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Females and Precarious Board Positions: Further Evidence of the Glass Cliff

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The 'glass cliff' posits that when women achieve high profile roles, these are at firms in precarious positions. Previous research analysed appointments (male/female), estimated the precariousness of firms involved and drew inferences about the glass cliff. This study is different as it directly tests the relationship between a precarious situation and changes in board gender diversity. The sample is companies listed on the UK stock exchange reporting an initial loss in the years 2004–2006. A matched control sample is used in a difference-in-differences analysis to avoid inadvertently attributing improvements arising from societal/regulatory changes in gender diversity to the loss event. Findings suggest that when the loss is 'big' there is a difference in the increase in gender diversity versus both the control and the 'small' loss subsamples, i.e. compelling evidence of the glass cliff. In the context of ongoing political and social debates about women on boards our work (i) identifies continuing structural barriers for women ascending to board level in that women are more likely to be over-represented on boards of companies that are more precarious and (ii) sounds a note of caution about celebrating increased gender diversity on boards without considering the precariousness of the company involved.

Introduction

Women who aspire to positions of leadership are often confronted with barriers that block their progress (Kanter, 1977). Some inroads have been made over the past two decades such that cracks are appearing in the glass ceiling (Davidson and Cooper, 1992; Dreher, 2003; Goodman, Fields and Blum, 2003; Stroh, Langlands and Simpson, 2004). Indeed, at the level of the corporate board several countries including Norway, Spain and France (among others) have mandated quotas for female board members, although the Davies Report (2011) did not recommend minimum quotas in the UK but rather a target of 25% by 2015 for the FTSE 100. While the issue of gender diversity has certainly received attention, the promise of greater diversity on corporate boards does not seem to have been delivered upon and there is clear evidence that gender discrimination exists and persists (Adams *et al.*, 2007; Adler, 2000; Sealy and Vinnicombe, 2013; Sealy, Singh and Vinnicombe, 2007).

Continued stark gender imbalance on corporate boards is perhaps even more surprising given that the past 20 years have seen growing media and political interest in gender diversity on boards. Regulatory pressure has increased recently in this domain following EU Commissioner Reding's proposed legislation on gender quotas (objective of 40% of the under-represented sex in non-executive board member positions by 2020). Recent research (Ryan and Haslam, 2005, 2007) has shifted the emphasis from the glass ceiling and the subtle processes that keep women from positions of organizational leadership to those circumstances where women *do* achieve positions of organizational leadership (Agars, 2004; King, 2006; Schmitt, Ellemers and Branscombe, 2003). The authors found evidence that women are more likely to achieve board positions when those positions are associated with a

state of crisis and a high risk of failure in their UK study of board appointments – a phenomenon termed the glass cliff.

Our paper contributes to ongoing and topical debates about continuing patterns of under-representation of women on corporate boards and in particular the stream of work exploring the existence of, and causes for, the phenomenon known as the glass cliff (Adams, Gupta and Leeth, 2009; Broadbridge and Hearn, 2008; Haslam *et al*., 2010; Marshall, 1995; Ryan and Haslam, 2005, 2009). Our work identifies differences in gender diversity based on situational factors, i.e. the severity of the company's loss. The findings add to our theorizing about how risk/precariousness underpins what on the face of it may be seen as advancement in gender diversity on boards. Highlighting how discriminatory patterns, particularly in the context of 'big' losses (and thus greater risk), continue to be played out at board level helps us to engage in a more nuanced discussion about women on corporate boards. It may also explain some of the evidence that, following years of incremental improvement corresponding to crisis and recession, there has been a decrease in the percentage of female directors as that crisis has receded.

The glass cliff

In parallel to an explicit focus on gender representation, ideas about what it takes to be an effective leader have moved from the traditional 'heroic individual' styles to more transformative, relational or post-heroic styles of leadership deemed to be more appropriate in the modern business context (Binns, 2008). Indeed in the 1990s a trend emerged lauding female leadership traits (soft skills such as empathy, relational or more collaborative styles etc.) as being superior to male traits (such as toughness, competitiveness etc.) (Helgesen, 1990; Rosener, 1990). Presciently, as it turns out, 20 years ago Calas and Smircich (1993) warned of the potential dangers inherent in essentializing male/female leadership traits as the more senior roles 'are still typed as needing toughness and other stereotypes of male management' (Calas and Smircich, 1993, in Marshall, 1995, p. 58). As Binns and Kerfoot (2011) point out, the problem for women who aspire to leadership positions has been that 'the good leader is defined according to normative masculinity' (p. 257) or, as Schein (1975) termed it, the 'think manager think male' bias (TMTM), wherein most people associate the attributes of a 'typical manager' with those of a 'typical man' but not a 'typical woman'. The risks of labelling behaviours as either 'male' or 'female' essentializes male and female characteristics and thus, as Billing and Alvesson (2000) warn, can further entrench male privilege. However, our purpose here is not to examine the leadership styles of men and women (Eagly, Johannesen-Schmidt and van Engen, 2003), or to debate which may be more or less effective, but rather to add to our understanding of patterns of exclusion of women at the highest levels of organizations by examining the 'exception', i.e. those particular circumstances/contexts in which women are more likely to finally crack that glass ceiling at board level.

