CEO Pay Ratios and Company Performance: a Study of JSE-listed Consumer Goods and Services Companies

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Abstract

The disparity in remuneration between company CEOs and other employees is a topical and highly controversial issue globally. Theoretically, there are two explanations for this pay disparity – tournament theory and behavioural theory. Tournament theory says that employees are more motivated to compete with a larger pay gap, while the behavioural theories say that employees feel inadequate and thus demotivated in the presence of a larger pay gap, resulting in poorer performance. In response to growing concerns about the pay gap, new legislation in the USA has required companies to disclose their pay ratios[1] in their financial statements, which is also likely to come to South Africa. As a means to explore CEO pay ratios in a South African context, a study of the determinants and performance effects of companies' CEO pay ratios was conducted in the Consumer Goods and Consumer Services subsectors on the JSE. Data was collected on companies for the period 2006 to 2014 and pay ratios were estimated for each company where the data allowed.

Due to the complexity of CEO remuneration, three different pay ratios were calculated, which differed in how long-term incentive payments were treated in each case. Using the same method as Shin, Kang, Hyun, & Kim (2015) used in their South Korean study, three different analyses were conducted. Firstly, the factors determining pay ratios were analysed in a regression analysis, which found CEO tenure, companies' future investment opportunities and company size to be key determinants of pay ratios.

Secondly, the deviations from companies' expected pay ratios were regressed against subsequent company performance to see whether CEOs being paid the, "wrong," amount relative to employees affects company performance. It was found that deviations from the expected pay ratio negatively affected company performance, and there was no difference in performance between under- and over-paying CEOs relative to employees.

Finally, as a means to test whether tournament theory or behavioural theories better explain the CEO pay ratio in South Africa, subsequent company performance was regressed against the three different pay ratios calculated. It was found that there is little evidence of a relationship between subsequent company performance and the pay ratio, except in the case where performance is measured by return on assets, and the pay ratio is measured such that it excludes long-term incentives completely. The relationship in this case was found to be positive, indicating that tournament theory better explained the relationship between pay ratios and company performance. One of the limitations of this study was the limited availability of data, which gives rise to self-selection bias. This was also found to be an issue in another study of a similar nature (Faleye, Reis, & Venkateswaran, 2012).

[1] This is calculated as CEO remuneration divided by average employee remuneration per company

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Chapter 1: Introduction and Background

"… people from all over the world and from all walks of life would prefer smaller pay gaps between the rich and poor." (Kiatpongsan & Norton, 2014).

Executive compensation is a highly controversial topic, both in the South African context, as well as abroad. One way to measure the quantum of executive remuneration is as the so-called CEO pay ratio, which is the ratio of CEO remuneration to that of the average employee of the company. Much criticism has been levelled at the amount of remuneration CEOs get paid relative to employees, with many saying that the ratio is excessive and unfair, and furthermore is detrimental to company performance. This study aims to contribute to this debate by investigating the drivers of the CEO pay ratio for South African listed consumer goods and services companies, as well as the link between CEO pay ratios and company performance for this selected group. The remainder of this chapter considers the background to these questions, as well as the research questions to be investigated in this study.

1.1 Background

The rise in executive compensation relative to employees has been widely documented in the USA, where the CEO pay ratio increased from 20:1 in 1960 to 295.9:1 in 2013 (Mishel & Davis, 2014). By comparison, CEOs of the top 100 FTSE companies are paid an average of 130 times their average employees' salary (Hildyard, 2014), yielding roughly half the pay ratio of their US counterparts. In South Africa, very little research has been conducted on CEO pay ratios. However, financial news provider MoneyWeb has recently began publishing the CEO pay ratios of South African listed companies, finding that the average Johannesburg Stock Exchange (JSE) listed company has a CEO pay ratio of 38.92. (van Niekerk, 2015c) The reason for this number being significantly lower than that of the US or UK, however, is that in contrast to these studies, the methodology employed in South Africa excludes long-term incentive grants and uses industry average salaries instead of company-specific average salaries (van Niekerk, 2015a).

There have been numerous media reports of director overpayment relative to company performance and employee salaries. For instance, Nova, a private property company, paid its directors R16.7 million, in spite of having an operating loss of R50 million (van Niekerk, 2015b). The remuneration of directors has been put in the spotlight for other industries as well, including mining (The Star, 2014), banking (BusinessTech, 2015) and retail (Carte, 2011). The causes of the tragic Marikana Massacre in 2012 have also been linked to the pay disparity between mineworkers (who were striking for an increase to R150 000 per annum) and mining company CEOs (who were earning R20 million per annum each) – an implied pay ratio of approximately 133 (Letsoalo & Molele, 2012). At its recent annual general meeting, 29% of Shoprite's shareholders (including South Africa's largest asset manager, the

Public Investment Corporation) voted against the remuneration to be paid to its CEO largely because the company's CEO is paid predominantly fixed (rather than performance-based) remuneration (Kew, 2015). Therefore, the media is flush with reports of the overpayment of CEOs relative to company performance, as well as to other employees' salaries, and shareholders appear to be taking action.

The amount of remuneration received by CEOs is staggering. For example, in 2014, the top-earning CEO (Chief Executive Officer) of a South African company earned a massive R122 million in compensation[2], while the top ten South African CEOs took home a total of R780 million (BusinessTech, 2014). This is dwarfed by the earnings of CEOs elsewhere in the world. For instance, the top earning CEO of companies in the USA received a total of $156 million (AFLCIO, 2014), which is equivalent to R1.804 billion as at the 2014 year-end exchange rate. The top ten CEOs of American companies earned a total of $734 million, which equates to R8.493 billion. CEOs in other parts of the world are paid significantly less than their American counterparts, with the top UK CEO earning £42.978 million (R774.03 million), and the top ten earning a combined £156.337 million (R2.816 billion) for the 2014 calendar year. It has further been found that South African CEOs' remuneration had the highest purchasing power worldwide over the period 2009 to 2011 (PECS, 2014). The latest results of this survey, show South African CEOs as being ranked second in the world (after the USA) in terms of their salaries' purchasing power.

The general consensus amongst the media as well as of the general population appears to be that CEOs are overpaid relative to both employees' salaries, as well as the returns generated for shareholders. However, given the controversy surrounding CEO compensation, especially relative to employees' salaries, it is worthwhile to understand the factors that influence pay ratios of companies, as well as the link between pay ratios and company performance. For the remainder of this introduction, the importance of analysing pay ratios of companies in South African context remuneration is highlighted and various responses to the issue of relative pay for performance are considered.

The issue of pay disparity is of significant importance in the South African context, which has the fourth highest level of income inequality in the world, as measured by its Gini coefficient[3] (World Bank, 2015). Although the extent of income inequality in South Africa is difficult to measure, a high pay ratio

[2] Alan Clark of South African Breweries is the lucky CEO, who received this compensation for the company's 2014 financial year (SAB, 2014). This is based on (SAB, 2014) a salary of £1.085 million, retirement and other benefits of £0.499 million, an annual bonus of £1.196 million, long-term incentives based on an IFRS 2 expense of £3.683million, converted into Rands at an exchange rate of R18.876.

[3] This measure is far from perfect, due to different countries using different definitions of income, the exclusion of the informal sector and the exclusion of social grants (Margaret Chitiga, Sekyere, & Tsoanamatsie, 2014) and thus must be taken subjectively. It was found that, after having taken government grants into account, South Africa's 2008 Gini coefficient dropped from 0.7 to 0.59 (Rossouw *et al*., 2010), reducing its apparent level of inequality. PWC (2014) calculated a Gini coefficient for the employed of South Africa (0.45) and the country as a whole (0.66) for 2014, which indicates that even within the employed population, there is still a significant pay disparity.

exacerbates the level of wealth inequality over time, which has destructive effects on South African society (Im *et al*., 2012). In order to address this and also as a means to remunerate their employees more fairly, some South African companies have been found to calculate their own corporate Gini coefficient (PWC, 2015), which should reduce the level of income inequality amongst companies' employees.

