Post-GFC Remuneration in the Australian banking industry:

The impact of remuneration guidance on the alignment between pay-performance sensitivity and prudent risk-taking

by

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Statement

I hereby certify that this thesis is the result of my own research and that is has not, nor has any part of it, been submitted for a higher degree to any other university or institution.

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Abstract

This study investigates empirically the relation between remuneration and performance for the CEO and top 5 highest paid executives in Australian banks in the pre- and post-GFC periods. Pay-performance sensitivity is influenced by remuneration policy, and is based on agency theory. In the post GFC period, financial firms were pressured internationally to redesign managerial remuneration in the face of many studies pointing at poor remuneration practices in the financial sector as a cause of the GFC. Australia's implementation of a remuneration guideline (Prudential Practice Guide: PPG 511 - Remuneration) in 2009 was designed to align pay-performance sensitivity with prudent risk-taking through properly structured remuneration. This study makes an original contribution by evaluating the impact of implementing Remuneration Guidelines in the Australian banking sector.

Using a 13-year sample covering all Australian banks listed in the Australian Securities Exchange (ASX) between 2003 and 2015, the results show that bank CEO remuneration became aligned with risk-taking in the post-guideline period. The absence of such an alignment in the pre-guideline period may suggest that the introduction of the remuneration guidelines had an impact on practice. I also find that a strong interest alignment between top executives and shareholders remains in the post-guideline period in the Australian banking industry.

Chapter 1 - Introduction

"What APRA looks at is not the 'how much' of executive pay, but the 'why'. Our concern is to make sure that the remuneration practices adopted by regulated financial institutions are sound and do not imbed 'risk time bombs' on the balance sheet which could undermine the viability of the firm in the future." David Lewis, General Manager, Australian Prudential Regulation Authority (APRA).[1]This statement summarises APRA's expectation of Australian banks on their remuneration practices.

Despite the fact that the Australian financial system was largely uninterrupted during the GFC of 2007 and 2008 (Pais & Stork, 2011), the Australian banking regulator adopted the Financial Stability Board's(FSB's)Principles for Sound Compensation Practices[2](APRA, 2009) in 2009 when the global economy was still gloomy from the aftermath of the GFC. In line with the FSB's global financial system reform regarding remuneration, a number of key areas have been targeted by APRA to ensure the soundness of remuneration policy in the Australian financial industry. Those key areas include: 1.) stipulating the board of directors as a key input in remuneration policy settings, 2.) defining properly-designed remuneration as a governance system to encourage key personnel to take risks prudently,[3] and 3.) motivating executives to maintain a long-term view through properly-structured remuneration.

The primary objective of this study is to review the effectiveness of the remuneration guideline imposed on the Australian banking industry. In particular, the alignment of pay-performance sensitivity and prudent risk-taking is the key interest of this research. In addition, the association between corporate governance, especially the board of directors, and pay-

[1]Speech delivered at The Financial Institutions' Remuneration Group Annual Conference, Terrigal 18 September 2012 (APRA, 2012)

[2] FSB's Principle for Sound Remuneration Practice is endorsed by G20 and so it is also adopted by other major economies globally other than Australia.

[3] The coverage of the guideline include a wide range of personnel relevant to the soundness of the banks. For example, non-employees engage in loan brokerage services on behalf of the bank. A more comprehensive discussion will be given in section 2.3 of Chapter 2.

performance sensitivity will also be included in this study. Attempts have been made also to investigate the effectiveness of remuneration to motivate executives to focus on the long-term success of the institution.

In addition to the guideline review, this study also examines interest alignment between executives and shareholders. Within the context of Australia, there is a shortage of recent academic literature on bank executive remuneration. The most recent study regarding Australia's top bank executives being remunerated to enhance shareholders' value was published a decade ago (Doucouliagos, Haman, & Askary, 2007), and their study period ends in the year prior to the GFC (and the introduction of APRA's guideline on remuneration in financial industry). Thus, it is important to revisit the contractual relationship between executives and shareholders, especially subsequent to a policy change represented by the guideline. While narrowly focusing on whether agency relations between executives and shareholders might be associated with a risk-seeking corporate culture (Chen, Steiner, & Whyte, 2006; Fahlenbrach & Stulz, 2011; Pathan, 2009; Vallascas & Hagendorff, 2013), APRA's remuneration guideline does not inhibit the corporate objective of shareholders' value maximisation. Thus, the interest alignment between executives and shareholders should remain strong in the post-guideline period.

Using a 13-year sample covering all Australian banks listed in the Australian Securities Exchange (ASX) between 2003 and 2015, I find that bank CEO remuneration became aligned with risk-taking in the post-guideline period of 2010 to 2015. The absence of such an alignment in the pre-guideline period of 2003 to 2009 may suggest that this is the result of the introduction of the remuneration practice guide.

I also find that a strong interest alignment between top executives and shareholders remains in the post-guideline period. This was expected for two reasons. Firstly, the most recent study

focusing on shareholder return for the period 1992 to 2005 found it to be the determinant of CEO remuneration in the Australian banking industry. Secondly, the guideline does not discourage the board from designing a remuneration policy that aligns the interests of top executives and shareholders.

Nevertheless, the same interest alignment is not found in the pre-guideline period. One plausible explanation for interest alignment between top executives and shareholders being absent in the pre-guideline period (2003-2009) but present in the period covered by previous study (1992-2005) and the post-guideline period (2010-2015) is that remuneration policy in the Australian banking industry failed to adjust for extreme adverse economic conditions, such as the GFC. This explanation affirms the recommendation in the guideline that the board of directors should adjust downward the performance-based portion of remuneration in adverse circumstances.

The results also indicate that executive remuneration policy in Australian banks changed dramatically in the post-guideline period. For example, the traditional strong and persistent relation between firm size and bank remuneration is not found in the post-guideline period. While a negative relation between corporate governance and executive remuneration is found in the pre-guideline period, a positive relation between these variables is found in the post-guideline period.

I also extend the analysis to the economic significance of performance to executive remuneration and the association between long-term past performance and current remuneration. From the viewpoint of banking policy, the analysis of economic significance concludes that while CEO remuneration policy is generally in line with the guideline, non-CEO executive remuneration seems to be relatively less compliant to the guideline. Thus, the relation between long-term performance and remuneration is not found in the full period. Due

to data unavailability, the analysis cannot be conducted in separate pre- and post-guideline periods. As such, for conservativeness, no conclusion has been drawn from this result and this issue will be left for future study.

For robustness, other specifications of a key explanatory variable (i.e., firm size) and regression model format (i.e., pooled OLS) have been used. In addition, the results of the full period have been compared to the pre- and post-periods to ensure that the conclusions drawn are not only based on theoretical arguments but also on statistical evidence. Their high consistency indicates the robustness of the results.

This study contributes to the literature in a number of ways. Firstly, it enriches the scarce Australian remuneration literature on the banking industry and provides the latest understanding of banking remuneration policy in Australia. Secondly, it provides a timely review of the effectiveness of the remuneration guideline within the context of Australia. Thirdly, it expands the analysis of focus on CEO remuneration to cover non-CEO remuneration. To the best of my knowledge, this is the first study of non-CEO executive remuneration in the Australian banking industry. Fourthly, while the use of a corporate governance index is not a new concept, the implementation of an index to capture the board's effect on remuneration in this study is an innovative approach within the relevant literature. More importantly, a governance index consisting of gender diversity, independence and financial expertise on the board is found to be associated with executive remuneration in Australian banks.

The reminder of the thesis is structured as below: Chapter 2 analyses the Australian banking industry and the remuneration guideline, reviews the literature on remuneration, corporate governance and the banking industry, and develops testable hypotheses. Chapter 3 discusses the data collection process, research design, model specification and research method in

testing hypotheses. Chapter 4 reports the testing results and provides detailed analysis of the implication of the results, including their limitations. Chapter 5 concludes the findings and their implications for banking policy in Australia.

Chapter 2 -Literature and background

2.1 Introduction

This chapter starts with a brief introduction to the business environment of the Australian banking industry, including its market structure and regulatory environment (section 2.2). Following an analysis of APRA's guideline concerning remuneration practice in Australian financial institutions and its implications for the financial industry (section 2.3), the focus will be on a literature review (section 2.4). In particular, agency theory will be introduced and its influence on remuneration practice will be discussed at length (section 2.4.1). Then, section 2.5will show the different social roles played by financial and non-financial firms. Since APRA's guideline was introduced to address the executive remuneration issue in the banking sector, the relevant literature will be reviewed to justify the decision to issue the guideline (section 2.6). After that, corporate governance will be discussed in detail. The discussion will cover its function as an institutional device and the relation between pay and corporate risk culture in the context of the literature (sections 2.7 and 2.8). A corporate governance index will be introduced as a variable in this study (section 2.9).Alternative theories, which may influence remuneration policy, will be introduced next (section 2.10).Finally, two testable hypotheses will be developed based on the analysis of APRA's guideline and the relevant literature (section 2.11, subsections 2.11.1 and 2.11.2).

2.2 The Background of Australian banking industry

In Australia, there are 149 Authorised Deposit-Taking Institutions (ADIs), comprising 31 Australian-owned banks, seven foreign subsidiary banks, 45 branches of foreign banks, three building societies, 60 credit unions and three other ADIs as at September 2016 (http://www.apra.gov.au/adi/pages/adilist.aspx). Yet the Australian banking industry is dominated by with the four largest banks ('the big 4'), namely Commonwealth Bank of Australia (CBA), Westpac Banking Corporation (WBC), National Australia Bank (NAB) and Australia and New Zealand Banking Group (ANZ). With the combined value amounting more than a quarter of ASX 200 companies in terms of market capitalisation (McConnell, 2016), the financial soundness of the big 4can have a direct impact on the entire Australian economy. Thus, it is not surprising that the Australian banking industry has attracted enormous attention from academic researchers, the public and regulators.

Currently, the regulation of financial markets in Australia is divided into prudential regulation, regulation of market conduct by financial institutions, protection of financial stability and protection of competition in the financial system. Those responsibilities are designated to the Australian Prudential Regulation Authority (APRA), Australian Securities and Investments Commission (ASIC), Reserve Bank of Australia (RBA) and Australian Competition and Consumer Commission (ACCC) respectively (http://www.apra.gov.au/Speeches/Pages/99_02.aspx). Since the key area of this study relates to banking risk policy, the focus will be on APRA.

Having gone through the GFC of 2007 to 2008 with little adverse impact, the Australian banking sector has attracted the interest of researchers as to how Australian banks escaped from this global economic disaster. In an empirical study of Australian banking policy leading up the GFC, Pais & Stork (2011) found that the bank risk policy imposed by APRA appeared to be relevant in explaining Australian banks' robustness against the GFC. From the

perspective of operating efficiency, studies also found that Australian banks were more efficient than their international counterparts prior to the GFC (Shamsuddin & Xiang, 2012; Vu & Turnell, 2011). Further, Australian bank resilience has also been evident in their high credit ratings (http://www.relbanks.com/best-banks/australia) and their presence in the top 50 world's safest bank list (https://d2tyltutevw8th.cloudfront.net/media/document/safest-banks-2016-global-top-50-1473374611.pdf) in recent years.

While the Australian banking industry seems to be undeniably strong given the sound risk policy and high efficiency found in the literature, the development of the banking sector is not without challenges. In the IMF's (2012) financial system stability assessment report, some unique Australian business practices have been highlighted and they may give rise to uncertainty in the Australian banking industry. For example, the big 4 banks' dominancy in the residential mortgage market and their interdependency in funding increases systemic risk and makes the Australian banking industry vulnerable to the housing market. And their heavy reliance on off-shore funding means that Australian banks are sensitive to economic shocks in other economies. In addition, there is evidence showing that the big 4 banks focus more on profit maximisation than cost efficiency (Vu & Turnell, 2011). And this finding seems to be a legitimate reason for the public to be concerned about the remuneration model of mortgage brokers under which Australian banks pay brokers upfront (Scheule, 2014).

The continuous effort to ensure the soundness of the banking industry by vigorously adhering to international standards after the GFC means that the business environment has also changed constantly. For example, following the recognition of the big 4 banks by the Basel Committee Banking Supervision as systemically important banks domestically (APRA, 2013b; BIS, 2012), APRA announced an additional 1% Higher Loss Absorbency (HLA) capital requirement for those big banks to be effective in 2016 (APRA, 2013a). And the RBA's decision to provide ADIs with a Committed Liquidity Facility as an alternative to the Basel

III liquidity standard requires banking institutions to increase their holdings of high quality assets, which are in short supply in the Australian market (RBA, 2011a, 2011b). All these prudential policies shape the landscape in which Australian banks operate.

2.3 APRA's Prudential Practice Guide PPG 511 - Remuneration

As part of a global effort to reform remuneration in the financial industry, APRA adopted the Financial Stability Board's (FSB) Principles for Sound Compensation Practices: Implementation Standards (Implementation Standards) and issued Prudential Practice Guide - PPG 511 in 2009.[4] The recommendation for remuneration reform in the global financial industry stems from the notion that poorly-designed remuneration was one of the main contributors to the GFC (FSB, 2009a). Specifically, FBS (2009a) believes that the prevailing corporate culture of short-term profits orientation and excessive risk-taking driven by the problematic incentive arrangement in financial institutions should be addressed on a global scale. And since the board of directors is the remuneration governing body in a firm, FSB's Implementation Standards also emphasise the importance of the board as a key player in remuneration formulation, in addition to its role in the promotion of prudent risk-taking and long-term success through strategic remuneration policy (FSB, 2009b). Naturally, these have also become the key objectives of introducing PPG 511 in Australia.

With the intent of promoting global remuneration standards in the financial industry, the FSB's (2009b) Implementation Standards are expected to be adopted by regulators across countries in accordance with their considerations of relevance. Thus, it is sensible that APRA (2009) has decided not to replicate the entire body of Implementation Standards but to adopt the relevant sections based on the unique market structure and business environment of the financial sector in Australia. The three key areas of remuneration reform found in the

[4]hereafter: PPG 511 or the guideline

guidelines are remuneration governance, alignment of remuneration and prudent risk-taking, and the promotion of long-term success.

Firstly, with respect to the remuneration governance, APRA's guideline stipulates that the board of directors is the chief institutional device in ensuring that remuneration policy is in line with the prudent remuneration principles set out in the guideline. To that end, the board is given the ultimate decision right to override its remuneration committee's decision on compensation policy. Moreover, three requirements for the duty and construction of the remuneration committee to reassure the effectiveness of governance mechanism concerning remuneration. The first point is that the remuneration committee should conduct periodical reviews of remuneration policy. The second is that the remuneration committee should collate information from other relevant sub-committees, such as risk and human resources committees, for making informed decisions on remuneration policy. Third, the composition of the remuneration committee needs to demonstrate its capability for aligning remuneration and risk policy. Viewing all these requirements collectively, the influence of governance devices on the remuneration policy after the introduction of APRA's guideline should be pronounced.

Secondly, in relation to the alignment of remuneration and prudent risk-taking, the guideline focuses on the two key issues, which may undermine the soundness of the remuneration policy. The first issue is that the remuneration policy should extend beyond top management (CEO and non-CEO executives) in the corporate hierarchy, whose decisions are likely to have an impact on the whole group, to three other groups inside and outside the firm. Those groups include employees whose: 1.) primary duty involves financial control or risk management, and 2.) whose remuneration structure has a significant component of variable performance-based commission or bonus. And it also covers individuals who are not directly employed by the financial institutions but the product they sell on behalf of the institutions

can potentially have a sizeable detrimental effect on the institution (loan mortgages). The second issue addresses the compensation of individuals who are identified as covered by this guideline, directing that properly designed remuneration arrangements should link their pays to performance measures that adjust for risk and promote prudent risk-taking behaviour.

Thirdly, APRA also expects that, by following the guideline, remuneration policy should promote the long term success of a financial institution. To achieve this goal, a large portion relative to the total variable pay should be deferred for an extended period of time and the subsequent eligibility should be subject to a minimum long-term performance target. Although from the view of guidelines, the deferral can enhance the accuracy of risk and performance measure, it also acknowledges that the period of deferral should be set at an optimal level, since the effectiveness of the incentive may be undermined as a result of eligibility being exceedingly extended. Another suggestion that may support the remuneration reform is that the guideline encourages the board of the director to consider downward adjustments of the deferred performance-based compensation in the event of the regulated institutions facing considerable adversity.

While the guideline has articulated APRA's view of prudent remuneration policy through the three aforementioned objectives analysed previously, the structure of remuneration and the performance measures that meet the minimum requirement of the guideline are not specified.[5]The corresponding liberty given to the board in remuneration settings can induce unintended consequences. For example, to avoid the adverse consequences of breaching the requirement, remuneration policy may be designed to meet all of the specified requirements and comply superficially with the recommendations in the area where clear instructions are

[5]APRA has actually commented on the flaw of particular performance measure and incentive instrument. For example, Relative Total Shareholder return may be susceptible to earnings manipulation. And the unbalanced payoff feature of options in the upward and downward market may incentivise executives to add unnecessary volatility. Yet the guideline does not prohibit the use of any particular performance measure in designing remuneration. Instead the board can decide whether and in what ways they use performance measures.

absent. Thus, it is unclear if the guideline can truly lead those regulated financial institutions to incorporate prudent risk-taking into remuneration determination.

It is clear that the guideline's main objective is to require financial institutions to have a remuneration mechanism in place that promotes prudent risk-taking but it does not conflict with the corporate goal of equity value creation or shareholder return maximisation. The implication for the introduction of APRA's remuneration guideline is that the new corporate goal is perhaps to maximise profit or equity value within an acceptable risk level.

2.4 Executive remuneration and agency theory

The contractual relationship separating control and ownership, known in the literature as agency theory, is created with the intention of benefiting all parties in the relationship. In a study of evolution of corporations in the early 1900s, Berle and Mean (1932) observed the rise of large corporations with the characteristics of dispersal shareholding ownership and separation of control and ownership. Today, this is the dominate type of company ownership structure in many economies. The idea behind this phenomenon is that this cooperative scheme also creates an opportunity for fulfilling the goal of involving parties who lack the resources to achieve the same results by themselves. For example, two basic ingredients for a company are capital resources and human resources. When one party possesses capital resources and needs others to generate a return, and the other lacks the funds to turn their human resources into cash (Shleifer & Vishny, 1997), both parties become willing to enter into a corporative scheme.

While the cooperative scheme appears to provide mutual benefits for the contracting parties, the inherent differences and asymmetric information between managers and owners may create unresolved problems. From the perspective of shareholders, their general goal is to get

returns from their investments. And as risk bearers, they tend to hold diversified investments in order to minimise the risk (Fama, 1980). Thus, the best outcome for shareholders is that each of the companies they own shares in employs a profit maximisation strategy regardless of the level of risk involved. However, since a substantial portion of managers' incomes generally comes from employment income, which is basically undiversifiable, managers are more interested in creating conglomerations with relatively less firm risk and more stable income (Amihud & Lev, 1981). There is clearly a goal divergence between shareholders and managers.[6]

Due to the asymmetrical information and inherent differences suggested in agency theory, agency problems perhaps cannot be fully solved, or will at least prove difficult to solve. A corporate governance device may mitigate the problem. In agency literature, the remuneration committee and the board of directors are two governance mechanisms which are believed to effectively mitigating agency problem (Fama, 1980; Jensen & Murphy, 1990b; Ross, 1973). The essence of remuneration lies in its motivational power of inducing the recipients to take actions in favour of shareholders (Jensen & Murphy, 1990b). Consequently, the performance monitoring and decision ratifying responsibilities of the board of directors serve as a relatively lower cost of device to moderate the agency problem (Fama, 1980). In fact, the remuneration mechanism and the board are closely related, since remuneration policy is set by the board of directors. Thus, the combination of these two mechanisms makes a fundamental governance system that can help achieve the shareholder goal of profit maximisation.

[6]In addition, due to the fact that it is almost impossible for shareholders to monitor managers' behaviour and performance effectively, the prosperity of the cooperative scheme may be further undermined by this shirking and adverse selection (Eisenhardt, 1989).

2.4.1 The effectiveness of remuneration as a moderator in agency problems

Agency theorists suggests that the remuneration in practice is a testing ground for the agency problem and that, as a result, the solution to this problem should be found in remuneration policy. In the early literature concerning the agency problem, the seminal study of CEO and shareholder wealth sensitivity conducted by Jensen & Murphy (1990b) documents a strong statistical link but weak economic significance between these two variables. This study is important because the result can serve as evidence that remuneration is an incentive device to align the interest of CEOs and shareholders, but it also suggests that CEOs are not sufficiently motivated to act in the best interest of shareholders. Inspiring by these findings, similar empirical studies have been carried out to investigate agency problems internationally but the focus is usually narrowed down to the pay-performance sensitivity. Pay-performance relation studies have been carried out internationally (Gregg, Machin, & Stefan, 1993; Izan, Sidhu, & Taylor, 1998; Sloan, 1993). However, much of the results during the 1990s show a weak or missing link between CEO remuneration and shareholder returns from the perspective of agency theory. This can be interpreted as a message for remuneration setters at the firm to revamp the remuneration mechanism, by aligning better the interest between CEO and shareholders.

Facing pressure from shareholder activists and academics demanding the increased use of stock-options (Jensen & Murphy, 2004), it seems the solution for agency problems can be found most simply in adding the stock-option into the CEO remuneration mix. Taking pay-performance sensitivity as a proxy for the level of agency problem, the inclusion of stock-option as part of remuneration packages, which indirectly increases the subsequent executives' ownership upon option exercise, appears to be an effective arrangement to enhance pay-performance sensitivity (Jensen & Murphy, 1990a; Smith & Stuiz, 1985). The argument of using options also seems to strike at the core of the agency problem. For example, Smith et al. (1985) postulate that the use of option can increase the risk appetite of executives whose

natural aversion to risk is one of two major sources of agency problems. As a result, under such an incentive system, the interest of an individual manager appears to be tied more closely in theory to that of shareholders.

In practice, while the effect on the firm of granting a stock-option may yield positive results, a negative effect on corporate performance is also evident. For example, market reaction to the announcement of stock-option grants as part of executive remuneration is usually positive and leads to the subsequent increase of firm value (Morgan & Poulsen, 2001). When the stock option used as an incentive device seems to bring immediate benefit to shareholders, the detrimental effect may require one to rethink option's incentive role in executives, especially in the long run. For instance, Erickson, Hanlon & Maydew (2004) document a significant and positive association between the level of stock-option grant to executives and accounting fraud. Furthermore, empirical study suggests that while the use of stock-option was the main source of strong growth in executive pay from the1980s to the1990s, the corresponding improvement in firm performance was relatively insignificant (B. Hall & Liebman, 1998). Evidence of management controlling the stock-option award date (Yermack, 1997), the association between the option award and earnings management (Bergstresser & Philippon, 2006) and, perhaps more relevant to agency problem, the finding that executives profited substantially from adjusting the terms of their option grants (Brenner, Sundaram, & Yermack, 2000), demonstrate that the incentive of stock-option compensation may not necessarily induce executives to act in the best interest of shareholders.

