The impact of board size on board demographic faultlines

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Abstract

Purpose – Demographic faultlines are associated with negative group processes and low performance. Little is known about the formation of faultlines in boards and how they can be weakened to capitalize on the positive effects of diversity.

Design/methodology/approach – This study draws on social identity theory and faultlines theory to provide insights into how gender and age faultlines are formed in a board. Subsequently, it proposes and tests a U-shaped board size-faultlines strength relationship. Archival data were collected on 288 organizations listed on the Australian Securities Exchange.

Findings – Hierarchical regression analyses indicate that small- and large-sized boards experience stronger faultlines than medium-sized boards.

Originality/value – This study provides pioneering evidence for a U-shaped relationship between board size and demographic faultlines strength. These findings inform practice by suggesting an optimal board size.

Keywords Board size, faultlines, gender, age, social identity theory, faultlines theory

Paper type Research paper

Introduction

Faultlines are alignments of diversity attributes in a diverse group creating homogeneous subgroups (Lau and Murnighan, 1998). For example, a group comprising three women and three men will form faultlines if, for example, the women are younger than the men. In this case, group members’ genders and ages align, creating two homogeneous subgroups of young women and aged men. Faultlines strength refers to the extent to which diversity attributes align (Thatcher et al., 2003). For instance, a group comprising three young women and three aged men demonstrates stronger faultlines strength compared to a group comprising two young women, one aged woman and three aged men.

Faultlines are generally associated with negative group processes, such as low productive energy (Kunze and Bruch, 2010), and high emotional conflict (Pearsall et al., 2008). These negative group processes can be stronger than those experienced by a group where the subgroups
are based on a single diversity attribute (e.g. women vs. men, no alignment of gender and age) (Lau and Murnighan, 1998; Price et al., 2007; Tuggle et al., 2010). Therefore, faultlines can explain performance, above and beyond what can be explained by demographic diversity (e.g. Bezrukova et al., 2016; Bhat et al., 2019; Martinez-Jimenez et al., 2020; Mazzotta et al., 2017; Wellalage and Locke, 2013). These possibilities drove several studies on the impact of faultlines on group processes (e.g. Flache and Mäs, 2008; Lau and Murnighan, 2005; Meyer et al., 2016; Molleman, 2005; Stanciu, 2017), group outcomes (e.g. Ren et al., 2014; Rico et al., 2012; van Knippenberg et al., 2011; Zhang et al., 2017), and moderating effects on the faultlines-processes/outcomes relationship (e.g. Adair et al., 2017; Schölmerich et al., 2016; Spoelma and Ellis, 2017). The moderating effect of faultlines on the predictor-outcome relationship (e.g. Hutzschenreuter and Horstkotte, 2013; Mo et al., 2019; Price et al., 2007; Spell et al., 2011; Vora and Markóczy, 2012) and measurement of faultlines have also been an area of interest (e.g. Shaw, 2004; Trezzini, 2008; Lawrence and Zyphur, 2011; Meyer and Glenz, 2013). A very small body of research investigated the formation or antecedents of faultlines (Kaczmarek et al., 2012a), dormant and activated faultlines (e.g. Jehn and Bezrukova, 2010; Veltrop et al., 2015), and crisscrossing group members (e.g. Mäs et al., 2013).