The early empirical work relating to the glass cliff was in response to a commentary by Judge (2003) who noted the correlation between the number of women on UK boards and lower company share price performance. Ryan and Haslam (2005) questioned the logic of the arguments presented by Judge that (p. 21) women had 'wreaked havoc on companies' performance' by arguing that the association might be reversed. That is, it is the drop in share price (representing declining corporate performance in general) that leads to women being appointed to boards rather than vice versa. Ryan and Haslam (2005) used a matched sample of appointments of male directors and found that share price performance tended to be (a) lower prior to a woman's appointment than a man's and (b) no different after the appointment of a woman or a man. They argue that both patterns suggest that Judge's interpretation of the relationship was in the wrong direction. Seeking to provide further evidence of the glass cliff, Adams, Gupta and Leeth (2009) analysed the appointment of female CEOs in the USA using an objective accounting-based (rather than a subjective market-based) performance measure but found that males and females are on an equal footing in term of the financial performance of the firms they are appointed to lead. Similarly Elsaid and Ursel (2011), when exploring gender and CEO succession issues in North American firms, did not find any significant relationship between company profitability (as measured by return on assets) and the gender of the successor. Haslam *et al*. (2010) present data which

suggests that the non-findings in Adams, Gupta and Leeth (2009) are due to differences between subjective (stock market based) and objective (return on assets, return on equity) measures of financial performance. In considering conflicting findings, Ryan and Haslam (2009) urge consideration of organizational processes that might contribute to the emergence of the glass cliff to see when and why women are appointed to precarious leadership positions.

Although the possibility of the glass cliff was uncovered in the context of poor company performance, Ryan and Haslam (2009) argue that it is defined by notions of precariousness and risk. For example, Brady *et al*. (2011) find that firms that have experienced a scandal in recent years are more likely to have female executives. Systematic over-representation of females in such positions would be consistent with structural barriers to advancement making it necessary for women leaders to take bigger risks. In a new twist on Schein's TMTM, Ryan and Haslam call this the 'think crisis think female' (TCTF) bias, and suggest that it could spring from a number of sources, such as plain old-fashioned sexism, in-group favouritism (protecting men from precarious positions), a crisis prompting a desire to change the status quo or simply that undesirable risky positions are the only ones available to women. Thus, with conflicting findings, the factors affecting the presence (or absence) of women on corporate boards clearly warrants further research.

Such factors could include the cumulative effects of discrimination, such as Simon and Landis's (1989) finding that workers tend to prefer male supervision, or studies that show that female leaders are perceived as being less effective than men (Bowen, Swim and Jacobs, 2000; Eagly and Karau, 2002; Eagly, Makhijani and Klonsky, 1992; Heilman, 2001; Schein, 2001) which could make women more willing to accept challenging and perhaps precarious positions when offered. In experimental studies with business leaders, students and members of the public where the risk of organizational failure in scenarios is manipulated to maximize the causal impact of the perceived suitability of women for leadership roles, Ryan and Haslam (2007) consistently found that women are selected ahead of equally qualified men only in contexts where there is a high risk of organizational failure – a pattern that has been replicated in US studies (Bruckmuller and Branscombe, 2010). A vicious cycle is thus being perpetuated – women experience discrimination when seeking senior positions and are therefore more likely to be appointed to more marginal, precarious positions (where the risk of failure is higher) where if/when they fail it re-confirms stereotypes that women are not suitable for leadership positions. Taking the helm of a precarious organization is a risky career strategy since (especially when the issue of interlocking directorates is considered) being a director of an unsuccessful company impacts negatively on your chances of being appointed to other leadership positions elsewhere (Ferris, Jagannathan and Pritchard, 2003; Fich and Shivdasani, 2007; Gilson, 1990).

Ryan *et al*. (2011) provide some further insight into the processes underlying the glass cliff: their participants still make the TMTM association for managers of successful companies, but their research indicates that a distinction exists between 'descriptions of managers (which may simply reflect the status quo) and prescriptive stereotypes about what is ideal or desirable' (p. 18) and also that the TCTF bias is dependent on context, specifically the role to be performed. Bruckmuller and Branscombe (2010) delve further into when the glass cliff happens and why it does so. Thus, in line with the evidence from other change-in-governance studies, the glass cliff is shown to happen for a 'company in trouble scenario' but moderated by its history of organizational leadership. This could potentially be explained by status quo bias that is referred to as 'stickiness' in the corporate governance literature (see Brown, Beekes and Verhoeven, 2011) which suggests that firms are motivated to change their corporate governance mechanisms having due regard to the need for and cost of such changes (Agrawal, Jaffe and Karpoff, 1999). That is, for consistently successful companies there is little incentive to change; conversely if a company experiences a crisis it may be a spur to change the profile of the board (Farber, 2005; Fich and Shivdasani, 2006; Johnstone, Li and Rupley, 2011; Srinivasan, 2005).