The role that agency theory plays in the evolution of remuneration has been proven to be influential. Under the agency view, remuneration is structured to align the interest between CEOs and shareholders because these two parties are the main focus of agency theory. The trajectory of development appears to coincide with the suggestions from empirical study. One point worthy to mention is that the early studies do not distinguish financial and non-financial

industries. Perhaps their research design was intentionally constructed in such a way because the narrow focus of the CEO-shareholder relationship is unlikely to be appropriate in financial institutions, whose special role in any economy requires them to look beyond the general corporate objective of profit maximisation. In next section, the special nature of the financial industry will be discussed.

2.5 The special nature of the financial sector

The significant role of financial institutions in social, financial and economic systems distinguishes them from other industries in an economy. For example, banks facilitate economic growth through lending, strengthen corporate governance in non-financial companies through monitoring (Mullineux, 2006), and provide a safe place for the public to store their money through accepting deposits. And insurance companies provide peace of mind to policyholders by meeting the financial promises stated in their policies. Therefore, financial institutions are regulated differently from other industries.

History teaches us that the failure of major financial institutions could have material adverse consequences on the stability of an entire economy. For example, the collapse of Australian insurance company HIH in 2001 caused a substantial negative impact on Australian society and many individuals lost their pensions and superannuation savings (Pontell & G, 2007). Although no major bank collapse has occurred in Australia's recent history, the adverse consequences of the banking sector's actions will undoubtedly be enormous for the whole economy. And this is due to the special nature of their fragile capital structure and high risk of contagion (Kaufman, 1997).

The latest failure in the global financial system between 2007 and 2008 also demonstrates the different and crucial role that financial institutions, especially banks, play in the stability of

global economy. To that end, it is reasonable that the development of remuneration in the banking industry differs from that of non-financial industries. It is important to emphasise that it is not that the collapse of non-financial institution is insignificant to an economy, but that the systemic risk accompanying financial institutions is, in general, relatively substantial (Kaufman & Scott, 2003). But the recent crisis highlights that even when a small number of systemically important financial firms are at risk of collapsing, the stability of global financial and economic systems are also on the line. One solution to address this spillover effect on the international financial system is to have all financial institutions in major economies refraining from problematic business practices. Although clear causality between poor design of remuneration incentives and the GFC of 2007 and 2008 is difficult to develop, the incentive given by remuneration policy to fuel the financial crisis appears to be clear (Bebchuk, Cohen, & Spamann, 2010; Bhagat & Bolton, 2014; Fahlenbrach & Stulz, 2011; FSB, 2009a). In light of this, the Principal for Sound Compensation Practices for financial institutions has been developed and implemented by major economies (FSB, 2011) and the key objective is to align the interest of shareholders, executives and risk-taking.

2.6 Agency theory and executive compensation in financial sector

While it seems to be obvious that the agency view is not entirely appropriate for use in the remuneration policy setting for financial institutions, empirical evidence seems to find a clear consistency between agency theory and practice in top executive remuneration leading up to the GFC. Two studies in particular examine the remuneration design of bank executives in the US. Their conclusions about how well bank executives committed to shareholders might be different, yet both show that poorly-designed remuneration contributed to the GFC by inducing executives to undertake excessive risk leading up to the crisis. For instance, Fahlenbrach et al. (2011) show that bank executives were highly motivated by their compensation package to achieve profit maximisation faithfully for shareholders leading up to

the GFC. It also shows that the subsequent considerable loss incurred by the banks as a result of excessive risk taking was unanticipated by the executives. Another study demonstrates that executives were fully aware of the looming economic downfall caused by their risky investment strategies, and their ability to liquidate their own shareholdings before the GFC allowed them to make substantial net gains even after accounting for the significant drop in value of ownership in their own banks (Bhagat et al., 2014). The first study suggests that the agency view of focusing narrowly on CEO-shareholder relationship can be dangerous, as it has been proven that the adverse consequences in the banking industry are born by parties outside the shareholding group. Although the link of agency theory to banking is not as clear as the first study, the utility-maximising behaviour of CEOs and shareholders suggested by agency theory seems to be found in the second study. Given the dominance of agency views in the remuneration literature, it is not surprising that bank executive remuneration plans are designed at least to some extent with the agency lens.

2.7 The composition and objective of corporate governance

It is important to note that the corporate governance factors included here consist of only a small fraction of the entire corporate governance system. The entire system can in fact cover the extensive area of corporate affairs. For example, in a study concerning interconnectedness between governance, Larcker, Richardson & Francisco (2007) include seven categories of governance factor: 1.) board characteristics, 2.) insider ownership, 3.) outsider ownership by institutions, 4.) outsider ownership by activists, 5.) debt-type security holders, 6.) composition of remuneration, and 7.) anti-takeover devices. Their research demonstrates the complexity and difficulty of a corporate governance system. In this study, the main focus will be investigating relations between board characteristics and pay-performance.

While executive remuneration policy formulation is undoubtedly an important control function the board requires to perform, there are other responsibilities held by the board may impair their ability to fulfil their control function. Thus, it is not clear how they balance their roles in practice. The early literature centring on agency theory often emphasised hiring, firing and compensating top managers and oversighting their behaviour as a board's main duties (Fama & Jensen, 1983). Then, a review of the board's role identified the strategic influence of directors (Zahra & Pearce, 1989). With respect to the board's strategic role, an empirical study suggests that by strengthening social ties (i.e., establishing friendships), a board can encourage executives to seek strategic advice from the directors (Westphal, 1999). The purpose of providing strategic advice is to increase the efficiency of the firm and subsequently enhance shareholder value. From the perspective of agency theory, shareholder return maximisation is the key objective. So, if the board identifies that the benefit of focusing on strategic role gain is greater than the cost of relaxing the directors' control function, it is sensible for the board to choose an option to optimise the result. Perhaps this is also one of the considerations in formulating executive remuneration policy.

2.8 The effect of corporate governance on remuneration and risk taking

Following the theoretical roles of corporate governance recognised in the literature, significant research efforts have been devoted to investigate by what channels corporate governance operates. In corporate governance studies concerning boards of directors, association with top executive remuneration and risk-taking make up a sizeable portion of the relevant literature. However, their overall findings are inconclusive as to whether the board of directors fulfils their expected roles. In the empirical literature, board characteristics are often used to proxy corporate governance. The widely used characteristics are board independence and board size. In addition to those, empirical evidence also indicates that the

input of gender diversity in the board may be associated with variations in the firm's strategic direction.

2.8.1 Corporate governance in the Australian regulated firms

Corporate governance recommendations in Australia cover many operational issues in a company and not surprisingly, remuneration, risk management and board structure are included in the principles and recommendation guidelines (ASX, 2014). According to the guidelines, the board of directors is responsible for designing and reviewing the risk management of an entity. With respect to remuneration, executives should be remunerated in a manner that incentivises them to pursue both short-term and long-term success of the company. In regards to the board of directors, ASX (2014)emphasises the importance of board size, independence and separation of the roles of executive and chairman. However, the recommended principles do not distinguish firms such as financial institutions that are subject to industry-specific regulations.

While the latest issue of corporate governance principles employs a one-size-fits-all approach (ASX, 2014), APRA's (2009) PPG511 covering regulated financial institutions, including banks, also advocates that boards of directors should play a crucial role in designing and reviewing executive remuneration policy in Australian banks. With proper remuneration structure, bank executives are motivated to focus on the long-term success and to take into account risk-taking when making business decisions. Thus, the influence of corporate governance factors on executive pay-performance relations and risk-appetite in Australian banks will be included in this study.

2.8.2 The inconclusive findings about governance effects on remuneration

With respect to the board of directors' role as a remuneration policy setter, there is evidence suggesting that there is a relation between the board and executive remuneration, although

contrary results can also be found in the literature. The idea that there is a significant association between the board and pay-performance sensitivity comes from agency theory's proposition that the board sets the remuneration according to the input and output of top executives. Evidence of higher pay-performance sensitivity associated with a stronger board supports such notion (Basu, Hwang, Mitsudome, & Weintrop, 2007; Core, Holthausen, & Larcker, 1999). However, the overall empirical results in the corporate governance literature are inconclusive as to whether variations in board structure are associated with the effectiveness of remuneration policy.

According to the ASX's (2014) recommendations, an appropriate board size may facilitate stronger corporate governance. However, the empirical results are ambiguous concerning the effect of board size on remuneration governance. For example, Cyert, Kang & Kumar (2002) investigate the determinants of CEO remuneration in US firms across all industries using a wide range of explanatory variables, such as firm performance, risk and corporate governance factors. With the result regarding board size showing statistical insignificance after including proxies for firm size, they conclude that board size does not have a direct influence on CEO compensation. In contrast, Ozkan (2007), using UK firms across all industries, find that there is a positive relation between board size and CEO compensation.

Despite the inconclusive evidence of board size for firms across all industries, it may be relevant in the Australian banking industry. Doucouliagos et al. (2007) documents that larger board size is associated with smaller CEO remuneration in Australian banks, and this evidence indicates that board size has an effect on top-management remuneration. Further, more recent evidence also support the proposition that boards of larger size can be more effective (Renee B. Adams & Mehran, 2012).

Another widely examined corporate governance variable is board independence. Although board independence is intuitively a good quality of boards, evidence supporting such a notion is limited. In the early literature, Core et al. (1999) document a negative relation between board independence and level of pay. However, the linkage between these two variables is not found in the Australian banking industry (Doucouliagos et al., 2007). Moreover, Australian empirical studies across industries suggests that board independence in firms bears either no relation to CEO compensation (Heaney, Tawani, & Goodwin, 2010) or no better than an executive-dominated board (Capezio, Shields, & O'Donnell, 2011). Within the context of US, an empirical study also suggests that the effect of board independence on top executive is insignificant (Guthrie, Sokolowsky, & Wan, 2012).

2.8.3 The influence of governance on risk

International evidence concerning directors and risk-taking suggests that the board of directors may have an influence on bank risk culture. Pathan (2009) investigates corporate governance, CEO power and risk-taking in US banks between 1997 and 2004 and finds that a strong board is associated with risk-taking. The result is interpreted with from an agency viewpoint as evidence of bank directors acting in the best interest of shareholders. Since bank executives are generally risk-averse but shareholders are more interested in profit maximisation than level of risk-taking, taking higher risks appears to be consistent with shareholders' desires. Furthermore, Minton, Taillard & Williamson (2014) find that an independent director with better financial knowledge was positively related to risk-taking in US banks leading up to the GFC. Therefore, the overall empirical results suggest that an effective board is an independent one.

2.8.4The effect of board gender diversity on firm culture

One of the widely researched area with board gender diversity as the focal point is its relation with risk-taking. Although the overall findings appear to be inconclusive, there is no shortage of evidence suggesting gender diversity matters to a firm. For example, Levi, Li & Zhang (2014) find that female directors tend to be more prudent in acquisition activity and less likely to overvalue the target firm. With the same logic, gender diversity may affect the risk-appetite of the board and also the firm's risk culture. However, when Dwyer, Gilkeson and List (Dwyer, Gilkeson, & List, 2002) control the variations in financial knowledge, the gender effect becomes much less pronounced. In a more recent study, Berger, Kick & Schaeck (2014) finds that the higher the proportion of female board members is associated with higher risk in the banking sector. Consistent with this result, Adams & Ragunathan (2015) also show that female directors appear to have similar risk appetites to their male peers and a higher proportion of female board members in a bank during the GFC was not associated with lower risk. The impact of gender diversity on firms is also found in areas other than risk culture. For example, Adams & Ferreira (2009) find that female directors tend to increase the firm value of firms with weak boards but decrease the firm value in the case of strong boards. They argue that it may be the result of over-monitoring. Thus, it appears that gender diversity may have multifaceted effects on firm culture.

2.9 Corporate governance index

In the literature concerning the corporate governance index, there seems to be little restriction on the construction of such an index and the composite of governance index can be determined by the purpose of the research. For example, with the aim of unearthing the relation between governance and firm performance, Brown & Caylor (2004) constructed an index covering 51 variables from eight categories based on data from Institutional Shareholder Services. On a smaller scale, Gompers, Ishii & Metrick (2003) focussed on the

governance factor in relation to takeover defence as a proxy for shareholder rights and constructed a relevant governance index to investigate the association with firm performance. In the Australian remuneration literature, Clarkson, Walker & Nicholls (2011), based on the requirements of accounting standard (AASB 1046), created a governance index concerning remuneration disclosure.

The composite of corporate governance covered in this study is based on the requirement of PPG 511, which focuses on the board of directors. Thus, the construction of a corporate governance index encompasses key components of board characteristics, such as board independence, board gender diversity, and subcommittees related to remuneration policy settings.

2.10 Other remuneration theories and their impact on pay design process

While agency theory may explain part of the consideration for remuneration design, other theories may also influence the remuneration process. In studies of remuneration policy in regulated industries, institutional theory has been found to be relevant.

Institutional theory offers an alternative explanation for remuneration policy, one which might not follow the agency view of focusing on the pay-performance sensitivity or the CEO-shareholder interest alignment. In the context of organisational practice, Dimaggio & Powell (2016) recognise that the homogeneity can be formed under pressure from three types of channel, termed coercive isomorphism, mimetic isomorphism and normative isomorphism. In simple terms, coercive isomorphism is formed through pressure from competitors or/and regulators. Mimetic isomorphism stems from pressure from the eagerness to catch up with the leaders. And normative isomorphism is the result of market participants who have professionalised themselves in similar ways. Putting institutional theory into the context of

the remuneration policy setting, the decision to not conform to the objective of maximising shareholder returns as suggested by agency theory can be explained by the introduction of new regulations, the shift of public expectations, or the pursuit of advice from external professional remuneration consultants (Bender, 2003; Filatotchev & Allcock, 1990).

Within the context of banking business, institutional theory is particularly relevant, since the practice of a bank is under the constant scrutiny of regulators and media. Moreover, the similarity of products offered by banking institutions is likely to create pressure for smaller banks to follow larger banks. In Australia, the dominance of the big 4 banks is likely to make them the trend setters in the banking industry based on institutional theory. Since the GFC, the recognition of those four largest banks as domestically systemically important institutions may have change boards of directors' views on the best practice of remuneration policy.

2.11 Hypothesis development

The objective of this thesis is to investigate executive remuneration practice in the Australian banking industry before and after the introduction of APRA's (2009) Prudential Practice Guideline PPG 511 - Remuneration. Based on the key objective of the guideline, Australian bank executives in the post-guideline period should be remunerated by risk-adjusted performance, which was not the focus in the pre-guideline period. Therefore, it is hypothesised that the relation between executive pay and performance is different in pre-and post-guideline periods. To test this hypothesis, two testable hypotheses are formulated.

2.11.1 Hypothesis 1

H1: There is a positive relation between executive pay and shareholder return in the pre-and post-guideline periods

There are two reasons to expect this hypothesis will hold true. Firstly, as the literature indicates in the pre-guideline period, shareholder return as a performance measure had been considered one of the most relevant performance metrics within the context of prevailing agency theory. Despite the emergence of alternative remuneration theories, agency theory remains the most influential in the remuneration literature. In addition to this, the strong statistical relation between CEO pay and total shareholder return has been found in banking and non-banking literature within the context of Australia prior to the guideline (Doucouliagos et al., 2007; Merhebi, Pattenden, Swan, & Zhou, 2006). Secondly, despite its emphasis on prudent risk-taking, the guideline does not prohibit Australian banks from pursuing the standard corporate objective of profit maximisation or shareholder value maximisation. Rather, the guideline requires Australian banks to be motivated to remain prudent in risk-taking in their pursuit of profit maximisation. Therefore, the continuity of Australian banks valuing shareholder return maximisation is expected to be unbroken in pre- and post-guideline periods.

This hypothesis is tested over the full period between 2003 and 2015 split into two sub-periods spanning the years 2003 to 2009 and 2010 to 2015. The expected result is that all three samples will show a strong statistical relation between pay and performance for CEOs with all signs being positive. For the top five highest paid executives, it is expected that the statistical relation between pay and performance will be found at least in post-guideline period. It is due to the fact that there is little guidance for the board of directors from the literature on the pay-performance relation for executives other than CEO in the pre-guideline period. So no particular statistical relation is expected. In contrast, the guideline suggests that remuneration should cover executives whose decisions can have an influence on the soundness of the institutions. Having received remuneration comparable to CEOs in terms of structure and level, top non-CEO executives are expected to hold a great deal of responsibility.

Therefore, this hypothesis should be applied to both CEOs and the top five highest paid executives in the post-guideline period.

However, there is reason to expect that relation between executive pay and total shareholder return is likely to be much less pronounced in the split sample covering the years between 2003 and 2009 than the other two samples. Firstly, the sample size is small and the time period is short so the relation between the variables needs to be very pronounced to be captured by the regression model. Secondly, and more importantly, the GFC between 2007 and 2008 is likely to give a significant impact on the pay-performance association and, given the magnitude of the GFC, it is sensible to believe the association may not withstand the economic shock.

2.11.2 Hypothesis 2:

H2: There is a more positive relation between pay and risk-adjusted performance in the post-guideline period compared to the pre-guideline period.

The logic of the hypothesis is that the concept of prudent risk-taking becomes part of the requirements for Australian banks only after the introduction of the guideline. In the pre-guideline period, the debate and evidence revolving around remuneration focuses on interest alignment between CEO and shareholder. Drawing upon the mimetic isomorphism of institutional theory, it is possible for a board to prioritise profit maximisation above prudent risk-taking when a majority of their counterparts were likely to do the same in the pre-guideline period.

To test this hypothesis, the three periods used to test the first hypothesis are also used here, for CEO and top five highest paid executives. Although the conclusion can be drawn by

comparing the regression results from between pre-guideline and post-guideline periods, the small sample size may cause instability in the results. Thus, to enhance their reliability, the results from the full period will also be compared to see if they are consistent. It is also important to mention that the sub-periods are not equally weighted with the pre-guideline period containing a longer span than post-guideline. Therefore, the pay-risk-adjusted performance relation in the post-guideline period may be less stable.

2.12 Conclusion

This chapter started by introducing the unique market structure and regulatory environment of banking in Australia. In particular, it discussed the implication for remuneration practice in Australian banks as a result of the introduction of PPG 511. While the motivation of introducing the guideline was to address the issue of poorly-design remuneration identified in the fallout from the GFC, the problem could be traced a few decades ago. To illustrate, agency theory and its influence on remuneration practice has been discussed. An area of governance device other than remuneration, the role of the board of directors is reviewed in the context of the literature. As suggested by the guideline, the directors should hold the ultimate responsibility for executive remuneration policy despite the presence of a remuneration committee. In the literature, the conventional research approach for examining the relation between corporate governance and pay-performance does not seem to generate a consistent result. Therefore, a corporate governance index that can be used to capture the multiple important characteristics of both board and committee has been considered. After that, alternative theory relevant to remuneration is discussed. Based on the findings of the literature review and the analysis of the guideline, two testable hypotheses have been developed.

Chapter 3 - Data & Methodology

3.1 Introduction

In this chapter, I begin by reporting on the sample selection, data collection and source of data used for regression analyses (Sections 3.2 to 3.4.2). In section 3.5, the justification for the model specifications used in this study will be given. Next, the decision rule for including each variable in the regression model will be detailed: executive remuneration (section 3.6), accounting-based performance (3.7.1), market-based performance (3.7.2), risk-adjusted market return (section 3.7.3), corporate governance (section 3.8), firm size (section 3.9) and bank risk (section 3.10). Logarithms of remuneration and firm size proxies and data trimming have been used to enhance the performance of the regressions and the decision for making this data transformation will be justified in section 3.11. Finally, particular research methodologies such as regression procedures will be discussed in section 3.12.

3.2 Remuneration data

In this study, thirteen years of executive remuneration data spanning years between 2003 and 2015 have been selected for regression analyses. The decision to choose this sample period was arrived at after considering both data quality and quantity. In fact, the initial research plan for the study period was designed for sixteen years, starting in2000 because the longer period would, in theory, provide more stable statistical results as the sample became larger. Taking the benefit of manual collation of remuneration data, it was however detected that the quality and availability of remuneration data for the banks selected for the study backwards from 2002 was not at a satisfactory level.

The total sample size from the period between 2003 and 2015 still allows the full sample to be split into pre-guideline (2003-2009) and post-guideline periods (2010-2015) with the number of observations above 50 and 45 respectively. Although the sample size for the post-guideline period may introduce a stability issue for the test results, this problem can only be mitigated by including more firm years, which will have to be conducted in a future study.

The landscape of listed banking in Australia has little changed since the only prior study on this particular topic (Doucouliagos et al., 2007). Since the starting year of this study is 2003 and, in that year, Bank of Western Australia Limited was delisted from the ASX as a result of being acquired by HBO plc, Bank of Western Australia Limited is not included in this study. In addition to this, differences in the sample observed here compared with the prior study include: 1.) the merger of Bendigo Bank Limited and Adelaide Bank Limited in 2007 created what is known now as the Bendigo and Adelaide Bank;2.) the merger of St. George Bank Limited and Westpac Banking Limited in 2008;3.) the corporate restructure of Macquarie Bank Limited, which became part of the Macquarie Group Limited from2007. Despite the fact that there are more than a hundred authorised deposit-taking institutions registered in Australia based on the most updated information from APRA

(http://www.apra.gov.au/adi/Pages/adilist.aspx), the majority of the institutions that qualified for this study do not provide sufficient executive remuneration information. Thus, as the summary reported in Table 1 shows, the total number of banks included in the sample over the study period is ten, which is similar to the previous study.

Table 1: Summary of banking institutions included in the sample:

Adelaide Bank Limited	2003-2007
Australia and New Zealand Bank Limited	2003-2015
Bank of Queensland Limited	2003-2015
Bendigo Bank Limited	2003-2007
Bendigo and Adelaide Bank Limited	2008-2015
Commonwealth Bank of Australia	2003-2015
Macquarie Group Limited	2003-2007 (Macquarie Bank Limited), 2008-2015 (Macquarie Group Limited)
National Australia Bank Limited	2003-2015
St George Bank Limited	2003-2008
Suncorp-Metway Limited	2003-2015
Westpac Banking Limited	2003-2015

Sources: SIRCA and banks' annual reports

To ensure the quality of this study, the remuneration data has been carefully examined. For example, over the sample period, executives may be replaced during the year and the newly appointed executive is treated as an executive of that particular year. With this approach, a material number of dismissal payments for the departed executives are excluded. The reason for this treatment is to remove the severance and retirement payment from the remuneration data, because it may distort the pay-performance sensitivity analysis. For example, in the case

of a CEO dismissal, it could be resulting from poor performance. Although that CEO is no longer eligible for the performance portion of their compensation, the amount of the dismissal payment is sometimes large enough to be comparable to their performance-based compensation. During the data collection process, one CEO has been identified as falling into this scenario.