Following the conceptualization of faultlines at the group level (Lau and Murnighan, 1998), most empirical studies focused on this phenomenon at this level (e.g. Bezrukova et al., 2009; Choi and Sy, 2010). A body of research also studied faultlines at the top management team level (e.g. Cooper et al., 2014; Georgakakis et al., 2017; Li and Jones, 2019; Ou et al., 2017; Richard et al., 2019; Xie et al., 2015). Few board level studies mainly investigated the faultlines-performance relationship (Kaczmarek et al., 2012b; Peteghem et al., 2018; Vecchiarini et al., 2014; Veltrop et al., 2015), with little emphasis on the formation or antecedents of faultlines (e.g. presence of CEO on the nomination committee as an antecedent; Kaczmarek et al., 2012a). Studying formation or antecedents of faultlines in corporate boards is especially important (Veltrop et al., 2015). Stereotypical incongruent subgroups (e.g. young female directors vs. aged male directors) may be formed, having a strong impact on board processes (Steger, 2014; Thatcher, 2013). These negative board processes can have adverse effects on organizational outcomes. Thus, demographic faultlines may partly explain why board demographic diversity can lead to negative outcomes (e.g., Hafsi and Turgut, 2013; Haslam et al., 2010) or non-significant outcomes (e.g. Fernández-Temprano and Tejerina-Gaite, 2020; Horak and Cui, 2017).
The current study advances the field of faultlines in three ways. First, we extend the faultlines field by examining the formation of demographic faultlines in corporate boards in a real-world setting. Most group level studies used field/laboratory experiments with artificial allocation of individuals to groups to form various faultlines strengths (e.g. Homan et al., 2007; Lau and Murnighan, 2005; Sawyer et al., 2006). The artificial field/laboratory experimental settings fail to fully capture the faultlines formation possibilities present in the real world (Chrobot-Mason et al., 2009). Second, we pioneer a new direction in faultlines literature on the group size-faultlines relationship by examining a curvilinear impact of board size on faultlines. Research so far has mainly controlled for the effect of group size.\footnote{One exception is a meta-analysis that found an inverted U-shaped relationship between group size and faultlines strength (Thatcher and Patel, 2011). This meta-analysis has been retracted.} Specifically, we present a positive a U-shaped board size-faultlines strength relationship. We test this relationship using archival data on 288 organizations listed on the Australian Securities Exchange (ASX).

**Theoretical underpinnings and hypotheses development**

*Formation of gender and age faultlines*

Diversity includes any attributes (e.g. gender, age, ethnicity) people use to tell themselves that another person is different (Williams and O'Reilly, 1998). The formation of subgroups based on diversity attributes and their alignment can be derived by social identity theory (Tajfel, 1978; Tajfel and Turner, 1986) and faultlines theory (Lau and Murnighan, 1998; Thatcher, 2013).

The members of a group may start categorizing themselves into various subgroups based on multiple diversity attributes (Turner et al., 1987). Social identity theory postulates that following the categorization, members of those subgroups establish a positive social identity with their subgroup (ingroup) (Tajfel, 1978; Tajfel and Turner, 1986). The members of each subgroup may start showing favoritism to ingroup members over the members of the other subgroup (outgroup) (Billig and Tajfel, 1973). The extent that an ingroup membership is salient, one’s perceived similarity to others in the ingroup is increased (Hogg, 2006). The social identity is especially salient when it is linked with minority status (e.g. female or young board members) and when those subgroups are important in a given context. Additionally, social identity may strengthen when the ingroup identity is threatened in the presence of biases, prejudices and negative stereotypes (Steele et al., 2002). In sum, positive social identity elicits a complex
cognitive process through which individuals’ interpretation of events are based, in part, on the strength of their identification with their social identity. It also triggers a strong emotional response from the members to the fate of their subgroup (Haslam and Ellemers, 2005) and a creation of ‘us-them’ distinction within a group (Homan et al., 2007).

The members of such a group are likely to cooperate with ingroup members and compete against outgroup members (Wagner et al., 1986), strengthening the formation of subgroups and eliciting faultlines (Bezrukova et al., 2009; Lau and Murnighan, 1998; Thatcher et al., 2003). For example, in a group comprising three aged men and two young women we expect subgroups and faultlines to emerge if gender and age are salient (Chrobot-Mason et al., 2009). Extant literature shows that the ingroup-outgroup distinction and the negative competition may lead to relationship conflict (Kochan et al., 2003), less satisfaction (Pelled et al., 1999), and poor overall group functioning (Harrison et al., 1998). Thus, demographic diversity can undermine group processes by provoking environments where an individual is more easily influenced by ingroup than the outgroup members (Hekman et al., 2009). Prior research suggests that social identity theory is critical in understanding the processes by which individuals form subgroups and how these subgroups impact the perceptions and behaviors of its members (Gover and Duxbury, 2012; Homan et al., 2007).

