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Board gender diversity and corporate social responsibility: Is there a case for critical mass?

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ABSTRACT

The role of business sector in addressing Sustainable Development Goals (SDGs) is increasingly recognised around the world. The SDG 5 Gender Equality has given impetus to actions in many countries in the form of gender equality and gender diversity in businesses. Rapid progress has been made recently in achieving gender representation on corporate boards with voluntary initiatives such as the 30% Club in Australia and other countries. This study differs from previous studies in that it considers the ethical and social dimensions rather an economic angle by examining the association between gender diversity and corporate social responsibility (CSR). The limited prior research with this approach has focused on the US and UK context with emphasis on analysing how female directors with their unique views, perspectives and specific experiences contribute to strategic decision making and for addressing issues that are of concern to society and stakeholders. Continuing in this vein, this study examines the association between gender diversity and positive and negative dimensions of CSR separately. For a sample of constituents of the ASX 300 Index and employing systems Generalized Method of Moments (GMM) methods, this study finds evidence supporting both the token theory and the critical mass theory. Both positive and negative dimensions of CSR are unrelated to gender diversity when there is a token female representation on the boards of directors. However, companies that have improved gender balance undertake more positive CSR activities and reduce negative or controversial activities that hinder CSR.

1. Introduction

Board gender diversity has captured the attention of policy makers, companies, media and academic scholars in many countries over the past decade. Board gender diversity is an important component in the changes in corporate governance around the world and is seen as an essential step in addressing the issue of 'related tension' between societies and markets (Dhir, 2015). Initiatives relating to board gender diversity have varied across countries, with some countries such as Norway and Germany adopting mandated quotas while other countries such as the United States of America (US) and the United Kingdom (UK) focusing on voluntary principle-based approaches.

In Australia, a self-regulatory approach has been adopted following the changes to the Australian Securities Exchange (ASX) Corporate Governance Principles and Recommendations in 2010 (Chapple and Humphrey, 2014; KPMG, 2012, 2013). In line with this approach, significant efforts have been made by the Australian Institute of Company Directors (AICD) since 2015 to address the issue of gender diversity. The 30% Club is a key initiative that has the specific target of achieving 30% or more representation of female directors on the boards of listed firms. This initiative was originally launched in the UK in 2010. In Australia, the AICD spearheaded this campaign in May 2015 as part of its advocacy role. The AICD aimed to achieve this target of a 30% female component of boards of directors by the end of December 2018 for companies included in the ASX 200 stock market index. At the end of December 2018, the ASX 200 companies have an average of 29.7% female directors, an increase of slightly over 10% from 19.4% in May 2015 when the 30% Club initiative was launched in Australia (AICD, 2019). During this three-and-a-half-year period, the number of ASX 200 companies with 30% or more female directors more than doubled from 40 to 96 (AICD, 2019). However, this figure also highlights the challenge, as more than half of the ASX 200 companies still have not reached the company-level target of 30%.

Equal representation of women in leadership positions is

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Abbreviations

SDGs	Sustainable Development Goals
CSR	Corporate Social Responsibility
ASX	Australian Securities Exchange
AICD	Australian Institute of Company Directors
ASX200	S&P ASX 200 Index
ASX300	S&P ASX 300 Index
CSP	Corporate Social Performance
RDT	Resource Dependence Theory
RoE	Return on Equity
R&D	Research and Development
CEO	Chief Executive Officer
GMM	Generalized Method of Moments
Div	Diversity

imperative for both ethical and economic reasons (Campbell and Mínguez-Vera, 2008). The ethical arguments highlight the moral failings of limiting opportunities for women in leadership roles, and suggest that women and men have an equal role in the governance of corporate firms. The economic arguments, on the other hand, suggest that corporate firms that do not select board members on the basis of their competencies and skills fail to achieve optimal financial outcomes. Most of the prior research on gender diversity has been focused on the economic point of view, and has examined the possible association between female representation on the boards of directors and financial performance (for a review, see Post and Byron, 2015). Such efforts largely yielded mixed findings, with the studies differing on the importance of making an economic case for diversity. Robinson and Dechant (1997) emphasized the need to make a business case for diversity initiatives to gain top management acceptance and implementation of policies to achieve targets relating to diversity. Ferreira (2015), on the other hand, argued that the economic argument is often difficult to validate empirically as a number of issues other than corporate financial performance may affect board diversity. Kemp (2011) argued that the board of directors and senior management have a critical role in ensuring that firms pursue economic value creation objectives by observing values that are consistent with social responsibility. Following the highly publicised corporate scandals at the beginning of this century involving Enron and WorldCom in the USA and HIH Insurance and One. Tel in Australia, the roles and responsibilities of the board of directors have come under greater scrutiny. Increasingly, businesses are evaluated for their broader environmental, social and economic performance. Corporate social responsibility (CSR) has become an integral part of businesses and it is no longer acceptable for companies to exclusively focus on economic goals. Other dimensions of corporate performance, or CSR, are equally important for stakeholders and, hence, it is imperative to consider the relationships between board diversity and CSR. This study therefore examines the relationship between gender diversity and CSR.

The literature on gender diversity and CSR is still emerging and the few previous studies that have been undertaken have focused on the USA and a few European countries. In the Australian context, Galbreath (2016) found a positive association between gender diversity and CSR for a sample consisting of ASX 300 firms for the 2004 period. Similarly, Nadeem et al. (2017) found that gender diversity had a positive influence on the sustainability reporting practices of ASX listed companies for the period 2010 to 2014. The average percentage of female directors on the ASX 300 boards in the sample of companies employed by Galbreath (2016) was 6%, with a standard deviation of 7% for the year 2004. Percentage of women on corporate boards of directors in Australia increased over time. Nadeem et al. (2017) found that average percentage of women for the sample employed for the period 2010 to 2014 was 10.33% and the standard deviation was 11.90%. Studies on corporate governance in Australia that were undertaken before the diversity initiatives began also indicate a lower percentages of female directors on corporate boards (see, for example, Vafaei et al., 2015). Given the recent gender diversity initiatives in Australia and the rising levels of female representation on boards, the present study reconsiders the association between gender diversity and CSR in the S&P/ASX300 index companies for the recent period of 2011–2016. The 30% Club initiatives in Australia and elsewhere are based on the idea that a critical mass of female directors is needed to have a meaningful impact on board discussions and deliberations as opposed to having a minimal or token representation. Similarly, CSR activities may range from reactions of corporations to minimise the negative impacts of its activities on the environment and the society – negative CSR – to initiatives that proactively contribute to achieving the sustainability goals – positive CSR. Unlike previous Australian studies of Galbreath and Shum (2012); Nadeem et al. (2017) who consider an aggregate measure of CSR or sustainability, this study considers separately the positive CSR and the negative CSR. The main research objectives of this study therefore are to consider specifically the association between female directors and (i) the aggregate CSR as well as the association between gender diversity and (ii) negative CSR and (iii) positive CSR separately.