In this study, the investigation is conducted by combining each bank's non-CEO executives' and CEO's remuneration. In particular, the sum of CEO and top 4 highest paid non-CEO executive remuneration represents the Top 5 highest paid executives' (top 5) pay, which is used subsequently to assess the executive pay-performance sensitivity. A small number of Australian banks in the early years of this study period reported only top 5 pay information and some of them might have retired or been dismissed in the reporting period. Since those executives are likely to receive a significant payout sum on their departure, final payments received by them in that year are excluded from the total remuneration. In situations where the reported executives exceed five, the sample selection will be based on the size of total remuneration after the removal of such payments.

Despite the fact that remuneration data is partially from SIRCA, a majority of data for this study has been manually collected from annual reports. For data collected from SIRCA, errors have been detected and therefore the entire data has been reviewed by cross-checking with the numbers reported in the annual report of corresponding banks.

Only remuneration for current and group executives is used in the sample. In other words, all remuneration for former, retired and other executives reported in the annual reports is excluded from this sample. This is due to the fact that the reported remuneration structure of those executives appears to be materially different from those of peers in the same offices. More importantly, the influence of former executives on current firm performance is likely to

be relatively insignificant compared to the current executives, who might drive the company differently from their predecessors.

In certain situations, non-CEO executives servicing subsidiaries may be able to earn a substantial amount of equity-based remuneration and the sum of the total remuneration for those executives can be as large as that received by the CEO (as reported in CBA annual reports 2011-2005). Without the knowledge of whether the performance-base of those non-group executives is entirely linked to group performance or partially to the subsidiaries, it would be running a risk of generating a biased result to include their remuneration data in this study. In addition, while their performance may have a direct impact on the group's performance, their decisions are less likely to be as influential as group executive decisions to the group from the strategic point of view. Although they may be among the top5 highest paid executives for certain years, they are not included in this study. That said, all the non-CEO executives included in the study are personnel who can exercise influence on the entire banking group from the top.

3.3 Financial data

Bank size in this study is proxied by the log of market capitalisation and the log of total asset, which are obtained from MorningStar database. Consistent with the original study design, financial data is collected between 2002 and 2015 for the banks in the sample. However, financial data will only be collected for those years where remuneration data is also available. For example, the quality of remuneration disclosure for ANZ fits for this study are only available from 2004. In this case, the financial data for ANZ is from 2004 to 2015.

Net income before abnormal items and average total assets over the year are used to calculate return on assets. This measure of ROA is different from the default setting of ROA from the

MorningStar database, which uses the year-end total assets of a firm as denominator.[7]For banks which are more risk-prudent, it is expected that ROA from net income before abnormal items will be more statistically significant than the alternative ROA using EBIT. This is because the former ROA measure takes into account leverage. For consistency, the same approach is applied to the calculation of ROE, where average total equity is used.

There is no shortage of academic research using earnings per share (EPS) as a performance measure but for the purpose of staying focused on answering the main research interest, EPS will not be used as an alternative performance measure at this stage of the study. The use of EPS has been criticised as one of the most easily manipulated performance measures due to all the elements (i.e., earnings and shares outstanding) being accounting data, which can be managed at the discretion of executives (Jensen & Murphy, 2004). One concern of implementing this measure is that executive effort and firm resources are diverted to enhance this measure instead of activities that improve shareholder returns. In the Australian banking literature, one study has found that there is a positive relation between CEO pay and performance measure of EPS between 1992 and 2005 (Doucouliagos et al., 2007). Although it may be interesting to investigate the continuity of EPS application as an incentive and to compare the results found in this study with the prior ones, the main interest of this study lies in the association between risk, performance and pay. Thus, including four performance measures is sufficient for the purpose of this study.

Dividend is the integral part of the shareholder return. In reality, shareholder will need to deal with the tax issue of dividend received from the firm. For simplicity purposes, the tax effect of receiving non-fully franked dividends is disregarded in this study. In fact, dividend

[7]Among all the calculating measures of ROA, net income before abnormal items is deemed to be appropriate as opposed to earnings before interest and tax (EBIT). Since the main cost of banking businesses is interest expenses and the profit comes from their ability to earn a positive interest spread, the interest expense is equivalent to the cost of goods sold for manufacturing business. By removing this part of expenses from the financial measure, it also removes an important part of the information regarding business management.

payouts from a majority of the observations in this study from the year 2000 onward are generally fully-franked. Thus, the tax effect is likely to be minimal.

3.4 Corporate governance index

3.4.1 Board and committee independence

While the data for board characteristics and committee structure can be easily obtained from the SIRCA database, assurance of data accuracy has been conducted by manually matching it with the information reported by the respective banks. During the process of data matching, it has been found in certain Australian banks that some committees responsible for executive remuneration design are also involved in other human resources affairs. For example, the board committee with the function of formulating remuneration policy has also been involved in searching for executive candidates, setting the executive succession plan and other human resources affairs. In fact, this type of board structure also is observed in other Australian banks in the past. Since the remuneration policy setting is indeed a complex corporate matter, decisions should be based on a large amount of information both internal and external. Members of remuneration committees are likely to collate information from other committees, such as human resources, risk and audit, when they decide the optimal remuneration policy. Thus, the heterogeneity in function between a remuneration committee and a human resources committee with remuneration setting responsibility should be minimal.

3.4.2 Finance expertise and gender diversity

Financial expertise is recognised mainly by the directors' work experience. Consistent with prior studies (Burak Guner, Malmendier, & Tate, 2008; Minton et al., 2014), a director is classified as a financial expert in this thesis if he or she meets one of the following criteria: 1.) has held executive positions in a financial institution, 2.) currently holds a position with a significant financial function in a non-financial firm (i.e., CFO, accountant or treasurer), 3.)

holds an academic position in a related area, such as finance, economics or accounting, 4.) is a professional investor, such as a manager in a hedge fund, private equity fund, venture capital or any other investment firm.

The measurement of gender diversity is simply the proportion of female directors to the total number of directors. In the literature concerning the corporate governance index, most are constructed without gender diversity. Studies concerning female directors generally test the gender effect as a stand-alone variable in the regression model, and use a number of different approaches to its measurement. For example, while Levi et al. (2014) use the fraction of female directors on the board in their study, gender differences captured in dichotomous variables are seen in other relevant studies (Renée B. Adams & Ferreira, 2009; Dwyer et al., 2002).

3.5 Model specifications

The aim of this section is to explain the model specification in which the identified independent variable and explanatory variables are included. In order to test the hypotheses developed in the last section, executive remuneration, firm size, firm performance, corporate governance and risk factors have been identified as essential variables. In the remuneration literature, the model specifications vary according to the purpose of the research.

While a variety of model specifications are used in the study of remuneration (Doucouliagos et al., 2007), the implicit rule can be identified by the high consistency between its general form and the key theory. For example, the prevailing agency view in the early literature argues that the dependency of CEO remuneration on corporate performance is the manifestation of interest alignment between CEO and shareholders (Kaplan, 1994; Murphy, 1985). The building block of model specifications as identified in the literature has

remuneration as the dependent variable and performance measures as the independent variables. Subsequent to the seminal work conducted by Jensen & Murphy (1990b), who found a strong statistical but weak economic significance in the association between CEO wealth and shareholder wealth, studies concerning pay-performance sensitivity follow the basic specifications of managerial pay or wealth as dependent variables (Amzaleg, Azar, Ben-Zion, & Rosenfeld, 2014; Core et al., 1999; Hermalin & Wallace, 2001; Matolcsy, 2000; Rajgopal, Shevlin, & Zamora, 2006). Being the key explanatory variable for executive compensation, various measures of corporate performance used are not uncommon in studies like these; this will be discussed below.

To explain a complex business phenomenon, it is often more realistic to consider using a multivariate regression model. Within the context of remuneration, it is desirable to model the level of pay according to the talent and productivity of the employees. In practice, due to the unobservable nature of such attributes, proxies such as share performance and firm size are often used to measure them. (Hölmstrom, 1979; Murphy, 1985). For example, in Murphy's (1985) investigation of the sensitivity of various pay components to firm performance, the inclusion of the firm size effect is found relevant in a way that not only explains the remuneration but also enhances the performance of the model. The significance of firm size as a predictor for executive and director remuneration was found to be strong and consistent in subsequent studies, where various model specifications are involved (Conyon, 1997; Doucouliagos et al., 2007; Harford & Li, 2007; Heaney et al., 2010; Merhebi et al., 2006). Therefore, bank size will be included in this study.

The support for the notion of corporate governance, especially for the board and remuneration, holding an important role in determining remuneration design can be found in both theoretical arguments and empirical studies in the pre-guideline period. And APRA's demand for the board of directors' active participation in remuneration design in financial institutions makes

the inclusion of the governance factor as one of the explanatory variables more compelling. As Jensen & Murphy (2004) neatly summarise that "the primary role of the board of directors is to hire, fire and set the remuneration of CEO and other executives", a functioning board should be significantly connected to executive remuneration in a statistical sense. Consistent with this argument, Core, Holthausen, and Larcker (1999) find that agency costs appear to be higher when a firm's governance structure is weaker. From the perspective of model specifications, they see the statistical significance of governance factors as an indicator that the governance factor is an integral explanatory variable in pay-performance sensitivity regression analyses. In the Australian literature, evidence of linkage between corporate governance and pay-performance sensitivity has been found in a study concerning firms across all industries (Schultz, Tian, & Twite, 2013) and also a banking industry-specific study (Doucouliagos et al., 2007). It is also important to note that there are sub-committees responsible for different functions delegated by the board. Among them, the remuneration committee holds the key role for executive remuneration design and its relation with executive remuneration is also supported by empirical results (Conyon, 1997; Conyon & Peck, 1998). Moreover, APRA (2009) demands the presence of a remuneration committee (or delegate remuneration setting responsible to the relevant committee, if the bank has a reason for not setting up a remuneration committee) as a compulsory institutional device. That the board of directors takes an active role in designing and reviewing the executive remuneration in Australian financial institutions highlights the importance of their roles in executive remuneration in the post-guideline period. Thus, both board of directors and remuneration committee will be included in the regression model as part of the governance factor.

The association between risk-taking and executive remuneration is the key focus of APRA's remuneration guideline. In fact, the complicated relation between risk, return and executive remuneration had been studied under the agency view before the guideline was introduced in 2009. Agency theory suggests that the relation between pay-performance sensitivity and risk

is likely to be negative due to managers' risk-aversion, a proposition backed by empirical evidence (Aggarwal & Mandelker, 1987; Merhebi et al., 2006). One of the plausible explanations for that involves the board's offer of incentives to executives for taking more risk. For instance, when the board has determined the level of risk-taking by the executive below the optimal level, they can incentivise executives to take more risk through adjustments in remuneration policy (Harford & Li, 2007). When the performance accompanying the additional risk does not grow faster than or at least at the same level, it can cause a positive relation between pay-performance sensitivity and risk. In the banking literature, evidence has shown that an effective board is positively associated with bank risk-taking (Pathan, 2009). More recently, Cheng, Hong & Scheinkman (2015) investigate the association between executive pay and risk-taking in the banking industry. From their results, they deduce that the co-existence of executive pay and risk-taking in the banking industry is the natural consequence of principal-agent theory because in order to retain risk-averse executives in a risky firm, more generous remuneration packages are required.

To answer the research question about the impact of the implementation of the Prudential Remuneration Practice guide (PPG511) on bank executive pay-performance sensitivity and risk taking, the model specification has been built upon the argument above as:

$$Pay_{it} = f(performance_{it} + size_{it} + corporategovernance_{it} + risk_{it})$$

Pay_{it} = the logarithm of executivetotal remuneration in year t

$performance_{it}$ = average return on asset (ROA), average return on equity (ROE), Total Shareholder Return (TSR) and Risk-adjusted return

$size_{it}$ = the logarithm of total assets and logarithm of market capitalisation

$corporategovernance_{it}$ = corporate governance index (the sum of the level of independence in the board, audit committee, risk committee, and remuneration committee, the level of gender diversity on the board, and the level of financial expertise in board) and board size.

$risk_{it}$ = $\sigma_{(\text{daily stock return})}$ over 1 year of time

3.6 Dependent variable: Executive remuneration

The current year of total remuneration for each bank's CEO and top 5 highest paid executives will be used as its remuneration measure. The collective decisions and actions of CEOs and top non-CEO executives incorporate hierarchies are expected to be more influential on ultimate firm performance. Under the agency lens, the partial solution is to align the interest of shareholders and that of top-managers with the assumption that the CEO is the sole decision maker in the firm. Thus, from the perspective of agency theory, it is sensible that many pay-performance sensitivity studies focus mainly on CEOs (Doucouliagos et al., 2007; B. J. Hall & Murphy, 2002; Heaney et al., 2010; Jensen & Murphy, 1990b). In practice, while bank CEO decisions might have a profound impact on a bank's prospect, top-level management decision makers such as the chief financial officer and chief risk officer can also influence its future performance. In addition, the similarity of the structure and composition of the CEO's and non-CEO executives' remuneration allows this study to examine their remuneration as one group of decision managers. More importantly, APRA's guideline covers basically everyone in the bank who engages in risky financial business in addition to risk management and financial control and the CEO. Thus, the remuneration policy for non-CEO executives is expected to be different in the post-guideline period.

It is worthy of mention that only a little remuneration study covers top 5 highest pay executives within the context of Australia. In the recent Australian banking literature, the focus is on CEO and director pay (Doucouliagos et al., 2007). Therefore, it is likely that this is the first Australian study to examine the pay-performance relation for top non-CEO bank executives.

With respect to remuneration measurement, I have used total remuneration disclosed in the annual report. In the early literature, one approach to compute overall pay-performance sensitivity is to add the sensitivity of different pay components. In an empirical study concerning executive pay-performance relations in banking, Houston & James (1995) argued that the overall sensitivity estimate obtained through this method yielded unbiased and efficient results on the condition of different components being uncorrelated with each other. Since there seems to be a lack of evidence suggesting remuneration components are correlated (Crawford, Ezzell, & Miles, 1995), it appears that the result from Houston et al. (1995) is robust. However, after carefully considering the risk involved in this approach, the most widely use method in extant studies of simply taking the remuneration as dependent variable is followed.

APRA (2009) emphasises that remuneration policy in financial institutions should be designed to motivate executives to focus on the long-term success of the bank. To achieve this goal, APRA (2009) specifies that boards of directors should take an active role in designing and reviewing remuneration in financial institutions. In view of this, total remuneration should, to some extent, be associated with not only contemporaneous performance but also performance in the recent past.

3.7 Independent variable: Performance

3.7.1 Accounting-based performance measure

ROE and ROA as performance measures for businesses have been widely used in practice and academic arenas. In the literature, the use of these metrics can be found in studies involving performance measures of non-financial and financial companies (Aebi, Sabato, & Schmid, 2012; Core et al., 1999; Doucouliagos et al., 2007; Harford & Li, 2007).

ROA and ROE have been chosen as accounting based performance measures with benefits including: 1.) allowing direct comparing reason with prior studies (Doucouliagos et al., 2007);and 2.) their ability to capture different aspects of firm performance. ROE provides the basic measure of profitability of a company with the focus on equity. The fundamental link of ROE with equity may be viewed as a measure of the agency problem from the perspective of shareholders (Haldane, 2012).

In practice, strong ROE alone does not indicate the financial health of a company. For instance, ROE in the US banks leading up to the GFC reached as high as 30% (Aebi et al., 2012) although this exceptional performance did not lead them to a long-term success. Since the growth rate of ROE can be boosted by increasing leverage, which also represents an increase of risk-taking (Haldane, 2012), measuring firm performance solely from the perspective of profitability with ROE ignores long-term stability and prosperity.

While ROE focuses on the profitability aspects of the business without capturing the level of risk-taking, ROA may be used to justify whether the growth rate of ROE is reasonable. ROA is usually used to measure the productivity aspects of a firm, since it is the ratio of return to total asset owned by the firm. As accounting rules dictate, the increase of leverage should also lift the level of asset. Therefore, the implementation of ROA as a performance measure

should adjust for the expansion of balance sheet in theory. A European Central Bank (2010) study also finds that ROA's ability to capture the leverage effect in banking business makes it a better performance measurement in comparison with ROE during a crisis. In view of this, it is not surprising that there is a call for shifting the focus of bank performance measure from ROE to ROA, which can be considered as risk-adjusted performance measure (Haldane, 2012). In fact, ROA has always been used extensively as a performance measure in finance and banking literature (Aebi et al., 2012; Houston, Lin, Lin, & Ma, 2010; Knapp, Gart, & Becher, 2005).

However, there is no uniformity of how to define ROA and ROE. For example, while Choi & Hasan (2005) compute ROA and ROE using net income plus depreciation as the nominators for both ratio and book value of total assets and book value of total equity respectively, Aebi et al. (2012) employ banks' cumulative net income over the year t+1 and t+2 as nominators for ROA and ROE and book value of equity and total assets as of year t as denominators respectively. This suggests that the definition of ROA and ROE in the literature can be adapted to suit the purpose of a study. In this study, ROA and ROE are defined as follows:

$$ROA = \frac{NetIncome}{AverageTotalAsset}$$

$$ROE = \frac{NetIncome}{AverageTotalEquity}$$

3.7.2 Market-based performance measure

This study will use a market-based performance measure. TSR has been selected as this measure for several reasons. In the literature concerning pay-performance sensitivity, market-based performance measures have played a central role in assessing the interest alignment between top managers. One of the arguments for market-based performance measures being

superior to accounting-based measures is that rewarding management with accounting profits may induce management to manipulate the accounting (Jensen & Murphy, 1990b). By linking management's compensation with market-based performance measures like stock price and dividend, management can be induced to devote its efforts to actions that increase shareholder wealth. Thus, it may help mitigate the agency problem by motivating executives to fulfil their responsibility to shareholders. Despite TSR's inherent drawback of ignoring risk-taking, it remains a useful measure of interest alignment between executive and shareholders.

A variety approaches to measuring market-based performance are in use in pay-performance sensitivity studies (Capezio et al., 2011; Core et al., 1999; Doucouliagos et al., 2007; Leone, Wu, & Zimmerman, 2006; Merhebi et al., 2006). In this study, raw annual stock return will be used and is defined as the sum of stock price movement and dividend divided by share price at the beginning of the year.

$$Stockpricereturn = \frac{\left((stockprice_{(end)} - stockprice_{(beginning)}) + dividend\right)}{stockprice_{(beginning)}}$$

3.7.3 Risk-adjusted market return

Risk-adjusted market performance is a key measure in this study for investigating whether executive remuneration design in Australian banks has changed pursuant to APRA's guideline. As a regulated business, banking needs to fulfil the requirements of its regulator (APRA, 2009). The expectation of bank executives is to be prudent in risk-taking. To test this, risk-adjusted performance is included in the regression analyses.

The measure of risk-adjusted performance is $(^{TSR}/_{\sigma})$ and $\sigma$is that adjusted risk estimated as the standard deviation of daily return over the past year. The use of this risk measure will be

justified below in the risk measure session.

In the literature, surprisingly, this risk-adjusted performance measure receives minimal attention. Resembling the Sharpe ratio, which is a widely used risk adjusted return in practice, it has attracted little academic research interest. The difference between risk-adjusted performance measure and Sharpe ratio is that the latter removes the risk-free rate so that it can assess the true performance of an investment manager or an asset. Pedersen & Rudholm-Alfvin (2003) point out that the risk-adjusted performance measure can invite serious bias without taking into account the interest rate differential in international comparison. Since all sampled banks selected in this study are domestic firms, the problem caused by international comparison does not apply here.

3.8 Independent variable: Corporate governance

While the effect of individual components of board structure on executive remuneration is unclear in the literature(Renee B. Adams & Mehran, 2012; Capezio et al., 2011; Core & Guay, 1999; Cyert et al., 2002; Doucouliagos et al., 2007; Guthrie et al., 2012; Heaney et al., 2010; Ozkan, 2007), the effectiveness of corporate governance may be more pronounced when all elements work together as a system. This leads to the decision to create a corporate governance index for this study.

Since there are no rules governing the construction of a corporate governance index (Brown & Caylor, 2004; Clarkson et al., 2011; Gompers et al., 2003), the index constructed here is based on the remuneration guideline. As such, data concerning the financial expertise of boards of directors, independence of remuneration, audit and risk committees, as well gender diversity are collected to construct corporate governance index for this study.

Each component of board characteristics included in the index is expressed in percentage terms. Since each of them is within the continuous value range between 0 and 1, the score of the index can be calculated simply as the sum of all selected governance characteristics with the higher score representing higher level of independence and/or higher level of gender diversity. The composition of the index is:

$$CORPORATEGOVERNANCEINDEX_{it} \in (GENDERDIVERSITY_{it} + BOARDINDEPENDENCE_{it} + AUDITCOMMITTEEINDEPENDENCE_{it} + RISKCOMMITTEEINDEPENDENCE_{it} + REMUNERATIONCOMMITTEEINDEPENDENCE_{it} + FINANCIALEXPERTISE_{it})$$

where $CORPORATEGOVERNANCEINDEX_{it}$ is i^{th} bank at the time t.

While the conventional research approach allows one to form an expectation for each components including in the regression, the corporate governance index captures a range of governance effects that may yield an unexpected result. In reality, it is likely that a board presents both good or bad characteristics as defined in the recommended principles (ASX, 2014). However, the possible supplementary or undermining effect generated by the interaction of a particular mix of governance characteristics is almost impossible to quantify with precision. For simplicity, following the general expectation of good governance possessing a high level of independence, financial knowledge and respect for gender equity, the higher scores indicate, presumably, a more effective board.

In addition to the index, board size is included in the model as a single independent variable. The statistical relation between board size and remuneration has been proven in empirical studies concerning banking and non-banking firm within the context of Australia, although there is a contradictory relation between pay and board size in Australian banking and non-banking literature (Doucouliagos et al., 2007; Heaney et al., 2010; Schultz et al., 2013).Thus, the relation between board size and executive compensation is revisited by including it as a separate variable along with other control variables[8].

3.9 Control variable: firm size

Firm size has been found to play a significant and consistent role in the pay-performance sensitivity in both financial and non-financial firm studies (Doucouliagos et al., 2007; Heaney et al., 2010; Leone et al., 2006; Murphy, 1985) In the early literature, Murphy (1985) finds that pay-performance relation models may suffer from the omitted variable problem by not including the firm size effect. From a theoretical point of view, there should be a relation between executive pay and firm size. As a firm grows larger, the business should become more complex and higher pay should be required to hire more competent executives (Core et al., 1999; Rose & Shepard, 1997). In addition, the link between firm size and survivability established in the literature (Jensen & Murphy, 2004) legitimises the phenomenon of executives' pay rises in tandem with the growth of firm size. Coinciding with these theories, empirical results often suggest that firm size matters in explaining the compensation for top management regardless of industrial differences. Therefore, the firm size effect is considered an important control variable and will be included in all models in this study.