‘Theory of faultlines’ is also pertinent to our research (Thatcher, 2013, p. 57). Lau and Murnighan argued that demographics (e.g. gender, age, ethnicity) and psychological attributes (e.g. personality, values) can create imaginary dividing lines (i.e. faultlines) along which subgroups may be formed within a group. The faultlines are deep and strong when the subgroups are of similar size, attributes align (high level of homogeneity across multiple attributes) within each subgroup (female group members are also young) and when there is a high level of heterogeneity between subgroups (the other subgroup comprises male group members who are aged) (Gover and Duxbury, 2012; Lau and Murnighan, 1998). Prior studies suggest that strong faultlines are associated with negative group processes and outcomes such as high emotional conflict (Homan et al., 2007; Li and Hambrick, 2005; Tuggle et al., 2010). In sum, social identity theory and faultlines theory predict subgroupings in a group due to categorization into subgroups, positive social identity with the ingroup, and alignments of multiple diversity attributes. These subgroups may strengthen following incidents such as differential treatment, differing values,
assimilation (the expectation that group members will demonstrate same behaviors), insult, and even simple contact between dissimilar subgroups (Chrobot-Mason et al., 2009).

In particular, we expect gender and age to initiate faultlines in boards for two main reasons. First, categorization based on visible differences, such as gender and age, is common (Messick and Mackie, 1989). There is a high potential for gender and age to become salient categories (Turner, 1985) in boards comprising members who are dissimilar with regards to gender and age. This categorization influences their sense of belongingness with (or alienation from) others (Zhu et al., 2014). Thus, board members that are dissimilar in gender and age may have less sense of connection and belongingness which, in turn, may activate faultlines. Second, gender and age are visible diversity dimensions and they more often than not arouse responses founded on biases, prejudices, or stereotypes (Milliken and Martins, 1996). These biases, prejudices and stereotypes are critical in interactions among board members and may trigger faultlines formation. For example, studies show that outgroup members’ influence is resisted, dismissed and their input is devalued in making group decisions (Tanford and Penrod, 1984). We argue that increased resistance to outgroup influence will sharpen the distinction between ingroup and outgroup members. This, in turn, may prompt the emergence of faultlines in boards.

**Gender diversity**

Gender has been a subject of enquiry in board literature (e.g. Ali et al., 2014; Byron and Post, 2016; Konrad et al., 2008). We expect faultlines to form between aged male directors and young female directors. Gender is salient in the board of directors context and is very likely a basis for categorization. The gender-based attributions are frequently made in explaining observed differences and behaviors between employees (Chattopadhyay et al., 2004). The gender based stereotypes are also entrenched in society and influence information processing, attitudes and behaviors towards other people (Bargh et al., 1996). In this respect, there is a possibility that the aged male directors may see themselves in the same social category that is characterized by maturity and experience while the young females may be perceived as ‘others’ who are not so mature or experienced.

An increased representation of women on a board is expected to strengthen ingroup-outgroup distinctions (Konrad et al., 2008). Konrad and her colleagues found that the presence of three women (instead of one or two) on a board results in women who ‘… were … associating
with one another’ (p.147). Based on social identity theory, we expect that gender categorization will be salient when there are more women on the board and this, in turn, may trigger prejudices, biases and negative stereotyping (Steele et al., 2002). As women move into roles that have traditionally been reserved for men, they are likely to encounter a hostile work climate (Kossek et al., 2003). A hostile climate refers to the shared perceptions of discrimination and harassment towards minority members (Kossek et al., 2003). These hostile work climates and negative behaviors may force women to behave collaboratively and interactively with other women to neutralize the effects of gender biases (LePine et al., 2002). Individuals are attracted to, prefer to work with and are open to communicate with those who are similar to them and perceived as ingroup (Bryne, 1971; van Knippenberg et al., 2004). Thus, we anticipate that women on the board will be attracted to and support each other. Such support and collaborative behaviors among women may intensify gender faultlines in corporate boards.

Spector and Jones (2004) reported that men trust a new male member more than a new female member and prefer a masculine leadership model (Butterfield and Powell, 2010). Moreover, employees use gender stereotypes in evaluating leadership (Namok et al., 2009). The biases and prejudices reported above may be driven by social identity theory and may, in turn, elicit perceived differences in the way men and women are treated on corporate boards. In this respect, the dominant members (men) may perceive differences in treatment as loyalty, while the non-dominant members (women) may see it as favoritism (Chrobot-Mason et al., 2009). Therefore, group polarization can occur when members receive unequal opportunities or unequal/differential treatment (Chrobot-Mason et al., 2009). Given the above, we argue that gender-based differential treatment may also provoke faultlines along gender lines.

