

An Investigation of CEO Characteristics on Financing and Innovation

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Doctor of Philosophy (Finance)

By

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Table of Contents

Table of Contents I

List of Tables V

List of Figures VII

Abstract VIII

Declaration X

Acknowledgements XI

Chapter 1: Introduction 1

1.1 Background and motivation 1

1.2 Research objectives 2

1.3 Thesis contribution and key findings 2

1.4 Thesis outline 4

Chapter 2: Literature Review 6

2.1 Review methodology 6

2.2 Management 9

2.2.1 Upper echelon theory 9

2.2.2 CEO characteristics 10

2.3 Finance 13

2.3.1 Financial experience 13

2.3.2 Military experience and survival of the Great Depression 14

2.3.3 Founder CEOs and CEO-chairperson duality 14

2.3.4 CEO overconfidence 15

2.4 Strategy 15

2.4.1 Stewardship theory 16

2.4.2 Research and development strategy 16

2.4.3 International, diversification, and acquisition strategy 18

2.4.4 Family firms 18

2.4.5 Environmental strategy 20

2.5 Interdisciplinary 21

2.5.1 Principal – Agent 21

2.5.2 Auditing 22

2.5.3 Corporate governance 23

2.5.4 Accounting 24

2.5.5 Risk management 24

2.6 CEO Characteristics: Emerging Trends 25

2.6.1 Expansion of the scope of CEO characteristics 25

2.6.2 Entrepreneurship and open innovation 26

2.6.3 Emerging markets and political activity 26

2.6.4 New methodologies 27

2.7 Conclusion 27

Chapter 3: Empirical Study 1 42

3.1 Introduction 42

3.2 Review of event study methodology 45

3.3 Research methodology 49

3.3.1 Dependent variables 54

3.3.2 Independent variables 57

3.3.3 Control variables 62

3.3.4 Regression with dummy variables and control variables 66

3.3.5 Robustness tests 67

3.4 Empirical results and discussion 69

3.4.1 Regression with control variables and dummy variables 69

3.4.2 Regression with dummy variables only 84

3.4.3 Robustness analysis – CAR comparisons 99

3.5 Conclusion 145

Chapter 4: Empirical Study 2 148

4.1 Introduction 148

4.2 Literature review 150

4.3 Data and research methodology 153

4.3.1 Dependent variable 154

4.3.2 Independent variables 155

4.3.3 Control variables 158

4.3.4 Robustness tests 158

4.4 Empirical results and discussion 159

4.4.1 Panel regressions 160

4.4.2 Regressions of CEO characteristics and R&D expenditure on relative industries 162

4.4.3 Robustness analysis 171

4.4.4 Control for endogeneity 180

4.5 Conclusion 181

Chapter 5: Conclusion 183

5.1 Overview 183

5.2 Thesis summary 183

5.3 Key contributions of the thesis 185

5.4 Limitations and Directions for Future Research 187

References 190

Appendix 212

Appendix A. Citation details for top 51 publications 212

Appendix B. Parametric t-tests result on comparing female and male CEOs 214

Appendix C. Parametric t-tests result on comparing dual and independent CEOs 215

Appendix D. Parametric t-tests result on comparing CEOs with PhD degrees and others 216

Appendix E. Parametric t-tests result on comparing CEOs with MBA degrees and others 217

Appendix F. Parametric t-tests result on comparing CEOs with Masters degrees and others 218

Appendix G. Parametric t-tests results on comparing CEOs located in Australia and others 219

Appendix H. Announcements examples for each category 220

List of Tables

Table 1. Summary of results 29

Table 2. Summary of announcements collection 49

Table 3. Descriptive statistics for each category 51

Table 4. Estimation for CEO characteristics with control variables 71

Table 5. Effects summary of CEO characteristics with control variables 79

Table 6. Summary of effects with control variables after Bonferroni corrections 81

Table 7. Summary of effects with Holm-Bonferroni method 83

Table 8. Effects summary of CEO characteristics without controls 86

Table 9. Summary of effects of CEO characteristics 94

Table 10. Summary of effects with Bonferroni corrections 96

Table 11. Summary of effects with Holm-Bonferroni method 98

Table 12. AR and CAR of related announcements 101

Table 13. Gender effects on debt ARs and CARs 105

Table 14. Duality effects on debt ARs and CARs 106

Table 15. Education effects on debt ARs and CARs 108

Table 16. Location effects on debt ARs and CARs 111

Table 17. Gender effects on equity ARs and CARs 112

Table 18. Duality effects on equity ARs and CARs 114

Table 19. Education effects on equity ARs and CARs 115

Table 20. Location effects on equity ARs and CARs 117

Table 21. Gender effects on equity ARs and CARs 119

Table 22. Duality effects on capital raising ARs and CARs 120

Table 23. Education effects on capital raising ARs and CARs 122

Table 24. Location effects on capital raising ARs and CARs 124

Table 25. Gender effects on refinancing ARs and CARs 125

Table 26. Duality effects on refinancing ARs and CARs 127

Table 27. Education effects on refinancing ARs and CARs 128

Table 28. Location effects on refinancing ARs and CARs 130

Table 29. Gender effects on bond ARs and CARs 131

Table 30. Duality effects on bond ARs and CARs 133

Table 31. Education effects on bond ARs and CARs 135

Table 32. Location effects on bond ARs and CARs 136

Table 33. Gender effects on loan ARs and CARs 138

Table 34. Duality effects on loan ARs and CARs 139

Table 35. Education effects on loan ARs and CARs 140

Table 36. Location effects on loan ARs and CARs 142

Table 37. CEO characteristics results with CAR analysis 143

Table 38. Estimation for CEO characteristics and R&D expenditure 161

Table 39. Estimation for CEO characteristics and R&D expenditure on relative industries 165

Table 40. Tobit models for CEO characteristics and R&D expenditure 172

Table 41. Tobit regression models for CEO characteristics and R&D expenditure on relative industries 175

Table 42. Summary of CEO effects on R&D expenditure in different industries 180

List of Figures

Figure 1. Citation map of the most highly cited publications (with top 51 LCS) pertaining to CEO characteristics and firm performance. 8

Figure 2. Number of announcements under each category in each year 50

Figure 3. Number of firms in each industry 163

Abstract

This thesis examines chief executive officers (CEOs) and how their characteristics affect firm behaviour. CEO demographic factors have attracted limited research attention over the past two decades. Comprising three studies, this thesis investigates the influence of various CEO characteristics over time on firm performance and innovation. Hambrick and Mason (1984) identify demographic factors of top managers using Upper Echelon Theory (UET) and Zahra and Pearce (1989) highlight the role of CEOs who are usually the central strategic decision makers and even control the top strategy-making group. The first study in this thesis is a qualitative study that provides a systematic review of the literature regarding CEO characteristics in the research areas of 'management', 'business', 'business finance', and 'economics'. The thesis then presents two empirical studies investigating CEO characteristics, firm performance, and innovation in Australian markets. These studies contribute to the understanding of managerial effects in corporate finance, which is vital for firms, markets, and economies.

Using the concept of managerial effects, the first qualitative study reviews the literature pertaining to CEO characteristics published in areas of management, business, business finance, and economics from 1984 to 2019. Four key research streams are identified: Management, Finance, Strategy and Interdisciplinary. Based on this review, this study concludes that various aspects of CEO characteristics have significant influence on stock ownership and stock option pay; firms' time to IPO; family firms; financing decisions; financial policies; research and development (R&D) strategy; international experience, diversification, and acquisition strategy; and environmental strategy. Further, CEO characteristics have impacts in a range of disciplines, including principal-agent, auditing, corporate governance, accounting, and risk management. Emerging research trends are also identified, including expansion of CEO characteristics, entrepreneurship and open innovation, emerging markets, and political activity.

The first empirical study considers the effects of different CEO demographic factors on firm performance in Australian stock markets. For the period January 2003 to December 2018, impacts of CEO characteristics are investigated for firm performance via panel regression models and the event study method (Ramiah et al., 2013). In line with prior research, this study identifies a similar pattern whereby CEO gender, CEO-chairman

duality, CEO education level, and CEO location show significant managerial effects on firm performance following six types of debt and equity related announcements. The results add support for UET that characteristics of CEOs play a significant role on firm outcomes in Australia and provide guidance to board members and human resource departments on investigating the efficiency and fairness of CEOs.

The second empirical study analyses the influence of CEO characteristics on firm innovation. R&D expenditure of Australian firms is used as a measurement of innovation in panel regression models and Tobit regression models to estimate managerial effects. Endogeneity effects are also considered. Prior research has shown that variations in CEO characteristics are explained proportionally by industry conditions or industry product differentiation. Thus, this study further conducts analysis on associations between CEO characteristics and R&D expenditure at industry level. The results demonstrate CEO gender and CEO educational level have stronger impacts on R&D expenditure innovation (especially in specific industries) compared to CEO-chairman duality and CEO location. These findings on CEO characteristics have important implications for firms in different industries that are willing to promote competitiveness and performance of firms through R&D activities in the long term.

Declaration

I declare that this thesis presents work carried out by myself and does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university; to the best of my knowledge it does not contain any materials previously published or written by another person except where due reference is made in the text; and all substantive contributions by others to the work presented, including jointly authored publications, is clearly acknowledged.

The work presented in Chapter 2 previously published in Accounting and Finance as CEO Characteristics: A Review of Influential Publications and a Research Agenda by Yun Shen only.

Yun Shen

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Chapter 1: Introduction

This thesis examines chief executive officers (CEOs) and how their characteristics affect firm behaviour. More specifically, this study looks at the influence of CEO gender, CEO-chairman duality, CEO education level, and CEO location on firm's performance. The results of this research contribute to (1) various disciplines including principal-agent, auditing, corporate governance, accounting, and risk management and (2) entrepreneurship and open innovation. This chapter presents the research background (Section 1.1) and objectives (Section 1.2). Section 1.3 describes the key findings, and Section 1.4 outlines the remaining chapters of this thesis.

1.1 Background and motivation

The concept of managerial effects plays an important role in corporate finance, motivating board members and investors to facilitate efficient incorporation of selections into prices in a market that is open for all investors. Demographic factors of top managers have been identified by the Upper Echelon Theory (UET), which states that organizational outcomes are proportionally predicted by managerial background characteristics of CEOs or their top management team (Hambrick and Mason, 1984). Chief executive officers (CEOs) are usually the central strategic decision makers and even control the top strategy-making group (Zahra and Pearce, 1989). The CEO of a firm provides critical leadership, social capital, and legitimacy (Bamford et al., 2016), and, as such, exerts significant influence on firm performance in a variety of areas. Further, the level of CEOs' leadership and social capital they have built is closely connected with firm performance, particularly with debt and equity. The reason why Australia is chosen are as follows. Nonetheless, the majority of existing studies are focused on US and UK markets and Australia, as one of the leading exchange groups, has received limited attention. Australian CEOs in general have shorter tenure and much less duality with the chair since ASX corporate governance guidelines in 2004, as distinct from US markets. In addition, the necessity of manually collecting data on CEO demographic factors increases research difficulty. For these reasons, CEO characteristics associated with managerial effects have received limited attention over the past two decades.

1.2 Research objectives

This thesis empirically addresses three core issues: (1) the influence of various CEO characteristics on firm performance; (2) the impact of CEO characteristics over time on firm innovations; and (3) the effects of different CEO characteristics on research and development investments in diverse industries. This study also discusses the implications of varying CEO characteristics on firm performance and innovation in Australian markets, and is of particular importance for board members, human resource departments, and investors. The aim of the study is to examine the effects of CEO demographic factors on organizational outcomes, firm performance, market reactions, and innovation activities.

More specifically, this thesis aims to answer the following research questions.

(1) Do CEO characteristics affect firm performance in Australia?
(2) Do CEO characteristics impact of research and development in Australia?

1.3 Thesis contribution and key findings

Chapter 2 provides a review of literature pertaining to CEO characteristics. Using Boolean searches within the Social Sciences Citation Index (an online academic citation database within the Web of Science - Clarivate Analytics platform), 495 records across 144 publication sources published from 1984 to 2019 are identified. The annual output of publications on CEO characteristics in management, business, business finance, and economics is mapped, focusing on the top 51 cited publications based on Local Citation Score (LCS). The key research streams are identified as Management, Finance, Strategy, and Interdisciplinary and this is our contribution to the literature.

Drawing on Hambrick and Mason's (1984) UET, the management research stream includes the influence of CEO characteristics on CEO succession, CEO power, stock ownership, stock option pay, firms' time to initial public offering (IPO) and CEO narcissism. The finance research stream explores how corporate financing decisions and financial policies are

influenced by CEO characteristics, including financial experience, military experience and survival of the Great Depression, founder CEOs and CEO-chairperson duality and CEO overconfidence. In line with UET (Hambrick and Mason, 1984), the strategy stream of research examines the linkage between an executive's prior experience and a firm's strategies, which comprises stewardship theory, research and development (R&D) strategy, international experience, diversification and acquisition strategy, family firms and environmental strategy. The interdisciplinary research stream offers more evidence regarding the impact of CEO characteristics in a range of disciplines including principal-agent, auditing, corporate governance, accounting and risk management. Additionally, manual assessment of recent publications facilitates discussion of important emerging research trends in several key areas, namely, expansion of the scope of CEO characteristics, entrepreneurship and open innovation, emerging markets and their political activities and new methodologies. This systematic review of the literature provides a comprehensive summary of CEO characteristics utilized in a variety of research streams and offers emerging research trends. The major countribution of this thesis is the combination of four streams to draw conclusions about the performance of CEOs.

Chapter 2 shows the research conducted on the effect of CEO characteristics (or characteristics of the top management team) and argue that there is no agreement on whether specific CEO characteristics have a positive or negative impact on firm performance.

Chapter 3 examines the effects of different CEO demographic factors on firm performance via analysing abnormal returns and cumulative abnormal returns on six types of important announcements on the Australian stock markets. Using panel regression models and the event study method in line with Ramiah et al. (2013), this study finds that all of the CEO characteristics investigated in this thesis impact on debt and equity. In particular, CEO characteristics appear to increase leverage, capital raising, bond issuance and loans. In addition, gender diversity, separation of chairman and CEO roles, graduates from PhD degrees or MBA degrees, and international experience (as proxied by CEO location) are identified as key characteristics. Our results support the argument that CEO characteristics play a significant role on firm outcomes in the Australian market and reinforce their importance for board members and human resource departments.

Chapter 4 starts by looking at prior research surrounding investing in innovation. According to this literature innovation is (1) parallel with holding options for the future, (2) necessary for profitability, (3) essential for long-term survival and (4) important for growth. Furthermore, CEOs are usually the central strategic decision maker and they even control the top strategy-making group (Zahra and Pearce, 1989; Daellenbach et al., 1999; Classen et al., 2012). R&D expenditure as an input to the innovation process is one of the most important strategic decisions made by CEOs or top managers—which potentially leads to future competitive advantage, productivity and higher firm performance (Barker and Mueller, 2002; Chen and Hsu, 2009). To examine the reaction of R&D expenditure to different CEO characteristics, we use panel regression models and Tobit regression models at an industrial level. Our findings suggest a strong impact of CEO characteristics on firm innovation. CEO gender and CEO educational level appear to have stronger impacts on R&D expenditure when compared to CEO-chairman duality and CEO location. Furthermore, CEOs with different characteristics make significantly different R&D investments, particularly in basic materials, consumer goods, consumer services, financials, health care, technology, and telecommunications industries. Our findings on CEO characteristics have important implications for (1) firms willing to promote competitiveness and performance of firms through R&D activities in the long term and (2) different industries examining the efficiency and fairness of their CEOs.

Overall, the findings of this thesis provide insights into CEO characteristics, with specific reference to firm performance and innovation activities in the Australian markets. In addition, this thesis highlights measurement methods for CEO education levels, and a novel demographic factor—CEO location. The outcomes contained in this thesis are also relevant for other markets around the world.

1.4 Thesis outline

The structure of this thesis is as follows. Chapter 2 provides a systematic review of literature pertaining to CEO characteristics and firm performance. Chapter 3 focuses on the relationship between CEO characteristics and firm performance via a range of important announcements in Australian markets. Chapter 4 analyses how research and development (R&D) expenses vary

for Australian firms based on the demographic factors of their CEOs. Chapter 5 summarizes and concludes this thesis and provides suggestions for future research.

Chapter 2: Literature Review

This chapter provides a systematic review of literature pertaining to CEO characteristics and firm performance. The CEO of a firm provides critical leadership, social capital, and legitimacy (Bamford et al., 2006), and, as such, exerts significant influence on firm performance in a variety of areas. This chapter proceeds as follows. The review methodology is presented in Section 2.1. The key research streams are then explored, namely Management (Section 2.2), Finance (Section 2.3), Strategy (Section 2.4) and Interdisciplinary (Section 2.5). Section 2.6 presents emerging themes and Section 2.7 concludes the chapter.

2.1 Review methodology

Publications for inclusion in this literature review are identified through Boolean searches within the Social Sciences Citation Index—an online academic citation database within the Web of Science - Clarivate Analytics platform. An advanced search is conducted for journal articles with the term “CEO*" OR "chief executive officer*" and "characteristic*" in the title, abstract, or keywords. The asterisk (*) is included as a wildcard symbol to search for variations of the terms (e.g. CEOs, chief executive officers, and characteristics). The search is restricted to publications classified as belonging to the areas of ‘management’, ‘business’, ‘business finance’, and ‘economics’ to ensure relevance. A total of 532 records are identified.

The 532 records are downloaded from the Web of Science and imported into HistCite™ (version 12.03.17). HistCite is a flexible software solution to aid researchers in visualizing the results of literature searches in the Web of Science. It is easy, fast, and provides perspectives and information not available from Web of Science. HistCite creates clear and informative data tables and graphs in an HTML format readable in a web browser. HistCite is a software implementation of algorithmic historiography, and is developed by Dr Eugene Garfield, founder of the Institute for Scientific Information and the inventor of historiographic citation analysis. The records are manually cleaned by checking the title, abstract, and keywords of each record, and, if necessary, referring to the full text of the publication to determine its relevance to this review. 39 publications not related to this review are removed, leaving 493

records in the data set. A cited reference search is also used to identify a further two publications as per Garfield (2004), leading to a final data set of 495 records across 144 publication sources published from 1984 to 2019 (cut-off: 8th March 2019).

The annual output of publications on CEO characteristics in management, business, business finance, and economics is mapped in Figure 1. Since 2000, there has been a growing body of research focused on CEO characteristics in different domains. The citation map created within HistCite™ plots the top 51 cited publications within the data set along a timeline based on Local Citation Score (LCS). There is as yet no consensus regarding how many publications should be included in a citation map, but a large number renders the citation map less readable. This study selects the top 51 publications as this provides a sufficiently comprehensive, significant, and legible map. The citation cut-off is a LCS of 3. Each paper is identified as a node and lines illustrate the citation linkages between articles. Some nodes are larger than others, illustrating a higher number of citations (measured by LCS). Citation details and LCS for each publication in the map are listed in the Appendix A. The main research streams related to CEO characteristics (grey shaded and labelled) comprise Management, Strategy, Finance, and Interdisciplinary. These four streams, which can be considered as different lines of enquiry, have developed over time and contribute to a comprehensive understanding of CEO characteristics. These streams are reviewed in detail in the following sections.

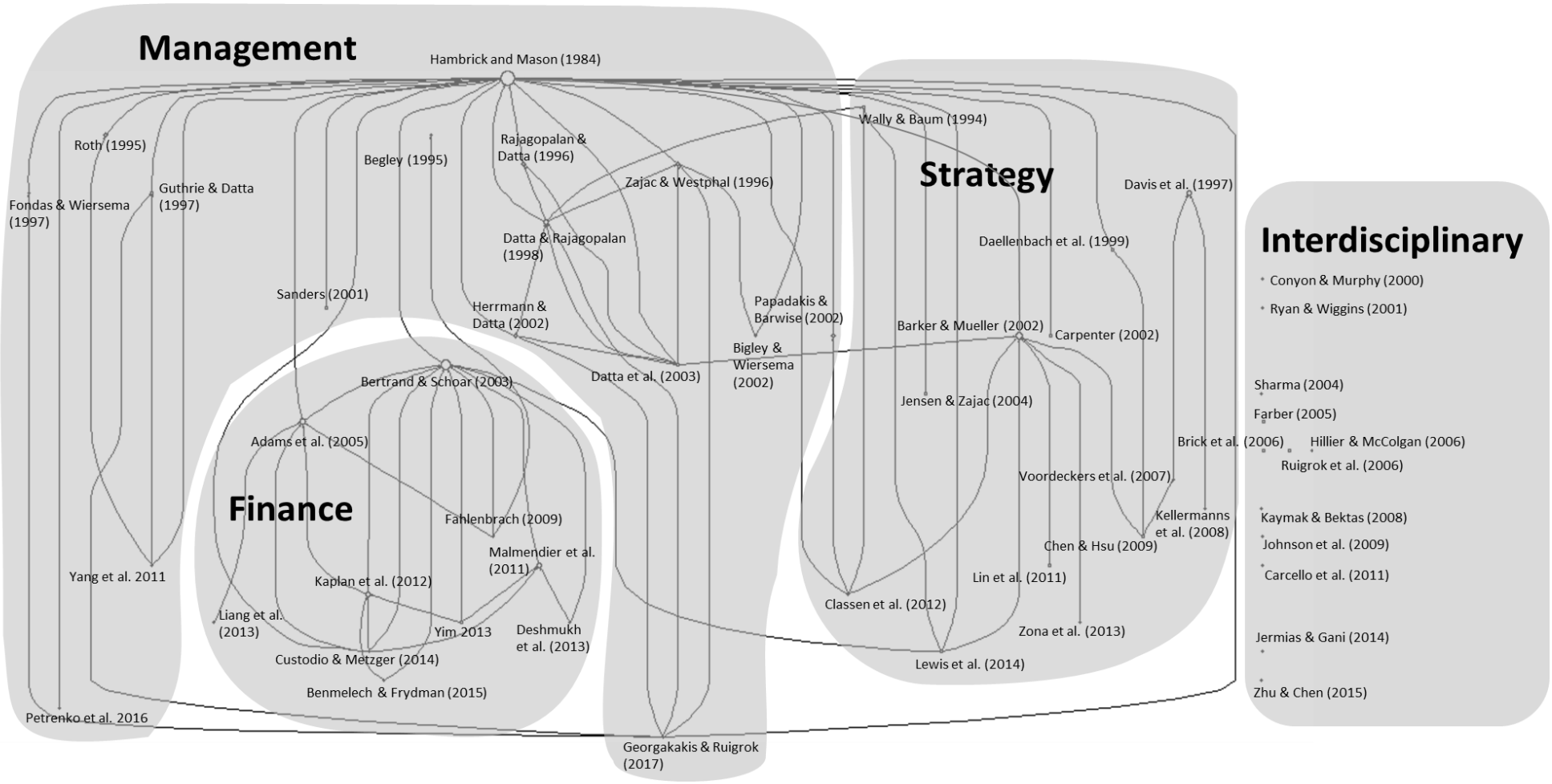


Figure 1. Citation map of the most highly cited publications (with top 51 LCS) pertaining to CEO characteristics and firm performance.

This figure plots the cross-references between publications from 1984 to 2019. The different streams are shaded and labelled. For clarity, publications are displayed along a timeline, with older publications at the top of the citation map and newer publications at the bottom.

2.2 Management

The management research stream is based on Hambrick and Mason's (1984) Upper Echelon Theory (UET), described in detail in Section 2.2.1. CEO characteristics and their use in the management literature stream are discussed in Section 2.2.2.

2.2.1 Upper echelon theory

Drawing on literature in organizational behaviour and strategic management, the UET states that CEOs' or top executives' experiences, values, and characters highly affect their strategic decisions and, in turn, influence organizational outcomes (Hambrick and Mason, 1984; Datta and Rajagopalan, 1998; Herrmann and Datta, 2002; Hambrick, 2007). Further, Hambrick and Mason (1984) argue that observable managerial characteristics of CEOs or top management team (include age, functional tracks, other career experiences, education, socioeconomic roots, financial positions, and group characteristics) affect strategic decision-making and organizational performance rather than psychological characteristics (cognitive base values). However, the basic logic of the Carnegie School states that complex decisions are mainly the result of behavioural factors, including the values and cognitive orientation of the core participants (Cyert and March, 1963; Herrmann and Datta, 2002). This indicates that differences in cognitive views and characteristics of executives or managers influence all aspects of the strategic decision-making process, choices, and organizational performance, including issue identification (Dutton and Duncan, 1987), information search (Herrmann and Datta, 2002), information or message processing (Cyert and March, 1963), selective specification, chosen methods of work (Herrmann and Datta, 2002); product innovation (Lyon and Ferrier, 2002), international diversification (Olson, Parayitam, and Twigg, 2006), mergers and acquisitions (Krug, Wright, and Kroll, 2014), capital structure (Chen, Hsu, and Huang, 2010), productivity and firm performance (Chen and Hsu, 2009) and corporate social responsibility (Petrenko, Aime, Ridge, and Hill, 2016). In other words, executives' or managers' decision-making processes and actions are driven by their beliefs, experiences, assumptions, and values. Top executives bring their prior experiences, preferences, and dispositions into their

decision-making processes and leadership behaviours (Finkelstein and Hambrick, 1996; Carpenter, Geletkanycz, and Sanders, 2004). As such, CEOs exert a significant influence on firm outcomes.

UET has subsequently been applied to different contexts such as firm strategies, firm innovation, organizational structure, planning formality, firms' time to IPO, corporate social responsibility, industry factors, and the international arena (e.g. Miller and Toulouse, 1986; Bantel and Jackson, 1989; Finkelstein and Hambrick, 1990; Datta and Rajagopalan, 1998; Papadakis and Barwise, 2002). For example, Rajagopalan and Datta (1996) explore environmental and industry factors to explain variations in CEO characteristics, finding that variations in CEO firm tenure, level of education, functional background, and functional heterogeneity are explained proportionally by industry conditions. Datta and Rajagopalan (1998) further explore the linkage between industry structure and the characteristics of CEO successors, revealing that industry product differentiation and industry growth rate are significantly linked to CEO successor characteristics. In the international arena, Roth (1995) demonstrates that CEOs must be "internationally networked" in a high interdependence environment.

2.2.2 CEO characteristics

CEOs have varying background and demographic characteristics that may result in differences in cognitive orientation and thus strategic decision-making (Hambrick and Mason, 1984; Rajagopalan and Datta, 1996). The concept of experience is defined to involve life experience (age), firm experience (tenure), and functional experience (functional specification) (Zajac and Westphal, 1996; Herrmann and Datta, 2002). A CEO's characteristics may provide signs or information to investors, underwriters, and other financial intermediaries regarding a firm's value (Zimmerman, 2008). There are several advantages to using demographic factors, such as objectivity, parsimony, and testability (Hambrick and Mason, 1984). These characteristics have been analysed in the literature regarding their influence on CEO succession (Section 2.2.2.1), CEO

power, stock ownership, and stock option pay (Section 2.2.2.2), firms' time to IPO (Section 2.2.2.3), and CEO narcissism (Section 2.2.2.4).

2.2.2.1 CEO succession

CEO succession is defined as the process by which boards of directors ensure that their organization has the ability to sustain excellence in CEO leadership over time, with transitions from one leader to the next. A considerable body of research focuses on CEO succession because selection of a new CEO is a critical decision that represents a defining event in a firm's life (Herrmann and Datta, 2002). Furthermore, Kesner and Sebora (1994) note that CEO succession is "an important, unique, and very visible event" that has profound effects on firm performance and strategy. Both pre-succession experience (Guthrie and Datta, 1997) and post-succession experience (Hermann and Datta, 2002) of CEOs are important factors. Guthrie and Datta (1997) report that pre-succession firm size and risk is linked with the age of appointed CEOs and pre-succession profitability and advertising intensity is associated with the type of functional background experience. In contrast, Hermann and Datta (2002) demonstrate that outsider CEOs with international experience have a positive impact on post-succession organizational performance. Further, Georgakakis and Ruigrok (2017) find that the appointment of an outsider CEO has benefits derived from both the organizational adaptation perspective and the organizational disruption perspective. More recently, Datta et al. (2003) highlight the significance of the post-succession phase, indicating that CEO openness to change is negatively correlated with strategic persistence in the post-succession period, which strongly supports the theoretical predictions derived from UET (Hambrick and Mason, 1984; Datta et al., 2003). Datta et al. (2003) note that organizations can derive significant benefits from choosing CEOs whose prior experience and background are consistent with the firm's desired strategic direction.

2.2.2.2 CEO power, stock ownership, and stock option pay

Studies examining CEO compensation packages (Westphal and Zajac, 2001), CEO successors' characteristics (Zajac and Westphal, 1996), and firms' board composition (Westphal and Zajac, 1995) typically model and test associations between power and specific outcomes (Bigley and Wiersema, 2002). There is an intrinsic limitation in this line of enquiry as the power of CEOs can only be measured as the ability to bring about a preferred or intended effect (Bigley and Wiersema, 2002). As boards often implement incentives such as stock option pay with the intention of achieving incentive alignment and altering firm outcomes, stock-based incentives clearly affect decision-making (Amburgey and Miner, 1992; Westphal and Zajac, 1993; Sanders, 2001). When CEOs are compensated with stock option pay, firms are more likely to engage in acquisitions and divestitures; in contrast, when CEOs own stock, firms are less likely to be engaged in acquisitions and divestitures (Sanders, 2001).

2.2.2.3 Firms' time to IPO

CEO characteristics are also influential in terms of firms' time to initial public offering (IPO), particularly regarding the CEO's prior executive experience, network, and age (Yang et al., 2011). Age is argued to affect commitment to the status quo as well as willingness to accept change (Hambrick and Mason, 1984; Yang et al., 2011). Using a sample of CEOs of firms in the US software industry, Yang et al. (2011) demonstrate that younger CEOs, CEOs with prior executive experience, and CEOs with a larger social network take firms public earlier.

2.2.2.4 CEO narcissism

Building on the logic of UET (Hambrick and Mason, 1984), Petrenko et al. (2016) show that CEO narcissism could lead to agency behaviours which may result in negative financial implications for firms. CEO narcissism is defined as CEOs who have inflated views of themselves and who seek to have those positive self-views continuously reinforced (Petrenko et al., 2016). Moreover, Chatterjee and Hambrick (2007) highlight

that narcissism is a common trait in CEOs, and Petrenko et al. (2016) indicate that narcissistic CEOs have a positive impact on levels and profile of organizational CSR. Furthermore, narcissistic CEOs are likely to manage firms differently compared to their non-narcissistic counterparts (Zhu and Chen, 2015). Utilizing Chatterjee and Hambrick's (2007) measurements for CEO narcissism, Zhu and Chen (2015) find that CEOs prefer new directors with similar narcissistic traits and prior experience. In addition, CEO power is positively related to new directors having similar characteristics and similar prior experience with narcissistic CEOs. More importantly, consistent with Chatterjee and Hambrick (2007, 2011), Zhu and Chen (2015) also find that CEO narcissism positively affects risk-taking spending, implying that new directors with similar narcissistic traits to the CEO may be more supportive regarding risk-taking spending. Overall, there is a distinct lack of knowledge regarding executives' psychological characteristics given the emphasis of UET on the influence of executive personality characteristics on firm strategic decisions (Petrenko et al., 2016).

2.3 Finance

The finance research stream explores the influence of CEO characteristics on corporate financing decisions and financial policies. Bertrand and Schoar's (2003) investigation of systematic behavioural differences in corporate decision-making across managers is one of the early influential publications in this stream, revealing that older executives are financially more conservative (on average) and executives who hold an MBA degree appear to be more aggressive. A range of other factors have since been explored in the literature, including financial experience (Section 2.3.1), military experience and survival of the Great Depression (Section 2.3.2), founder CEOs and CEO-chairperson duality (Section 2.3.3), and CEO overconfidence (Section 2.3.4).

2.3.1 Financial experience

CEOs have unique management styles based on their prior experiences, with significant implications for firm performance (Adams et al., 2005). Supplementing studies that investigate CEO personal characteristics (Kaplan et al., 2012) and CEO personal traits

(Malmendier et al., 2011). Custodio and Metzger (2014) demonstrate that CEOs with a financial background (i.e. financial expert CEOs) are able to manage financial policies more actively, hold less cash, issue more debt, engage in more share repurchases, invest less in research and development, produce less innovation, raise external financing in times of poor credit conditions, are more responsible regarding dividend and capital gains, and are prone to be employed by more mature firms or more diversified firms. Kaplan et al. (2012) further demonstrate that general ability, communication, interpersonal skills, and execution skills are necessary for effective CEOs.

2.3.2 Military experience and survival of the Great Depression

In addition to work experience of CEOs, military service may also impact behaviours of servicemen or women (Benmelech and Frydman, 2015). Duffy (2006) provides evidence from sociology and organizational behaviour perspectives that hands-on leadership experience is required during military service, creating a strong foundation for decisions under pressure or in a financial crisis. Benmelech and Frydman (2015) find that military CEOs have lower investment, lower leverage ratios, lower expenditure on research and development, lower likelihood of corporate fraud, and perform better during industry busts. Malmendier et al. (2011) find that CEOs with military experience are prone to choose more aggressive policies (including higher leverage ratios). Extending their analysis to include the Great Depression, Malmendier et al. (2011) find that CEOs who grew up during the Great Depression are debt conservative, equity conservative, and more reliant on internal financing. More broadly, their results regarding experience of the Great Depression and military experience implies that personal events can have life-long impact on risk attitudes and choices (Malmendier et al., 2011).

2.3.3 Founder CEOs and CEO-chairperson duality

Building on UET (Hambrick and Mason, 1984) and existing financial literature on managerial effects on firm outcomes (e.g., Bertrand and Schoar, 2003), Adams et al. (2005) demonstrate that founder CEOs and CEO-chairperson duality has a positive

impact on stock returns. In line with this logic, based on the phenomenon that founders comprise 11% of CEOs of US public firms, Fahlenbrach (2009) provides further evidence that founder CEO firms are systematically distinct from successor-CEO firms regarding firm valuation, investment behaviour, and stock market performance. Namely, founder CEO firms have a higher valuation, a higher stock market performance, make more mergers and acquisitions, and invest in more research and development and capital expenditures than non-founder CEO firms (Fahlenbrach, 2009). However, in the Chinese banking sector, Lian et al. (2013) fail to find a significant relationship of CEO-chairperson duality on ROA, which may be due to the prevalence of small boards, more frequent board meetings, more independent boards, and fewer politically connected board members.

2.3.4 CEO overconfidence

In contrast to the literature on managerial fixed effects (e.g., Bertrand and Schoar, 2003; Frank and Goyal, 2007) above and beyond traditional firm-, market-, and industry-level determinants of capital structure, several studies illustrate that CEO overconfidence plays an important role in dividend policy. Malmendier et al. (2011) demonstrate that managerial factors have considerable explanatory power for corporate financing decisions and financial policies in terms of overconfidence. They report that overconfident CEOs employ less external financing, conditional on accessing external capital, and issue less equity than their peers. Consistent with Malmendier et al. (2011), Deshmukh et al. (2013) find that overconfident CEOs overestimate external financing costs and schedules, reducing reliance on external financing via cutting down the dividend payout. Furthermore, they also show that the magnitude of the positive stock price response to announcements of dividend growth is higher in firms with more uncertainty regarding CEOs' overconfidence level.

2.4 Strategy

This stream of research examines the link between an executive's prior experience and a firm's strategy, in line with UET (Hambrick and Mason, 1984). Based on the strategic

choice paradigm (Child, 1972), which postulates that key managers have considerable control over an organization's future direction, many studies have investigated the relationships between top-management characteristics and firm strategy (e.g., Datta et al., 2003). Wally and Baum (1994) were one of the first to incorporate a wider range of individual characteristics, including cognitive ability, intuition, tolerance for risk, propensity to act, centralization, formalization, size, and industry effect. Cognitive ability is the level of intellectual capability brought to a decision (Wally and Baum, 1994). They find that CEOs' cognitive ability, use of intuition, risk tolerance, and propensity to act are positively correlated with rapid strategic decisions. This stream of literature comprises stewardship theory (Section 2.5.1), research and development strategy (Section 2.5.2), international experience, diversification, and acquisition strategy (Section 2.5.3), family firms (Section 2.5.4), and environmental strategy (Section 2.5.5).

2.4.1 Stewardship theory

In addition to UET (Hambrick and Mason, 1984) and agency theory (Jensen and Meckling, 1976), the stewardship theory has also been used to explain the composition of the board of directors or top management teams (Davis et al., 1997). In particular, Davis et al. (1997) reconcile the differences between agency theory and stewardship theory, demonstrating that top managers or CEOs under agency theory are identified as rational individuals that seek to maximize their own utility, whereas under stewardship theory they act as stewards whose behaviours are ordered such that pro-organizational, collectivistic behaviours have higher utility than individualistic, self-serving behaviours. Further, the authors suggest that CEOs or managers that act as stewards have centralized control of the firm and view firm performance as their own wealth maximization (Davis et al., 1997).

2.4.2 Research and development strategy

In today's rapidly changing world, investing in innovation is parallel with holding options for the future (Daellenbach et al., 1999). Research and development

expenditure (as an input to the innovation process) is one of the most important strategic decisions made by CEOs or top managers, potentially leading to future competitive advantage, productivity, and higher firm performance (Ettlie, 1998; Barker and Mueller, 2002; Grant, 2002; Chen and Hsu, 2009). Daellenbach et al. (1999) were one of the first to investigate the relationship between the commitment to innovation (or research and development spending) and characteristics of top management teams and CEOs. The authors reveal a significantly positive relationship between research and development expenditure and technically oriented CEOs or top executives, indicating that firms willing to strengthen their innovation strategy should hire CEOs or top executives with technical backgrounds and working experience (Daellenbach et al., 1999).

Barker and Mueller (2002) extend the work of Daellenbach et al. (1999), finding that CEO characteristics play a significant role in firm research and development expenditure, even when controlling for corporate strategy and ownership structure. They find that research and development expenditure is higher in firms with CEOs that are younger, have more investment in firm stock, and have greater professional experience in marketing/research and development/engineering (Barker and Muller, 2002). Furthermore, Barker and Muller (2002) also find that longer CEO tenure is related with an increase in research and development expenditure, indicating that CEOs may shape research and development expenditure to match their own preferences over time. More recently, Lin et al. (2011) investigated the impacts of CEO characteristics on firms' innovation efforts in the Chinese context, finding that CEO education level, professional background, and political connections have positive impacts on firms' research and development activities. This indicates that well-designed CEO incentive schemes contribute to increased research and development activities and promote competitiveness and performance of firms in the long term (Lin et al., 2011).

Furthermore, CEO-chairperson duality or separation of CEO and chair positions is an important element for research and development strategy. In their investigation of the relationships among family ownership, CEO duality, and research and development investment in Taiwanese electronic firms, Chen and Hsu (2009) demonstrate that the

mutual effect of family ownership and CEO duality ratio is negatively correlated with research and development investment. Zona et al. (2013) examine how board composition affects firm innovation, demonstrating that the effect of the outside board ratio on research and development expenditure is positively moderated by firm size, whereas the impact of board demographic diversity (measured from CEO's responses in five different dimensions: functional background, industry background, education background, age, and personality and values) on research and development expenditure is negatively moderated by firm size.

2.4.3 International, diversification, and acquisition strategy

Building on UET, Carpenter (2002) examines the relationship between top management team heterogeneity and firm performance in terms of the internationalization strategies of firms. Carpenter (2002) demonstrates that educational background, functional background, and tenure of top management teams are positively and significantly related to firm international strategy, with a stronger relationship between short-tenured top management teams and firm international strategy. Diversifications and acquisitions as corporate strategy decisions are usually complicated; acquisitions in particular are commonly regarded as significant elements for achieving a preferred diversification level (Salter and Weinhold, 1978; Jensen and Zajac, 2004). Jensen and Zajac (2004) offer one of the first studies to jointly consider demographic characteristics (UET perspective) and governance positions (agency theory), exploring how executives and directors drive firm strategy in terms of corporate diversification level and acquisition activity. The authors find that firms with CEOs with a finance background are significantly more likely to be highly diversified and are associated with more acquisition activities than firms with CEOs lacking a finance background.

2.4.4 Family firms

Family firms are usually categorized as small and medium-sized firms, a description that encompasses the majority of businesses. Family firms play a significant role in

economic production, employment, and wealth creation (Corbetta and Montemerlo, 1999; IFERA, 2003; Zahra, Hayton, and Salvato, 2004; Voordeckers, Van Gils, and Van den Heuvel, 2007; Kellermanns, Eddleston, Barnett, and Pearson, 2008). Voordeckers et al. (2007), drawing on different perspectives from agency theory (Jensen and Meckling, 1976), resource dependency theory (Pfeffer and Salancik, 1978; Hillman, Cannella, and Paerzold, 2000), stewardship theory (Davis, Schoorman, and Donaldson, 1997), institutional theory (DiMaggio and Powell, 1983), and social network theory (Gulati and Gargiulo, 1999), find that CEO-chairperson duality, CEO education, generation transition, and family firms' objectives play significant roles in board composition of family firms. Specifically, CEO-chairperson duality and CEO education have negative effects on board composition in family firms, indicating that the greater the CEO's power, the higher the CEO's education level, and the lower the possibility of employing outside directors.

From the view of board composition, Classen et al. (2012) show that a higher percentage of nonfamily members in the top management team (or board) results in a wider search breadth of family firms (i.e. it is more likely that family firms will access a variety of external resources or partnerships). Moreover, Chen and Hsu (2009) provide further evidence on the mutual effect of family ownership and CEO-chairperson duality that is negatively correlated with research and development investment. In addition, when the firm CEO is also a chairperson, the negative relationship of family ownership and research and development investment becomes stronger; when firms have more independent directors, this negative relationship becomes weaker (Chen and Hsu, 2009). Therefore, the improved corporate governance from more independent directors may not only stimulate more research and development investment, but also efficiently monitor and offer resources that can lower firm investment risks (Chen and Hsu, 2009).

Firm innovation is necessary for profitability, long-term survival, and growth (Classen et al., 2012). Family firms are encouraged to build various partnerships to access a wide range of external resources to support and promote innovation processes (Das and Teng,

2000; Classen et al., 2012). In turn, search breadth or holding a variety of partner agreements plays an important role in the innovation processes of small and medium-sized enterprises as they usually have restricted information and resources compared with large enterprises (Street and Cameron, 2007). Based on UET (Hambrick and Mason, 1984) and further evidence regarding CEO education and background (Wally and Baum, 1994; Barker and Mueller, 2002), Classen et al. (2012) demonstrate that CEO educational level has a significantly positive effect on the search breadth of family firms. This result suggests that the selection of a well-educated CEO will improve a firm's engagement in innovation and external resource acquisition.

On the other hand, entrepreneurial behaviour is considered a crucial factor for firms' profitability and firm growth (Lumpkin and Dess, 1996). Kellermanns et al. (2008) explore the relationship of CEO characteristics (including CEO age, CEO gender, CEO tenure, and generational involvement) to entrepreneurial behaviour and subsequent firm growth. The authors did not find a significant effect of CEO age and CEO gender but identified a negative relationship between CEO tenure and entrepreneurial behaviour, which indicates that CEOs with longer tenure may be more concerned with issues pertaining to succession rather than firm growth.