A number of measures of firm size recur in the literature with respect to remuneration and the

[8]More importantly, in order to include the board size effect in the corporate governance index in this study, the data would need to be transformed into a percentage between 0 and 1. The subjective judgement required to carry out such data transformation may seriously impair the quality of this study.

limited empirical study dedicated to the best proxy of this variable in the banking literature requires careful judgement for selection. Heaney et al.(2010) use the market value of asset as a proxy for size and find a strong relation with CEO pay. Merhebi et al. (2006) employ three different measures of size, total revenue, total assets and market capitalisation and the results show a strong positive association of size and CEO compensation.

Total assets and market capitalisation have been selected as proxies for firm size. The decision to use total assets as a core measure was made after careful consideration of the advantages and disadvantages of both size proxies. With respect to the appropriateness of using market capitalisation as a proxy for firm size, Gabaix & Landier (2008) examine the best proxy for firm size using companies across all industries and find that market capitalisation is the best choice. In addition to this, market capitalisation used as a firm size proxy in a prior Australian bank study is also found relevant to top executive remuneration (Doucouliagos et al., 2007). On the other hand, total assets as a proxy for bank size is also supported by many banking empirical studies (Gul, Irshad, & Zaman, 2011; Kashyap, Stein, & Wilcox, 1993). More importantly, the key advantage of total assets over market capitalisation is that, being an accounting-based measure of firm size, total assets is less likely to interact with market-based performance measures, which are more relevant to the hypothesis testing than other performance measures. In order to minimise the risk of running spurious statistical results and drawing the wrong conclusion, total assets is selected as the core variable for firm size proxy. Market capitalisation is also used as a robust check.

3.10 Bank risk measure

Among all different measures of risk-taking in the banking literature, total risk is taken to represent the degree of risk taken by banks and to construct an additional performance measure in this study. Consistent with a large body of banking studies (Anderson & Fraser,

2000; Chen, Steiner, & Whyte, 1998; Chen et al., 2006; Pathan, 2009; Saunders, Strock, & Travlos, 1990), bank risk is measured as the standard deviation of daily stock return. The main purpose of measuring total risk is to facilitate the investigation of pay-performance sensitivity with risk-taking behaviour of Australian banks. To that end, risk-adjusted return will be used in addition to the chosen performance measures above, and is calculated as the ratio of TSR to total risk (i.e., $\frac{TSR_t}{\sigma_t}$).

In fact, early studies in the bank literature in connection with risk appetite usually use a number of capital market measures of risks to achieve more robust results. For instance, hypothesising risk-taking as endogenous decisions for managers in the banking industry, Saunders et al. (1990) examine the effect of managerial ownership on risk, proxied by $\sigma_s$total return risk, $\sigma_\varepsilon$nonsystematic risk, $\beta_m$market risk, β_i and interest rate risk. Studies conducted subsequently with the research interest of bank risk (Anderson & Fraser, 2000; Chen et al., 2006; Pathan, 2009) include total risk, systematic risk and idiosyncratic risk. And the measure used for total risk in those studies is standard deviation of daily return.

While including various risk measures may strengthen the robustness of the result, there is a compelling argument for taking total risk as an input only for risk-adjusted return. One of the key assumptions for using systematic risk as a component of risk-adjusted performance measure is that shareholders hold a diversified portfolio. Although shareholder interest is one of the areas which this study explores, the key focus is to investigate whether bank executive remuneration is sufficiently well designed to balance shareholder-maximisation and risk-taking. Thus, it is more appropriate to use total risk and not make the assumption of whether shareholders hold a well-diversified portfolio.

Moreover, APRA's guideline emphasises that the proper measure of risk forms an integral

part of the remuneration. The risk measure should reflect the remuneration setters' forward looking view beyond the use of accounting profit. In practice, Kemp (2015) observed that volatility has been widely used as the measure of future risk in industry despite its limitation (http://www.morningstar.com.au/funds.mvc/article/volatility-risk/7002/1). Thus, it is sensible to assume that stock volatility as a proxy for risk is likely to be at least one of the risk measures used by Australian banks given no specific guidance provided by APRA's guideline.

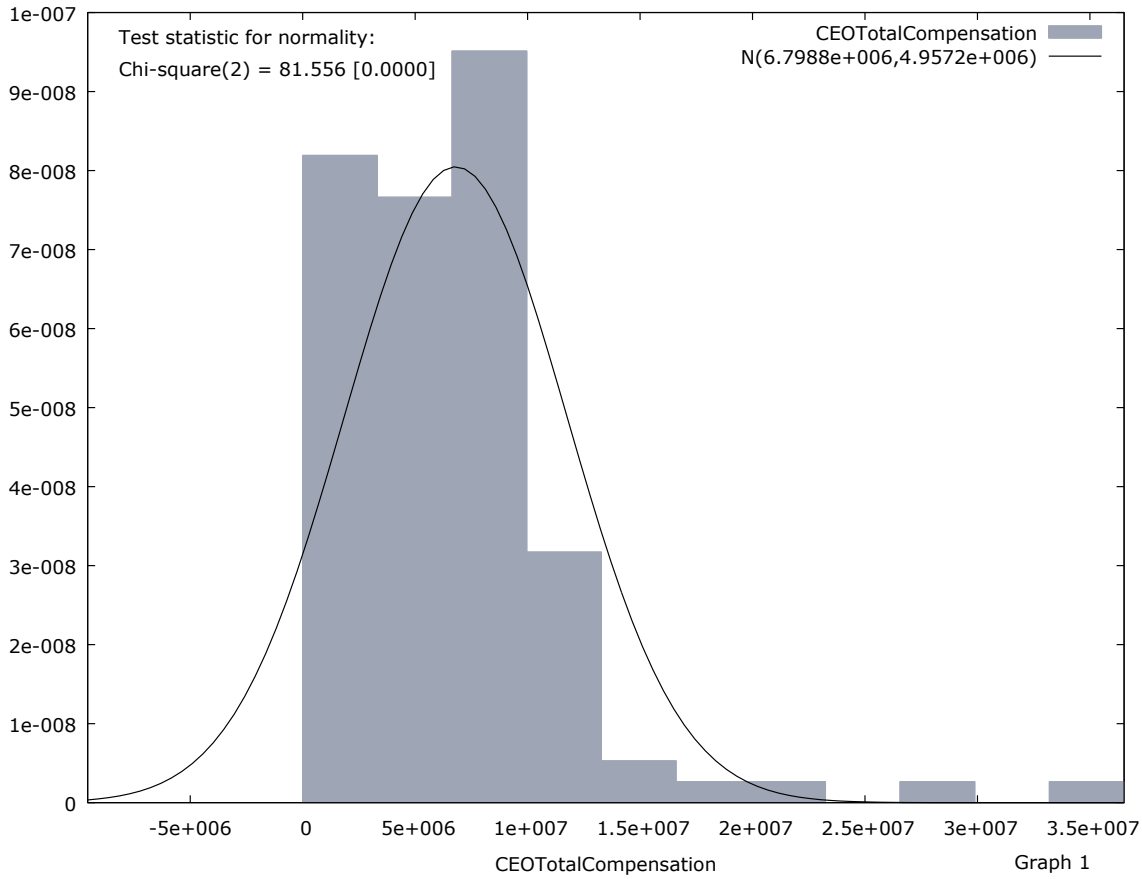
3.11 Data transformation

Following contemporary empirical studies in remuneration literature, the natural logarithm of executive remuneration and firm size variables are used in regression analyses. While the natural characteristics of remuneration and firm size data are skewness and non-normal distribution, there is no shortage of studies on data transformation that contain limited discussion of their own data (Capezio et al., 2011; Doucouliagos et al., 2007; Harford & Li, 2007). Although there is probably a need to use a logarithm for those variables in this study, caution has been exercised to ensure that its statistical procedures are appropriate.

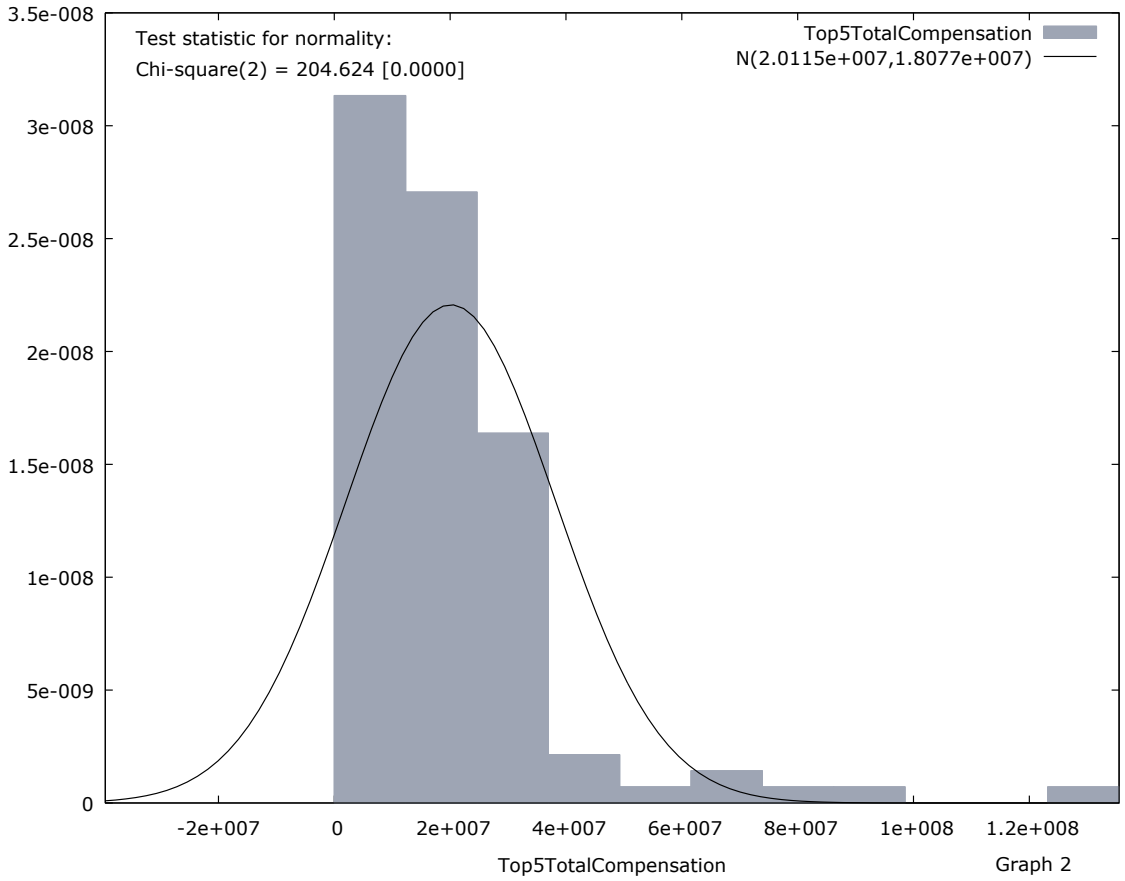
Graphs 1, 2, 3 and 4 below present the raw data for CEO total remuneration, top 5 total remuneration, total assets and market capitalisation respectively. Clearly, all of them tend to be skewed to the right and have outliers. Among them, the distance of outliers from the centre appears to be problematic, especially in remuneration data. Therefore, it has been decided to treat the outliers to statistical techniques.

Data trimming is one statistical method for removing outliers which may potentially generate biased results. Especially for a small sample with total observations approximating 110, a few outliers may have an impact on the results. In deciding what size of data should be removed from the sample, a similar study has been reviewed (Doucouliagos et al., 2007).

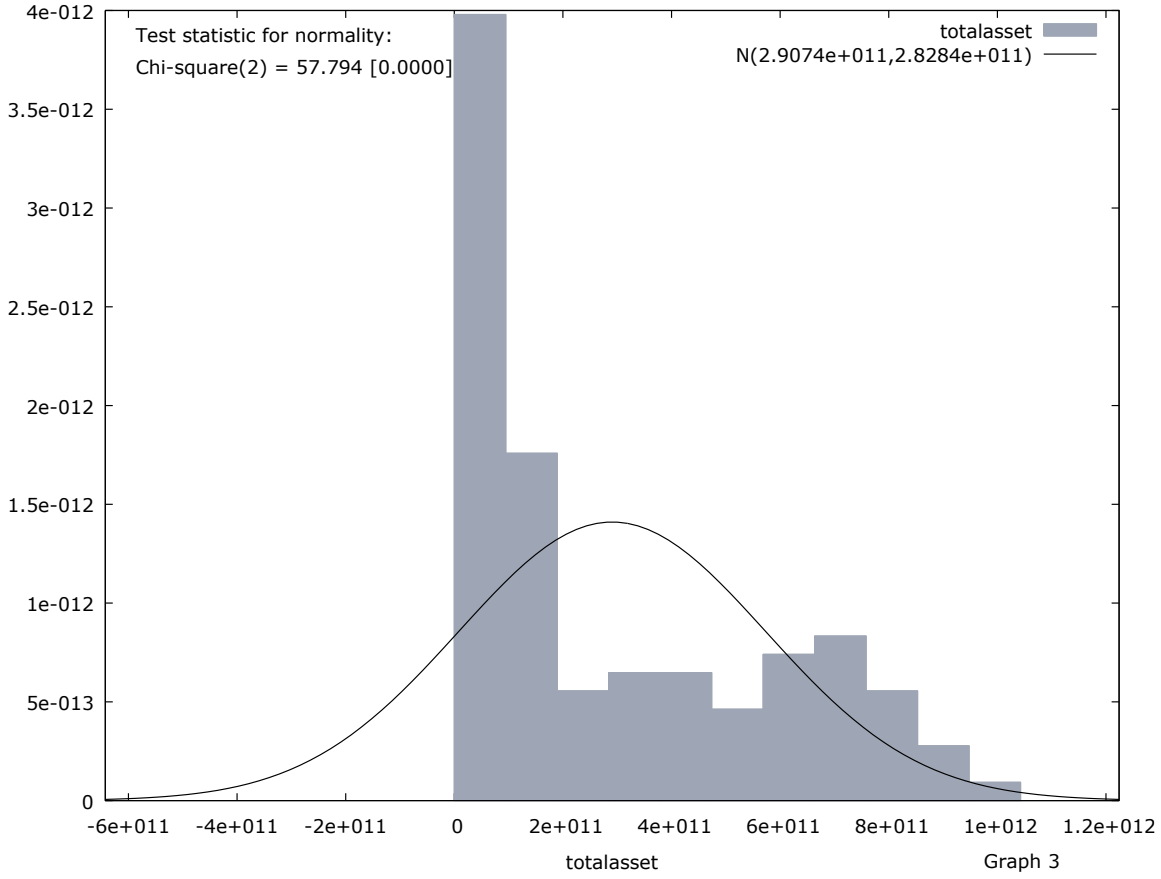
However, no treatment of outliers has been documented. Therefore, in order to ensure that no outlier is left in the sample, 5% of data from the upper and lower percentile is trimmed. Small size is also an important factor to be considered with trimming. Since the sample size remains above 100 for both CEO and top 5 executives after being trimmed, there are no major concerns in breaching the statistical rule.



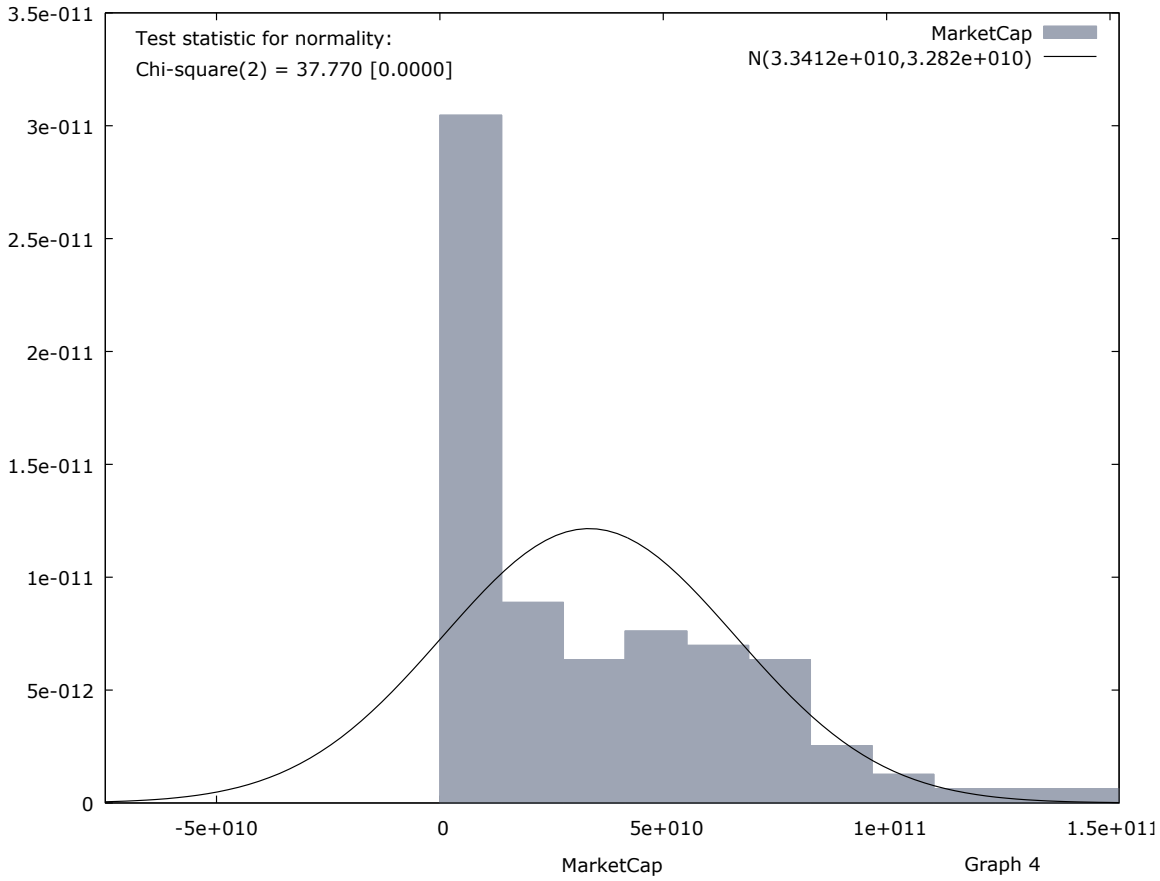
Graph 1



Graph 2

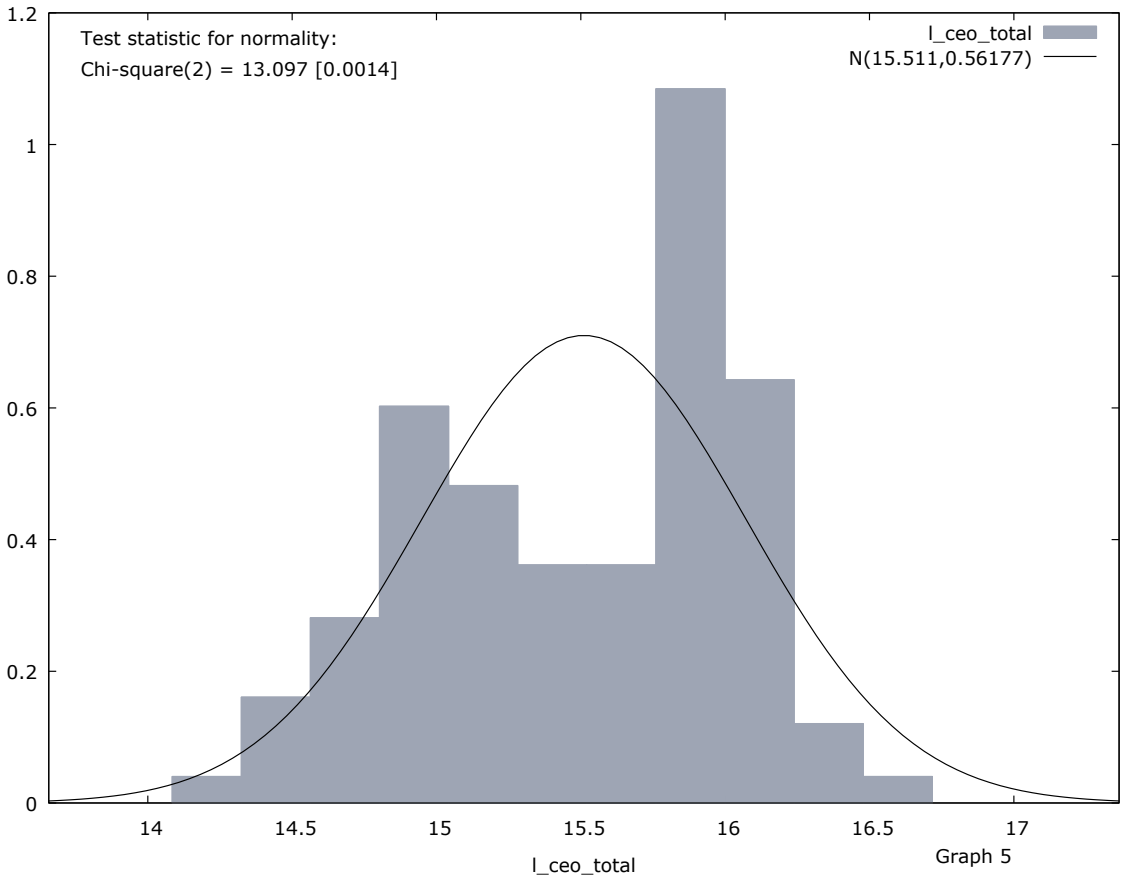


Graph 3

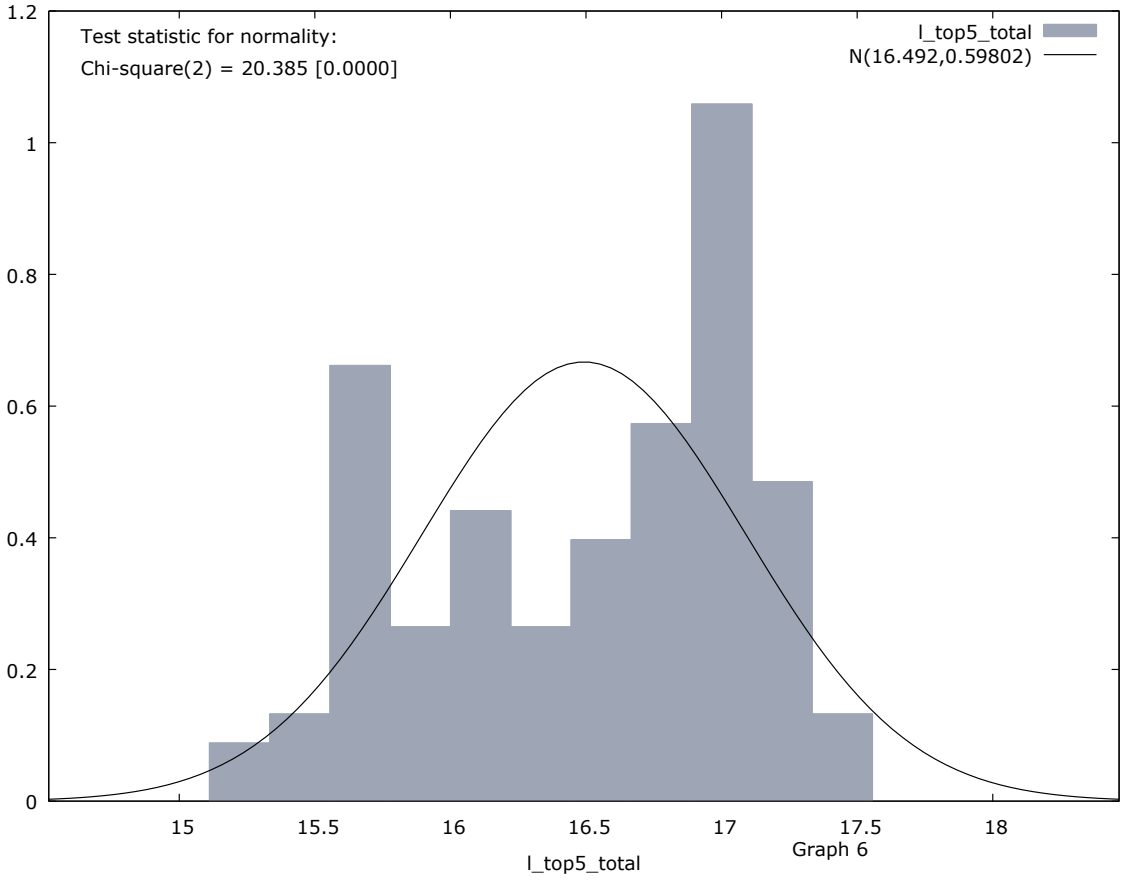


While the bias as a result of outliers has been contained, the issue of non-normal distribution seems to be more pronounced.[9] Therefore, remuneration and firm size variables are all log-transformed. As Graph 5,6,7 and 8 below show, after being log-transformed, all variables appear to be normally distributed. In other words, the distributional properties of data after these treatments are better for statistical analyses.