In South Africa, pay disparity has been a contributing factor to many labour strikes. In 2014 alone, there were 88 reported strikes as identified in the Department of Labour's (2014) report, with 98.4% of these being compensation-related disputes. However, this does not indicate the severity of the strikes, which is better measured by the International Labour Organization's (ILO) measure of working days lost per 1000 employees. South Africa lost a total of 670 working days per 1000 employees in 2014, with an average of 569 days lost between 2010 and 2014 (Department of Labour, 2014). In comparison, the UK experienced an average of just 16 days lost per 1000 employees (Office for National Statistics, 2014), resulting from 114 strikes, indicating that strikes are shorter and less severe in the UK. While this measure of strike intensity is by no means complete (Bhorat & Tseng, 2014), it does provide an indication of how strikes have affected the economy and highlights the need for equitable employee compensation.

There have been various responses by regulators to the increase of CEO remuneration over time. These include say-on-pay provisions, a pay cap, pay-for-performance disclosures, as well as the amendment of the Dodd-Frank Act in the USA requiring companies to disclose their pay ratios. Each of these responses are discussed below.

Say-on-pay provisions allow investors to vote on compensation paid to senior employees (including the CEO) at annual general meetings (SEC, 2011). One of the intentions behind this approach is to curb excessive CEO compensation, which has risen dramatically over time (Frydman & Jenter, 2010). Since 2002, many countries have adopted their own say-on-pay provisions, which typically differ in whether shareholders' votes on compensation are binding or not (Thomas & Van der Elst, 2014). The United States, for example, adopted say-on-pay provisions that between 2008 to 2010 allowed a non-binding vote on executive remuneration, but since 2011 has allowed for a binding vote. Using data from a group of firms that had a two-year exemption from holding a say-on-pay vote to isolate the effect that the vote had on executive compensation, Iliev & Vitanova (2015) found that compensation was higher with the vote than without it. This suggests that the say-on-pay bill did not have the intended effect of curbing CEO compensation.

South Africa's say-on-pay provisions result from a combination of the Companies Act (2008), as well as the King III Code (IODSA, 2009). Section 66 of the Companies Act (2008) requires that directors may

only be paid remuneration if it has been approved by shareholders by special resolution, within the previous two years, only if required by the company's memorandum of incorporation. However, the King III Code recommends that only non-executive directors' remuneration should be approved by a special shareholders' resolution (IODSA, 2009). For executive directors' remuneration policies, a non-binding advisory vote from shareholders is recommended by the King III Code (IODSA, 2009), which has been found to effect changes to remuneration policies (Ernst & Young, 2013). The effect of this is that executive director's remuneration is ultimately determined by remuneration committees, with any shareholder votes being non-binding. However, since the King III Code requires that companies either apply its principles or explain why they have not done so, companies need not give shareholders the opportunity to vote on remuneration at all. Recently, however, the JSE updated its listing requirements, requiring companies to publish the minutae of each individual shareholders' resolution passed at its annual general meeting (Gilmour, 2014). This will allow for a greater degree of transparency of the approval of directors' remuneration.

A more extreme option is to cap CEO's remuneration by law, as was recently proposed in Switzerland. Specifically, in 2013 a Swiss referendum on whether CEOs' pay should be limited by legislation to 12 times that of the company's lowest paid staff member failed, with 65% voting against this measure (Bosley, 2013b). However, in the same year Swiss voters approved the so-called, "fat cat bill," which provides shareholders with binding votes on executives' compensation at companies' annual general meetings (Bosley, 2013a).

Theoretically CEO's are remunerated for optimising company performance in the interests of shareholders. In this regard, pay-for-performance disclosures were recently proposed by the US Securities and Exchange Commission (SEC) (PWC, 2015). If implemented, this will require companies to disclose the relationship between executive compensation paid and the financial performance of companies. As a result, investors will be able to make better-informed decisions about which companies to invest in.

The amendment of the US Dodd-Frank Act (2010) requires companies to disclose the ratio of their chief executives' total compensation to that of the median employee. It took two years for the SEC to implement this rule, following extensive discussions with affected parties. Several allowances have been made to assist companies with its implementation, such as the use of statistical sampling to once every three years determine the median worker's compensation (Chappell, 2015).

There have, however, been mixed reactions to this new rule. The improvement in accountability and compensation transparency resulting from its implementation, as well as the improved investor decision-making it allows for, have been praised (Shorter, 2013). On the other hand, the cost of

implementing the CEO pay ratio rule has been criticised. Thus, an initial once-off compliance costs of of $1.3bn and annual compliance costs of $520mil has been estimated across all US publically listed companies, which is said to far outweigh the benefits (Bartl, 2015). However, with apprixomately 5 000 listed companies in the USA (Strumph, 2014), the average annual cost of compliance for companies is approximately $104 000, a pittance for most listed companies. Also, this cost is likely to be more for larger companies that have more resources, and less for smaller companies with fewer resources, making the allocation of costs equitable. Therefore, the cost of compliance does not appear to be a strong reason for not providing pay ratio disclosure.

Additionally, the disclosure of pay ratios have been criticised for giving investors a false sense of comparability between firms, as different companies tend to require different pay ratios (Piwowar, 2015). Furthermore, the CEO pay ratio does not indicate how well the CEO has performed, nor does it provide an indication of what a "good," ratio is (Hunter, 2015). Also, concerns have been raised about the disclosure rules driving CEOs out of public companies to avoid scrutiny over how much they are being paid (Larcker, 2011). There are, however, counterarguments to these criticisms. For instance, with regards to comparability argument, most information taken from financial statements and used in ratio analysis needs to be contextualized (by industry, competitors, etc.) anyway. The performance argument ignores the fact that the pay ratio may be useful in conjunction with, not as a substitute for, other performance measures. Finally, CEO remuneration information is already required to be disclosed for public companies around the world, which has been used to estimate pay ratios by the media and researchers. Therefore, it may be argued that overall, company stakeholders have a lot to gain from the required disclosure of CEO pay ratios.

1.2 Research questions, contribution and thesis structure

From the above discussion it is clear that CEO compensation, in particular relative to the average employee and in the context of company performance, is a very interesting, practical and topical area of research. In this regard, the two research questions to be addressed by this thesis are therefore as follows:

1. Which company specific factors affect the CEO-to-average-employee remuneration ratio in South Africa?

2. What is the impact of companies' CEO pay ratios on company performance?

Due to data and practical constraints, this study is restricted to the companies making up the consumer goods (J530) and consumer services (J550) subsectors of the JSE for the period 2006 – 2014.

This thesis makes numerous contributions to the South Africa body of executive compensation literature. Firstly, it is the first detailed study of the CEO pay ratio in the South African context, with a focus on its determinants and performance effects. In contrast, many of the other South African studies on CEO compensation focussed on its relationship to company performance without analysing its determinants. Secondly, it long-term incentives in its measure of remuneration, which has been suggested by other South African compensation literature (*e.g.* De Wet, 2012), but generally not implemented. Therefore, this thesis presents ground-breaking work in the South African executive compensation literature.

The remainder of this thesis is structured as follows: in Chapter 2 a review of relevant South African and international academic literature is presented. Thereafter, Chapter 3 discusses the data used in performing the research. This is followed by Chapter 4, which for purposes of flow and readability addresses the methodology, results and analysis of the study, Finally, Chapter 5 concludes, discusses limitations and recommendations, and makes suggestions for future avenues of research.

Chapter 2: Literature Review and Hypothesis Development

This literature review will cover the following themes relevant to the topic of pay disparity. Initially, the core academic articles that have explored pay disparity will be discussed, as well as the academic theories on the reasons for pay disparity within companies. As pay disparity relates to relatively high CEO remuneration, or relatively low employee remuneration, the academic literature on factors which affect the aforementioned will be examined, with more emphasis on CEO remuneration due to the greater availability of data in that regard in South Africa. Next, the limited literature on South African executive remuneration will be assessed. Finally, gaps in the existing literature on pay disparity will be presented, and the hypotheses to be tested in this study will be developed.