2.4.5 Environmental strategy

With increasing climate change concerns, firms' environmental actions have attracted scholars to begin to explore characteristics of firm executives that may drive the diversity of environmental practices (Bansal and Roth, 2000; Delmas and Toffel, 2008; Lewis et al., 2014). Combining perspectives from institutional theory (Bansal and Clelland, 2004; Delmas and Toffel, 2008) and UET (Hambrick and Mason, 1984), Lewis et al. (2014) examine how CEO characteristics (including CEOs with MBA degrees, CEOs with law degrees, and CEO tenure) affect firms' strategic responses to the Carbon Disclosure Project (CDP). The results show that CEOs who hold MBA degrees and have short tenures (or newly appointed CEOs) have a positive impact on environmental strategies, indicating that firms with these CEOs are more like to

voluntarily disclose firms' environmental information (Lewis et al., 2014). In direct contrast, firms with CEOs who hold law degrees are less likely to disclose their environmental information, even in the presence of institutional pressures to do so (Lewis et al., 2014). Hence, CEO characteristics play crucial roles in explaining firms' responses to institutional pressures via different environmental strategies.

2.5 Interdisciplinary

The majority of publications in the previously discussed research streams focus on perspectives derived from UET (Hambrick and Mason, 1984) and agency theory (Jensen and Meckling, 1976). In contrast, the interdisciplinary stream of research offers more evidence regarding the impact of CEO characteristics in a range of disciplines, including principal-agent (Section 2.6.1), auditing (Section 2.6.2), corporate governance (Section 2.6.3), accounting (Section 2.6.4), and risk management (Section 2.6.5)[1].

2.5.1 Principal – Agent

The principal-agent problem has been well examined in the literature, including characteristics of CEOs and board members. Increased scrutiny of corporate governance practices in the United Kingdom in the 1990s, particularly in the wake of reports by the Cadbury (1992), Greenbury (1995), and Hampel (1998) committees, revealed controversial payment levels of CEOs in the UK (although payment levels remain below their counterparts in the US) (Conyon and Murphy, 2000). Economic theory also suggests that in order to maximise shareholder wealth, firms should tie CEO compensation to stock performance (Ryan and Wiggins, 2001). Conyon and Murphy (2000) find that CEO age and CEO-chairperson duality is positively related to pay-performance sensitivity or CEO effective ownership percentage. In line with these results, Ryan and Wiggins (2001) find further evidence that CEO characteristics

[1] Interdisciplinary research relates to principal- agent, auditing, corporate governance, accounting and risk management. For example, risk management is regarded as an individual subject.

influence executive compensation policies, documenting that CEO age has a concave relationship with cash bonuses, implying that firms pay less cash bonuses to both the youngest and oldest executives. Additionally, CEO tenure has a negative effect on stock options, suggesting that long-tenured CEOs with aggregated stock are less interested in equity-based compensation than newly appointed CEOs (Ryan and Wiggins, 2001). This finding can be explained by differences in CEO horizon, wherein newly appointed CEOs are more focused on building their reputation whereas long-tenured CEOs are encountering retirement issues (Ryan and Wiggins, 2001). However, in direct contrast, Brick, Palmon, and Wald (2006) argue that there are no correlations between future firm performance with CEO and board compensation and CEO characteristics including CEO gender, CEO experience, and CEO duality.

2.5.2 Auditing

Prior research has documented that a low level of corporate governance is associated with company fraud (Farber, 2005). Increasing occurrences of fraud have attracted significant research attention, particularly regarding whether CEO characteristics play a role in a firm's fraudulent activities. Due to contextual differences between the US and Australia, it remains unclear whether CEO characteristics play a role in fraudulent activities in Australia. The high incidence of company fraud in Australia has led to the publication of several regulatory reports that advocate that the board of directors should improve their monitoring mechanisms through board independence and separation of CEO and chairperson roles to prevent fraud (Maslen, 1997). By examining several proxies of audit quality (auditor type, auditor specialization, audit opinion, and audit fees), Sharma (2004) shows that audit fees are positively correlated with the likelihood of fraud. Sharma (2004) provides evidence in the Australian context that CEO duality is positively linked to the occurrence of company fraud and demonstrates that the proportion of independent directors on the board and the proportion of independent institutional shareholders are significantly inversely correlated with the probability of company fraud. These results indicate that independent board directors and independent institutional shareholders play important monitoring and controlling roles regarding fraudulent behaviour.

Consistent with Sharma (2004), Farber (2005) provides empirical evidence that fraudulent firms in the United States in 1997 typically have more dependent board members and CEO duality. This emphasizes the significance of managerial influence regarding potential engagement in fraudulent activities. Extending Farber's (2005) study, Johnson et al. (2009) find that between 1991 and 2005, CEOs who are long-tenured are more likely to influence other executives to cooperate in committing fraud. Furthermore, firms with CEOs who are close to retirement or who serve on small boards are more likely to engage in fraudulent activities, as these CEOs believe they are unlikely to suffer reputational damage if caught.

2.5.3 Corporate governance

While publications in the previously discussed three streams describe the monitoring function of board members, Ruigrok, Peck, and Keller (2006) focus on corporate governance, particularly board involvement in strategic decision-making. From the perspective of agency theory regarding conflicts of interest between shareholders and top executives, board members should engage in a decision-making process to prevent CEOs or executives from unduly prioritising their own self-interests (Jensen and Meckling, 1976). Ruigrok et al. (2006) report a negative correlation between CEO duality and board involvement in strategic decision-making, which indicates that powerful CEOs are more likely to constrain board engagement in strategic decision-making.

Following the publication of the Cadbury Report (1992), corporate governance in the United Kingdom underwent significant reform, particularly in terms of board composition. Hillier and McColgan (2006) find that board independence and the separation of the roles of CEO and chairperson is significantly negatively related to director ownership and family affiliations, which indicates that changes in board composition are more likely to occur in response to changes in managerial control.

In addition to the empirical evidence of board independence and CEO duality in developed markets, including the United Kingdom (Hiller and McColgan, 2006), the United States (Conyon and Murphy, 2000; Farber, 2005; Jermias and Gani, 2014), Australia (Sharma, 2004), and Switzerland (Ruigrok et al., 2006), Kaymak and Bektas (2008) provide evidence in the emerging Turkish market, finding that CEO duality has a negative impact on bank performance and board independence. Jermias and Gani (2014) demonstrate that the negative influence of CEO duality and board independence on firm performance can be diminished by board capital, defined as "the ability of board members to perform manager-monitoring activities and to provide advice and counsel to management". Agency theory implies that managerial share ownership has a significant influence on firm performance, as share ownership gives CEOs or executives voting rights in corporate decisions. Jermias and Gani (2014) conclude that managerial share ownership has a positive effect on firm performance and that board capital can enhance this positive effect. From the literature, researchers are more focused on CEO duality when they analyse managerial effects on corporate governance.

2.5.4 Accounting

Existing research highlights the significance of audit committee independence and financial expertise. However, there is significantly less research in the accounting field, such as firm restatements. An exception is Carcello et al. (2011), who find a positive relationship between CEO-chairperson duality and firm restatements.

2.5.5 Risk management

Narcissistic CEOs are likely to manage firms differently compared to their non-narcissistic counterparts (Zhu and Chen, 2015). Utilizing Chatterjee and Hambrick's (2007) measurements for CEO narcissism, Zhu and Chen (2015) find that CEOs prefer new directors with similar narcissistic traits and prior experience. In addition, CEO power is positively related to new directors having similar characteristics and similar

prior experience with narcissistic CEOs. More importantly, consistent with Chatterjee and Hambrick (2007, 2011), Zhu and Chen (2015) also find that CEO narcissism positively affects risk-taking spending, implying that new directors with similar narcissistic traits to the CEO may be more supportive regarding risk-taking spending.

2.6 CEO Characteristics: Emerging Trends

This chapter provides a comprehensive summary of CEO characteristics utilized in a variety of research streams. However, the citation map developed in this chapter fails to offer a full account of emerging research trends and directions, as new publications have fewer citations. Manual assessment of recent publications facilitates discussion of important emerging research trends in several key areas, namely expansion of the scope of CEO characteristics (Section 2.6.1), entrepreneurship and open innovation (Section 2.6.2), emerging markets and political activity (Section 2.6.3), and new methodologies (Section 2.6.4).

2.6.1 Expansion of the scope of CEO characteristics

Researchers continue to be attracted to CEO characteristics and have recently expanded the scope of CEO characteristics, including CEO narcissism (Olsen and Stekelberg, 2015; Petrenko et al., 2016; Ham, Seybert, and Wang, 2018), CEO gender (Faccio, Marchica, and Mura, 2016), CEO connectedness (Khana, Kim, and Lu, 2015), and CEO humility (Ou, Waldman, and Peterson, 2018). New research on CEO narcissism explores its effect on corporate social responsibility (Petrenko et al., 2016), corporate tax sheltering (Olsen and Stekelberg, 2015), and firm investment policies and outcomes (Ham et al., 2018). Studies on CEO gender demonstrate that male and female CEOs vary in their risk-taking behaviours and efficiency of capital allocation (Faccio et al., 2016). With increasing occurrences of corporate fraud, researchers have also begun to scrutinise the connectedness of CEOs with top executives (Khana, Kim, and Lu, 2015). In contrast to overconfident and narcissistic CEOs, researchers have also begun to take an interest in CEOs who are humble or modest to document associated effects on firm performance (Ou et al., 2018). Ou et al. (2018) define CEO humility as a developmental

orientation that is grounded on a self-concept of subordinating oneself to an ideal, and it is manifested as (1) self-awareness and self-improvement, (2) other appreciation and other enhancement, and (3) low self-focus and self-transcendent pursuit. The emerging field of research in the area of expanding CEO characteristics indicate that future research could investigate whether and how broader CEO characteristics affect strategic choices and organizational performance.

2.6.2 Entrepreneurship and open innovation

Researchers are also increasingly interested in the topics of entrepreneurship and open innovation. Recent studies provide further insights into how CEO characteristics perform in entrepreneurship activities (Wei and Ling, 2015; D'Angelo and Presutti, 2019) and open innovation (Ahn, Minshall, Ridge, and Hill, 2017; Nuruzzaman, Gaur, and Sambharya, 2019). Open innovation is also considered to constitute an important firm decision. Recent research demonstrates that CEOs' positive attitude, entrepreneurial orientation, and education impact open innovation (Ahn et al., 2017). In addition, Nuruzzaman et al. (2019) argue that CEO characteristics in turn have impacts on subsidiary innovation. As recent research already shows the relevance of CEO characteristics and innovation activities, future research could focus on this relevance in different contexts.

2.6.3 Emerging markets and political activity

Instead of testing developed markets, namely the United States, researchers have begun to focus on other transitional economies, such as corporate entrepreneurship in China (Wei and Ling, 2015), budgeting practices of small and medium-sized enterprises (SMEs) in Turkey (Zor, Linder, and Endenich, 2019) and open innovation modes in Korea (Ahn et al., 2017). Existing literature shows that developing markets with different regulations, different stock market settings and different investment behaviours present a wide variety of future research (Linnenluecke, Chen, Ling, Smith, and Zhu, 2016). Researchers continue to examine corporate political activities in line with country-specific and global political changes. For example, Rudy and Johnson

(2019) use UET (Hambrick and Mason, 1984) to examine whether CEOs' characteristics affect firms invest in political activity. Research on corporate political activities with articles introducing innovative research directions by focusing on the performance outcomes of the firms invest in political activities, effects of other CEO characteristics, and gain from political investments (Rudy and Johnson, 2019).

2.6.4 New methodologies

The existing literature mainly employs annual data and surveys. Rudy and Johnson (2019) estimate the relationship between CEO demographic factors and corporate political activities via 27 years of annual data based on United States large firms. Nuruzzaman et al. (2019) construct the sample from the Management, Organization and Innovation (MOI) Surveys, administered jointly by the European Bank for Reconstruction and Development (EBRD) and the World Bank to investigate that CEO characteristics have impacts on subsidiary innovation. However, the appointments and resignations of CEOs constitute daily-based data. This may lead to firms having two or more different CEOs within the same year, which may result in unreliable findings. Discrepancies between appointment or resignation dates and firm-level annual data can be resolved by event study methodology, which can be adapted and extended to assess whether CEO characteristics are important for firms (Ramiah, Martin, and Moosa, 2013). Moreover, Akhtar, Akhtar, John, and Wong (2017) examine multinational's tax evasion via the event study method and multivariate regressions. Sandler and Sandler (2014) note that an event study typically accompanies difference-in-differences estimations, regression discontinuity, instrumental variables and other analysis. Thus, future research should consider combining the event study method and difference-in-differences approach to overcome discrepancies between appointment or resignation dates and firm-level annual data.

2.7 Conclusion

This chapter employs the bibliographic mapping approach to identify the most influential publications on CEO characteristics over the last fifty years. The main

research streams are identified as Management, Finance, Strategy, and Interdisciplinary. Each of these areas is discussed and reviewed in detail which enable us to provide a review of highly cited articles on CEO characteristics within the broader research conversation and identifies key academic contributions by top cited publications. Following examination and review of publications published since 2015 (2015-2019) related to CEO characteristics, this study also outlines emerging research trends and highlight opportunities for future research. These emerging trends include additional CEO characteristics (CEO narcissism, gender, connectedness, and humility); entrepreneurship and open innovation; emerging markets; firm investments in corporate political activities; and new methodologies for future research. With a highlight on possible pathways for future research, this paper outlines these emerging trends to integrate on existing knowledge and pursue innovative research opportunities to expand the research frontier. Table 1 provides a summary of results for Chapter 2.

Table 1. Summary of results

	Author	Journal	Result
Management	Begley (1995)	Journal of Business Venturing	Distinguish entrepreneurs from managers of smaller businesses based on their founder-nonfounder status, and their firms' ages, and growth rates.
	Bigley and Wiersema (2002)	Administrative Science Quarterly	There is an intrinsic limitation in this line of enquiry as the power of CEOs can only be measured as the ability to bring about a preferred or intended effect.
	Datta and Rajagopalan (1998)	Strategic Management Journal	Explore the linkage between industry structure and the characteristics of CEO successors, revealing that industry product differentiation and industry growth rate are significantly linked to CEO successor characteristics.
	Datta et al. (2003)	British Journal of Management	Organizations can derive significant benefits from choosing CEOs whose prior experience and background are consistent with the firm’s desired strategic direction.
	Fondas and Wiersema (1997)	Journal of Management Studies	Socialization theory permits the identification of a constellation of individual and situational characteristics that can drive or restrain strategic change following succession.
	Georgakakis and Ruigrok (2017)	Journal of Management Studies	The appointment of an outsider CEO has benefits derived from both the organizational adaptation perspective and the organizational disruption perspective.

Guthrie and Datta (1997)	Journal of Management Studies	Pre-succession firm size and risk is linked with the age of appointed CEOs and pre-succession profitability and advertising intensity is associated with the type of functional background experience.
Hambrick and Mason (1984)	Academy of Management Review	Upper Echelon Theory (UET) and argue that observable managerial characteristics of CEOs or top management team (include age, functional tracks, other career experiences, education, socioeconomic roots, financial positions, and group characteristics) affect strategic decision-making and organizational performance rather than psychological characteristics (cognitive base values).
Herrmann and Datta (2002)	Journal of International Business Studies	CEO position tenure, throughput functional background, and international experience are associated with full-control entry modes.
Papadakis and Barwise (2002)	British Journal of Management	The results suggest that (a) the characteristics of both the top-management team and the CEO influenced the strategic decision-making process, but the former had more influence, (b) the top-management team and CEO influenced different dimensions of the process, and (c) the broader context of strategic decisions is more influential than either the CEO or the top-management team.
Petrenko et al. (2016)	Strategic Management Journal	CEO narcissism could lead to agency behaviours which may result in negative financial implications for firms.

	Rajagopalan and Datta (1996)	Academy of Management Journal	Explore environmental and industry factors to explain variations in CEO characteristics, finding that variations in CEO firm tenure, level of education, functional background, and functional heterogeneity are explained proportionally by industry conditions.
	Roth (1995)	Academy of Management Journal	CEOs must be "internationally networked" in a high interdependence environment.
	Sanders (2001)	Academy of Management Journal	When CEOs are compensated with stock option pay, firms are more likely to engage in acquisitions and divestitures; in contrast, when CEOs own stock, firms are less likely to be engaged in acquisitions and divestitures.
	Yang et al. (2011)	Journal of Small Business Management	Younger CEOs, CEOs with prior executive experience, and CEOs with a larger social network take firms public earlier.
	Zajac and Westphal (1996)	Academy of Management Journal	More powerful boards are more likely to change CEO characteristics in the direction of their own demographic profile.
Finance	Adams et al. (2005)	Review of Financial Studies	Founder CEOs and CEO-chairperson duality has a positive impact on stock returns.
	Benmelech and Frydman (2015)	Journal of Financial Economics	Military CEOs have lower investment, lower leverage ratios, lower expenditure on research and development, lower likelihood of corporate fraud, and perform better during industry busts.

Bertrand and Schoar (2003)	Quarterly Journal of Economics	CEOs who hold an MBA degree appear to be more aggressive; thus, CEOs who do not hold an MBA degree are likely to be less motivated to achieve higher performance or maximize shareholders' wealth.
Custodio and Metzger (2014)	Journal of Financial Economics	CEOs with a financial background (i.e. financial expert CEOs) or with military experience invest less in R&D and produce less innovation.
Deshmukh et al. (2013)	Journal of Financial Intermediation	Overconfident CEOs overestimate external financing costs and schedules, reducing reliance on external financing via cutting down the dividend payout. They also show that the magnitude of the positive stock price response to announcements of dividend growth is higher in firms with more uncertainty regarding CEOs' overconfidence level.
Fahlenbrach (2009)	Journal of Financial and Quantitative Analysis	Founder CEO firms invest more in R&D expenditures than non-founder CEO firms.
Kaplan et al. (2012)	Journal of Finance	General ability, communication, interpersonal skills, and execution skills are necessary for effective CEOs.
Liang et al. (2013)	Journal of Banking and Finance	Board meeting frequency and board independence improve bank performance as well as asset quality. The results show that board size has a negative effect on bank performance.

	Malmendier et al. (2011)	Journal of Finance	CEOs with military experience are prone to choose more aggressive policies (including higher leverage ratios). CEOs who grew up during the Great Depression are debt conservative, equity conservative, and more reliant on internal financing. More broadly, their results regarding experience of the Great Depression and military experience implies that personal events can have life-long impact on risk attitudes and choices.
	Yim (2013)	Journal of Financial Economics	A firm's acquisition propensity is decreasing in the age of its CEO: a firm with a CEO who is 20 years older is less likely to announce an acquisition.
Strategy	Barker and Mueller (2002)	Management Science	CEO characteristics play a significant role in firm research and development expenditure, even when controlling for corporate strategy and ownership structure. They find that research and development expenditure is higher in firms with CEOs that are younger, have more investment in firm stock, and have greater professional experience in marketing/research and development/engineering.
	Carpenter (2002)	Strategic Management Journal	Educational background, functional background, and tenure of top management teams are positively and significantly related to firm international strategy, with a stronger relationship between short-tenured top management teams and firm international strategy.

Chen and Hsu (2009)	Family Business Review	When the firm CEO is also a chairperson, the negative relationship of family ownership and research and development investment becomes stronger; when firms have more independent directors, this negative relationship becomes weaker
Classen et al. (2012)	Journal of Small Business Management	CEO educational level has a significantly positive effect on the search breadth of family firms. This result suggests that the selection of a well-educated CEO will improve a firm's engagement in innovation and external resource acquisition.
Daellenbach et al. (1999)	R&D Management	They reveal a significantly positive relationship between R&D expenditure and technically oriented CEOs or top executives, indicating that firms willing to strengthen their innovation strategy should hire CEOs or top executives with technical backgrounds and working experience.
Davis et al. (1997)	Academy of Management Review	CEOs or managers that act as stewards have centralized control of the firm and view firm performance as their own wealth maximization.
Jensen and Zajac (2004)	Strategic Management Journal	Firms with CEOs with a finance background are significantly more likely to be highly diversified and are associated with more acquisition activities than firms with CEOs lacking a finance background.

Kellermanns et al. (2008)	Family Business Review	Identified a negative relationship between CEO tenure and entrepreneurial behaviour, which indicates that CEOs with longer tenure may be more concerned with issues pertaining to succession rather than firm growth.
Lewis et al. (2014)	Strategic Management Journal	CEOs who hold MBA degrees and have short tenures (or newly appointed CEOs) have a positive impact on environmental strategies, indicating that firms with these CEOs are more like to voluntarily disclose firms' environmental information. Firms with CEOs who hold law degrees are less likely to disclose their environmental information, even in the presence of institutional pressures to do so.
Lin et al. (2011)	Journal of Corporate Economics	CEO education level, professional background, and political connections have positive impacts on firms' research and development activities. This indicates that well-designed CEO incentive schemes contribute to increased research and development activities and promote competitiveness and performance of firms in the long term.
Voordeckers et al. (2007)	Journal of Small Business Management	Family-related contingency variables are far more important than CEO-related or control variables, giving support to the argument that board composition in family firms is a reflection of the family characteristics and objectives.

	Wally and Baum (1994)	Academy of Management Journal	CEOs' cognitive ability, use of intuition, risk tolerance, and propensity to act are positively correlated with rapid strategic decisions.
	Zona et al. (2013)	British Journal of Management	The effect of the outside board ratio on research and development expenditure is positively moderated by firm size, whereas the impact of board demographic diversity (measured from CEO's responses in five different dimensions: functional background, industry background, education background, age, and personality and values) on research and development expenditure is negatively moderated by firm size.
Interdisciplinary	Brick et al. (2006)	Journal of Corporate Finance	After controlling for monitoring proxies, they find a significant positive relationship between CEO and director compensation. They also find evidence that excess compensation (both director and CEO) is associated with firm underperformance.
	Carcello et al. (2011)	Contemporary Accounting Research	They find a positive relationship between CEO-chairperson duality and firm restatements.
	Conyon and Murphy (2000)	Economics Journal	CEO age and CEO-chairperson duality is positively related to pay-performance sensitivity or CEO effective ownership percentage.
	Farber (2005)	Accounting Review	They provide empirical evidence that fraudulent firms in the United States in 1997 typically have more dependent board members and CEO duality. This emphasizes the significance of managerial influence regarding potential engagement in fraudulent activities.

Hillier and McColgan (2006)	European Financial Management	Board independence and the separation of the roles of CEO and chairperson is significantly negatively related to director ownership and family affiliations, which indicates that changes in board composition are more likely to occur in response to changes in managerial control.
Jermias and Gani (2014)	British Accounting Review	Managerial share ownership has a positive effect on firm performance and that board capital can enhance this positive effect.
Johnson et al. (2009)	Review of Finance	Between 1991 and 2005, CEOs who are long-tenured are more likely to influence other executives to cooperate in committing fraud. Furthermore, firms with CEOs who are close to retirement or who serve on small boards are more likely to engage in fraudulent activities, as these CEOs believe they are unlikely to suffer reputational damage if caught.
Kaymak and Bektas (2008)	Corporate Governance - An International Review	CEO duality has a negative impact on bank performance and board independence.
Ruigrok et al. (2006)	Journal of Management Studies	They report a negative correlation between CEO duality and board involvement in strategic decision-making, which indicates that powerful CEOs are more likely to constrain board engagement in strategic decision-making.

Ryan and Wiggins (2001)	Journal of Corporate Finance	CEO characteristics influence executive compensation policies, documenting that CEO age has a concave relationship with cash bonuses, implying that firms pay less cash bonuses to both the youngest and oldest executives. Additionally, CEO tenure has a negative effect on stock options, suggesting that long-tenured CEOs with aggregated stock are less interested in equity-based compensation than newly appointed CEOs.
Sharma (2004)	Auditing: A Journal of Practice & Theory	CEO duality is positively linked to the occurrence of company fraud and demonstrates that the proportion of independent directors on the board and the proportion of independent institutional shareholders are significantly inversely correlated with the probability of company fraud. These results indicate that independent board directors and independent institutional shareholders play important monitoring and controlling roles regarding fraudulent behaviour.
Zhu and Chen (2015)	Strategic Management Journal	CEOs prefer new directors with similar narcissistic traits and prior experience. In addition, CEO power is positively related to new directors having similar characteristics and similar prior experience with narcissistic CEOs. They also find that CEO narcissism positively affects risk-taking spending, implying that new directors with similar narcissistic traits to the CEO may be more supportive regarding risk-taking spending.

Emerging Trends	Ahn et al. (2017)	R&D Management	CEOs' positive attitude, entrepreneurial orientation, and education impact open innovation.
	Faccio et al. (2016)	Journal of Corporate Finance	Male and female CEOs vary in their risk-taking behaviours and efficiency of capital allocation.
	Nuruzzaman et al. (2019)	Global Strategy Journal	They argue that CEO characteristics in turn have impacts on subsidiary innovation.
	Ou et al. (2018)	Journal of Management	They define CEO humility as a developmental orientation that is grounded on a self-concept of subordinating oneself to an ideal, and it is manifested as (1) self-awareness and self-improvement, (2) other appreciation and other enhancement, and (3) low self-focus and self-transcendent pursuit.
	Petrenko et al. (2016)	Strategic Management Journal	CEO narcissism could lead to agency behaviours which may result in negative financial implications for firms.
	Rudy and Johnson (2019)	Business & Society	Research on corporate political activities with articles introducing innovative research directions by focusing on the performance outcomes of the firms invest in political activities, effects of other CEO characteristics, and gain from political investments.

Of the 495 papers that we have reviewed, only 13 publications cover the Australian market. These thirteen papers address issues such as relationship between CEO duality and the likelihood of company fraud (Sharma, 2004), the association between CEO dismissal and corporate performance (Lau, Sinnadurai, and Wright, 2009), female CEOs perform in family firms (Barrett and Moores, 2010), the links between CEO compensation structure and firm performance (Matolcsy and Wright, 2011), investigation of CEO duality, CEO cash bonuses and corporate governance (Ferguson, Grosse, Kean, and Scott, 2011; Seamer, 2014), CEO duality on the survival likelihood of new economy initial public offering (Chancharat, Krishnamurti, and Tian, 2012), requirements on non-family CEOs and non-family chief financial officers (Hiebl, 2014), the effect of CEO power on idiosyncratic volatility (Tan and Liu, 2016) and bank profitability (Mollah and Liljeblom, 2016), an ethnicity effect on CEO compensation (Ellahie, Tahoun, and Tuna, 2017), pay gap between male and female executives (Yanadori, Gould, and Kulik, 2018), CEO duality, board structure, and profiles of board members with industry-level analysis (Chandrakumara, McCarthy, and Glynn, 2018). The following papers are specifically related to CEO characteristics within the Australian corporate setting. These papers cover a diverse range of CEO characteristics but highlight the extent of the research in an Australian setting. Sharma (2004) show that CEO duality is positively linked to the occurrence of company fraud while Chandrakumara, et al. (2018) reveal that CEO duality are largely consistent with the ASX principles and corporate governance practices. Further, Chancharat, et al. (2012) demonstrate that board independence is associated with an increase in the likelihood of corporate survival. From a gender perspective, Barrett and Moores (2010) suggest that female leaders display distinct characteristics when learning entrepreneurship roles. While in terms of gender equity, both the proportion of women executives and the executive-level gender pay gap needs to be monitored (Yanadori, et al., 2018). In analysing CEOs from 31 countries, Ellahie, et al. (2017) find that the effect of inherited beliefs and values is stronger when firms replace a CEOs with a person from a different ethnicity. Matolcsy and Wright (2011) indicate that firms whose CEOs receive compensation inconsistent with their firm characteristics have a lower performance. Turning to CEO power and influence, firms whose CEOs have stronger managerial power are associated with lower idiosyncratic volatility (Tan and Liu, 2016), whereas CEO power has a significant positive relation to bank profitability and asset quality

(Mollah and Liljeblom, 2016). Further, Ferguson, et al. (2011) discover that resource development stage entities have different measures of board independence, CEO duality and CEO cash bonuses. Hiebl (2014) suggest that family firm owners seek to integrate non-family CEOs with professional non-family firm experience to enrich the family firm's resource pool. Lastly, from a perspective of corporate governance, Seamer (2014) reveal that a firm's corporate governance impacts on its continuous disclosure performance. Consistent with prior US and UK studies, Lau, et al. (2009) find that corporate performance is negatively related to the probability of CEO dismissal.

Other areas such as the effects of CEO gender, CEO education level, and CEO location on firm performance and innovation are not documented. We conclude that this is a major gap in the literature.[2] The following two chapters attempt to bridge this gap in the literature.

[2] The reason why these CEO characteristics are not all relevant is some of these characteristics are found that no linkages with firm performance (e.g., Kellermanns et al., 2008). Moreover, each publication is based on their own data set.

Chapter 3: Empirical Study 1

3.1 Introduction

This chapter investigates the relationship between CEO characteristics and firm performance via a range of important announcements in Australian markets. The identification of CEO characteristics allows for the examination of their effects on the abnormal returns and cumulative abnormal returns on debt and equity related announcements over the 180 days before and after the announcement. The abnormal returns are daily stock returns less benchmark or expected returns. Benchmark returns for obtaining abnormal returns are approximated by the capital asset pricing model (CAPM), the market model, or some other benchmark such as a control group (Barber and Lyon, 1997). Upper Echelon Theory (UET) identifies a range of CEO characteristics, including life experience (age), firm experience (tenure), and functional experience—both educational and functional specification (Hambrick and Mason, 1984; Zajac and Westphal, 1996; Herrmann and Datta, 2002). This research considers four key CEO demographic characteristics namely CEO gender, CEO duality, CEO education level, and the location of the CEO (a proxy for international experience). Relevant data are obtained from MorningStar, annual reports, Bloomberg, Linkedin, and InvestSmart websites, which facilitate identification of each member in the top management team.

Managerial effects on corporate finance have received limited attention in prior studies—particularly in Australia. As described in Chapter 2, research based on UET has been conducted regarding the effect of CEO characteristics (or characteristics of the top management team) as measured by CEO age, CEO power, CEO education, CEO overconfidence, and CEO experience on organizational performance (Hambrick and Mason, 1984). Other CEO characteristics have also been examined in management, strategy, and other disciplines, such as CEO succession, CEO entrepreneurship, and CEO narcissism. Nevertheless, there is (1) no agreement on whether specific CEO characteristics have a positive or negative impact on firm performance and (2) a

relatively sparse literature within the Australian context. Drawing on UET, organizational outcomes are proportionally predicted by managerial background characteristics of CEOs or their top management team (Hambrick and Mason, 1984), and reflect the corporate decisions they have made (Datta and Rajagopalan, 1998). In contrast, agency theory (Jensen and Meckling, 1976) posits that there are inherent interest conflicts between shareholders and top executives, which in turn implies that CEOs may destroy firm value.

The objective of this study is to examine the effects of different CEO demographic factors (gender, duality, education and location) on six types of important announcements on the Australian stock markets. The types of announcements are debt, equity, capital raising, refinancing, loan and bond. This is an important issue, given that the level of CEOs' leadership and social capital they have built is closely connected with firm performance, particularly with debt and equity.

Furthermore, Australia is one of the leading exchange groups in the world, with the Committee for Economic Development of Australia confirming that the global economy has benefited Australia and foreign investment plays an important role in Australian economic growth and development (Nicholas et al., 2003). Additionally, the majority of existing studies are focused on US markets whereby Australia, as one of the leading exchange groups, has received limited attention. An exception is Sharma (2004), who explores the influence of CEO characteristics and board characteristics on fraudulent firm activities in the Australian setting. Prior research, nonetheless, largely ignores whether CEO characteristics or managerial characteristics have effects on financing decisions of firms in both developed and developing markets. There is limited evidence demonstrating which characteristic(s) of CEOs or top managers impact firms based on annual data in selected countries.

To examine the reaction of the Australian stock market to CEO gender, CEO-chairperson duality, education level of CEOs, and location of CEOs, we use panel

regression models and the event study method in line with Ramiah et al. (2013) to investigate the effect of CEO demographic factors on debt and equity announcement stock returns. We believe the discrepancies between appointment or resignation dates and firm-level annual data can be addressed by event study methodology as it will enable us to assess whether CEO characteristics are important for firms.

Our results demonstrate the impact of CEO characteristics on six types of debt and equity related announcements. Generally, CEO characteristics have a greater impact on debt, capital raising, bond, and loan decisions compared to equity and refinancing announcement returns. Moreover, the empirical results demonstrate that CEO gender, CEO-chairperson duality, CEO education level, and CEO location are dominant factors for examining managerial effects on firm performance. Firms run by female CEOs have better market reactions than those run by male executives. When CEOs also hold the chairperson position, the results indicate that centralized decision-making power constrains board engagement, enabling the CEO to pursue their own interests instead of targeting high performance.

Positive educational effects imply that refinancing decisions made by CEOs who have MBA degrees are more favourable than CEOs who have other educational degrees. Regression analysis with CEO characteristics provides further evidence regarding CEO educational level, with positive and significant effects of CEOs with MBA degrees on debt offerings indicating CEOs successfully apply their management training and knowledge acquired through an MBA program (King et al., 2016) to improve firm performance through a superior choice of firm policies (Graham and Harvey, 2001).

With regards to geographical location, CEOs who are located within Australia have negative and significant impacts on firms undertaking debt, capital raising, and loan related decisions. These negative associations suggest that CEOs with international networks or international experience tend to improve post-succession organizational performance (Roth, 1995; Hermann and Datta, 2002). Another aspect of our study

follows the background and development of event study methodology to measure the effects of CEO characteristics on firm performance. Female CEOs fail to generate positive returns on capital raising decisions but generate positive returns on bond announcements. Similar to the regression results, CEO-chairperson duality, CEO education level, and CEO location have an impact on stock returns.

The remainder of this chapter is organised as follows. Section 3.2 reviews the development of the event study methodology, and Section 3.3 presents the research methodology and robustness tests. Section 3.4 discusses the empirical results and implications, and Section 3.5 concludes.

3.2 Review of event study methodology

Modigliani and Miller (1958; 1963) hypothesised that the market value of firms is irrelevant to leverage in the perfect capital market. However, capital structure decisions are important when firms operate in imperfect markets. With the ongoing international investigation of capital structure determinants, several alternative capital structure theories have evolved, such as pecking order theory, trade-off theory, agency theory, market timing theory, information asymmetry, and signalling theory. The market timing theory of capital structure has been proposed by advocates of behavioural finance. Baker and Wurgler (2002) argue that rational optimizing by managers of corporations may cause market timing.

Myers (1984) and Myers and Majluf (1984) state that a “pecking order” exists whereby managers prefer internal cash flows for financing new investments. Pecking order theory provides an intuitively pleasing explanation for the notion that more profitable firms tend to have lower leverage. On the other hand, the trade-off theory of capital structure states that a firm chooses the level of debt and equity in financing for new investments by balancing the costs and benefits. The pecking order theory of Myers (1984) is based on the existence of information asymmetry, namely that asymmetric

information between the managers of firms and public investors affects the capital structure of firms. Further, under pecking order theory, firms commonly use internal funds for financing to eliminate adverse selection.

The existing literature provides comprehensive evidence that firm-level, industry-level, and country-level characteristics in addition to macroeconomic conditions play important roles in determining firm capital structure (e.g., Korajczyk and Levy, 2003; De Jong et al., 2008; Frank and Goyal, 2009; Kayo and Kimura, 2011). There is a growing literature claiming that CEOs are a core element for firms and that CEO personal characteristics affect firm leverage (e.g., Bertrand and Schoar, 2003; Frank and Goyal, 2009).

Prior literature (described in detail in Chapter 2) confirms the significance of CEO demographic characteristics in organizational outcomes. However, within this literature there exists a degree of uncertainty in the outcomes resulting from CEO characteristics; this provides, in part, the motivation for this analysis. For instance, Adams et al. (2005) find that dual position of CEO and chairperson on a board has a positive impact on stock returns in US firms whilst other studies around Swiss and Turkish firms have observed a negative impact on performance (Ruigrok et al., 2006; Kaymak and Bektas, 2008). In situations where there is a clear and measurable differentiation (that is whether we have CEO duality or not), event study methodology can be used to identify the effect of the change in board structure on firm performance. More specifilcally, event study method allows us to distinguish between the performance of the firm before and after the change in board structure. Event study methodology is particularly suited to this type of analysis with appointments and resignations of CEOs being easily measured with daily data.

Dolley (1933) was the first to introduce the event study technique in finance, examining 95 stock splits between 1921 and 1931. As one of the influential studies on event study methodology, Brown and Warner (1985) investigate the effects of the characteristics of

daily stock returns. By using various models to measure excess returns and examining the statistical properties of both daily stock returns and excess returns, they randomly select securities and event dates to construct their samples and presume that if their measurements are correct, there should be no abnormal returns detected. Furthermore, Brown and Warner estimate the significance of the tests in terms of testing the possibility of have a certain level of abnormal performance. However, Brown and Warner (1985) emphasize the latent problems of event study methodology via daily data, as follows.

a. Non-normality of daily stock returns for one single security is observed and this is not observed with monthly data. It has been shown that compared to a normal distribution, distributions of daily returns are more likely to be driven by a fat-tail (Fama, 1976). Nonetheless, with large number of observations in daily financial data series, non-normality is not a major concern.

b. Non-synchronous trading between the security and the market contributes to severe bias and logical inconsistency via the ordinary least square (OLS) method to measure market model parameters (Scholes and Williams, 1977; Dimson, 1979). Whilst this was an issue in the 1980's it is not of major concern nowadays.

c. Three variance estimation issues are summarized: (1) non-synchronous trading can result in serial dependence of daily excess returns (Ruback, 1982); (2) cross-sectional dependence occurs on the security-specific excess returns (Brown and Warner, 1980; Beaver, 1981; Dent and Collins, 1981); and (3) around announcement dates, the variance of stock returns increases, namely the stability of daily variances such as earnings announcements (Beaver, 1968; Patell and Wolfson, 1979).

Barker (1956, 1957, 1958), Fama and French (1993, 2015), and Ramiah et al. (2013) extend and facilitate the development of this methodology. Event study methodology is

not only used to examine firm-specific events (such as stock splits and earnings announcements), but is also used to investigate announcements in other areas, including regulatory announcements, terrorist attacks, and other natural disasters. For instance, Dowell et al. (2000) investigate the effect of the global environmental standards of US multinational organizations on market values and show that higher environmental standards result in higher market values. More recently, Ramiah et al. (2013) use event study methodology to analyse the effect of green policies on risk and return on the Australian stock market. Ramiah et al. (2015) use several asset-pricing models (simple rolling average model, market model, Capital Asset Pricing Model (CAPM), Fama-French 3-Factor Model, and Carhart 4-Factor Model) to implement the event study method to examine the effects of Chinese environmental regulations. Apart from analysing the effect of firm events, several studies also consider the effect on environmental regulations. Hamilton (1995), White (1995), and Klassen and McLaughli (1996) apply the event study methodology to demonstrate that news of excessive toxic emissions contributes to negative abnormal returns.

According to Binder (1998) there are five approaches to measure abnormal returns (AR) in event study methodology: mean adjusted returns, market adjusted returns, market model (Fama et al., 1969), the CAPM, and the multifactor model based on Arbitrage Pricing Theory (Ross, 1976). Nevertheless, Brown and Warner (1980) argue that the multifactor model does not outperform the market model. Brown and Warner (1985) analyse how the characteristics of daily stock returns affect event study methodology and estimate the probability of detecting abnormal performance at a certain level. Based on the estimation models applied to execute analysis, event studies are capable of providing a wider range of results (Cam and Ramiah, 2014), suggesting that lower abnormal returns compared to Brown and Warner's (1985) estimation exist when controlling for systematic risk factors.

3.3 Research methodology

All firms listed on the Australian Stock Exchange (ASX) are included in our study and as the announcements data is available as from 2003 on the ASX website, the sample period is from January 2003 to May 2018. Announcements related to debt and equity are collected in six categories (debt, equity, capital raising, refinancing, bonds, and loans) from the ASX, MorningStar, and InvestSMART websites. The classification of each category is based on the title of each announcement if it contains the word: "debt", "equity", "capital raising", "refinancing" or "refinance", "bond", and "loan".

This study utilizes daily data as reported by Datastream and Worldscope on each return index, the ASX200 share price index (as the proxy for the market), and the interbank 3-month index (as a proxy for the risk-free rate) over the period January 2003 to May 2018.[3] Table 2 provides the final sample which consists of 11315 announcements made by 5015 CEOs from 4118 firms. All these 11315 announcements are not placed in this thesis as it requests about 300 pages to present. However, all these 11315 announcements are available to provide under request.

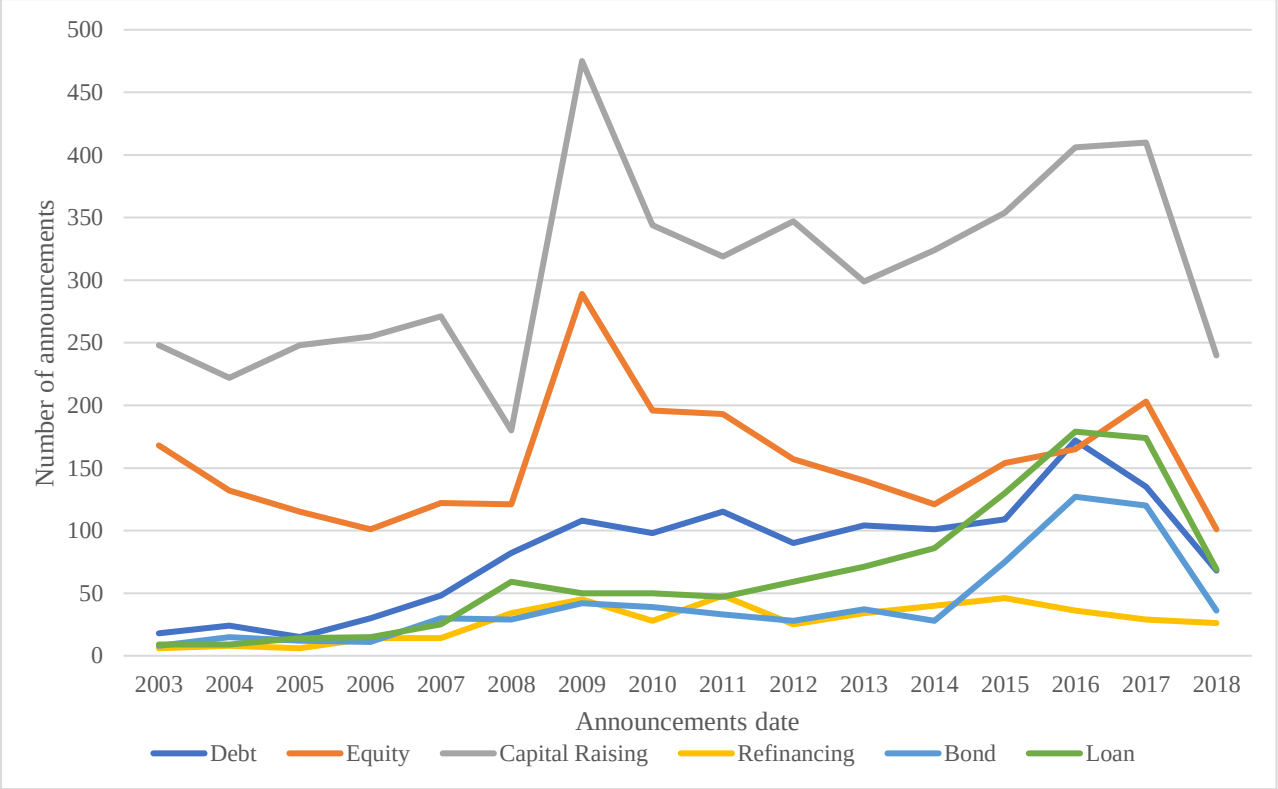
Table 2. Summary of announcements collection

Announcement Type	No. of Announcements	No. of Firms	No. of CEOs
Debt	1317	559	632
Equity	2478	1009	1141
Capital Raising	5365	1666	2214
Refinancing	439	227	262
Bond	670	171	217
Loan	1046	486	549
Total	11315	4118	5015

[3] Announcements on ASX are the dominant data source for this Chapter, and they are only available since 2003 on the InvestSmart website.