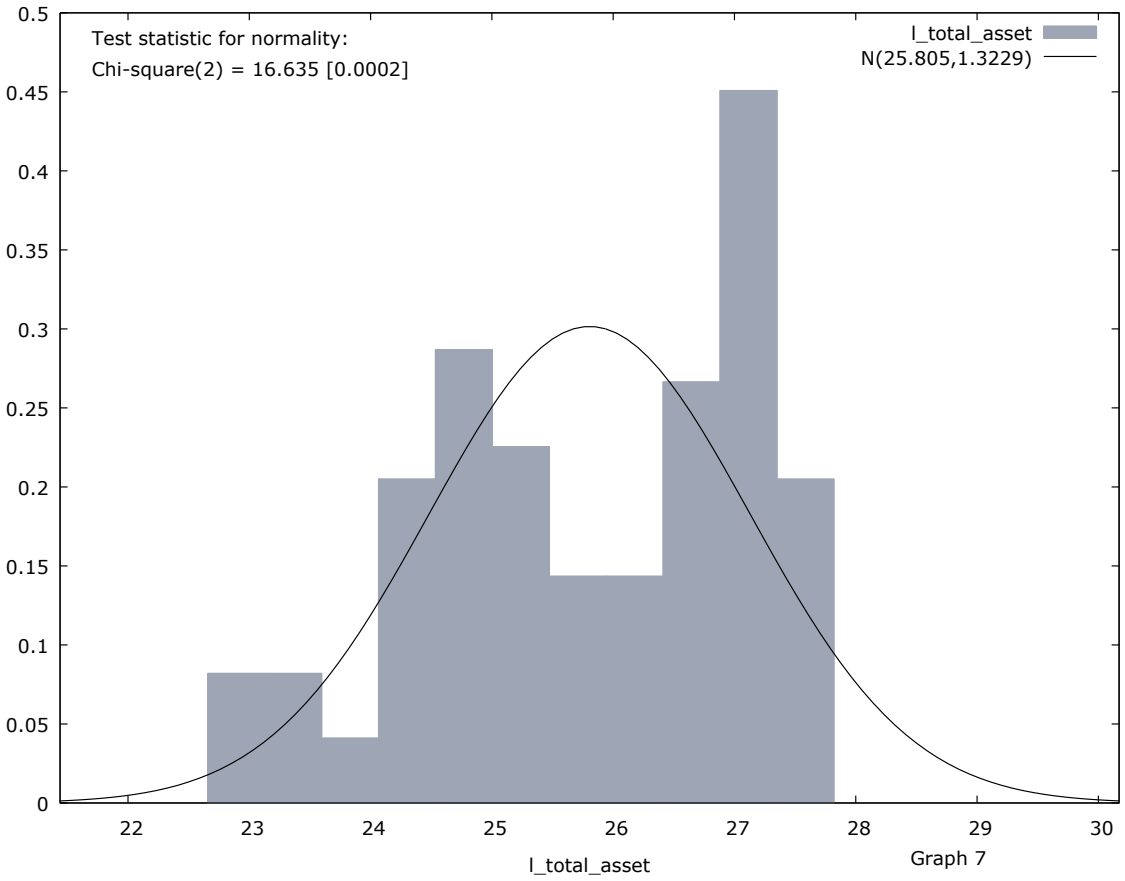
[9] For brevity, the graphs for remuneration and firm size distribution are not reported in here.



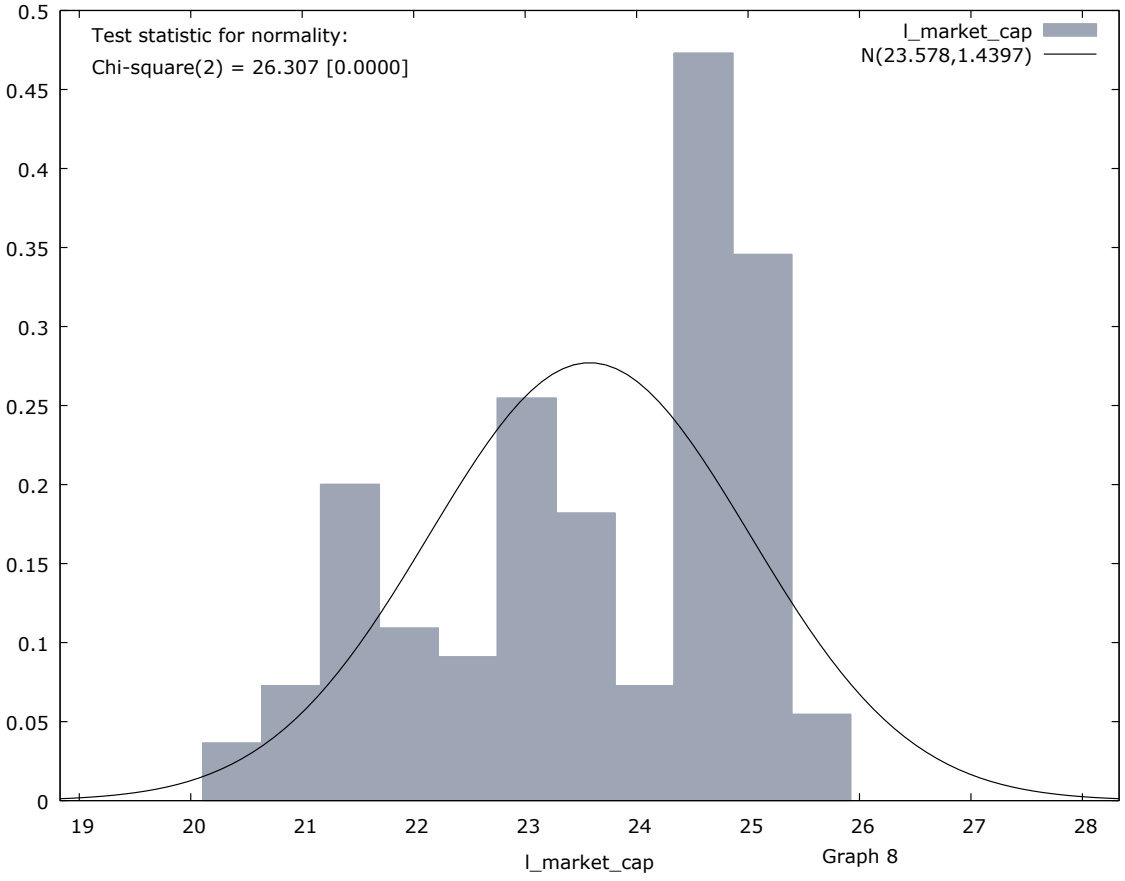
Graph 5



Graph 6



Graph 7



Graph 8

3.12 Methodology

With respect to regression testing, multivariate regression model is used to test the hypotheses developed in the next chapter (Chapter 4. Result). 4 models are created to test the relation between variables. While the full period spanning years between 2003 and 2015 can be used to test the hypothesis 1, the split periods created from the full period are used to test the hypothesis 2. For comparability, regression will be run using pooled OLS and fixed model. So, for each set of sample, it can generate up to 32 sets of regression results from 4 models for CEOs and top-five highest paid executives remuneration combined.

The blueprint of the research method is based on the prior studies concerning bank executive remuneration in Australia (Doucouliagos et al., 2007). Modifications have been made to suit the research purposes in here. In particular, the research approach following the previous study is 1.) use of pooled OLS and panel fixed effect model. 2.) the idea of testing pay-performance relation in different models[10]. The different approaches used to conduct this study includes: 1.) the inclusion of top, 2.) the creation of split samples, 3.) new approach of capturing the governance effect and risk factor.

Since the new approach of capturing the governance effect and risk factor, and the rationale for including top 5 have been discussed in section 3.6, 3.8 and 3.10, the following sections will explain the issues related to the creation of 4 models and 3 sample period.

[10]4 models have been created for regression analyses.

3.12.1 Four models

The 4 models using in regression analyses are:

Model 1.) base model - incorporating firm size effect as controlling variable in the model, where captures the effect of performance on executives total remuneration,

$$\ln(pay)_{it} = \alpha_0 + \beta_1 \ln(size)_{it} + \beta_2(performance)_{it} + \varepsilon_{it}$$

Model 2.) CG model - based on the model 1, corporate governance effect (i.e., corporate governance index and board size) is added,

$$\ln(pay)_{it} = \alpha_0 + \beta_1 \ln(size)_{it} + \beta_2(performance)_{it} + \beta_3(corporategovernanceindex)_{it} + \beta_4(boardsize)_{it} + \varepsilon_{it}$$

Model 3.) risk model - based on the model 1, risk measure is added,

$$\ln(pay)_{it} = \alpha_0 + \beta_1 \ln(size)_{it} + \beta_2(performance)_{it} + \beta_3(risk)_{it} + \varepsilon_{it}$$

Model 4.) full model - it is the full model, where all independent variables (firm size effect, performance measures, corporate governance factors and risk measure) are included.

$$\ln(pay)_{it} = \alpha_0 + \beta_1 \ln(size)_{it} + \beta_2(performance)_{it} + \beta_3(corporategovernanceindex)_{it} + \beta_4(boardsize)_{it} + \beta_5(risk)_{it} + \varepsilon_{it}$$

Since there are four alternative of performance measures selected in this study, regression is run with each performance measure for each model[11].

In base model and CG model, all 4 performance measures are used. In risk model and full model, risk-adjusted return is excluded from the model due to the presence of risk effect variable. Although the correlation coefficients between risk_adj_ret (risk-adjusted return) and

[11]Wherever there is risk factor as independent variable in the model, market-based risk-adjusted performance measure will not be included in the regression model. It is to avoid the multicollinearity.

daily_sd (risk measure) shown in table 1 and 2 is not high (i.e., <0.4), they are related by construct, given one of the components of this performance measure being the risk measure. To avoid risking the reliability of research result, no model contains both risk factor and risk-adjusted return.

Following previous remuneration studies (Cheng et al., 2015; Chhaochharia & Grinstein, 2009; Doucouliagos et al., 2007), regression analyses are run by using fixed effect panel data model for the reason that the statistical results generated by such model are expected to be more appropriate and conservative than OLS pooled model. In the relevant literature, the ability of executives has been identified as one of the important determinants for their pays. However, the unobservability of manager's ability means that it cannot be quantified without using proxy. One feature of fixed effect model is that the constant over-time unobservable heterogeneity is believed to be captured by this model. Given this feature, fixed effect model is expected to be more appropriate than the OLS. To support this argument, Doucouliagos et al. (2007) show that the goodness of fit is substantially higher under the fixed effect model than the OLS pooled in their study.

In addition to the appropriateness, fixed effect model can also be a more conservative estimate of regression analyses. To achieve such result, clustered-robust standard error is used in the fixed effect regression. This statistical procedure is particularly crucial, given the small size of split sample. For the purpose of supporting the argument of fixed effect model being more appropriate and conservative or more importantly for robustness purposes, results will be compared with those generated by using OLS model.

3.12.2 Three sample period

Split samples have been created by cutting the sample using the year the guideline introduced as the splitting point (i.e., 2009). Unlike the conventional remuneration studies, whose interest lies in the interest alignment between shareholders and top managers, the focus in this is to investigate whether bank executives are motivated enough to act in the best interest of shareholders within the acceptable risk level. Thus, sub-samples have been created by splitting the full period and the same regression analytical procedures for the full period are performed to the split samples.

While the hypotheses can be tested by examining the systemic variations over time through split sample, it would be more prudent to start analysing the full period for external and internal comparison. By comparing externally with results from prior study, it allows one to conduct a preliminary diagnosis of the possible shift in executive remuneration practice.

Further, as one of APRA's key components in the guideline, designing remuneration policy in such a way that top executives are motivated to maintain the long-term view on strategic planning. To test this, the introduction of lagged value of performance measures in the regression model is required. Considering the reduction in sample size as a result of introducing lags, this statistical technique can only be implemented with the full period, which spans from the year of 2003 through 2015. Following prior study (Doucouliagos et al., 2007), regression analyses using fixed effect model with 3 lags of each performance measure are performed for direct comparison.

Internal comparison of regression results between full period and split samples is particular important given the small samples in this study. One of the possible problems caused by the small sample is the instability of regression results. Coupling with the study period spanning across the period of economic turbulent as well as introduction of remuneration guideline, the

pattern of change captured by the regression analyses may not be very pronounced to make a solid conclusion. Under such circumstances, the shift of remuneration practice may be confirm through internal comparison. Performing such comparison is especially useful in detecting spurious statistical results. For example, in the instance where no risk-adjusted return appearing to be statistical significance in split samples but the significance of the same variable seen in the full period may indicate poor reliability of regression results.

Following the analysis and comparison of full period, split samples of period spanning pre- and post-APRA's guideline for remuneration design in financial institutions are created by dividing the full period. With the guideline being introduced in 2009, the unbalance sub-samples spanning years 2003-2009 and years 2010-2015 represent pre- and post-guideline period. In an attempt of investigating how and whether determinants of executive remuneration has been changed pursuant to the suggestions of APRA's guideline, detailed comparison between and analysis of split samples' regression results are performed in the next section. In addition to the statistical significance, economic significance is also discussed.

3.13 Conclusion

With the aim of testing the hypotheses developed in Chapter 2, this chapter detailed the data collection, statistical modelling and research methodology adopted for this thesis. In regard to data, source of data, the selection process and decision rules are reported upfront. Then, based on the literature, model specifications and variables included are justified and thoroughly discussed. I report decision rules for variables for which there is limited guidance in the literature, such as the construction of a corporate governance index. Finally, the decisions for data transformation and research procedures are detailed with explanations.

Chapter 4 - Results

4.1 Introduction

The purpose of this chapter is to investigate how and whether executive remuneration practice in the Australian banking industry has changed since the introduction of the guideline. To that end, the pay-shareholder return relation and the association between pay and risk-adjusted return in the pre- and post-guideline periods are the key focus. The first step is to examine the descriptive statistics in section 4.2 and analyse the correlation coefficients in section 4.3 to look for indicators supporting or contradicting the hypotheses developed in the chapter 2. Next, the results of the regression analyses for the full period (section 4.4.1), the pre-guideline period (section 4.4.2) and the post-guideline period (section 4.4.3) are presented, to test the hypotheses. The results of the hypothesis testing (section 4.5), pay-long-term performance relation (section 4.6.1)and economic significance for Australian bank remuneration policy (section 4.6.1)are reported. Section 4.7 concludes.

4.2 Descriptive Statistics

Table 4.1 reports the descriptive statistics for key variables about CEOs after trimming the upper and lower 5% of observations from the raw data. There are three panels in the table showing the same set of variables over three sample periods: the full period (2003 - 2015), the pre-guideline period (2003 - 2009) and the post-guideline period (2010 - 2015).In panel A, the full period, it appears that a majority of the variables are normally distributed by simple measure of the distance between mean and median with the exception of firm size measures and risk-adjusted return. In fact, the tendency for firm size to be skewed to the right is expected, given the oligopolistic structure of Australian banking, where the big 4 banks dominate the market. When analysing the risk-adjusted return, it is also important to compare it to TSR, because risk-adjusted return is a measure of TSR per unit of risk. The central tendency of TSR and the right skewness of risk-adjusted return indicate that while Australian banks tend to generate a similar amount of TSR on average, after factoring in their risk-taking, their performances differ distinctly; the same comparison is applied to the pre- and post-guideline periods.

In panel B, while all other variables maintain a similar distance between mean and median, market-based performance measures appear to be different in the pre-guideline period. For example, the risk-adjusted return is skewed to the right but its magnitude is less than in the full period. On the other hand, TSR is significantly skewed to the left. This skewness may be attributed to the massive damage of the GFC to the global market in the pre-guideline period, when banks tended to perform poorly on average.

In Panel C, although market capitalisation seems to be distributed more normally in the post-guideline period, the focus is the comparison to market-based performance measures. As the table shows, both TSR and risk-adjusted return are skewed to the right. For TSR, this is in fact consistent with expected movements in the market. Since the post-guideline period

covers the recovery stage of the economic cycle, the high growth rate in TSR is consistent with such a correction in the market price.

Comparisons between variables in the pre- and post-guideline periods are conducted. First of all, both mean accounting-based performance measures in the pre-guideline period are greater than those in the post-guideline period. On one hand, this suggests that the growth of earnings in banking after the GFC may be weaker, or the assets and equity may grow much faster in the post-GFC period. On the other hand, it may mean that Australian banks are more conservative in recording accounting profit or are less focused on accounting profit.

Both mean TSR and risk-adjusted return in the post-guideline period are higher than in the pre-guideline period. While the stronger TSR in the post-guideline period can be explained by the global economic recovery from the GFC, the weaker accounting performance in the corresponding period seems to contradict the market recovery phenomenon indicated by the surge in the market-based performance measure. More interestingly, CEO total pay and firm size proxies are all higher in the post-guideline period than in the pre-guideline period. Taken all together, it is clear that there are differences in the determinants of remuneration between the post-guideline and pre-guideline periods.

For the corporate governance measures, the mean CG index in the post-guideline period is slightly higher than that in the pre-guideline period, while the board size is roughly the same.[12] But when comparing the minimum observations for both variables, there are differences between the pre- and post-guideline periods. For example, the minimum observation of CG index is 3.8571 in the post-guideline period and the corresponding value is 3.0773 in the pre-guideline period. Because the maximum score that the index can reach is 6,

[12]Board size is measured by the number of board members, so a difference of about 0.03 (i.e., 9.5439 (pre) - 9.5106 (post)) implies little difference.

the increase of almost 0.8 in the index value is substantial. The minimum observation for board size is 8 in the post-guideline period compared to 7 in the pre-guideline period. Although again it may not be appropriate to draw any solid conclusions from the descriptive statistics, the overall picture is one of change between the two periods.

Table 4.2 reports the descriptive statistics for top 5 executive remuneration in the same fashion as table 4.1. The pattern of the variables mentioned in the discussion of table 4.1can also be seen here. The values of variables other than total pay (the dependent variable) should logically be the same. Given the effect of trimming, some variables may be substantially different from those in table 4.1. For example, while in the pre-guideline period TSR is 0.1041 in table 4.1, the corresponding variable in table 4.2 is 0.0760. Although the values of descriptive statistics in some independent variables appear to be different from the corresponding values in table 4.1, the pattern of differences in each variable between the pre-guideline and the post-guideline periods is consistent with the analysis in table 4.1.