The present study

The objective in this paper is to further explore the Ryan and Haslam hypothesis that females are over-represented in precarious leadership

positions. The methodology chosen by Ryan and Haslam in their initial study was, to a certain extent, imposed by Judge's conjecture. That is, their investigation was not an attempt to uncover a universal phenomenon but rather a direct response to Judge's claims which required that they use a similar methodology regardless of the potential impact of unmeasured third variables (Ryan and Haslam, 2009). Similarly in the study by Adams, Gupta and Leeth (2009) where they retested the over-representation hypothesis, the same methodology was used in an effort to provide further evidence of the glass cliff; in that case the possible impact of unmeasured suppressor variables (given the lack of evidence found) was not explored, i.e. the lack of correlation found by Adams, Gupta and Leeth (2009) cannot establish lack of causation.

This study attempts to clarify the issue of causality and account for unmeasured variables by using a difference-in-differences methodology to establish whether there is an increase in female representation on corporate boards in the UK in response to a specific unambiguous signal of precariousness. Kosnik (1987) claims that the effectiveness of corporate governance mechanisms is better gauged when a firm is facing a crisis situation. Indeed, Franks, Mayer and Renneboog (2001) argue that financial distress (as a manifestation of a crisis situation) is the only focused and significant force in disciplining poor leadership. This study differs from previous studies in that an unambiguously objective precarious event is chosen *ex ante* and then the change in female board representation around (and as a result of) this event is measured.

In this case the precarious (or troubled) event under analysis – the reporting of an initial loss, i.e. a reported loss following two consecutive years of reported profits – is an objective accounting-based one. Incurring an initial loss is indicative of a situation that will evolve into a crisis if losses perpetuate (i.e. bankruptcy and liquidation) and so requires remedial action. Even if losses are not expected to perpetuate they are indicative of a rate of return that is clearly below that required by investors. The signal of unambiguous underperformance (and hence precariousness) provided by the initial loss will not be tolerated by investors over a prolonged period and needs to be addressed (Hayn, 1995). When the initial loss is first reported investors will attempt to assess whether it is a transitory blip or a symptom of the terminal decline of the company. The severity of the reported loss is an important source of information in that regard.

A key contribution of this research is that in order to account for any underlying trend in female board representation as a result of regulatory/social pressures (especially considering the debate about the mandating of gender quotas in many European countries at the time), this study uses an industry- and size-matched control sample of profit firms. The result is that any change in diversity at firm and industry level is controlled for; therefore, any statistically significant difference in the change in gender diversity between the initial loss and control samples over the sample period can be specifically attributed to the initial loss event. The validity of this analysis is based on the implicit assumption in the difference-in-differences model that regulatory/social pressures impact on the initial loss and control groups equally, such that the problem of unmeasured or suppressor variables highlighted by Ryan and Haslam (2009) is already accommodated by the methodological approach. This is significant in so far as any theoretical exploration of why and how the glass cliff emerges needs to have a solid foundation of evidence for the phenomenon actually occurring. Given the inconclusive findings of prior glass cliff research, this needs to be addressed and clarified.

The present study also builds on previous work on the glass cliff in a variety of ways. First, this study focuses on female participation at the board level (Ryan and Haslam, 2005) rather than at the managerial level (Adams, Gupta and Leeth, 2009). Also, similar to Haslam *et al.* (2010) but different from Haslam and Ryan (2008) and Ryan and Haslam (2005), this study focuses on the presence of females on the board rather than just appointments and so is a more subtle gender variable. That is, female representation on the board can change in response to a precarious situation without a female being appointed to the board if the size of the board is decreased by the removal or fleeing of a male director(s) from the board. In this regard our more subtle measurement links the glass cliff literature with the 'in-group favouritism' stream of literature (see Haslam and Platow, 2001; Tajfel and Turner, 1979). From this perspective, increased female (out-group) representation could increase where men (in-group) are

protected from being appointed to precarious positions or flee from such positions (potentially to other board opportunities) to protect themselves and their reputations, leaving women without such alternatives in a relatively more precarious position.

Finally, this study distinguishes between relatively more/less precarious situations by separating the initial loss sample into 'big' and 'small' loss subgroups. As discussed, the relative severity of the loss is an important source of information in determining whether the loss is likely to be a transitory blip or a signal of terminal decline. By bifurcating the initial loss sample, the analysis in this study is extended beyond merely comparing the loss sample to the control sample but also allows the loss subsamples to be compared with each other as well as with the control sample. In conjunction with the relatively large sample size versus previous studies and the inclusion of an industry- and size-matched non-precarious control sample, this study represents a comprehensive search for evidence of the glass cliff.

Thus our hypothesis stated in positive form is

H1: The change in gender diversity on the board of initial loss firms is positively related to the severity of the loss.