2.1 Theories of Pay Disparity

There are four different theories which attempt to explain pay disparity within organizations, namely tournament theory, equity theory, relative deprivation theory and expectations theory. However, these theories can be grouped broadly into two categories, namely the economic perspective (comprising tournament theory), and the behavioural perspective (comprising equity theory, relative deprivation theory and expectations theory) (Henderson & Fredrickson, 2001). These theories will be discussed in the context of their reaction to organizational content, according to Greenberg's taxonomies of organizational distributive justice (1987).

2.1.1 The Economic Perspective

Tournament theory is one of the core theoretical underpinnings of explaining pay disparity, and seeks to explain why employees, with similar levels of productivity, are paid differently (Lazear & Rosen, 1981). Tournament theory posits that rewards are based on employees' level of performance relative to their peers, *i.e.* their ranking within an organization, rather than absolute levels of output (Lazear & Rosen, 1981). As a result, the theory holds that paying senior employees more than other employees in an organization serves as motivation for the other employees to compete to fill higher-level positions, so that they can enjoy the prize of higher pay. Given a set of simplifying assumptions, using tournament theory to set wages is within this framework considered a superior motivator compared to a pay-for-performance compensation mechanism (Connelly, Tihanyi, Crook & Gangloff, 2013).

Factors that motivate a larger prize according to tournament theory include having a larger number of contestants, as this reduces the probability of winning (McLaughlin, 1988). In explaining why CEOs in particular have such high remuneration, sequential tournaments' prizes increase with higher organizational levels due to the achievement of that level, but also due to the potential for climbing up to future levels. Since the CEO is at the highest level, compensation must be given for the fact that

no higher levels can be reached (Rosen, 1986). Conversely, a smaller prize is more appropriate when contestants are interdependent, as a large prize hinders cooperation between competitors (Lazear, 1999).

2.1.2 The Behavioural Perspective

Equity theory focusses on employees' feelings towards pay disparity (Adams, 1963). It posits that employees compare their own inputs and outcomes with those of other employees as a means to assess whether or not they are being remunerated fairly. The key to this theory is that employees' own perceived inputs are compared to their perceived inputs of other employees. If there is a difference between what the employees are receiving and what they feel that they should be receiving, they will act to alleviate the situation (Adams, 1963). Employee reactions to such feelings of deprivation can include going on strike, absenteeism, or working inefficiently, as this will have the effect of reaching equilibrium between the employees' inputs and output. Alternatively, employees that are overpaid are likely to exhibit feelings of guilt, which will also hamper their productivity (Adams, 1963). Pay inequality will therefore have a negative effect on employees' performance (Walster, Hatfield, Walster & Berscheid, 1978) within this framework. Since inputs will be inherently different between job types, equity theory is better suited to explaining horizontal pay disparity, rather than vertical disparity[4] (Gupta, Conroy & Delery, 2012).

Relative deprivation theory (Martin, 1981) resembles equity theory in that it also involves individuals making social comparisons of themselves to others in similar positions. However, the outcome of these comparisons may result in individuals feeling deprived if their comparisons are legitimate, and the achievement of those desires is blocked (Martin, 1981). There exists fairly strong empirical evidence for this phenomenon in labour markets. For instance, a Taiwanese study on the productivity of workers in the manufacturing industry found the effects of relative deprivation to have a statistically significant negative impact on employees' productivity (Liu & Sakamoto, 2005). A study by Fehr and Schmidt (1999), which has a more general application, similarly found empirical evidence supporting the validity of relative deprivation theory. The implications of these findings are that employees in those countries will perform better if there is a smaller wage gap at different organizational levels.

Finally, expectations theory (Vroom, 1964) suggests that there are three factors affecting employee motivation, namely attractiveness of outcomes, the probability that performance will lead to the desired outcome, and the probability that the employee's effort will lead to performance. Therefore,

[4] Vertical pay disparity refers to a difference in pay from one level in the organizational hierarchy to another. In contrast, horizontal pay disparity refers to a difference in pay between employees at the same level in an organization.

if employees want to reach an outcome and believe that their efforts will lead to that outcome, then they will be motivated to achieve it. Employees will perform the best, under this theory, when the additional pay at stake is large (Gupta *et al*., 2012). This theory can explain vertical pay disparity by explaining promotion, given that if measures are in place for employees to be promoted and the outcome is attractive (such as a higher salary from a promoted position), then employees will be more likely to be motivated. Conversely, if any of those links are missing, then employees will not be motivated to perform well.

It is important to contextualize the pay ratio with regard to how it fits in with the two contrasting theories. Under tournament theory, the CEO's remuneration is the ultimate prize of the tournament, which is what all employees in the firm are competing for. While it may seem far-fetched for workers at the bottom of the organizational hierarchy to be competing for the position of CEO, the CEO's remuneration, due to it being widely available in financial statements and widely publicized by the media, will be used by employees as a reference point for the kind of salaries that they could be earning from promotions. Thus, under tournament theory, a higher level of remuneration earned by the CEO will result in more competition within the company as employees compete to work their way up the organizational hierarchy.

The behavioural theories have a different take on higher CEO pay ratio. These theories say that a higher pay ratio will cause employees lower down the organizational hierarchy to compare their remuneration to the CEO, who acts as the, "referent other," in the context of equity theory. If the referent other is being paid more than the employee, without appearing to be putting in commensurate additional effort, the employee will feel deprived, which will cause demotivation, absenteeism and other negative effects, that will ultimately be detrimental to company performance.

Therefore, the CEO pay ratio can be used as a means to empirically test the validity of tournament theory and the behavioural theories, in order to investigate which is more influential in driving company performance. Tournament theory predicts that a higher pay ratio will result in better company performance, while behavioural theories predict that better company performance will result from a lower pay ratio. It is therefore worthwhile to examine the empirical evidence of tests based of these two theories which investigated the link between the CEO pay ratio and company performance.

2.1.3 Empirical Tests of Pay Disparity Theories

Several researchers have empirically tested tournament theory and the behavioural theories, with mixed results.

O'Reilly, Main and Crystal (1988) conducted a cross sectional study to test which theory better predicted CEO compensation. Data on 105 US publically listed firms from Business Week's 1984 executive compensation survey was used. Tournament theory was tested to see if the number of vice-presidents in a company was positively related to CEO compensation, while equity theory was tested by comparing CEO salaries with those of non-executive directors. After controlling for various economic factors, it was found that there was a strong relationship between CEO salaries and non-executives' salaries, while a negative relationship existed between the number of vice-presidents in a company and CEO compensation. Thus, in this study, equity theory was able to explain deviations in CEO compensation, while tournament theory was not. More recent studies have supported the validity of tournament theory in explaining compensation structures, as covered in a comprehensive review of research on this theory (Connelly *et al*., 2013). For example, in a recent study by DeVaro (2006), it was found that higher spreads between wages of workers positioned at different levels of the organizational hierarchy, have the effect of increasing workers' motivation to get promoted.

Using 189 firm-years of data for selected US-listed companies over the period 1985 to 1990, Henderson & Fredrickson (2001) set out to investigate under which conditions theory better explains the reasons for, and performance effect of, pay disparity between executives. Underlying this research was the argument that in instances where a greater degree of collaboration between employees is required, relative deprivation theory implies that optimal company performance is achieved through a smaller pay gap. Conversely, when individual performance is more important than cooperation, tournament theory suggests that a larger pay gap will improve company performance. The above researchers found that tournament theory was better able to predict the size of pay gaps, while a combination of the two theories better explained company performance for different levels of pay disparity.

A study conducted in the emerging economies of China and India (Zhou *et al*., 2010) considered whether relative deprivation theory would explain the pay differentials between local workers and expatriate workers, within and between each country. The researchers hypothesized that since economic development increases the relevance of small levels of pay disparity in terms of relative deprivation theory, the narrowing of pay gaps will still result in feelings of relative deprivation as the economies develop over time (Zhou *et al*., 2010). This links to the increased use of international workers as reference points for felt levels of deprivation among local workers (Leung, Wang, & Smith, 2001), as well economic advancement increasing peoples' levels of entitlement (Carr, McWha, MacLachlan & Furnham, 2010). The study found that relative deprivation theory applied to the workers working in both countries, such that there were feelings of unfairness and demotivation amongst the local workers regarding expatriates' salaries (Zhou *et al*., 2010). The relevance of this

study to this paper is that it shows the persistence of relative deprivation theory in developing economies, indicating that employees perform better with a smaller vertical pay disparity.