Table 2 presents the distribution of announcements based on announcements categories.[4] Decision of capital raising is the most common announcements made by CEOs in Australian market, followed by equity and debt announcements. Figure 2 shows the number of announcements in each category from 2003 to 2018. Due to the Global Financial Crisis between 2008 and 2009, evidence suggest that there was a decline in credit availability in Australia (Ramiah, Zhao, & Moosa, 2014). In direct response to credit crunch, there is a sharp increase of financing announcements in 2008 and 2009, which reflects the dire financial circumstances at that time.

Figure 2. Number of announcements under each category in each year



[4] The announcement examples are: 1) Debt: the Dexus Property Group (ASX: DXS) adopted the decision on 11 March 2011 which is about pricing a USD 250 million debt issue in the bond market; 2) Equity: Base Resources Limited announced equity issues to raise up to AUD 170 million for providing the necessary funding for the development of the Kwale Project; 3) Capital raising: the a2 Milk Company Limited was seeking to raise NZD 40 million of capital to support the company's continued growth in Australia and New Zealand and its targeted international markets of China, the UK and the USA; 4) Refinancing: CAA has completed a new facility agreement with Australia and New Zealand Banking Group Limited of AUD 60.5 million to refinance the previous facility; 5) Bond: AIA announced retail bond issue programme opened to investors with a public offer of NZD 80 million of bonds with an option to accept NZD 50 million oversubscriptions on 15 October 2008; 6) Loan: FMS announced the extension of loan facility with PIO Mines Pty Limited (PIO) from 30 June 2018 to 27 July 2018.

We carefully construct a unique hand-collected dataset for the analysis and it captures CEO characteristics for each announcement for the period 2003 to 2018. Data is gathered from the annual reports of each firm, the MorningStar database, InvestSMART website, Bloomberg website, and LinkedIn website. Four CEO characteristics are collected from the above sources namely CEO gender, CEO education level, CEO-chairperson duality, and CEO location. Table 3 provides descriptive statistics on the sample. The dependent variable is described in Section 3.3.1. Abnormal returns, and the four key independent variables (CEO gender, CEO education level, CEO-chairperson duality, and CEO location) are defined in Section 3.3.2 and control variables are detailed in Section 3.3.3. The panel regressions used to test abnormal returns are outlined in Section 3.3.4, and robustness tests are detailed in Section 3.3.5.

Table 3. Descriptive statistics for each category

Panel A: Debt announcements					
Debt	Mean	Median	Maximum	Minimum	Std. Dev.
CAR	-0.0031	-0.0046	0.5771	-0.3115	0.1309
Prior & Post	0.6481	1	1	0	0.4784
Gender	0.0259	0	1	0	0.1592
Duality	0.8333	1	1	0	0.3734
PhD	0.0667	0	1	0	0.2499
MBA	0.3074	0	1	0	0.4623
Masters	0.5741	1	1	0	0.4954
Location	0.9185	1	1	0	0.2741
Firm Age	34.6	22	121	3	27.8715
Firm Size	13.0726	13.7089	17.9601	6.9903	2.5149
Leverage	27.5406	27.245	188.94	0	21.3084
ROA	3.8039	7.205	442.83	-171.99	35.8895
Sales Growth Rate	19.249	9.655	1193	-100	81.3954
Slack Resources	2.9507	1.3019	81.2314	0.0384	7.3125

Panel B: Equity announcement					
Equity	Mean	Median	Maximum	Minimum	Std. Dev.
CAR	0.0095	-0.0029	0.5963	-0.3181	0.166
Prior & Post	0.7066	1	1	0	0.456
Gender	0.0329	0	1	0	0.1787
Duality	0.8892	1	1	0	0.3143
PhD	0.0719	0	1	0	0.2586
MBA	0.0299	0	1	0	0.1707
Masters	0.482	0	1	0	0.5004
Location	0.8862	1	1	0	0.318
Firm Age	31.027	20	163	1	26.3869
Firm Size	11.7662	11.9242	17.4389	2.0794	2.6971
Leverage	41.3417	21.13	3248.38	0	208.2121
ROA	-11.2592	4.08	442.83	-259.84	51.6268
Sales Growth Rate	19.824	7.885	1066.68	-100	79.1583
Slack Resources	2.9553	1.3908	38.7955	0	4.6443
Panel C: Capital Raising announcements					
Capital Raising	Mean	Median	Maximum	Minimum	Std. Dev.
CAR	0.0113	0.0032	0.6331	-0.5673	0.1688
Prior & Post	0.7717	1	1	0	0.4198
Gender	0.0477	0	1	0	0.2133
Duality	0.8273	1	1	0	0.3781
PhD	0.0262	0	1	0	0.1597
MBA	0.2695	0	1	0	0.4438
Masters	0.1112	0	1	0	0.3145
Location	0.9202	1	1	0	0.2711
Firm Age	26.0739	20	123	0	22.6036
Firm Size	10.6702	10.4875	18.1386	2.0794	2.4797
Leverage	27.0162	11.3	3248.38	0	108.1277
ROA	-22.3191	-2.94	1717.17	-1126.53	91.5057
Sales Growth Rate	24.4161	10.54	1193	-100	84.2471
Slack Resources	5.8944	1.6384	1337	0	35.5487

Panel D: Refinancing announcements					
Refinancing	Mean	Median	Maximum	Minimum	Std. Dev.
CAR	0.0058	-0.0002	0.4875	-0.2879	0.1323
Prior & Post	0.575	1	1	0	0.4964
Gender	0.0083	0	1	0	0.0913
Duality	0.8	1	1	0	0.4017
PhD	0.025	0	1	0	0.1568
MBA	0.2083	0	1	0	0.4078
Masters	0.375	0	1	0	0.4862
Location	0.9083	1	1	0	0.2898
Firm Age	36.4833	23	164	4	31.1219
Firm Size	13.5634	14.0173	16.7133	7.4425	1.9872
Leverage	27.9158	28.175	114.76	0	17.0762
ROA	9.7651	7.11	442.83	-32.17	41.6032
Sales Growth Rate	13.6357	10.99	240.14	-56.87	32.491
Slack Resources	2.1426	1.3066	38.7955	0.0384	4.3923
Panel E: Bond announcements					
Bond	Mean	Median	Maximum	Minimum	Std. Dev.
CAR	0.0158	0.0094	0.397	-0.2123	0.0972
Prior & Post	0.6146	1	1	0	0.4874
Gender	0.027	0	1	0	0.1622
Duality	0.7709	1	1	0	0.4208
PhD	0.062	0	1	0	0.2415
MBA	0.2372	0	1	0	0.4259
Masters	0.4663	0	1	0	0.4995
Location	0.7008	1	1	0	0.4585
Firm Age	36.9757	23	125	0	30.7955
Firm Size	13.7046	14.2131	18.5597	3.1781	2.4881
Leverage	25.6715	25.06	93.71	0	17.83
ROA	3.9572	6.77	66.3	-104.44	18.31
Sales Growth Rate	27.3672	10.54	467.75	-100	72.0037
Slack Resources	2.9483	1.2997	123.7351	0.0379	8.0634

Panel F: Loan announcements

Loan	Mean	Median	Maximum	Minimum	Std. Dev.
CAR	0.0117	-0.003	0.6804	-0.3387	0.175
Prior & Post	0.6772	1	1	0	0.469
Gender	0.038	0	1	0	0.1917
Duality	0.9367	1	1	0	0.2443
PhD	0.0506	0	1	0	0.2199
MBA	0.2089	0	1	0	0.4078
Masters	0.462	0	1	0	0.5001
Location	0.9494	1	1	0	0.2199
Firm Age	27.943	21	85	5	17.5816
Firm Size	10.9623	10.4032	17.518	2.1972	2.7463
Leverage	40.2704	17.2	1516.41	0	158.8935
ROA	-13.0815	2.06	112	-345.37	53.1261
Sales Growth Rate	2.7634	4.555	202.92	-100	45.1681
Slack Resources	3.3351	1.4779	54.3469	0.0085	6.3919

3.3.1 Dependent variables

3.3.1.1 Abnormal return analysis

Daily returns, expressed as the natural logarithm of the return index, are calculated for each individual announcement in the data set. The return index shows a theoretical growth in value of a shareholding that includes the dividend payment. Following Brown and Warner (1985), daily returns are approximated by the CAPM to obtain the ex post abnormal returns.

The daily return (DR_{it}) for each of i = 1, 2, 3… N securities across t = 1, 2, 3… T days is calculated as:

$$DR_{it} = LN\left(\frac{RI_{it}}{RI_{it-1}}\right) \quad (1)$$

where RI_{it} is represented by the natural logarithm of the return index of firm i at time t.

The AR_{it} for each of i = 1, 2, 3… N securities across t = 1, 2, 3… T days is calculated as:

$$AR_{it} = DR_{it} - E(R_{it}) \quad (2)$$

where $E(R_{it})$ is the expected return of firm i at time t, estimated by the market model.

$$E(R_{it}) = \beta_{it}^{0} + \beta_{it}^{1}\left(RM_{it} - R_{ft}\right) \quad (3)$$

where RM_{it} is the market return, R_{ft} is the risk-free rate, and $\beta_{it}^{0}\ and\ \beta_{it}^{1}$ are the estimated parameters from a rolling CAPM over a time period of the previous 260 days.

The ex-post AR is then grouped into six announcement categories (debt, equity, capital raising, refinancing, bonds, and loans) to obtain the average AR for each category (c) at time t, estimated as below:

$$AR_{ct} = \frac{\sum_{i=1}^{N} AR_{it}}{N} \quad (4)$$

where N is the number of firms in each category.

The standard t statistic for a category's abnormal return is calculated to indicate if the result is statistically different from zero by using the following equation:

$$t = \frac{AR_{ct}}{StD(AR_{ct})} \quad (5)$$

where $StD(AR_{ct})$ is the standard deviation of the abnormal returns of each category of financial announcements in a time spread of 244 days prior to the announcement day, the announcement day (t), and 15 days after the announcement day. We assume that the abnormal returns of financial announcements are normally distributed in the parametric t-test.

The standard t-test leads to three possible outcomes of each classified AR:

$$AR_{ct} = 0 \quad (6)$$

$$AR_{ct} > 0 \quad (7)$$

$$AR_{ct} < 0 \quad (8)$$

The underlying assumption is that the abnormal return of a category is a function of revenue minus cost.

Based on the efficient market hypothesis (EMH) framework, an instant reaction of the stock market occurs when new information is released and changes in stock prices reflect all available information. The event study methodology with abnormal return analysis provides opportunities to capture the reactions of the stock market on the first day of trading following the announcement. Further, investors may react efficiently on the first day and there may be some delayed responses from the stock market. Hence, market participants could either over-react or under-react when new information arrives. In other words, market participants or investors have a tendency to correct their mistakes in the following days. To alleviate this concern, the cumulative abnormal return (CAR) over j trading days is estimated as follows:

$$CAR180_i = \sum_{j=1}^{180} AR_{cj} \quad (9)$$

where $CAR180_i$ is the cumulative abnormal return of one category over 180 trading days and AR_{cj} is the abnormal return of category c on day j.

The application of the CAR approach over the time period between 180 days prior to the announcement date and 180 days after it enables the author to pinpoint whether or not the market returns to its mean process or keeps deviating from the mean price. Statistical significance of cumulative returns is assessed using the difference in means tests.

3.3.1.2 Cumulative abnormal return analysis

Other dependent variables are CARs of firms over 180 trading days prior to and after the announcement date. CAR is chosen as market participants or investors have a tendency to correct their mistakes in the days following an announcement. In order to determine whether CEO characteristics have different effects on the market prior to and after the announcement dates, this study uses a prior and post dummy. If CARs are examined after the announcement dates, the prior and post dummy equals one, otherwise zero.

3.3.2 Independent variables

There are four independent variables included in this thesis, namely CEO gender, CEO-chairperson duality, CEO education level, and CEO location. The effects of CEO gender, CEO education level, and CEO location on firm performance and innovation are not documented. More importantly, the data availability and the thesis progress limit the diversity of variables used in this study.

3.3.2.1 CEO gender

Studies on CEO gender demonstrate that male and female CEOs vary in their risk-taking behaviours and efficiency of capital allocation (Faccio et al., 2016). Huang and Kisgen (2013) report that male CEOs are relatively more overconfident than female CEOs regarding corporate decision-making. They demonstrate that female CEOs issue less debt and are less likely to participate in merger and acquisition activities. However, Kellermanns et al. (2008) argue that CEO gender does not affect entrepreneurial behaviour and subsequent firm growth. The controversial results motivate us to examine whether male CEOs differ from female CEOs in Australia.

Data on CEO gender is collected primarily from the MorningStar database, with any missing information collected from annual reports, Bloomberg, Linkedin, and

InvestSmart. If the CEO is female, the CEO gender dummy variable takes the value of one; if the CEO is male, the variable equals zero.

The outcome of zero abnormal return occurs when revenue or cost does not change as a result of female CEOs. It may also materialize if the firm experiences a reduction in revenue, balanced out by a decrease in cost in the form of female CEOs making decisions that are not agreed upon by board members (or vice versa). In this vein, the wealth of shareholders remains invariable.

The outcome of positive abnormal returns occurs when wealth is created for shareholders. We hypothesize that this outcome relates to male CEOs, as they are relatively overconfident regarding the potential of debt and equity related announcements (Huang and Kisgen, 2013). The introduction of male and female CEOs may have contrary impacts on the profitability of these firms as the cost of strategic decision-making rises by the issuance of debt or equity. The effects depend on the CEOs' skills, abilities, and power to pass on the extra cost to securities issuance.

The outcome of negative abnormal returns will materialize if female CEOs fail to put the extra cost to issuance, or decisions made by female CEOs are not recognized by the board members. Huang and Kisgen (2013) illustrate that male CEOs are relatively overconfident compared to female CEOs regarding corporate decision-making. This indicates that female CEOs are relatively risk adverse which may be detrimental to shareholders and this may cause negative reactions from the market.

3.3.2.2 CEO-chairperson duality

Building on UET (Hambrick and Mason, 1984), Adams et al. (2005) demonstrate that founder CEOs and CEO-chairperson duality has a positive impact on stock returns. In direct contrast, Chen and Hsu (2009) demonstrate that the duality ratio is negatively

correlated with research and development investment. This study provides Australian empirical evidence to resolve the mixed results based largely on the US stock market. If the CEO also holds the position of chairperson, the Duality dummy equals one, otherwise zero.

The outcome of zero abnormal return occurs when revenue or cost has no changes as a result of separate CEO and chairperson roles. It may also materialize if the firm experiences a reduction in revenue. It is balanced out by a decrease in cost in the form of independent CEOs making decisions that are not agreed upon by board members (or vice versa). In this vein, the wealth of shareholders remains invariable.

The outcome of positive abnormal returns occurs when wealth is created for shareholders and is implied by positive abnormal return. We hypothesize that this outcome relates to CEOs who are also a chairperson on the board (i.e. CEO-chairperson duality). CEOs who also hold the chairperson position are more powerful than independent CEOs and may contribute more to shareholder wealth maximization than independent CEOs (Conyon and Murphy, 2000; Sharma, 2004; Adams et al., 2005; Farber, 2005). Hence, the creation of abnormal return occurs, which supports the stewardship theory (Davis et al., 1997).

The outcome of negative abnormal returns will materialize if CEOs fail to put the extra cost to issuance, or decisions made by independent CEOs are not recognized by board members. Under agency theory (Jensen and Meckling, 1976), (independent) CEOs are identified as rational individuals that seek to maximize their own utility instead of maximizing shareholders' wealth. Under this view, a decrease in stock returns is likely (see Chapter 2).

3.3.2.3 CEO education level

Based on UET (Hambrick and Mason, 1984), a number of studies have examined different levels and subjects of CEO education, revealing that education level has a positive impact on firms' research and development activities, firm international strategy, board composition of family firms, and open innovation (refer to Chapter 2 for more detail). Data on CEO education level is collected from the MorningStar database, annual reports, Bloomberg, and LinkedIn. Three dummy variables are used: degrees of Doctor of Philosophy (PhD), Master of Business and Administration (MBA), and Master's degree.[5] The PhD dummy equals one if the CEO has a doctorate degree and zero otherwise; the MBA dummy equals one if the CEO has an MBA degree and zero otherwise; and the Masters dummy equals one if the CEO has a master's degree and zero otherwise.

The outcome (6) of zero abnormal return occurs when revenue or cost does not change as a result of CEOs who do not have a postgraduate degree. Undergraduate education level, identified by Frank and Goyal (2007), constitutes a basic undergraduate level of training that aids development of transferable skills. Thus, insufficient skills mean that CEOs are unable to achieve successful performance outcomes and undertake risky projects. Thus, the wealth of shareholders remains the same.

The outcome (7) of positive abnormal returns occurs when wealth is created for shareholders and is implied by positive abnormal return. The author hypothesizes that this outcome relates to CEOs who have a higher education level. Higher education level (e.g. MBA or PhD education) represents significant management training and technical expertise, equipping CEOs with skills to manage large and complex firms to achieve successful performance outcomes or positive ARs (Frank and Goyal, 2007; King et al.,

[5] We did not include the discipline of study, and this is in part of my limitation. If the CEO's degree is in engineering, he/she might be well-performed in firms which belong to mining industry rather than firms which belong to healthcare or tourism industry as they have relevant knowledge and skills. The rest can be done in the same manner. Therefore, use levels of education without discipline, it may have biases on CEOs and partial of our results.

2016). Classen et al. (2012) further suggest that the selection of a well-educated CEO will improve a firm's engagement in innovation and external resource acquisition.

The outcome (8) of negative abnormal returns will materialize if CEOs fail to put the extra cost to issuance, or decisions made by CEOs who have a lower level of education are not recognized by board members. Bertrand and Schoar (2003) note that CEOs who hold an MBA degree appear to be more aggressive; thus, CEOs who do not hold an MBA degree are likely to be less motivated to achieve higher performance or maximize shareholders' wealth (see Chapter 2).

3.3.2.4 CEO location

In the international arena, Roth (1995) demonstrates that CEOs must be "internationally networked" in a high interdependence environment. Moreover, Hermann and Datta (2002) demonstrate that outsider CEOs with international experience have a positive impact on post-succession organizational performance. We collect the data for CEO location based on the headquarters of the firm and the address below CEOs' signatures on corporate and investors related documents. If the CEO is located within Australia, the location dummy equals one, otherwise zero.

The outcome of zero abnormal return occurs when revenue or cost has no changes as a result of CEOs who are located overseas. It may also materialize if the firm experiences a reduction in revenue, balanced out by a decrease in cost in the form of overseas CEOs making decisions that are not agreed upon by domestic board members (or vice versa). In this vein, the wealth of shareholders remains invariable.

The outcome of positive abnormal returns implies that wealth is created for shareholders and is captured by positive abnormal return. We hypothesize that this outcome relates to CEOs who are based within Australia, as Australians typically place

a higher level of trust in local CEOs/firms compared to overseas CEOs/international firms.

The outcome of negative abnormal returns will materialize if CEOs fail to put the extra cost to issuance, or decisions made by overseas CEOs are not recognized by local investors. We hypothesize that this outcome relates to CEOs who are located within the country where the company is listed (i.e. Australia in this study). Meyer and Nguyen (2005) report that different locations affect attraction to foreign investors and preferred entry mode. This may potentially make foreign companies less attractive to Australian investors.

3.3.3 Control variables

The two models used in this research contain a number of firm-level control variables, detailed in the following subsections.

3.3.3.1 Firm size

Firm size is measured using a firm's book value of total assets provided by Datastream and Worldscope. The natural log of firm size is used to avoid high skewness of this variable and obtain a normal distribution (Khanna et al., 2015; Rudy and Johnson, 2019). Acting as a proxy for the ability of firms, firm size may determine financing ability. Higher debt capacity by larger firms is more likely to be detected because these firms have more transparent information and better chances of higher credit ratings than smaller firms, and results in easier access to external funds with lower levels of information asymmetry (Titman and Wessels, 1988; Byoun, 2008; De Jong et al., 2008). Providing Australian evidence, Cassar and Holmes (2003) state that smaller enterprises may have less debt than larger enterprises because of the large transaction costs, agency costs, or monitoring costs resulting from external financing. This may be because firms are required to be in a scale range when they receive equity funds publicly (Cassar and Holmes, 2003) or because the bankruptcy costs that indirectly or directly affect

operating or financing decisions are negatively related to firm size (Titman and Wessels, 1988). Operating risk is another explanation for why smaller firms use less debt and external financing (Cassar and Holmes, 2003).

3.3.3.2 Profitability

In order to control for differences in management quality, profitability is included. We use return on assets (ROA) as the measurement for firm profitability, which is reported by Datastream and Worldscope.

Myers (1984) and Myers and Majluf (1984) use pecking order theory to explain the observed preferences of firms when choosing different financing sources, derived from information asymmetry. According to Kayo and Kimura (2011), retained earnings and excess liquid assets are used first, followed by debt and equity. Since profitability reflects a portion of a firm's retained earnings, it is regarded as a significant factor influencing capital structure (Titman and Wessels, 1988). Fama and French (2002) suggest that leverage of a firm may have a negative relationship with profitability in a simple pecking order model with fixed investment levels. If retained earnings are less than the amount of investment needed, the amount of debt tends to increase. On the other hand, trade-off theory suggests that profitability has a positive impact on leverage because low profitability may cause a high bankruptcy risk (Fama and French, 2002). In addition, profitable firms can obtain benefits from corporate debt tax shields as they may have high leverage ratios (Frank and Goyal, 2003) and this is used to increase firm performance (Margaritis and Psillaki, 2010).

3.3.3.3 Sales growth

As larger firms and higher-growth firms usually attract more investor attention, we control for sales growth in the analysis. The five-year annual growth rate in sales as reported in Datastream and Woldscope is employed as the measurement for sales growth.

Growth opportunities of firms are involved in agency theory and pecking order hypotheses. Agency theory assumes that managers are rational and attempt to maximize their own utility via opportunistic behaviours. Leverage allows firms to have a number of investment opportunities and high free cash flow to enhance issuance of debt and this has an influence on managers' behaviour (Kayo and Kimura, 2011). Agency theory states that growth opportunities have a negative influence on capital structure of firms, whereas pecking order theory demonstrates this correlation is positive. The disciplinary role of debt can mitigate a manager's opportunistic behaviour, which may explain the negative relationship suggested by agency theory (Kayo and Kimura, 2011). The opportunistic behaviour of managers is more prominent when firms have high free cash flow. When free cash flow is low and investment choices have positive net present value, conflict between managers and shareholders is less likely. However, debt may contribute to underinvestment issues, leading firms to want more equity. Thus, debt plays a significant role in motivating managers to have high efficiency (Kayo and Kimura, 2011). D'Mello and Miranda (2010) find that issuing debt can decrease excessive cash ratios, reducing abnormal capital expenditure and enhancing a firm's market value. However, De Jong and Veld (2001) argue that the disciplinary role of debt tends to be activated in the absence of managerial entrenchment.

On the other hand, the pecking order hypothesis suggests that growth opportunities are positively correlated with firm leverage, which is derived from the asymmetric information between managers and investors (Kayo and Kimura, 2011). Managers prefer to issue new shares when stock prices are overestimated, which can satisfy long-term shareholders (Myers and Majluf, 1984), whereas new shareholders may require a lower stock price in order to obtain the new shares. At this phase, managers are likely to reject the deal from the new shareholders even if they may lose profitable investments. Myers (1984) suggests that firms tend to have preferences for financing resources in order to eliminate the costs of information asymmetry, with the following order of preference: retained earnings, low-risk debt, high-risk debt, and new equity. On the contrary, Kovacs (2010) argues that by decreasing the level of information

asymmetry, firms may simply issue new equity in the first place.

3.3.3.4 Firm age

Firm age is measured as the number of years since the firm was incorporated. This is considered a proxy for firms' reputation and experience (Rudy and Johnson, 2019).

Financing decisions vary in different stages of the business life cycle. Newly founded firms have a high likelihood of facing asymmetric information and prefer to rely on debt instruments rather than the equity market (Bhaduri, 2002). Lower agency costs and reduced access to credit also motivate small and young firms to issue debt (Huisman and Hermes, 1997).

3.3.3.5 Slack resources

The availability of slack resources is controlled for by using firm-specific conditions that may influence the financing intensity of a firm. Slack resources are measured as the ratio of current assets to current liabilities (Daniel et al., 2004; Petrenko et al., 2016; Rudy and Johnson, 2019). Daniel et al. (2004) document a strong positive relationship between firm slack and financial performance. Deesomsak et al. (2004) report that slack resource is an inverse function of firm leverage, which indicates that higher firm liquidity means there are internal funds available to finance obligations, thus reducing the need for leverage. CEOs or top managers have the right to organise liquid assets in order to support the shareholders of the company and to reject the interests of debt holders (Deesomsak et al., 2004).

3.3.3.6 Leverage

The relationship between financial leverage and firm performance has been examined in an abundance of research, but remains unclear (Jermias, 2008). Higher financial

leverage firms may attract more attention by banks and fixed-income investors (Khanna et al., 2015). Financial leverage is calculated as the sum of short-term debt and long-term debt divided by total assets, and these data are reported by Datastream and Worldscope.

From an agency theory perspective (Jensen and Meckling, 1976), the presence of agency costs in debt financing is due to the need for lenders to protect their own interest in firms (Jermias, 2008). Myers (1977) points out that debt financing can result in underinvestment of equity holders, as a small portion of their investment income goes to debt holders, which in turn contributes to sub-optimal firm performance. In addition, Simerly and Li (2000) advocate that growing debt financing will lead debt holders to have more debt covenants which in turns constrain managers' choices and their ability to effectively manage the firm. However, Jensen (1986) oppose the proposition that debt covenants is a control mechanism and Harris and Raviv (1991) contend that higher leverage levels can align the interests of managers and shareholders. Overall, the literature confirms that financial leverage has an impact on firm performance.

3.3.4 Regression with dummy variables and control variables

To investigate the effects of CEO characteristics on debt and equity related announcements, this study uses CARs of firms over 180 trading days prior and post as the dependent variable. Similar to Korajczyk and Levy (2003), after obtaining the CARs of firms over 180 trading days prior and post, we assume that CARs can be described by the following two equations:

$$CAR_{it} = \beta_0 + \beta_1 T + \beta_2 D_i + \beta_3 X_i + \mu \quad (10)$$

and

$$CAR_{it} = \beta_0 + \beta_1 T + \beta_2 D_i + \mu \quad (11)$$

Equation (10) describes a firm's cumulative abnormal returns between 180 trading days

prior and 180 trading days post (CAR_{it}) as a function of time dummy T, one or more of the CEO characteristic dummies D_i, and all the known firm-level control variables X_i. Equation (11) describes a firm's cumulative abnormal returns between 180 trading days prior and 180 trading days post (CAR_{it}) as a function of time dummy T, and one or more of the CEO characteristic dummies D. We firstly examine effects of each single CEO characteristic dummy on CARs and then construct the regression with multiple dummies. We firstly analyse the single CEO characteristic dummy individually with control variables, and then include all the CEO dummies.

3.3.5 Robustness tests

The standard two-sided t-test (at the 0.1 level of significance) is applied to test whether CEOs have specific characteristics that affect firm performance. A hypothesis is not rejected if the t score is less than the critical t; otherwise the hypothesis is rejected. Due to the possibility of delayed reactions, a t-test is also applied for CARs from 180 days prior to 180 days after the announcement date. Moreover, comparisons via parametric t-tests for each CEO characteristic are applied as a robustness analysis.

Linear combinations of the CEO characteristic lead to issues regarding determination of significant interaction effects from pairwise comparisons. Namely, multiple testing of the dependent variable may contribute to some significant results being recorded purely by chance. Multiple comparison procedures are widely used by researchers in different areas. Saville (1990) introduces and discusses five of the more common multiple comparison procedures: the unrestricted least significant difference (LSD) procedure (or multiple t-test), Tukey's honest significant difference (HSD) procedure, Waller and Duncan's procedure, Duncan's Multiple Range Test, and the Scheffé test. There are three main objections to the use of the unrestricted LSD procedure: "too many of the pairwise differences are correlated, too many chances of spuriously declaring a zero difference to be nonzero (i.e., of committing a Type I error), and [it] is based on comparison-wise error rates rather than experiment-wise error rates" (Saville, 1990). Tukey's procedure (Tukey, 1949) is based on the standardized range distribution and

specifies the exact family significance level for comparing all pairs of significant means. In Waller and Duncan's procedure (Waller and Duncan, 1969), the overall F value is used to calculate the LSD. If the overall F value is large, the calculated LSD is smaller (and vice versa) (Saville, 1990). Duncan's multiple range test (Duncan, 1955) is derived from two alterations of Tukey's HSD procedure and applies the critical value for the range distribution for the number of treatments in a reduced group (Saville, 1990). These are also used to change the protection level according to the number of treatments for matching the structured case (Saville, 1990). Scheffé's test (Scheffé, 1953) is suggested for the analysis of general unplanned contrasts and attempts to simultaneously formulate and test hypotheses (Saville, 1990). Another widely used method for multiple comparisons is the Bonferroni correction, which enables adjustment of threshold levels of significance for correlation coefficients for multiple comparisons in a group of N correlation coefficients obtained from regressions (N=1,5,10…) (Curtin and Schulz, 1998).

To protect from Type I error, we conduct a Bonferroni correction to adjust the level of statistical significance of multiple correlation coefficients (Curtin and Schulz, 1998). Correlation coefficients are tested against the null hypothesis, and correlation is equal to zero. The α-level of the test or probability of Type I error is commonly set as 5% or 0.05. To calculate the adjusted p-value, divide the α-value (in this case 5%) by the number of analyses on the dependent variable (CAR_{it}). There are overall seven dummies (three different levels of degrees for measuring education level) conducted on the dependent variable (CAR_{it}), which means that for single dummy regressions the number of analyses is equal to seven and thus the adjusted significance level is equal to 0.71% or 0.0071. For multivariate regressions, five dummies are involved (namely the time dummy and four different CEO characteristics dummies), and thus the adjusted significance level is equal to 1% or 0.01. Thus, to determine if any of the correlations is statistically significant, the p-value has to be less than the adjusted significance level.

Although the Bonferroni correction is the simplest to calculate, it has an inherent lack of statistical ability. As stated by Holm (1979): "except in trivial non-interesting cases

the sequentially rejective Bonferroni test has strictly larger probability of rejecting false hypotheses and thus it ought to replace the classical Bonferroni test at all instances where the latter usually is applied". Thus, we apply this improved Bonferroni test, namely the Holm-Bonferroni method, to control for the family-wise error rate at α-level of 5% or 0.05. The calculation process begins with ranking all the p-values in order of smallest (equal to 1) to largest (in this case equal to seven and five). The p-value is then adjusted to equal the α-value (in this case 5%) divided by the number of tests (seven and five) minus the ranking number plus one. If the p-value of each correlation coefficient is less than the adjusted significance level, we determine that the correlation is statistically significant. The application of multiple comparison tests provides more information about the relationships being investigated than conventional analysis of variance.

3.4 Empirical results and discussion

The results confirm the proposition that announcements related to debt and equity made by CEOs with different demographic characteristics have different impacts on stock returns in Australia. Section 3.4.1 reports the results of regressions with control variables and dummy variables, Section 3.4.2 reports the results of regressions with dummy variables only, and Section 3.4.3 details the robustness analysis with CAR comparisons and a difference in means tests conducted in the thesis and is reported in Appendices B - G.

3.4.1 Regression with control variables and dummy variables

3.4.1.1 Panel regressions

This section details the results of the ordinary least square (OLS) regressions testing whether CEOs with different characteristics make significantly different corporate financial decisions. The panel dimension of the dataset is exploited to control for firm-level factors, which include firm size, profitability, sales growth, firm age, slack resources, and financial leverage, which are correlated with firm performance. Table 4

presents panel regression results controlling for firm-level factors. Panel A, of Table 4, provides the results with a single dummy variable of our regression specification. Panels B, C, and D report the results using the full panel of firms and CEO dummies with PhD dummy, MBA dummy, and Masters dummy as the proxy of CEO education level, respectively.

3.4.1.1.1 Characteristics that affect Debt announcements

From Table 4, we observe that three independent variables, namely prior and post the event dummy variable, CEO-chairperson duality, and MBA dummy are statistically significant for the three panels (Panel B, Panel C and Panel D). In Panels B and D, the coefficients for prior and post are -0.0465 and -0.0473 with p-values 0.0056 and 0.0065, respectively. This implies that if the CEO has dual positions and has an MBA degree, this results in a 4.65% decrease in debt announcement CARs in the post announcement period, a very significant result in economic terms.

Building on UET (Hambrick and Mason, 1984) and the existing financial literature around managerial effects on firm outcomes (e.g., Bertrand and Schoar, 2003), research and development activities (e.g., Chen and Hsu, 2009), and company fraud (e.g., Sharma, 2004), CEO-chairperson duality is identified as a key element for managerial effects.

Table 4. Estimation for CEO characteristics with control variables

Panel A: Panel regression with single dummy variable

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	-0.0224	-0.0418***	-0.0372***	0.0047	0.0048	-0.0044
	(-0.1441)	(-0.0068)	(-0.0005)	(-0.8354)	(-0.6424)	(-0.8585)
Gender	-0.0070	-0.0276	-0.0038	0.0913	0.0153	0.0238
	(-0.8690)	(-0.4658)	(-0.8492)	(-0.5122)	(-0.5918)	(-0.7125)
Duality	-0.0292	-0.0341*	-0.0018	-0.0279	0.0015	0.0771
	(-0.1100)	(-0.0786)	(-0.8777)	(-0.3445)	(-0.8955)	(-0.0361)
PhD	-0.0318	0.0489	0.0510*	-0.0787	-0.0165	-0.0064
	(-0.3102)	(-0.1407)	(-0.0611)	(-0.2231)	(-0.4399)	(-0.9223)
MBA	-0.0247	-0.0609	-0.0009	0.0057	-0.0013	-0.0199
	(-0.1488)	(-0.2433)	(-0.9258)	(-0.8450)	(-0.9171)	(-0.5535)
Masters	-0.0071	-0.0217	0.0037	0.0147	0.0003	0.0526*
	(-0.6606)	(-0.2070)	(-0.7902)	(-0.5399)	(-0.9785)	(-0.0635)
Location	0.0077	-0.0144	0.0044	0.0369	-0.0037	-0.0024
	(-0.7507)	(-0.4365)	(-0.7823)	(-0.3701)	(-0.7245)	(-0.9531)

Panel B: All dummy variables and use PhD dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	-0.0465***	-0.0298	-0.0371***	-0.0146	0.0096	0.0094
	(-0.0056)	(-0.1323)	(-0.0005)	(-0.5491)	(-0.3840)	(-0.7604)
Gender	0.0769	-0.0044	-0.0031	0.0694	0.0237	0.0432
	(-0.1281)	(-0.9310)	(-0.8785)	(-0.5998)	(-0.4706)	(-0.5781)
Duality	-0.0275	-0.0444	-0.0053	-0.0510*	0.0016	0.0939*
	(-0.2023)	(-0.1103)	(-0.6463)	(-0.0935)	(-0.9008)	(-0.0980)
PhD	-0.0267	0.0564*	0.0512*	-0.0900	-0.0160	-0.0055
	(-0.3960)	(-0.0940)	(-0.0600)	(-0.2333)	(-0.4623)	(-0.9331)
Location	-0.0024	-0.0295	0.0049	0.0275	0.0001	0.0405
	(-0.9334)	(-0.2407)	(-0.7606)	(-0.5043)	(-0.9955)	(-0.5105)

Panel C: All dummy variables and use MBA dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	-0.0228	-0.0358*	-0.0369***	-0.0157	0.0100	0.0021
	(-0.1470)	(-0.0786)	(-0.0005)	(-0.5206)	(-0.3573)	(-0.9444)
Gender	-0.0158	-0.0044	-0.0043	0.0707	0.0242	0.0349
	(-0.7148)	(-0.9278)	(-0.8321)	(-0.5961)	(-0.4599)	(-0.6536)
Duality	-0.0382*	-0.0374	-0.0042	-0.0533*	0.0014	0.0888
	(-0.0523)	(-0.1611)	(-0.7173)	(-0.0813)	(-0.9159)	(-0.1149)
MBA	-0.0297*	-0.0582	-0.0017	0.0053	-0.0012	-0.0163
	(-0.0862)	(-0.2828)	(-0.8649)	(-0.8580)	(-0.9219)	(-0.6290)
Location	0.0023	-0.0159	0.0050	0.0249	-0.0036	0.0035
	(-0.9256)	(-0.5544)	(-0.7536)	(-0.5477)	(-0.7636)	(-0.9521)

Panel D: All dummy variables and use Masters dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	-0.0473***	-0.0330*	-0.0368***	-0.0154	0.0096	-0.0055
	(-0.0065)	(-0.0944)	(-0.0006)	(-0.5287)	(-0.3814)	(-0.8558)
Gender	0.0731	0.0115	-0.0043	0.0762	0.0245	0.0184
	(-0.1611)	(-0.8204)	(-0.8331)	(-0.5684)	(-0.4591)	(-0.8119)
Duality	-0.0238	-0.0375	-0.0041	-0.0518*	0.0012	0.0985*
	(-0.2827)	(-0.1769)	(-0.7209)	(-0.0918)	(-0.9272)	(-0.0780)
Masters	-0.0075	-0.0229	0.0032	0.0133	0.0008	0.0555*
	(-0.6474)	(-0.1888)	(-0.8147)	(-0.5936)	(-0.9376)	(-0.0530)
Location	-0.0002	-0.0316	0.0048	0.0232	-0.0011	0.0045
	(-0.9937)	(-0.2124)	(-0.7626)	(-0.5774)	(-0.9298)	(-0.9369)

Significance at the 10% (*), 5% (**), or 1% level (***) is indicated.

Adams et al. (2005) demonstrate that founder CEOs and CEO-chairperson duality has a positive impact on stock returns. On the other hand, Ruigrok et al. (2006) report a negative correlation between CEO duality and board involvement in strategic decision-making, which indicates that powerful CEOs are more likely to constrain board engagement in strategic decision-making. In the Chinese banking sector, Liang et al. (2013) fail to find a significant effect of CEO-chairperson duality on ROA, which may be due to the prevalence of small boards, more frequent board meetings, more independent boards, and fewer politically connected board members. In Table 4, Panel C, we identify that CEO duality results in a statistically significant 3.82% reduction in returns for debt announcements. This result indicates that when CEOs also hold the

chairperson position, they use their power or high reputation to constrain board engagement, pursuing their own interests instead of targeting high performance (Ruigrok et al., 2006). In other words, CEOs' opinions can be transformed more directly into firm outcomes when CEO-chairperson duality exists, as decision-making power is more centralized in the hands of the CEO (Adams et al., 2005). Our finding is consistent with Kaymak and Bektas (2008) and Chen and Hsu (2009), who demonstrate that the duality ratio is negatively correlated with firm performance as well as research and development investment.

Three different measurements of CEO education level are applied in the regression tests separately (that is one at a time). Our result, in Table 4, Panel C, shows that the MBA dummy has significantly negative effects on debt announcement returns. This result fails to support the UET—whereby managers who are well educated have the ability to handle complex information and difficult situations (Hambrick and Mason, 1984). The negative educational effects imply that debt decisions made by CEOs who have MBA degrees are less favourable than CEOs who have other formal education degrees. Distinct from other degrees, MBA degrees require candidates to have a minimum of two years working experience. This experience enables candidates to successfully apply their management training and knowledge acquired through the MBA program (King et al., 2016) to improve firm performance through a superior choice of firm policies (Graham and Harvey, 2001). The results of this study are inconsistent with Chevalier and Ellison (1999) and King et al. (2016) wherein CEOs with MBA degrees outperform their peers and are more responsive to capital incentives for improving organizational performance. The results implicitly shows that the Australian market does not recognise the design and quality of MBA degrees.

The remaining CEO characteristics do not affect cumulative abnormal returns. Our results are consistent with Kellermanns et al. (2008) who finds that CEO gender does not affect entrepreneurial behaviour and subsequent firm growth. On the other hand, our results are inconsistent with Huang and Kisgen (2013) who illustrate that male CEOs are relatively overconfident compared to female CEOs regarding corporate

decision-making. In addition, our results do not support Hermann and Datta (2002) who demonstrate that outsider CEOs with international experience have a positive impact on post-succession organizational performance. The very small percentage (less than 10%) of female CEOs and overseas CEOs in our sample may be a possible reason for these results.

3.4.1.1.2 Characteristics that affect Equity announcements

According to Table 4, three independent variables, namely prior and post dummy variable, CEO-chairperson duality, and PhD dummy are statistically significant for the four panels (Panel A, Panel B, Panel C and Panel D), which means these three CEO characteristics can influence the markets perception around equity announcements. Similar to of the findings around debt announcements, CEO-chairperson duality is identified as a key element for managerial effects. In Table 4, Panel A, we identify that CEO-chairperson duality leads to a statistically significant 3.41% decrease in returns for equity announcements, indicating that when CEOs hold the chairperson position, they use their power or high reputation to constrain board engagement, pursuing their own interests instead of targeting high performance (Ruigrok et al., 2006). This result is consistent with Kaymak and Bektas (2008) and Chen and Hsu (2009), who demonstrate that the duality ratio is negatively correlated with firm performance and research and development investment.

Our result in Panel B shows that the PhD dummy has significant positive effects on equity announcement returns. This result supports the UET—whereby managers who are well educated have the ability to handle complex information and difficult situations (Hambrick and Mason, 1984). The positive coefficient of PhD dummy is inconsistent with the results of prior studies that demonstrate PhD education appears not to matter for firm performance (e.g., King et al., 2016).

For the remainder of CEO characteristics, we do not find evidence of those factors'

impact on cumulative abnormal return.

3.4.1.1.3 Characteristics that affect Capital Raising announcements

In terms of capital raising announcements, we only find two independent variables (which are prior and post dummy and PhD dummy) are statistically significant for the four panels (Panel A, Panel B, Panel C and Panel D). In Table 4, the coefficients for prior and post are all negatively related to abnormal returns and statistically significant at the 1%level. This implies that CEO characteristics have significant effects on returns before they make capital raising announcements.

Different CEO education levels are separately tested in the regression. Our results in Panels A and B of Table 4 show that the PhD dummy has significant positive effects on capital raising announcement returns (at 6.11% level in Panel A and at 6.00% level in Panel B). These results are consistent with the UET—managers who are well educated have the ability to handle complex information and difficult situations (Hambrick and Mason, 1984). This finding adds support to Carpenter (2002) and Lin et al. (2011) who demonstrate that educational background and functional background are positively and significantly related to firm international strategy and firms' research and development activities.