Method

The initial loss sample selection

The reporting of an initial loss is the selected troubled or precarious event in this study. The first step in collecting the sample is to select all those companies which reported a net income loss in the years 2004, 2005 or 2006. All of the non-failed companies were taken from the Datastream 'live' list of quoted UK industrial firms (UKQI). To avoid survivorship bias this study also includes the failed companies taken from the Datastream 'dead' list (DEADUK). To emphasize the precariousness of the loss event a further restriction that the loss year is preceded by two years of positive net income is imposed – these isolated losses are what this study refers to as initial losses (the remaining loss firms are then 'non-conforming' and are excluded). Being so defined, the troubled event in this study is an unambiguously objective, accounting-based measure of performance providing real evidence of the glass cliff based on a binary (i.e. profit/loss) performance measure. All foreign companies whose primary stock exchange listing is abroad (with the exception of Irish firms) are excluded as are banks, investment trusts, property companies and other financial institutions (i.e. all those companies with an industry classification benchmark code of 8000) because these firms have specialized accounting measurement methods. Initial loss firms with no available gender information (typically because the annual report is not available from any source) are also excluded. All of these restrictions result in a total of 138 initial loss firms (40, 50 and 48 firms for 2004, 2005 and 2006, respectively) included in Table 1.

Table 1. Loss sample selection and loss firm characteristics

Sample selection of 138 loss firms	
Number of firms reporting a loss between 2004 and 2006	2397
Less:	
Non-conforming loss firms	2142
Duplicate firms	26
Financial firms	10
Firms with a foreign primary listing	36
Firms with insufficient data/other	45
Final sample	138

Annual reports for the year before and the year after the loss event were downloaded from Thomson One Banker for each of these 138 initial loss firms. The number of females on the board as well as the total size of the board were collected from these reports to establish a snapshot of female board participation before and after the initial loss.

Table 2 indicates that initial loss firms are widely distributed among industry classifications, with some clustering in business support services, software, publishing and heavy construction.

The control sample selection

Prior research and the current study show some clustering by industry among loss firms. Dechow, Sloan and Sweeney (1996) and Farber (2005) find a similar industry clustering in their studies where the disclosure of fraud is the precarious event. Therefore, an examination of changes in gender diversity surrounding reported initial losses has the potential to reveal characteristic changes in gender diversity that are associated with changes at industry level rather than with the precarious event. To control for this possibility and to account for any general underlying changes in

Table 2. Distribution of loss firms by industry classification benchmark (ICB) codes

ICB industry code	ICB sub. code	Industry description	No. of firms	ICB industry code	ICB sub. code	Industry description	No. of firms
2000	2713	Aerospace	1	1000	1775	General mining	1
5000	5751	Airlines	1	1000	1777	Gold mining	2
5000	5371	Apparel retailers	2	4000	4533	Healthcare providers	1
3000	3355	Auto parts	2	2000	2357	Heavy construction	6
4000	4573	Biotechnology	2	3000	3728	Home construction	1
5000	5553	Broadcast and entertainment	3	5000	5375	Home improvement retail	1
2000	2353	Building materials and fixtures	3	2000	2757	Industrial machinery	4
2000	2791	Business support services	16	2000	2797	Industrial suppliers	1
2000	2793	Business training and employment	3	5000	5555	Media agencies	2
3000	3763	Clothing and accessories	3	4000	4535	Medical equipment	1
9000	9533	Computer services	5	4000	4537	Medical supplies	1
7000	7535	Consumer electricity	1	1	573	Oil equipment and services	2
2000	2723	Containers and packaging	2	1000	1737	Paper	2
2000	2717	Defence	1	3000	3767	Personal products	2
1000	1773	Diamonds and gemstones	1	4000	4577	Pharmaceuticals	1
2000	2727	Diversified industrials	1	5000	5557	Publishing	6
3000	3722	Durable household products	1	3000	3745	Recreational products	2
2000	2733	Electrical equipment	3	5000	5755	Recreational services	2
2000	2737	Electronic equipment	3	5000	5757	Restaurants and bars	2
9000	9574	Electronic office equipment	1	9000	9576	Semiconductors	1
1	533	Exploration and production	4	9000	9537	Software	8
3000	3573	Farming and fishing	1	5000	5377	Specialized consumer services	1
6000	6535	Fixed line telecommunications	1	1000	1357	Specialty chemicals	1
3000	3577	Food products	2	5000	5379	Specialty retailers	5
5000	5337	Food retail, wholesale	2	9000	9578	Telecommunications equipment 5	
3000	3726	Furnishings	2	3000	3747	Toys	3
5000	5752	Gambling	3	2000	2777	Transport services	2
7000	7573	Gas distribution	1	5000	5759	Travel and tourism	1

diversity, regulation and enforcement across all industries during the period under study, a matched sample of control (i.e. profit) firms was also collected. A control company is defined as any company reporting a profit for three consecutive years ending in the year in question (2004, 2005 or 2006) which also reports a profit (or is acquired, liquidated or delisted) in the two years following the event year.

The matching of the control companies is a two-stage process. The first stage is that the initial loss firms are sorted by industry classification benchmark subsector code (Datastream: FTAG5) and the control firms are matched to the appropriate subsector group; this ensures that the initial loss and control firms are, where necessary, matched for industries that are stereotypically feminine (e.g. Haslam *et al*., 2010) and thus more predisposed to changes in gender diversity. The second stage involves selecting the control firm from the subsector group with a market value closest to that of the initial loss firm. This ensures that the initial loss and control firms are matched, where necessary, for firm size in so far as larger companies are more sensitive to societal pressures and thus more predisposed to changes in gender diversity in troubled times. In some situations there is no control firm with the same subsector code as the initial loss firm. In these situations the matching criterion is relaxed to the broader industry code (Datastream: FTAG2) where, as before, the control firm with the closest market value is chosen.