Table 4.1: Descriptive Statistics of trimmed Data for CEO

Panel A: full period (2003 -2015)

	N	Mean	Std. Dev.	Median	Min.	Max.	5th percentile	95th percentile
Dependent variable								
Total pay ($M)	104	6.284	3.1595	5.9431	1.475	16.158	1.9490	10.971
Explanatory variable: Firm size proxy								
Total Asset ($M)	104	310,650	287,640	176,580	8,752.2	955,050	13,846	811,220
MKT. Cap.) ($M)	104	35,690	33,398	23,713	703.31	138,910	1,284	99,551
Explanatory variable: Accounting-based performance								
ROA (ratio)	104	0.0087	0.0029	0.0088	0.0007	0.0186	0.0045	0.0134
ROE (ratio)	104	0.1322	0.0461	0.1355	0.0111	0.2123	0.0469	0.1973
Explanatory variable: Market-based performance								
TSR (ratio)	104	0.1481	0.2621	0.1434	-0.4790	0.9988	-0.3921	0.5856
Risk-adj ret (ratio)	104	13.975	20.153	10.404	-23.252	75.036	-17.509	51.552
Explanatory variable: Risk measure								
Daily volatility	104	0.0148	0.0071	0.0127	0.0075	0.0374	0.0080	0.0342
Explanatory variable: Corporate Governance measure								
CG index	104	4.3007	0.40297	4.3556	3.0773	4.8889	3.5500	4.7944
Board size (No.)	104	9.5288	1.5005	9.0000	7.0000	13.000	8.0000	12.750

Panel B: split period (2003 - 2009)

	N	Mean	Std. Dev.	Median	Min.	Max.	5th percentile	95th percentile
Dependent variable:								
Total pay ($M)	57	5.521	2.841	4.774	1.475	12.96	1.791	11.108
Explanatory variable: Firm size proxies								
Total Asset ($M)	57	222,490	201,430	147,380	8,752	656,800	10,389	623,750
MKT. CAP. ($M)	57	27,454	23,362	18,836	703.3	78,161	944.8	64,961
Explanatory variable: Accounting-based performance								
ROA (ratio)	57	0.0093	0.0032	0.0101	0.0036	0.0186	0.0036	0.0163
ROE (ratio)	57	0.1470	0.0415	0.1564	0.0275	0.2123	0.0533	0.2058
Explanatory variable: Market-based performance								
TSR (ratio)	57	0.1041	0.2395	0.1572	-0.4790	0.5632	-0.4167	0.5109
Risk-adj ret (ratio)	57	11.441	17.654	10.640	-23.252	57.964	-18.408	45.681
Explanatory variable: Risk measure								
Daily volatility	57	0.0160	0.0091	0.0117	0.0075	0.0374	0.0078	0.0356
Explanatory variable: Corporate Governance measure								
CG index	57	4.1480	0.4173	4.2222	3.0773	4.8571	3.4489	4.7607
Board size (No.)	57	9.5439	1.6374	9.0000	7.0000	13.000	7.0000	13.000

Panel C: split period (2010 - 2015)								
	N	Mean	Std. Dev.	median	Min.	Max.	5th percentile	95th percentile
Dependent variable:								
Total pay ($M)	47	7.209	3.305	7.922	1.814	16.15	2.372	12.24e
Explanatory variable: Firm size proxies								
Total Asset ($M)	47	417,560	338,460	531,740	38,571	955,050	40,644	887,260
MKT. CAP. ($M)	47	45,677	40,586	48,850	1,765	138,910	2,279	123,520
Explanatory variable: Accounting-based performance								
ROA (ratio)	47	0.0079	0.0022	0.0075	0.0007	0.0119	0.0046	0.0112
ROE (ratio)	47	0.1143	0.0453	0.1097	0.0111	0.1880	0.0373	0.1834
Explanatory variable: Market-based performance								
TSR (ratio)	47	0.2016	0.2805	0.1345	-0.3159	0.9988	-0.2266	0.7456
Risk-adj ret (ratio)	47	17.047	22.637	10.029	-21.865	75.036	-13.881	65.947
Explanatory variable: Risk measure								
Daily volatility	47	0.0133	0.0030	0.0136	0.0075	0.0221	0.0080	0.0182
Explanatory variable: Corporate Governance Measure								
CG index	47	4.4859	0.2959	4.5778	3.8571	4.8889	3.9159	4.8533
Board size (No.)	47	9.5106	1.3331	9.0000	8.0000	13.000	8.0000	12.600

Table 4.2: Descriptive Statistics of trimmed Data for Top 5

Panel A: Full period (2003-2015)

	N	Mean	Std. Dev.	Median	Min.	Max.	5th percentile	95th percentile
Dependent variable:								
Total pay ($M)	102	17.057	8.875	17.177	4.083	37.697	5.505	32.663
Explanatory variable: Firm size proxies								
Total Asset ($M)	102	316,170	287,680	208,460	8,752	955,050	152,86	811,600
MKT. CAP. ($M)	102	36,212	33,495	289,51	703.31	138,910	1,430	100,060
Explanatory variable: Accounting-based performance								
ROA (ratio)	102	0.0086	0.0029	0.0088	0.0007	0.0186	0.0045	0.0125
ROE (ratio)	102	0.1316	0.0462	0.1355	0.0111	0.2123	0.0462	0.1974
Explanatory variable: Market-based performance								
TSR (ratio)	102	0.1282	0.2641	0.1319	-0.6051	0.9988	-0.4069	0.5779
Risk-adj ret (ratio)	102	12.478	19.298	9.6890	-23.252	75.036	-18.326	46.100
Explanatory variable: Risk measure								
Daily volatility	102	0.0151	0.0074	0.0131	0.0075	0.0374	0.0079	0.0343
Explanatory variable: Corporate Governance Measure								
CG index	102	4.3167	0.3945	4.3704	3.0773	4.8889	3.5550	4.7967
Board size (No.)	102	9.5196	1.5073	9.0000	7.0000	13.000	8.0000	12.850

Panel B: Full period (2003 - 2009)

	N	Mean	Std. Dev.	Median	Min.	Max.	5th percentile	95th percentile
Dependent variable:								
Total pay ($M)	56	14.69	7.619	13.03	4.083	29.698	5.302	28.628
Explanatory variable: Firm size proxies								
Total Asset ($M)	56	228,170	199,930	172,370	8,752	656,800	10,972	625,430
MKT. CAP. ($M)	56	27,926	23,297	23,713	703.31	78,161	1,132	65,342
Explanatory variable: Accounting-based performance								
ROA (ratio)	56	0.0092	0.0032	0.0099	0.0036	0.0186	0.0036	0.0163
ROE (ratio)	56	0.1457	0.0418	0.1494	0.0275	0.2123	0.0528	0.2059
Explanatory variable: Market-based performance								
TSR (ratio)	56	0.0760	0.2449	0.1405	-0.6051	0.5428	-0.4732	0.3892
Risk-adj ret (ratio)	56	9.5336	16.549	9.9657	-23.252	46.184	-18.527	44.428
Explanatory variable: Risk measure								
Daily volatility	56	0.0165	0.0093	0.0119	0.0075	0.0374	0.0078	0.0356
Explanatory variable: Corporate Governance Measure								
CG index	56	4.1754	0.40965	4.2500	3.0773	4.8571	3.4723	4.7661
Board size (No.)	56	9.5179	1.6403	9.0000	7.0000	13.000	7.0000	13.000

Panel C: Full period (2010 - 2015)

	N	Mean	Std. Dev.	median	Min.	Max.	5th percentile	95th percentile
Dependent variable:								
Total pay ($M)	46	19.932	9.511	23.357	5.018	37.697	5.529	36.260
Explanatory variable: Firm size proxies								
Total Asset ($M)	46	423,290	339,890	563,110	38,571	955,050	40,551	887,590
MKT. CAP. ($M)	46	46,298	40,808	50,085	1,765	138,910	2,272	124,500
Explanatory variable: Accounting-based performance								
ROA (ratio)	46	0.0079	0.0023	0.0075	0.0007	0.0119	0.0046	0.0112
ROE (ratio)	46	0.1144	0.0458	0.1113	0.0111	0.1880	0.0371	0.1836
Explanatory variable: Market-based performance								
TSR (ratio)	46	0.1917	0.2752	0.1273	-0.3159	0.9988	-0.2288	0.7456
Risk-adj ret (ratio)	46	16.062	21.845	9.4549	-21.865	75.036	-14.164	63.072
Explanatory variable: Risk measure								
Daily volatility)	46	0.0133	0.0030	0.0136	0.0075	0.0221	0.0080	0.0182
Explanatory variable: Corporate Governance Measure								
CG index	46	4.4888	0.29861	4.5889	3.8571	4.8889	3.9112	4.8578
Board size (No.)	46	9.5217	1.3456	9.0000	8.0000	13.000	8.0000	12.650

4.3Analysis of correlation coefficients

Comparing the correlation coefficients between tables 4.3 and 4.4, there are some interesting results to note. Firstly, the correlation between total pay and both firm size proxies in both tables are high (i.e., >70%), which is consistent with the existing literature and theory suggesting firm size is a key factor for determining remuneration. In particular, the relatively constant ratio of pay to firm size over the recent half-century documented in the literature supports such a proposition (Xavier Gabaix, Landier, & Sauvagnat, 2014; Kaplan, 2012).

Secondly, the high correlations between firm size proxies (i.e., >90%) and between market-based performance measures (i.e., >90%) observed in both tables 4.3 and 4.4 show their inherent similarity. In fact, the extensive use of total assets and market capitalisation as proxies for firm size in the literature indicates that they share certain characteristics. As a result, the high correlation between TSR and risk-adjusted return is also anticipated[13]. Since each performance measure and firm size measure is included in separate regressions, the high correlation between them is not a concern.

Thirdly, while the relation between CEO pay and company size does not appear to be noticeably different before and after the introduction of the APRA guideline, the differences in the strength of correlation between CEO pay and each performance measure between the pre- and the post-guideline periods are pronounced. For instance, the level of correlation between pay and each performance measure is higher in the post-guideline period. And the direction of each pair is unanimously positive as opposed to the situation in the pre-guideline period where some negative signs can be seen between pay and market-based performance. Thus, based on the univariate analysis, I find indications of support for my hypothesis that executive remuneration policy in Australian banks in the post-guideline period is systemically different from that in the pre-guideline period.

[13]The calculation of risk-adjusted return uses the measures of TSR and stock volatility.

Finally, the relations between pay, corporate governance index and board size appear to be weaker in the post-guideline period. Given the board's role in remuneration design explicitly specified in APRA's guideline, this is surprising. More detailed analysis will be carried out based on the multivariate regression results in the next section.

In sum, while the high correlation coefficients among certain pairs of variables may indicate multicollinearity, their separation in multivariate regression analyses ensures that the results are free from such statistical problems.

Table 4.3: Correlation coefficients using CEOs' pay between 2003 and 2009

			1	2	3	4	5	6	7	8	9	10
1	CEO Pay	l_ceo_total	1.000	0.7705	0.7642	0.2941	0.3446	-0.0759	-0.0266	0.4538	0.1945	-0.0372
2	Size proxy	l_total_asset		1.0000	0.9719	0.2366	0.2857	-0.2764	-0.2081	0.5437	0.3802	0.0087
3		l_market_cap			1.0000	0.4201	0.3820	-0.1776	-0.0978	0.5746	0.3790	-0.1201
4	Accounting-based performance	Roa				1.0000	0.6763	0.4492	0.4895	0.3005	-0.0033	-0.5319
5		Roe					1.0000	0.5066	0.4708	0.4509	-0.3019	-0.4345
6	Market return	Tsr						1.0000	0.9319	-0.0408	-0.2800	-0.3990
7		risk_adj_ret							1.0000	-0.0258	-0.2146	-0.5072
8	Corporate governance	cg_index								1.0000	-0.2417	-0.0613
9		board_size									1.0000	0.1227
10	Risk factor	daily_sd										1.0000

This table shows correlation coefficients among the sample variables between year 2003 and 2009 (pre-guideline period). l_ceo_total is the logarithm of CEO's total pay. l_total_asset is the logarithm of total asset, which is the proxy of company size. l_market_cap is the logarithm of market capitalisation, which is also the proxy of company size. roa is the return on average asset. roe is the return of average equity. tsr is the total shareholder return. risk_adj_ret is the risk-adjusted return. cg_index is the corporate governance index. daily_sd is the daily volatility, which is the proxy of risk.

Table 4.4: Correlation coefficients using CEOs' pay between 2010 and 2015

			1	2	3	4	5	6	7	8	9	10
1	CEO Pay	l_ceo_total	1.000	0.7377	0.7896	0.6657	0.5623	0.3191	0.2867	0.1120	0.0645	-0.1104
2	Size proxy	l_total_asset		1.0000	0.9746	0.6628	0.8168	0.1229	0.1439	0.0873	0.4032	-0.3284
3		l_market_cap			1.0000	0.7531	0.8079	0.2071	0.2338	0.1297	0.3457	-0.3911
4	Accounting-based performance	Roa				1.0000	0.8102	0.2287	0.2371	0.3942	-0.0255	-0.3391
5		Roe					1.0000	0.2174	0.2283	0.4100	0.2078	-0.3572
6	Market return	Tsr						1.0000	0.9582	0.0596	0.0764	-0.2034
7		risk_adj_ret							1.0000	0.0692	0.1081	-0.3715
8	Corporate governance	cg_index								1.0000	-0.5538	-0.1398
9		board_size									1.0000	-0.1897
10	Risk factor	daily_sd										1.0000

This Table shows correlation coefficients among the sample variables between year 2010 and 2015 (post-guideline period). l_ceo_total is the logarithm of CEO's total pay. l_total_asset is the logarithm of total asset, which is the proxy of company size. l_market_cap is the logarithm of market capitalisation, which is also the proxy of company size. roa is the return on average asset. roe is the return of average equity. tsr is the total shareholder return. risk_adj_ret is the risk-adjusted return. cg_index is the corporate governance index. daily_sd is the daily volatility, which is the proxy of risk.

4.4Regression Results

4.4.1Results and discussion for the full period (between 2003 and 2015)

Consistent with the existing literature, company size has been a key factor explaining the level of top managerial remuneration. Tables 4.5 and 4.6 below show the regression results using a fixed effect model with the logarithm of total assets as proxy for firm size effect for CEO and top 5executive remuneration, respectively. Results for all selected performance measures are presented in columns (1) and (2). Since risk factor is included in the model, risk-adjusted performance measure is left out for columns (3) and (4).Overall, across column (1) through column (4) of tables4.5 and 4.6,similar results for the determinants of executives' remuneration are found, implying that the remuneration mechanism for CEO and top 5executives are the same. From a statistical point of view, the strong and positive significant relation between firm size and executive total pay is not only supported by the fact that the *t*-statistics for firm size as an explanatory variable for executives' total pay largely exceed the conventional critical value. To enhance the reliability of this result, additional regression analyses have been performed using a fixed effect panel with alternative firm size proxy as well as an OLS pooled model with both firm size proxy. The consistency found in these unreported regression results suggests that the positive relation between firm size and executive total pay is strong and stable.

Contrary to both the expectation and many of the findings in prior studies in the remuneration literature, accounting-based performance measures (both ROE and ROA) do not appear related to either CEO or top 5 executive pay, based on the statistical results shown intables4.5 and 4.6.[14]

[14]Although negative associations between ROA and top 5 have been found in models with alternative firm size effect, the relation only presents in the base model and CG model. This suggests that such relation is not stable.

One plausible explanation for the diminishing influence of accounting-based performance on executive remuneration is that the component of remuneration dependant on such measures has become proportionally less important relative to total remuneration. While accounting-based performance measures generally do not encourage prudent risk-taking,[15] failing to find their effect on total pay does not seem to contradict the suggestion of APRA's guideline. Since absolute and risk-adjusted market-based performance are found to be positively associated with total pay, boards may have shifted the remuneration incentive strategically to meet the requirements of the guideline. Alternative models and firm size proxies have been used to generate additional results to check the robustness of these findings. These unreported statistical results support the aforementioned conclusions drawn from tables 4.5 and 4.6.

While evidence of accounting-based performance being less influential for determining executives' pay has been found from tables 4.5 and 4.6, the positive association between pay and both absolute and risk-adjusted market-based performance shown in tables 4.5 and 4.6 may indicate that bank executive remuneration policy is being changed in the way suggested by APRA's remuneration guideline. Conventionally, the CEO has been identified or at least assumed to be the sole decision maker of a firm, which may be explained by the prevalence of the agency perspective that narrowly focuses on the CEO and shareholder relationship. In reality, the similarity of the reward systems for top management at executive level implies that non-CEO executives, especially those getting compensation packages at the level comparable to the CEO, may hold decision making responsibility that is no less influential than the CEO's. In the context of risk management in the financial industry, APRA (2009) specifies that the responsibility of exercising prudent risk-taking in a financial institution is held by all relevant employees rather than just the top management. Thus, the finding of

[15] Some suggest that ROA's ability to capture the leverage effect makes it a risk-adjusted measure in accounting measure (European Central Bank, 2010; Haldane, 2012).

consistent results for CEO and top 5 executives with the pay-market based performance relation is consistent with the suggestion of the guideline.

In comparison to the empirical evidence documented in the Australian banking literature (Doucouliagos et al., 2007), the presence of statistical significance in TSR confirms that acting in the interest of their shareholders is the corporate objective of Australian banks. Setting a corporate goal such as shareholder return maximisation per se is not inconsistent with the suggestions of the guideline, if this goal is achieved within an acceptable risk level. Since an acceptable or tolerable level of risk is a vague concept, the statistical significance found between risk-adjusted return and executive remuneration here suggests that executives are rewarded and motivated to consider the risk accompanying the business decisions they make. Because there are no comparable results in the relevant prior literature (Doucouliagos et al., 2007), I split the whole sample into two sub-periods, pre-guideline and post-guideline, to consider whether the significance found in risk-adjusted return for the whole period can be attributed to the introduction of APRA's guideline in 2009.

When the alternative firm size effect is used to run the panel regression with the fixed effect model, the consistency disappears and the statistical significance of TSR is only seen in the risk and full models for CEO and the full model for top 5 executives. With risk-adjusted return being the performance measure, no association is found in the fixed effect regression using the alternative size proxy. Two plausible explanations have been identified in the analysis of the results. The first is that it may be caused by the small sample size. The second is that it may be due to extreme events occurring within the sample period. The two known events that are most likely to trigger a structural change in bank executive remuneration in Australia were the GFC and the introduction of APRA's remuneration policy. The overall results do not lead one to conclude that there is a relation between either pay and TSR or pay and risk-adjusted return. However, without any evidence that the results are caused by noise

or spurious statistics, no further assumptions will be made to explain the result but the discussion of pay-performance sensitivity will be resumed in the analysis of results from the split samples.

The remaining variables are CG index, board size and risk factors. Table 4.5 shows that there is a strong and negative relation between CG index and CEO total pay. Since the CG index represents board and committee independence, and board gender diversity in this study, the results indicate that the board and the committee possess such qualities that may constrain the growth of CEO remuneration. For board size and risk factor variables, no association with CEO pay is found in this study. In table 4.6, no relation between top 5 remuneration with any of these three variables is reported. Again, regressions using fixed effect models and alternatives for firm size find the same pattern of results for these three variables, and results for both CEO and top 5executives reinforce the inverse relation between CG index and CEO/top 5 total pay. The consistent results also suggest that the role played by risk factors alone and with board size are insignificant, and the effect of CG index, board size and risk factors alone on top 5remuneration are minimal.

It is worth mentioning that the empirical results documented in the Australian banking literature concerning corporate governance are inconsistent with the results reported in this study. For example, Doucouliagos et al. (2007) report an inverse relation between board size and CEO pay, and find no relation of CEO pay with board independence. In fact, the same relation between board size and total pay is only found in the pooled OLS results(with both firm size proxies) for CEOs and for most models for top 5 executives in this study. For board independence, a direct comparison with the result found in this study is not appropriate, because the CG index consists of more factors than just independence.

Table 4.5: Effect of performance, corporate governance and risk on Australian bank CEOs pay 2003-2015, Fixed Effects.

	Dependent variable: ln(total pay)			
	Base model (1)	CG model (2)	Risk model(3)	Full model(4)
Panel A: ROA				
Ln(size)	0.2579	0.3544	0.2581	0.3481
	4.4630***	4.6070***	4.4910***	4.7950***
ROA	12.4831	15.9600	17.0230	18.1513
	0.9311	0.9543	0.8368	0.8423
C.G. index	_	−0.2286	_	−0.2131
		−3.1000**		−2.7470**
Board size	_	−0.0276	_	−0.0286
		−0.9939		−1.044
Risk	_	_	3.4480	1.8962
			0.5081	0.2888
R-squared	0.7844	0.7918	0.7859	0.7922
Panel B: ROE				
Ln(size)	0.2528	0.3418	0.248242	0.341120
	3.7430***	4.079***	3.785***	4.468***
ROE	0.8406	0.9883	0.8872	0.9897
	0.6526	0.6834	0.6542	0.6681
C.G. index	_	−0.2203	_	−0.2192
		−3.2200**		−2.9840**
Board size	_	−0.0252	_	−0.0252
		−0.8230		−0.8287
Risk	_	_	1.8936	0.1164
			0.3419	0.0213
R-squared	0.7843	0.7911	0.7848	0.7911
Panel C: TSR				
Ln(size)	0.2418	0.3341	0.2270	0.3117
	0.0753**	3.823***	3.087**	3.7670***
TSR	0.2787	0.2966	0.3264	0.3244
	2.1660*	2.5560**	2.666**	2.874**
C.G. index	_	−0.2403	_	−0.2069
		−3.3800***		−2.7230**
Board size	_	−0.0201	_	−0.0213
		−1.0010		−1.010
Risk	_	_	5.4870	3.6863
			1.1880	0.7668
R-squared	0.7983	0.8062	0.8023	0.8078
Panel D: Risk-Adjusted return				
Ln(size)	0.2394	0.3296		
	3.2710***	3.9340***		
Risk-adj.	0.0029	0.0031		
return	2.1300*	2.5100**		
C.G. index		−0.2331		
		−3.4910***		
Board size		−0.0254		
		−1.1480		
Risk		-		
R-squared	0.7930	0.8006		

Note:

ln(total pay)	Natural log of the CEO's total remuneration including fixed-based, cash bonus, long-term equity incentive and all other elements compensation.
Ln(size)	Natural log of the bank's total book value of assets.
ROA	Return on Assets calculated as the ratio of net income before extraordinary items to average book value of assets.
ROE	Return on Equity calculated as the ratio of net income before extraordinary items to average book value of equity.
TSR	Total Shareholder Return is calculated as the sum of stock price and dividend at time t divided by the stock price at time t-1.

Risk-adj. return	Risk-adjusted return is calculated as the ratio of TSR to risk (as defined below).
C.G. index	C.G. index consists of 6 board characteristics, which include gender diversity, independence of the board, remuneration committee, audit committee and risk committee, level of financial expertise in board. Since they can all be naturally expressed in the continuous value range from 0 to 1. the index is calculated as the sum of their scores.
Board size	Board size is the number of directors in the board.
Risk	Risk is the total risk of the bank and it is measured by daily stock volatility for the past year.

The table contains 104 observations. All models are estimated using panel fixed effect regressions with cluster-robust standard errors. Figures in parentheses are t-statistics. Superscripts *, ***, *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table 4.6: Effect of performance, corporate governance and risk on Australian bank Top five highest paid executives' pay 2003-2015, Fixed Effects.

	Dependent variable: ln(total pay)			
	Base model (1)	CG model (2)	Risk model (3)	Full model (4)
Panel A: ROA				
Ln(size)	0.2892	0.2969	0.2891	0.2991
	3.4970***	3.929***	3.4640***	3.7030***
ROA	1.5479	0.7548	0.4480	0.0516
	0.1625	0.0775	0.0316	0.0037
C.G. index		−0.0149		−0.0208
		−0.2157		−0.2537
Board size		−0.0222		−0.0220
		−1.030		−0.9818
Risk			−0.8302	−0.6398
			−0.1444	−0.1040
R-squared	0.8736	0.8746	0.8737	0.8747
Panel B: ROE				
Ln(size)	0.2865	0.2920	0.2886	0.2962
	3.1500**	3.3730***	3.1030**	3.3210***
ROE	0.0298	−0.0897	0.0131	−0.0896
	0.0273	−0.0850	0.0112	−0.0835
C.G. index		−0.01185	_	−0.0190
		−0.1724		−0.2568
Board size	_	−0.02276	_	−0.0224
		−1.0810		−1.0300
Risk	_		−0.8740	−0.6446
			−0.1792	−0.1233
R-squared	0.8736	0.8747	0.8737	0.8747
Panel C: TSR				
Ln(size)	0.2901	0.3149	0.2824	0.2982
	3.431***	3.8070***	3.2670***	3.3350***
TSR	0.2597	0.2620	0.2860	0.2837
	2.9870**	2.9530**	4.6760***	4.4480***
C.G. index		−0.0627		−0.0355
		−0.8248		−0.4300
Board size		−0.0172		−0.0181
		−1.2530		−1.320
Risk			2.8569	2.8105
			0.8262	0.7243
R-squared	0.8864	0.8873	0.8874	0.8881
Panel D: Risk-adjusted return				
Ln(size)	0.2863	0.3072		
	3.3650***	3.6490***		
Risk-adj.	0.0023	0.0023		
return	2.1520*	2.1770*		
C.G. index		−0.0495		
		−0.6729		
Board size		−0.0204		
		−1.304		
Risk				
R-squared	0.8792	0.8801		

Note:

ln(total pay)	Natural log of the CEO's total remuneration including fixed-based, cash bonus, long-term equity incentive and all other elements compensation.
Ln(size)	Natural log of the bank's total book value of assets.
ROA	Return on Assets calculated as the ratio of net income before extraordinary items to average book value of assets.
ROE	Return on Equity calculated as the ratio of net income before extraordinary items to average book value of equity.
TSR	Total Shareholder Return is calculated as the sum of stock price and dividend at time t divided by the stock price at time t-1.