The remaining CEO characteristics do not affect cumulative abnormal returns. Our results are consistent with Liang, Xu, and Jiraporn (2013) who fail to find a significant effect of CEO-chairperson duality on ROA and inconsistent with Kaymak and Bektas (2008) and Chen and Hsu (2009) who show that CEO-chairperson duality do affect firm performance.

3.4.1.1.4 Characteristics that affect Refinancing announcements

CEO-chairperson duality is the only variable which affects firm returns in terms of refinancing announcements. All other characteristics (prior and post, gender, PhD, MBA, Masters) appear to not matter for refinancing.

As mentioned in Chapter 2, CEO-chairperson duality is identified as a key element for managerial effects. In Table 4, we show statistical significance with -0.0510 at the 9.35% level for refinancing announcements in Panel B, -0.0533 at the 8.13% level in Panel C, and -0.0518 at 9.18% in Panel D. These results indicate that when CEOs also hold the chairperson position, they use their power or high reputation to constrain board engagement, pursuing their own interests instead of targeting high performance (Ruigrok et al., 2006). In other words, CEOs' opinions can be transformed more directly into firm outcomes when CEO-chairperson duality exists, as decision-making power is more centralized in the hands of the CEO (Adams et al., 2005).

3.4.1.1.5 Characteristics that affect Bond announcements

From Table 4, we observe that none of the independent variables are statistically significant for any of the four panels (Panel A, Panel B, Panel C and Panel D). This indicates that none of the CEO characteristics affect cumulative abnormal return around these announcements. Our results provide empirical evidence to the literature that certain CEO characteristics do not affect bond decisions.

3.4.1.1.6 Characteristics that affect Loan announcements

There are two independent variables (CEO-chairperson duality and Masters dummy) are statistically significant for three panels (Panel A, Panel B, and Panel D).

Similar to previous findings, CEO-chairperson duality is identified as a key element for

firm return. Based on Table 4, CEO-chairperson duality is positively related to loan announcement return with coefficient 0.0939 at the 9.80% level in Panel B, and coefficient 0.0985 at the 7.80% level in Panel D. This implies that firms managed by dual CEOs experience an increase in cumulative abnormal return of 9.39% around announcements of loan when compared to independent CEOs. Our results are consistent with Adams et al. (2005) who demonstrate that CEO-chairperson duality has a positive impact on stock returns. Our finding is in contrast to Kaymak and Bektas (2008) and Chen and Hsu (2009), who demonstrate that the duality ratio is negatively correlated with firm performance and research and development investment.

CEOs' education level is important for firms in terms of loan announcements. Table 4, Panels A and D show that if the firm has a CEO who has a master's degree, the firms' loan announcements generate higher returns. This evidence supports the UET (Hambrick and Mason, 1984), and is consistent with Frank and Goyal (2007), Lin et al. (2011), and King et al. (2016) who find that CEO education level has positive impacts on firm performance. Moreover, our results contribute to the existing literature by providing additional insights regarding loan announcements in the Australian market.

Table 5 provides a summary of the results depicted in the numerous panels in Table 4. In Table 5 we summarise whether CEOs characteristics have an influence on firm performance. Specifically, Panel A of Table 5 reports results using a single dummy variable after controlling for firm-level factors in our regression specification (see Equation (11)). Panel B presents results using the full panel of firms and CEO dummies, with PhD dummy as the proxy of CEO education level. Panels C and D provide a summary from the tests with the MBA dummy and Masters dummy as the education level.

Table 5 demonstrates that CEO characteristics play a role in firm performance in terms of stock returns. In particular, CEO characteristics have a strong impact on debt, equity, capital raising, and loan decisions. Moreover, the empirical results demonstrate that

CEO-chairperson duality and CEO education level are two dominant factors for examining managerial effects on firm performance. The insignificance of results regarding CEO gender and CEO location indicate that both variables do not exert a strong effect on firm performance.

Table 5. Effects summary of CEO characteristics with control variables

Panel A: Panel regression on single dummy variable

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	No	Yes	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	Yes	No	No	No	No
PhD	No	No	Yes	No	No	No
MBA	No	No	No	No	No	No
Masters	No	No	No	No	No	Yes
Location	No	No	No	No	No	No

Panel B: Estimation for all dummy variables with PhD dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	Yes	No	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	No	Yes	No	Yes
PhD	No	Yes	Yes	No	No	No
Location	No	No	No	No	No	No

Panel C: Estimation for all dummy variables with MBA dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	No	Yes	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	Yes	No	No	Yes	No	No
MBA	Yes	No	No	No	No	No
Location	No	No	No	No	No	No

Panel D: Estimation for all dummy variables with Masters dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	Yes	Yes	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	No	Yes	No	Yes
Masters	No	No	No	No	No	Yes
Location	No	No	No	No	No	No

3.4.1.2 Bonferroni corrections

A Bonferroni correction is utilized to adjust the level of statistical significance of multiple correlation coefficients (Curtin and Schulz, 1998). The Bonferroni correction facilitates the adjustment of the threshold levels of significance for correlation coefficients for multiple comparisons in a group, of N correlation coefficients, obtained from regressions (N=1,5,10…). A summary of results after the Bonferroni Corrections are conducted is reported in Table 6. The corresponding p-values, reported in Table 4, are compared with the benchmark of 0.05 divided by seven (this is because we run seven regressions using seven dummies in Panel A). If the corresponding p-value is less than 0.05 divided by seven, the results survive the robustness test and we denote it with a 'Yes'.

Panel A reports results using a single dummy variable after controlling for firm-level variables of our regression specification. Panel B presents the results using the full panel of firms and CEO dummies, with the PhD dummy as the proxy of CEO education level. Panels C and D provide findings from tests with the MBA dummy and the Masters dummy as the education level, respectively.

Except for the prior and post dummy, all CEA characteristics (gender, CEO-chairperson duality, PhD, MBA, Masters, location) fail to show significant effects on all types of announcement returns after Bonferroni corrections are performed. In other words, the demographic factors of CEOs do not significantly affect firm performance in terms of major financing decisions. The small percentage (less than 10%) of female CEOs and overseas CEOs may be a possible reason for these results.

Table 6. Summary of effects with control variables after Bonferroni corrections

Panel A: Panel regression on single dummy variable

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	No	Yes	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	No	No	No	No
PhD	No	No	No	No	No	No
MBA	No	No	No	No	No	No
Masters	No	No	No	No	No	No
Location	No	No	No	No	No	No

Panel B: Estimation for all dummy variables with PhD dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	Yes	No	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	No	No	No	No
PhD	No	No	No	No	No	No
Location	No	No	No	No	No	No

Panel C: Estimation for all dummy variables with MBA dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	No	No	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	No	No	No	No
MBA	No	No	No	No	No	No
Location	No	No	No	No	No	No

Panel D: Estimation for all dummy variables with Masters dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	Yes	No	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	No	No	No	No
Masters	No	No	No	No	No	No
Location	No	No	No	No	No	No

3.4.1.3 Holm-Bonferroni method

Drawing on Holm (1979), we conduct the improved Bonferroni test, namely the Holm-Bonferroni method, to control the family-wise error rate at α-level of 5% or 0.05. A summary of the results using the Holm-Bonferroni method is reported in Table 7. The corresponding p-values, reported in Table 4, are compared with the benchmark of 0.05 divided by seven (this is because we run seven regressions using seven dummies in Panel A). If the corresponding p-value is less 0.05 divided by seven, the results survive the robustness test and we denote it with a 'Yes'.

Panel A reports results using a single dummy variable after controlling for firm-level variables of our regression specification. Panel B presents results using the full panel of firms and CEO dummies, with the PhD dummy as the proxy of CEO education level. Panels C and D provide findings from tests with the MBA dummy and the Masters dummy as the education level, respectively. The results are the same as those observed with Bonferroni corrections.

Table 7. Summary of effects with Holm-Bonferroni method

Panel A: Panel regression on single dummy variable

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	No	Yes	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	No	No	No	No
PhD	No	No	No	No	No	No
MBA	No	No	No	No	No	No
Masters	No	No	No	No	No	No
Location	No	No	No	No	No	No

Panel B: Estimation for all dummy variables with PhD dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	Yes	No	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	No	No	No	No
PhD	No	No	No	No	No	No
Location	No	No	No	No	No	No

Panel C: Estimation for all dummy variables with MBA dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	No	No	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	No	No	No	No
MBA	No	No	No	No	No	No
Location	No	No	No	No	No	No

Panel D: Estimation for all dummy variables with Masters dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	Yes	No	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	No	No	No	No
Masters	No	No	No	No	No	No
Location	No	No	No	No	No	No

Generally, CEO characteristics have a stronger impact on debt, equity, capital raising, refinancing, and loan decisions rather than bond announcement returns. Moreover, the empirical results demonstrate that two of the CEO characteristics in our analysis are

dominant factors for examining managerial effects on firm performance, namely CEO-chairperson duality and CEO education level. When CEOs also hold the chairperson position, our results indicate that centralized decision-making power constrains board engagement, enabling the CEO to pursue their own interests instead of targeting high performance. The educational effects imply that equity and capital raising decisions made by CEOs who have PhD degrees are more favourable than CEOs who have other educational levels. Loan decisions made by CEOs who have Masters degrees are more favourable than CEOs who have lower education degrees, whereas debt decisions made by CEOs who have MBA degrees are less favourable than CEOs who have non-MBA degrees. Other CEO characteristics, namely, CEO gender and CEO location, failed to show any statistical significance for any types of announcements in our sample. This indicates that CEO gender and CEO location do not affect entrepreneurial behaviour and subsequent firm growth.

3.4.2 Regression with dummy variables only

We now move on to examine the effect of the CEO characteristics dummies by themselves without the control variables. These tests enable us to have a comprehensive understanding of CEO characteristics as each individual CEO is likely to display more than one factor.

3.4.2.1 Panel regressions

Table 8 presents the panel regression results without controlling for firm-level factors. Panel A provides the results with a single dummy variable of our regression specification model. Panels B, C, and D report the results using the full panel of firms and CEO education dummies with the PhD, MBA, and Masters dummies as proxies of CEO education levels.

3.4.2.1.1 Characteristics that affect Debt

From Table 8, we observe that two independent variables, namely prior and post dummy variable, and Masters dummy are statistically significant for all of the four panels (Panel A, Panel B, Panel C and Panel D).

In all of the four panels (Panel A, Panel B, Panel C and Panel D), the coefficients for prior and post are positive and significant on debt announcements returns at the 1% level. This implies that CEO characteristics have significant effects on returns before they make debt announcements.

The three different measurements of CEO education are applied in the regression tests separately. Our result in Panel D of Table 8 shows that the Masters dummy has significantly negative effects on debt announcement returns (at 8.12% level). This implies that firms managed by CEOs who hold master's degrees experience an increase in cumulative abnormal return of 1.19% around announcements of debt when compared to other CEOs. This result supports the UET—whereby managers who are well educated have the ability to handle complex information and difficult situations (Hambrick and Mason, 1984). The positive educational effects imply that debt decisions made by CEOs who have Masters degrees are more favourable than CEOs who have other formal education degrees. The results indicate that debt decisions are better received if the firm has a CEO who has a master's degree. The positive relationship between the Masters dummy and debt announcement returns, to some degree, is consistent with Carpenter (2002) and Lin et al. (2011), namely that higher education level has a positive impact on international strategy and research and development investment.

The remaining CEO characteristics do not affect cumulative abnormal return in terms of debt announcement. Our results are consistent with Kellermanns et al. (2008) who find CEO gender does not affect entrepreneurial behaviour and subsequent firm growth.

Our results are inconsistent with Huang and Kisgen (2013) who illustrate that male CEOs are relatively overconfident compared to female CEOs regarding corporate decision-making. In addition, our results are inconsistent with Hermann and Datta (2002) who demonstrate that outsider CEOs with international experience have a positive impact on post-succession organizational performance.

Table 8. Effects summary of CEO characteristics without controls

Panel A: Panel regression with single dummy variable

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	-0.0164***	-0.0424***	-0.0329***	-0.0032	-0.0010	-0.0075
	(-0.0045)	(0.0000)	(0.0000)	(-0.7128)	(-0.8430)	(-0.2624)
Gender	0.0005	-0.0138	0.0113	-0.0092	0.0222*	0.0018
	(-0.9735)	(-0.2622)	(-0.1283)	(-0.7323)	(-0.0988)	(-0.8919)
Duality	0.0005	-0.0082	-0.0178***	0.0188	0.0073	0.0074
	(-0.9402)	(-0.2334)	(0.0000)	(-0.1015)	(-0.2141)	(-0.4883)
PhD	-0.0108	0.0008	-0.0044	-0.0415*	-0.0026	-0.0379**
	(-0.4764)	(-0.9526)	(-0.7114)	(-0.0829)	(-0.8151)	(-0.0191)
MBA	0.0059	-0.0100	0.0115***	0.0116	-0.0023	0.0022
	(-0.3946)	(-0.5697)	(-0.0023)	(-0.2455)	(-0.7112)	(-0.8124)
Masters	0.0108	-0.0093	-0.0021	0.0084	0.0054	-0.0092
	(-0.1059)	(-0.1314)	(-0.6909)	(-0.3413)	(-0.3154)	(-0.2403)
Location	0.0014	0.0004	-0.0131**	0.0116	-0.0023	-0.0031
	(-0.8837)	(-0.9577)	(-0.0330)	(-0.5528)	(-0.6703)	(-0.7668)

Panel B: All dummy variables and use PhD dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	-0.0263***	-0.0367***	-0.0329***	-0.0133	-0.0023	0.0043
	(-0.0001)	(0.0000)	(0.0000)	(-0.1294)	(-0.6694)	(-0.5842)
Gender	0.0041	-0.0113	0.0099	-0.0073	0.0229	-0.0131
	(-0.8200)	(-0.4936)	(-0.1847)	(-0.7704)	(-0.1043)	(-0.4926)
Duality	0.0014	-0.0172*	-0.0173***	0.0136	0.0039	0.0169
	(-0.8740)	(-0.0588)	(-0.0001)	(-0.2247)	(-0.5768)	(-0.2319)
PhD	-0.0103	0.0032	-0.0022	-0.0539**	-0.0016	-0.0392**
	(-0.4977)	(-0.8213)	(-0.8555)	(-0.0418)	(-0.8851)	(-0.0156)
Location	0.0067	-0.0095	-0.0116*	0.0056	-0.0022	-0.0024
	(-0.6013)	(-0.3095)	(-0.0593)	(-0.7579)	(-0.7230)	(-0.8495)

Panel C: All dummy variables and use MBA dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	-0.0151**	-0.0345***	-0.0329***	-0.0133	-0.0017	0.0037
	(-0.0107)	(0.0000)	(0.0000)	(-0.1301)	(-0.7473)	(-0.6317)
Gender	0.0008	-0.0107	0.0092	-0.0095	0.0222	-0.0120
	(-0.9581)	(-0.4823)	(-0.2167)	(-0.7081)	(-0.1161)	(-0.5211)
Duality	0.0021	-0.0187**	-0.0169***	0.0127	0.0043	0.0176
	(-0.7860)	(-0.0321)	(-0.0001)	(-0.2573)	(-0.5398)	(-0.2051)
MBA	0.0063	-0.0109	0.0106***	0.0130	-0.0025	0.0026
	(-0.3678)	(-0.5467)	(-0.0051)	(-0.2069)	(-0.6943)	(-0.7878)
Location	0.0012	-0.0062	-0.0114*	0.0033	-0.0033	-0.0113
	(-0.9065)	(-0.5073)	(-0.0634)	(-0.8580)	(-0.5969)	(-0.3583)

Panel D: All dummy variables and use Masters dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	-0.0258***	-0.0367***	-0.0329***	-0.0131	-0.0023	0.0037
	(-0.0001)	(0.0000)	(0.0000)	(-0.1350)	(-0.6692)	(-0.6316)
Gender	0.0058	-0.0100	0.0099	-0.0101	0.0240*	-0.0083
	(-0.7481)	(-0.5430)	(-0.1834)	(-0.6935)	(-0.0891)	(-0.6624)
Duality	0.0027	-0.0169*	-0.0174***	0.0132	0.0033	0.0170
	(-0.7585)	(-0.0634)	(-0.0001)	(-0.2403)	(-0.6373)	(-0.2228)
Masters	0.0119*	-0.0099	-0.0002	0.0099	0.0056	-0.0084
	(-0.0812)	(-0.1121)	(-0.9673)	(-0.2775)	(-0.3048)	(-0.2890)
Location	0.0091	-0.0111	-0.0116*	0.0039	-0.0013	-0.0115
	(-0.4807)	(-0.2345)	(-0.0596)	(-0.8294)	(-0.8393)	(-0.3488)

Significance at the 10% (*), 5% (**), or 1% level (***) is indicated.

3.4.2.1.2 Characteristics that affect Equity

From Table 8, we observe that two independent variables, namely prior and post dummy variable, and CEO-chairperson duality are statistically significant for the four panels (Panel A, Panel B, Panel C and Panel D).

In all of the four panels (Panel A, Panel B, Panel C and Panel D), the coefficients for prior and post are positively significant on equity announcements returns at the 1% level. This implies that CEO characteristics have significant effects on returns before

they make equity announcements. In Table 8, we identify statistical significance with -0.0172 at the 5.88% level for equity announcements in Panel B, statistical significance with -0.0187 at the 3.21% level for equity announcements in Panel C, and statistical significance with -0.0169 at the 6.34% level for equity announcements in Panel D. These empirical results indicate that when CEOs also hold the chairperson position, they use their power or high reputation to constrain board engagement, pursuing their own interests instead of targeting high performance (Ruigrok et al., 2006). In other words, CEOs' opinions can be transformed more directly into firm outcomes when CEO-chairperson duality exists, as decision-making power is more centralized in the hands of the CEO (Adams et al., 2005). Our finding is consistent with Kaymak and Bektas (2008) and Chen and Hsu (2009), who demonstrate that the duality ratio is negatively correlated with firm performance and research and development investment. These results support our view that powerful CEOs are more likely to constrain board engagement in strategic decision-making.

The remaining CEO characteristics do not affect cumulative abnormal returns. Our results are consistent with Kellermanns et al. (2008) who finds that CEO gender does not affect entrepreneurial behaviour and subsequent firm growth and inconsistent with Huang and Kisgen (2013) who illustrate that male CEOs are relatively overconfident compared to female CEOs regarding corporate decision-making. Furthermore, the insignificance of CEO educational level is inconsistent with Hambrick and Mason (1984), Bertrand and Schoar (2003), Frank and Goyal (2007), and King et al (2016) who revealing that education level has a positive impact on firms' research and development activities, firm performance, firm international strategy, board composition of family firms, and open innovation.

3.4.2.1.3 Characteristics that affect Capital Raising announcements

From Table 8, we observe that four independent variables (which are prior and post dummy, CEO-chairperson duality, MBA dummy, and location dummy) are statistically significant for the four panels (Panel A, Panel B, Panel C and Panel D). In Panel A,

Panel B, Panel C and Panel D, the coefficients for prior and post are all negatively significant at the 1% level. This implies that CEO characteristics have significant effects on returns before they make capital raising announcements.

CEO-chairperson duality is identified as a key element for managerial effects based on UET (Hambrick and Mason, 1984) and existing financial literature on managerial effects on firm outcomes (e.g., Bertrand and Schoar, 2003; Chen and Hsu, 2009; Sharma, 2004). Ruigrok et al. (2006) report a negative correlation between CEO duality and board involvement in strategic decision-making, which indicates that powerful CEOs are more likely to constrain board engagement in strategic decision-making. In Table 8, we show statistical significance results at the 1% level for relationship between CEO duality and capital raising announcements in all panels, supporting Ruigrok et al. (2006). These results further support our view that powerful CEOs are more likely to constrain board engagement in strategic decision-making.

Similar to previous test, three different measurements of CEO education level are applied in a regression separately. Our results in Panel A and C of Table 8 show that the MBA dummy has significant positive effects on capital raising announcement returns (at 1% level). The coefficients for MBA are 0.0115 in Panel A and 0.0106 in Panel C with p-values are 0.0023 and 0.0051. This implies that firms managed by CEOs who have MBA degrees experience an increase in cumulative abnormal returns, of about 1%, around announcements of capital raising when compared to other CEOs. These results support the UET—whereby managers who are well educated have the ability to handle complex information and difficult situations (Hambrick and Mason, 1984). The positive educational effects imply that capital raising decisions made by CEOs who have MBA degrees are more favourable than CEOs who have other formal education degrees. Distinct from other degrees, MBA degrees require candidates to have a minimum of two years working experience. This experience enables candidates to successfully apply their management training and knowledge acquired through the MBA program (King et al., 2016) to improve firm performance through a superior choice of firm policies (Graham and Harvey, 2001). The results of this study are consistent with Chevalier and

Ellison (1999) and King et al. (2016) wherein CEOs with MBA degrees outperform their peers and are more responsive to capital incentives for improving organizational performance. The results implicitly show that the Australian market recognises the design and quality of MBA degrees. The positive relationship between the MBA dummy and capital raising announcement returns, to some degree, is consistent with Carpenter (2002) and Lin et al. (2011), namely that higher education level has a positive impact on international strategy and research and development investment.

The location dummy, in Table 8, is significant and negatively correlated to capital raising announcement returns in all of the four panels (Panel A, Panel B, Panel C, and Panel D), which indicates that the market interprets capital raising decisions made by firms with CEOs who are located within Australia less favourably than overseas CEOs. Francis et al. (2016) point out that location also has effects on CEO power and board composition, which in turn influences decision-making and firm value. Additionally, John et al. (2011) argue that remote location increases the cost of shareholder oversight of CEOs' investment decisions, and notes that these firms pay higher dividends to mitigate agency conflicts. By adding evidence on regressions with control variables, the results in Table 8 reveal that CEOs who are located within Australia have negative and significant (at 1% levels) impacts on firms making capital raising related decisions. The Australian market interprets capital raising decisions made by firms with local CEOs to be more value increasing on average than those made by overseas CEOs. This is in line with Roth (1995) and Hermann and Datta (2002), who argue that CEOs must be "internationally networked" or have international experience to have a positive impact on post-succession organizational performance.

CEO gender does not affect cumulative abnormal return. Our results are consistent with Kellermanns et al. (2008) who find CEO gender does not affect entrepreneurial behaviour and subsequent firm growth and inconsistent with Huang and Kisgen (2013) who illustrate that male CEOs are relatively overconfident compared to female CEOs regarding corporate decision-making.

3.4.2.1.4 Characteristics that affect Refinancing announcements

With the exception of the PhD dummy for education level, all the remaining characteristics (prior and post, gender, CEO-chairperson duality, MBA dummy and Masters dummy) do not matter for refinancing. Our results show that the PhD dummy has significantly negative effects on refinancing announcement returns and indicates that refinancing decisions are better received if the firm has a CEO with a lower education degree than a PhD degree. As the prevailing interest rate is one of the biggest drivers of corporate refinancing, firms may refinance their debts to improve their credit quality or obtain a better financing option with favourable interest rates. After refinancing, firms usually have less interest payments, longer payment terms, and lower risks, and, in turn, they are more flexible regarding funds for operations and investments. Xiao and Zhang (2018) investigate the announcement effect of several major direct refinancing methods of listed companies in China and demonstrate that non-public issuance and allotment (out of five refinancing methods) have significant negative effects on announcement returns. Our results contribute to the existing literature by providing additional insights regarding refinancing announcements in the Australian market.

3.4.2.1.5 Characteristics that affect Bond announcements

With the exception of gender, all the remining characteristics (prior and post, CEO-chairperson duality and all education dummies) are not significant for bond announcements. Entrepreneurial roles are more often associated with men than women (Kellermanns et al., 2008). According to Chief Executive Women (CEW, 2018), only 7% of CEOs of ASX200 companies are women. In 2017, only 5% of ASX200 firms had female CEOs. Studies on CEO gender (see Chapter 2) demonstrate that male and female CEOs vary in their risk-taking behaviours and efficiency of capital allocation (Faccio et al., 2016). Panels A and D of Table 8 show that the coefficients for gender is 0.0222 and 0.0240 with the p-values are 0.0988 and 0.0891. This implies that firms managed by female CEOs experience an increase in cumulative abnormal returns of

more than 2% around announcements of bond when compared to male CEOs. The results show that female executive firms have better market reactions than those of male executive firms. This result is in contrast to Huang and Kisgen (2013) who argue that debt issues have lower announcement returns for firms with male executives in the US market and female CEOs are less likely to make significant corporate decisions.

The remaining CEO characteristics do not affect cumulative abnormal return. Our findings are consistent with Liang, Xu, and Jiraporn (2013) who fail to find a significant effect of CEO-chairperson duality on ROA and inconsistent with Kaymak and Bektas (2008) and Chen and Hsu (2009) who show that CEO-chairperson duality do affect firm performance. Our results on CEO educational level are inconsistent with Hambrick and Mason (1984), Bertrand and Schoar (2003), Frank and Goyal (2007), and King et al (2016) who revealing that education level has a positive impact on firms' research and development activities, firm performance, firm international strategy, board composition of family firms, and open innovation. In addition, our results also are inconsistent with Hermann and Datta (2002) who demonstrate that outsider CEOs with international experience have a positive impact on post-succession organizational performance.

3.4.2.1.6 Characteristics that affect Loan decisions

All CEO characteristics (prior and post, gender, CEO-chairperson duality, MBA, Masters) are not significant for loan decisions except the PhD dummy for education level. Our results indicate that the PhD dummy has significantly negative effects on loan announcement returns (at the 5% level in Panels A and B). This is contrary to UET which states that managers who are well educated have the ability to handle complex information and difficult situations (Hambrick and Mason, 1984). The negative coefficient of the PhD dummy for loans confirms the results of prior studies that demonstrate that PhD education level appears to not matter for firm performance (e.g., King et al., 2016). This result may be due to PhD qualifications in non-business related fields such as science or mining. Our results contribute to the existing literature by

providing additional insights regarding refinancing announcements in the Australian market.

Table 9 shows a summary of the results depicted in the numerous panels in Table 8. In Table 8 we summarise whether CEOs characteristics have an influence on firm performance without the control variables. Panel A reports the results using a single dummy variable of our regression specification. Panel B presents the results using the full panel of firms and CEO dummies with PhD dummy as the proxy of CEO education level. Panels C and D provide findings from tests with MBA dummy and Masters dummy as the education level, respectively. Table 9 demonstrates that CEO characteristics play a role in firm performance in terms of stock returns. In particular, CEO characteristics have a strong impact on debt, equity, and capital raising decisions. Moreover, the empirical results demonstrate that CEO-chairperson duality, CEO education level, and CEO location are three dominant factors for examining managerial effects on firm performance. The weak significance of results regarding CEO gender indicate that this variable does not exert a strong effect on firm performance.

Table 9. Summary of effects of CEO characteristics

Panel A: Panel regression on single dummy variable

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	Yes	Yes	Yes	No	No	No
Gender	No	No	No	No	Yes	No
Duality	No	No	Yes	No	No	No
PhD	No	No	No	No	No	Yes
MBA	No	No	Yes	No	No	No
Masters	No	No	No	No	No	No
Location	No	No	Yes	No	No	No

Panel B: Estimation for all dummy variables with PhD dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	Yes	Yes	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	Yes	Yes	No	No	No
PhD	No	No	No	Yes	No	Yes
Location	No	No	Yes	No	No	No

Panel C: Estimation for all dummy variables with MBA dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	Yes	Yes	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	Yes	Yes	No	No	No
MBA	No	No	Yes	No	No	No
Location	No	No	Yes	No	No	No

Panel D: Estimation for all dummy variables with Masters dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	Yes	Yes	Yes	No	No	No
Gender	No	No	No	No	Yes	No
Duality	No	Yes	Yes	No	No	No
Masters	Yes	No	No	No	No	No
Location	No	No	Yes	No	No	No

3.4.2.2 Bonferroni corrections

Bonferroni correction is also applied to the results of the regressions with dummy variables only in an identical fashion to Section 3.4.1 in order to adjust the level of statistical significance of multiple correlation coefficients (Curtin and Schulz, 1998). The summary of results after the Bonferroni Corrections is reported in Table 10. The corresponding p-values reported in Table 8 are compared with the benchmark value of 0.05 divided by seven (this is because we run seven regressions using seven dummies in Panel A). If the corresponding p-value is less 0.05 divided by seven, the results survive the robustness test and we denote it with a 'Yes'.

Panel A provides the results using a single dummy variable after controlling for firm-level variables in our regression specification model. Panel B presents results using the full panel of firms and CEO dummies, with PhD dummy as the proxy of CEO education level. Panels C and D provide findings from tests with the MBA dummy and the Masters dummy as the education level, respectively.

Column 3 in Table 10 reveals that CEO-chairperson duality and MBA dummies for capital raising remain significant. The significant coefficients of duality for capital raising indicates that CEO-duality enables CEOs to exert their power regarding capital raising decisions. As a result, top management teams must carefully consider whether the CEO should also serve as chairperson, as independent roles are likely to lead to more successful performance outcomes. CEOs who hold MBA degrees exert statistically different and positive effects on firm performance in terms of capital raising announcement returns compared to those CEOs with other education levels. This result adds support to our argument that CEOs who graduated with MBA degrees can successfully apply their management training and knowledge acquired through the MBA program to obtain better future organizational performance and is consistent with King et al. (2016). These findings are consistent with prior studies where educational background is positively and significantly related to firm international strategy (Carpenter, 2002), research and development activities (Lin et al., 2011), and firm

outcomes (King et al., 2016). This indicates that instead of considering only degree levels, education majors can perhaps be added for better measurement of the educational level of CEOs. Overall, our findings imply that firms with independent CEOs who hold MBA degrees are more likely to achieve successful firm outcomes.

Table 10. Summary of effects with Bonferroni corrections

Panel A: Panel regression on single dummy variable

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	Yes	Yes	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	Yes	No	No	No
PhD	No	No	No	No	No	No
MBA	No	No	Yes	No	No	No
Masters	No	No	No	No	No	No
Location	No	No	No	No	No	No

Panel B: Estimation for all dummy variables with PhD dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	Yes	Yes	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	Yes	No	No	No
PhD	No	No	No	No	No	No
Location	No	No	No	No	No	No

Panel C: Estimation for all dummy variables with MBA dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	No	Yes	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	Yes	No	No	No
MBA	No	No	Yes	No	No	No
Location	No	No	No	No	No	No

Panel D: Estimation for all dummy variables with Masters dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	Yes	Yes	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	Yes	No	No	No
Masters	No	No	No	No	No	No
Location	No	No	No	No	No	No

3.4.2.3 Holm-Bonferroni method

We also conduct the improved Bonferroni test, namely the Holm-Bonferroni method, to control the family-wise error rate at α-level of 5% or 0.05. A summary of results using the Holm-Bonferroni method is reported in Table 11. The corresponding p-values reported in Table 8 are compared with the benchmark of 0.05 divided by seven (this is because we run seven regressions using seven dummies in Panel A). If the corresponding p-value is less 0.05 divided by seven, the results survive the robustness test and we denote it with a 'Yes'.

Panel A, of Table 11, provides results using a single dummy variable after controlling for firm-level variables in our regression specification model. While Panel B presents results using the full panel of firms and CEO dummies, with the PhD dummy as the proxy of CEO education level. Panels C and D provide findings from tests with the MBA dummy and the Masters dummy as the education level, respectively. The results are the same as those observed with Bonferroni corrections.

Table 11. Summary of effects with Holm-Bonferroni method

Panel A: Panel regression on single dummy variable

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	Yes	Yes	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	Yes	No	No	No
PhD	No	No	No	No	No	No
MBA	No	No	Yes	No	No	No
Masters	No	No	No	No	No	No
Location	No	No	No	No	No	No

Panel B: Estimation for all dummy variables with PhD dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	Yes	Yes	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	Yes	No	No	No
PhD	No	No	No	No	No	No
Location	No	No	No	No	No	No

Panel C: Estimation for all dummy variables with MBA dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	No	Yes	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	Yes	No	No	No
MBA	No	No	Yes	No	No	No
Location	No	No	No	No	No	No

Panel D: Estimation for all dummy variables with Masters dummy as proxy for education level

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
Prior & Post	Yes	Yes	Yes	No	No	No
Gender	No	No	No	No	No	No
Duality	No	No	Yes	No	No	No
Masters	No	No	No	No	No	No
Location	No	No	No	No	No	No

The regression results, including only CEO characteristics, namely CEO gender, CEO-chairperson duality, CEO education level, and CEO location reveal that all of the CEO characteristics in our analysis are dominant factors for examining managerial effects on

firm performance. The gender dummy is significantly positive in bond announcements, which provides additional evidence for gender effects on firm performance. Female CEOs generate positive announcement returns on bond decisions that outperform their male counterparts, and female CEOs are better received in the Australian market when making bond decisions. Negative effects of CEO duality support the agency theory, whereby combined roles of CEO and chairman may reduce the monitoring function of the board and increase the likelihood of bankruptcy (Daily and Dalton, 1994; Krause et al., 2014). The PhD dummy is negatively associated with refinancing and loan announcement returns. Moreover, our results show that firms led by CEOs with MBA degrees or Masters degrees achieve a statistically better performance than firms headed by CEOs with non-MBA degrees or lower education degrees. This contributes to the literature that states there are no significant differences between MBA CEOs and non-MBA CEOs (Huang and Kisgen, 2013). In addition, this finding shows that MBA candidates, with their mandatory two years of working experience, are able to apply their knowledge more efficiently to practical work than other degree graduates.

3.4.3 Robustness analysis – CAR comparisons

To further verify whether announcements of a firm have any effect on the share price of a firm, we conduct an event study to calculate the average abnormal return (AR) and cumulative abnormal return (CAR) for our sample with subcategories over a 361-day event window. This study utilizes the ARs and CARs of financing announcements as measurements of firm performance to identify managerial effects on stock prices of Australian listed firms from 2013 to 2018. Table 12 displays the average AR and CAR of all related announcements in our sample with statistically significant results highlighted in bold. The announcement dates in Table 12 are defined as day 0. Moreover, comparisons via parametric t tests on each CEO characteristic are applied as a robustness analysis and showed in Appendices B - G. Appendix B shows the difference, in AR and CAR, between male and female CEOs on the six categories of announcements using a difference in means tests. Appendix C presents the difference between CEO-chairperson duality and independent CEO in AR and CAR for all announcements via the difference in means tests. Appendices D – F report the

differences in AR and CAR among three different education levels of CEOs, ie PhD, MBA and master's degrees, for all announcements using parametric t-tests . The difference in means tests between local and overseas CEOs in AR and CAR for all categories of financing announcements are showed in Appendix G.

Table 12 presents evidence of CEO characteristics' influence on firm performance. The results show five types of announcements, in our sample, that have continuous significant CARs generated within the event window. The one type of announcement that does not show any significance for AR or CAR is loan announcements. The positive and significant reactions after debt, equity, capital raising, and refinancing announcement returns reveal that no matter what finance sources firms are using, the market interprets these decisions as value-adding.

The first two columns of Table 12 show continuous significant positive CARs are generated from 5 days to 60 days after the debt event. The positive and significant delayed reactions mean that when there are debt related announcements on the ASX, there is a 0.43% increase from five days after the event in the value of the underlying Australian shares.

For equity announcements, Table 12 shows continuous significant positive CARs are generated from 180 days to 10 days before the event and from 30 days to 90 days after the event. The positive and significant reactions indicates that when there are equity related announcements on the ASX, there is, on average, a 3.48% decrease from 180 days before the event in the value of the underlying Australian shares and a 0.35% increase between 30 days and 90 days after the event.

Table 12. AR and CAR of related announcements

Event Days	Debt		Equity		Capital Raising		Refinancing		Bond		Loan	
	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat
-180	**0.9265**	**2.1338**	**3.5849**	**9.8883**	**3.3770**	**13.4028**	-0.0754	-0.1174	**1.6190**	**4.6418**	0.7111	1.5160
-120	**0.7654**	**2.2665**	**3.0760**	**10.3414**	**2.8693**	**13.7226**	0.4373	0.8280	**1.3425**	**4.5896**	0.4514	1.1753
-90	**0.6525**	**2.3555**	**2.4671**	**10.1640**	**2.3778**	**13.6596**	0.2339	0.5146	**1.3622**	**5.1602**	0.3780	1.1300
-60	0.2323	1.1087	**1.6526**	**8.8727**	**1.9311**	**14.4932**	-0.0042	-0.0121	**1.1673**	**5.2761**	0.2728	1.0249
-30	-0.0916	-0.7253	**0.7011**	**6.5007**	**1.0765**	**13.6017**	-0.0053	-0.0226	**0.3890**	**2.5777**	-0.0373	-0.2346
-15	-0.1150	-1.4587	**0.2107**	**3.3715**	**0.4355**	**9.2674**	-0.1360	-1.0155	0.1899	1.8827	-0.0926	-0.9188
-10	-0.0902	-1.5260	**0.1052**	**2.2622**	**0.2747**	**8.0516**	-0.1285	-1.2403	**0.1819**	**2.2362**	-0.1168	-1.5314
-5	-0.0227	-0.6040	0.0279	0.9849	**0.1190**	**5.8118**	-0.0584	-0.8499	**0.1129**	**2.9553**	-0.0517	-1.1498
0	0.0024	0.1823	0.0084	0.8405	**0.0243**	**3.2953**	0.0106	0.4326	0.0117	0.7081	0.0104	0.5982
+5	**0.0794**	**2.2428**	0.0501	1.8405	**0.0851**	**3.9626**	**0.1579**	**2.6029**	0.0564	1.3203	0.0198	0.4464
+10	**0.1612**	**2.9669**	0.0631	1.3435	**0.2055**	**5.8271**	**0.2953**	**3.0353**	**0.1664**	**2.4560**	0.0120	0.1638
+15	**0.3238**	**4.3492**	0.0970	1.5372	**0.3393**	**7.0798**	**0.4624**	**3.7547**	**0.2398**	**2.7827**	0.0213	0.2206
+30	**0.4350**	**3.4601**	**0.3338**	**3.2194**	**0.5732**	**7.2793**	0.3883	1.8060	**0.5519**	**3.6297**	-0.1396	-0.8686
+60	**0.4253**	**2.1018**	**0.5159**	**2.9751**	**0.8577**	**6.7075**	0.3011	0.9020	**1.1867**	**5.0157**	0.0194	0.0730
+90	0.2369	0.9010	**0.6834**	**2.9764**	**0.9697**	**5.9473**	0.0573	0.1313	**1.5142**	**5.6093**	0.2724	0.8577
+120	-0.0324	-0.1006	0.3252	1.1980	**0.8203**	**4.3643**	-0.3517	-0.6530	**1.5193**	**4.9155**	0.1820	0.4898
+180	-0.7152	-1.8769	**-0.6566**	**-2.0828**	0.0904	0.4090	-0.3951	-0.6770	**1.5178**	**4.0748**	-0.0431	-0.0895

The third group of announcements is capital raising, which requires a cash injection to expand existing operations, protect market share, develop new businesses or engaged in mergers and acquisitions for firms. Moreover, the effects of capital raising announcements have been considered as an indicator of increased shareholder wealth (Brown and Warner, 1985). Table 12 shows that between 180 days prior and 180 days post the capital raising announcements, CARs are statistically significant for the majority of the window period except 180 days after the event. Before the event date, CARs show positive, though decreasing, returns from 3.38%, 180 days before the announcement to 0.02% on the event date. An increase on CARs from 0.09%, 5 days after the event to 0.82% on 120 days after the event.

Firms may refinance their debt when they need to improve their financial situation and credit quality or request better financing options with favourable interest rates. After refinancing, firms usually have less interest payments, longer payment terms and lower risks which result in flexible funds for operations and investments. To the best of our knowledge, there are few publications that have examined refinancing announcements. Of the few publications in this area, Xiao and Zhang (2018) investigate the announcement effect of several major direct refinancing methods of listed companies in China. They demonstrate that non-public issuance and allotment refinancing methods have significant effects on announcement returns. This study contributes to the existing literature by providing insights into refinancing announcements on Australian market. Based on Table 12, there are statistically significant positive CARs from day 5 (0.16%) until day 15 day (0.46%) after firms announced refinancing. This increase in CAR shows that refinancing announcements are identified as positive signals and better decisions for firms.

Bonds or convertible bonds are hybrid securities with features of debt, equity, and refinancing and are an important source of financing (Dutordoir, Li, Liu, and Verwijmeren, 2016). Bond announcement effects have been examined in number of studies in the US, Japan, and other developed countries. For instance, Dann and Mikkelson (1984), Eckbo (1986), Mikkelson and Partch (1986) provide evidence on the US market with convertible bond announcements. They find that issuer share prices

react negatively to convertible bond announcements, which is consistent with the Myers and Majluf (1984) signalling model. Kang et al. (1995) and Christensen et al. (1996) show positive reactions from the Japanese market to bond announcements whereas Mollemans (2003) find opposite effects based on Japanese firms. Magennis, Watts and Wright (1998) show negative announcement effects for Australian market, and Abhyankar and Dunning (1999) report same effects within the UK market. Table 12 reports continuously positive CARs are statistically significant showed from 180 days (1.62%) to 30 days (0.39%), from 10 days (0.18%) to 5 days (0.11%) before the event; and from 10 days (0.17%) to 180 days (1.52%) after the event. This result is contrary to Magennis, Watts and Wright (1998) who indicate that this difference lies in Australian managers preferring to pay more attention on shareholder value rather than market share. Another possible explanation is that the Australian market may be more focused on CEOs that are looking for financing options to undertake new positive-net present value (NPV) projects, resulting in positive stock price reactions.

Compared to other forms of financing, loans are unique and special and have been investigated in banking sectors with the results generally showing positive and significant abnormal returns for borrowers (Billett, Flannery, and Garfinkel, 1995; Aintablian and Roberts, 2000). However, the findings of Maskara and Mullineaux (2011) suggest that loan announcements are relatively rare events and do not provide statistically significant abnormal returns. From Table 12, there are no statistically significant results in AR and CARs of loan announcements. This result is consistent with Maskara and Mullineaux (2011) in US market.

3.4.3.1 Characteristics that affect Debt announcements

3.4.3.1.1 CEO gender

The significance of CEO gender has been reinforced in that entrepreneurial roles are more often associated with males than females (Kellermanns, et al., 2008). According to CEW (Chief Executive Women) 2018, only 7% of CEOs of ASX200 companies are women. In 2017, only 5% of ASX200 firms have female CEOs. In our sample, female CEOs represent an even lower percentage. For all debt related announcements, there

are only 2.4% announcements made by female CEOs in the Australia stock market (there are 31 female CEOs whereas 1277 are male). Table 13 presents results of the abnormal return analysis and two tailed parametric t-tests which compare difference in means, with results for gender effects are reported in Appendix B.

Table 13 presents the results of female and male CEOs on debt related announcements. Prior studies on CEO gender demonstrates that male and female CEOs vary in their risk-taking behaviour and efficiency of capital allocation (Faccio, Marchica, and Mura, 2016). Our results show that firms with female executives have lower announcement returns (-0.10%) than those made by male executives (0.01%). This finding is not consistent with Huang and Kisgen (2013) who demonstrate that debt issues have lower announcement returns for firms with male executives. This evidence indicates that the Australian market may have a bias towards gender, as indicated by the positive abnormal returns for male executives and negative abnormal returns for female executives. Another explanation may be that female executives in Australia are relatively risk averse, they make value destructive decisions which can be identified by the board. It also could be due to the small number of qualified female executive announcements (33 observations out of 1308 in total).