**Age diversity**

Age is a critical factor in interpersonal relations because age cohorts share similar experiences (Rhodes, 1983) and accept similar social values. The sharing of similar experiences and acceptance of social values for people of the same age group often result in similar behavioral patterns resulting in age norms. The age effects intensify as people mature while aging also produces changes in cognition (Parry and Urwin, 2011). This suggests that board members who are dissimilar with respect to age may have different age norms and different lenses through which events on the board are interpreted and decisions made. The concept of age norms also indicates
that age identities (based on age groups) may have become salient because the individual perceivers have been exposed to them in the past. These identities represent a coherent resolution of observed patterns of similarity and difference (see Turner, 1985; Oakes et al., 1994) that may distinguish one age group from another.

We argue that age diversity will be a predictor of faultlines for two major reasons. First, age similarity may increase attraction, frequency and quality of communication and interaction among ingroup members (Barsness et al., 2005). Second, social identity theory suggests that people who are in the same age cohort share similar experiences and will tend to think alike and, therefore, find it easier to see themselves as ingroup members (Brown and Turner, 1981). Thus, differences in age will create ingroup and outgroup distinctions such that boards with high age dissimilarity will find it difficult to leverage information from each other, thereby promoting faultlines (Twenge et al., 2010). An increase in board diversity with respect to age may thus be prone to difficult processes (e.g. conflict) that may, in turn, increase the distance between young and aged board members and further create coalitions and faultlines (Hafsi and Turgut, 2013). Consistent with social identity theory we expect that as age diversity increases in a board (e.g. from one young and nine aged directors to three young and seven aged directors) faultlines will form.

We expect both gender and age diversity to trigger negative behaviors such as stereotypical role expectations (Elsass and Graves, 1997) and decreased communication (Kravitz, 2003) culminating in faultlines.

**Curvilinear Board size–faultlines strength relationship**

Group size has implications for the formation of faultlines because size facilitates the desire for subgroup interactions (Hart and van Vugt, 2006). While research examining faultlines usually takes group size into consideration, most of the time such studies use group size as a control variable (e.g. Bezrukova et al., 2010; Gibson and Vermeulen, 2003). We bridge this gap by testing the direct link between board size and faultlines. Specifically, we propose a U-shaped relationship between board size and faultlines strength.
Small- to medium-sized boards

Literature suggests that the optimal group size may vary depending on several factors inherent in groups and the nature of the tasks groups need to accomplish. We argue that a small board is likely to have strong faultlines strength because the distinction between the ingroup and outgroup will more likely be sharper and more pronounced in small- than in medium- or large-sized boards. For example, a board with three members may have only one woman who is also likely to be the youngest director. As the board size increases, from three to five members, there is likely to be at least one crisscrossing director, such as a young male director or an aged female director. Having at least one crisscrossing director will weaken the faultlines strength. Some evidence suggests that groups consisting of around five members experience high levels of participation and coordination leading to group effectiveness (Shaw, 1981). If we further increase the board size from five to 10, we are likely to have additional crisscrossing directors (young male directors and aged female directors). Therefore, the faultlines will become even weaker. In sum, there should be a negative relationship between board size and faultlines strength for boards of small to medium size.

Medium- to large-sized boards

With a further increase in board size beyond the medium level we are very likely to have a greater proportion of typical board members, such as aged male directors and young female directors. We expect this increase to exacerbate faultlines and make them stronger. Group size literature supports that as group size increases members’ liking for each other decreases (Klein et al., 2009), leading to low social integration (Seashore, 1977) and low perceived attachment (Smith et al., 1994). Thus, they are likely to seek out similar group members resulting in subgroup formation (Hamilton et al., 2010). Although there is a lack of research on the positive impact of medium- to large-sized groups/boards on faultlines strength, there is plenty of evidence that large boards have process issues and are less effective than small boards. For instance, large boards experience increased coordination problems when exchanging information and engaging in other communication (Cheng, 2008). In the same vein, it takes more compromises for a large board to reach consensus (Cheng, 2008). Thus, increased board size may negatively impact the ability of board members to make strategic decisions due to a lack of cohesion (Shaw, 1981). These issues might be attributed to stronger faultlines in these boards. In sum, beyond optimal size there seems to be increased process losses and reduced group integration that surpass the gain from a large board size.
Overall, board size has a nonlinear impact on faultlines strength. In small- to medium-sized boards (e.g. three to 10 members) we will see a negative relationship between board size and faultlines strength. However, in medium- to large-sized boards (e.g. 10-16 members) we will see a positive relationship between board size and faultlines strength. Thus, it is proposed:

**Hypothesis:** There is a U-shaped relationship between board size and faultlines strength.

**Methods**

We used archival data to test the hypothesized relationship.

**Sample and data collection**

The study’s population comprised for-profit organizations across nine industries in Australia. The initial sample comprised 2164 organizations listed on the ASX in October 2011. Four hundred and forty-six organizations with over 100 employees were selected for this research (e.g., Wang and Clift, 2009). Small organizations were excluded as archival databases are less likely to have data on these organizations than on large organizations. Missing data on board member age reduced the sample size to a final sample of 288 organizations. Data on gender and age of board members for 2011 were obtained from the Orbis database. Data on control variables were obtained as follows: board size (Orbis), organization size (DatAnalysis), organization age (Osiris), organization type in terms of holding/subsidiary or stand-alone (OneSource) and industry (ASX website).

The final sample of 288 organizations was diverse. The organization size ranged from 101 to 190,000 employees. Women’s representation ranged from 0% to 50% with a mean of 11.25%, comparable to other Australian studies (e.g. Chandrakumara et al., 2018; Nadeem et al., 2017). The sample organizations represented nine industry groups based on Standard Industrial Classification (SIC) codes, with no organization belonging to the Public Administration category. The most frequent industry groups were: Transportation, Communications, Electric, Gas and Sanitary Services (24% of the organizations); Mining (18%); Services (16%); Construction (15%); and Finance, Insurance and Real Estate (12%). Board size ranged from two to 15 (mean 6.4). Women’s representation on the corporate boards ranged from zero to five women (mean .82). Ages of board members ranged from 34 years to 89 years (mean 58.9).

**Measures**
**Outcome/dependent variable**

Faultlines strength was calculated for each organization using a regression-based measure introduced by van Knippenberg et al. (2011) (see equations 1 and 2). This measurement maintains the continuous nature of board age diversity and has high content validity as it includes both age and gender of each board member (Boyd et al., 2013; Boyd et al., 2005). In Step 1, for each of the 288 organizations, board member age variable (comprising data on age of each board member) and board member gender variable (comprising binary coded data [male/female] on gender of each board member) were created. It resulted in 288 board member age variables (one for each board) and 288 corresponding board member gender variables (one for each board), matching the age with gender of each board member. In Step 2, for each of the 288 organizations, the board member age variable was regressed on the board member gender variable to find the variance in age that can be explained by gender (equation 1). The resulting $R$ value represented the faultlines strength for each board (equation 2). The faultlines strength score ranged from 0 (no faultlines; for instance, all board members were men) to 1 (very strong faultlines; one possible situation is where all aged board members were men and all young board members were women). A value of 1 means that all the variance in the ages of board members is explained by the gender of board members. The mean value of faultlines strength for our sample was .21.

$$\text{Board member age} = \beta_0 + \beta_1 \text{Board member gender} + \varepsilon \quad (1)$$

$$\text{Faultlines strength for each board} = R \text{ from equation 1} \quad (2)$$

**Predictor/independent variable**

Board size was operationalized as the total number of board members including both executive and non-executive members (Ali, 2018; Kaczmarek et al., 2012b).