Risk-adj. return	Risk-adjusted return is calculated as the ratio of TSR to risk (as defined below).
C.G. index	C.G. index consists of 6 board characteristics, which include gender diversity, independence of the board, remuneration committee, audit committee and risk committee, level of financial expertise in board. Since they can all be naturally expressed in the continuous value range from 0 to 1. the index is calculated as the sum of their scores.
Board size	Board size is the number of directors in the board.
Risk	Risk is the total risk of the bank and it is measured by daily stock volatility for the past year.

This table contains 102 observations. All models are estimated using panel fixed effect regressions with cluster-robust standard errors. Figures in parentheses are t-statistics. Superscripts *, ***, *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

4.4.2Results and discussions for pre-guideline period (period between 2003 and 2009)

Tables4.7 and 4.8present a summary of regression results for the associations between pay, performance, corporate governance effect and risk factors for CEO and top 5 executives in the pre-guideline period. The format of the results tables (and also for the table4.9 and 4.10) is consistent for easy comparison. Since this sample is created by carving out part of the full period, the observations concern only a fraction of the full period.

In tables 4.7 and 4.8, the most noticeable fact is that the firm size effect is again highly relevant to the level of remuneration for CEOs and top 5 executives in the Australian banks. The positive signs of the coefficients indicate that the larger the bank that an executive works for, the higher the compensation he or she can expect to get. On the theoretical front, one of the explanations is that larger firms tend to be more complex and also possess more resources relative to small firms in general, so they need and are able to afford more competent managers. In the empirical literature, the consistent evidence documented in the literature seems to support this proposition.

Next, the focus turns to the pay-performance sensitivity for the CEO and top 5. The overall results suggest that CEO total pay is not related to either the absolute or risk-adjusted market-based performance. For the accounting-based performance measures, CEO total pay is only weakly associated with ROA and has no association with ROE. Although ROA can be considered as a performance measure superior to other accounting-based performance measures in terms of capturing risk (European Central Bank, 2010; Haldane, 2012), the absence of a direct link between market-based measures and shareholder returns raises a concern about the effectiveness of remuneration mechanisms in solving the agency problem. Compared to the situation with the top 5 executives, CEO pay-performance sensitivity appears to be significantly stronger. These results provide no evidence of the top 5 pay-performance sensitivity.

Based on the results reported here, pay-performance sensitivity is not present in the pre-guideline period, which provides support for the remuneration guideline's suggestion of enabling the board of directors to adjust downward performance-based remuneration in adverse circumstances. Since positive pay-performance sensitivity in the Australian banking sector is evident in prior studies spanning the period between 1992 and 2005 (Doucouliagos et al., 2007), it is possible that the disappearing pay-performance relation is due to the failure of remuneration policy to adjust downward for extreme adverse circumstances, such as the GFC of 2007 to 2008.In fact, this conjecture is not unreasonable given the traditional structure of executive compensation, which comprises predictable and unpredictable portions, none of which can ever go below zero. In the event of a firm suffering a substantial decline in performance caused by extreme adverse economic conditions, the decoupling of the pay-performance relation might be justified if top management is shown to be prudent in risk-taking and vigilant for the signs of economic conditions shifting to another stage.

US evidence suggests that the top executive remuneration in the banking industry leading up to the GFC encouraged aggressive rather than prudent risk-taking behaviour, which resulted in significant losses being borne by shareholders and stakeholders (Bhagat & Bolton, 2014). Although the setback in economic growth during the GFC was only short-lived and Australian banks did not need to be rescued financially like those in the US, it does not mean that prudent policy is not needed for Australian banks. On the contrary, it shows the importance of properly designed remuneration, which encourages executives to consider the level of risk-taking. Equally importantly, remuneration contractual clauses inserted in the executive remuneration design, such as clawback provisions, that discourage executives from taking risk recklessly may help foster a prudent risk culture given the presence of an effective board. The evidence of the disappearing pay-performance relation for the pre-guideline period highlights the need for restrictive measures. And it supports APRA's suggestion that the

board should take the initiative in adjusting downwards the performance portion of remuneration in adverse economic conditions.

While the remuneration mechanism during the period between 2003 and 2009 did not seem to be very effective, executive behaviour may also be kept in check by the monitoring mechanism provided by corporate governance. Table 4.7shows that highly negative and significant relations (the lowest is below 5% of statistical significance) between CEO remuneration and corporate governance did exist during this period, where a positive pay-size association and no pay-performance relation is found. This finding suggests that corporate governance was an effective factor controlling the level of total pay for CEOs in the pre-guideline period.

In table 4.8 however, which reports the regression results for top 5 executives, there is no association between CG index and pay. Jensen et al. (2004) observe that academic findings can actually shape corporate culture and practice. Since the research focus in the top management remuneration literature tends to be on the CEO (Doucouliagos et al., 2007; Harford & Li, 2007; Jensen & Murphy, 1990b; Leone et al., 2006; Minnick, Unal, & Yang, 2011), non-CEO executive remuneration policy, although similar to the CEO's in terms of structure, receives less scrutiny. In light of this, the board of directors is likely to face more pressure to ensure that CEO remuneration is in line with the expectations of the public, shareholders and regulators by conducting regularly reviews. Compared to remuneration policy for the CEO, the level of urgency and pressure in formulating properly-designed remuneration to non-CEO executives is relatively lower.

In all four models for CEO and top 5 executives, risk factors have no association with total pay based on the regression results for the period between 2003 and 2009, as shown in tables 4.7 and 4.8. This result is consistent with the absence of risk-adjusted market-based

performance as a significance variable in columns 1 and 2 of tables 4.7 and 4.8. Further, it is also consistent with findings from many studies suggesting that top bank executives are incentivised to focus on equity value creation (Chaigneau, 2012) and to pursue a profit maximisation strategy (Fahlenbrach & Stulz, 2011) regardless of the risk taken during the period leading up to the GFC.

The relation between pay and board size is not seen for either CEO or top 5, and further research may clarify why such a relation was found in prior studies(Andres & Vallelado, 2008; Doucouliagos et al., 2007). Along with the inclusion of board size as part of recommended corporate governance principles by the ASX (2014), the impact of board size on corporate culture is plausible. In the studies by Andres et al. (2008) and Doucouliagos et al. (2007), each board characteristic is separately included as an individual variable in the regression model. In this study, although board size is a separate variable, the rest of the board characteristics are grouped with other corporate governance factors to form a corporate governance index. Board size may affect the effectiveness and coordination of a board (Jensen, 1993). It might also affect skill and gender diversity of the board, which could have an impact on the firm. Since the CG index includes independence, skill and gender effects, it may compound some of the board size effect. In addition, there is also evidence suggesting that board size reflects the relation between firm size and remuneration (Cyert et al., 2002). While there may be other reasons to explain the absence of relation between board size and executive remuneration, no further discussion will be carried out as it is not the focus of this study.

Regression analyses using fixed effect models and the logarithm of market capitalisation as the size proxy have also been performed for comparison purposes. For CEOs, the situation is largely similar under this alternative firm size proxy. However, the positive relation between ROA as a performance measure and pay is no longer statistically significant, meaning that no

performance measure used in this study is associated with pay for this period. In the risk and full models, the positive associations between risk and pay are found in the models using ROA as a performance measure. Since no consistent pattern of pay-risk relation is found, this overall relation is unstable. For top 5 executives, the results generated with the alternative size measure do not appear to be materially different with the exception of the risk factor, which shows a positive association with total pay in both the risk and full models with both accounting-based and absolute market-based performance measures.[16]Again, the absence of a relation between risk and total pay suggests an unstable result, which may be caused by the small sample.

There are two things with respect to the results to be discussed. Firstly, the seven years of the sample period from 2003 to 2009cover both a boom and a bust stage of the economic cycle, and the magnitude of damage by the GFC is arguably comparable to the Great Depression. In order to find a pay-performance relation, the sensitivity of pay to performance has to be extremely high in both up and down markets. Since both stock-options and performance shares as part of executive remuneration cannot fall below zero, and other components consisting fixed pay, bonuses and benefits are unlikely to link to market performance, there is a downside limit on the sensitivity of total pay to performance. This is a potential explanation for the lack of a relation between pay and performance.

Secondly, although the sample size of about 55 observations is undisputedly small in a statistical sense, it should be sufficient for a regression analysis. However, the relation between independent and dependent variables in such a regression must be very pronounced in order to be statistically significant. Thus, the consistent findings, across all models and alternative firm size measures, of a positive pay-size relation and a negative pay-CG index association during this period is strong evidence of their existence.

[16]Risk-adjusted return is not included in the model containing the risk factor.

To sum up the remuneration landscape of the pre-guideline period based on the evidence in tables 4.7 and 4.8, the larger size of bank an executive works for, the higher the salary he or she is likely to get. Moreover, boards featuring higher independence and gender diversity are found to be more effective in controlling the level of CEO remuneration. Finally, the executive remuneration policy in the pre-guideline period (2003 to 2009) fails to align the interests of executives and shareholders in Australian banks.

Table 4.7: Effect of performance, corporate governance and risk on Australian bank CEOs' pay 2003-2009, Fixed Effects.

	Dependent variable: ln(total pay)			
	Base model (1)	CG model (2)	Risk model (3)	Full model (4)
Panel A: ROA				
Ln(size)	0.3730	0.4127	0.2798	0.3141
	3.7110***	6.1630***	2.5090**	4.2110***
ROA	24.8676	29.01480	37.1501	41.2258
	2.0830*	2.1440*	2.7090**	2.7240**
C.G. index		−0.3186		−0.285664
		−4.3220***		−4.0140***
Board size		0.0215		0.0292
		0.7892		1.0370
Risk			8.6442	8.2593
			1.5460	1.3720
R-squared	0.7963	0.8100	0.8042	0.8169
Panel B: ROE				
Ln(size)	0.2957	0.3423	0.2417	0.2895
	2.7030**	3.9140***	1.9960*	3.7360***
ROE	0.4108	1.1466	0.5946	1.3287
	0.2922	0.6298	0.4002	0.6933
C.G. index		−0.3456		−0.3363
		−2.802**		−2.5930**
Board size		0.0205		0.0235
		0.5277		0.5848
Risk			3.6935	3.3789
			0.7659	0.6278
R-squared	0.7879	0.8021	0.7897	0.8034
Panel C: TSR				
Ln(size)	0.3303	0.3860	0.2741	0.3377
	3.2300**	5.1670***	2.2680**	4.4300***
TSR	0.1580	0.2483	0.1785	0.2643
	0.7766	1.2500	0.8278	1.337
C.G. index		−0.3523		−0.3403
		−4.0090***		−3.4040***
Board size		0.0207		0.0224
		0.7170		0.8055
Risk		_	3.9297	3.1557
			0.7589	0.5746
R-squared	0.7908	0.8062	0.7928	0.8075
Panel D: Risk-Adjusted return				
Ln(size)	0.2996	0.3446		
	3.1900**	4.8170***		
Risk-adj.	0.0007	0.0013		
return	0.3152	0.5881		
C.G. index		−0.3144		
		−3.4040***		
Board size		0.0123		
		0.4454		
Risk				
R-squared	0.7877	0.7996		

Note:

ln(total pay)	Natural log of the CEO's total remuneration including fixed-based, cash bonus, long-term equity incentive and all other elements compensation.
Ln(size)	Natural log of the bank's total book value of assets.
ROA	Return on Assets calculated as the ratio of net income before extraordinary items to average book value of assets.
ROE	Return on Equity calculated as the ratio of net income before extraordinary items to average book value of equity.
TSR	Total Shareholder Return is calculated as the sum of stock price and dividend at time t

	divided by the stock price at time t-1.
Risk-adj. return	Risk-adjusted return is calculated as the ratio of TSR to risk (as defined below).
C.G. index	C.G. index consists of 6 board characteristics, which include gender diversity, independence of the board, remuneration committee, audit committee and risk committee, level of financial expertise in board. Since they can all be naturally expressed in the continuous value range from 0 to 1. the index is calculated as the sum of their scores.
Board size	Board size is the number of directors in the board.
Risk	Risk is the total risk of the bank and it is measured by daily stock volatility for the past year.

The table contains 57 observations. All models are estimated using panel fixed effect regressions with cluster-robust standard errors. Figures in parentheses are t-statistics. Superscripts *, ***, *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table 4.8: Effect of performance, corporate governance and risk on Australian bank top 5 highest paid executives' remuneration 2003-2009, Fixed Effects.

	Dependent variable: ln(total pay)			
	Base model (1)	CG model (2)	Risk model (3)	Full model (4)
Panel A: **ROA**				
Ln(size)	0.3075	0.3181	0.2494	0.2521
	2.9710**	3.7800***	2.4130**	3.1900**
ROA	8.1279	10.9199	15.6950	19.0923
	1.1240	1.2390	1.9360*	1.6960
C.G. index		−0.1234		−0.1014
		−1.285		−1.207
Board size		0.0204		0.0256
		0.6807		0.8359
Risk			5.3425	5.5275
			1.7690	1.5560
R-squared	0.9032	0.9063	0.9061	0.9092
Panel B: **ROE**				
Ln(size)	0.2780	0.2898	0.2315	0.2390
	2.7110**	3.3180***	2.1860*	2.9350**
ROE	−0.0097	0.3873	0.1457	0.5597
	−0.0142	0.4128	0.1960	0.5239
C.G. index		−0.1322		−0.1234
		−1.2250		−1.1700
Board size		0.0194		0.0220
		0.5916		0.6546
Risk			3.1366	3.2236
			1.0990	1.0230
R-squared	0.9023	0.9051	0.9035	0.9063
Panel C: TSR				
Ln(size)	0.3084	0.3251	0.2541	0.2700
	2.9520**	4.0650***	2.208*	3.3620***
TSR	0.1156	0.1702	0.1363	0.1892
	1.2560	1.5280	1.421	1.6670
C.G. index		−0.1526		−0.1396
		−1.4830		−1.362
Board size		0.0230		0.0248
		0.8209		0.9228
Risk			3.7340	3.5556
			1.4770	1.397
R-squared	0.9041	0.9082	0.9058	0.9097
Panel D: Risk-Adjusted return				
Ln(size)	0.2915	0.3017		
	3.0450**	3.7860***		
Risk-adj.	0.0007	0.0011		
return	0.5250	0.7261		
C.G. index		−0.128626		
		−1.253		
Board size		0.0181475		
		0.6718		
Risk				
R-squared	0.9027	0.9056		

Note:

ln(total pay)	Natural log of the CEO's total remuneration including fixed-based, cash bonus, long-term equity incentive and all other elements compensation.
Ln(size)	Natural log of the bank's total book value of assets.
ROA	Return on Assets calculated as the ratio of net income before extraordinary items to average book value of assets.
ROE	Return on Equity calculated as the ratio of net income before extraordinary items to average book value of equity.
TSR	Total Shareholder Return is calculated as the sum of stock price and dividend at time t

	divided by the stock price at time t-1.
Risk-adj. return	Risk-adjusted return is calculated as the ratio of TSR to risk (as defined below).
C.G. index	C.G. index consists of 6 board characteristics, which include gender diversity, independence of the board, remuneration committee, audit committee and risk committee, level of financial expertise in board. Since they can all be naturally expressed in the continuous value range from 0 to 1. the index is calculated as the sum of their scores.
Board size	Board size is the number of directors in the board.
Risk	Risk is the total risk of the bank and it is measured by daily stock volatility for the past year.

This table contains 56 observations. All models are estimated using panel fixed effect regressions with cluster-robust standard errors. Figures in parentheses are t-statistics. Superscripts *, ***, *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

4.4.3Results and discussions for post-guideline period (period between 2010 and 2015)

The results in tables 4.9 and 4.10 represent the output of regressions using fixed effect models with the logarithm of total assets as the size proxy. Comparing the overall results produced for the post-guideline period with those from the pre-guideline period in the previous section, the landscape of executive remuneration practice in Australian banks seems to have experienced a notable change. In order to show this, the rest of this section will highlight the differences between results presented in the tables 4.9 and 4.10 and results in the tables 4.7 and 4.8.

As reported intables4.9 and 4.10, the strong connection between firm size and both CEO and top 5 pay seen in previous sections has disappeared, and the discontinuity of the pay-size relation observed in all models indicates that executive remuneration practice in the Australian banking industry may have gone through a structural change. This conjecture comes from the fact that the positive effect of firm size on both CEO and top 5 remuneration has been shown to be the most consistent and influential regardless of which size proxy is used in previous sections. A positive pay-size relation is also constantly documented in the literature for not only the financial industry but also the non-financial industries. Despite this, the regression results from all four models consistently report no pay-size performance relation for either CEO or top 5. In order to enhance the robustness of these results, regressions using fixed effect models with alternative firm size proxies have also been run. The unreported results also fail to detect the pay-size relation in all 4 models for CEOs and top 5 executives. With such consistency, the finding of executive remuneration being less reliant on firm size in the post-guideline period is supported.

In reviewing the pay-performance relation, remarkable differences have been found between the post-guideline period and the pre-guideline period. In tables4.9 and 4.10, ROA as an accounting performance metric is shown to be irrelevant to the remuneration determination

for both bank CEOs and executives. But for ROE, a positive relation with total pay is found in all four models for CEOs and two models (i.e., base and risk model in columns 1 and 3 of table4.10) for top 5 executives. Similarly, the positive association between pay and absolute shareholders return is found for both CEO and executives.

For the connection between total pay and risk-adjusted performance, statistical significance can only be seen for the CEO. In comparing the regression results produced using the fixed effect model and alternative firm size measures for robustness checks, the exact pattern of the relation for the CEO is identified. For top 5 executives, the only difference is that the risk-adjusted performance is found to be associated with total pay in the CG model. Otherwise, the results for either size measures would be the same for the top 5 as for the CEO. The results suggest that while no pay-performance relation can be identified for either CEO or top 5 executives in the pre-guideline period, the connection between pay and both accounting-based and market-based performance is found for both CEO and top 5executives in the post-guideline period. More importantly, the finding of risk-adjusted performance as a determinant for CEO pay is consistent with the requirement of APRA's guideline.

The support for the notion that the remuneration landscapeh as changed can also be reinforced by the remaining results presented intables4.9 and 4.10. For example, the constraining effect of corporate governance for CEO remuneration in the pre-guideline period is not seen in the post-guideline period. Interestingly, the connection between CG index and top 5 executives is identified in a positive way. Caution must be exercised in interpreting this result. When positive relations between corporate governance and remuneration are found, the finding generally is interpreted in the literature as indicating that corporate governance is an effective controlling factor for excessive executive remuneration (Heaney et al., 2010; Monem & Ng, 2013). In the scenario where a positive pay-corporate governance relation is found, using the

same logic to analyse the result may risk misinterpreting the true relation between corporate governance and remuneration.

Although the board and committee may directly influence top executives' total pay through remuneration policy, the fact that total pay consists of predictable and unpredictable components complicates the final remuneration executives get. If the predictable pay component is disproportionately small compared to the unpredictable component, the board is able to control executives' actions and behaviour with more liberty in executing the strategic objectives of the firm. For example, remuneration policy can be set in such a way that executives are rewarded for being risk prudent by using risk-adjusted performance measures. By the same token, executives can be rewarded for taking more risk by using risk measures (Pathan, 2009). So, it is important to note that the relation between corporate governance and executives' pay is through the avenue of remuneration policy and by which risk behaviour can also be affected. However, the absence of statistical significance for risk-adjusted performance and risk factors for top 5executives (refer to table 4.10) does not provide evidence to support the conclusion that a risk effect is incorporated into remuneration policy as one of its determinants.

A robustness check of running the regression with alternative firm size proxies has been done and the result shows similar results to those reported in tables4.9 and 4.10. For CEOs, the same pattern of results has been found, indicating that the effect of CG index, board size and risk on CEO pay are likely to be weak. For top 5 executives, while no connection with top 5s are found for the risk and board size, the pay-CG relation shows a slightly different pattern of results compared to the reported models in table 4.10. For instance, the positive relation between CG index and pay is absent in the full model, where ROE is used as the performance measure. But the finding of a positive pay-risk-adjusted performance and pay-CG index

relation found in the CG model (which is equivalent to column 2) indicates instability in the model.

It is important to reiterate that it is more difficult to find statistical significance in a small sample than a larger one, in the case where the small sample is caused by a small population. With a sample of less than 50 in the split sample representing the post-guideline period, the likelihood of getting results is lower unless the pattern and relation are clear. Yet the consistent results reported in tables4.9 and 4.10 and the unreported results using an alternative size effect proxy can be seen as strong evidence that remuneration practice for both CEO and top 5 executives in Australian banks has been evolving in a way that coincides with APRA's remuneration guideline.

4.5 Results on the hypotheses and the implication

To recapitulate, there are two hypotheses developed earlier in chapter 2:

H1: There is a positive relation between executive pay and shareholder return in the pre-and post-guideline period.

H2: There is a more positive relation between pay and risk-adjusted performance in the post-guideline period compared to the pre-guideline period.

Based on the overall results found in this study,H1 is rejected. Although the full period and the post-guideline period show consistent results with the prediction contained inH1, the pre-guideline period results fail to support it. One reason to develop this hypothesis is to highlight the effectiveness of remuneration plans under different economic conditions. By failing to meet requirements for the pre-guideline period, the results show that the

remuneration plans in the Australian banks fail on average to adjust for extreme adverse economic conditions. Perhaps this expectation is unrealistic, nevertheless the results support the guideline's recommendation of enabling the board to adjust downward or eliminate part of the performance-based remuneration in adverse circumstances. With this term inserted in executives' remuneration plans, a prudent risk-taking culture would be enforced, and the outcomes might also be beneficial to shareholders.

H2 is supported. It is clear that risk-adjusted return is only associated with CEO pay in the post-guideline period. Though this hypothesis is supported, the results show that there are still some issues the regulator should deal with. The first issue is the lack of association between top 5 executive pay and risk-adjusted return. The guideline recognises that a remuneration policy to promote prudent risk-taking should cover group executives and all other employees or non-employees for whom a substantial portion of their pay consists of a performance-based payment. Thus, the linkage between top non-CEO executive compensation and risk-adjusted return should be relevant in the post-guideline period. This is an area that the regulator should investigate further. The second issue is that despite the positive association between CEO total pay and risk-adjusted return in the post-guideline period, the banking regulator should remain vigilant on the issue of top decision managers' incentives. It is important to point out that in the post-guideline period, there have not been any significant adverse economic conditions. Thus, these results provide evidence that top executive remuneration policy in the Australian banks is generally in line with the guideline in an up market. Whether it can withstand the adverse circumstances of a down market remains to be seen.