In a cross-country study Burns, Minnick and Starks (2013) analysed the causes and consequences of pay disparity between CEOs and other executives, and found that in general a steeper tournament structure (*i.e.* paying the CEO significantly more than other executives) yielded better company performance. However, this was not the case in African countries, the sample of which was dominated almost exclusively by South Africa. Presumed reasons for this largely related to cultural influences, which include acceptability of power, income differentials, and the desirability for competition. These cultural variables were measured using questions from the World Value Survey.

2.2 Other Factors Affecting the CEO Pay Ratio

In addition to the assumptions of tournament theory and behavioural theories, there are several other internal and external factors that are thought to affect pay disparity. External factors include economic factors, cultures and laws, while organizational factors include strategy, policies and the financial performance of the company (Milkovich, Newman & Gerhart, 2011). Additional factors that influence employee compensation can be classified as either job-based or person-based. Job-based factors relate to the complexity of the duties and tasks required of the specified job (Mahoney, 1991), the pay for which is determined by the use of market surveys and internal job evaluations (Milkovich *et al*., 2011). Person-based factors relate to the characteristics of the person, rather than the job that they perform, such as their competencies and skills (Gupta *et al*., 2012). This explains horizontal pay variation more than vertical pay variation and this will therefore not be a focus of this thesis. Thus, it can be argued that CEOs are paid more than the average employee because their jobs have been determined to be worth more to the organization - both internally based on job evaluations, as well as externally by the market.

Additional factors that may have an impact on pay disparity include the levels of leverage of the company (Chemmanur, Cheng, & Zhang, 2013), and the investment opportunities that a company has (Bloom & Michel, 2002). Chemmanur, Cheng and Zhang (2013) theorise that under optimal contracting[5], firms with higher leverage have to pay their employees more as compensation for the employees' loss of human capital in the event of company bankruptcy. This is because human capital cannot be fully insured, and it is assumed that a significant proportion of employees' human capital is specific to the company (Chemmanur *et al*., 2013). In testing this theory it was found, using S&P 1500 firm data for the period 1992 to 2006, that there is a significant positive relationship between CEO

[5]Optimal contracting refers to employment contracts drafted such that companies attract the best CEOs and incentivises them to exert effort at the minimal cost to the company.

compensation and leverage (as measured by the debt ratio), as well as a significant positive relationship between average employee compensation and leverage. Therefore, the net effect of leverage on the CEO pay ratio is unclear, but is it likely that the components of the CEO pay ratio are affected.

Bloom and Michel (2002) studied the dispersion of pay as it relates to the uncertainty faced by a company, as well as its investment opportunities, instability and munificence. The results of this study indicated that, based on a data set of 460 US companies for the period 1992 to 1997, firms with greater investment opportunities have a greater degree of vertical pay disparity in their compensation structure. The researchers ascribe this to such companies requiring a high degree of managerial skill to realize the value of future projects to be undertaken. Firms with greater investment opportunities and growth opportunities face higher risk and a greater dependence on achieving growth, thus remuneration will be tied to such growth, implying a high focus on share-based remuneration. One of the overall findings of this study is that the company context has to be considered to better understand pay disparity and its effects.

2.3 Drivers of CEO and Employee Compensation

The next part of the literature review will examine, in isolation, the drivers of CEO compensation and employee compensation.

2.3.1 Agency Theory

Agency theory describes the relationship between two parties, known as the principal and the agent respectively, wherein the agent acts, or is supposed to act, in the interests of the principal (Ross, 1973). The problem arises as a result of the separation of ownership of companies (through shareholders) from their management (through executive management, including the CEO). This is applicable to companies in the sense that CEOs are viewed as agents of shareholders, as CEOs are responsible, at a high level, for company performance for the benefit of shareholders. The agency conflict occurs when the agent does not act in the best interests of the principal, which in the case of companies will occur when CEOs promote their own interests at the expense of that of shareholders. Therefore, one of the indicators of an agency conflict in the context of CEO remuneration is when the latter is unrelated to company performance.

One of the ways to address the effect of the agency problem on company performance is to provide executive management with an ownership stake in the firm, as well as to use financial instruments to align the interests of management with those of shareholders (Frydman & Jenter, 2010). If executives are remunerated in terms of agency theory (*i.e.* to limit agency conflict), then there should be a positive relationship between executive pay and company performance. Murphy (1999) found a

positive correlation between executive remuneration and company performance based on companies in the S&P 500. More recent research, based on data from a large sample of American companies between 1994 and 2006, found there to be a negative relationship between industry and size adjusted CEO pay, and changes in future shareholder wealth (Cooper, 2009). In order to attempt to explain the lack of correlation (and even negative correlation) often observed between CEO pay and company performance, the managerial power hypothesis has been devised (Bebchuk, Fried & Walker, 2002). This hypothesis states that managers are using their power to set their remuneration, rather than using their skills to improve company performance, as a means of getting paid more.

2.3.2 Managerial Power and Rent Extraction

The consideration of managerial power in setting executive remuneration contrasts with optimal contracting, which involves the board of directors setting executive compensation in order to maximize shareholder value, thus alleviating agency problems (Fama, 1980). However, empirical testing has shown there to be many departures from optimal contracting, largely resulting from managerial power playing a key role in the remuneration decision (Bebchuk *et al*., 2002). Managerial power, as used in setting remuneration contracts, enables management to extract excessive pay (compared to what would be the case under optimal contracting) for their position, with little regard for maximizing shareholder value (Bebchuk *et al*., 2002). The extent of managerial power captured by senior executives is determined, *inter alia*, by the company's corporate governance and ownership structures, as well as outrage costs from shareholders.

In terms of corporate governance structures, the structure of the board of directors has been empirically shown to influence CEO remuneration in two ways. Firstly, a larger board has been shown to result in higher CEO remuneration in both the US (Core, Holthausen & Larcker, 1999), and the UK (Ozkan, 2007). This appears to be counter-intuitive, but has been rationalised in terms of a larger board being less cohesive than a smaller board, and thus holding less power relative to the CEO, whom it is supposed to be monitoring. Additionally, in the UK boards with a larger proportion of non-executive directors result in higher CEO salaries (Ozkan, 2007), which is again consistent with findings in the US (Core *et al*., 1999). This additional apparent contradiction suggests that non-executive directors are unable to reduce the level of power held by the CEO, thus resulting in higher CEO compensation.

One of the factors that limits managers' ability to extract excessive pay from companies is the cost of outrage expressed by shareholders, which can manifest in several ways (Bebchuk *et al*., 2002). Shareholders might be inclined to vote to remove the incumbent CEO if he or she is consistently paid more than what shareholders consider to be fair. Dierynck and Renders (2014) recently researched

outrage costs in the Belgian context, by investigating the change in remuneration of CEOs resulting from new disclosure rules that require public companies to disclose CEO remuneration. It was found that, due to outrage costs, CEO remuneration on the upper end of the spectrum dropped, while CEOs at the bottom end of the remuneration scale experienced an increase resulting from social comparison. Thus, the result of the disclosure of CEO remuneration seemed to cause a herding effect with the spread in CEO remuneration decreasing. Another example of outrage costs, this time in an American context, related to the payment of perks by companies to their CEOs (Grinstein, Weinbaum & Yehuda, 2011). When new disclosure rules requiring the disclosure of perks earned by directors were implemented by the Securities and Exchange Commission, it was found that companies that did not previously disclose the value of perks increased disclosed CEO remuneration by 190% on average, and experienced a significant reduction in share price. Subsequently, the amount of perks granted to CEOs dropped over time as a result of the effects of shareholder outrage for those companies. Similar to the above mentioned findings of Dierynck & Renders (2014), companies that were already disclosing their perks and had relatively low levels of perks experienced an increase in CEO compensation following the disclosure ruling. Again, this is evidence of companies making comparisons with one-another and adjusting their compensation practices accordingly.