This study makes many pertinent contributions to the debate on gender diversity in corporate boards in Australia and around the world. First, the study period constitutes a natural experiment where important diversity initiatives by the ASX and the AICD came into effect, and therefore offers opportunities to evaluate the effectiveness of such initiatives. Second, this study considers two disaggregated measures of CSR which often work in opposite directions thus there is an opportunity to examine the role of gender diversity on positive and negative dimensions of CSR separately. Third, this study considers additional proxies of gender diversity to capture the token representation as well as representation reaching a threshold thus offering avenues to evaluate the effects of token representation as well as the role of critical mass of female directors in realising the desired effect on CSR. Fourth, additional control variables are included to remove the effects of financial constraints and the effect of positive economic conditions when examining the effects of gender diversity on CSR. The findings of this study will help to evaluate the effects of the recent gender diversity initiatives in Australia, and also help to clarify the need for a critical mass of female directors on corporate boards in Australia and around the world. Specifically the study is relevant in the context of the Sustainable Development Goal (SDG) 5 Gender Equality. Equal representation of women and men on corporate boards will help firms achieve other important SDGs as well.

The next section provides a brief review of the relevant literature and develops appropriate hypotheses relating to gender diversity and CSR. The research design is then described, followed by a presentation of the findings of the study. The last section provides a discussion of the findings and concludes by considering the implications for policy and directions for future research.

2. Literature and hypotheses examined

Many previous studies examined the association between board diversity and financial performance of firms. In a Norwegian setting, Ahern and Dittmar (2012) found that the mandatory quotas requiring 40% representation of female directors on boards led to a negative association between gender diversity and financial

performance. The mandated quotas resulted in the appointment of inexperienced board members, which resulted in a decline in operating performance of firms that then faced greater uncertainty in the marketplace. Matsa and Miller (2013) found evidence of a reduced short-term profitability for a sample of Norwegian firms that implemented the mandatory board quotas. In contrast, Campbell and Mínguez-Vera (2008) found that gender balance on the board of directors had a significant positive association with financial performance for a sample of Spanish firms. In circumstances where there is a focus on innovation, firms may achieve better task performance and improved financial performance by attracting female directors who may bring informational and social benefits of diversity to the board room deliberations and decision making (Dezsö and Ross, 2012). There are many other studies that either find a positive, negative or no relationship between gender diversity and financial performance, as summarised in Renée et al. (2015).

A few studies considered the influence of board gender diversity on CSR. Post et al. (2011) found that a critical mass of (three or more) female directors led to a higher environmental strength score for a sample of electronic and chemical firms in the US. Using a sample of the Most Admired List of firms compiled by *Fortune* magazine in 2009, Bear et al. (2010) found that the CSR ratings improved with an increase in the number of female directors. Boulouta (2013) found in a sample of the S&P 500 companies that gender diversity had a significant impact on CSR, but the effect varied depending on the measure used for capturing CSR. While gender diversity had a positive effect, or in some instances no effect, on the strengths dimension of CSR, it had a negative effect on the concerns dimension of CSR more generally. Hafsi and Turgut (2013) found a positive relationship between gender diversity and CSR for a sample of manufacturing and service firms in the US for the year 2005. Zhang et al. (2013) also found evidence supporting the positive effective of gender diversity on social performance for a sample of firms after the enactment of the Sarbanes-Oxley Act in the US.

From the perspective of developing countries, for a sample of Palestine businesses over the period 2013 to 2018, Zaid et al. (2020) found that gender diversity and nationality had a positive but statistically insignificant effect on corporate sustainability practices. Similarly Zahid et al. (2020) found that gender diversity has a significant positive effect on corporate sustainability disclosures in Malaysia for the period 2011 to 2013.

A country's national context and its institutions may have a significant effect on the CSR of firms. Cai et al. (2016) found that country-level factors of economic development, national culture and institutional framework rather than firm characteristics explained the variation in corporate social performance (CSP) across firms. In a meta-analysis of 87 samples from 20 countries, Byron and Post (2016) found that gender diversity of boards and social performance were positively related, and that this relationship was more pronounced in countries where there was strong investor protection and/or more gender parity that created positive conditions for a balanced power distribution in corporate boards. Rao and Tilt (2016) reviewed the literature on diversity and CSR and summarised that gender diversity had a positive influence on many dimensions of CSR. Ideological differences among board members may lead reduced CSR. Olthuis and van den Oever (2020) found that for a sample of Dutch municipalities ideological differences led to reduced CSR.

Coffey and Wang (1998) and Williams (2003) found that gender diversity had a positive effect on corporate philanthropy. Webb (2004) found that the constituent firms of a social responsible index have, on average, more female directors compared to a matched sample of firms. Other studies found a negative or no relationship (e.g., Rao, Tilt and Lester, 2012; Rodriguez-Dominguez et al., 2009). Rodriguez-Dominguez et al. (2009) found that gender diversity had no impact on the ethical practices of firms in UK, Spanish and Italian companies. de Oliveira et al. (2018) provide a systematic review of literature on green supply chain management highlighting the research carried out around the wold.

2.1. Theoretical framework and hypotheses

Resource dependence theory (RDT) highlights the role that the board of directors play in managing uncertainty in the external environment and gain access to critical resources (Hillman et al., 2009; Pfeffer and Salancik, 2003). Female directors offer many benefits for organizations. They help businesses understand certain customers better and thus help access to better resources (Nadeem et al., 2017).