There are delayed significant positive CARs when the announcements are made by male CEOs from 5 days to 60 days after the event. To determine the statistical significance of gender effects of CEOs, is the difference in means tests are applied and the result shows insignificance between female CEOs and male CEOs (see Appendix B). This is consistent with Kellermanns et al. (2008) and Brick, Palmon, and Wald (2006) who find that there is no significant effect of CEO gender on entrepreneurial behaviour, subsequent firm growth or future firm performance.

Table 13. Gender effects on debt ARs and CARs

Event Days	Debt			
	Female CEO		Male CEO	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	0.2124	0.1057	**0.9272**	**2.0857**
-120	1.1306	0.6705	**0.7435**	**2.1554**
-90	0.9982	0.6422	**0.6295**	**2.2305**
-60	-0.1356	-0.1338	0.2276	1.0650
-30	0.5132	0.5479	-0.1111	-0.8701
-15	0.1576	0.2547	-0.1111	-1.3986
-10	0.1381	0.3731	-0.0859	-1.4335
-5	0.0109	0.0522	-0.0166	-0.4365
0	-0.1082	-1.4865	0.0070	0.5127
+5	-0.0660	-0.2754	**0.0894**	**2.5092**
+10	-0.0362	-0.1021	**0.1710**	**3.1017**
+15	-0.0565	-0.0873	**0.3403**	**4.5443**
+30	0.3175	0.3898	**0.4429**	**3.4681**
+60	1.1114	0.9626	**0.4097**	**1.9844**
+90	0.2496	0.1391	0.2352	0.8801
+120	-0.1725	-0.0773	-0.0125	-0.0384
+180	0.5113	0.1873	-0.7230	-1.8708

3.4.3.1.2 CEO-chairperson duality

In the debt announcement category, CEOs duality occurs in 87.11% of the sample. Table 14 provides the results of independent CEOs and CEO-chairperson duality on debt related announcements at various windows (-180 to 180 days) from the event date. The results reported in Table 14 show that CEOs who also hold chairperson position have positive (0.01%) AR compared with negative (-0.04%) AR created by independent CEOs on debt announcements. This finding is consistent with Adams, Almeida, and Ferreira (2005) and indicate that dual positions of chairman and CEO strengthen their power on strategic decision making. As a result, CEOs have more discretion in the firms, and prefer to maximize their own benefits which ultimately maximizes shareholder wealth. In other words, CEOs' opinions are delivered more directly into firm outcomes when CEO-chairperson duality exists which means the decision-making power is more centralized in the hands of the CEO (Adams, Almeida, and Ferreira, 2005).

In the period between 180 days (1.05%) and 90 days (0.61%) before the event we observe a continuously decreasing positive CARs for debt announcements for firms which have dual CEOs. From 10 days (0.16%) to 30 days (0.43%) after the event the results show a continuously increasing positive CARs for debt announcements for firms where CEO-chairperson duality exists. This implies that investors are more reliant on firms managed by CEOs who also hold the chairperson position as dual CEOs have deeper understanding of the firm. However, the results do not show any statistical significance between CEOs who holds chairperson and independent CEOs (see Appendix C). Consistent with prior literature regarding firm performance with CEO characteristics (Brick, Palmon, and Wald, 2006), this analysis fails to identify the correlation between CEO-chairperson duality and firm performance.

Table 14. Duality effects on debt ARs and CARs

Event Days	Debt			
	Dual CEO		Independent CEO	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	**1.0509**	**2.2756**	-0.5574	-0.4532
-120	**0.7373**	**2.0957**	0.3663	0.3422
-90	**0.6084**	**2.0944**	0.6089	0.6955
-60	0.1783	0.8026	0.3385	0.5443
-30	-0.1410	-1.0706	0.1332	0.3263
-15	-0.1337	-1.6041	-0.0279	-0.1154
-10	-0.1007	-1.6060	-0.0406	-0.2271
-5	-0.0171	-0.4264	-0.0735	-0.6686
0	0.0081	0.5610	-0.0359	-1.0026
+5	0.0704	1.8489	0.1236	1.2575
+10	**0.1588**	**2.7692**	0.1614	0.9556
+15	**0.3105**	**3.9921**	0.3906	1.6028
+30	**0.4257**	**3.2697**	0.5076	1.1861
+60	0.3755	1.7802	0.8308	1.2374
+90	0.1153	0.4158	1.1645	1.4190
+120	-0.1463	-0.4301	1.0093	1.0174
+180	**-0.8167**	**-2.0189**	0.2758	0.2405

3.4.3.1.3 CEO education level

CEO education level has been identified as an important characteristic to explain firm performance. Education level is also considered as one of the important proxies in receptivity to innovations, which eventually increases firm value (Lin et al., 2011). For example, Rajagopalan and Datta (1996) explore environmental and industry factors to explain variations in CEO characteristics and finds that variations in the level of education are explained by industry conditions to a certain degree. Carpenter (2002) demonstrates that a CEOs educational and functional background are positively related to a firm's international strategy and a stronger relationship exists between short-tenured top management teams and a firm's international strategy. Moreover, consistent with Carpenter (2002), Lin et al. (2011) provide evidence from Chinese markets and finds that CEO education level has a positive impact on firms' research and development activities. This indicates that well-designed CEO incentive schemes contribute to increased research and development activities and promote competitiveness and performance of firms in the long term (Lin et al., 2011). These findings add support to the suggestion that a CEOs education level has effects on debt announcements returns in Australian market. Under the debt announcements category, there are 7.14% of CEOs that have a PhD degree, 16.33% who CEOs hold an MBA degree, and 38.92% of CEOs graduated with a master's degree.

Table 15 shows that all three measurements for CEO education level creates positive ARs. To summarise, a 0.07% AR is observed for CEOs with PhDs, 0.03% for MBA holders, and 0.02% for master's holders.

For PhD degrees, there are statistical significantly CARs from 10 days (0.51%) to 30 days (1.08%) after the event. This delayed reaction from the market shows that for firms with CEOs who hold PhD degrees, positive effects on firm performance are observed, which is consistent with Carpenter (2002) and Lin et al. (2011). PhD education shows the level of technical expertise obtained through an

Table 15. Education effects on debt ARs and CARs

Event Days	PhD				MBA				Masters			
	PhD degree holders		Other degree holders		MBA degree holders		Other degree holders		Masters degree holders		Other degree holders	
	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat
-180	3.2209	1.7309	**1.2069**	**2.3495**	**4.2360**	**3.2480**	0.2730	0.5969	**3.0251**	**3.6123**	0.2472	0.4111
-120	2.4551	1.6527	**0.9176**	**2.3499**	**2.1806**	**2.5384**	0.4496	1.2158	**1.8333**	**3.1117**	0.4818	0.9907
-90	1.2642	1.1153	**0.7193**	**2.2471**	**1.7155**	**2.4697**	0.4379	1.4363	**1.4533**	**3.0650**	0.3019	0.7572
-60	0.1225	0.1596	0.2969	1.2160	0.6773	1.3020	0.1217	0.5281	0.6231	1.7493	0.0537	0.1759
-30	-0.1519	-0.3092	-0.0896	-0.6066	-0.1190	-0.4291	-0.0947	-0.6673	-0.1287	-0.6354	-0.0597	-0.3105
-15	-0.0945	-0.3144	-0.1239	-1.3582	-0.2390	-1.5406	-0.0924	-1.0289	-0.1727	-1.4287	-0.0659	-0.5424
-10	-0.1469	-0.6015	-0.1147	-1.6687	**-0.2480**	**-2.1040**	-0.0599	-0.8899	-0.1855	-1.9796	-0.0612	-0.6711
-5	-0.0436	-0.2516	-0.0357	-0.8155	-0.0411	-0.5523	-0.0184	-0.4273	-0.0590	-0.9720	-0.0121	-0.2063
0	0.0689	1.0373	-0.0104	-0.6658	0.0277	1.0765	-0.0035	-0.2267	0.0208	0.9472	-0.0158	-0.7613
+5	0.1626	0.9385	0.0730	1.8014	0.0753	1.0064	0.0740	1.8489	0.0889	1.4742	0.0914	1.7671
+10	**0.5126**	**2.4445**	0.1178	1.8953	0.0882	0.6560	**0.1623**	**2.7072**	**0.1868**	**1.9921**	0.1427	1.8580
+15	**0.6967**	**2.4552**	**0.2313**	**2.7469**	0.1506	0.8448	**0.3417**	**4.1391**	**0.2804**	**2.2172**	**0.2813**	**2.7033**
+30	**1.0823**	**2.3408**	0.2675	1.8793	0.2728	1.0289	**0.4490**	**3.1489**	**0.4485**	**2.1644**	0.2744	1.5205
+60	0.6349	0.8948	0.2033	0.8821	-0.2270	-0.5014	**0.5239**	**2.3043**	0.2130	0.6188	0.2840	0.9922
+90	0.2034	0.2310	-0.0850	-0.2816	-0.7673	-1.3307	0.3926	1.3290	-0.1593	-0.3645	0.0241	0.0632
+120	-1.5328	-1.3555	-0.3681	-1.0104	-0.9255	-1.3327	0.1127	0.3102	-0.7538	-1.4052	-0.2233	-0.4847
+180	**-2.8077**	**-2.0335**	**-1.1470**	**-2.6884**	**-2.3348**	**-2.5439**	-0.4316	-1.0207	**-1.9721**	**-2.9917**	-0.7968	-1.5235

advanced degree or doctorate (King, Srivastav, and Williams, 2016). Under this view, debt issued by CEOs with PhD degrees may be recognised as a smart choice for financing by the investors as these CEOs are more knowledgeable and have the ability to make the correct financing decisions and the capacity to pay off the debts.

CEOs who hold MBA are found to have significant effects on 180 days (4.24%), 120 days (2.18%), 60 days (1.72%) and 10 days (-0.25%) before announcements dates and 180 days (-2.33%) after announcements dates. MBA education represents the level of management training and knowledge acquired through an MBA programme (King, Srivastav, and Williams, 2016). This implies that CEOs with MBA degrees are not only possess professional knowledge but also have outstanding management skills. Debt issued by these CEOs can be identified as a profitable strategy.

Master's degree CEOs have significant CARs on 180 days (3.03%), 120 days (1.83%), and 60 days (1.45%) before the announcement dates and 10 days (0.19%), 15 days (0.28%), and 30 days (0.45 percent) after the announcement dates. These positive effects of CEO education level indicate that CEOs with higher education levels create higher returns for Australian firms. This may be because higher educated CEOs have been delivered a stronger ability, more professional knowledge, better management skills, and broader networks which enable CEOs to manage firms in a more efficient manner which results in successful firm outcomes (King, Srivastav, and Williams, 2016).

Refer to Appendix D, E, and F, for the t-test results show that CEOs who have PhD degrees, MBA degrees or Master's degree have statistically significant effects on debt announcements returns within the event window. This evidence confirms the significance of CEO education level on debt announcements and further implies that it is a long-term effect on firm outcomes.

3.4.3.1.4 CEO location

John, Knyazeva, and Knyazeva (2011) argue that CEOs located in remote locations (relative to shareholders) increases the cost of shareholder oversight of CEOs' investment decisions and find that these firms are paying higher dividends to mitigate agency conflicts. Ivković and Weisbenner (2005) show that fund managers and financial analysts have an informational advantage with respect to local stocks and a preference for local stocks. Moreover, Francis et al. (2016) point out that location also has an effect on CEO power and board composition which, in turn, influences decision making and firm value. These findings support the idea of assessing effects of location on firm performance.

Table 16 identifies the abnormal returns at various windows (-180 to 180 days) from the event date. It shows that CEOs located within Australia can generate positive AR, whereas overseas CEOs created negative AR. This evidence adds support to Ivković and Weisbenner (2005) to the extent that investors in Australia have an informational benefit with care for local firms and a preference for local stocks. Between various windows, from 5 days (0.09%) to 60 days (0.47%) after the announcement date, CEOs who are located domestically generate statistically significant positive CARs for debt announcements. This significant delayed reaction from the market indicates that investors rely more on local CEOs' ability which maximizes firm value through debt issuance. The significant results from the t-tests confirm the location of CEOs is a key element for the Australian market and investors to consider their investment (see Appendix E).

Table 16. Location effects on debt ARs and CARs

Event Days	Debt			
	In Australia		Out of Australia	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	0.6690	1.4933	**4.4368**	**2.5968**
-120	0.6290	1.8023	**2.6247**	**1.9906**
-90	0.5394	1.8812	**2.1941**	**2.0725**
-60	0.1554	0.7079	1.2807	1.9569
-30	-0.1390	-1.0518	0.5543	1.3678
-15	-0.1283	-1.5546	0.0661	0.2595
-10	-0.0947	-1.5341	-0.0297	-0.1469
-5	-0.0163	-0.4164	-0.1097	-0.8369
0	0.0088	0.6345	-0.0849	-1.8343
+5	**0.0896**	**2.4296**	-0.0602	-0.4890
+10	**0.1766**	**3.1041**	-0.0488	-0.2822
+15	**0.3678**	**4.7590**	-0.2761	-1.0256
+30	**0.5020**	**3.8393**	-0.4779	-1.0758
+60	**0.4695**	**2.2274**	-0.1766	-0.2481
+90	0.3092	1.1241	-0.7486	-0.8758
+120	0.1043	0.3098	-1.8964	-1.8430
+180	-0.5436	-1.3641	**-3.0549**	**-2.4858**

To conclude, for the debt announcements category, CEO characteristics of education level and location are the two significant variables for firms listed on the ASX. The results indicate that higher education level of CEOs result in positive debt announcement returns, with a similar result for CEOs located in Australia. We did not find any evidence indicating that CEO gender and CEO-chairperson results in abnormal returns over any windows.

3.4.3.2 Characteristics that affect Equity announcements

3.4.3.2.1 CEO gender

Table 17 presents the results of female and male CEOs on equity related announcements. There are only 2.5% CEOs in our sample that are female. Our results show that firms with female executives have higher announcement returns (0.08%) than those made by male (0.01%) executives on the event day. However, equity issues made by firms with male CEOs have higher announcement returns than those made by female CEOs within the event

window (especially prior to the event). Our results are contrary to Huang and Kisgen (2013) that there is no significant difference made by female CEOs on equity decisions compared with male CEOs. In Australia market, the explanation of this finding could be that male CEOs are relatively overconfident than female CEOs, which male CEOs hold some discretion in their exposure to the equity value of firm and overestimate returns resulting in they believe the stock is undervalued.

Table 17. Gender effects on equity ARs and CARs

Event Days	Equity			
	Female CEO		Male CEO	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	-0.2361	-0.1314	**3.6829**	**9.9875**
-120	-0.4324	-0.3419	**3.1661**	**10.4446**
-90	-1.0849	-0.9665	**2.5582**	**10.3569**
-60	-1.2598	-1.4045	**1.7273**	**9.1200**
-30	-0.0042	-0.0071	**0.7192**	**6.5630**
-15	0.3063	0.9239	**0.2082**	**3.2779**
-10	0.0978	0.3700	**0.1054**	**2.2323**
-5	0.0296	0.1646	0.0279	0.9711
0	0.0875	1.7221	0.0064	0.6273
+5	0.2107	1.2035	0.0460	1.6688
+10	0.1990	0.6487	0.0596	1.2544
+15	0.1446	0.3337	0.0958	1.5022
+30	1.1163	1.6398	**0.3137**	**2.9916**
+60	1.7876	1.5632	**0.4833**	**2.7557**
+90	1.2851	0.8946	**0.6680**	**2.8719**
+120	0.4256	0.2577	0.3226	1.1724
+180	1.1088	0.6669	**-0.7019**	**-2.1903**

From Table 17, there are significant positive CARs when the announcements are made by male CEOs from 180 days to 10 days before the event, from 30 days to 90 days and 180 days after the event. To determine the statistical significance of gender effects of CEOs, the t test is applied, and the results show statistically significance between female CEOs and male CEOs (see Appendix B). This finding confirms our argument that female CEOs do make significantly different equity decisions than male CEOs.

3.4.3.2.2 CEO-chairperson duality

Under equity announcement category, CEOs duality occurs in 91.56% of the sample. Table 18 provides the results between independent CEOs and CEO-chairperson duality on equity related announcements at various windows (-180 to +180 days) from the event date. The results reported in Table 18 shows that CEOs who also hold chairperson position has positive (0.01%) AR compared with negative AR created by independent CEOs (-0.01%) on equity announcements. The positive effects on equity announcement returns made by CEOs who also chair the board may be because they have more decision-making power which in turn affects firm outcomes (Adams, et al., 2005). This finding is consistent with Adams, et al. (2005) and indicate that dual positions of chairman and CEO strengthen their power on strategic decision making which indicates that CEO has more discretion in the firms, and they prefer to maximize their own benefits which ultimately maximize shareholder wealth.

From 180 days (3.64%) until 10 days (0.12%) before the event, dual CEOs show continuously positive CARs on equity related announcements. This implies that when firms announce equity related news with CEOs who have dual positions, investors believe that dual positions on one individual narrows difference between CEOs and the board and dual CEOs do have deeper understanding of the firm and are more reliable. However, the results from t test did not show statistical significance between CEOs who holds chairperson and independent CEOs within the event window (see Appendix C).

Table 18. Duality effects on equity ARs and CARs

Event Days	Equity			
	Dual CEO		Independent CEO	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	**3.6389**	**9.5859**	**3.0110**	**2.4544**
-120	**3.1051**	**9.9693**	**2.7206**	**2.7055**
-90	**2.4302**	**9.6155**	**2.8170**	**3.2373**
-60	**1.6138**	**8.3245**	**2.0241**	**3.0257**
-30	**0.6994**	**6.1435**	**0.7026**	**2.1328**
-15	**0.2196**	**3.3303**	0.1078	0.5605
-10	**0.1180**	**2.4297**	-0.0392	-0.2430
-5	0.0322	1.1034	-0.0159	-0.1410
0	0.0105	1.0771	-0.0134	-0.2473
+5	0.0408	1.4562	0.1495	1.3998
+10	0.0437	0.8900	0.2767	1.7251
+15	0.0794	1.2057	0.2890	1.3162
+30	**0.3151**	**2.9299**	0.5252	1.3631
+60	**0.4838**	**2.6886**	0.8517	1.3227
+90	**0.6266**	**2.6079**	1.3070	1.6720
+120	0.2809	0.9887	0.8313	0.9015
+180	**-0.6874**	**-2.0777**	-0.2802	-0.2700

3.4.3.2.3 CEO education level

Of the CEOs in this study who make equity announcements, 7.79% have a PhD degree, 1.66% hold an MBA degree, and 61.86% have graduated from master's degree. Table 19 shows that all PhD degree and MBA degree holders generate negative ARs, -0.03% for PhD degree holders and -0.02% for MBA holders, respectively. CEOs with master's degree generate opposite ARs – positive 0.01%, which is higher than other degree holders (0.005%). For PhD degree, there are statistically significant and positive CARs from 180 days before the event until 90 days from 10.91% to 2.73% and statistically significant and negative CARs on 5 days (-0.19%), 120 days (-3.28%), and 180 days (4.36%) after the event. The reactions before and after event date from market show that for firms with CEOs who hold PhD degrees have positive effects on firm performance before the announcement and negative impacts on firm outcome after the announcement. In addition, CEOs who holds MBA are failed to find significant effects within various windows.

Table 19. Education effects on equity ARs and CARs

Event Days	PhD				MBA				Masters			
	PhD degree holders		Other degree holders		MBA degree holders		Other degree holders		Masters degree holders		Other degree holders	
	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat
-180	**10.9084**	**5.7421**	**3.6203**	**8.2684**	3.0524	1.1659	**4.0245**	**9.2075**	**4.6043**	**8.3880**	3.5139	**5.0095**
-120	**4.5987**	**3.7810**	**3.5342**	**9.4740**	0.6904	0.3722	**3.5416**	**9.8310**	**4.4698**	**9.6134**	2.2345	**4.0643**
-90	**2.7256**	**2.7830**	**2.9608**	**9.6805**	0.7445	0.4171	**2.8453**	**9.6091**	**3.7118**	**9.7105**	1.6948	**3.8012**
-60	0.8493	1.1375	**2.1202**	**9.0722**	-0.0339	-0.0264	**1.9342**	**8.5654**	**2.7234**	**9.2997**	0.8821	**2.6094**
-30	-0.3778	-0.9223	**1.0476**	**7.6996**	-0.7041	-1.1197	**0.9061**	**6.9230**	**1.2662**	**7.5311**	0.4018	**1.9909**
-15	-0.3966	-1.6624	**0.3723**	**4.7204**	-0.1664	-0.5363	**0.2866**	**3.8001**	**0.5011**	**5.1528**	0.0062	0.0530
-10	-0.3046	-1.5540	**0.1980**	**3.3877**	0.1066	0.4142	**0.1352**	**2.4111**	**0.2747**	**3.8446**	-0.0290	-0.3215
-5	-0.1732	-1.5627	0.0555	1.5539	-0.0600	-0.3654	0.0315	0.9243	0.0679	1.5309	-0.0115	-0.2186
0	-0.0342	-0.8479	0.0112	0.8851	-0.0199	-0.3466	0.0031	0.2527	0.0089	0.5685	0.0056	0.2972
+5	**-0.1878**	**-2.0493**	**0.0698**	**2.0338**	0.0157	0.0804	0.0407	1.2428	0.0694	1.6060	0.0179	0.3694
+10	-0.3579	-1.7855	0.1123	1.9377	0.1609	0.4213	0.0682	1.2249	0.1134	1.5945	0.0145	0.1612
+15	-0.4565	-1.7095	**0.1791**	**2.3236**	0.2781	0.5052	0.1076	1.4520	0.1784	1.9016	0.0502	0.4154
+30	-0.5610	-1.4441	**0.5878**	**4.5358**	1.0245	1.1358	**0.4268**	**3.4595**	**0.6400**	**4.0076**	0.2683	1.3837
+60	-1.1541	-1.6592	**0.9771**	**4.4503**	1.9748	1.3072	**0.7417**	**3.5350**	**1.2550**	**4.5771**	0.0910	0.2819
+90	-1.6451	-1.7460	**1.1328**	**3.8849**	1.2141	0.6848	**0.8971**	**3.2324**	**1.3501**	**3.6684**	0.2127	0.5033
+120	**-3.2772**	**-2.8226**	**0.8803**	**2.5687**	-0.8664	-0.4097	0.5830	1.7807	**1.1112**	**2.5685**	-0.3438	-0.6833
+180	**-4.3614**	**-3.0032**	-0.2007	-0.5127	-1.4662	-0.5618	-0.4143	-1.0906	-0.0293	-0.0597	-1.3289	**-2.2359**

Under this mix results, PhD degrees or MBA degree for CEOs making equity decisions may not be recognised as the appropriate measurements for education level.

Master's degree CEOs have significant positive CARs on 180 days (4.60%) to 10 days (0.27%) before announcements dates and from 30 days (0.64%) to 120 days (1.11%) after the event. These positive effects of CEOs who have master's degrees indicate that these CEOs creates returns for Australian firms. This may because master's degree is the standard for CEOs who making equity related decisions to manage firms effectively with positive returns and achieve successful firm outcomes (King, Srivastav, and Williams, 2016).

Results of the difference in means tests (see Appendix D, Appendix E, and Appendix F) show that CEOs who have PhD degree, MBA degree or master's degree have statistically significant effects on equity announcements returns compared with CEOs who do not have these degrees in the window of 180 days prior and 180 days post. This evidence confirms the significance of CEO education level on equity announcements and also implies that it is a long-term effect on firm outcomes.

3.4.3.2.4 CEO location

Table 20 identifies the abnormal returns at various windows (-180 to 180 days) from the event date. The AR is positive with 0.01% for firms with CEOs located within whereas overseas CEOs created negative AR with -0.02 percent. This evidence adds support to Ivković and Weisbenner (2005) that investors in Australia have an informational benefit with care for local firms and a preference for local stocks.

Between various windows from 180 days (3.81%) after to 10 days (0.10%) before the announcement date and from 30 days (0.34%) to 90 days (0.70%) after the announcement date, CEOs who located locally generate statistically significant positive CARs on equity announcements. These significant reactions from the market indicates that investors are more relied on local CEOs' ability that maximizes firm value through equity issuance. The

significant results from t test confirm the location of CEOs is a key element for Australian market and investors to consider their investment (see Appendix G).

Table 20. Location effects on equity ARs and CARs

Event Days	Equity			
	In Australia		Out of Australia	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	**3.8058**	**9.8468**	1.2950	1.3640
-120	**3.2640**	**10.2902**	1.1277	1.4563
-90	**2.5627**	**9.8976**	**1.4756**	**2.3261**
-60	**1.6559**	**8.3510**	**1.6182**	**3.1941**
-30	**0.6770**	**5.9224**	**0.9509**	**3.0347**
-15	**0.2046**	**3.0953**	0.2738	1.4645
-10	**0.1025**	**2.0793**	0.1331	0.9863
-5	0.0352	1.1716	-0.0475	-0.5751
0	0.0107	1.0135	-0.0156	-0.5168
+5	0.0467	1.6183	0.0851	1.0858
+10	0.0548	1.1092	0.1490	0.9939
+15	0.0934	1.4054	0.1345	0.6729
+30	**0.3384**	**3.1010**	0.2857	0.8659
+60	**0.5467**	**3.0191**	0.1975	0.3283
+90	**0.7037**	**2.9480**	0.4732	0.5705
+120	0.3060	1.0826	0.5236	0.5423
+180	**-0.7568**	**-2.3142**	0.3824	0.3301

CEO characteristics of gender, education level and location are the significant factors for firms listed on ASX. The positive results indicate that female CEOs, the higher education level of CEOs and located within Australia generate positive equity announcement returns. We did not find CEO-chairperson duality perform statistically different with their subgroups.

3.4.3.3 Characteristics that affect Capital Raising announcements

3.4.3.3.1 CEO gender

Table 21 presents the results between female and male CEOs on capital raising announcements. Under this group, there are only 2.49% CEOs in our sample is female. Our results show that firms with female executives have lower announcement returns (0.01%) than those made by male executive firms (0.02%). This result is similar to our findings in debt announcement. Australian market may have bias towards gender, as positive abnormal returns for male and negative abnormal returns for female. Another explanation is that female executives in Australia are relatively risk adverse compare to male executives, they make value destructive decisions which can be identified by the board. Another explanation could be due to the number of qualified female executives (133 observations out of 5349 in total) represents an extremely small proportion.

For female CEOs, it has been found statistically significant and positive CARs from 180 days (3.27%) to 15 days (0.69%) prior to the event date. However, there are significant positive CARs when the announcements are made by male CEOs except one day: 180 days after the event. These two results from female CEOs and male CEOs show that they are both important for firm performance. To determine the statistical significance of gender effects of CEOs, the t test is applied and the result (see Appendix B) within the event window shows insignificance between female CEOs and male CEOs. This is consistent with Kellermanns et al. (2008) and Brick, Palmon, and Wald (2006) that there is no significant effect of CEO gender on entrepreneurial behaviour, subsequent firm growth and future firm performance.

Table 21. Gender effects on equity ARs and CARs

Event Days	Capital Raising			
	Female CEO		Male CEO	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	**3.2736**	**2.1877**	**3.3897**	**13.2326**
-120	**3.7246**	**2.7307**	**2.8642**	**13.5166**
-90	**3.4530**	**2.7523**	**2.3706**	**13.4809**
-60	**2.4485**	**2.2964**	**1.9305**	**14.4001**
-30	**1.6231**	**2.8046**	**1.0688**	**13.3667**
-15	**0.6938**	**2.0108**	**0.4347**	**9.1596**
-10	0.4132	1.5956	**0.2752**	**7.9941**
-5	0.2246	1.5332	**0.1192**	**5.7563**
0	0.0101	0.1728	**0.0247**	**3.3157**
+5	0.0375	0.1608	**0.0861**	**4.0497**
+10	0.5261	1.8590	**0.1971**	**5.5480**
+15	**0.8179**	**2.1113**	**0.3276**	**6.7863**
+30	0.9414	1.4790	**0.5638**	**7.1069**
+60	1.1596	1.0832	**0.8532**	**6.6346**
+90	2.2982	1.8053	**0.9461**	**5.7551**
+120	2.2266	1.5263	**0.7967**	**4.2029**
+180	0.0876	0.0539	0.0972	0.4350

3.4.3.3.2 CEO-chairperson duality

CEOs duality occurs in 92.10% of the sample under capital raising announcement category. Table 22 provides the results between independent CEOs and CEO-chairperson duality on capital raising announcements at various windows (-180 to 180 days) from the event date. The results reported in Table 22 shows that CEOs created positive ARs whether they hold dual positions or not.

Independent CEOs generated 0.05% AR whereas CEO-chairperson duality generated 0.02% AR on capital raising announcements. In addition, Table 22 report both positive and significant t statistics for both independent CEOs and CEOs with dual positions in various windows (180 days prior to 180 days post). Moreover, both dual CEOs and independent CEOs have economically significant effects on capital raising returns, ranging between 0.12% and 4.64% before the event. The large returns from 180 days prior to the event for both dual

and independent CEOs (3.24% and 4.64%, respectively) suggests the usual information leakage observed in the event studies (Ball and Brown, 1968). This information leakage is thought to be the result of informed traders trading individual stocks. The increasing pattern of pre-announcement abnormal returns is identified in the aggregate results but not for individual stocks. Independent CEOs have some economically significant effects after the event whereas dual CEOs have continuously and economically significance between 0.08% and 1.00%. However, t test results (see Appendix C) fail to show statistical differences between CEOs who holds chairperson and independent CEOs within the event window. This evidence is contrary to Adams, Almeida, and Ferreira (2005) which advocate dual positions enable CEOs have more power on capital raising decisions compared with independent CEOs.

Table 22. Duality effects on capital raising ARs and CARs

Event Days	Capital Raising			
	Dual CEO		Independent CEO	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	**3.2414**	**12.4367**	**4.6440**	**4.7974**
-120	**2.7967**	**12.8962**	**3.4433**	**4.4084**
-90	**2.3409**	**12.9295**	**2.6078**	**4.1052**
-60	**1.9268**	**13.8515**	**1.8377**	**3.9328**
-30	**1.0763**	**13.0036**	**1.0050**	**3.6675**
-15	**0.4344**	**8.8066**	**0.4417**	**2.8391**
-10	**0.2772**	**7.7404**	**0.2595**	**2.2984**
-5	**0.1209**	**5.6342**	0.1150	1.6654
0	**0.0228**	**2.9396**	0.0474	1.9368
+5	**0.0825**	**3.6547**	0.1228	1.7479
+10	**0.2014**	**5.4533**	**0.2554**	**2.1084**
+15	**0.3288**	**6.5258**	**0.4631**	**2.9788**
+30	**0.5456**	**6.5953**	**0.8928**	**3.4756**
+60	**0.8658**	**6.4375**	0.7600	1.8568
+90	**1.0039**	**5.8651**	0.6201	1.1584
+120	**0.8635**	**4.3875**	0.3452	0.5373
+180	0.1160	0.5024	-0.1866	-0.2410

3.4.3.3.3 CEO education level

There are 9.20% CEOs have a PhD degree, 13.05% CEOs hold an MBA degree, and 47.24% CEOs graduated from master's degree in capital raising category. Table 23 shows that PhD holders and master's holders create positive ARs (-0.02% for PhD degree holders and -0.01% for master's degree holders), and MBA holders create positive ARs (0.02%). For PhD degree holders, statistical significantly CARs are found between 180 days (3.54%) to 120 days (1.82%) prior and between 60 days (1.10%) to 30 days (0.67%) prior the event. Additionally, the results show that firms with CEOs who hold PhD degrees have lower announcement returns than non-PhD degree CEOs.

Refer to Appendix D, t test results confirm that CEOs who have PhD degrees make statistically significant different capital raising decisions than other CEOs with non-PhD degrees. CEOs who holds MBA are found have significant effects from 180 days (4.37%) to 10 days (0.24%) before announcements dates and positive effects from 15 days (0.27%) to 120 days (1.06%) after the event. This implies that CEOs with MBA degrees are not only with professional knowledge but also have outstanding management skills. Consequently, capital raising made by these CEOs can be identified as activities that increasing firm value and shareholder wealth. However, we did not find evidence that CEOs who have MBA degrees make different financing decisions than CEOs with other degrees from t test results (see Appendix E).

Master's degree CEOs have significant positive CARs from 180 days (0.69%) to 30 days (0.33%) before announcements dates and from 15 days (0.13%) to 120 days (0.49%) after the event. Moreover, results in Table 23 reveal that the positive returns generated by CEOs with master's degrees are less than lower degree holders. These CEOs with master's degrees who majored in non-business disciplines may be the possible explanation for this evidence. This finding is inconsistent with prior literature that higher educated CEOs have been delivered stronger ability, more professional knowledge, better management skills, and broader networks enable CEOs to manage firms properly with

Table 23. Education effects on capital raising ARs and CARs

Event Days	PhD				MBA				Masters			
	PhD degree holders		Other degree holders		MBA degree holders		Other degree holders		Masters degree holders		Other degree holders	
	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat
-180	**3.5438**	**3.6876**	**3.5803**	**11.0610**	**4.3706**	**6.2798**	**3.2279**	**11.9451**	**0.6935**	**2.5063**	**5.7778**	**11.3926**
-120	**1.8153**	**2.2686**	**3.0347**	**11.3902**	**3.1143**	**5.2637**	**2.8325**	**12.6750**	**0.5885**	**2.6064**	**5.4309**	**13.1318**
-90	1.2074	1.8461	**2.5136**	**11.6121**	**2.5434**	**5.2241**	**2.3529**	**12.6240**	**0.6643**	**3.3284**	**4.3708**	**12.9320**
-60	**1.1018**	**2.2761**	**1.9691**	**11.9469**	**2.1807**	**6.1784**	**1.8936**	**13.1701**	**0.6510**	**4.0164**	**3.2749**	**12.7725**
-30	**0.6670**	**2.3081**	**0.9726**	**10.0229**	**1.1596**	**5.1537**	**1.0641**	**12.5883**	**0.3312**	**3.3543**	**1.7744**	**11.7513**
-15	0.3308	1.7309	**0.3937**	**6.9595**	**0.4181**	**3.1122**	**0.4381**	**8.7371**	0.0691	1.0970	**0.7839**	**8.9596**
-10	0.0600	0.4412	**0.2331**	**5.7727**	**0.2369**	**2.3613**	**0.2804**	**7.7379**	0.0127	0.2829	**0.5648**	**8.9430**
-5	0.0088	0.1060	**0.0856**	**3.6086**	0.0775	1.3736	**0.1253**	**5.6994**	-0.0534	-1.9062	**0.2920**	**7.7927**
0	-0.0232	-0.7865	0.0159	1.9104	0.0228	1.1475	**0.0245**	**3.0891**	-0.0084	-0.8658	**0.0565**	**4.0243**
+5	-0.0762	-0.9815	**0.0633**	**2.5384**	0.0588	0.9944	**0.0891**	**3.8633**	-0.0122	-0.4406	**0.2328**	**5.9183**
+10	-0.0067	-0.0533	**0.1909**	**4.5898**	0.1086	1.1240	**0.2201**	**5.8099**	0.0163	0.3636	**0.4816**	**7.3701**
+15	0.0733	0.3965	**0.3591**	**6.3581**	**0.2717**	**2.0885**	**0.3494**	**6.7798**	**0.1324**	**2.2370**	**0.6925**	**7.8342**
+30	0.2332	0.7593	**0.6128**	**6.6430**	**0.5684**	**2.6957**	**0.5739**	**6.7637**	**0.2442**	**2.4982**	**1.1552**	**7.8896**
+60	0.6244	1.3379	**1.0036**	**6.5141**	**0.9381**	**2.6718**	**0.8456**	**6.1591**	**0.4491**	**2.9261**	**1.7884**	**7.5058**
+90	0.5745	0.8905	**1.0765**	**5.3803**	**1.1048**	**2.4344**	**0.9495**	**5.4343**	**0.5337**	**2.8346**	**2.0806**	**6.6683**
+120	0.4191	0.5359	**0.8633**	**3.7042**	**1.0619**	**2.0065**	**0.7840**	**3.9000**	**0.4853**	**2.3698**	**1.8172**	**4.9408**
+180	0.0584	0.0614	0.1319	0.4859	0.6451	1.0115	0.0071	0.0303	0.0612	0.2638	0.7113	1.6413

positive returns and achieve successful firm outcomes (King, Srivastav, and Williams, 2016). Furthermore, t test results (see Appendix F) prove our argument that CEOs who have lower than master's degrees can help their firms to obtain more capital raising announcements returns than those CEOs who have higher degrees.

3.4.3.3.4 CEO location

Table 24 identifies the abnormal returns at various windows (-180 to 180 days) from the event date. Capital raising announcement made by CEOs located within Australia can generate positive AR with 0.02% for Australian firms whereas overseas CEOs created lower AR with 0.01 percent. Between various windows from 180 days (3.27%) before the announcement date to 120 days (0.82%) after the announcement date, CEOs who located locally generate statistically significant positive CARs on capital raising announcements. These significant reactions from the market indicates investors are more relied on CEOs' ability to maximize firm value through capital raising rather than CEOs' international experience. The significant results from t test (see Appendix G) confirm that CEOs have international experience or location of CEOs is a key element for Australian market and investors to consider their investment.

Table 24. Location effects on capital raising ARs and CARs

Event Days	Capital Raising			
	In Australia		Out of Australia	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	**3.2690**	**12.7641**	**6.4526**	**4.6613**
-120	**2.8035**	**13.1714**	**4.7425**	**4.2784**
-90	**2.3294**	**13.1450**	**3.7562**	**4.0679**
-60	**1.8811**	**13.8300**	**3.3545**	**5.2309**
-30	**1.0498**	**12.9875**	**1.8390**	**4.8879**
-15	**0.4248**	**8.8800**	**0.7384**	**2.9670**
-10	**0.2747**	**7.9150**	0.2759	1.4767
-5	**0.1235**	**5.9490**	-0.0093	-0.0769
0	**0.0248**	**3.2999**	0.0115	0.2853
+5	**0.0901**	**4.1176**	-0.0564	-0.5018
+10	**0.2109**	**5.8674**	0.0541	0.2949
+15	**0.3440**	**7.0388**	0.2049	0.8473
+30	**0.5805**	**7.2551**	0.3646	0.8250
+60	**0.8389**	**6.4532**	1.3923	1.9679
+90	**0.9618**	**5.8038**	1.1965	1.3124
+120	**0.8218**	**4.3042**	0.7753	0.7302
+180	0.1174	0.5236	-0.6795	-0.5303

To conclude, CEO education and CEO location are found with significant effects on capital raising announcements for firms listed on ASX. CEOs hold lower educational degrees and located within Australia generate positive capital raising announcement returns. We did not find statistically difference between female and male CEOs, and between dual and independent CEOs when they making capital raising decisions, which indicates that both female and male CEOs of listed ASX firms are equally qualified, and both dual and independent CEOs of Australian firms are equally performed.

3.4.3.4 Characteristics that affect Refinancing announcements

3.4.3.4.1 CEO gender

Table 25 presents the results between female and male CEOs on refinancing announcements. Only 2.29% female CEOs is identified in the sample. Our results show that firms with female executives have lower announcement returns (-0.03%) than those made by male

(0.01%) executive firms, which adds empirical evidence to the literature that refinancing decisions have lower announcement returns for firms with female CEOs.

Table 25. Gender effects on refinancing ARs and CARs

Event Days	Refinancing			
	Female CEO		Male CEO	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	0.9853	0.6878	-0.1136	-0.1724
-120	0.1216	0.1336	0.4222	0.7787
-90	-0.3642	-0.4261	0.2343	0.5018
-60	**-1.1535**	**-2.3131**	0.0254	0.0715
-30	-1.0752	-1.8556	0.0203	0.0842
-15	-0.7130	-1.6496	-0.1244	-0.9062
-10	-0.5558	-1.3044	-0.1217	-1.1479
-5	-0.2033	-0.8843	-0.0565	-0.8013
0	-0.0274	-0.2568	0.0110	0.4408
+5	-0.0021	-0.0083	**0.1648**	**2.6571**
+10	0.1656	0.4224	**0.3022**	**3.0351**
+15	0.2276	0.5286	**0.4699**	**3.7270**
+30	-0.3353	-0.6112	0.3975	1.8043
+60	0.3619	0.3841	0.2888	0.8439
+90	-0.3333	-0.3490	0.0649	0.1448
+120	-1.1483	-0.9724	-0.3294	-0.5957
+180	-1.9788	-1.0613	-0.3585	-0.5995

The results only show significance CARs on refinancing announcements that made by female CEOs on 60 days before the event with -1.15% whereas male CEOs show positive effects with 0.03% on the same date. In addition, there are significant positive CARs when the announcements are made by male CEOs from 5 days (0.16%) to 15 days (0.47%) after the event. To further determine the statistical significance of gender effects of CEOs, the t test is applied and the results show significance only on 30 days before the event between female CEOs and male CEOs (see Appendix B). This weak evidence adds support to Kellermanns et al. (2008) and Brick, Palmon, and Wald (2006) that there is no significant effect of CEO gender on entrepreneurial behaviour, subsequent firm growth and future firm performance.

3.4.3.4.2 CEO-chairperson duality

In refinancing announcements group, CEOs duality occurs in 84.90% of the sample. Table 26 provides the results between independent CEOs and CEO-chairperson duality on refinancing announcements at various windows (-180 to 180 days) from the event date. Independent CEOs generated -0.04% AR whereas CEO-chairperson duality generated 0.02% AR on refinancing announcements. This finding indicates that when CEOs hold chairperson position on the board, they generate positive returns for their firms than independent CEOs. From 5 days (0.20%) to 30 days (0.49%) after the announcements, there are significantly positive CARs that created by dual CEOs. This further implies that when firms announce refinancing news with CEOs who have dual positions, investors believe that dual positions on one individual narrows difference between CEOs and the board and dual CEOs do have deeper understanding of the firm and are more reliable.

However, the results from t test did not show statistical significance between CEOs who holds chairperson and independent CEOs within the event window (see Appendix C). This is inconsistent with Adams, et al. (2005) which advocate dual positions enable CEOs have more power on making decisions compared with independent CEOs.

Table 26. Duality effects on refinancing ARs and CARs

Event Days	Refinancing			
	Dual CEO		Independent CEO	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	0.1838	0.2648	-1.5556	-0.9023
-120	0.5146	0.8847	-0.0342	-0.0269
-90	0.2784	0.5512	0.0253	0.0244
-60	-0.0629	-0.1671	0.4251	0.4829
-30	-0.0041	-0.0161	0.0599	0.0907
-15	-0.1268	-0.8724	-0.1180	-0.3402
-10	-0.1030	-0.9270	-0.2252	-0.7938
-5	-0.0348	-0.4689	-0.1582	-0.8722
0	0.0219	0.8430	-0.0353	-0.5144
+5	**0.2026**	**3.2080**	-0.0799	-0.4233
+10	**0.3551**	**3.5213**	-0.0111	-0.0359
+15	**0.5568**	**4.4014**	-0.0188	-0.0475
+30	**0.4939**	**2.2745**	-0.1788	-0.2442
+60	0.5684	1.6602	-1.2235	-1.1288
+90	0.3504	0.7682	-1.6396	-1.2223
+120	0.1176	0.2108	-3.0463	-1.7979
+180	0.0427	0.0682	-2.9547	-1.8459

3.4.3.4.3 CEO education level

There are 4.03% CEOs have a PhD degree, 24.24% CEOs hold an MBA degree, and 37.63% CEOs graduated from master's degree in refinancing category. Table 27 shows that all three different measurements for CEO education level create positive ARs, with 0.10% for PhD degree holders, 0.00% for MBA holders, and 0.04% for master's holders.