**Controls**

The analyses controlled for some alternative explanations of board size and board faultlines. Compared to small organizations, large organizations are likely to have diverse boards (Carter et al., 2003; Wang and Clift, 2009). Consistent with previous research, organization size was operationalized as the total number of employees (Alexander et al., 1995; Jackson et al., 1991). Organization age may have an impact on the levels of board gender and age diversity. Organization age was operationalized as the number of years since the organization was founded (Jackson et al.,
Organizations that are holding companies or subsidiaries, compared to stand-alone organizations, may experience different board diversity levels and diversity dynamics. As such a dummy variable called ‘Organization type’ was created, with ‘0’ representing ‘Holding or subsidiary’ and ‘1’ representing ‘Stand-alone’. Industry type predicts the level of gender and age diversity in boards (Brammer et al., 2007; Hillman et al., 2007; Kang et al., 2007). The nine SIC industry groups of the sample organizations were categorised into services and manufacturing (Ali et al., 2014). A dummy variable called ‘Industry type’ was created, with ‘1’ representing manufacturing and ‘0’ representing services. Analyses also controlled for earnings before interest and taxes (EBIT) and Tobin’s q as corporate governance is linked to profitability and market measures of performance (Bhatt and Bhatt, 2017; Ujunwa, 2012).

Model specification and analyses

The proposed curvilinear relationship between board size and faultlines strength is represented by equation 3.

\[
\text{Faultlines strength} = \beta_0 + \beta_1 \text{Organization size} + \beta_2 \text{Organization age} + \beta_3 \text{Organization type} + \beta_4 \text{Industry type} + \beta_5 \text{EBIT} + \beta_6 \text{Tobin’s q} + \beta_7 \text{Board size} + \beta_8 \text{Board size}^2 + \epsilon \quad (3)
\]

We used hierarchical multiple regression to test the hypothesis. To test curvilinearity, board size\(^2\) (i.e. board size \(\times\) board size) was created after the board size was centred to reduce multicollinearity with the squared term (Aiken and West, 1991). Faultlines was regressed on board size and board size\(^2\). The control variables were entered in Step 1, board size was entered in Step 2, and board size\(^2\) was entered in Step 3.

Results

Table 1 presents the means, standard deviations and correlation coefficients for all variables. The mean board size of 6.44 was comparable to other Australian studies (e.g. Chandrakumara et al., 2018; Pandey et al., 2019). Board size and organization size were significantly strongly correlated. Board size was significantly weakly to moderately correlated with organization age, EBIT and faultlines strength. Some controls were significantly weakly to moderately correlated with each other.

Table 1 near here
The results shown under Model 3 in Table 2 indicate that board size\(^2\) ($\beta = .37$, $p < .01$) significantly affected faultlines strength and accounted for an additional 6 percent of variance in faultlines strength. The positive coefficient on board size\(^2\) indicates a U-shaped relationship. Therefore, we found support for our hypothesis.

Table 2 near here

We plotted the effects of board size on faultlines strength. Figure 1 presents the regression line for the U-shaped curvilinear effects of board size on faultlines strength. The U-shaped curvilinear relationship was strongly negative for small- to medium-sized boards. The faultlines strength decreased from .59 for boards comprising two members to .13 for boards comprising 10 members. Subsequently, the relationship between board size and faultlines strength became moderately positive for medium- to large-sized boards. The faultlines strength increased from .13 for boards comprising 10 members to .32 for boards comprising 16 members.

Figure 1 near here

**Discussion**

The main objective of this study was to investigate the curvilinear relationship between board size and faultlines strength. We found a significant U-shaped relationship between board size and faultlines strength. Our results indicate a strong negative relationship between board size (small- to medium-sized boards) and faultlines strength, followed by a moderate positive relationship between board size (medium- to large-sized boards) and faultlines strength (see Figure 1). Specifically, faultlines strength decreased from .59 for boards comprising two members to .13 for boards comprising 10 members. The faultlines strength then increased from .13 for boards comprising 10 members to .32 for boards comprising 16 members. As the board size increases from a small board to a medium-sized board it is increasingly unlikely that the diversity attributes of gender and age will align and therefore the faultlines strength will decrease. The faultlines strength reaches its lowest point of .13 with an increased number of crisscrossing directors. Any further increase in board size will increase the likelihood of some alignment of diversity attributes and the formation of subgroups. The findings suggest that a board comprising 10 members is ideal, having the weakest faultlines strength. The findings are consistent with past research that found the ideal board size to be nine members (Guest, 2009) or 10-12 members (Nguyen and Faff, 2006).
The significant U-shaped relationship between board size and faultlines strength is consistent with some past research that investigated the board size–performance relationship. A U-shaped relationship between board size and faultlines (small and large boards have strong faultlines) means that there should be an inverted U-shaped relationship between board size and performance (small and large boards underperform because of strong faultlines). For instance, Guest (2009) found strong evidence for an inverted U-shaped relationship between board size and profitability. Similarly, Hartarska and Nadolnyak (2012) found an inverted U-shaped relationship between board size and efficiency. Small boards lack a variety of skills and large boards suffer from poor communication and decision-making, and ‘free-riding’ (Nguyen and Faff, 2006).