Betz et al. (1989) summarised two approaches that highlighted the similarities and differences between men and women when dealing with decisions on competition and ethical practices. The structural approach suggested that occupational considerations dominate the behaviour of men and women, and that both men and women adopted less competitive and more ethical behaviour in certain occupations while in other occupations, both men and women might take actions that were unethical but competitive. On the other hand, the gender socialization approach suggested that women and men differed in their attitude towards competitive and ethical decisions, with men tended to place emphasis on competition at the expense of ethical behaviour, while women placed emphasis on caring and harmonious relationships with others at the expense of competitiveness.

Similar to the gender socialization approach, social role theory contends that men and women exhibit prosocial behaviours that benefit others and organizations (Eagly, 2009). Accordingly, both men and women perform both gender and organizational roles. At times, there may be situations where the gender role is expressed more prominently than other roles, but in other instances, other roles may be given priority. In uncertain situations when dealing with social pressures arising from others' expectations, women tend to perform 'communal' roles, whereas men tend to show a preference towards 'agentic' behaviour (Eagly, 2009). Differences in the social role expectations of men and women, variations in work or career path and the challenges of unfavourable treatment in workplaces and society result in women caring more than men about the diverse stakeholders and their interests (Cook and Glass, 2018). Gender role expectations, functional differences between males and females and gender-based discrimination may contribute to female directors developing a strong commitment to improving CSR practices (Cook and Glass, 2018).

Given the social role expectations, women in leadership positions face a paradoxical situation. Women who show toughness or aggressiveness are considered to be violating the gender norms. On the other hand, when women in leadership positions show traits of kindness and caring, they are often viewed as lacking competitiveness. Boulouta (2013) characterised these roles and expectations as a tension between a managerial role and a gender role. The dilemma women face from such a 'double-bind' circumstance results in women showing more commitment to fairness and inclusiveness (Eagly and Karau, 2002; Ryan and Haslam, 2007). Thus, firms with women in leadership roles may focus more on the stakeholders and their interests, leading to improvements in CSR initiatives and outcomes.

Women are involved in a more diverse range of functions and types of organizations than men, including not-for-profit organizations, as men tend to specialize in a narrow functional area in a specific industry (Hillman et al., 2002; Singh et al., 2008). Given

these experiences, women tend to show more interest in CSR compared to men.

The career paths of men and women differ and women often have to take a more arduous and longer path to a leadership position compared to men (Eagly et al., 2007; Hillman et al., 2002). A woman's career progression is often limited by cultural and social stereotypes and discrimination. In addition, women are subjected to scrutiny of their physical traits, appearance and what they wear, and as they advance into senior, traditionally male-dominated roles, they are likely to face more discrimination; therefore, women may develop the resolve for equal treatment, fairness and openness for a diverse range of stakeholders (Cook and Glass, 2018; Konrad and Cannings, 1997; Mavin and Grandy, 2016). This resolve and commitment may result in women focusing more on CSR in the organizations in which they are involved. Organizations with more female directors thus strive more to improve positive CSR outcomes for a diverse range of stakeholders while at the same time curbing negative CSR activities that harm stakeholder interests. Thus, the number and percentage of female directors may have a positive or a negative association with CSR, depending on whether it is positive CSR or negative CSR. Based on the arguments presented above, the following hypotheses are drawn for empirical examination:

Hypothesis 1a. The percentage of female directors has a positive influence on positive CSR.

Hypothesis 1b. The percentage of female directors has a negative influence on negative CSR.

Hypothesis 2a. The number of female directors has a positive influence on positive CSR.

Hypothesis 2b. The number of female directors has a negative influence on negative CSR.

2.2. Token theory and critical mass theory

Fig. 1 depicts the possible associations between gender diversity and CSR. Female representation on the boards and achieving a balance in terms of effective contributions to the corporate strategy from all members is fraught with many challenges. As shown in Fig. 1, when a solo woman is appointed to the board, this action often leads to a higher visibility and consequently a heightened degree of scrutiny of that board member, creating performance pressure on the sole female member (Kanter, 1977). Also, in general, a solo member is likely to imitate the behaviour of the majority directors, resulting in the member's assimilation with the majority, with their views being token representation only. In addition, the dominant group may exhibit non-conciliatory behaviour towards a new, sole, female member or may exhibit a patronising attitude, leading to isolation of the sole female member. Token representation of women may therefore limit opportunities for them to share their experiences or point out views that may be seen as trouble-making (Cook and Glass, 2018; Kanter, 1977). Thus, the solo woman or token female representation may not result in any significant association between gender diversity and positive CSR and gender diversity and negative CSR, as shown in Fig. 1.

Hypothesis 3a. One or more female directors has no influence on positive CSR.

Hypothesis 3b. One or more female directors has no influence on negative CSR.

2.3. Critical mass theory

A critical mass of female directors may lead to an effective balancing of boards and consideration of their diverse experiences in a meaningful way when formulating the corporate strategy. While the solo member may face resistance, above a certain threshold of representation, the female directors are valued for their individual contributions, and they elicit cooperation from the majority groups in undertaking shared tasks such as formulating the corporate strategy (Bear et al., 2010; Cook and Glass, 2018). A critical mass of female directors not only helps foster positive CSR, but would also be useful in providing effective monitoring of negative CSR, as shown in Fig. 1.

Hypothesis 4a. A critical mass of female directors has a positive influence on positive CSR.

Hypothesis 4b. A critical mass of female directors has a negative influence on negative CSR.

3. Research design

3.1. Sample selection

The sample of companies is drawn from the constituents of the S&P/ASX300 index. Companies included the ASX300 Index include different size segments of the market including the large, the medium and the small companies. These companies offer investors opportunity to invest in a broad spectrum of sectors in Australia. As of March 2018, the equity issued by these companies represents 89% of the market capitalization of the ASX listed firms. These firms also represent a mix of large, medium and small firms. The financial firms are excluded from this study given the significant differences in the nature of these businesses and the regulations that these firms are subject to compared to the manufacturing and other services firms. Companies in the telecommunication sector are also omitted as there are only four firms. The final sample consists of 214 firms representing the basic materials (69), consumer cyclicals (38), consumer non-cyclicals (17), energy (31), healthcare (16), industrials (33) and technology (10) sectors. Given that the sample employed in this study accounts for nearly 90% of the overall market, the findings of this study are generalizable to other Australian businesses.