Managerial power manifests itself in several aspects of remuneration contracts. These include using alternative, less efficient forms of remuneration in order to camouflage actual levels of pay in order to reduce shareholder outrage at excessively high remuneration (Bebchuk *et al*., 2002). A study on whether CEO pension plans demonstrate rent extraction or optimal contracting, found that companies did not use pension disclosure rules as a means to hide CEO compensation (Gerakos, 2007). However, another study found that executives effectively hid a significant portion of their compensation as severance pay which, because it would only be paid when they left the company, would not reflect in their annual disclosed compensation (Yermack, 2004). Finally, share options were found to be an effective and popular way of hiding compensation. Kuhnen & Zwiebel (2008) identified that share options are often not well enough disclosed for investors to be able to understand the effect that they will have on company profits. Additionally, there are several means that companies use, such as repricing and implicit agreements to backdate share options that make them more valuable to the CEO than the value at which they are disclosed in the financial statements (Heron & Lie, 2007).

The costs of rent extraction are not limited to the cash value of compensation that the directors ultimately gain, as there are also costs relating to the suboptimal management of company resources by managers. This is likely to persist under managerial power because of a lack of incentive to do otherwise, as the aforementioned effects of managerial power result in significant remuneration irrespective of company performance (Bebchuk *et al*., 2002). It has been found that in general, there

are very few instances where CEO compensation contracts are structured optimally (Dittmann & Maug, 2007), and so the observations relating to the managerial power hypothesis are likely to be more widespread than those under optimal contracting theory. Overall, it appears as though managerial power has a significant impact on CEO compensation.

2.3.3 Empirical Studies of Pay Inequality within Companies

The importance of studying corporate income differentials was highlighted in a review by Pryce, Kakabadse and Lloyd (2011). This review proposed that publically traded companies should calculate and publish their own internal Gini coefficients as a means for interested parties to see the level of pay inequality inherent to these companies. However, one of the issues with this is that the data required to calculate such a measure is not available to the general public, and companies will likely be reluctant to share it with researchers due to its sensitive and confidential nature. As an alternative measure of corporate inequality, researchers have been using the pay ratio as a means of measuring corporate inequality.

Generally the relationship between company performance and the pay ratio has been found to be positive. Newman & Bannister (1998), Bell and Reenen (2012), Faleye *et al*. (2012) and Crawford, Nelson, & Rountree (2014) all found there to be a positive relationship between the CEO pay ratio and company performance, most of which used data from the USA. Faleye *et al*. (2012) specifically found that the positive relationship was strongest when there were only a small number of employees, while the other aforementioned studies found the positive relationship to hold generally. On the other hand, Shin *et al*. (2015) found there to be a negative relationship between the pay ratio and company performance based on data used from South Korean companies.

The contrasting results between studies may be at least partially a result of the different measurement bases used for CEO compensation, specifically with regard to long-term incentive (LTI) contacts. The different measurement bases of LTIs granted to CEOs was specifically highlighted by Mishel and Sabadish (2013), who found that it can cause variations of up to 189% in CEO remuneration. The issue of measurement of long-term incentive contracts is discussed in more detail later in this thesis.

Additionally, Shin *et al*. (2015) also found there to be a negative relationship between the deviation from the expected pay ratio and subsequent company performance. This implies that if a pay ratio is out of line with what is expected, given a set of company variables, company performance will suffer irrespective of whether the ratio is higher or lower than expected.

In terms of the determinants of the CEO pay ratio and CEO pay, all studies reviewed in this thesis found there to be a positive relationship between company size and the pay ratio. Newman & Bannister

(1998) found this relationship to be due to increased diversification, as well as more effort required to coordinate the activities of the company. Additional factors that could explain this relationship include that larger companies have more resources, and are thus able to pay more to their CEOs. Finally, it could be a result of efforts from the board to attract only skilled enough managers to handle the complexity of a larger company.

Many of the studies that were reviewed tested corporate governance variables for their ability to explain CEO pay ratios, with mixed results. Interestingly, Newman & Bannister (1998) found there to be a negative relationship between the number of non-executive directors and the CEO pay ratio. This was also found to be the case by Shin *et al*. (2015), who found that smaller boards with a lower meeting frequency exhibited a higher pay multiple. On the other hand, Faleye *et al*. (2012) found that several corporate governance variables, including board size and percentage of non-executive directors, were not significantly related to the CEO pay ratio. This is similar to a study by Rajgopal and Srinivasan (2006), which found corporate governance variables to generally not be significantly related to the CEO-executive pay ratio (the ratio of CEO pay to that of the sum of the next five highest paid executives).

CEO-specific factors, which include age and tenure, have also been tested for their relationship to pay ratios. Crawford *et al*. (2014), Shin *et al*. (2015) and Rajgopal and Srinivasan (2006) all found the aforementioned variables to be positively related to pay ratios, indicating that more experienced and older CEOs are generally paid more relative to other employees.

A brief summary of the previously discussed literature is presented in Table 1 below.

Table 1: Summary of Pay Ratio Literature

Author	**Period**	**Sample**	**Relationship between pay ratio and performance**	**Long-term incentives**	**Company Size**
Newman & Bannister (1998)	1991	106 Fortune 500 firms	Positive	Excluded	Positive
Bell and Reenen (2012)	2000-2010	300 largest UK listed companies	Positive	Current MV of LTIs	Positive
Faleye *et al*. (2012)	1993-2006	450 Companies in the S&P 1500	Positive	Grant date Fair value	Positive
Crawford, Nelson, & Rountree (2014)	1995-2012	US commercial banks	Positive	Grant date Fair value	Positive
Shin *et al*. (2015)	2000-2009	500 South Korean listed companies	Negative	Grant date Fair value	Positive

Therefore, it appears as though company-specific and CEO specific factors are significant (at the 5% confidence level) in explaining CEO pay ratios among companies. However, according to the literature, only some corporate governance variables have explanatory power over CEO pay ratios.

2.4 CEO Compensation and Pay Ratios - The South African Perspective

There exists very little academic research on executive compensation in South Africa, and even less on the CEO pay ratio. South African literature on executive compensation generally involves performing a regression using a measure of CEO compensation as the dependent variable, against several measures of company performance as independent variables. The key themes that arise in the South African literature on executive compensation will be presented in this section.

The majority of the researchers excluded long-term incentives from their measures of CEO compensation. In the South African literature, it appears as though the use of long-term incentives in measures of CEO compensation is, to some extent, an elephant in the room. Several of the relevant South African studies recommended that share options and long-term incentives be incorporated into further research on CEO compensation (*e.g.* De Wet, 2012). However very few studies have actually done so, and the few studies that included long-term incentives failed to mention how their value had been calculated. This is a crucial piece of information, as the way in which they are measured makes a significant difference to the amount of remuneration recognized.[6]

Table 2 on page 19 shows the large variety of company performance measures used in research on pay for performance in South Africa. One pervasive detail is that many South African studies focus on accounting measures of company performance (such as return on assets and return on equity), as well as hybrid measures of performance (economic value added and market value added), while ignoring the use of pure market-based measures, such as total shareholder return. One of the dangers of this is that accounting-based measures of performance do not provide an indication of the increase in shareholders' wealth associated with investing in a company. Thus, by using mostly accounting-based measures of return, South African executive compensation research generally fails to assess the impact of executive compensation on investors in companies.

Generally, South African researchers found no significant relationship between company performance and CEO remuneration. Bussin & Nel (2015), Bradley (2013) and Bussin and Modau (2012) found there to be no significant relationship between CEO remuneration and company performance. On the other hand, De Wet (2012) and Deysel and Kruger (2015) found a positive relationship. One of the apparent

[6] Please refer to Mishel and Sabadish (2013) for different ways of incorporating long-term incentives into executive compensation research. In the data and methodology section, as well as Appendix 1, the issue of measurement of long-term incentives is discussed in more detail.

contradictory results from studies in the South African literature is that De Wet (2012) found there to be as positive relationship between return on assets and company performance, while Bussin and Modau (2015) found there to be no such relationship. The likely reason for this contradiction is that De Wet (2012) included long-term incentives as a performance measure, while Bussin and Modau (2015) did not. This highlights the importance of the use of long-term incentives in executive compensation research in South Africa.

