.83	1.70	.30
Employees (log)	3.55	3.63	1.01	3.59	3.67	0.98	0.05	.32
Snr mgmt. Size	39.80	31.00	32.49	33.50	26.00	26.93	-6.30	<.001
Board size	8.82	8.00	2.55	8.89	9.00	2.41	0.07	.61
Board independence	0.63	0.63	0.13	0.67	0.66	0.11	0.04	<.001
Dual CEO	0.04	0.01	0.19	0.03	0.01	0.16	-0.01	.18

Table 3.

Fixed effects panel regression for women in senior management.

	Model 1	Model 2	Model 3
Tobin's Q	0.062** (0.029)	0.035** (0.013)	0.040** (0.013)
Return on Assets	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)
Employees (<i>log</i>)	-0.372 (0.696)	-1.381 (0.853)	-1.413* (0.836)
Snr mgmt. size	-0.053** (0.017)	0.006 (0.018)	-0.010 (0.018)
Board Size	0.075 (0.061)	0.046 (0.064)	0.046 (0.065)
Board Independence	0.496 (1.580)	-1.348 1.709	-1.859 (1.721)
Dual CEO	-4.069 (2.618)	-3.914 (2.653)	-4.37 (2.671)
Women on Board		0.0284 (0.019)	0.067** (0.022)
Regulation		1.036*** (0.285)	1.577*** (0.405)
Regulation*Women on Board			-0.067** (0.026)
Year Dummies	Incl.	Incl.	Incl.
Constant	25.99*** (2.945)	28.103*** (3.287)	28.907*** (3.324)
R ²	0.04	0.07	0.08

Note: n = 1448

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