Initial impetus to improve gender diversity on the ASX boards came from changes proposed to the Principles of Good Corporate Governance and Best Practice Recommendations June 2010. These recommendations, which were aimed at improving gender diversity, came into effect on 1 January 2011 in Australia. Therefore, this study examines gender diversity in Australian firms for the period 2011 to 2016.

3.2. Variable selection

Measures of CSR are collected from the *Thomson Reuters ESG Scores*. The total CSR is a score based on information disclosed on the environmental, social and governance factors and the controversies covered in the global media. The positive CSR score is based on the information disclosed on the environmental, social and governance factors, and the negative CSR scores are based on the identified controversies relating to environmental, social and governance factors and any negative events reported in the global media. These scores are calculated by Thomson Reuters using a percentile rank scoring relating to the environmental, social and governance dimensions of CSR (Thompson Reuters Eikon, 2018).

Gender diversity on the boards of directors is the primary independent variable of interest. Two broad proxies are initially employed to analyse the association between gender diversity and CSR. The first proxy, female director %, is calculated as the number of female directors divided by the number of total directors on a

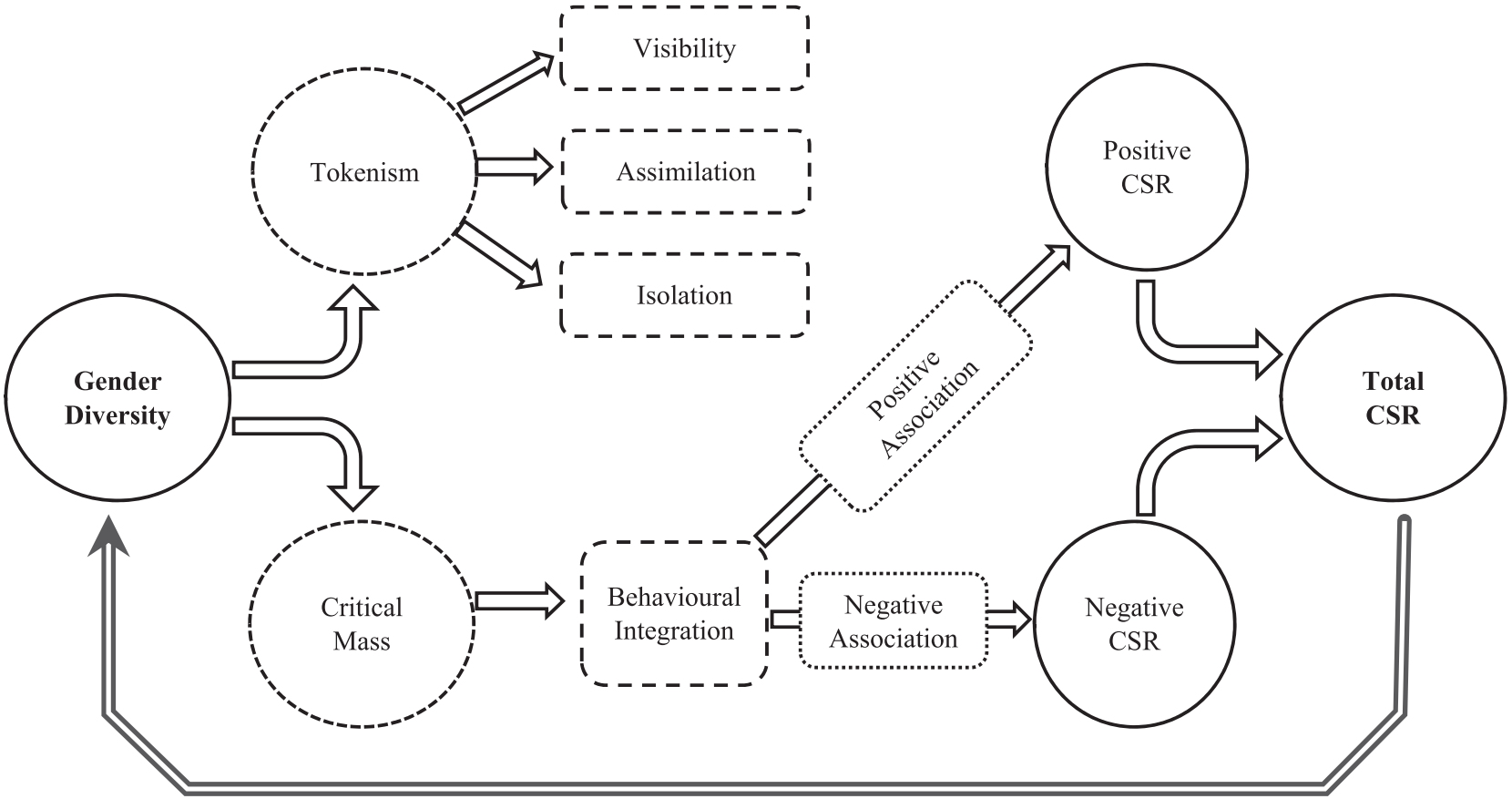

Fig. 1. Gender diversity and CSR – effects of token and critical mass representation.

Table 1
Descriptive statistics for variables employed.

Variables	Observations	Mean	SD
1. Total CSR	1208	0.425	0.142
2. Positive CSR	1208	0.457	0.155
3. Negative CSR	1208	0.537	0.177
4. Female director %	1231	0.131	0.128
5. Number of female directors	1231	0.929	0.936
6. Board size	1231	6.498	1.961
7. Independent director %	1229	0.558	0.254
8. Chairperson-CEO dual role	1232	0.111	0.315
9. Firm size (in $billions)	1284	3.543	13.600
10. Stock return	1275	0.144	0.770
11. RoE	1264	−0.045	2.026
12. Slack	1272	0.122	0.215
13. Risk	1272	0.151	0.164
14. Dividend ($)	1279	0.228	0.641
15. Capex	1126	0.830	4.917

Firm size is measured using total assets. Slack is measured as cash and short-term investments minus short-term liabilities to total assets. Risk is measured as long-term debt to total assets. Dividend is dividend per share. Capex is capital expenditure as a percentage of net sales. SD is standard deviation.

company's board at the end of a given year. The second proxy is the number of total female directors on the board in a given year. The data on the measures of gender diversity are collected from the ASSET4 module of the Thompson Reuters Datastream and are cross-checked with information from the directors' profiles published in the annual reports of companies.