Variables

Gender diversity

In scientific studies (species) diversity is measured using a variety of methods. Reflecting audience expectations, this study uses the three most common measures of diversity. The first is the percentage of females on the board (FEM%) which is calculated by dividing the number of females by the total number of directors on the board. The second is the Blau index which takes both the number of gender categories (two, male and female) and the evenness of the distribution of board members among them into account. These two attributes of diversity, referred to as variety and balance, respectively, may be combined into dual concept measures of diversity (Stirling, 1998). The Blau index is constructed as

$$\text{Blau} = 1 - \sum_{i=1}^{n} P_i^2$$

where P_i is the percentage of board members in each category (male or female) and n is the total number of board members. Values of the Blau index for gender diversity range from 0 to a maximum of 0.5, which occurs when the board comprises an equal number of men and women. The third measure is the Shannon index, constructed as

$$\text{Shannon} = -\sum_{i=1}^{n} P_i \ln P_i$$

where P_i is as previously defined. Once again, the minimum value of the index is zero and diversity is maximized when both genders are present in equal proportions, which gives rise to a value of 0.69.[1] The properties of the Shannon index are qualitatively similar to those of the Blau index although it will always yield a larger number and, as a logarithmic measure of diversity, is more sensitive to small differences in the gender composition of boards.

The model

We employ a difference-in-differences analysis to establish if gender diversity improves around the time an initial loss is incurred. There is evidence that the market's interpretation of accounting earnings (losses in this case) is always conditioned by other available information (e.g. El-Gazzar, 1998; Freeman, 1987). For instance firms which can claim to have a relatively small loss will be less likely than firms with a relatively big loss to alter their gender diversity because the severity of under-performance (and hence the precariousness of the situation) is lower. Indeed the propensity to report a small loss can be seen as an indication of the quality of the firm's accounting choices because choosing to report a small loss as it occurs rather than utilizing abnormal accruals (i.e. manage earnings to report a small profit) to defer it is seen as evidence of better quality earnings in the accounting literature (Burgstahler and Dichev, 1997). Accordingly this study takes account of

[1]Since the logarithm of 0 is not defined, if $P_i = 0$ this study adopts the convention that the expression equals 0.

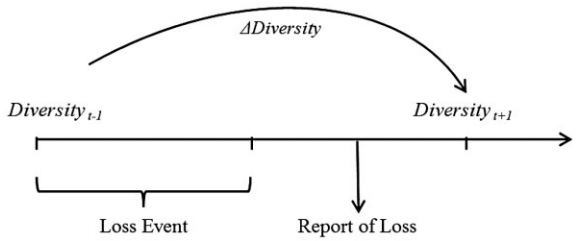

Figure 1. Calculating changes in gender diversity

the severity of the initial loss in the following model:

$$\Delta\text{Diversity} = \beta + \delta_1\text{Big\_Loss}_t + \delta_2\text{Small\_Loss}_t + \theta\text{Return} + \varepsilon$$

where

$$\text{Loss} = \begin{cases} 1 & \text{for the initial loss sample} \\ 0 & \text{for the control sample} \end{cases}$$

and where ΔDiversity represents the change in gender diversity (as measured by FEM%, Blau and Shannon, respectively) during the test period $t - 1$ to $t + 1$. We use the return on the company's share price performance, Return, over the test period to control for the wider information environment. Constructed thus, the intercept β reflects the underlying change in gender diversity for the control sample and the ordinary least squares estimators δ_1 and δ_2 compare the impact of the initial loss event conditioned by the severity of the loss (i.e. the Big_Loss and Small_Loss states, respectively) to the entire control sample.

Results

A fundamental prediction of this study is that an initial loss is an event that motivates a firm to undertake necessary change since if initial losses perpetuate the firm will fail. We predict that firms have sufficient knowledge about their performance to anticipate the reporting of a loss. Accordingly we predict that the initial loss will motivate changes that extend across the test period. Figure 1 outlines the time line surrounding the initial loss event.

Figure 1 illustrates that the initial loss event is incurred between $t - 1$ and t and is reported between t and $t + 1$. It is clear from the way firms plan, budget and assess internal performance throughout the financial year that the board has ample opportunity to react to the initial loss before it is reported. Therefore our measure of the change in diversity, ΔDiversity, extends over a test period from the end of year $t - 1$ to the end of year $t + 1$.

Univariate results

Table 3 illustrates the direction and magnitude of changes in the three diversity variables for the initial loss and control samples across the test period. The analyses use univariate comparison tests to compare the mean and median diversity levels before and after the initial loss as well as mean and median diversity changes around the reporting of an initial loss. A preliminary comment is that the FEM% variable (which includes both executive and non-executive directors) for the 3 years 2004–2006 has a range of 4.3%–6.6% for the initial loss and control samples (the mean, not reported here, is 5.5%), which is lower than the 11.0% cited by Sealy, Singh and Vinnicombe (2007) over a similar period. Another observation is that for all pre- and post-period levels, in both the loss and control samples, the median level and change in gender diversity is zero in all cases indicating how entrenched the glass ceiling is at board level.