2.5 Development of Hypotheses

Following on the literature discussed in this chapter thus far, the hypotheses discussed below are to be tested in this study for the selected sample. The hypotheses are grouped according to whether they relate to the determinants or performance effects of CEO pay ratios.

2.5.1 Determinants of the CEO pay ratio

The age of CEOs has been used in South Africa (*e.g.* Bradley,2013) and internationally (*e.g.* Shin *et al*., 2015) as a means to explain CEO remuneration, and has intuitive appeal. Older CEOs are likely to be more experienced than their younger counterparts, and will thus possess a higher degree of human capital. Therefore, older CEOs are likely to be paid more than younger CEOs.

Hypothesis 1: The pay ratio is positively related to the age of the CEO.

CEO tenure, measured as the amount of time, in years, from the director's appointment as CEO to the company's financial year-end, has been very widely used in pay disparity research, amongst others by Bebchuk *et al*. (2011), Faleye *et al*. (2012) and Shin *et al*. (2015). The logic behind its use is fairly obvious – a CEO that is more experienced in his or her position in a company will be able to add more value than a less experienced CEO, and thus will be paid more relative to the average employee. Additionally, a long-serving CEO will have more time for her options to become deep in-the-money, which will have the effect of increasing CEO remuneration relative to that of employees.

Hypothesis 2: The pay ratio is positively related to the CEO's tenure at the company.

It is widely known that remuneration committees benchmark the compensation of the CEO against peers, so it is possible that they also benchmark the pay ratio against their peers. Industry effects have also been incorporated in several other studies on pay disparity, including those by Bebchuk *et al*. (2011), Faleye *et al*. (2012) and Shin *et al*. (2015). Therefore, it is hypothesized that the pay ratio of companies is positively related to the industry pay ratio.

Hypothesis 3: The pay ratio is positively related to the industry pay ratio.

Table 2: A Summary of South African Executive Compensation Literature				
Author(s)	**Period**	**Sample**	**Variables tested**	**Measure of CEO compensation**
Bussin and Modau (2012)	2006-2012	JSE - TOP 40, 21 Companies	MC, EPS, ROE, EVA, MVA	Fixed pay plus short-term incentives
De Wet (2012)	2006 - 2010	JSE - Number of companies not provided	EVA, MVA, ROE, ROA	Fixed pay plus short-term incentives plus long-term incentives
Bussin and Nel (2015)	2006 - 2011	JSE - Consumer goods subsector, 30 companies	ROE, NM, TAT, LEV	Guaranteed cost to company (fixed pay)
Scholtz and Smit (2013)	2003 - 2010	JSE - Alt X, 58 companies (variable)	TA, TO, SP	Fixed pay plus short-term incentives
Deysel and Kruger (2015)	2008 - 2014	JSE - Banking subsector	SP, ROE, EBITA, HEPS, TA, EMP, IndCEOSal, Pay Ratio, CPI	Total compensation per the financial statements
Bradley (2013)	2005 - 2010	12 Mining, 12 Financial Services and 16 Industrial companies	ROE, ROA, EPS, CEO Age, CEO Tenure	Fixed pay plus short-term incentives

Key:			
CPI	Consumer Price Index	MC	Market capitalization
EBITA	Earnings before interest and tax	MVA	Market value added
EMP	Number of employees	PayRatio	CEO pay ratio
EPS	Earnings per share	ROE	Return on equity
EVA	Economic value added	SP	Share price
HEPS	Headline earnings per share	TA	Total Assets
IndCEOSal	Industry CEO salary	TAT	Total asset turnover
LEV	Leverage (total assets/total equity)	TO	Turnover

The leverage of the firm, measured as total liabilities divided by total assets (the debt ratio), has been found to have a positive correlation with both the amount of CEO compensation, as well as the amount of employee compensation (Berk, Stanton & Zechner, 2010). As a result, the studies by Faleye *et al*. (2012) and Shin *et al*. (2015) included leverage as one of the explanatory regression variables. The theory behind the link between leverage and CEO and employee compensation is that firms with higher leverage face a higher risk of bankruptcy. Therefore, it is argued that as a means of compensating employees and CEOs for this risk, against which they cannot completely insure themselves, companies pay their employees and CEOs more. Another view is that firms with high levels of leverage have the potential for higher returns, thus since share options provide unlimited upside and limited downside, management would be more likely to negotiate for options to be part of their pay packages in companies having higher leverage.

Hypothesis 4: The pay ratio is positively related to the degree of leverage of the company.

The market-to-book ratio is a measure of the market's valuation of the equity of a company relative to the book value of its net assets. It is commonly argued that the market assigns higher market-to-book ratios to firms with more investment opportunities than those with less (Shin *et al*., 2015; Rajgopal & Srinivasan, 2006 and Faleye *et al*., 2012). Therefore, the argument is that in order to realize the benefits of those investment opportunities, a more skilled CEO is required and so there is likely to be a positive relationship between the market-to-book ratio and the pay ratio.

Hypothesis 5: The pay ratio is positively related to the company's market-to-book ratio.

Company size is one of the most common control variables in CEO compensation literature. Larger firms require better-skilled CEOs to manage them due to the complexity inherent to larger firms. This factor has been controlled for using several different measures, including total assets (*e.g.* Crawford *et al*., 2014; Deysel & Kruger, 2015); turnover (*e.g.* Newman & Bannister, 1998; Faleye *et al*., 2012), and market capitalization (Shin *et al*., 2015). Scholtz and Smit (2013) used both turnover and total assets as measures of company size.

Hypothesis 6: The pay ratio is positively related to the size of the company.

Three factors relating to the board of directors were examined, namely the number of directors on the board, the number of board meetings per year and the percentage of non-executive directors on the board. Shin *et al*. (2015) found that smaller boards with a lower meeting frequency had higher pay multiples, while Faleye *et al*. (2012) found there to be no relationship between variables relating to the board of directors and the level of pay disparity. Additionally, in other literature, it was found that larger boards result in higher CEO compensation, as do boards with a greater percentage of non-

executive directors (Ozkan, 2007 and Core *et al*., 1999). Therefore, due to the seemingly conflicting relationships between features of the board of directors and executive compensation, it was decided to include corporate governance variables in the regression equation.

Hypothesis 7: The pay ratio is negatively related to the number of directors on the board.

Hypothesis 8: The pay ratio is negatively related to the degree of board independence.

Hypothesis 9: The pay ratio is negatively related to the number of board meetings.

2.5.2 Performance effects of the CEO pay ratio

Following the research of Shin *et al*. (2015) and Rajgopal & Srinivasan (2006), it is hypothesized that a deviation from the expected CEO pay ratio will be negatively related to company performance. This is because companies with different characteristics (such as growth opportunities and sizes) will generally perform better with certain pay ratios and any deviation from this will result in poor company performance.

Hypothesis 10: Deviations from the expected pay ratio will negatively affect company performance.

From the managerial power hypothesis (Bebchuk *et al*., 2002), it is posited that shareholders' outrage will limit the amount of remuneration received by CEOs, which manifests in shareholders selling their shares and/or voting for a replacement CEO at meetings. Therefore, if a company's CEO pay ratios is higher than expected, it is hypothesized that company performance will be worse than if the CEO pay ratio is lower than expected.

Hypothesis 11: Deviations resulting from a higher than expected pay ratio will have a greater negative impact than deviations from a lower than expected pay ratio.

Due to conflicting empirical evidence (for example, see Shin *et al*, 2015 and Faleye *et al*., 2012), as well as conflicting theories on the relationship between pay ratios and performance (for example, see Lazear & Rosen, 1981, and Adams, 1963), the direction of the relationship between the CEO pay ratio and company performance is unknown. However, it is hypothesized that there is a relationship between the pay ratio and company performance.