A number of control variables relating to board structure, composition and economic factors are employed based on previous studies (Boulouta, 2013; Nadeem et al., 2017). Naciti (2019) found that larger boards led to lower sustainability performance, while separation of CEO and chairperson roles and more diversity on boards led to higher sustainability performance for a sample of Italian firms. Similar evidence was presented by Fuente et al. (2017) for the Spanish companies. Board size, independent director % and chairperson-CEO dual role are collected from the ASSET4 module of the Thomson Reuters Datastream database and are cross-checked with information contained in the annual reports published by the companies. The firm size is measured as the natural logarithm of total assets. Dividend is measured as dividend per share. Risk is measured as a ratio of long-term debt to total assets. Information on firm size, total stock returns, return on equity (RoE), dividend and risk are collected from Worldscope and are cross-checked with information from the DatAnalysis Premium database.

Financial constraints may affect the investments made in CSP and CSR activities (Hong et al., 2012). Under flexible financial conditions, firms may invest more in CSR and, further, the goodwill generated may lower the cost of capital, leading to a higher market valuation. Hong et al. (2012) also find that CSR spending is more sensitive to financial conditions compared to capital expenditure and investment in research and development (R&D). Financial slack is computed as the ratio of cash and short-term investments minus short-term liabilities to total assets. Financial slack is employed as a control variable. Given the lack of adequate disclosure relating to R&D investments in Australia, Capex, measured as capital expenditure to net sales, is employed as a control variable.

3.3. Descriptive statistics

Table 1 shows that in terms of CSR activities, the sample firms fare slightly below the global average (of firms covered by Thomson Reuters ESG universe) in terms of positive activities, while reported CSR controversies and negative events are just above the global average. There are no major changes in CSR activities of Australian firms during the study period of 2011–2016. The technology sector generally lagged behind other sectors while the healthcare sector showed higher scores. For the study period, boards of directors in Australia have an average of 13% female directors, with the number of female directors being less than 1 on average, as shown in Table 1. The percentage of female directors showed an increasing trend from 9.7% in 2011 to 17.9% in 2016. Also, the average number of female directors went up from 0.724 to 1.23 during the study period, indicating the progress in terms of gender diversity on Australian corporate boards. As shown in Table 1, the sample firms have an average board size of 6.5 directors, with approximately 56% of them being independent and approximately 11% having the same person performing the dual roles of chairperson and CEO. The sample firms have an average size of $3.5 billion, with average total stock returns of 14.4%, whereas the average return on equity is negative 4.5%. On average, financial slack accounts for 12.2%, with long-term debt to total assets of 15%, a dividend per share of $0.23 and firms spending on average 83% of net sales on capital expenditure.

Table 2 presents correlations among the variables employed. Gender diversity is positively associated with positive CSR activities, whereas it is negatively associated with negative CSR activities. As expected, larger and more independent boards have a positive association with positive CSR, while they have a negative association with negative CSR. Firm size, risk and dividend have a positive association with positive CSR, while they have a negative association with negative CSR. Slack and Capex, on the other hand, have a negative association with positive CSR and positive association with negative CSR. Gender diversity is positively associated with firm size, board size, board independence, profitability, risk and dividends, and is negatively associated with financial slack and capital expenditure. These associations suggest that the larger and more profitable firms may appoint more women to their boards. Similarly, the presence of more female directors is positively associated with board size. Companies that take a higher degree of financial risk and pay a higher dividend are associated with having more female directors on their board, whereas companies that have a higher degree of financial slack and incur a greater amount of capital expenditure are associated with having a fewer number of female directors on their boards.

3.4. Empirical methods

CSR may be influenced by several factors, including some of the 'unobservable' firm characteristics such as culture and quality of management and the national context. This study, therefore, employs panel data models to control for the endogeneity related to unobserved heterogeneity. It is also possible that gender diversity may influence CSR, while at the same time CSR may, in turn, influence gender diversity, as shown in Fig. 1. Similarly, large and profitable firms may pay more attention to CSR and may have more gender-diverse boards. To take into account the dynamic nature of the relationships between CSR, gender diversity and other factors, a two-step systems generalized method of moments (GMM) is adopted (Arellano and Bond, 1991; Arellano and Bover, 1995; Wooldridge, 2010).

$$CSR_{n,it} = \beta_0 CSR_{n,it-1} + \beta_1 DIV_{m,it} + \beta_2 X1_{it} + \beta_3 X2_{it} + \beta_4 X3_{it} + \beta_5 X4_{it} + \beta_6 X5_{it} + \beta_7 X6_{it} + \beta_8 X7_{it} + \beta_9 X8_{it} + \beta_{10} X9_{it} + \beta_{11} X10_{it} + \mu_i + \varepsilon_{it}$$

Where CSR_n refers to total CSR (Models 1, 4, 7, 10 and 13), positive CSR (Models 2, 5, 8, 11 and 14) and negative CSR (Models 3, 6, 9, 12 and 15). The subscripts i and t refer to firm i and year t. DIV_m refers

Table 2
Correlations between dependent and independent variables employed.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Total CSR														
2. Positive CSR	0.84***													
3. Negative CSR	0.23***	−0.28***												
4. Female director %	0.38***	0.44***	−0.13***											
5. Number of female directors	0.45***	0.58***	−0.22***	0.93***										
6. Board size	0.35***	0.53***	−0.28***	0.31***	0.55***									
7. Independent director %	0.23***	0.30***	−0.10***	0.13***	0.17***	0.10***								
8. Chairperson-CEO dual role	−0.03	−0.03	0.00	0.00	0.02	0.05*	−0.04							
9. Firm size	0.13***	0.40***	−0.35***	0.16***	0.32***	0.47***	0.17***	−0.01						
10. Stock return	0.02	0.05*	−0.07**	0.02	0.02	−0.02	−0.01	−0.01	−0.01					
11. RoE	0.04	0.06*	−0.02	0.05*	0.06**	0.07**	0.04	0.02	0.02	0.01				
12. Slack	−0.15***	−0.19***	0.07**	−0.17***	−0.20***	−0.21***	−0.05	0.02	−0.08***	0.02	−0.03			
13. Risk	0.25***	0.30***	−0.11***	0.31***	0.34***	0.31***	0.01	0.02	0.13***	0.04	−0.09***	−0.32***		
14. Dividend	0.11***	0.23***	−0.19***	0.19***	0.26***	0.24***	0.06**	0.01	0.30***	−0.01	0.04	−0.10***	0.11***	
15. Capex	−0.07**	−0.07**	0.02	−0.07**	−0.07**	−0.07**	0.02	−0.02	−0.02	−0.03	−0.00	0.08***	−0.04	−0.03