The change results for initial loss firms (column 4) indicate that gender diversity improves across the two-year test period, i.e. the mean/median *p*-values for the various diversity proxies (FEM%, Blau and Shannon) are all significant (i.e. ≤ 0.10 in all cases). At the end of the test period, the results (column 10) show that there is a statistically significant difference between the initial loss and control samples for gender diversity ($p \leq 0.05$) for the mean/median values for each of the diversity proxies. However, the results in column 11 are the main difference-in-differences results under investigation in this study and these results indicate that there is no difference in the change in gender diversity between the loss and control samples across the test period such that a more thorough analysis is required to formally test Hypothesis 1.

Multivariate results conditioned by the severity of the initial loss

The results of estimating the model to test Hypothesis 1 are included in Table 4 where the

Table 3. Univariate tests of pre-period and post-period differences and difference-in-differences (DIDs) in diversity levels and changes between the initial loss and control samples

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Loss firms				Control firms						
	$n = 138$ Pre-period Mean (median) [SD]	$n = 114$ Post-period Mean (median) [SD]	$n = 114$ Change Mean (median) [SD]	Significance of change Two-tailed p-value: t-test Sign rank	$n = 138$ Pre-period Mean (median) [SD]	$n = 124$ Post-period Mean (median) [SD]	$n = 124$ Change Mean (median) [SD]	Significance of change Two-tailed p-value: t-test Sign rank	p-value of testing Pre-period differences, column (1) minus (5) Two-tailed p-value: t-test Sign rank	p-value of testing Post-period differences, column (2) minus (6) Two-tailed p-value: t-test Sign rank	p-value of testing DIDs, column (3) minus (7) Two-tailed p-values: t-test Sign rank
FEM%	0.058	0.066	0.125	0.10	0.043	0.046	0.004	0.37	0.15	0.03	0.45
	(0.000)	(0.000)	(0.000)	0.01	(0.000)	(0.000)	(0.000)	0.79	0.22	0.04	0.29
	[0.095]	[0.100]	[0.079]		[0.074]	[0.083]	[0.055]				
Blau	0.091	0.104	0.019	0.07	0.071	0.076	0.005	0.49	0.21	0.02	0.31
	(0.000)	(0.000)	(0.000)	0.03	(0.000)	(0.000)	(0.000)	0.78	0.24	0.03	0.31
	[0.142]	[0.146]	[0.110]		[0.118]	[0.127]	[0.084]				
Shannon	0.145	0.166	0.030	0.06	0.119	0.124	0.006	0.60	0.27	0.02	0.24
	(0.000)	(0.000)	(0.000)	0.03	(0.000)	(0.000)	(0.000)	0.77	0.28	0.03	0.35
	[0.220]	[0.227]	[0.169]		[0.191]	[0.201]	[0.134]				

This table provides some summary statistics and includes univariate tests of significance for the diversity variables for the initial loss and control samples for time periods from time $t - 1$ to $t + 1$, as well as tests of the difference in the pre- and post-period values between the initial loss and control samples and tests of the difference-in-differences (DIDs) between the initial loss and control samples for the test period. Time t includes panel data from years 2004, 2005 and 2006. The collection and matching of the initial loss and control samples is detailed in the text. The decrease in the number of firms (initial loss and control) across time is due to firms liquidating or being acquired. The diversity variables FEM%, Blau and Shannon are as constructed, discussed and winsorized in the text.

Table 4. Coefficient estimates for initial loss versus control firms conditioned by the severity of the loss
$\Delta\text{Diversity} = \beta + \delta_1\ \text{Big\_Loss}_t + \delta_2\ \text{Small\_Loss}_t + \theta\text{Return} + \varepsilon$

Independent variable	FEM% (*t*-statistic)	Blau (*t*-statistic)	Shannon (*t*-statistic)
Intercept	0.003	0.003	0.002
	(0.43)	(0.28)	(0.13)
Big_Loss_t	**0.028**	**0.037**	**0.055**
	(2.56)**	**(2.37)****	**(2.25)****
Small_Loss_t	–0.0100	–0.007	–0.003
	(–0.90)	(–0.43)	(–0.11)
Return	0.003	0.005	0.009
	(0.56)	(0.64)	(0.67)
n	238	238	238
R^2	4.1%	3.1%	2.5%
Two-tailed *p*-values for tests of significance			
$\text{Big\_Loss}_t = \text{Small\_Loss}_t$	<0.01	0.02	0.04