For PhD degree, there are statistical significantly CARs between 180 days prior and 180 days post: 90 days (-3.99%) and 60 days (-2.57%) prior, and from 60 days (-2.45%) to 180 days (-5.13%) after the event. The reactions before and after event date from market show that for firms with CEOs who hold PhD degrees have negative returns indicate that these CEOs are with professional background and intelligent skills which should not have made worse debt issuance in the early time to make refinancing

Table 27. Education effects on refinancing ARs and CARs

Event Days	PhD				MBA				Masters			
	PhD degree holders		Other degree holders		MBA degree holders		Other degree holders		Masters degree holders		Other degree holders	
	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat
-180	-0.2055	-0.0859	0.5394	0.7664	-0.0001	0.0000	0.6673	0.8564	0.7631	0.6526	0.3563	0.4262
-120	-2.6052	-1.4886	0.8877	1.5320	0.6418	0.5438	0.7794	1.2209	1.1171	1.1634	0.5235	0.7597
-90	**-3.9941**	**-3.3673**	0.3890	0.7974	0.7121	0.6689	0.0574	0.1096	0.7372	0.9217	-0.1045	-0.1790
-60	**-2.5747**	**-3.6167**	0.0050	0.0136	0.1280	0.1678	-0.1693	-0.4181	0.2360	0.3954	-0.3011	-0.6744
-30	-1.3224	-1.6119	-0.0870	-0.3642	0.1400	0.2857	-0.2226	-0.8466	0.1374	0.3266	-0.3023	-1.1145
-15	-1.0183	-1.9358	-0.1705	-1.2623	-0.0144	-0.0496	-0.2636	-1.7924	-0.1678	-0.7197	-0.2269	-1.4426
-10	-0.6640	-1.4200	-0.1458	-1.3553	0.1206	0.4546	**-0.2556**	**-2.3275**	-0.0058	-0.0280	**-0.2637**	**-2.3333**
-5	-0.3607	-1.0129	-0.0999	-1.3833	-0.0285	-0.1495	-0.1358	-1.9000	-0.0952	-0.6427	-0.1196	-1.7069
0	0.1009	0.6588	0.0005	0.0187	0.0008	0.0121	0.0057	0.2116	0.0363	0.7421	-0.0146	-0.5114
+5	0.0698	0.2689	0.1190	1.8936	0.1607	1.0761	0.1035	1.5808	0.0963	0.8103	0.1295	1.9333
+10	-0.2745	-0.5912	**0.2259**	**2.2635**	0.2761	1.1675	0.1839	1.7528	0.1842	1.0361	0.2186	1.9151
+15	0.0623	0.1049	**0.4223**	**3.2812**	0.2639	0.8453	**0.4523**	**3.3913**	0.2309	0.9921	**0.5145**	**3.5615**
+30	-0.7664	-0.9028	0.3016	1.3887	0.2109	0.3884	0.2733	1.2418	0.1062	0.2536	0.3505	1.5519
+60	**-2.4536**	**-2.1112**	0.1962	0.5907	-0.0717	-0.0846	0.1393	0.4193	-0.4880	-0.7751	0.4378	1.2477
+90	**-4.5048**	**-2.8019**	-0.1509	-0.3528	-0.2875	-0.2895	-0.3386	-0.7478	-0.5914	-0.7900	-0.1666	-0.3368
+120	**-4.5931**	**-2.4297**	-0.6786	-1.2703	-0.4858	-0.4041	-0.9451	-1.6585	-1.1730	-1.2668	-0.6334	-1.0247
+180	**-5.1335**	**-2.6642**	-0.8134	-1.4009	0.0142	0.0119	**-1.2980**	**-2.0305**	-0.8824	-0.9735	-1.0511	-1.4583

announcements later. Results from t tests (see Appendix D) report that the findings on CEOs with PhD degrees remain significant. CEOs who holds MBA and master's degrees are found have no significant effects from 180 days before announcements dates and 180 days after the event.

There are no significantly difference between MBA holders and non-MBA holders of CEOs and no differences between master's degree holders and lower degree holders of CEOs from t tests is detected within the event window (see Appendix E and Appendix F). This result implies that using academic degrees as proxies of CEO education level may not be appropriate.

The negative effects of CEO education level indicate that CEOs with higher education level destroy their values via refinancing announcements. This may because higher educated CEOs are respected with making correct decisions and refinancing may considered as a failure of well-educated CEOs by investors.

3.4.3.4.4 CEO location

Table 28 identifies the abnormal returns at various windows (-180 to 180 days) from the event date in terms of CEO location. Between various windows from 5 days (0.16%) to 15 days (0.45%) after the announcement date, CEOs who are located locally generate statistically significant positive CARs on refinancing announcements but lower than CEOs who are located overseas. CEOs located within Australia generate positive AR with 0.01% whereas overseas CEOs create negative AR with -0.05 percent. These significant reactions from the market indicates that investors are more relied on local CEOs' ability that access more cash via refinancing. The significant results from t test (from 60 days to 30 days before) confirm the location of CEOs is a key element for Australian market and investors to consider their investment (see Appendix G). This evidence add support to Ivković and Weisbenner (2005) that investors have an informational benefit with care for local firms and a preference for local stocks.

Table 28. Location effects on refinancing ARs and CARs

Event Days	Refinancing			
	In Australia		Out of Australia	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	0.0167	0.0252	-1.9254	-0.8629
-120	0.5483	0.9981	-1.8181	-1.2087
-90	0.3542	0.7493	-2.1421	-1.6783
-60	0.1001	0.2786	**-2.0377**	**-2.2638**
-30	0.0565	0.2308	**-1.1995**	**-1.9872**
-15	-0.1235	-0.8857	-0.4371	-1.1561
-10	-0.1188	-1.1010	-0.3972	-1.4036
-5	-0.0512	-0.7152	-0.2346	-1.1919
0	0.0134	0.5279	-0.0463	-0.6647
+5	**0.1609**	**2.5396**	0.0818	0.5951
+10	**0.2830**	**2.7879**	**0.5346**	**2.2301**
+15	**0.4480**	**3.4811**	**0.7426**	**2.8334**
+30	0.3921	1.7480	0.3271	0.6133
+60	0.2947	0.8466	0.3781	0.4345
+90	0.0521	0.1142	0.0795	0.0792
+120	-0.2991	-0.5345	-1.2524	-0.7353
+180	-0.3280	-0.5431	-1.4954	-0.6978

In terms of refinancing announcements, the influence of CEO characteristics on firm performance can be summarised as: 1) CEO education and CEO location are found with significant effects on refinancing announcements for firms listed on ASX; 2) CEOs hold bachelor or lower level degrees and located within Australia generate positive refinancing announcement returns; 3) there is no statistically difference on CEO gender and CEO-chairperson duality, indicating that CEOs perform equally whether they are female or male, and whether they are holding chairperson position or not.

3.4.3.5 Characteristics that affect Bond announcements

3.4.3.5.1 CEO gender

Table 29 presents the results between female and male CEOs on bond announcements. Under this group, there are 3.73% CEOs in our sample is female which is highest percentage in all announcement categories. Our results show that firms with female executives have

higher abnormal returns (0.17%) than those made by male (0.01%) executive firms. Moreover, the significance is showed in female groups on 180 days (3.81%) before the event, from the event day (0.16%) to 15 days (1.19%), and 60 days (2.34%) after the event. The explanation of this finding could be in Australia market, male CEOs are relatively overconfident than female CEOs, and male CEOs prefer to take risky projects with lower returns than females.

To determine the statistical significance of gender effects of CEOs, the parametric t test is applied with the results showing statistically significance between female CEOs and male CEOs (see Appendix B). Female CEOs generate positive stock returns on bond announcements in Australian market whereas male CEOs show lower returns. This is contrast to Kellermanns et al. (2008) and Brick, Palmon, and Wald (2006) that there is no significant effect of CEO gender on entrepreneurial behaviour, subsequent firm growth and future firm performance. Our results provide empirical evidence on gender effects on bond announcement returns to the literature that CEO gender has impact on bond announcements.

Table 29. Gender effects on bond ARs and CARs

Event Days	Bond			
	Female CEO		Male CEO	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	**3.8131**	**2.1687**	**1.5339**	**4.3160**
-120	1.1699	0.9834	**1.3492**	**4.4924**
-90	1.6736	1.5131	**1.3501**	**4.9851**
-60	1.4060	1.6468	**1.1581**	**5.0922**
-30	0.4580	0.6660	**0.3863**	**2.5009**
-15	0.5125	1.4456	0.1774	1.7084
-10	0.2902	0.9235	**0.1777**	**2.1254**
-5	0.1999	1.1546	**0.1095**	**2.8007**
0	**0.1661**	**2.6028**	0.0057	0.3377
+5	**0.4521**	**2.2425**	0.0410	0.9423
+10	**0.6872**	**2.0196**	**0.1463**	**2.1188**
+15	**1.1896**	**2.8561**	**0.2030**	**2.3140**
+30	1.3316	1.8319	**0.5217**	**3.3594**
+60	**2.3379**	**2.1947**	**1.1421**	**4.7173**
+90	1.2058	1.1672	**1.5262**	**5.4992**
+120	0.6223	0.5468	**1.5540**	**4.8880**
+180	0.2064	0.1745	**1.5687**	**4.0844**

3.4.3.5.2 CEO-chairperson duality

In our sample, there are 77.91% CEOs are holding the chairperson position simultaneously. Table 30 provides the results between independent CEOs and CEO-chairperson duality on bond announcements at various windows (-180 to 180 days) from the event date. The results reported in Table 26 shows that dual CEOs generate higher positive AR (0.01%) than independent CEOs (0.00%). In addition, except for the event date, dual CEO created positive and higher CARs than independent CEO in the event window. This positive stock returns on bond announcements by dual CEOs is may because they have higher reputation in the industry and attract more attentions from investors. This finding is consistent with Adams, Almeida, and Ferreira (2005) and indicate that dual positions of chairman and CEO strengthen their power on strategic decision making which indicates that CEO has more discretion in the firms, and they prefer to maximize their own benefits which ultimately maximize shareholder wealth.

The parametric t test results (see Appendix C) also confirm the statistical significance between CEOs who holds chairperson and independent CEOs and indicate that powerful CEOs could translate their characteristics more directly into firm outcomes.

Table 30. Duality effects on bond ARs and CARs

Event Days	Bond			
	Dual CEO		Independent CEO	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	**1.8563**	**4.8001**	0.7820	0.9880
-120	**1.5908**	**4.8896**	0.4670	0.7119
-90	**1.6071**	**5.4391**	0.4981	0.8600
-60	**1.3752**	**5.7176**	0.4342	0.8222
-30	**0.5078**	**3.2019**	-0.0299	-0.0766
-15	**0.2875**	**2.7326**	-0.1544	-0.5847
-10	**0.2395**	**2.8950**	-0.0214	-0.0955
-5	**0.1607**	**3.7054**	-0.0560	-0.7100
0	0.0139	0.7527	0.0041	0.1099
+5	**0.1218**	**2.6096**	-0.1744	-1.7616
+10	**0.2785**	**3.8222**	-0.2288	-1.3995
+15	**0.3824**	**4.0193**	-0.2629	-1.3585
+30	**0.7741**	**4.5630**	-0.2317	-0.6972
+60	**1.4935**	**5.5426**	0.1046	0.2164
+90	**1.4706**	**4.8628**	**1.6681**	**2.7976**
+120	**1.3784**	**3.9748**	**2.0160**	**2.9739**
+180	**1.2281**	**2.9861**	**2.5398**	**2.9717**

3.4.3.5.3 CEO education level

7.64% CEOs have PhD degrees, 20.81% hold MBA degrees, and 41.30% are with master's degrees in bond category. Table 31 shows that all three different measurements for CEO education level can create positive ARs, 0.07% for PhD degree holders, 0.05% for MBA holders, and 0.06% for master's holders. For PhD degree, it shows statistical significantly CARs only on 90 days after the event (2.38%) and higher than CEOs with non-PhD degrees. This indicates that firms managed by CEOs with PhD degree obtain higher returns than other CEOs which further support the idea that higher educated CEOs have been delivered stronger ability, more professional knowledge, better management skills, and broader networks enable CEOs to manage firms properly with positive returns and achieve successful firm outcomes (King, et al., 2016). Refer to Appendix D, there are statistically significant difference between CEOs who hold PhD degrees and other degree holders.

CEOs who holds MBA are found have significantly positive effects from 5 days (0.27%) to 180 days (2.16%) after the event and higher than non-MBA holders. This implies that CEOs with MBA degrees are with professional knowledge and outstanding management skills, which bond decisions made by these CEOs can be identified as increasing firm value and shareholder wealth. The parametric t tests (see Appendix E) show that the results of MBA degree holders remain significant.

Table 31 further reports the significant positive stock returns for CEOs who have master's graduation on the event date (0.06%), 5 days (0.15%), and from 60 days (0.94%) to 180 days (1.78%) after the event. These positive effects of CEO education level with parametric t tests for statistically difference between degree holders and lower degree holders revealed (see details in Appendix F) indicate that CEOs with a master's level creates higher abnormal returns than other CEOs with lower degrees. This adds support to King, et al. (2016) that higher educated CEOs have been delivered stronger ability, more professional knowledge, better management skills, and broader networks enable CEOs to manage firms properly with positive returns and achieve successful firm outcomes.

The positive effects of CEO education level indicate that CEOs with higher education level obtain returns via bond announcements. This implies that higher educated CEOs are more capable to achieve higher firm performance.

Table 31. Education effects on bond ARs and CARs

Event Days	PhD				MBA				Masters			
	PhD degree holders		Other degree holders		MBA degree holders		Other degree holders		Master degree holders		Other degree holders	
	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat
-180	0.4721	0.4716	**1.6493**	**4.3542**	0.6738	0.8139	**1.6943**	**4.3077**	0.9425	1.8132	**1.9933**	**4.0892**
-120	-0.2083	-0.2149	**1.2990**	**4.1411**	0.3115	0.5410	**1.2828**	**3.7971**	0.3601	0.8316	**1.7634**	**4.3387**
-90	0.4836	0.4616	**1.3588**	**4.7684**	0.8938	1.5324	**1.2826**	**4.1832**	0.6700	1.5762	**1.7295**	**4.8127**
-60	0.2418	0.2486	**1.1760**	**4.9755**	0.5597	1.1974	**1.1587**	**4.4773**	0.5002	1.4599	**1.5299**	**4.9559**
-30	0.2129	0.2558	**0.3143**	**1.9832**	0.3973	1.2305	0.2537	1.3973	0.1525	0.6011	**0.4149**	**2.0252**
-15	0.1449	0.2233	0.1536	1.5030	0.2245	1.0236	0.1203	0.9921	0.0000	-0.0001	0.2606	1.9746
-10	0.4511	0.7874	0.1394	1.7325	0.1337	0.8319	0.1719	1.7112	0.0870	0.6076	**0.2168**	**2.0270**
-5	0.1683	1.1705	**0.0879**	**2.1379**	0.1642	1.6689	0.0735	1.7175	0.0889	1.3560	**0.0976**	**1.9899**
0	0.0687	1.1947	0.0059	0.3211	0.0479	1.2205	0.0005	0.0256	**0.0569**	**2.2548**	-0.0218	-0.9148
+5	0.0095	0.0771	0.0742	1.5634	**0.2678**	**2.4886**	0.0073	0.1503	**0.1529**	**2.1218**	0.0104	0.1822
+10	-0.2672	-1.0431	**0.2237**	**3.0389**	**0.5035**	**2.7688**	0.0948	1.2631	0.2293	1.9213	0.1559	1.7939
+15	-0.4019	-1.2191	**0.3166**	**3.3978**	**0.5139**	**2.1205**	**0.1940**	**2.0693**	0.1682	1.0549	**0.3275**	**3.1380**
+30	0.6177	0.7268	**0.5744**	**3.6297**	**0.8175**	**2.1131**	**0.5084**	**2.9155**	0.4494	1.6162	**0.6679**	**3.5250**
+60	1.5623	1.7507	**1.2141**	**4.6911**	**1.5266**	**2.4118**	**1.1478**	**4.3145**	**0.9444**	**2.3987**	**1.4492**	**4.5303**
+90	**2.3829**	**2.9340**	**1.4145**	**4.7851**	**1.6226**	**2.4065**	**1.4409**	**4.7180**	**1.1585**	**2.7239**	**1.7207**	**4.6336**
+120	1.6894	1.8004	**1.4888**	**4.3434**	**1.8846**	**2.3924**	**1.3858**	**3.9268**	**1.2549**	**2.5067**	**1.6795**	**3.9419**
+180	2.2665	1.8151	**1.5274**	**3.7155**	**2.1611**	**2.4714**	**1.4385**	**3.2927**	**1.7824**	**3.1038**	**1.4443**	**2.7217**

3.4.3.5.4 CEO location

Table 32 identifies the abnormal returns within various windows (-180 to 180 days) from the event date. It shows the CEOs located within Australia can generate positive AR with 0.03% whereas overseas CEOs create negative AR with -0.03 percent. This evidence adds support to Ivković and Weisbenner (2005) that investors in Australia have an informational benefit with care for local firms and a preference for local stocks.

Between various window, CEOs who located in Australia generate statistically significant positive and higher CARs before and after the bond announcements except for the event date. This indicates that investors in Australia are more relying on local CEOs instead of CEOs who have international working experience. The significant results from parametric t tests (see Appendix G) confirm the location of CEOs is a key element for Australian market and investors to consider their investment.

Table 32. Location effects on bond ARs and CARs

Event Days	Bond			
	In Australia		Out of Australia	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	**1.0962**	**2.7093**	**2.9794**	**4.4112**
-120	**1.1397**	**3.2605**	**1.8704**	**3.5289**
-90	**1.3438**	**4.1961**	**1.4099**	**3.0789**
-60	**1.1209**	**4.2118**	**1.2881**	**3.2669**
-30	**0.3830**	**2.0833**	0.4045	1.5676
-15	**0.2822**	**2.2368**	-0.0504	-0.3269
-10	**0.2469**	**2.3877**	0.0127	0.1101
-5	**0.1614**	**3.4343**	-0.0135	-0.2185
0	0.0284	1.3965	-0.0317	-1.1659
+5	**0.1131**	**2.2706**	-0.0913	-1.1177
+10	**0.2130**	**2.6757**	0.0452	0.3515
+15	**0.2946**	**2.9156**	0.0974	0.5913
+30	**0.6500**	**3.4284**	0.2967	1.2523
+60	**1.3750**	**4.6930**	0.6967	1.8404
+90	**1.6631**	**5.0154**	**1.1269**	**2.5204**
+120	**1.6074**	**4.2562**	**1.2900**	**2.4671**
+180	**1.6594**	**3.6728**	1.1495	1.7798

Bond announcements category as a compound group for debt, equity and refinancing performs different results with CEO characteristics. CEO gender, CEO-chairperson duality, CEO education, and CEO location are all demonstrated with significant effects on bond announcements for firms listed on ASX. Female CEOs, CEOs with dual positions, hold master's level degrees (including MBA degree), and located within Australia generate positive bond announcement returns.

3.4.3.6 Characteristics that affect Loan announcements

3.4.3.6.1 CEO gender

In this section, there are 6.53% loan announcements are made by female CEOs in Australia stock market. Table 33 presents the results between female and male CEOs on loan related announcements. Our results show that firms with female executives have lower announcement returns (-0.04%) than those made by male (0.02%) executive firms. This indicates Australian market may have bias towards gender, as positive abnormal returns for male and negative abnormal returns for female. Another explanation is that female executives in Australia are relatively risk adverse compare to male executives, they make worse decisions which can be identified by the board. It also could be due to the number of qualified female executives plays a small portion.

Parametric t test results show that there are no statistically significant for CARs in various windows and there is no gender difference. This result is consistent with Kellermanns et al. (2008) and Brick, Palmon, and Wald (2006) that there is no significant effect of CEO gender on entrepreneurial behaviour, subsequent firm growth and future firm performance.

Table 33. Gender effects on loan ARs and CARs

Event Days	Loan			
	Female CEO		Male CEO	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	1.0824	0.6052	0.7131	1.4664
-120	1.2127	0.8069	0.4290	1.0795
-90	1.8749	1.4829	0.2963	0.8536
-60	1.8262	1.9715	0.1837	0.6619
-30	0.3336	0.5995	-0.0441	-0.2662
-15	0.0106	0.0285	-0.0895	-0.8537
-10	-0.1751	-0.6659	-0.1059	-1.3288
-5	-0.0474	-0.2856	-0.0482	-1.0301
0	-0.0430	-0.8023	0.0153	0.8410
+5	-0.0951	-0.5877	0.0315	0.6826
+10	-0.0589	-0.2328	0.0232	0.3029
+15	0.2142	0.6066	0.0163	0.1615
+30	0.3291	0.5408	-0.1547	-0.9279
+60	0.3591	0.3666	0.0136	0.0493
+90	0.9347	0.8918	0.2361	0.7102
+120	1.3918	1.1871	0.1105	0.2835
+180	1.1155	0.8097	-0.1161	-0.2287

3.4.3.6.2 CEO-chairperson duality

Under loan category, there are 92.05% CEOs are holding the chairperson position simultaneously. The results between independent CEOs and CEO-chairperson duality on loan announcements at various windows (-180 to 180 days) from the event date are presented in Table 34. Dual CEOs generate lower positive AR (0.00%) than independent CEOs (0.05%). In addition, significance of t statistics on independent CEO created positive CARs only on the 5 days (0.25%) after the event. The only statistically significant result of independent CEOs generate higher loan announcement returns than dual CEOs which are contrary to Adams, et al. (2005) and indicate that powerful CEOs with dual positions generate higher returns for firms than independent CEOs. The parametric t test results (see details in Appendix C) fail to show statistical significance between CEOs who holds chairperson and independent CEOs.

Table 34. Duality effects on loan ARs and CARs

Event Days	Loan			
	Dual CEO		Independent CEO	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	0.7045	1.4529	1.2510	0.7079
-120	0.4611	1.1646	0.7284	0.4901
-90	0.3710	1.0693	0.7170	0.5798
-60	0.2429	0.8801	0.8160	0.8268
-30	-0.0158	-0.0952	-0.1316	-0.2492
-15	-0.0890	-0.8343	-0.0698	-0.2439
-10	-0.1041	-1.2948	-0.2173	-0.9422
-5	-0.0473	-1.0027	-0.0784	-0.5300
0	0.0071	0.3912	0.0488	0.7969
+5	-0.0001	-0.0019	**0.2451**	**1.9924**
+10	-0.0162	-0.2092	0.3418	1.5828
+15	0.0097	0.0940	0.1453	0.5601
+30	-0.1457	-0.8524	-0.1086	-0.2557
+60	0.0525	0.1863	-0.4259	-0.5881
+90	0.3520	1.0478	-0.8110	-0.8925
+120	0.3017	0.7704	-1.3651	-1.2096
+180	0.1438	0.2847	-2.4076	-1.5192

3.4.3.6.3 CEO education level

In loan announcement category, 7.64% of CEOs have PhD degrees, 20.81% hold MBA degrees, and 41.30% are with master's degrees. Table 35 shows that three different measurements for CEO education level create different ARs, 0.13% for PhD degree holders, -0.04% for MBA holders, and -0.03% for master's holders. For PhD degree, it shows statistical significantly CARs from 60 days (-2.22%) to 30 days (-1.59%) prior the event, on the announcement date (0.13%), and from 90 days (-3.15%) to 180 days (-4.45%) after the event. Furthermore, the parametric t tests (see Appendix D) show statistically significant differences between CEOs with PhD degrees and non-PhD degree CEOs. The mixed results indicate that PhD degree for CEOs may not be the most appropriate proxy for education level or could be measured with annual data.

Table 35. Education effects on loan ARs and CARs

Event Days	PhD				MBA				Masters			
	PhD degree holders		Other degree holders		MBA degree holders		Other degree holders		Master degree holders		Other degree holders	
	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat	CAR (%)	t-stat
-180	-3.4524	-1.9630	0.4089	0.7780	-0.5156	-0.3976	0.3168	0.5822	-0.8542	-0.9845	0.8581	1.4197
-120	-1.1423	-1.0229	-0.0098	-0.0220	-0.7400	-0.7171	0.0841	0.1848	-0.5468	-0.8381	0.2718	0.5032
-90	-1.4075	-1.3723	0.0053	0.0136	-0.8438	-0.9060	0.0746	0.1869	-0.6233	-1.0657	0.2805	0.5953
-60	**-2.2158**	**-2.4105**	-0.0082	-0.0263	-0.3302	-0.4385	-0.1294	-0.4003	-0.6298	-1.3388	0.1447	0.3780
-30	**-1.5871**	**-2.7744**	-0.1594	-0.8649	-0.2487	-0.5436	-0.2646	-1.3979	-0.5410	-1.8643	-0.0781	-0.3574
-15	-0.7414	-1.8569	-0.1155	-0.9811	-0.1896	-0.6152	-0.1675	-1.3917	-0.3228	-1.6556	-0.0712	-0.5254
-10	-0.4886	-1.5881	-0.1330	-1.4873	-0.0466	-0.1943	-0.1783	-1.9602	-0.2193	-1.4690	-0.1150	-1.1191
-5	-0.1054	-0.6286	-0.0647	-1.2101	0.1695	1.3015	**-0.1092**	**-1.9844**	-0.0268	-0.3065	-0.0864	-1.4011
0	**0.1269**	**2.8951**	-0.0095	-0.4538	-0.0430	-0.8884	0.0152	0.7063	-0.0291	-0.8169	0.0283	1.2544
+5	-0.1316	-0.6816	-0.0230	-0.4472	0.0085	0.0676	-0.0431	-0.7954	-0.1181	-1.3977	0.0205	0.3379
+10	-0.2809	-1.1094	-0.0347	-0.4136	-0.0004	-0.0021	-0.0910	-1.0537	-0.1215	-0.9058	-0.0459	-0.4687
+15	-0.6036	-1.6278	-0.0190	-0.1728	0.1275	0.4710	-0.1410	-1.2386	-0.0965	-0.5274	-0.0961	-0.7630
+30	-1.0294	-1.5745	-0.1971	-1.0754	-0.1232	-0.2932	-0.3494	-1.8165	-0.4279	-1.4069	-0.2352	-1.1206
+60	-2.1759	-1.7455	0.1348	0.4576	0.9145	1.3683	-0.2946	-0.9239	-0.4118	-0.8075	0.1169	0.3431
+90	**-3.1561**	**-2.3950**	0.4986	1.3905	**1.7485**	**2.0839**	-0.1238	-0.3287	-0.1163	-0.1907	0.3889	0.9572
+120	**-3.7211**	**-3.0775**	0.3912	0.9102	1.6069	1.5627	-0.1867	-0.4233	-0.1855	-0.2682	0.3083	0.6213
+180	**-4.4531**	**-2.6360**	0.1315	0.2341	1.3450	0.9127	-0.4464	-0.7913	-0.6143	-0.6741	0.1595	0.2478

CEOs who hold MBA are found to have significantly positive effect only on 90 days (1.75%) after the event. This significance is remained after the parametric t tests (see Appendix E), and this effect implies that CEOs with MBA degrees are with professional knowledge and outstanding management skills, which bond decisions made by these CEOs can be identified as increasing firm value and shareholder wealth.

Parametric t test results (see Appendix F) show that there are no statistically significant for CARs in various windows and there is no education difference between master's degree holders and lower degree holders. This result is inconsistent with King, et al. (2016) that higher educated CEOs have been delivered stronger ability, more professional knowledge, better management skills, and broader networks enable CEOs to manage firms properly with positive returns and achieve successful firm outcomes.

3.4.3.6.4 CEO location

Table 36 identifies the abnormal returns at various windows (-180 to 180 days) from the event date. It shows the CEOs located within Australia that generate positive AR with 0.01% whereas overseas CEOs created lower AR with 0.006%. This is consistent with Ivković and Weisbenner (2005) that investors in Australia have an informational benefit with care for local firms and a preference for local stocks, but our result is contrary to Hermann and Datta (2002) that CEOs with international networks or international experience may improve post-succession organizational performance.

Between various windows from 10 days (-0.59%) to 5 days (-0.32%) before the announcement date, CEOs who located overseas generate statistically significant negative and lower CARs on bond announcements. The results from parametric t tests (see Appendix G) confirm that firms managed by CEOs with international experience have lower returns than other CEOs. In addition, our results imply that the location of CEOs is a key element for Australian market and investors to consider their investment.

Table 36. Location effects on loan ARs and CARs

Event Days	Loan			
	In Australia		Out of Australia	
	CAR (%)	t-stat	CAR (%)	t-stat
-180	0.7923	1.6042	-0.1513	-0.1024
-120	0.6132	1.5352	-1.2672	-0.9218
-90	0.5492	1.5763	-1.4403	-1.2255
-60	0.4013	1.4465	-1.0918	-1.1738
-30	0.0544	0.3288	-1.0115	-1.7992
-15	-0.0441	-0.4164	-0.6084	-1.8689
-10	-0.0723	-0.9079	**-0.5895**	**-2.2619**
-5	-0.0260	-0.5560	**-0.3246**	**-2.0328**
0	0.0108	0.6006	0.0060	0.0925
+5	0.0383	0.8384	-0.1769	-1.0354
+10	0.0313	0.4093	-0.1931	-0.7496
+15	0.0611	0.6059	-0.4016	-1.2000
+30	-0.1021	-0.6063	-0.5382	-0.9998
+60	-0.0064	-0.0232	0.2934	0.3251
+90	0.2473	0.7527	0.5398	0.4478
+120	0.1246	0.3271	0.7910	0.5255
+180	-0.1903	-0.3832	1.5199	0.8096

CEO characteristics perform different results on loan related announcements which are considered by researchers as special and unique financing source. From our results, CEO education level and CEO location have significant effects on loan announcements. CEOs with MBA degrees and located within Australia create positive stock returns. We did not find significant CEO gender and CEO-chairperson duality for making loan decisions.

Event study method through AR and CAR analysis for CEO characteristics on six types of debt and equity related announcements are applied in this section. Table 37 summarize the findings of whether CEO characteristics have effects on these announcements. CEO gender as first demographic characteristic plays important roles in equity and bond related announcements. CEO-chairperson duality does have effects

on firm outcomes through bond related announcements returns analysis. CEO education level and CEO location are two significant characteristics that we find significant findings in all six categories announcements, in particular MBA degree as a proxy for CEO education level. Our findings from CAR analysis suggest that CEO characteristics do have impacts on firm performance to a certain degree. It also suggests that MBA degree and based locally are two core requirements for firms hiring CEOs.

Table 37. CEO characteristics results with CAR analysis

	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
CEO Gender	No	Yes	No	No	Yes	No
CEO-chairperson Duality	No	No	No	No	Yes	No
CEO Education level	Yes	Yes	Yes	Yes	Yes	Yes
CEO Location	Yes	Yes	Yes	Yes	Yes	Yes

Female CEOs exert a significantly positive impact on equity and bond announcements throughout the event window. Similar to the panel regression results, firms managed by female CEOs have higher bond announcement returns than male CEOs. This finding indicates that the gender of CEOs does make a significant difference regarding equity and bond decisions. In addition, the market interprets equity and bond decisions made by firms with female CEOs much more favourably than male CEOs. In other words, these results indicate that bond offerings are better received if the firm has a female CEO compared to a male CEO. These positive results on gender effects indicate that female CEOs are more likely to issue equity and are risk adverse.

Moreover, we find that CEO-chairperson duality has significantly positive effects on bond announcement returns which indicate that firms with independent CEOs are more likely to obtain positive returns than CEOs who also hold chairperson position. These results are consistent with Ruigrok et al. (2006), who report a negative correlation between CEO duality and board involvement in strategic decision-making. This finding adds empirical evidence to our panel regression results which shows CEO-chairperson

duality has significant effects on equity and capital raising announcement returns.

Distinct from results reported in precious sections (Section 3.4.1 and Section 3.4.2), the PhD effect exerts negative and significant abnormal returns on capital raising announcements. This finding fails to support Carpenter (2002) and Lin et al. (2011) who demonstrate that educational background and functional background are positively and significantly related to firm international strategy and firms' research and development activities. Furthermore, the PhD dummy exerts significant effects on debt and refinancing announcements in this section. The PhD dummy shows significant effects on all six categories of announcements in our sample. For the MBA dummy, we find opposite results with previous sections that firms managed by CEOs with MBA degrees have positive returns on debt announcements whereas previous sections show negative effects on debt announcements. Results from CAR comparisons show that firms lead by CEOs with MBA degrees have significantly positive returns on debt, bond, and loan announcements. For the Masters dummy, the results are the same as the panel regressions. In addition, the Masters dummy also shows significant effects on equity, capital raising, and bond announcements. To summarize, CEOs with higher educational level make statistically different corporate financing decisions compared to CEOs with lower education level, particularly regarding debt, equity, capital raising, bond, and loan related decisions. In addition, the market interprets debt, equity, capital raising, and bond decisions that are made by firms with CEOs with higher academic degrees more favourably than other CEOs, whereas the market views refinancing and loan decisions made by firms with lower academic degrees to be more value increasing on average than those made by CEOs with higher degrees. Overall, CEOs' educational level has a significant impact on firms' performance in terms of financing announcements.

Prior results in Section 3.4.1 and Section 3.4.2 demonstrated that the location dummy has negative and significant effects on capital raising decisions. Results in this section however provide a different result in that CEOs who are located overseas create positive returns on all six categories of financing decisions (debt, equity, capital raising, refinancing, bond, and loan). This positive association suggests that investors in Australia have an informational benefit with care for local firms and a preference for

local stocks (Ivković and Weisbenner, 2005).

Section 3.4.3 applies the event study method utilizing AR and CAR analysis for CEO characteristics on six types of debt and equity related announcements. The results suggest that CEO characteristics impact on firm performance to a certain degree. Having a higher academic degree and being based within Australia might be two core requirements for firms hiring CEOs. Furthermore, the positions of CEO and chairperson of the board should be separated based on our results. The inconsistent direction of the impact for each variable may be because each type of announcement receives different reactions from the market (Table 3, Table 9, and Table 37). In addition, analysing single variables rather than considering multiple variables on announcement returns may lead to inconsistent findings. On the other hand, single variable effects on different types of announcements enable us to understand CEO characteristics more comprehensively.

3.5 Conclusion

This chapter presents the methods and empirical results used in this thesis to investigate the relationship between CEO characteristics and firm performance via a range of financing announcements in Australian markets. We first conduct panel regressions with firm-level control variables that use CARs of firms over 180 trading days prior and post as our dependent variable, and CEO characteristics as independent dummy variables. Generally, CEO characteristics have a stronger impact on debt, equity, capital raising, refinancing, and loan decisions rather than bond announcement returns. Moreover, the empirical results demonstrate that two of the CEO characteristics in our analysis are dominant factors for examining managerial effects on firm performance, namely CEO-chairperson duality and CEO education level. When CEOs also hold the chairperson position, our results indicate that centralized decision-making power constrains board engagement, enabling the CEO to pursue their own interests instead of targeting high performance. The educational effects imply that equity and capital raising decisions made by CEOs who have PhD degrees are more favourable than CEOs who have other educational levels, and loan decisions made by CEOs who have Masters

degrees are more favourable than CEOs who have lower education degrees, whereas debt decisions made by CEOs who have MBA degrees are less favourable than CEOs who have non-MBA degrees. Other two CEO characteristics, CEO gender and CEO location, are failed to show significance on any types of announcements in our sample. This indicate that CEO gender and CEO location do not affect entrepreneurial behaviour and subsequent firm growth.

Regression results including only CEO characteristics reveal that all of the CEO characteristics in our analysis are dominant factors for examining managerial effects on firm performance, namely CEO gender, CEO-chairperson duality, CEO education level, and CEO location. The gender dummy is significantly positive in bond announcements, which adds evidence to gender effects on firm performance. Female CEOs generate positive announcement returns on bond decisions that outperform their male counterparts, and female CEOs are better received in the Australian market when making bond decisions. Negative effects of CEO duality support the agency theory, whereby combined roles of CEO and chairman may reduce the monitoring function of the board and increase the likelihood of bankruptcy (Daily and Dalton, 1994; Krause et al., 2014). The PhD dummy is negatively associated with refinancing and loan announcement returns. Moreover, our results show that firms led by CEOs with MBA degrees or Masters degrees achieve statistically better performance than firms headed by CEOs with non-MBA degrees or lower education degrees. This contributes to the literature that states there are no significant differences between MBA CEOs and non-MBA CEOs (Huang and Kisgen, 2013). In addition, this finding shows that MBA candidates, with their mandatory two years of working experience, are able to apply their knowledge more efficiently to practical work than other degree graduates.

Expanding on the regression results, this study adopts the event study methodology to measure the effects of CEO characteristics on firm performance. The results indicate that all of CEO characteristics in our sample, namely CEO gender, CEO-chairperson duality, CEO education level, and CEO location exert important effects on stock returns.

The results of this study add support to the argument that CEO characteristics play a significant role on firm outcomes in the Australian market. The findings on CEO characteristics have important implications for board members and human resource departments investigating the efficiency and fairness of CEOs. The efficiency of CEOs contains a number of aspects, such as accept that conflict is part of their job, align their agenda with the company's priorities and understand how their behaviour drives the firm. Fairness of CEOs usually means fair CEO compensation and gender diversity. The efficiency and fairness of CEOs are directed to their organisations (enable each part of the organisation to function better), board members (improve the board's effectiveness by ensuring that new members complete a thorough onboarding program and creating opportunities for the board to learn about topics like changing technology, emerging risks, rising competitors, and shifting macroeconomic scenarios), employees or staffs members (connect with staff, identify and eliminate work obstacles) and CEOs themselves (reputation and compensation).

Chapter 4: Empirical Study 2

4.1 Introduction

This chapter empirically examines how research and development expenses vary for Australian firms based on CEO demographic factors. Drawing on UET and the findings of Chapter 3, this research considers four key CEO demographic characteristics: CEO gender, CEO duality, CEO education level, and the location of the CEO. Relevant data are obtained from MorningStar, annual reports, Bloomberg, and Linkedin.

In today's rapidly changing world, investing in innovation is parallel with holding options for the future (Daellenbach et al., 1999). To put it another way, firm innovation is necessary for profitability, long-term survival, and growth (Classen et al., 2012). CEOs are usually the central strategic decision maker and even control the top strategy-making group (Zahra and Pearce, 1989). R&D expenditure (as an input to the innovation process) is one of the most important strategic decisions made by CEOs or top managers, potentially leading to future competitive advantage, productivity, and higher firm performance (Ettlie, 1998; Barker and Mueller, 2002; Grant, 2002; Chen and Hsu, 2009).

The objective of this study is to examine the effects of different CEO demographic factors on R&D expenditure on the Australian stock markets. This is an important issue, given that the level of CEOs' leadership and social capital they have built is closely connected with firm innovation. Firm innovation involves R&D expenditure as an input, which is largely controlled by the CEO; in contrast, the financial results from earnings can be considered as an output of innovation. Moreover, R&D-driven innovation has been considered as the primary engine for global economic growth (Feldman and Link, 2001; Guellec and Potterie 2004; Chen et al., 2015).

To examine the reaction of R&D expenditure to CEO gender, CEO-chairperson duality, education level of CEOs, and location of CEOs, panel regression models and Tobit regression models are used to investigate the effect of CEO demographic factors on R&D expenditure. The results demonstrate the strong impact of CEO characteristics on firm innovation, especially in specific industries. Generally, the empirical results demonstrate that CEO gender and CEO educational level have stronger impacts on R&D expenditure compared to CEO-chairman duality and CEO location. Firms managed by female CEOs have higher R&D expenditure than male CEOs regardless of education proxy. The educational effects imply that CEOs who have PhD degrees or MBA degrees have significantly positive effects on R&D spending in panel regression and Tobit regressions. This implies that firms with CEOs who hold PhD degrees or MBA degrees are more likely to engage in R&D activities and in turn have greater R&D expenditure.

Earlier studies report that not only high-technology firms but also firms in traditional industries have high R&D expenditure to improve their competitiveness. This study conducts both panel regression models and Tobit regression models to test whether CEOs with different characteristics make significantly different R&D investments in different industries.

The overall gender effect does not show up for all ten industries but is seen in basic materials and health care industries. Similarly, the PhD effect does not show up in all industries but is present in basic materials, consumer goods, financials, and industrials industries. Other CEO characteristics appear to be of importance for some industries, such as the MBA dummy for basic materials, consumer goods, consumer services, health care, and telecommunications industries; the Masters dummy for basic materials, consumer goods, consumer services, and telecommunications industries; CEO-chairman duality for consumer services, financials, technology, and telecommunications industries; and CEO location for health care and technology industries.

The remainder of this chapter is organised as follows. Section 4.2 reviews firm innovation and R&D, and Section 4.3 presents the research data, methodology, and robustness tests. Section 4.4 discusses the empirical results and implications, and Section 4.5 concludes.

4.2 Literature review

Researchers are increasingly interested in the topics of entrepreneurship and open innovation (refer to Chapter 2 for more detail). A handful of studies have empirically examined the relationship between CEO characteristics and firm innovation or R&D spending. Thomas et al. (1991) were one of the first studies to demonstrate the association between CEOs and firm innovation strategies. They find that younger and more educated CEOs with marketing and R&D functional backgrounds are more likely to be hired in firms that follow market innovation strategies in the computer industry (Thomas et al., 1991). Daellenbach et al. (1999) examine the relationship between the commitment to innovation (or R&D spending) and characteristics of top management teams and CEOs. They reveal a significantly positive relationship between R&D expenditure and technically oriented CEOs or top executives, indicating that firms willing to strengthen their innovation strategy should hire CEOs or top executives with technical backgrounds and working experience (Daellenbach et al., 1999). Barker and Mueller (2002) extend the work of Daellenbach et al. (1999), finding that CEO characteristics play a significant role in firm R&D expenditure, even when controlling for corporate strategy and ownership structure. They find that R&D expenditure is higher in firms with CEOs that are younger, have more investment in firm stock, and have greater professional experience in marketing/R&D/engineering (Barker and Mueller, 2002).

Furthermore, longer CEO tenure is related to an increase in R&D expenditure, indicating that CEOs may shape R&D expenditure to match their own preferences over time. More recently, Lin et al. (2011) investigated the impacts of CEO characteristics on firms' innovation efforts in the Chinese context, finding that CEO education level, professional background, and political connections have positive impacts on firms'

R&D activities. This indicates that well-designed CEO incentive schemes contribute to increased R&D activities and promote competitiveness and performance of firms in the long term (Lin et al., 2011). However, on the contrary, Custodio and Metzger (2014) and Benmelech and Frydman (2015) demonstrate that CEOs with a financial background (i.e. financial expert CEOs) or with military experience invest less in R&D and produce less innovation.