Hypothesis 12: The pay ratio will be either positively or negatively related to measures of company performance.

Chapter 3: Sample and Data

In this chapter the sample chosen, the collection of data, and the challenges that had to be addressed in cleaning and sourcing the data, are presented.

Ideally, a study of this nature should encompass as many companies as possible to get a true sense of the determinants and performance effects of CEO pay ratios in South Africa. Initially, it was intended to include all JSE-listed industrial firms in this study. Unfortunately, however, due to resource constraints given the large element of manual data collection required, this was not possible. Another reason why the scope was narrowed to consumer products and services companies only, was that an unexpected complication was found relating to reported employee numbers, which were required for the determination of average employee remuneration with the other input into the calculation being the company's total annual employee cost expense. The problem was that in some industries (notable examples being construction and mining), outsourcing is widely prevalent (for reasons behind this, see Steenkamp & Lingen, 2014 and CIDB. 2013). This results in an often significant mismatch in the reported employee number, which often excludes outsourced labour, and the reported employee expense, which usually includes outsourcing costs. This problem can result in significantly overstated average employee compensation numbers, which partially accounts for the decision to exclude mining and construction companies from the study. In addition, in line with other studies, financial firms were also excluded due to the significantly higher degree of regulation imposed on them, which potentially affects both financial ratios and remuneration policies.

The initial population for this study therefore comprised of all the companies listed in the consumer goods and consumer services sectors of the JSE for any of the years 2006 to 2014, which came to a total of 30 and 47 companies, respectively. Since the ability to perform the analysis hinged on the availability of data relating to the number of employees at each company, the disclosure of which is not mandatory, this data was obtained from INET-BFA in order to determine how many potential data points were available. It was found that several companies did not disclose data relating to employee numbers, resulting in a total of 411 possible company years of data remaining, which represented 19 consumer goods companies and 35 consumer service companies. Three dual-listed companies were excluded from the study as they have to subscribe to different listing requirements, and have CEOs remunerated significantly in foreign currency, which would skew the analysis. This reduced the total number of company year observations to 387. As a result of the calculation of the average worker's salary (staff cost divided by average number of employees over two years) a further 58 observations were lost due to companies' missing information for certain years. Finally, one of the companies in the sample failed to identify its CEO, and it's four observation years therefore also had to be excluded.

All of the above resulted in a final sample of 325 company year observations, representing a total of 51 different companies.

There is clearly some degree of self-selection bias within this process, which has been identified in another study that followed a similar approach (see Faleye *et al*., 2012). Unfortunately, this cannot be corrected due to the limited availability of employee data, and so this remains one of the limitations of this study.

The majority of data were obtained from the INET-BFA database, as it provided a simple and consistent means to get some of the financial statements and market-related data. However, limited data on executive remuneration and corporate governance variables are provided by the service, and therefore these data points were manually extracted from companies' annual financial statements and integrated reports. The data used, including a description of each and where it was sourced from, is given in Table 3 on the following page.

The CEO of each company is taken to be the director who is identified in the financial statements as the CEO or managing director. Observations for cases where no CEO or managing director was clearly identified in the financial statements were excluded from the sample. Additionally, if there was no clear CEO but an executive chairperson has been appointed, then they were treated as the CEO. This is in line with other studies conducted in South Africa (*e.g.* Bradley, 2013; Bussin & Nel, 2015), as well as abroad (*e.g.* Shin *et al*., 2015).

While the intention was to replicate the international research conducted previously on this topic by Shin *et al*. (2015), not all the required data is available for South Africa. For instance, no data is publically available on the average employee compensation for JSE-listed companies. Additionally, limited CEO-specific remuneration data is available, particularly with regard to the benefit received from long-term incentives. The CEO's probability of promotion, a key variable used by Shin *et al*. (2015) which required the number of executive directors for its calculation, could not always be calculated due to limited disclosure. This would have an impact on the results obtained from replicating the study in South Africa. Finally, data on the average tenure of employees and unionization rates of employees at companies are not available (Statistics South Africa ceased to publish the latter in 2007 at an industry level). Thus, several omissions and estimates needed to be made in order to best approximate the variables used (Shin *et al*., 2015), as well as to highlight to regulators, investors and employees the need for such disclosures in the financial statements of companies. It is possible that the omissions of these important data are the result of obfuscation by executives in exploiting their power as managers (Bebchuk *et al*., 2002).

Table 3: Data Used in the Analysis	
Description	**Source**
Number of board meetings held during the financial year	Financial statements
Number of board members as at the financial year end	Financial statements
Number of executive directors as at the financial year end	Financial statements
The age of the CEO as at financial year-end, calculated as the number of years from the CEO's date of birth to the financial year end	Financial statements
The length of time the CEO occupied their position as CEO at the company, calculated as the number of years from when the CEO was appointed as CEO to the end of the company's financial year-end.	Financial statements
The company's total assets as reported in its statement of financial position as at each year-end	INET Bridge Database
The company's turnover, as reported in its statement of financial position as at each year-end	INET Bridge Database
The company's share price multiplied by its number of shares issued at each year end	INET Bridge Database
The total liabilities of the company as at each financial year-end, as reported in the statement of financial position	INET Bridge Database
The share price as at the start of each calendar year	INET Bridge Database
The share price as at the end of each calendar year	INET Bridge Database
The total dividends declared for each calendar year per share	INET Bridge Database
The standard deviation of the share price, annualized for each calendar year	INET Bridge Database
The return on assets for each company, as at each finance year-end	INET Bridge Database
The number of people employed at each company at each financial year-end.	INET Bridge Database
The total staff cost reported by the company, excluding directors' remuneration, for each financial year-end	INET Bridge Database
The fixed salary of the CEO as reported in the company's annual financial statements	Financial statements
The non-salary fixed compensation received by the CEO, as reported in the financial statements' directors emoluments note disclosure	Financial statements
The short-term incentive compensation received by the CEO for the year-end, as reported in the financial statements' directors emoluments note disclosure	Financial statements
The CEO's portion of the IFRS 2 expense recognized by the company in respect of long-term incentives, as reported in the disclosures in the financial statements.	Financial statements
The gain from share options exercised by the CEO, as reported in the disclosures in the financial statements.	Financial statements

Chapter 4: Methodology, Results and Analysis

In order to make the structure of this thesis easier to follow, the methodology, results and analysis chapters have been combined. To answer the research questions about the determinants and performance effects of CEO pay ratios identified in the introduction, this thesis uses the same method as Shin *et al*. (2015). This approach is first described broadly below, and then subsequently in more detail.

- In Stage 1 of the analysis, the determinants of CEO pay ratios were identified through the use of linear regression models.
- Stage 2 involves using the residuals from the first stage as deviations from the expected pay ratio, which are regressed against company performance variables to analyse the relationship between deviations from the expected pay ratio, and company performance.
- Finally, in Stage 3, company pay ratios are regressed against company performance variables to identify whether tournament theory or the behavioural theories better explain the relationship between the pay ratio and company performance.

In the first stage of the analysis, Shin *et al*. (2015) calculated a pay ratio using disclosed CEO remuneration and median employee salaries per company, and used various explanatory variables in a regression to identify the determinants of the pay ratio. These explanatory variables covered various aspects of the company, including its size, growth opportunities, corporate governance structures and human resource characteristics. Provided that those variables are the key determinants of CEO pay ratios of companies, the residuals from having run the regression represent the deviations from the company's expected pay ratio, which were used in the next stage of the analysis.