This table reports the results of testing the effect of an initial loss on gender diversity. The test (initial loss sample) consists of 138 firms which reported a loss in year t following two years of reporting a profit and the control sample consists of 138 firms matched for industry and market value which reported a profit in each of year $t-2$ to $t+2$. The reduction in the number of firms in the analysis is due to firms being acquired, listed or going bankrupt during the test period. Financial information is obtained from Datastream/Worldscope. All continuous variables are winsorized at the 1% and 99% levels to mitigate the influence of outliers. Estimated coefficients are followed by *t*-statistics in parentheses. Significance levels at 5% and 1% are indicated by ** and *** respectively.
ΔDiversity is the change in diversity across the test period. Big_Loss_t is a dummy variable equal to 1 for firms that report an initial loss in year t which is above the 50th percentile of scaled losses versus other losses (where the size of the loss is scaled by market value) and 0 otherwise. Small_Loss_t is a dummy variable equal to 1 for firms that report an initial loss in year t which is below the 50th percentile of scaled losses versus other losses (where the size of the loss is scaled by market value) and 0 otherwise. Return is the stock market return over the test period calculated as

$$r_t = \left(\frac{P_{t+1} - P_{t-1}}{P_{t-1}}\right) + [D_t(1 + \text{capital gain}_{t+1})] + \left(D_{t+1}\frac{P_t}{P_{t-1}}\right)$$

where

$$\text{capital gain}_{t+1} = \frac{P_{t+1} - P_t}{P_t}$$

and D_t and D_{t+1} are the 12-month forward dividend yields. FEM% is the percentage of females on the board, P_i. Blau is a measure of diversity calculated as

$$\text{Blau} = 1 - \sum_{i=1}^{n} P_i^2$$

Shannon is a measure of diversity calculated as

$$\text{Shannon} = -\sum_{i=1}^{n} P_i \ln P_i$$

primary coefficient of interest is δ_1. The results indicate that, with a value (*t*-statistic) of 0.028 ($t = 2.56$) for FEM%, the change in gender diversity (an improvement – positive change) for 'big', i.e. more severe, initial loss firms is significantly different at the 1% level from the control sample and this result is robust to the alternative measures of gender diversity, i.e. the coefficient value (*t*-statistic) for Blau and Shannon specifications are 0.037 ($t = 2.37$) and 0.055 ($t = 2.25$), respectively. Another way to analyse the results in Table 4 is to compare the two loss subsamples to one another by testing if the additional change in gender diversity over and above the control sample is different between the more precarious 'big' initial loss firms and less precarious 'small' initial loss firms, i.e. to compare the coefficients of 'big' loss firms with 'small' loss firms. The results from a two-tailed test of significance included at the end of Table 4 (i.e. a Wald test that $\delta_1 = \delta_2$) indicates that the responses of these two subgroups to the initial loss are different to one another (i.e. $p < 0.01$ for FEM%) and that this result is also robust to alternative measures of gender diversity (i.e. $p = 0.02$ and $p = 0.04$ for the Blau and Shannon specifications, respectively). Overall this study finds evidence that the severity of the reported initial loss has significant implications for the change in gender diversity at board level in response to that loss, i.e. we can accept Hypothesis 1.

Discussion

Given the persistent patterns of underrepresentation of women on corporate boards any improvement in gender diversity is to be welcomed. However, the emergence of the 'glass cliff' concept has drawn attention to the precarious circumstances in which women are favoured for appointment. The literature documents various reasons explaining why this might be the case ranging from women leaders self-selecting into precarious positions to structural barriers to advancement making it necessary for women to take bigger career risks. Such structural barriers include a lack of opportunity for women, a lack of knowledge about those opportunities that do exist (as a result of exclusion from networks to which males belong) and the board of directors systematically biasing their appointment practices

against women such that females are required to take on more precarious opportunities when they do arise. Regardless of the reason, the presence of a glass cliff represents a significant barrier to the advancement of women in leadership positions and, given the lack of universal evidence in the literature to date, is an issue worth examining further.

The empirical analysis in this study examines the change in gender diversity on the board of initial loss firms over a two-year test period around the reporting of the loss. An initial loss, as defined in this study, is an unambiguous, objective, accounting-based signal of underperformance and thus avoids the contention from market-based studies that any positive findings are due to a 'pre-emptive' strike by investors who fear the upcoming appointment of women to a board. An industry- and size-matched control sample of non-loss firms is used against which to compare the results of the loss sample so as not to inadvertently attribute any underlying changes in diversity (resulting from the international focus on gender diversity, from loss firms being drawn disproportionately from stereotypically feminine industries or from firms of different size) to the initial loss event. This study then uses a difference-in-differences approach to set up a natural experiment to isolate the impact of the initial loss event across the test period. When the initial loss is conditioned by the severity of the loss, the 'big' loss subsample is shown to have a statistically significant positive relationship with each of the gender diversity change measures in this study indicating that women are represented disproportionately in more precarious situations versus less precarious 'small' loss situations as well as versus the entire control sample. In short, this study finds compelling evidence of the operation of the glass cliff phenomenon. Given the ongoing debate as to the very existence of the glass cliff, this is an important addition to the stream of research exploring patterns of female representation on boards.

Implications and directions for future research

The present study contributes to the dialogue on the importance of situational factors in determining both when and why the glass cliff might emerge. For example, Bruckmuller and Branscombe (2010) considered the organization's history of leadership (i.e. whether an organization has a long history of male leadership or not) as a moderator of the glass cliff effect. This study considers the relative precariousness of the firm as another moderator to add to the increasingly nuanced understanding of when, where and how the glass cliff phenomenon emerges. The finding that firm performance impacts on gender diversity has implications for the body of literature which looks at the impact of gender on performance. In other words, the relationship works in both directions such that the results of any study which links performance and gender (or any other governance variable) and ignores the inherent endogeneity problem are called into question (Brown, Beekes and Verhoeven, 2011). In addition, it is also evident that the results from gender and performance studies which treat profit and loss firm years as being equal, and use contemporaneous (rather than lagged) measures of gender in a panel analysis of firm year observations, are likely to be dampened.