Note: Firm size is measured as logarithm of total assets. ***, **, * respectively represent significance at 1%, 5% and 10% levels.

to diversity and is alternatively measured as female director % (in Models 1, 2, and 3), number of female directors (in Models 4, 5 and 6), at least one female director (in Models 7, 8 and 9), at least two female directors (in Models 10, 11 and 12) and three or more female directors (in Models 13, 14 and 15). Board and economic control variables are represented as follows: *X*1 is board size, *X*2 is independent director %, *X*3 is chairperson-CEO dual role, *X*4 is firm size, *X*5 is stock return, *X*6 is RoE, *X*7 is slack, *X*8 is risk, *X*9 is dividend and *X*10 is Capex. B1 to B11 are the estimated coefficients, μ_i is the unobserved time-invariant component and ϵ_{it} are idiosyncratic errors.

4. Findings of the study

Given the objective of this study is to examine the association between gender diversity and the CSR activities of Australian firms, empirical analyses are carried out that employ female director % and number of female directors as measures of gender diversity and positive, negative and total CSR scores as proxies for CSR activities. The case for a critical mass of female directors is examined by analysing the association between female directors and CSR activities as the number of female directors on the board increases from a token presence of a female director on a board to having at least three female director on a board. The first set of hypotheses (Hypotheses 1a and 1b) examines the influence of female director % on the CSR (positive and negative) activities of the sample firms.

Table 3 presents the results relating to the influence of female director % on total CSR, positive CSR and negative CSR. The estimated coefficients provide evidence that gender diversity has a significant positive influence on the total CSR and thus supports resource dependence theory and these findings are consistent with previous studies such as Galbreath (2016); Nadeem et al. (2017). While female director % has a significant positive influence on total CSR, female director % has no significant influence on the positive and negative dimensions of CSR, thus leading to a rejection of Hypothesis 1a, Female director % has a positive influence on positive CSR, and Hypothesis 1b, Female director % has a negative influence on negative CSR. In other words, gender diversity has no influence on the individual components of CSR.

Table 4 presents the results for the second set of hypotheses that deal with the impact of the number of female directors on the CSR activities of the sample firms. The results support Hypothesis 2a, that the number of female directors has a positive influence on positive CSR, but does not support Hypothesis 2b, that the number of female directors has a negative influence on negative CSR.

To examine the importance of a critical mass of female directors, the empirical analyses separately examines the impact of presence of (i) a threshold of at least one female director, (ii) a minimum of two female directors and, finally, (iii) a minimum threshold of three female directors on both positive and negative CSR. The results presented in Table 5 do not support either Hypothesis 3a, that a threshold of one female director does not have any influence on positive CSR, or Hypothesis 3b, that a threshold of one female director does not have any influence on negative CSR. When female representation increases to a threshold of two directors, as shown in Table 6, female directors start influencing positive CSR, but their

Table 3
Female director % and CSR.

Independent and control variables	Model (1)	Model (2)	Model (3)
	Total CSR	Positive CSR	Negative CSR
Total CSR t-1	0.469***		
	(3.79)		
Positive CSR t-1		0.787***	
		(8.21)	
Negative CSR t-1			0.499***
			(3.51)
Female director %	17.314***	5.905	−0.423
	(3.00)	(1.34)	(-0.05)
Board size	−0.318	−0.571	−0.429
	(-0.49)	(-1.28)	(-0.33)
Independent director %	−0.826	0.578	−2.571
	(-0.32)	(0.40)	(-0.87)
Chairperson-CEO dual role	−2.259	−3.494	−2.966
	(-0.65)	(-1.41)	(-0.31)
Firm size	1.797***	1.052**	2.315**
	(3.97)	(2.43)	(2.30)
Stock return	−0.568	−0.186	−1.605
	(-1.37)	(-0.62)	(-0.90)
RoE	0.082	0.068*	−0.100
	(1.60)	(1.87)	(-0.67)
Slack	1.697	−0.691	8.999*
	(0.63)	(-0.42)	(1.78)
Risk	4.273	2.409	−3.266
	(1.29)	(1.05)	(-0.61)
Dividend	−1.419***	0.492	−5.824*
	(-2.86)	(0.86)	(-1.86)
Capex	−0.121***	−0.025	−0.207
	(-4.27)	(-0.35)	(-1.57)
Sector	Yes	Yes	Yes
Year	Yes	Yes	Yes
Number of firms	859	859	859
F value	527.024	2017.984	535.970
Probability	0.000	0.000	0.000

Note: t-statistic in parenthesis. ***, **, * indicate significance at 1%, 5% and 10% level respectively. GMM systems regressions with robust standard errors are employed.

Table 4
Number of female directors and CSR.

Independent and control variables	Model (4)	Model (5)	Model (6)
	Total CSR	Positive CSR	Negative CSR
Total CSR t-1	0.422***		
	(3.36)		
Positive CSR t-1		0.731***	
		(7.60)	
Negative CSR t-1			0.440***
			(2.73)
Number of female directors	3.429***	1.636**	−0.491
	(3.83)	(2.26)	(-0.31)
Board size	−1.263*	−0.937*	−0.617
	(-1.86)	(-1.85)	(-0.50)
Independent director %	0.617	0.736	−2.035
	(0.23)	(0.53)	(-0.64)
Chairperson-CEO dual role	−3.624	−4.275*	−4.224
	(-1.02)	(-1.70)	(-0.41)
Firm size	2.237***	1.356***	2.604**
	(4.38)	(2.85)	(2.44)
Stock return	−0.579	−0.106	−1.847
	(-1.40)	(-0.36)	(-1.04)
RoE	0.104**	0.074*	−0.093
	(2.09)	(1.92)	(-0.59)
Slack	2.647	−0.161	10.705**
	(0.91)	(-0.10)	(2.07)
Risk	4.965	2.467	−2.090
	(1.51)	(1.13)	(-0.39)
Dividend	−1.608***	0.393	−6.591*
	(-2.76)	(0.79)	(-1.83)
Capex	−0.111***	−0.004	−0.255**
	(-3.88)	(-0.05)	(-2.16)
Sector	Yes	Yes	Yes
Year	Yes	Yes	Yes
Number of firms	859	859	859
F value	454.980	1845.443	473.060
Probability	0.000	0.000	0.000

Note: t-statistic in parenthesis. ***, **, * indicate significance at 1%, 5% and 10% level respectively. GMM systems regressions with robust standard errors are employed.