CEO-chairperson duality or separation of CEO and chair positions are important elements for R&D strategy. In their investigation of the relationships among family ownership, CEO duality, and R&D investment in Taiwanese electronic firms, Chen and Hsu (2009) demonstrate that the mutual effect of family ownership and CEO duality ratio is negatively correlated with R&D investment. Zona et al. (2013) examine how board composition affects firm innovation, demonstrating that the effect of the outside board ratio on R&D expenditure is positively moderated by firm size, whereas the impact of board demographic diversity (measured from CEO's responses in five different dimensions: functional background, industry background, education background, age, and personality and values) on R&D expenditure is negatively moderated by firm size. From another perspective, Fahlenbrach (2009) demonstrates that founder CEO firms invest more in R&D expenditures than non-founder CEO firms. More recently, Ahn et al. (2017) and Nuruzzaman et al. (2019) demonstrate that CEOs' positive attitude and education impact open innovation, which is considered to constitute an important firm decision, and CEO characteristics in turn have impacts on subsidiary innovation.

Nevertheless, there are several limitations regarding the existing literature. First, the majority of prior studies investigate the US (Thomas et al., 1991; Barker and Mueller, 2002; Fahlenbrach, 2009; Custodio and Metzger, 2014; Benmelech and Frydman, 2015), European countries (Classen et al., 2012; Zona et al., 2013; Nuruzzaman et al., 2019), and China (Lin et al., 2011; Wei and Ling, 2015). There is a lack of Australian evidence regarding the association between R&D spending and CEO characteristics. Research has shown that Australian firms vary in terms of ownership concentration compared with the US (Monem, 2013).

In addition, prior studies are mainly based on within-industries firms; this restricts the generalizability of their findings and implications. Prior research has shown that variations in CEO characteristics are explained proportionally by industry conditions, and industry product differentiation and industry growth rate are significantly linked to CEO successor characteristics (Rajagopalan and Datta, 1996; Datta and Rajagopalan, 1998). Additionally, Hambrick et al. (1992) reveal that firms with higher R&D expenditure in high-technology industries are led by CEOs with different characteristics compared with firms in low-technology industries. Hence, industry idiosyncrasies behind broader patterns of industry interactions are reflected by within-industry studies.

Third, CEO characteristics associated with R&D spending in the literature are mainly focused on age, education, duality, tenure, and prior experience or background. Gender effects and location effects, which are identified as dominant factors for examining managerial effects from prior literature (i.e., Roth, 1995; Hermann and Datta, 2002; Huang and Kisgen, 2013; Faccio et al., 2016), are not included in the analysis. In particular, Carpenter et al. (2004) identify that gender diversity represents a 'needed innovation' for top management research. Dezsö and Ross (2012) is an exception; they examine the interaction between female representation in top management teams and innovation intensity (measured by R&D spending scaled by total assets) using US firms. They reveal that female representation in top management teams will improve firm performance only when a firm's strategy is concentrated on innovation and advocate the need for further research on gender and management (Dezsö and Ross, 2012).

Given the promising foundations but also the limitations of the existing literature, this study empirically examines how R&D expenditure varies in Australian firms based on their CEO characteristics in terms of CEO gender, CEO-chairperson duality, CEO education level, and CEO location. Furthermore, this research investigates how CEO characteristics affect R&D expenditure in each industry group based on Industry Classification Benchmarks (ICB).

4.3 Data and research methodology

This research is focused on the Australian market, one of the leading exchange groups in the world.[6] The study sample comprises the firms collected from Chapter 3 as the original dataset. Firms which did not report R&D expenditures in Datastream or Worldscope databases between 1st of Janurary1999 and 31st if December 2018 are excluded. According to the Productivity Commission (2009), real R&D expenditure in Australia has been growing quite strongly since the mid-1970s, but growth has been particularly strong in the 2000s. The final sample with completed annual data including industries (from ten industries based on ICB) and CEO characteristics consists of 1006 firms. The ICB implements a combined industry classification of Dow Jones and FTSE, and also enables researchers to compare firms through four hierarchical levels of industry classification (Industry, Supersector, Sector, and Subsector). It uses a system of ten industries, which includes basic materials, consumer goods, consumer services, financials, health care, industrials, oil and gas, technology, telecommunications, and utilities.

In this Chapter, we carefully construct (use present tense across to be consistent) a unique hand-collected dataset for the analysis that captures CEO characteristics for each firm from 1999 to 2018. The data is gathered from the annual reports of each firm, the MorningStar database, Bloomberg website, and LinkedIn website. Four CEO characteristics are re-collected from the above sources as fully annual data for CEO characteristics are requested whereas daily data for CEO characteristics are only collected on announcements dates: CEO gender, CEO education level, CEO-chairperson duality, and CEO location. The dependent variable (innovation) is defined in Section 4.3.1. The four key independent variables (CEO gender, CEO education level, CEO-chairperson duality, and CEO location) are described in Section 4.3.2. Section 4.3.3 presents the control variables and Section 4.3.4 details the robustness tests.

[6] Given the R&D and corporation structure differences, stakeholders in Australia perceive influence on CEO's decisions, and in turn, the impact of CEO characteristics on organisational performance and innovation (Taghian, D'Souza, and Polonsky, 2015). Investigation on CEO characteristics and firm innovation can help investors (e.g., superannuation funds in Australia) to achieve key information.

4.3.1 Dependent variable

The dependent variable is innovation, measured as the dollar value of firm R&D expenditure. Researchers have employed a variety of proxies to measure innovation, but R&D expenditure is the most recognised and easiest to measure (He and Tian, 2018). For instance, Barker and Mueller (2002) use R&D spending per employee; however, it is disputed whether this is more stable than using R&D spending divided by firm total sales (Hoskisson and Hitt, 1988; Chen and Hsu, 2009; Kuo et al., 2018). Chen and Hsu (2009) argue that using R&D spending scaled by total sales ratio enables them to control for size effects and heteroscedasticity, and firms' commitment to innovation can be better demonstrated compared to the absolute amount of R&D expenditure (Hoskisson and Hitt, 1988). Dezsö and Ross (2012) measure innovation intensity as R&D spending scaled by total assets to investigate whether gender diversity has effects on R&D spending. Furthermore, Zhu (2013) utilizes the absolute amount of R&D expenditure as an independent variable to investigate the relationship between financial leverage and firm-level characteristics, while Zeng and Wang (2015) utilize R&D expenditure to investigate whether female CEOs are more conservative on corporate cash holdings than male CEOs. More recently, Hu et al. (2019) use four R&D indicators (R&D spending scaled by sales ratio, a firm's own R&D expenditure, government R&D the firm receives, and the share of government R&D in the firm's total R&D expenditure) to examine whether government R&D grants stimulate firms' own R&D expenditure in manufactory industries of China. By following Zhu (2013), Zeng and Wang (2015) and Hu and Yongxu (2019), the dollar value of firms' R&D expenditure is applied in this study as it enables us to examine the demographic effects of CEOs but also provide economic implications.

Small-sized firms may not conduct R&D investment each year (Czarnitzki and Hottenrott, 2011). Additionally, Himmelberg et al. (1999) point out that the sample in favour of R&D expenditure will be biased if eliminating observations with missing values. Hence, those not available or not applicable values reported for R&D expenditure in firms' annual reports, Datastream, or Worldscope databases are treated as zero.

4.3.2 Independent variables

Yearly data of R&D expenditure with associated CEO characteristics leads to the issue of a CEO transition in the same year. Murphy and Zimmerman (1993) resolve this issue by defining the fiscal year of CEO change as the transition year. Thus, the transition year is considered as the first year for the incoming CEOs whereas the preceding year is the last full fiscal year for the outgoing CEOs (Murphy and Zimmerman, 1993). By following Murphy and Zimmerman (1993), the outgoing CEO is associated with the year preceding the transition year.

4.3.2.1 CEO gender

Studies on CEO gender demonstrate that male and female CEOs vary in their risk-taking behaviours and efficiency of capital allocation (Faccio et al., 2016). Huang and Kisgen (2013) report that male CEOs are relatively more overconfident than female CEOs regarding corporate decision-making. Dezsö and Ross (2012) is one of the few studies to investigate gender effects on R&D spending. Using a sample of US firms, the authors reveal female representation in top management teams and advocate the need for further research on gender and management (Dezsö and Ross, 2012). The lack of Australian market empirical findings motivates the author to examine whether female CEOs are more innovative or more conservative than male CEOs.

Data on CEO gender is collected primarily from the MorningStar database, with any missing information collected from annual reports, Bloomberg, and Linkedin. If the CEO is female, the CEO gender dummy variable takes the value of one; if the CEO is male, the variable equals zero.

4.3.2.2 CEO-chairperson duality

Building on UET (Hambrick and Mason, 1984), Finkelstein and D'aveni (1994) argue that CEO-chairperson duality gives newly appointed CEOs greater power, which results in greater R&D investment. On the contrary, Chen and Hsu (2009) demonstrate that CEO-chairperson duality has a negative impact on R&D investment. In addition, Chen and Hsu (2009) suggest that separation of CEO and chairperson roles is associated with an increase in R&D investment for high family ownership firms. This study provides Australian empirical evidence to bridge this literature gap, namely that the majority of earlier studies are based on the US stock market, and resolves the mixed results of CEO-chairperson duality.

If the CEO also holds the position of chairperson, the Duality dummy equals one, otherwise zero.

4.3.2.3 CEO education level

Based on UET (Hambrick and Mason, 1984), a number of studies have examined different levels and subjects of CEO education, revealing that education level and science-related degrees have positive impacts on firms' R&D activities (Barker and Mueller, 2002; Wincent et al., 2010; Lin et al., 2011; Kuo et al., 2018). Lin et al. (2011) conclude that CEOs with higher education level are associated with stronger innovation and managerial capabilities (Kuo et al., 2018) and the ability to solve R&D related problems (Wincent et al., 2010). Particularly, Kuo et al. (2018) classify educational level into 4 categories: doctorate, master degree, bachelor degree, and high-school or below. They find that for family-controlled firms, the R&D investment ratio increases with higher education level of directors when master degree level is the average education level, and decreases when the average education level is above bachelor degree. Furthermore, compared with family-controlled firms, professional-managed firms have greater R&D investments (Kuo et al., 2018). However, for professional-managed firms, the R&D investment ratio declines with higher education level when the average education level is above master degree (Kuo et al., 2018). Scedrova et al. (2019) demonstrate that CEOs with PhD degrees and Master of Business and

Administration (MBA) degrees have positive impacts on R&D efficiency, and PhD degree CEOs have negative impacts on commercial effectiveness. In addition, Graham and Harvey (2002) report that CEOs who hold MBA degrees prefer to apply their technical knowledge compared to other CEOs, which in turn will affect R&D decision-making. This study provides Australian empirical evidence to fill the literature gap, namely that the majority of studies are based on the US stock market, Chinese stock market, and European markets.

Data on CEO education level is collected from the MorningStar database, annual reports, Bloomberg, and LinkedIn. Three dummy variables are used: degrees of Doctor of Philosophy (PhD), MBA, and master's degree. The PhD dummy equals one if the CEO has a doctorate degree and zero otherwise; the MBA dummy equals one if the CEO has an MBA degree and zero otherwise; and the Masters dummy equals one if the CEO has a master's degree and zero otherwise.

4.3.2.4 CEO location

In the international arena, Roth (1995) demonstrates that CEOs must be "internationally networked" in a high interdependence environment. Moreover, Hermann and Datta (2002) demonstrate that outsider CEOs with international experience have a positive impact on post-succession organizational performance. Further, Rodenbach and Brettel (2012) show that CEOs with international experience have more knowledge on foreign markets, more international business practice experience, and a wider worldview. These attributes improve their firm management and R&D capacity compared to other CEOs. However, the relationship between CEO location and R&D expenditure has been relatively unexplored (Herrmann and Datta, 2006). This study investigates the R&D spending of Australian firms and examines whether the location of CEOs has an impact on R&D spending.

If the CEO is located within Australia, the Location dummy equals one, otherwise zero.

4.3.3 Control variables

The two models used in this research contain firm-level control variables. Based on prior studies, firm size may have effects on R&D investment (Kuo et al., 2018). For instance, Kellermanns and Eddleston (2006) state that larger firms are more likely to have more slack resources for R&D investment. Firm size is measured using a firm's book value of total assets provided by Datastream and Worldscope.

The relationships between CEO characteristics and R&D investment are tested via ordinary least squares regression analyses. Similar to Barker and Mueller (2002), the equation is shown below:

$$R\&D_{it} = \beta_0 + \beta_1 D_i + \beta_2 X_i + \mu \quad (12)$$

which can be described as a firm's R&D expenditure in year t as a function of one or more of the CEO characteristic dummies D_i, and the known firm-level control variable – firm size X_i. We firstly analyse the single CEO characteristic dummy individually with control variables, and then include all the CEO dummies.

4.3.4 Robustness tests

As the dollar value of R&D expenditure is utilized as the dependent variable and unavailable or not reported data on R&D expenditure is recorded as zero, there will be a range of values for this variable. Some observations may "hit" the limit or the boundary, zero. This means that the regression models in this study are limited dependent variable models and the dependent variable belongs to a censored sample. As small-sized firms may not conduct R&D investment each year, this study follows Czarnitzki and Hottenrott (2011) to take the censored dependent variable (R&D expenditure) into account using Tobit regression models or censored regression models. The Tobit model or censored normal regression model can be specified as:

$$R\&D_{it}^{*} = \beta_0 + \beta_1 D_i + \beta_2 X_i + \mu \quad (13)$$

where $R\&D_{it}^{*}$ is the latent dependent variable.

The R&D spending models can be expressed as:

$$R\&D_{it} = \begin{cases} R\&D_{it}^{*}, & if\ R\&D_{it}^{*} > 0 \\ 0, & if\ R\&D_{it}^{*} \leq 0 \end{cases} \quad (14)$$

If no observations are censored in the regression models, this indicates that the Tobit model is the same as the ordinary least squares regression models. After estimating the baseline models, we also estimate R&D expenditure in ten different industries (based on ICB) via ordinary least squares regression analyses and Tobit regression analyses.

Although Tobit regression models provide supportive evidence to panel regression analyses, endogeneity is still a concern in empirical research (Gippel et al., 2015). Gippel et al. (2015) discuss several textbook solutions to the endogeneity issue, including the two-stage least squares (2SLS) regression analysis, instrumental variables, differenced generalized method of moments (GMM), and system GMM. The authors also detail three specification tests to assess whether instruments are appropriate, including the Hausman-Wu test and two other specification tests (Gippel et al., 2015). This study employs three steps to control for possible endogeneity following Gippel et al. (2015).

4.4 Empirical results and discussion

The results confirm the proposition that CEOs with different demographic characteristics have different impacts on R&D investments in Australia. Section 4.4.1 reports the results of panel regressions with control variables and dummy variables, and Section 4.4.2 presents the results of industry variations on R&D investments. Section 4.4.3 details the robustness analysis with Tobit regression models and Section 4.4.4

details the control for endogeneity.

4.4.1 Panel regressions

This section details the results of the ordinary least square regressions testing whether CEOs with different characteristics make significantly different R&D investments. Table 38 presents panel regression results after controlling for firm size. Columns 1, 2, and 3 report the results using the full panel of firms and CEO dummies with PhD dummy, MBA dummy, and Masters dummy as the proxy of CEO education level, respectively.

4.4.1.1 CEO gender effects on R&D expenditure

Studies on CEO gender (see Chapter 2) demonstrate that male and female CEOs vary in their risk-taking behaviours (Faccio et al., 2016). Dezsö and Ross (2012) reveal that female representation in top management teams will improve firm performance only when a firm's strategy is focused on innovation. More specifically, Chen et al. (2016) use a US sample to investigate whether board gender diversity reduces R&D risk and suggest that female representation on the board enhances risk management efficiency in R&D investments.

The coefficients of CEO gender are statistically significant (at 1% level) with R&D expenditure in all three columns in Table 38. In addition, the first row of Table 38 shows that when CEOs are female, firms would spend approximately 1600 dollars more on R&D activities than male CEOs in each year. This indicates that after controlling for firm size, firms managed by female CEOs have higher R&D expenditure than male CEOs regardless of education level proxy. The results show that female CEOs are more innovative than male CEOs in Australia. Our finding is consistent with Chen et al. (2016) but contrary to Zeng and Wang (2015), who find that female CEOs are more conservative or risk-adverse on corporate cash holdings compared to their male counterparts. A possible explanation is that female CEOs may be more likely to mitigate the adverse impact of R&D on the cost of debt and aim to lower the R&D investment

risk (Chen et al., 2016).

Table 38. Estimation for CEO characteristics and R&D expenditure

	R&D (PhD)	R&D (MBA)	R&D (Masters)
Gender	1695.16***	1642.85***	1665.85***
	(-0.0004)	(-0.0007)	(-0.0006)
Duality	72.02	59.52	45.86
	(-0.6988)	(-0.7479)	(-0.8046)
Education	1274.78***	134.98	-60.83
	(0.0000)	(-0.4708)	(-0.7060)
Location	245.57	18.21	11.25
	(0.3778)	(0.9477)	(0.9677)

Significance at the 10% (*), 5% (**), or 1% level (***) is indicated.

4.4.1.2 CEO-chairperson duality effects on R&D expenditure

The second row of Table 38 shows that CEOs who also hold the chairperson role are more likely to engage in R&D activities. This is consistent with Finkelstein and D'aveni (1994), who argue that CEO-chairperson duality enables CEOs to be more powerful, leading to greater R&D investment. However, none of the analyses indicates a significant result of CEO-chairperson duality on R&D spending.

4.4.1.3 CEO education effects on R&D expenditure

The third row of Table 38 presents the results of relationships between three different CEO educational levels and R&D spending. The results show that the PhD dummy has significantly positive effects on R&D spending (at 1% level), whereas the MBA dummy and Masters dummy show insignificance on R&D spending. This supports UET, whereby managers who are well educated have the ability to handle complex information and difficult situations (Hambrick and Mason, 1984).

The positive educational effects imply that R&D investment decisions made by CEOs

who have PhD degrees are more favourable than CEOs who have lower education degrees. In other words, CEOs with PhD degrees are more likely to realize the importance of R&D expenditure for firms than other CEOs. Using a measure derived from airplane flying as a hobby, Sunder et al. (2017) indicate that CEOs who fly airplanes are passionate, adventurous, and risk takers, with positive impacts on R&D expenditure. The authors also find that CEOs with PhD degrees also have positive impacts on R&D expenditure. Further, Simango (2000) provide evidence that PhD degree holders are regarded as good human resources in Ireland, which contributes to technology transfer and innovation through human capital. Moreover, the results of the PhD dummy add support to Lee and Moon (2016), who demonstrate that CEOs with higher degrees are associated with greater strategic risks (measured by sum of R&D spending, capital investment, acquisition investment, and long-term debt). Conversely, Barker and Mueller (2002) use the same measurements for CEO educational level as Daellenbach et al. (1999) and report that CEOs with undergraduate degrees are associated with greater R&D expenditure and no significant effects for higher educational degrees. The remaining two measurements of CEO education level (MBA and Masters dummy) do not affect R&D expenditure. The findings of this thesis contribute to the existing literature by providing insights regarding CEOs' educational level on R&D expenditure in the Australian market.

4.4.1.4 CEO location effects on R&D expenditure

The location dummy is positively correlated with R&D spending (last row of Table 38), but is insignificant. This indicates that the location of CEOs does not significantly affect firms' innovation strategies. The very small percentage (less than 10%) of overseas CEOs may be a possible reason for these results, which suggest that firms should not be biased in terms of hiring overseas CEOs.

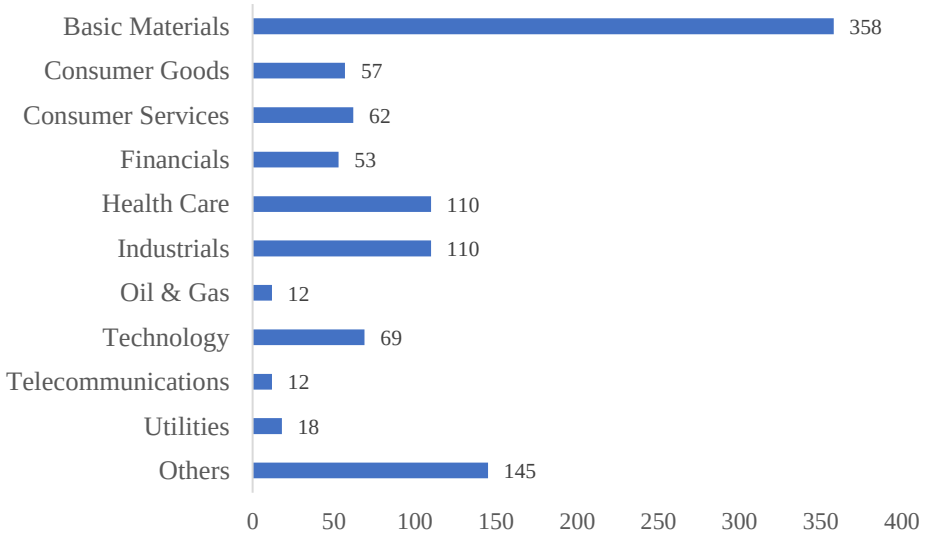
4.4.2 Regressions of CEO characteristics and R&D expenditure on relative industries

This section reports the results of the ordinary least square regressions testing whether CEOs with different characteristics make significantly different R&D investments in different industries. Researchers provide evidence that R&D spending is driven by

firms' industries (Scherer, 1986; Barker and Mueller, 2002). Moreover, R&D expenditure or investment has become increasingly attractive to firms in recent years (Chen et al., 2015). Despite the reliance of high-technology firms on innovation, firms in traditional industries also display high R&D expenditure to improve their competitiveness (Chen et al., 2015).

Figure 3 plots the number of firms with R&D spending in each industry based on the ICB. In this sample, the basic materials (35.59%), health care (10.93%), and industrials (10.93%) industries are the top three industries in terms of R&D expenditure in Australia. There are a very low number of firms in oil & gas, telecommunications, and utilities industries (less than twenty out of 1006 firms); as a result, it is not possible to analyse these industries via regression models. This limitation may be a product of sample selection (based on Chapter 3 rather than collecting all firms listed on the ASX).

Figure 3. Number of firms in each industry



Linking CEO characteristics with R&D spending, Chaganti and Sambharya (1987) investigate firms in the tobacco industry and report that firms following innovation strategies are more likely to have executives with production and R&D backgrounds.

Thomas et al. (1991) document that younger and more educated CEOs with marketing and R&D functional backgrounds are more likely to be hired in firms that follow market innovation strategies in the computer industry. Daellenbach et al. (1999) provide evidence on primary metals and semiconductor industries in the US and show that technical working experience of CEOs is associated with higher R&D spending, but fail to find any effect of CEO education levels. Mezghanni (2010) examine French firms with relative industries based on the ICB to investigate how CEO characteristics affect R&D expenditures, suggesting that firms operating in high-technology industries may need to employ younger CEOs who are more conducive to innovation and CEOs who are more capable of integrating information.

Table 39 presents results of firms and CEO dummies in all industries. Panels A, B, and C provide findings from tests with PhD dummy, MBA dummy, and Masters dummy as the proxy of CEO education level, respectively.

Table 39. Estimation for CEO characteristics and R&D expenditure on relative industries

Panel A: Estimation for all dummy variables with PhD dummy as proxy for education level										
	Basic Materials	Consumer Goods	Consumer Services	Financials	Health Care	Industrials	Oil & Gas	Technology	Telecommunications	Utilities
Size	0.00	0.00	0.00	0.00	0.00	0.00	-	-0.00***	0.00	-
	(-0.2448)	(-0.4932)	(-0.8212)	(-0.2600)	(-0.8940)	(-0.6606)		(-0.0045)	(-0.1556)	
Gender	8227.49***	347.46	-258.92	-215.31	-325.11	-650.91	-	-485.68	-404.47	-
	(0.0000)	(-0.4161)	(-0.6819)	(-0.3458)	(-0.4855)	(-0.8572)		(-0.8220)	(-0.7076)	
Duality	205.89	333.07*	163.22	-190.24	-17.89	-341.88	-	2557.12***	-871.98	-
	(-0.6224)	(-0.0650)	(-0.5318)	(-0.1578)	(-0.9532)	(-0.5860)		(-0.0016)	(-0.1409)	
PhD	2959.48***	2045.73***	-205.92	3404.57***	232.20	3266.43***	-	-1810.72	-659.92	-
	(0.0000)	(0.0000)	(-0.5113)	(0.0000)	(-0.3583)	(0.0000)		(-0.2564)	(-0.4119)	
Location	1136.14	-58.82	34.43	147.40	233.58	292.12	-	-3516.11***	443.48	-
	(-0.1297)	(-0.8218)	(-0.8756)	(-0.5247)	(-0.5744)	(-0.6051)		(-0.0032)	(-0.5538)	

Panel B: Estimation for all dummy variables with MBA dummy as proxy for education level

	Basic Materials	Consumer Goods	Consumer Services	Financials	Health Care	Industrials	Oil & Gas	Technology	Telecommunications	Utilities
Size	0.00	0.00*	0.00	0.00	0.00	0.00	-	-0.00***	-0.00*	-
	(-0.1927)	(-0.0511)	(-0.6756)	(-0.1296)	(-0.7205)	(-0.6437)		(-0.0121)	(-0.0952)	
Gender	8212.85***	325.74	-433.18	-401.04	-519.39	-1151.22	-	42.08	-99.85	-
	(0.0000)	(-0.4605)	(-0.4727)	(-0.1181)	(-0.2714)	(-0.7533)		(-0.9858)	(-0.9180)	
Duality	133.52	212.02	171.71	-351.40**	37.49	-449.00	-	2376.33***	-668.54	-
	(-0.7442)	(-0.2462)	(-0.4472)	(-0.0202)	(-0.9017)	(-0.4812)		(-0.0049)	(-0.2297)	
MBA	1163.52**	548.80***	369.68*	-264.35*	466.48*	-650.20	-	-903.47	1516.55***	-
	(-0.0145)	(-0.0040)	(-0.0543)	(-0.0715)	(-0.0742)	(-0.1055)		(-0.4242)	(-0.0060)	
Location	882.03	-177.52	-4.22	124.04	261.86	293.76	-	-5322.85***	233.50	-
	(-0.2367)	(-0.5121)	(-0.9846)	(-0.6418)	(-0.5286)	(-0.6074)		(0.0000)	(-0.7336)	

Panel C: Estimation for all dummy variables with Masters dummy as proxy for education level

	Basic Materials	Consumer Goods	Consumer Services	Financials	Health Care	Industrials	Oil & Gas	Technology	Telecommunications	Utilities
Size	0.00	0.00*	0.00	0.00	0.00	0.00	-	-0.00***	-0.00*	-
	(-0.1873)	(-0.0908)	(-0.7367)	(-0.1019)	(-0.8338)	(-0.6018)		(-0.0089)	(-0.0805)	
Gender	8234.34***	262.74	-394.95	-300.43	-433.77	-1250.78	-	244.26	-98.16	-
	(0.0000)	(-0.5526)	(-0.5129)	(-0.2403)	(-0.3550)	(-0.7327)		(-0.9184)	(-0.9185)	
Duality	106.69	164.26	138.11	-290.81*	43.86	-513.14	-	2352.38***	-2172.16***	-
	(-0.7948)	(-0.3676)	(-0.5388)	(-0.0525)	(-0.8861)	(-0.4181)		(-0.0054)	(-0.0028)	
Masters	593.28	370.40**	248.47	-164.52	271.61	-707.74*	-	-909.98	1923.44***	-
	(-0.1125)	(-0.0403)	(-0.1401)	(-0.1662)	(-0.2673)	(-0.0607)		(-0.3171)	(-0.0025)	
Location	873.66	-156.77	28.90	185.92	294.56	298.28	-	-5226.21***	115.84	-
	(-0.2418)	(-0.5651)	(-0.8944)	(-0.4780)	(-0.4831)	(-0.6016)		(0.0000)	(-0.8656)	

Significance at the 10% (*), 5% (**), or 1% level (***) is indicated.

4.4.2.1 CEO gender effects on R&D expenditure

The coefficients of CEO gender related to basic materials are presented in Panels A, B, and C of Table 39 indicate that after controlling for firm size, firms operating in the basic materials industry managed by female CEOs have higher R&D spending than male CEOs. These findings are consistent with Chen et al. (2016), who report that female executive representation enhances risk management efficiency in R&D investments. In addition, these results for the basic materials industry add further support to our prior results, namely that firms in the basic materials industry managed by female CEOs have higher R&D expenditure than male CEOs regardless of education level proxy. The results suggest that gender diversity in the top executive team is beneficial in Australia.

For the remainder of industries, we do not find evidence of CEO gender impact on R&D expenditure.

4.4.2.2 CEO-chairperson duality effects on R&D expenditure

In Table 39, the significance at the 1% level of the CEO-chairperson duality coefficients on R&D expenditure of firms belong to technology industries is showed in all panels which indicates that when CEOs also hold the chairperson position, they use their power to shape R&D spending patterns to suit their own preferences (Barker and Mueller, 2002). This is consistent with Finkelstein and D'aveni (1994) who argue that CEO-chairperson duality enables CEOs to be more powerful, leading to greater R&D investment. On the other hand, the coefficient of CEO-chairperson duality is statistically significant correlated with telecommunications (significant at 1% level) in Panel C of Table 39. This indicates that R&D spending in firms which operate in the telecommunications industry is reduced by approximately 2172 dollars when the CEO and chairperson roles are held by the same individual.

The negative and significant effect (at 5% level) of CEO-chairman duality is also observed in Panel B of Table 39 on R&D spending in financials firms. This indicates

that R&D spending in firms which operate in the financials industry is decreased by around 315 dollars per year when the CEO and chairperson roles are held by the same individual. These results are consistent with Chen and Hsu (2009) who demonstrate that CEO-chairperson duality has a negative impact on R&D investment and suggest that separation of CEO and chairperson roles is associated with an increase in R&D investment of high family ownership firms. The mixed results for CEO-chairperson duality are consistent with Peng et al. (2007) who report mixed results on firm performance. This might be due to the sample selection of firms, as not all firms on the ASX with available R&D expenditure data are included in this study.

From Table 39, we observe that CEO-chairperson duality are statistically significant for R&D expenditure in none of other industries.

4.4.2.3 CEO education effects on R&D expenditure

Three different measurements of CEO education level are applied in regression tests individually. Our results show that the PhD dummy has significantly positive effects (at 1% level) on R&D spending in basic materials, consumer goods, financials, and industrials firms; the MBA dummy has significantly positive effects on R&D spending in basic materials (at 5% level), consumer goods (at 1% level), and telecommunications (at 1% level) firms; and the Masters dummy has significantly positive effects on R&D spending in consumer goods (at 5% level) and telecommunications (at 1% level) firms. These results are consistent with Scedrova et al. (2019) who demonstrate that CEOs with PhD degrees and MBA degrees have positive impacts on R&D efficiency. These results also support the UET, whereby managers who are well educated have the ability to handle complex information and difficult situations (Hambrick and Mason, 1984). Moreover, these results for CEO education level provide support to Hambrick et al. (1992), namely that firms in high-technology industries (such as telecommunications) are more likely to hire CEOs with higher education levels. Furthermore, MBA and Masters results provide further confirmation of our prior results regarding a lack of significance of MBA and master's degrees on R&D spending.

For the remaining industries, we did not find CEO education level has effects on R&D expenditure.[7]

4.4.2.4 CEO location effects on R&D expenditure

The location dummy is significantly negatively correlated to R&D expenditure in technology firms at the 1% level in all three panels of Table 39, which indicates that firms operating in the technology industry with CEOs who are located within Australia are less innovative compared with overseas CEOs. This is in line with Rodenbach and Brettel (2012) who demonstrate that CEOs' international experience has significantly positive effects on marketing and R&D capabilities.

The remaining industries are not affected by the location of CEOs in terms of R&D expenditure.

To this point, the results demonstrate that CEO characteristics play a role in firms' R&D expenditure. In particular, CEO characteristics have a strong impact on firms who are operating in basic materials, consumer goods, technology, and telecommunications industries. Moreover, the empirical results demonstrate that CEO gender, CEO education level, and CEO location are determinants for examining managerial effects on firms' R&D expenditure. Indeed, R&D spending is more likely to occur in firms with female CEOs who hold PhD or MBA degrees and are located overseas compared to others. Results of mixed significance regarding CEO-chairperson duality on R&D expenditure might be due to the sample selection of firms and thus robustness analysis is required.

[7] From the literature, the level of education is more important for innovation (Ahn, Minshall, and Mortara, 2017; Musteen, Barker III, and Baeten, 2010; Lin et al., 2011). We did not find evidence on CEOs' discipline of education on industry effect, future research could focus on academic major of CEOs.

4.4.3 Robustness analysis

R&D expenditure is used as the dependent variable in this study. Czarnitzki and Hottenrott (2011) suggest that a censored dependent variable (in this case R&D expenditure) should be taken into account using Tobit regression models or censored regression models. This section utilizes Tobit regression models to identify managerial effects on Australian firms' innovation measured by R&D expenditure between 1999 and 2018.

Table 40 demonstrates the results of the associations between CEO characteristics and R&D expenditure of all firms in our sample. Column 2 of Table 40 reveals that the CEO education effects measured by PhD degrees remain significant on R&D spending remains at the 1% level. This result indicates that R&D strategies are better presented in firms led by CEOs with doctorate degrees. This finding supports UET (Hambrick and Mason, 1984) and is consistent with Simango (2000), Lee and Moon (2016), and Sunder et al. (2017), who find that CEOs with PhD degrees are associated with firm innovation measured by R&D spending.

Distinct from results reported in previous sections, a MBA degree as a proxy for CEO education level has significantly positive effects on R&D spending (at 1% level and 5% level, respectively). The finding that the MBA dummy exerts positive and significant effects on R&D spending adds support to Carpenter (2002) and Lin et al. (2011) who demonstrate that educational background and functional background are positively and significantly related to firm international strategy and firms' R&D activities. CEOs with higher educational level are more likely to present R&D strategies compared to CEOs with lower education level (lower than MBA degree, including Masters degree).

CEO gender, CEO-chairperson duality, and CEO location fail to show significant effects on R&D expenditure after Tobit regression models are performed. In other words, the gender of CEOs, CEO-chairperson duality, and the location of CEOs do not significantly affect firm innovation in terms of R&D expenditure. The very small

percentage (less than 10%) of female CEOs and overseas CEOs may be a possible reason for these results. Another possible reason is that the sample is based on Chapter 3 instead of collecting all available Australian firms.

Overall, the findings imply that firms with CEOs who hold PhD degrees or MBA degrees are more likely to engage in R&D activities and in turn have greater R&D expenditure. The results also suggest that firms eager to gain a competitive advantage through R&D activities and investments should employ CEOs who hold PhD degrees or MBA degrees.

Table 40. Tobit models for CEO characteristics and R&D expenditure

	R&D (Tobit) PhD	R&D (Tobit) MBA	R&D (Tobit) Masters
Gender	1791.75	1530.94	1632.32
	(-0.3322)	(-0.4104)	(-0.3799)
Duality	-624.15	-693.71	-689.98
	(-0.3901)	(-0.3393)	(-0.3426)
Education	2453.56***	1780.58**	958.97
	(-0.0087)	(-0.0115)	(-0.1203)
Location	-397.38	-943.14	-995.08
	(-0.7066)	(-0.3679)	(-0.3422)

Significance at the 10% (*), 5% (**), or 1% level (***) is indicated.

Table 41 presents results with Tobit regression models for CEO characteristics and R&D expenditure on relative industries. We find same results essentially with panel regressions. From Table 41, female CEOs exert a significantly negative impact (at 5% level in all three Panels) on R&D spending in health care firms. This finding indicates that female CEOs are more conservative and less likely to engage in R&D activities for firms operating in the health care industry than male CEOs. The opposite finding regarding gender effects for firms in the basic materials industry may be due to the fact that compared with firms in other industries, firms in the health-care industry are considered as high-risk investment with huge R&D expenditure and long development

cycle which requires significant cash outlays (Herzlinger, 2006; Mitrione et al., 2014). The small percentage (less than 8%) of female CEOs of firms in the Australian Health Care industry from 1999 to 2018 might be another explanation for the contrary results on gender effects.

On the basis of panel results for duality effects, Panel A and Panel B of Table 41 show that CEO-chairman duality has significantly negative effects (at 1% level) on R&D spending of firms in the financials industry and has significant positive effects (at 5% level) on R&D spending of firms in consumer services. The negative effects observed for firms operating in the Financials industry might be due to the different business models employed in this industry (Fama and French, 1992). The positive duality effects observed for consumer services are consistent with D'aveni (1994) who argues that CEO-chairperson duality enables CEOs to be more powerful, leading to greater R&D investment.

Similar to the panel regression results, Panel B of Table 41 reports that firms in the Health Care industry managed by CEOs with MBA degrees have significantly positive impacts (at 1% level) on R&D spending compared to other degree holders. Moreover, Panel C of Table 41 presents that firms in the basic materials and consumer services industry managed by CEOs with master's degrees also have significantly positive (at 5% level) impacts on R&D expenditure than lower degree holders. The findings for the MBA dummy and Masters dummy provide further evidence for CEO education level and indicate that consistent with Scedrova et al. (2019) CEOs with higher formal education level have positive impacts on R&D efficiency.

In addition to prior results demonstrating that the location dummy has negative and significant effects on R&D expenditure at the 5% level, Panel A and Panel B of Table 41 report that CEOs who are located overseas also create greater R&D spending for firms in the health care industry. These findings add support to Nieto and Rodríguez

(2011) who confirm that foreign knowledge inputs have positive effects on innovation. The negative association suggests that CEOs with international networks or international experience may improve firm innovation (Roth, 1995; Hermann and Datta, 2002).

Table 41. Tobit regression models for CEO characteristics and R&D expenditure on relative industries

Panel A: Estimation for all dummy variables with PhD dummy as proxy for education level										
	Basic Materials	Consumer Goods	Consumer Services	Financials	Health Care	Industrials	Oil & Gas	Technology	Telecommunications	Utilities
Size	-0.00**	0.00	0.00	0.00	0.00	0.00	-	-0.00**	-0.02	-
	(-0.0293)	(-0.2174)	(-0.1646)	(-0.1575)	(-0.6612)	(-0.1007)		(-0.0443)	(-0.4814)	
Gender	16971.33***	-823.69	2647.08	-25856.91	-6583.02**	-87563.50	-	-123254.20	-6125.23	-
	(0.0000)	(-0.7121)	(-0.3538)	(-1.0000)	(-0.0155)	(-1.0000)		(-1.0000)	(-0.3377)	
Duality	117.99	461.23	2294.69*	-4306.84***	326.60	-1677.50	-	3959.18	-1801.96	-
	(-0.9391)	(-0.5654)	(-0.0547)	(-0.0073)	(-0.7981)	(-0.5089)		(-0.1592)	(-0.6548)	
PhD	5866.556***	4566.98***	-2228.52	6339.77***	-2148.90*	7058.22***	-	3897.01	-60264.36	-
	(-0.0041)	(-0.0004)	(-0.1707)	(0.0000)	(-0.0622)	(-0.0021)		(-0.4354)	(-1.0000)	
Location	1022.23	928.55	53.72	2043.35	-3461.01**	2896.19	-	-11897.71***	-7430.19	-
	(-0.7083)	(-0.4595)	(-0.9618)	(-0.2954)	(-0.0320)	(-0.2082)		(-0.0010)	(-0.1455)	

Panel B: Estimation for all dummy variables with MBA dummy as proxy for education level

	Basic Materials	Consumer Goods	Consumer Services	Financials	Health Care	Industrials	Oil & Gas	Technology	Telecommunications	Utilities
Size	-0.00**	0.00**	0.00	0.00	0.00	0.00	-	-0.00*	-	-
	(-0.0266)	(-0.0328)	(-0.1139)	(-0.1380)	(-0.9236)	(-0.1059)		(-0.0641)		
Gender	17121.67***	-1072.71	1031.90	-30788.64	-7428.17***	-92236.84	-	-123829.40	-	-
	(0.0000)	(-0.6620)	(-0.6908)	(-1.0000)	(-0.0071)	(-1.0000)		(-1.0000)		
Duality	-147.177	243.093	2095.83**	-5424.77***	245.645	-2032.93	-	4307.675	-	-
	(-0.9226)	(-0.7696)	(-0.0462)	(-0.0045)	(-0.8456)	(-0.4314)		(-0.1353)		
MBA	4766.49***	2693.60***	2331.48***	-411.743	2832.03***	-2306.23	-	-1454.946	-	-
	(-0.0042)	(-0.0011)	(-0.0088)	(-0.6680)	(-0.0087)	(-0.1363)		(-0.7191)		
Location	558.537	459.768	122.946	2527.286	-3375.40**	3098.912	-	-14797.76***	-	-
	(-0.8378)	(-0.7287)	(-0.9129)	(-0.2798)	(-0.0331)	(-0.1862)		(0.0000)		

Panel C: Estimation for all dummy variables with Masters dummy as proxy for education level										
	Basic Materials	Consumer Goods	Consumer Services	Financials	Health Care	Industrials	Oil & Gas	Technology	Telecommunications	Utilities
Size	-0.00**	0.00*	0.0001	-0.0014	0	-0.00**	-	-0.00**	-	-
	(-0.0262)	(-0.0553)	(-0.1586)	(-0.1311)	(-0.8682)	(-0.0899)		(-0.0428)		
Gender	17307.56***	-1237.12	1209.19	-31780.9	-6599.81**	-87585.9	-	-127988.1	-	-
	(0.0000)	(-0.6117)	(-0.6436)	(-1.0000)	(-0.0145)	(-1.0000)		(-1.0000)		
Duality	-167.604	-10.6364	1960.05*	-5389.02***	332.368	-2287.56	-	4303.456	-	-
	(-0.9121)	(-0.9898)	(-0.0606)	(-0.0048)	(-0.7934)	(-0.3744)		(-0.1371)		
Masters	2719.65**	1809.44**	2004.32**	186.069	1493.97	-2089.87	-	-682.9335	-	-
	(-0.0439)	(-0.0230)	(-0.0129)	(-0.8222)	(-0.1469)	(-0.1429)		(-0.8277)		
Location	509.198	618.623	219.186	2720.306	-2934.16*	3179.914	-	-14725.98***	-	-
	(-0.8523)	(-0.6445)	(-0.8449)	(-0.2479)	(-0.0683)	(-0.1752)		(0.0000)		

To summarize, CEO characteristics have a stronger impact on R&D spending in firms operating in the basic materials, consumer goods, consumer services, financials, health care, industrials, technology, and telecommunications industries. The results demonstrate that all of the CEO characteristics included in the industry analysis are dominant factors for examining managerial effects on firm performance, namely CEO gender, CEO-chairperson duality, CEO education level, and CEO location. Moreover, firms operating in the basic materials industry managed by female CEOs have higher R&D spending than male CEOs, whereas firms operating in the health care industry managed by female CEOs have lower R&D spending than male CEOs.

When CEOs also hold the chairperson position, the results indicate that for financials and telecommunication firms, centralized decision-making power constrains board engagement, enabling the CEO to pursue their own interests instead of applying R&D strategies for firm innovation in order to target high performance. Meanwhile, CEO duality has positive effects on R&D expenditure in firms operating in Consumer Services and Technology industries. Mixed results for CEO-chairperson duality effects on R&D spending indicate that CEO-chairperson duality and being based overseas are significant factors for CEOs in specific industry firms, such as consumer services, financials, health care, technology, and telecommunications. This might be due to the sample selection of firms as not all firms on the ASX with available R&D expenditure data are included in this study.