Table 4.9: Effect of performance, corporate governance and risk on Australian CEOs' 2010-2015, Fixed Effects.

	Dependent variable: ln(total pay)			
	Base model (1)	CG model (2)	Risk model (3)	Full model (4)
Panel A: ROA				
Ln(size)	−0.5358	−0.7140	−0.5643	−0.7324
	−1.3550	−1.539	−1.4640	−1.570
ROA	56.2043	48.8576	55.4504	48.5214
	1.7980	1.192	1.7460	1.1940
C.G. index		0.2635		0.2552
		0.6995		0.6935
Board size		−0.0116		−0.0136
		−0.2355		−0.3109
Risk			−3.9814	−3.2960
			−0.2528	−0.2032
R-squared	0.8897	0.8938	0.8900	0.8940
Panel B: ROE				
Ln(size)	−0.4685	−0.6230	−0.4983	−0.6434
	−1.326	−1.389	−1.4140	−1.4050
ROE	6.1042	5.6227	6.0545	5.6065
	4.2380***	2.4330**	4.0300***	2.4510**
C.G. index		0.2158		0.2061
		0.5654		0.5577
Board size		−0.0169		−0.0192
		−0.3735		−0.4887
Risk			−4.0275	−3.6423
			−0.2584	−0.2293
R-squared	0.8994	0.9026	0.8997	0.9028
Panel C: TSR				
Ln(size)	−0.3886	−0.6431	−0.3680	−0.6168
	−1.044	−1.367	−1.0140	−1.3130
TSR	0.3123	0.3172	0.3187	0.3267
	2.1680*	2.5100**	1.9240*	2.1750*
C.G. index		0.3584		0.3687
		1.4220		1.3400
Board size		−0.0248		−0.0229
		−0.7338		−0.6557
Risk			2.57254	4.15492
			0.1600	0.2230
R-squared	0.8971	0.9060	0.8972	0.9063
Panel D: Risk-Adjusted return				
Ln(size)	−0.4957	−0.7534		
	−1.3430	−1.6360		
Risk-adj.	0.0037	0.0037		
return	2.0460*	2.2900*		
C.G. index		0.3607		
		1.5430		
Board size		−0.0242		
		−0.7266		
Risk				
R-squared	0.8956	0.9045		

Note:

ln(total pay)	Natural log of the CEO's total remuneration including fixed-based, cash bonus, long-term equity incentive and all other elements compensation.
Ln(size)	Natural log of the bank's total book value of assets.
ROA	Return on Assets calculated as the ratio of net income before extraordinary items to average book value of assets.
ROE	Return on Equity calculated as the ratio of net income before extraordinary items to average book value of equity.
TSR	Total Shareholder Return is calculated as the sum of stock price and dividend at time t

	divided by the stock price at time t-1.
Risk-adj. return	Risk-adjusted return is calculated as the ratio of TSR to risk (as defined below).
C.G. index	C.G. index consists of 6 board characteristics, which include gender diversity, independence of the board, remuneration committee, audit committee and risk committee, level of financial expertise in board. Since they can all be naturally expressed in the continuous value range from 0 to 1. the index is calculated as the sum of their scores.
Board size	Board size is the number of directors in the board.
Risk	Risk is the total risk of the bank and it is measured by daily stock volatility for the past year.

This table contains 47 observations. All models are estimated using panel fixed effect regressions with cluster-robust standard errors. Figures in parentheses are t-statistics. Superscripts *, ***, *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Table 4.10: Effect of performance, corporate governance and risk on Australian top 5 highest paid executives' remuneration 2010-2015, Fixed Effects.

	Dependent variable: ln(total pay)			
	Base model (1)	CG model (2)	Risk model (3)	Full model (4)
Panel A: ROA				
Ln(size)	−0.1713	−0.4219	−0.1779	−0.4086
	−0.4591	−1.0780	−0.5045	−1.0720
ROA	30.2337	15.9691	30.2340	14.8021
	0.9599	0.4902	0.9509	0.4317
C.G. index		0.3746		0.4034
		3.1540**		2.7380**
Board size		−0.0075		−0.0042
		−0.2523		−0.1490
Risk			−0.9195	4.3980
			−0.0959	0.4646
R-squared	0.9538	0.9594	0.9538	0.9596
Panel B: ROE				
Ln(size)	−0.1343	−0.3600	−0.1448	−0.3525
	−0.3844	−0.9488	−0.4340	−0.9423
ROE	3.6928	2.7035	3.69859	2.6243
	2.2310*	1.3360	2.235*	1.2190
C.G. index		0.3144		0.3341
		2.5570**		2.2980*
Board size		−0.0121		−0.0099
		−0.4249		−0.3628
Risk			−1.4565	2.9198
			−0.1573	0.3148
R-squared	0.9577	0.9619	0.957738	0.962077
Panel C: TSR				
Ln(size)	−0.0863	−0.3634	−0.0594	−0.3279
	−0.2272	−0.8931	−0.1719	−0.8624
TSR	0.1887	0.1778	0.1948	0.1893
	1.9220*	1.9320*	2.0890*	2.0530*
C.G. index		0.3825		0.4272
		4.0510***		4.2190***
Board size		−0.0179		−0.0129
		−1.1020		−0.7103
Risk			3.4974	8.7607
			0.4022	0.9872
R-squared	0.9570	0.9643	0.9572	0.9653
Panel D: Risk-Adjusted return				
Ln(size)	−0.1504	−0.4190		
	−0.4019	−1.0300		
Risk-adj.	0.0022	0.0020		
return	1.846	1.7700		
C.G. index		0.3766		
		3.5120***		
Board size		−0.0173		
		−1.039		
Risk				
R-squared	0.9563	0.9633		

Note:

ln(total pay)	Natural log of the CEO's total remuneration including fixed-based, cash bonus, long-term equity incentive and all other elements compensation.
Ln(size)	Natural log of the bank's total book value of assets.
ROA	Return on Assets calculated as the ratio of net income before extraordinary items to average book value of assets.
ROE	Return on Equity calculated as the ratio of net income before extraordinary items to average book value of equity.
TSR	Total Shareholder Return is calculated as the sum of stock price and dividend at time t

	divided by the stock price at time t-1.
Risk-adj. return	Risk-adjusted return is calculated as the ratio of TSR to risk (as defined below).
C.G. index	C.G. index consists of 6 board characteristics, which include gender diversity, independence of the board, remuneration committee, audit committee and risk committee, level of financial expertise in board. Since they can all be naturally expressed in the continuous value range from 0 to 1. the index is calculated as the sum of their scores.
Board size	Board size is the number of directors in the board.
Risk	Risk is the total risk of the bank and it is measured by daily stock volatility for the past year.

This table contains 46 observations. All models are estimated using panel fixed effect regressions with cluster-robust standard errors. Figures in parentheses are t-statistics. Superscripts *, ***, *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

4.6 Long term pay-performance relation and economic significance

In addition to addressing the objectives of this study, an analysis of the relation between long-term performance and executive remuneration is undertaken, and an interpretation of the economic significance of the results is attempted. The motivation for the analysis of long-term performance comes from the guideline's emphasis on encouraging executives to focus on the long-term success of the bank through a properly-designed remuneration plan. Although the Australian remuneration literature shows a strong link between CEO remuneration and one-year lag in accounting performance, the relation dies down in the second year (Doucouliagos et al., 2007). In the third year, the instability in the relation makes it difficult to establish a long-term pay-performance relation. Thus, following the same research approach, three lags of performance measures are included in the regression model for the full period.[17]

The economic significance of the results is interpreted. Given the intended new objective of shareholder return maximisation within an acceptable level of risk for Australian banks, the level of economic significance should stay within a reasonable range for optimal interest alignment between executives and shareholders. Thus, this will be discussed briefly. The focus of the section lies in the effectiveness policy. To that end, comparison of economic significance of pay-performance sensitivity between CEO and top 5 executives will be made in the pre-guideline and post-guideline periods.

4.6.1 Testing Long term pay-performance relation

Repeating the same regression method as used previously to test the hypotheses with the inclusion of three lags of each performance measure[18] for CEO and top 5 remuneration, the observations for CEO and top 5 are reduced from 104 and 102, to 73 and 72 respectively.

[17]Due to the small sample size for the pre- and post-guideline periods, examining long-term relation and pay relation with lag is practically infeasible.

[18]When lagged value is included in the model, no performance measure in level is included.

This is sufficient for regression testing. The unreported results show little evidence of relation between executive pay and long-term performance. While relation between CEO pay and two-year lagged ROE is found in some models, little empirical evidence in the literature or economic theory provides an explanation for such a result. Thus, no conclusion can be drawn from such results and this issue will be left for future study.

4.6.2 Analysis of economic significance

The analysis of economic significance excludes the risk-adjusted return. Since that measure aims to express in a score capturing the return per unit of risk, it is not practical to interpret its economic significance. Thus, only accounting-based performance measures and TSR with statistical significance will be analysed for the pre- and post-guideline periods. There are four models and each yields different coefficients for the same performance measure but an analysis will only be conducted for those in the full model.

In column (4) of table 4.7, the only performance measure relevant to CEO pay is ROA. Since the logarithm of total CEO pay is used and the ROA is estimated as a level, the interpretation is that when ROA increases one unit (or one percent point), total CEO remuneration will increase approximately 41.2% while other variables remain constant. While the magnitude of such a CEO remuneration increase seems to be unrealistic, it is important to be reminded that the mean of ROA in the pre-guideline period is less than 1% as shown in panel B of table 4.1. With a one percentage point increase, performance as measured by ROA is doubled. So it is not unreasonable that CEO remuneration is allowed to increase almost 50%. The question would be when ROA grows to double its original size, is the shareholder return growing to comparable level? However, the statistical significance in TSR in the corresponding period is absent. For this reason, it is not practical to conduct any analysis. For top 5 executives, no relation is found between pay and performance and, thus, no analysis is attempted.

In column (4)of table 4.9, a statistically significant relation between CEO pay and ROE, and between CEO pay and TSR, are reported. The coefficients of ROE and TSR are approximately 5.6 and 0.33 respectively. This can be interpreted as, when ROE increases by one percentage point, total CEO pay increases 5.6% while other variables remain constant; and when the TSR increases by one percentage point, total CEO compensation rises by 0.33% while other variables stay the same. Referring to panel C of table 4.1, the means of ROE and TSR are 11.4% and 20.1% respectively. Thus, the economic significance of CEO pay-performance relation for shareholders does not seem to be unreasonable in the pre- and post-guideline periods. For the top 5, the pay-performance relation can only be identified in TSR as shown in column (10) of table 4.10. It suggests that when there is a one percentage point increase in TSR, other variables remain constant, and the top5 total remuneration is likely to increase by 0.19 %. As the mean of TSR reported in panel C of table 4.2 is 19.1%, which is similar to TSR (20.1%) in the CEO data set, the economic significance of TSR is materially lower for top5 executives. While the overall results do not suggest a serious concern in the interest alignment between executives and shareholders, policy implications may be drawn from the results.

The results regarding economic significance of TSR to executive pay supports the conjecture that the board of directors seems to concentrate on CEO remuneration policy. According to the guideline, remuneration policy should cover employees at all levels of the corporate hierarchy, including non-employees, whose decisions may affect the soundness of the bank. The first evidence from the finding of no relation between top 5 pay and risk-adjusted return, while the pay and risk-adjusted return relation is found for the CEO, indicates that bank remuneration policy may not effectively cover employees at levels below the CEO. The lower economic significance of TSR to top 5 pay compared to that of TSR to CEO pay further confirms that the board of directors is focused on the CEO, consistent with agency theory. Since the influence of agency theory on remuneration practice has been profound, it may take

time to shift the view of remuneration setters. In this regard, the regulator should pay closer attention to this development over time.

For bank shareholders, the economic significance of pay-performance sensitivity differs to the approach documented in the early literature (Jensen & Murphy, 1990b), as the banking industry is different to the others. The guideline's requirement of linking remuneration to prudent risk-taking means that bank executives cannot use the traditional project selection criteria, which are based on profitability. Instead, they are more likely to be rewarded by selecting projects with the highest returns per unit of risk. While one might argue the economic significance between CEO and TSR can be stronger without the promotion of prudent risk-taking, when looking at it through an agency lens, the alignment of the executive pay-performance relation and prudent risk-taking allows Australian banks to generate more solid returns on investment.

4.7 Conclusion

This chapter has tested the hypotheses developed in chapter 2 by carrying out the research methodology explained in chapter 3. With the aims of testing whether the relation between pay and shareholder return persists in the pre- and post-guideline periods and of comparing the level of statistical relation of pay and risk-adjusted return between the pre- and post-guideline periods, descriptive statistics, correlation coefficients and regression analyses are conducted.

I have shown that Australian bank executive remuneration practices are consistent with APRA's guideline in descriptive statistics and correlation coefficients. For example, the consistent shift of accounting-based performance measures, market-based performance measures and corporate governance measures from the pre-guideline to post-guideline periods

in the descriptive statistics support the hypotheses developed earlier. The correlation coefficients between variables confirm the appropriateness of the regression model and provide support for the hypotheses by showing the change of correlation between pay and other explanatory variables from the pre-guideline to the post-guideline period.

To test the hypotheses, regression analyses for pay and performance with other variables relevant to the guideline, such as corporate governance effect and risk factor, have been conducted. The regression results generated for the full period are generally consistent with expectations. For example, the positive firm size-pay relation and pay-TSR relation, the negative pay-governance relation, and more importantly, the positive pay and risk-adjusted return relation have been found to be significant for top executives.

When comparing the results between the pre- and post-guideline periods, the overall results show that Australian executive remuneration policy in the banking industry is designed in such a way as to be consistent with the key objectives of the guideline. Specifically, bank executives in Australia are motivated to account for risk in making decisions relevant to the firm's performance through their remuneration plans. The existence of pay and risk-adjusted return relation in the post-guideline period, but the absence of the same relation in the pre-guideline period, is the evidence to support this argument.

However, the evidence does not support H1 but only supports H2. To support H1, the pay-shareholder return relation has to exist in both the pre- and post-guideline periods. The absence of a pay-TSR relation in the pre-guideline period contradicts the hypothesis. H2, however, is supported because the statistically significant relation between pay and risk-adjusted performance is found in the post-guideline period but no association between such variables is found in the pre-guideline period for CEOs.

There are two implications for the results on these two hypotheses. Firstly, the absence of a pay-shareholder return relation in the pre-guideline period may be explained by the remuneration failing to adjust for the extreme adverse economic condition. This supports the guideline's recommendation encouraging the board to adjust downwards or eliminate performance-based remuneration as it sees fit. Secondly, the pay and risk-adjusted performance relations not being seen for the top 5 executives deserves the regulator's attention. While the guideline specifies that risk-prudent behaviour promoted through remuneration should cover top non-CEO executives, evidence supporting this recommendation of the guideline is not found in this study.

It is important to report the result regarding the relation between long-term performance and remuneration because one of the guideline's requirements is to have the board designing a remuneration policy that motivates executives to focus on the long-term success of the bank. Though testing the lagged value of performance and pay is not included in the hypotheses due to the lack of sufficient observations in the separate pre- and post-periods, it has been tested over the full period. However, the final regression results do not seem to be reliable. Thus, this issue will be left for future study.

The analysis of economic significance has been presented. The key focus of the undertaking is not to predict the movement of executive remuneration as a result of the shift in performance. But, instead, the focus is to highlight the level of interest alignment between executives and shareholders and policy implications through the analysis of the results. For example, the comparison of economic significance in TSR to total pay between CEOs and top 5 executives suggests that it matters more to the CEO than to the top 5 executives. It may also encourage the regulator to focus more on the remuneration of non-CEO executives, especially with respect to the guideline's requirement of remuneration policy covering personnel at all levels of corporate hierarchy and even some non-employees. Although the

analysis of economic significance is based only on shareholder return, which is not a risk-adjusted measure, the noticeable differences in interest alignment between CEO and shareholders, and between executives and shareholders, may further confirm that the reach of a properly-designed remuneration policy has not been extended.

Chapter 5 - Conclusion

5.1 Conclusion and policy implications

The banking industry holds a special responsibility for an economy and the financial system. For that reason, the corporate governance in this sector should ensure not only the soundness of the banks, but also the economy and the financial system(APRA, 2009; Macey & O'Hara, 2003). The GFC experience has demonstrated that the stability of the global financial system could be jeopardised when systemically important financial institutions fail. The contagion effect is the result of the high level of interconnectedness in the global financial system. In light of this, banking regulators in major economies have made a collective effort to address the issue with the aim of strengthening the global financial system.

Remuneration reform in the financial industry has been identified as one of the top priorities to make it more resilient to adverse economic conditions (FSB, 2009a). Empirical evidence also supports the view that poorly-designed remuneration policy in banks might have contributed to the GFC in such a way that bank executives were highly motivated to employ risky strategies (Bebchuk et al., 2010; Bhagat & Bolton, 2014; Fahlenbrach & Stulz, 2011; Kirkpatrick, 2009). The fact that the FSB's Principle for Sound Remuneration Practice is endorsed and adopted by major economies (FSB, 2011)does not mean that there is no room for further strengthening the global financial system. In fact, APRA (2012) has actually recognised that not all the areas of remuneration reform as suggested by the guideline are progressing at a satisfactory level.

Using a 13-year sample of bank executives' remuneration panel data from all banks listed in the Australian Securities Exchange from 2003 to 2015, the regression results show that Australian bank executives' remuneration policy has a much higher linkage with prudent risk-taking in the post-guideline period. For example, while the relation between top executive pay and risk-adjusted performance is absent in the pre-guideline period, risk-adjusted

performance is found to be significant and relevant to the top executives' remuneration in the post-guideline period.

With respect to the role of the board as the chief remuneration policy setter, the results suggest that the association between this governance mechanism and the pay-performance relation has changed since the introduction of the guideline. In particular, governance is found to have a negative effect on remuneration in the pre-guideline period only for CEOs. But, in the post-guideline period, the positive relation between such a mechanism and top executives is found. While the change of sign may be unexpected, the extended coverage reaching down below the CEO appears to be in line with the requirements of the guideline.

The interest alignment between executives and shareholders is also explored in this study. Although the view of narrowly focusing on this agency relation may be a contributory factor to the poorly-designed remuneration system leading up to the GFC (Fahlenbrach & Stulz, 2011), the interests of shareholders should not be disregarded. In addition, the guideline does not prohibit financial institutions from maximising shareholder value. In regard to this, I find that the interest alignment between executives and shareholders remains strong in the post-guideline period. However, the relation between pay and shareholder return is not statistically significant in the pre-guideline period. Although this result was not anticipated, it is not difficult to find reasons to explain it. One of them is the failure of executives' remuneration to adjust to extreme adverse economic conditions, such as the GFC. This reason supports the guideline's demand that the board consider downward adjustments of the performance portion of executives' remuneration, should unforeseen adverse circumstances arise.

I also extend the analysis to the economic significance of the pay-performance relation and the relation between longer-term performance and current remuneration. The finding of economic significance suggests that the guideline's requirement for remuneration policy to

cover practically all levels of the corporate hierarchy, even including non-employees, whose decisions may affect the soundness of the bank, may need to be further investigated by the regulator. This conjecture seems to be more plausible given the finding of an insignificant pay and risk-adjusted relation for executives in the post-guideline period, while the same relation is found for CEOs in the same period. The test of the association between long-term performance and current pay is motivated by the guideline's demand for the board to structure remuneration in such a way that executives are encouraged to focus on the long-term success of the bank. The results appear to be illogical for the full period in this study, as the only relation found between pay and performance is when performance is measured by two lags of ROE. Due to data unavailability, the same test is not statistically feasible in the two sub-periods of the pre-guideline and post-guideline periods. Since one of the characteristics of poorly-structured remuneration leading up to the GFC is the short-term result orientation (Bebchuk et al., 2010), this is a crucial area of remuneration reform. Owing to the inconclusive results found in this study, further examination of this area of remuneration in Australian banks should be conducted in the future.

To sum up, remuneration practice of Australian banks has gone through a dramatic change and the trajectory of that change appears to be beneficial to the stability of the financial system and in line with the recommendation of the guideline. While it is certainly a result acknowledging the regulator's contribution to social stability, there are some areas of remuneration reform in the banking industry that require its attention. In relation to the interest alignment between executives and shareholders, investors in Australian banking stocks should be confident because Australian bank executive remuneration is positively related to shareholder value creation.

5.2 Limitations

Two limitations in this study have been identified. The first is that the confounding effect of the GFC and the introduction of APRA's guideline creates uncertainty regarding the conclusion that the structural change of remuneration practices in the Australian banks in the post-guideline period is attributed to the introduction of the guideline. Since the occurrence of these two events is so close in time, I am not certain whether the shift in remuneration practice is mainly caused by the introduction of the guideline or the impact of the GFC. With no effective statistical instrument to control for the effect of GFC, the reliability of the result suffers from a confounding effect. The second is that the original design of the research was to investigate CEO remuneration and the sum of Chief Financial Officer (CFO) and Chief Risk Officer (CRO) remuneration, the latter because their decisions are relatively influential on the soundness of the bank at the non-CEO executive level. However, due to lack of data availability for the pre-guideline period, this element has been replaced with top 5 executive remuneration. Although I am satisfied with the assumption that the influence of the top 5 collectively is no less than the sum of CFO and CRO, the special roles played by these executives in a bank is more relevant to the purpose of this study.

5.3 Plan for future research

Remuneration compositions, bank risk measures, performance measures and corporate governance will be the key areas for future study. For remuneration composition, a future investigation will look at each component of total remuneration with close attention being paid to short-term cash bonuses and short- and long-term equity incentives. By this method, the relation between executives' pay and long-term performance may be more accurately captured. Bank risk measures are an integral part of the policy review. Pay-performance sensitivity (Delta) and the sensitivity of executives' wealth to the volatility of stock return

(Vega) have been used in studies concerning executive pay and risk-taking (Coles, Daniel, & Naveen, 2006; Guay, 1999). DeYong, Peng & Yan (2013) use these measures to examine the responsiveness of the board to the level of risk-taking by adjusting executive incentives. Furthermore, Minhat & Abdullah (2016) investigate the association between bank risk, insolvency risk and risk-taking induced by option incentives. In regard to performance measures, future study will expand the performance measures used in this study. Performance measures in fact are the key explanatory variables in this study. With a more comprehensive list of performance measures, the results regarding pay-performance sensitivity will yield a clearer picture of how executives in banks are remunerated. Finally, corporate governance in remuneration research includes components beyond board characteristics. One of the key governance effects is insiders' and outsiders' share ownership. In addition to this, board independence can be categorised by the level of independence. Those factors are all ignored at this stage of the study. A future study will address all of these issues.

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