**Theoretical and research implications**

The findings of this study have several theoretical implications. The support for a moderate positive relationship between board size (medium- to large-sized boards) and faultlines strength calls for social identity theory (Tajfel, 1978; Turner et al., 1987) to incorporate the possible alignments of social identities. Incorporating alignments of diversity attributes (Lau and Murnighan, 1998) and the presence of crisscrossing members (Mäs et al., 2013) will allow to fully capture the negative group processes predicted by social identity theory. The findings of this study strengthen the argument that since faultlines involve the alignment of diversity attributes, multiple attributes of diversity should be studied simultaneously, focusing on various combinations of those attributes (Thatcher et al., 2003; Thatcher and Patel, 2012). The support for a U-shaped board size-faultlines relationship may help refine faultlines theory (Lau and Murnighan, 1998; Thatcher, 2013). The results show that certain sizes of a board may predict stronger faultlines than other sizes. The boards experience different dynamics depending on their size: low, medium or large.

The findings of this study address important research gaps and provide directions for future research. This research is among the first few studies to focus on the empirical investigation of the formation of demographic faultlines at the board level (Kaczmarek et al., 2012a). Future research should investigate additional demographic attributes of board diversity such as race/ethnicity diversity (Lau and Murnighan, 1998). Moreover, faultlines can be different depending on the type of diversity: social category diversity (e.g. gender and age diversity focused in this study) versus informational diversity (e.g. educational diversity) versus value diversity (e.g. personality diversity) (Thatcher, 2013). Therefore, future research should investigate the impact of diversity
type on different faultlines formations and their subsequent different effects on board processes and outcomes. Furthermore, this study examined latent (potential) board demographic faultlines rather than perceived (active) faultlines. Future research should study how board members perceive the formation of faultlines and their identification with their subgroups. Research in this direction should also examine the triggers (differential treatment, different values, assimilation, insult or humiliating action and simple contact) that can initiate board faultlines formation (Chrobot-Mason et al., 2009) and then investigate how long the faultlines remain active (Thatcher, 2013).

Practical implications
The findings of this research have important practical implications. First, nomination committees need to consider the impact of board size on faultlines strength. The findings suggest that small- and large-sized boards experience strong faultlines, whereas a medium-sized board experiences weak faultlines. The ideal board size seems to be 10. Nomination committees need to take into account the trade-off between added value and low-quality decisions before increasing a board’s size (Appiah et al., 2016). Cheng, 2008; Kaczmarek et al., 2012b; Nguyen and Faff, 2006). Second, nomination committees need to take into account the faultlines emerging or getting stronger as a result of new board members (Mans-Kemp and Viviers, 2019). Managing gender–age faultlines is extremely important as past research indicates that these faultlines are associated with relationship conflict and other negative behaviors (Choi and Sy, 2010). Past literature suggests high gender but low age diversity. High board gender diversity is associated with improved productivity, and low board age diversity is associated with high return on assets (Ali et al., 2014). In adopting this composition we might see an improvement in the low levels of gender diversity in Australian boards – women represented only 29.7 per cent of directors on ASX 200 boards (Australian Institute of Company Directors, 2019). Moreover, any addition or replacement should be based on the consideration of bringing in a crisscrossing member (e.g. aged female director or young male director). These crisscrossing members can weaken the subgroups and unite the board in the long run (Mäs et al., 2013).