The educational effects imply that basic materials, consumer goods, consumer services, financials, health care, industrials, technology, and telecommunications firms managed by CEOs who have higher degrees (including a PhD degree, MBA degree, or master's degree) are more innovative than CEOs who have other educational levels. In particular, CEOs who hold PhD degrees positively affect R&D expenditure in firms operating in the basic materials, consumer goods, financials, and industrials industries; MBA degree holders positively affect firms in basic materials, consumer goods, consumer services, health care, and telecommunications industries; and master's degree graduates

positively influence firms in basic materials, consumer goods, consumer services, and telecommunications industries.

In addition to prior results demonstrating that the location dummy has negative and significant effects on R&D spending in firms operating in the technology industry, Table 41 reports that CEOs who are located overseas also create positive returns on health care firms. This negative association adds support to Roth (1995) and Hermann and Datta (2002) and indicates that CEOs who are located overseas have international networks and more international experience, contributing to R&D activities in health care and technology firms.

Based on above results, we summarise whether CEOs characteristics have an influence on firm innovation in Table 42. If the corresponding p-value is less 0.10, the results survive the robustness test and we denote it with a 'Yes'. First row of Table 42 shows that CEO gender has significant effects on innovation activities of firms which belong to basic materials and health care industries. CEO-chairperson duality plays a significant role in firms innovation where firms are under consumer services, financials, technology and telecommunications industries. All the industries showed in Table 42 (basic materials, consumer goods, consumer services, financials, health care, industrials, technology, and telecommunications) exert significant innovative impacts from CEO education level. In terms of CEO location, our results show that it has significant effects on innovation of firms which are belong to health care and technology. This indicates that CEO characteristics have a stronger impact on R&D spending in firms operating in the basic materials, consumer goods, consumer services, financials, health care, industrials, technology, and telecommunications industries. The results of this study add support to the argument that CEO characteristics play a significant role on firm inputs in the Australian market.

Table 42. Summary of CEO effects on R&D expenditure in different industries

	Basic Materials	Consumer Goods	Consumer Services	Financials	Health Care	Industrials	Technology	Telecommunications
Gender	Yes	No	No	No	Yes	No	No	No
Duality	No	No	Yes	Yes	No	No	Yes	Yes
PhD	Yes	Yes	No	Yes	No	Yes	No	No
MBA	Yes	Yes	Yes	No	Yes	No	No	Yes
Masters	Yes	Yes	Yes	No	No	No	No	Yes
Location	No	No	No	No	Yes	No	Yes	No

Section 4.4.3 applies Tobit regression models for CEO characteristics on R&D expenditure of Australian firms and analysis based upon different industries. The results suggest that CEO characteristics do have impacts on R&D expenditure to a certain degree. Having higher formal educational degrees might be the core requirement for firms seeking to pursue innovation strategies when hiring CEOs. Furthermore, based on our results, gender diversity of the top management team should be a priority.

4.4.4 Control for endogeneity

As the ordinary least square regressions are biased to endogenous explanatory variables, three steps are applied to control for possible endogeneity in empirical analysis of R&D spending and CEO characteristics (Gippel et al., 2015).[8] By following the natural experiment provided by Gippel et al. (2015), endogeneity is firstly tested and controlled by including the instrumental variable in the 2SLS regression analysis. Then, the system GMM is applied with lagged levels. The Hausman-Wu specification test is employed

[8] According to the prior literature, firm size has effects on R&D investment (Kuo et al., 2018; Kellermanns and Eddleston, 2006). Refer to Gipple et al. (2015), endogeneity has always been present and recognized as an important issue that undermines causal inference. In this chapter, we use R&D expenditure as our dependent variable, CEO characteristics as our independent variables, and firm size as our control variable. The possible endogeneity that might come from correlation between the regressors (CEO characteristics and firm size) and the residuals. The problem is that innovation and other key variables also drive the ability for CEOs to manage the firm. Reverse causality leads to an endogeneity problem, for instance, when CEOs in innovative firms have strong incentives to absorb new ideas and increase the probability of accepting innovations (Boermans and Roelfsema, 2016). Vaona and Pianta (2008) discuss endogeneity between firm size and innovation, and suggest that firm size does matter in identifying the determinants of both product and process innovations.

at the final step to compare whether the coefficients of instrumental variable estimation are significantly different from the coefficients of ordinary least square regression (Gippel et al., 2015). The result of the Hausman-Wu test does not provide evidence to reject the null hypothesis (endogenous regressors), which indicates that there are no endogeneity issues in this study.

4.5 Conclusion

This chapter presents the methods and empirical results used in this thesis to investigate the relationship between CEO characteristics and firm innovation via R&D expenditure in Australian markets. We first conduct panel regressions with firm-level control variable that use R&D spending as our dependent variable, and CEO characteristics as independent dummy variables. Generally, CEO characteristics have a strong impact on firm innovation activities. Moreover, the empirical results demonstrate that CEO gender and CEO educational level have stronger impacts on R&D expenditure compared to CEO-chairperson duality and CEO location. Firms managed by female CEOs have higher R&D expenditure than male CEOs regardless of education level proxy. CEOs who have PhD degrees have significant positive effects on R&D spending (at 1% level), whereas MBA holders and master's holders show insignificance on R&D spending in panel regressions. None of the panel regression analyses indicate significance of CEO-chairperson duality and CEO location on R&D spending.

This study adopts Tobit regression models to measure the effects of CEO characteristics on R&D spending, considering R&D expenditure as a censored dependent variable to expand on the regression results. The findings indicate that firms with CEOs who hold PhD degrees or MBA degrees are more likely to engage in R&D activities and in turn have greater R&D expenditure.

Earlier studies report that not only high-technology firms but also firms in traditional industries have high R&D expenditure to improve their competitiveness. This study conducts both panel regression models and Tobit regression models to test whether

CEOs with different characteristics make significantly different R&D investments in different industries. CEO characteristics have a stronger impact on R&D spending in firms operating in the basic materials, consumer goods, consumer services, financials, health care, industrials, technology, and telecommunications industries. The results demonstrate that all of the CEO characteristics used in industry analysis are dominant factors for examining managerial effects on firm performance, namely CEO gender, CEO-chairperson duality, CEO education level, and CEO location. Moreover, firms operating in the basic materials industry managed by female CEOs have higher R&D spending than male CEOs, whereas firms operating in the health care industry managed by female CEOs have lower R&D spending than male CEOs. Mixed results for CEO-chairperson duality effects on R&D spending are found, which might be due to the sample selection of firms, as not all firms on the ASX with available R&D expenditure data are included in the sample. The educational effects imply that basic materials, consumer goods, consumer services, financials, health care, industrials, technology, and telecommunications firms managed by CEOs who have higher degrees (including a PhD degree, MBA degree, or master's degree) are more innovative than CEOs who have other educational levels. Negative and significant results of CEO location indicate that CEOs who are located overseas have international networks and more international experience, contributing to R&D activities in health care and technology firms.

The results of this study add support to the argument that CEO characteristics play a significant role on firm inputs in the Australian market. The findings on CEO characteristics have important implications for firms seeking to promote competitiveness and performance of firms through R&D activities in the long term and for board members and human resource departments in different industries to investigate the efficiency and fairness of CEOs.[9]

[9] The efficiency and fairness of CEOs are directed to their organisations (enable each part of the organisation to function better), board members (improve the board's effectiveness by ensuring that new members complete a thorough onboarding program and creating opportunities for the board to learn about topics like changing technology, emerging risks, rising competitors, and shifting macroeconomic scenarios), employees or staffs members (connect with staff, identify and eliminate work obstacles) and CEOs themselves (reputation and compensation).

Chapter 5: Conclusion

5.1 Overview

Traditional theories emphasize firm, industry, and market level explanations on firm performance. Although these theories explain a significant portion of the observed variation in capital market, recent research identifies managerial-specific explanations in firm performance. According to Upper Echelon Theory (UET), demographic factors of top managers are a clear prediction of organizational outcomes (Hambrick and Mason, 1984). Chief executive officers (CEOs) are usually the central strategic decision makers and even control the top strategy-making group (Zahra and Pearce, 1989). The level of CEOs' leadership and social capital they have built is closely connected with firm performance, particularly with debt and equity.

The majority of existing studies in CEO characteristics and firm performance are US based, Australia, one of the leading exchange group country, has not received significant research attention. Moreover, the research on CEO demographic factors is rare as manually collecting such data is difficult. For these reasons, CEO characteristics associated with managerial effects are neglected in literature over the past two decades. Given this gap, this thesis analyses the effects of different CEO demographic factors on firm performance and innovation in Australian stock markets.

This chapter is structured as follows. Section 5.2 summarises each chapter of this thesis, and Section 5.3 discusses the key contributions of the thesis. Finally, Section 5.4 identifies the implications and limitations of this research and proposes directions for future research.

5.2 Thesis summary

Chapter 1 introduced the motivation and research objectives of this thesis. Additionally, thesis contribution and thesis structure were also presented in this chapter.

Based on Boolean searches within the Social Sciences Citation Index, Chapter 2 provides a review of literature pertaining to CEO characteristics to identify the most influential publications. As a result, 495 records across 144 publication sources published from 1984 to 2019 are identified. The main research streams are Management, Finance, Strategy, and Interdisciplinary. These research streams, which can be considered as different lines of enquiry, have developed over time and contribute to a comprehensive understanding of CEO characteristics. The literature in these research areas suggests that CEO of a firm provides critical leadership and exerts significant influence on firm performance. There is a gap to analyse effects of CEO gender, CEO education level, and CEO location on firm performance and innovation in Australian market.

More specifically, this thesis aims to answer the following research questions.

(1) Do CEO characteristics affect firm performance in Australia?
(2) Do CEO characteristics impact of research and development in Australia?

Chapter 3 investigate the relationship between CEO characteristics and firm performance via a range of financing announcements in Australian markets. We first conduct panel regressions with firm-level control variables that use CARs of firms over 180 trading days prior and post as our dependent variable, and CEO characteristics as independent dummy variables. Expanding on the regression results, this study also adopts the event study methodology to measure the effects of CEO characteristics on firm performance. Generally, CEO characteristics have a stronger impact on debt, equity, capital raising, refinancing, and loan decisions rather than bond announcement returns.

Chapter 4 investigates the relationship between CEO characteristics and firm innovation via R&D expenditure in Australian markets. Panel regression models and Tobit regression models are used to examine the firm reaction of R&D expenditure

(dependent variable) to demographic factors of CEOs (independent dummy variables). The CEO characteristics are gender, chairperson duality, education level, and location. In general, empirical results in this thesis suggest that CEO characteristics have a strong impact on firm innovation activities. Specifically, CEO gender and CEO educational level have stronger impacts on R&D expenditure compared to CEO-chairperson duality and CEO location.

Chapter 5 concludes the thesis and identifies the implications and limitations of this research.

5.3 Key contributions of the thesis

The most significant contribution of this thesis is providing insights into CEO characteristics, with specific reference to firm performance and innovation activities in the Australian markets. Other key contributions can be summarized as follows.

In Chapter 2, this study:

- Provides a systematic review of literature pertaining to CEO characteristics and firm performance via the bibliographic mapping approach.
- Identifies the most influential publications on CEO characteristics over the last fifty years.
- Identifies main research streams: Management, Finance, Strategy, and Interdisciplinary.
- Offers a review of highly cited articles on CEO characteristics within the broader research conversation and identifies key academic contributions by top cited publications.
- Identifies emerging research trends by following an examination and review of publications published since 2015 (2015-2019) related to CEO characteristics.
- Identifies a gap in the literature that only 13 publications cover the Australian market.

- Notes that issues analysed in Australian market are relationship between CEO duality and the likelihood of company fraud, the association between CEO dismissal and corporate performance, female CEOs perform in family firms, the links between CEO compensation structure and firm performance, investigation of CEO duality, CEO cash bonuses and corporate governance, CEO duality on the survival likelihood of new economy initial public offering, requirements on non-family CEOs and non-family chief financial officers, the effect of CEO power on idiosyncratic volatility and bank profitability, an ethnicity effect on CEO compensation, pay gap between male and female executives, CEO duality, board structure, and profiles of board members with industry-level analysis.
- Identifies the gap in literature whereby there is a need to analyse effects of CEO gender, CEO education level, and CEO location on firm performance and innovation.

In Chapter 3, this study:

- Finds that CEO characteristics play a significant role on firm outcomes in the Australian market.
- Finds that CEO characteristics have a stronger impact on debt, equity, capital raising, refinancing, and loan decisions rather than bond announcement returns.
- Provides empirical evidence of gender effects on firm performance, i.e. female CEOs generate positive announcement returns on bond decisions that outperform their male counterparts, and female CEOs are better received in the Australian market when making bond decisions.
- Identifies negative effects of CEO duality on firm performance, supporting the agency theory.
- Provides evidence of CEO education level's impact on firm performance as follows: (1) equity and capital raising decisions made by CEOs who have PhD degrees are more favourable than CEOs who have other educational levels; (2) loan decisions made by CEOs who have Masters degrees are more favourable than CEOs who have lower education degrees; (3) debt decisions made by CEOs who have MBA degrees are less favourable than CEOs who have non-MBA degrees.

In Chapter 4, this study:

- Provides empirical evidence of the impact of CEO characteristics on firm innovation.
- Provides evidence showing CEO gender and CEO educational level have stronger impacts on R&D expenditure compared to CEO-chairperson duality and CEO location.
- Finds that firms managed by female CEOs have higher R&D expenditure than male CEOs regardless of education level proxy (gender effect).
- Finds that firms with CEOs who hold PhD degrees or MBA degrees are more likely to engage in R&D activities and in turn have greater R&D expenditure (PhD effect).
- Provides empirical evidence of gender effect in Basic Materials and Health Care industries.
- Provides empirical evidence of the PhD effect in Basic Materials, Consumer Goods, Financials, and Industrials industries.
- Provides evidence showing effect of CEO-chairperson duality on R&D expenditure in Consumer Services, Financials, Technology, and Telecommunications industries.
- Provides evidence showing effect of CEO location on R&D expenditure in Health Care and Technology industries.
- Provides evidence of the MBA and Masters effect for Basic Materials, Consumer Goods, Consumer Services, and Telecommunications industries.

5.4 Limitations and Directions for Future Research

This thesis addresses issues of CEO characteristics regarding firm performance and innovation. There are other related issues that are beyond the scope of the current study and are therefore not addressed in this thesis. Given that a CEO is the central strategic decision maker, there is still a large amount of research that needs to be done in the area of how CEO demographic factors are incorporated into firm performance.

First, it is important to review highly cited articles on CEO characteristics within the broader research conversation and identify key academic contributions by top cited publications. Chapter 2 shows that additional CEO characteristics (CEO narcissism, gender, connectedness, and humility); entrepreneurship and open innovation; emerging markets; firm investments in corporate political activities; and new methodologies are emerging research trends based on examination and review of publications published since 2015 (2015-2019) related to CEO characteristics. Further exploration of these emerging research avenues would be valuable starting points for future research regarding CEO characteristics.

Second, in the area of linkage between CEO characteristics and firm performance there is a significant amount of work to be accomplished. Drawing on UET, organizational outcomes are proportionally predicted by managerial background characteristics of CEOs or their top management team (Hambrick and Mason, 1984), and reflect the corporate decisions they have made (Datta and Rajagopalan, 1998). Therefore, an important issue to investigate is managerial characteristics of top management teams based on Australian firms. The results from Chapter 3 show that CEO characteristics have opposite impacts on loan announcements returns compared to other types of announcements and do not show significant impacts on refinancing announcements returns. This suggests that loan decisions and refinancing announcements might be affected by other CEO characteristics or demographic factors of other executive officers. For instance, Jiang et al. (2010) investigate whether chief financial officers (CFOs) have more impact on earnings management compared to CEOs. However, it is beyond the scope of this thesis to identify effects of CFO characteristics on firm performance. This research could be accomplished for demographic factors of CFO influences on firm performance based on Australian markets. Furthermore, use levels of education without discipline, it may have biases on CEOs and partial of our results. For instance, if the CEO's degree is in engineering, he/she might be well-performed in firms which belong to mining industry rather than firms which belong to healthcare or tourism industry as they have relevant knowledge and skills. The rest can be done in the same

manner. This research could be completed for disciplines of CEO influences on firm performance based on Australian markets.

Finally, it is important to expand on the discussion of the effects of CEO characteristics on firm innovation. As suggested in Chapter 4, a quantitative study of firm innovation and CEO characteristics with Australian listed firms associated with all available research and development (R&D) expenditure data would improve our knowledge of the impacts from CEOs, and in different industries.

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Appendix

Appendix A. Citation details for top 51 publications

Rank	Author	Journal	LCS	GCS
1	Hambrick and Mason (1984)	Academy of Management Review	126	3764
2	Bertrand and Schoar (2003)	Quarterly Journal of Economics	61	729
3	Barker and Mueller (2002)	Management Science	34	294
4	Adams et al. (2005)	Review of Financial Studies	26	343
5	Datta and Rajagopalan (1998)	Strategic Management Journal	20	118
6	Kaplan et al. (2012)	Journal of Finance	20	131
7	Davis et al. (1997)	Academy of Management Review	19	1192
8	Malmendier et al. (2011)	Journal of Finance	19	222
9	Herrmann and Datta (2002)	Journal of International Business Studies	16	118
10	Rajagopalan and Datta (1996)	Academy of Management Journal	15	88
11	Roth (1995)	Academy of Management Journal	11	137
12	Zajac and Westphal (1996)	Academy of Management Journal	11	204
13	Papadakis and Barwise (2002)	British Journal of Management	11	113
14	Sanders (2001)	Academy of Management Journal	10	232
15	Farber (2005)	Accounting Review	10	346
16	Wally and Baum (1994)	Academy of Management Journal	9	194
17	Brick et al. (2006)	Journal of Corporate Finance	9	213
18	Lin et al. (2011)	Journal of Corporate Economics	9	57
19	Carpenter (2002)	Strategic Management Journal	8	256
20	Jensen and Zajac (2004)	Strategic Management Journal	8	166
21	Chen and Hsu (2009)	Family Business Review	8	135
22	Daellenbach et al. (1999)	R&D Management	7	75
23	Datta et al. (2003)	British Journal of Management	7	58
24	Guthrie and Datta (1997)	Journal of Management Studies	6	48
25	Ruigrok et al. (2006)	Journal of Management Studies	6	78
26	Yim (2013)	Journal of Financial Economics	6	79
27	Lewis et al. (2014)	Strategic Management Journal	6	59
28	Ryan and Wiggins (2001)	Journal of Corporate Finance	5	84

29	Bigley and Wiersema (2002)	Administrative Science Quarterly	5	85
30	Petrenko et al. (2016)	Strategic Management Journal	5	60
31	Fondas and Wiersema (1997)	Journal of Management Studies	4	42
32	Conyon and Murphy (2000)	Economics Journal	4	118
33	Voordeckers et al. (2007)	Journal of Small Business Management	4	100
34	Kellermanns et al. (2008)	Family Business Review	4	173
35	Johnson et al. (2009)	Review of Finance	4	117
36	Yang et al. (2011)	Journal of Small Business Management	4	23
37	Carcello et al. (2011)	Contemporary Accounting Research	4	69
38	Zona et al. (2013)	British Journal of Management	4	34
39	Jermias and Gani (2014)	British Accounting Review	4	18
40	Custodio and Metzger (2014)	Journal of Financial Economics	4	25
41	Benmelech and Frydman (2015)	Journal of Financial Economics	4	41
42	Begley (1995)	Journal of Business Venturing	3	104
43	Sharma (2004)	Auditing: A Journal of Practice & Theory	3	56
44	Hillier and McColgan (2006)	European Financial Management	3	14
45	Kaymak and Bektas (2008)	Corporate Governance - An International Review	3	39
46	Fahlenbrach (2009)	Journal of Financial and Quantitative Analysis	3	105
47	Classen et al. (2012)	Journal of Small Business Management	3	63
48	Deshmukh et al. (2013)	Journal of Financial Intermediation	3	49
49	Liang et al. (2013)	Journal of Banking and Finance	3	56
50	Zhu and Chen (2015)	Strategic Management Journal	3	14
51	Georgakakis and Ruigrok (2017)	Journal of Management Studies	3	10

Appendix B. Parametric t-tests result on comparing female and male CEOs

Gender	Debt	Equity	Capital Raising	Refinancing	Bond	Loan
-180	-0.3472	-2.1363 **	-0.0765	0.6969	1.2706	0.1993
	(0.7347)	(0.0378)	(0.9394)	(0.5167)	(0.2240)	(0.8437)
-120	0.2249	-2.7668 ***	0.6234	-0.2838	-0.1461	0.5041
	(0.8262)	(0.0077)	(0.5356)	(0.7886)	(0.8871)	(0.6181)
-90	0.2334	-3.1698 ***	0.8544	-0.6145	0.2841	1.2039
	(0.8198)	(0.0025)	(0.3961)	(0.5645)	(0.7826)	(0.2355)
-60	-0.3507	-3.2584 ***	0.4820	-1.9267 *	0.2806	1.6986
	(0.7322)	(0.0019)	(0.6318)	(0.0786)	(0.7852)	(0.0955)
-30	0.6604	-1.2237	0.9489	-1.7457	0.1016	0.6505
	(0.5206)	(0.2291)	(0.3461)	(0.1211)	(0.9214)	(0.5201)
-15	0.4307	0.2906	0.7438	-1.2980	0.9071	0.2584
	(0.6747)	(0.7740)	(0.4599)	(0.2425)	(0.3810)	(0.7981)
-10	0.5973	-0.0283	0.5284	-0.9887	0.3459	-0.2520
	(0.5609)	(0.9777)	(0.5995)	(0.3690)	(0.7369)	(0.8030)
-5	0.1297	0.0094	0.7126	-0.6107	0.5095	0.0044
	(0.8992)	(0.9926)	(0.4789)	(0.5729)	(0.6214)	(0.9965)
0	-1.5553	1.5651	-0.2456	-0.3507	2.4288	-1.0301
	(0.1356)	(0.1252)	(0.8071)	(0.7457)	(0.0244)	(0.3092)
+5	-0.6410	0.9295	-0.2077	-0.6436	1.9931	-0.7523
	(0.5327)	(0.3599)	(0.8364)	(0.5540)	(0.0614)	(0.4572)
+10	-0.5779	0.4490	1.1534	-0.3377	1.5580	-0.3107
	(0.5736)	(0.6575)	(0.2525)	(0.7545)	(0.1387)	(0.7584)
+15	-0.6092	0.1115	1.2559	-0.5401	2.3178 **	0.5390
	(0.5533)	(0.9123)	(0.2130)	(0.6177)	(0.0315)	(0.5939)
+30	-0.1521	1.1653	0.5887	-1.2396	1.0896	0.7668
	(0.8820)	(0.2520)	(0.5585)	(0.2597)	(0.2951)	(0.4487)
+60	0.5982	1.1274	0.2842	0.0729	1.0947	0.3394
	(0.5602)	(0.2676)	(0.7775)	(0.9458)	(0.2927)	(0.7370)
+90	0.0080	0.4241	1.0534	-0.3775	-0.2994	0.6354
	(0.9938)	(0.6754)	(0.2958)	(0.7237)	(0.7711)	(0.5298)
+120	-0.0710	0.0615	0.9720	-0.6281	-0.7885	1.0370
	(0.9448)	(0.9515)	(0.3346)	(0.5582)	(0.4457)	(0.3060)
+180	0.4476	1.0694	-0.0058	-0.8275	-1.0956	0.8388
	(0.6626)	(0.2926)	(0.9954)	(0.4474)	(0.2910)	(0.4070)

Significance at the 10% (*), 5% (**), or 1% level (***) is indicated.

Appendix C. Parametric t-tests result on comparing dual and independent CEOs

Duality	Debt	Equity	Capital Raising	Refinancing	Bond		Loan	
-180	-1.2242	-0.4889	1.3991	-0.9359	-1.2194		0.2982	
	(0.2234)	(0.6261)	(0.1655)	(0.3551)	(0.2253)		(0.7675)	
-120	-0.3293	-0.3652	0.7977	-0.3920	-1.5349		0.1738	
	(0.7430)	(0.7159)	(0.4342)	(0.6979)	(0.1273)		(0.8632)	
-90	0.0005	0.4269	0.4040	-0.2196	-1.7056	*	0.2694	
	(0.9996)	(0.6705)	(0.7013)	(0.8277)	(0.0904)		(0.7894)	
-60	0.2427	0.5891	-0.1828	0.5097	-1.6216		0.5592	
	(0.8090)	(0.5572)	(0.8439)	(0.6139)	(0.1074)		(0.5794)	
-30	0.6392	0.0089	-0.2491	0.0905	-1.2762		-0.2091	
	(0.5245)	(0.9929)	(0.7964)	(0.9286)	(0.2047)		(0.8357)	
-15	0.4143	-0.5502	0.0447	0.0234	-1.5546		0.0629	
	(0.6799)	(0.5835)	(0.9854)	(0.9815)	(0.1228)		(0.9502)	
-10	0.3173	-0.9326	-0.1496	-0.4010	-1.0935		-0.4634	
	(0.7520)	(0.3530)	(0.8602)	(0.6914)	(0.2771)		(0.6458)	
-5	-0.4822	-0.4120	-0.0819	-0.6296	-2.4070		-0.2005	
	(0.6310)	(0.6814)	(0.9103)	(0.5333)	(0.0171)		(0.8424)	
0	-1.1398	-0.4336	0.9594	-0.7796	-0.2361		0.6535	
	(0.2568)	(0.6657)	(0.3396)	(0.4409)	(0.8141)		(0.5173)	
+5	0.5050	0.9841	0.5459	-1.4195	-2.7063	***	1.8622	*
	(0.6150)	(0.3272)	(0.5803)	(0.1625)	(0.0075)		(0.0667)	
+10	0.0144	1.3888	0.4269	-1.1286	-2.8343	***	1.5603	
	(0.9885)	(0.1671)	(0.6658)	(0.2658)	(0.0052)		(0.1237)	
+15	0.3129	0.9142	0.8220	-1.3861	-2.9924	***	0.4861	
	(0.7554)	(0.3626)	(0.4137)	(0.1726)	(0.0032)		(0.6297)	
+30	0.1831	0.5253	1.2864	-0.8808	-2.6952	***	0.0810	
	(0.8553)	(0.6007)	(0.2001)	(0.3846)	(0.0077)		(0.9359)	
+60	0.6470	0.5503	-0.2458	-1.5765	-2.5088	**	-0.6156	
	(0.5195)	(0.5835)	(0.8049)	(0.1215)	(0.0130)		(0.5415)	
+90	1.2111	0.8320	-0.6830	-1.4046	0.2954		-1.2005	
	(0.2285)	(0.4073)	(0.4898)	(0.1669)	(0.7686)		(0.2351)	
+120	1.1019	0.5704	-0.7711	-1.7736	0.8373		-1.3954	
	(0.2731)	(0.5697)	(0.4378)	(0.0820)	(0.4046)		(0.1682)	
+180	0.8981	0.3739	-0.3745	-1.7440	1.3830		-1.5340	
	(0.3714)	(0.7094)	(0.7069)	(0.0868)	(0.1693)		(0.1303)	

Significance at the 10% (*), 5% (**), or 1% level (***) is indicated.

Appendix D. Parametric t-tests result on comparing CEOs with PhD degrees and others

PhD	Debt		Equity		Capital Raising		Refinancing		Bond		Loan	
-180	-1.0433		-3.7384	***	0.0359		0.2986		1.0998		2.1036	**
	(0.3028)		(0.0003)		(0.9714)		(0.7761)		(0.2804)		(0.0398)	
-120	-1.0010		-0.8368		1.4459		1.8947	*	1.4795		0.9421	
	(0.3228)		(0.4055)		(0.1495)		(0.0839)		(0.1485)		(0.3516)	
-90	-0.4626		0.2293		1.8960	*	3.4175	***	0.8061		1.2874	
	(0.6469)		(0.8195)		(0.0590)		(0.0037)		(0.4284)		(0.2041)	
-60	0.2166		1.6244		1.6959	*	3.2138	***	0.9334		2.2739	**
	(0.8300)		(0.1073)		(0.0911)		(0.0049)		(0.3598)		(0.0264)	
-30	0.1214		3.3021	***	1.0026		1.4458		0.1196		2.3754	**
	(0.9043)		(0.0012)		(0.3173)		(0.1802)		(0.9062)		(0.0206)	
-15	-0.0937		3.0600	***	0.3157		1.5611		0.0132		1.5037	
	(0.9261)		(0.0027)		(0.7527)		(0.1505)		(0.9896)		(0.1391)	
-10	0.1268		2.4575	**	1.2209		1.0801		-0.5388		1.1099	
	(0.9000)		(0.0154)		(0.2234)		(0.3121)		(0.5964)		(0.2735)	
-5	0.0440		1.9637	*	0.8857		0.7179		-0.5379		0.2317	
	(0.9653)		(0.0519)		(0.3770)		(0.4980)		(0.5966)		(0.8186)	
0	-1.1618		1.0736		1.2755		-0.6464		-1.0403		-2.8067	***
	(0.2518)		(0.2861)		(0.2035)		(0.5415)		(0.3074)		(0.0063)	
+5	-0.5037		2.6327	***	1.7116	*	0.1839		0.4890		0.5437	
	(0.6181)		(0.0094)		(0.0881)		(0.8611)		(0.6298)		(0.5907)	
+10	-1.8053	*	2.2535	**	1.4864		1.0536		1.8421		0.9230	
	(0.0763)		(0.0260)		(0.1384)		(0.3240)		(0.0738)		(0.3618)	
+15	-1.5724		2.2868	**	1.4796		0.5925		2.0975	**	1.5119	
	(0.1218)		(0.0239)		(0.1403)		(0.5748)		(0.0427)		(0.1370)	
+30	-1.6843	*	2.8050	***	1.1835		1.2189		-0.0501		1.2257	
	(0.0977)		(0.0058)		(0.2379)		(0.2555)		(0.9606)		(0.2270)	
+60	-0.5785		2.9219	***	0.7715		2.1922	**	-0.3748		1.8039	*
	(0.5668)		(0.0041)		(0.4414)		(0.0495)		(0.7121)		(0.0771)	
+90	-0.3099		2.8166	***	0.7432		2.6170	**	-1.1204		2.6761	***
	(0.7588)		(0.0056)		(0.4584)		(0.0222)		(0.2716)		(0.0095)	
+120	0.9803		3.4343	***	0.5442		1.9927	*	-0.2008		3.2047	***
	(0.3326)		(0.0008)		(0.5871)		(0.0714)		(0.8430)		(0.0020)	
+180	1.1491	***	2.7663	***	0.0744		2.1467	*	-0.5622		2.5751	**
	(0.0000)		(0.0000)		(0.9408)		(0.0535)		(0.5799)		(0.0123)	

Significance at the 10% (*), 5% (**), or 1% level (***) is indicated.

Appendix E. Parametric t-tests result on comparing CEOs with MBA degrees and others

MBA	Debt		Equity		Capital Raising	Refinancing	Bond		Loan	
-180	2.8675	***	-0.3662		1.5305	-0.4138	-1.1133		-0.5919	
	(0.0040)		(0.7211)		(0.1265)	(0.7162)	(0.2686)		(0.5559)	
-120	1.8507	*	-1.5090		0.4455	-0.1026	-1.4552		-0.7307	
	(0.0623)		(0.1477)		(0.6563)	(0.8938)	(0.1483)		(0.4672)	
-90	1.6842		-1.1611		0.3655	0.5518	-0.5900		-0.9064	
	(0.1039)		(0.2623)		(0.7150)	(0.6111)	(0.5572)		(0.3673)	
-60	0.9765		-1.5082		0.7532	0.3442	-1.1210		-0.2451	
	(0.4064)		(0.1481)		(0.4518)	(0.7868)	(0.2651)		(0.8073)	
-30	-0.0779		-2.5068	*	0.3974	0.6520	0.3876		0.0320	
	(0.8588)		(0.0193)		(0.6914)	(0.5924)	(0.6996)		(0.9746)	
-15	-0.8181		-1.4187		-0.1396	0.7680	0.4160		-0.0669	
	(0.2582)		(0.1722)		(0.8891)	(0.5113)	(0.6788)		(0.9469)	
-10	-1.3850		-0.1086		-0.4079	1.3107	-0.2015		0.5129	
	(0.1840)		(0.9156)		(0.6837)	(0.2265)	(0.8410)		(0.6098)	
-5	-0.2650		-0.5457		-0.7884	0.5270	0.8450		1.9710	*
	(0.9173)		(0.5951)		(0.4309)	(0.6306)	(0.4009)		(0.0509)	
0	1.0405		-0.3916		-0.0832	-0.0698	1.0814		-1.0987	
	(0.2571)		(0.7026)		(0.9338)	(0.9788)	(0.2825)		(0.2747)	
+5	0.0153		-0.1266		-0.4769	0.3510	2.2095	**	0.3785	
	(0.8145)		(0.9017)		(0.6338)	(0.7523)	(0.0289)		(0.7063)	
+10	-0.5028		0.2402		-1.0735	0.3566	2.0779		0.4110	
	(0.8571)		(0.8148)		(0.2836)	(0.7401)	(0.0399)		(0.6825)	
+15	-0.9733		0.3070		-0.5557	-0.5551	1.2310		0.9144	
	(0.4070)		(0.7648)		(0.5788)	(0.5857)	(0.2217)		(0.3631)	
+30	-0.5852		0.6565		-0.0246	-0.1065	0.7285		0.4897	
	(0.6098)		(0.5234)		(0.9804)	(0.9598)	(0.4687)		(0.6259)	
+60	-1.4823		0.8085		0.2454	-0.2318	0.5517		1.6328	
	(0.1819)		(0.4327)		(0.8063)	(0.8120)	(0.5832)		(0.1051)	
+90	-1.7902	*	0.1767		0.3194	0.0468	0.2455		2.0357	**
	(0.0760)		(0.8632)		(0.7497)	(0.9778)	(0.8070)		(0.0437)	
+120	-1.3247		-0.6774		0.4909	0.3453	0.5778		1.6030	
	(0.1786)		(0.5103)		(0.6238)	(0.7523)	(0.5654)		(0.1117)	
+180	-1.8833	**	-0.3989		0.9384	0.9705	0.7392		1.1353	
	(0.0438)		(0.6976)		(0.3486)	(0.3420)	(0.4621)		(0.2592)	

Significance at the 10% (*), 5% (**), or 1% level (***) is indicated.

Appendix F. Parametric t-tests result on comparing CEOs with Masters degrees and others

Masters	Debt		Equity		Capital Raising		Refinancing	Bond		Loan
-180	2.6946	***	-1.2243		8.8007	***	0.2830	-1.4747		-1.6192
	(0.0073)		(0.2213)		(0.0000)		(0.7781)	(0.1415)		(0.1063)
-120	1.7691	*	-3.1045	***	10.2768	***	0.5023	-2.3628	**	-0.9664
	(0.0775)		(0.0020)		(0.0000)		(0.6170)	(0.0187)		(0.3348)
-90	1.8587	*	-3.4345	***	9.4432	***	0.8501	-1.9034	*	-1.2033
	(0.0637)		(0.0006)		(0.0000)		(0.3974)	(0.0579)		(0.2298)
-60	1.2138		-4.1169	***	8.6504	***	0.7206	-2.2327	**	-1.2770
	(0.2256)		(0.0000)		(0.0000)		(0.4731)	(0.0262)		(0.2026)
-30	-0.2472		-3.2908	***	7.9996	***	0.8784	-0.8047		-1.2743
	(0.8050)		(0.0010)		(0.0000)		(0.3821)	(0.4221)		(0.2036)
-15	-0.6238		-3.2456	***	6.6302	***	0.2103	-1.1804		-1.0595
	(0.5333)		(0.0012)		(0.0000)		(0.8341)	(0.2392)		(0.2904)
-10	-0.9511		-2.6395	***	7.1164	***	1.0969	-0.7258		-0.5755
	(0.3423)		(0.0084)		(0.0000)		(0.2754)	(0.4691)		(0.5657)
-5	-0.5573		-1.1528		7.3838	***	0.1492	-0.1063		0.5578
	(0.5778)		(0.2495)		(0.0000)		(0.8819)	(0.9155)		(0.5777)
0	1.2111		-0.1326		3.8041	***	0.8987	2.2669	**	-1.3611
	(0.2266)		(0.8946)		(0.0001)		(0.3713)	(0.0240)		(0.1746)
+5	-0.0319		-0.7943		5.0971	***	-0.2432	1.5523		-1.3318
	(0.9746)		(0.4274)		(0.0000)		(0.8087)	(0.1218)		(0.1840)
+10	0.3635		-0.8636		5.8680	***	-0.1631	0.4972		-0.4548
	(0.7166)		(0.3882)		(0.0000)		(0.8710)	(0.6199)		(0.6498)
+15	-0.0055		-0.8376		5.2641	***	-1.0350	-0.8358		-0.0021
	(0.9956)		(0.4027)		(0.0000)		(0.3032)	(0.4046)		(0.9983)
+30	0.6339		-1.4797		5.1742	***	-0.5131	-0.6495		-0.5217
	(0.5267)		(0.1394)		(0.0000)		(0.6095)	(0.5171)		(0.6026)
+60	-0.1585		-2.7480	***	4.7255	***	-1.2845	-0.9950		-0.8621
	(0.8742)		(0.0061)		(0.0000)		(0.2018)	(0.3210)		(0.3896)
+90	-0.3162		-2.0296	**	4.2448	***	-0.4735	-0.9957		-0.6893
	(0.7522)		(0.0427)		(0.0000)		(0.6374)	(0.3207)		(0.4915)
+120	-0.7502		-2.1927	**	3.1641	***	-0.4846	-0.6460		-0.5801
	(0.4538)		(0.0286)		(0.0016)		(0.6294)	(0.5193)		(0.5626)
+180	-1.3968		-1.6861	*	1.3225		0.1457	0.4323		-0.6935
	(0.1633)		(0.0922)		(0.1862)		(0.8846)	(0.6662)		(0.4888)

Significance at the 10% (*), 5% (**), or 1% level (***) is indicated.

Appendix G. Parametric t-tests results on comparing CEOs located in Australia and others

Location	Debt		Equity		Capital Raising		Refinancing		Bond		Loan	
-180	2.1332	**	-2.4494	**	2.2614	**	-0.8341		2.3919	**	-0.6054	
	(0.0363)		(0.0151)		(0.0252)		(0.4239)		(0.0176)		(0.5482)	
-120	1.4632		-2.5530	**	1.7179	*	-1.4778		1.1509		-1.3135	
	(0.1486)		(0.0113)		(0.0883)		(0.1615)		(0.2516)		(0.1942)	
-90	1.5086		-1.5866		1.5175		-1.8340	*	0.1182		-1.6230	
	(0.1365)		(0.1144)		(0.1318)		(0.0855)		(0.9062)		(0.1094)	
-60	1.6301		-0.0693		2.2475	**	-2.2058	**	0.3515		-1.5382	
	(0.1077)		(0.9449)		(0.0261)		(0.0407)		(0.7260)		(0.1289)	
-30	1.6264		0.8212		2.0509	**	-1.9284	*	0.0676		-1.8188	*
	(0.1085)		(0.4132)		(0.0421)		(0.0708)		(0.9462)		(0.0732)	
-15	0.7260		0.3490		1.2373		-0.7783		-1.6698	*	-1.6486	
	(0.4717)		(0.7279)		(0.2187)		(0.4542)		(0.0964)		(0.1039)	
-10	0.3078		0.2132		0.0066		-0.9193		-1.5150		-1.8982	*
	(0.7600)		(0.8317)		(0.9947)		(0.3775)		(0.1312)		(0.0617)	
-5	-0.6829		-0.9408		-1.0809		-0.8759		-2.2492	**	-1.7948	*
	(0.4984)		(0.3486)		(0.2824)		(0.4004)		(0.0253)		(0.0771)	
0	-1.9394	*	-0.8237		-0.3210		-0.8055		-1.7701	*	-0.0702	
	(0.0564)		(0.4118)		(0.7492)		(0.4387)		(0.0781)		(0.9445)	
+5	-1.1660		0.4596		-1.2793		-0.5229		-2.1363	**	-1.2168	
	(0.2487)		(0.6469)		(0.2035)		(0.6129)		(0.0338)		(0.2289)	
+10	-1.2374		0.5965		-0.8395		0.9667		-1.1086		-0.8352	
	(0.2209)		(0.5522)		(0.4035)		(0.3530)		(0.2695)		(0.4079)	
+15	-2.2990	**	0.1952		-0.5636		1.0091		-1.0210		-1.3239	
	(0.0242)		(0.8457)		(0.5747)		(0.3314)		(0.3091)		(0.1907)	
+30	-2.1161		-0.1515		-0.4809		-0.1125		-1.1643		-0.7732	
	(0.0377)		(0.8800)		(0.6321)		(0.9132)		(0.2459)		(0.4434)	
+60	-0.8702		-0.5559		0.7693		0.0890		-1.4168		0.3175	
	(0.3886)		(0.5796)		(0.4439)		(0.9313)		(0.1582)		(0.7527)	
+90	-1.1780		-0.2671		0.2533		0.0249		-0.9632		0.2341	
	(0.2438)		(0.7900)		(0.8008)		(0.9807)		(0.3371)		(0.8163)	
+120	-1.8479	*	0.2163		-0.0431		-0.5317		-0.4920		0.4291	
	(0.0687)		(0.8293)		(0.9657)		(0.6084)		(0.6238)		(0.6704)	
+180	-1.9438	*	0.9465		-0.6126		-0.5243		-0.6468		0.8807	
	(0.0557)		(0.3458)		(0.5420)		(0.6138)		(0.5191)		(0.3831)	

Significance at the 10% (*), 5% (**), or 1% level (***) is indicated.

Appendix H. Announcements examples for each category

Company Name & ASX Code	Announcement Header	Announcement Date	Category
DUET Group	DUET establishes $150 million debt facility	2/6/2017	Debt
Devine Limited	Devine's Core Debt Facility Extended	5/30/2013	Debt
Dexus Prop	DEXUS (DXS) obtains refinancing for all 2009 debt maturities	11/24/2008	Debt
Commonwealth Bank of Australia	Sale of equity interest in BoComm Life	5/23/2018	Equity
Origin Energy Limited	No intention to raise equity on back of credit rating update	2/21/2013	Equity
XTV Networks Ltd	$5M Equity Raising - Placement and Entitlement Offer	8/16/2011	Equity
AXA Asia Pacific Holdings Limited	AXA APH announces capital raising	3/17/2009	Capital Raising
Archer Exploration Limited	Capital Raising - update	5/11/2016	Capital Raising
Apex Minerals NL	A$60.5 Million Capital Raising	9/29/2008	Capital Raising
88 Energy Limited	Debt Facility Refinance	3/26/2018	Refinancing
Abacus Property Group	Abacus refinances $480 million syndicated facility	6/20/2014	Refinancing
Downer EDI Limited	Downer and Spotless complete refinancing	5/16/2018	Refinancing
Alcoa Inc. (AAI)	Alcoa Form 8K Filed August 3 Closing of Bond Offering	8/4/2010	Bond
AAT Corporation Limited (AAT)	Proposed US$7.5 million Convertible Bond Issue	3/9/2007	Bond
ADX Energy Ltd (ADX)	Capital Raising to meet Bond requirements oversubscribed	8/27/2009	Bond
CML Group Limited	Trade Finance Loan Book and Compliance as at 31 March 2018	4/16/2018	Loan
Hillgrove Resources Limited	Hillgrove Gold Loan Repaid in Full	10/2/2014	Loan
Panterra Gold Limited	Shareholder Loans Conversion Rights Clarifying Statement	5/8/2017	Loan