Table 5
Female director presence and CSR.

Independent and control variables	Model (7)	Model (8)	Model (9)
	Total CSR	Positive CSR	Negative CSR
Total CSR t-1	0.574***		
	(4.32)		
Positive CSR t-1		0.831***	
		(10.37)	
Negative CSR t-1			0.542***
			(3.90)
Female director (threshold of one)	2.298	0.608	−2.109
	(1.28)	(0.45)	(-0.86)
Board size	−0.816	−0.524	0.235
	(-1.24)	(-1.25)	(0.18)
Independent director %	−1.004	0.607	−3.423
	(-0.40)	(0.44)	(-1.29)
Chairperson-CEO dual role	−4.833	−4.587*	−1.593
	(-1.41)	(-1.70)	(-0.18)
Firm size	1.778***	0.907**	1.911**
	(3.36)	(2.40)	(2.02)
Stock return	−0.643	−0.247	−1.701
	(-1.41)	(-0.98)	(-1.06)
RoE	0.106*	0.059	−0.073
	(1.93)	(1.60)	(-0.51)
Slack	2.547	−0.622	9.854**
	(1.08)	(-0.38)	(2.11)
Risk	5.805	2.061	−0.365
	(1.62)	(0.90)	(-0.06)
Dividend	−1.074**	0.279	−5.625*
	(-2.18)	(0.53)	(-1.87)
Capex	−0.146***	−0.008	−0.255
	(-5.47)	(-0.10)	(-1.51)
Sector	Yes	Yes	Yes
Year	Yes	Yes	Yes
Number of firms	859	859	859
F value	663.056	2277.094	643.728
Probability	0.000	0.000	0.000

Note: t-statistic in parenthesis. ***, **, * indicate significance at 1%, 5% and 10% level respectively. GMM systems regressions with robust standard errors are employed.

influence is not significant in the case of negative CSR. However, when female representation reaches a critical mass of three or more directors, the influence of gender diversity on boards is significant with both positive and negative CSR, as shown in Table 7. The results presented in Table 7 thus support Hypothesis 4a, that a critical mass of female directors has a positive influence on positive CSR, and Hypothesis 4b, that a critical mass of female directors has a negative influence on negative CSR.

5. Discussion and conclusion

As presented in the previous section, the association between gender diversity and CSR varied across the sample firms depending on the number of female directors. At the aggregate level, female directors have a significant positive association with the total CSR of firms supporting the resource dependence theory; however, the associations between gender diversity and positive CSR and gender diversity and negative CSR are not empirically supported. Further empirical analysis examines the relevance of token theory and critical mass theory and find support in favour of both of these theories.

Firms with a threshold of one female director do not show statistically significant associations between gender diversity and total CSR, positive CSR and negative CSR. These findings support the existence of the effects of tokenism. When boards are formed to include a token representation, it leads to problems of visibility of the lone female director, who is subjected to performance pressures. The token representation may cause the female director to imitate the behaviour of the male directors, leading to the continuance of 'agentic' behaviour rather than 'communal' behaviour. Similarly, female directors may be isolated as they are excluded from the social networks of male directors. Thus, tokenism may result in the lone female on these boards having no impact on the CSR activities of organizations. These findings contradict Boulouta (2013), who finds that the presence of at least one female director leads to a positive association between gender diversity and total corporate social performance (CSP) and a negative association between gender diversity and the concerns dimension of CSP. The findings of this study also contradict the findings of Cook and Glass (2018) who find that the presence of even one or two female directors is positively associated with commitment to CSR.

When boards of directors are constituted with a minimum of two female directors, the associations between gender diversity, total CSR and gender diversity and positive CSR become significant. Further, when boards of directors include a threshold level of three female directors, gender diversity has a significant positive association with (i) total CSR, and (ii) positive CSR and has a significant negative association with negative CSR. These findings support the propositions of the critical mass theory. A critical mass representation of female directors leads to behavioural integration of corporate boards. Female directors are able to give expression to their 'communal' feelings, resulting in corporate firms taking on positive CSR initiatives. Similarly, with a critical mass, female directors are able to show their care for all stakeholders by preventing corporate firms from undertaking negative CSR activities.

These findings are consistent with Boulouta (2013), who finds that a critical mass of female directors for a sample of UK firms has a

Table 6
Two or more female directors and CSR.

Independent and control variables	Model (10)	Model (11)	Model (12)
	Total CSR	Positive CSR	Negative CSR
Total CSR t-1	0.427***		
	(3.43)		
Positive CSR t-1		0.724***	
		(6.71)	
Negative CSR t-1			0.369**
			(2.00)
Female directors (threshold of two)	4.883***	2.655**	−1.019
	(2.81)	(2.08)	(-0.31)
Board size	−0.898	−0.929*	−0.359
	(-1.55)	(-1.82)	(-0.29)
Independent director %	−0.434	0.932	−2.500
	(-0.17)	(0.61)	(-0.86)
Chairperson-CEO dual role	−1.254	−3.404	−1.803
	(-0.41)	(-1.21)	(-0.21)
Firm size	2.172***	1.431***	2.804**
	(4.58)	(2.85)	(2.58)
Stock return	−0.735	−0.164	−2.042
	(-1.21)	(-0.55)	(-1.27)
RoE	0.098**	0.078*	−0.126
	(2.12)	(1.85)	(-1.02)
Slack	2.479	0.057	10.429*
	(0.86)	(0.03)	(1.89)
Risk	4.523	2.091	−2.295
	(1.56)	(0.93)	(-0.45)
Dividend	−1.423**	0.189	−8.582*
	(-2.18)	(0.37)	(-1.73)
Capex	−0.124***	−0.024	−0.315***
	(-4.40)	(-0.30)	(-3.22)
Sector	Yes	Yes	Yes
Year	Yes	Yes	Yes
Number of firms	859	859	859
F value	459.739	1740.339	414.844
Probability	0.000	0.000	0.000

Note: t-statistic in parenthesis. ***, **, * indicate significance at 1%, 5% and 10% level respectively. GMM systems regressions with robust standard errors are employed.