Limitations
This research has certain limitations. For instance, we could not consider racial/ethnic board diversity and how it can affect demographic faultlines formed in corporate boards. Most Australian organizations do not conduct racial/ethnic audits leading to a lack of data. The very low levels of racial/ethnic diversity in Australian boards, if considered, might not change the findings of this study. Similarly, a lack of data on informational diversity (e.g. educational diversity) and value diversity (e.g. personality diversity) prevented us from including these attributes of diversity and studying how they can change the formation of faultlines. Moreover, our focus on the use of archival data did not allow us to investigate active (perceived) faultlines (Jehn and Bezrukova, 2010; Pearsall et al., 2008; Thatcher, 2013); we studied dormant (potential) faultlines that may or may not be activated (Chrobot-Mason et al., 2009). A longitudinal survey of board members could allow the examination of active faultlines in corporate boards and how these faultlines change over a period of time (Mäs et al., 2013; Thatcher and Patel, 2012). Future research can also benefit from analysing archival panel data, spanning over an extended period of time (Alipour et al., 2019).
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Table 1. Means, standard deviations, and correlations$^a$

| Variable                        | Mean   | SD       | 1       | 2       | 3       | 4       | 5       | 6       | 7       |
|---------------------------------|--------|----------|---------|---------|---------|---------|---------|---------|---------|
| **Controls**                    |        |          |         |         |         |         |         |         |         |
| 1. Organization size            | 4719.37| 14694.76 |         |         |         |         |         |         |         |
| 2. Organization age             | 36.95  | 33.75    | .27**   |         |         |         |         |         |         |
| 3. Organization type            | .10    | .30      | -.10    | -.07    |         |         |         |         |         |
| (0 = Holding/subsidiary; 1 = Stand-alone) |         |          |         |         |         |         |         |         |         |
| 4. Industry type                | .42    | .50      | -.05    | .09     | .10     |         |         |         |         |
| (0 = Services; 1 = Manufacturing) |         |          |         |         |         |         |         |         |         |
| 5. EBIT (Millions of AUD)       | 144.14 | 1040.59  | .31***  | .12*    | -.04    | -.11    |         |         |         |
| 6. Tobin’s q                    | .76    | .90      | -.03    | -.09    | .00     | -.05    | -.09    |         |         |
| **Predictor/Independent**       |        |          |         |         |         |         |         |         |         |
| 7. Board size                   | 6.44   | 2.40     | .50**   | .28***  | -.11    | -.10    | .25***  | -.09    |         |
| **Outcome/Dependent**           |        |          |         |         |         |         |         |         |         |
| 8. Faultlines strength          | .21    | .23      | -.11    | .07     | .06     | .12     | -.12    | .10     | -.30*** |

$^a$2-tailed; * p<.05, ** p<.01, *** p<.001
### Table 2. Hierarchical regression analyses

| Variable                      | Controls                                                                 | Predictors/Independent Variables | Board size predicting faultlines strength | Hypothesis |
|-------------------------------|--------------------------------------------------------------------------|-----------------------------------|------------------------------------------|------------|
|                               |                                                                          |                                   | β (Model 1) | β (Model 2) | β (Model 3) |          |
|                               |                                                                          |                                   |             |             |             |          |
| **Controls**                  |                                                                          |                                   |             |             |             |          |
| Organization size             | -11                                                                      |                                   | .05         | .07         | -           |          |
| Organization age              | .08                                                                      |                                   | .13         | .17*        | .06         |          |
| Organization type             | .05                                                                      |                                   | .00         | -.03        | .06         |          |
| Industry type                 | .09                                                                      |                                   | .06         | .06         | .03         |          |
| EBIT                          | -.07                                                                     |                                   | -.04        | -.03        | .10         |          |
| Tobin’s q                     | .10                                                                      |                                   | .07         | .10         | .10         |          |
| **Predictors/Independent Variables** |                                                                          |                                   | -.34**      | -.56***     |             |          |
| Board size                    |                                                                          |                                   | -.34**      | -.56***     |             |          |
| Squared term                  |                                                                          |                                   | .37**       |             | .18         |          |
| R²                            | .05                                                                      |                                   | .13         | .18         |             |          |
| F                             | 1.22                                                                     |                                   | 2.97**      | 3.97***     |             |          |
| ΔR²                           | .05                                                                      |                                   | .08         | .05         | .05         |          |
| F for ΔR²                     | 1.22                                                                     |                                   | 12.87***    | 9.74**      |             |          |

n = 154; Standardised coefficients are reported; * p<.05, ** p<.01, *** p<.001
Figure 1. Relationship between board size and faultlines.