The current study adds to the stream of work that focuses on organizational (rather than individual) characteristics such as firm size, industry type, corporate diversification strategy and network effects that are predictive of women on corporate boards (Hillman, Shropshire and Cannella, 2007). Indeed, the methodological approach used in this study could also be modified to include any number of variables depending on the hypotheses to be tested. One way the dependent variable could be modified is to analyse (per Sealy and Vinnicombe, 2013) whether the change in diversity in response to a crisis event is at the executive or non-executive director level to test if the observed increase in board level diversity represents a real opportunity for women to lead. The independent initial loss variable could also be modified to consider whether other conditioning variables mitigate the board's gender response to the event. For example (i) similar to Ryan and Haslam (2005) and Adams, Gupta and Leeth (2009), the relative severity of the initial loss as reflected by the total shareholder return across the test period could be used as a market-based rather than an accounting-based measure of precariousness, and (ii) similar to Bruckmuller and Branscombe (2010), the degree of male/female representation as measured by diversity or by the presence of a male/female CEO or Chair at board level prior to the precarious event could be used.

Similarly, given the importance of risk/precariousness in the glass cliff phenomenon, an interesting analysis would be to compare data before and after the financial crisis. Such a structural change analysis could be performed to compare the difference in the change response between the initial loss and control samples before (2004–2006) and after (2010–2012) the financial crisis.

A further contribution of this study is to call attention to the need for subtlety in measuring changing female board level representation. Previous studies mainly focus on 'new' female appointments as an absolute measure of increased female participation whereas our work uses gender diversity (as a relative measure) to show that gender diversity can also increase as a result of a shrinking board (be it through the removal of males directors or their fleeing) where women are incumbent directors. The crucial point is that increased female representation is significantly more likely to occur in precarious situations, particularly in severe, 'big loss' scenarios as we have demonstrated here.

More broadly, our work suggests that we need to be cautious about interpreting improved representation as being evidence that the issue of women on corporate boards is dealt with. Given the glass cliff phenomenon, even when the glass ceiling cracks it is evident that gender dynamics are still negatively skewing opportunities for women. This is particularly interesting given the plateau issues highlighted in the Cranfield *Female FTSE Board Report 2013* (Sealy and Vinnicombe, 2013). From the plateauing observed it appears that it cannot be taken for granted that incremental improvements in women's representation on boards will continue and eventually bring parity. For example, in 2007 women accounted for just 3.6% of executive directorships in FTSE 100 companies (Sealy, Singh and Vinnicombe, 2007). Since the onset of the financial crisis female representation in FTSE 100 directorships had risen to 17.3% (5.8% for executive directorships and 21.8% for non-executive directorships) (Sealy and Vinnicombe, 2013). However, this figure represents a drop from 2012 when the female share of executive directorships stood at 6.6% (Sealy and Vinnicombe, 2012). Should this trend in female representation on boards continue to plateau, or indeed reverse, then it suggests that underlying dynamics of sexism, in-group favouritism etc. that produce both inequity and the glass cliff phenomenon are likely to continue and risk being exacerbated. Indeed, it could argued that the reduction in women on corporate boards from 2012 to 2013 may be attributable to a decrease in corporate precariousness as the worst effects of the recession recede. That is, based on the conditioned glass cliff premise presented in this study, as the crisis dissipates and precariousness reduces, it could be argued that women become less likely to ascend to board level.

Combining our findings with previous theoretical discussions on why and how the glass cliff emerges we can hypothesize a number of interacting factors here: (i) TCTF leading to new female appointments (Bruckmuller and Branscombe, 2010; Ryan and Haslam, 2007); (ii) men fleeing organizations they perceive to be too risky or being protected from taking on such precarious positions due to in-group favouritism; (iii) limited opportunities for women prompting them to take positions in risky organizations; (iv) women remaining on boards in risky organizations due to lack of mobility and/or alternative options; (v) men being more likely to occupy powerful positions on boards and more likely to be culled from those roles in times of extreme crisis (e.g. audit committee) thus increasing female representation through diminished male presence.

Finally, the findings in this study have resonance not just in relation to the glass cliff but also to wider debates about gender, leadership and risk. Worryingly, the glass cliff phenomenon shows that stereotypical assumptions about males and females seem to skew governance in times of organizational crisis and, given the vulnerability associated with a 'big loss' scenario, follows a negative trajectory in a manner that is risky for women's future career prospects. On a more positive trajectory Elsaid and Ursel (2011) found that boards with a higher female representation were more likely to appoint a female CEO and that these women then steered their firms towards lower levels of corporate risk taking. Even, and perhaps especially, in scenarios of crisis there are advantages for both women and organizations in breaking the mould.

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