Table 7
Three or more female directors and CSR.

Independent and control variables	Model (13)	Model (14)	Model (15)
	Total CSR	Positive CSR	Negative CSR
Total CSR t-1	0.435***		
	(2.88)		
Positive CSR t-1		0.808***	
		(8.54)	
Negative CSR t-1			0.403***
			(2.74)
Female directors (threshold of 3)	5.771**	3.273**	−6.849*
	(2.07)	(1.99)	(-1.70)
Board size	−0.821	−0.591	−0.150
	(-1.12)	(-1.42)	(-0.13)
Independent director %	−0.374	0.530	−1.221
	(-0.14)	(0.32)	(-0.43)
Chairperson-CEO dual role	−2.086	−3.447*	4.003
	(-0.60)	(-1.78)	(0.52)
Firm size	2.124***	1.017**	2.405***
	(3.32)	(2.38)	(2.70)
Stock return	−0.837*	−0.332	−1.853
	(-1.73)	(-1.49)	(-1.03)
RoE	0.144**	0.059	−0.159
	(2.34)	(1.52)	(-1.16)
Slack	4.272	0.222	8.612*
	(1.37)	(0.13)	(1.68)
Risk	10.039***	2.108	−4.851
	(2.61)	(0.90)	(-0.95)
Dividend	−1.147***	0.097	−4.987*
	(-2.82)	(0.19)	(-1.90)
Capex	−0.147***	0.002	−0.217
	(-5.41)	(0.03)	(-1.01)
Sector	Yes	Yes	Yes
Year	Yes	Yes	Yes
Number of firms	859	859	859
F value	397.483	1492.491	624.863
Probability	0.000	0.000	0.000

Note: t-statistic in parenthesis. ***, **, * indicate significance at 1%, 5% and 10% level respectively. GMM systems regressions with robust standard errors are employed.

significant negative association with the concerns dimension of CSP. However, the finding of this study that a critical mass of female directors has a positive association with positive CSR is in contrast to the finding of Boulouta (2013) that there is no significant association between gender diversity and the strengths dimension of CSP. On the other hand, the findings of this study are broadly consistent with Cook and Glass (2018), who find a positive association between a critical mass of female directors and several dimensions of CSR. The findings of this study are also consistent with Post et al. (2011), who find that companies with three or more female directors have higher environmental CSR strengths scores for a sample of companies from the US.

In summary, the improved gender balance on boards leads to enhanced behavioural integration of the various interests on boards. When boards are constituted with a lone female member, gender diversity and CSR are unrelated. With improved representation of women (two or more), gender diversity is positively associated with initiatives aimed at achieving sustainability goals or positive CSR. However, at this stage, boards still lack the ability to curb the 'agentic' behaviour of the male board members. As diversity improves further with three or more female directors, the monitoring effort also improves, resulting in a reduction in the negative impacts of corporate activities on the environment, the society or negative CSR. Therefore, a critical mass of female directors not only influences positive CSR but also curbs the negative CSR activities of firms. The key finding of this study is that a lone female director is unable to influence the CSR activities of firms in the Australian context. Improved representation for women helps boards achieve the benefits of expertise women bring to boards strategic decision making. Thus a critical mass of female directors is recommended for businesses in Australia and elsewhere.

Some of the earlier research in this area has issues of reverse causality – i.e., CSR affecting gender diversity. This study by employing panel data models, specifically the Generalized Method of Moments (GMM), addresses the issues of unobserved heterogeneity and reverse causality. This study is not without its limitations, however. This study considers CSR from two dimensions only, as being either positive or negative. It is possible that there are more than two CSR dimensions. Future studies may consider explicitly different Sustainable Development Goals (SDGs) and the role of boards in achieving SDGs. It would also be plausible to incorporate other forms of diversity on boards when examining the issues relating to diversity and CSR. Diversity of workforce and diversity of board members in terms of ethnicity and cultural background may also be considered. Similarly, some dimensions of CSR may be more important to certain directors while other dimensions may not be considered important. Given that this study focuses on the listed firms, the findings of the study may not be readily applied to non-listed entities. Similarly, this study does not explicitly consider legal and cultural differences and therefore the findings of this study many not apply to firms operating under varying legal and cultural context.

Notwithstanding these limitations, the findings of the study have implications for theory, practice, policy making and to the society in general. The findings of this study have implication for theory relating to functioning of boards and specifically the natural resource view of the firm. Women given their previous experiences and the arduous career path bring specialised skills or resources

that help in improved decision making of the boards. However, a token representation of women on corporate boards does not lead to corporate firms exerting any influence on their CSR activities. On the other hand, a critical mass of female directors enables boards of directors to take on positive CSR initiatives. Similarly, with a critical mass of female directors, boards improve their monitoring effectiveness, which, in turn, leads to fewer controversies and the curbing of unethical practices. Thus the findings of this study also have implications for token theory and critical mass theory. The findings of this study have implications for practice and policy-making. In terms of practice, it is advantageous for companies to improve their gender balance. Similarly, corporate governance policies that incorporate gender diversity initiatives in the form of improved reporting and initiatives such as the 30% Club are helpful in achieving SDGs. Therefore, policies aimed at improving diversity and equality are encouraged in Australia and other countries. The findings of this study have also implications for pursuit of SDGs by the business sector as improved gender diversity actively contributes to improving CSR and to achieve other SDGs. Further research may focus on other forms of diversity (age, race and ethnicity) and their effects on CSR and corporate performance. In addition, future research may also consider specific dimensions of CSR such as social and community performance.

Author contribution

Both the authors contributed equally for this article.

Declaration of competing interest

We do not have permission to share the data. We used data from the secondary database. We have provided all tables generated from the dataset in the paper. If required we will share the data analysis file.

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Appendix A. Supplementary data

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