The second stage of the analysis by Shin *et al*. (2015) used the residuals from the first stage as deviations from the company's expected pay ratio, and regressed them against company performance indicators (namely return on assets and total shareholder return) for the time period one year hence. The indicators of company performance were controlled for various factors such as company size and market-to-book ratio. The purpose of this stage was to test whether companies with a CEO pay ratio that was different to what was expected (represented by large residuals) performed worse than companies having pay ratios in-line with what was expected (represented by small residuals. This approach was chosen as it takes into account that companies with different characteristics (size, corporate governance structures, etc.) will inherently have different CEO pay ratios. It also allows for the testing of whether deviations from the expected pay ratio have an effect on subsequent company performance. In order to perform a more complete analysis, indicator variables were put in place to

identify companies with higher than expected (positive residual), or lower than expected (negative residual) CEO pay ratios, to see if paying CEOs more or less compared to employees made a difference to the company's subsequent performance.

Finally, the third stage (referred to by the above authors as the traditional approach) of the analysis was an analysis of the link between the CEO pay ratio and subsequent company performance. The same company performance variables and control variables were used in this stage as with the previous stage. This part of the analysis had the goal of identifying whether tournament theory or the behavioural theories better explained the CEO pay ratio of companies. A positive coefficient between the CEO pay ratio and company performance indicated the prevalence of tournament theory in explaining the link between the CEO pay ratio and company performance, a negative correlation would support the behavioural theories.

One of the key differences between this thesis and the study performed by Shin *et al*. (2015) was that, instead of using the average compensation received by the executive directors, this study used the compensation received by the CEO. The reason for making this adjustment was that the pay ratio in question was calculated to be as close as possible to that which is required to be disclosed by the Dodd-Frank Act in the USA, and is likely to be required to be disclosed in South Africa in the same manner in the foreseeable future (van Niekerk, 2015c).

The structure of this chapter is as follows. First, the calculation of the pay ratios is discussed, including the calculation of total CEO remuneration and average employee salaries for each firm-year. Second, for each stage of the study, the methods used and results obtained are discussed, which includes discussions of the models employed, as well as the statistical tests used to confirm their validity.

4.1 The Calculation of Pay Ratios

This section outlines the calculation of the pay ratios used in the various parts of this thesis. The pay ratio is calculated as the ratio of CEO remuneration to that of the average employee in a company. The calculation of each of these variables is discussed below, as well as the process followed to calculate three different pay ratios to be used, is described.

4.1.1. Estimating average wage

As previously discussed in the section on data, South African companies are not required to disclose the average remuneration of their employees. As such, an estimate had to be made, which was done by taking the staff cost excluding directors' remuneration, divided by the number of employees over the current and previous financial year. The average number of employees was used for two reasons. Firstly, this number more accurately represents the average employees' wages than using numbers

from the same year, due to the hiring and firing of employees from one year to the next. Secondly, it made the average employee salaries more stable over time, which reduced noise in the data. This is a slightly different approach than what used in the studies by Faleye *et al*. (2012) and Crawford *et al*. (2014), in which the current year staff cost was divided by the current year number of employees.

One of the issues encountered is that there is potentially self-selection bias in the sample, as only firms that voluntarily disclosed their number of employees in their financial statements could be used in this study. This problem was also encountered in the pay disparity study by Faleye *et al*. (2012).

4.1.2. Measuring CEO compensation

The measurement of CEO compensation is complicated by the complexity and variety of CEO remuneration forms.

Companies are fairly inconsistent in the terminology used for the different types of compensation disclosed in directors' emoluments notes in financial statements. Therefore, for the sake of consistency, the definitions used by Murphy (1999), in conjunction with the groupings used by PWC (2013a), was followed for the purposes of this research. The following types of compensation are typically amongst those granted to executive officers of companies:

- *Total guaranteed package* – these are typically fixed amounts of remuneration which are determined through benchmarking industry peers and taking company size into account (Murphy, 1999). Additionally, other payments which are not expressed as being part of the base salary, such as retirement benefits, fringe benefits like medical aid, and the right of use of company vehicles, are included in this measure.
- *Short-term incentive plans* – these are paid based on different measures of company performance achieved within a year. It was found that in South Africa these bonuses are typically correlated strongly with return on assets and return on equity, which suggests that those are the measures used to determine the bonus payment (De Wet, 2012).
- *Long-term incentive plans* – this is a very broad grouping of CEO compensation, which comprises all cash and equity-settled payments that accrue to executives over a minimum of 12 months (PWC, 2013). This remuneration category is the broadest and most poorly disclosed in annual financial reports (PWC, 2015), and therefore the most difficult to bring into a research framework. It includes awards received by executives such as share grants, share options and share appreciation rights. These schemes are typically highly complex, which goes against what executives want based on a survey by PWC (2012). For illustrative purposes, an example of a particularly complicated long-term incentive scheme can be found in Appendix 1.

4.1.3 Long-Term Incentive Plans – Share-Based Payments

It is worthwhile to provide some context to long-term incentive plans (LTIPs) to get a better idea of what they are, how they are accounted for, and how companies disclose them, as this has implications for the research method applied.

The two most common types of LTIPs are the grant of call options on company shares, as well as share appreciation rights (SARs). For the sake of simplicity, call options granted on company shares will be referred to as share options. In accounting parlance, share options and SARs are known as equity-settled and cash-settled share based payments respectively.

A share option is a right that allows the holder to purchase shares in a company at a predetermined price (the strike price, or exercise price). The value of an option will increase when the share price of the company increases, because the strike price remains constant while the market price of the underlying shares increase. In effect, share options potentially allow the holder to purchase shares at a discount to the value at which they are currently trading in the market, which gives them value.

In South Africa, share-based payments are accounted for in accordance with International Financial Reporting Standard 2 (IFRS 2), as required by the Companies Act (2008) for companies listed on the JSE. In essence, the effect of IFRS 2 is that the employee receiving a share option or SAR will earn it evenly over its vesting period (the period of time that the employee has to work before owning the share option or SAR). However, companies disclosing director's remuneration will either show share option- or SAR-based remuneration as a gain from the exercise of the option or SAR. The implication of this is that option or SAR-based remuneration is only earned when the option or SAR is exercised, rather than the IFRS 2 approach which results in remuneration typically being earned evenly over time. Interestingly, a report by PWC (2015) found that disclosure of executive remuneration by companies listed on the JSE, particularly with regard to long-term incentives, was not up to international standards.

To fully appreciate the challenges of this type of research in relation to the use of share options, the reader is referred to Appendix 1 for further information, discussion and illustrative examples.

The review by Mishel & Sabadish (2013) provides a useful summary of the different measures that have been used for CEO compensation in research in the USA. In total, seven different measures of CEO compensation have been identified, with the treatment of share options being the main difference between them. There are three different measures that value share options once they have been exercised, and four different measures that use the IFRS 2 accounting treatment of share options as basis for calculating executive compensation. Unfortunately, due to the limited compensation data available in South Africa, the value of options exercised is much more widely available than the IFRS 2

value of options granted. Therefore, to cover different approaches to the CEO pay ratio measurement, three different pay ratios were calculated and used throughout this thesis, using different measures of CEO compensation. These three pay ratios will be referred to as *Pay Ratio A*, *Pay Ratio B* and *Pay Ratio C*. The difference in their calculation relates to the treatment of long-term incentives in the calculation of CEO remuneration. These ratios are defined as follows:

- *Pay Ratio A* is calculated as the ratio of total guaranteed package plus short-term incentives earned by the CEO, to average employee remuneration.
- *Pay Ratio B* uses the measure of CEO compensation calculated as total guaranteed package, short-term incentives earned and the IFRS 2 expense in respect of long-term incentives granted to the CEO.
- *Pay Ratio C* is calculated the same way *Pay Ratio B*, except that instead of using the IFRS 2 expense, it uses the gain from share options exercised.

The three different ways of measuring the CEO pay ratio in this thesis is expressed in the equations below:

$$Pay\ Ratio\ A = \frac{Total\ Guaranteed\ Package + Short\ term\ Bonus}{Average\ employee\ salary} \quad (1)$$

$$Pay\ Ratio\ B = \frac{Total\ Guaranteed\ Package + Short\ term\ Bonus + IFRS\ 2\ expense\ of\ share\ based\ payments}{Average\ employee\ salary} \quad (2)$$

$$Pay\ Ratio\ C = \frac{Total\ Guaranteed\ Package + Short\ term\ Bonus + Gain\ from\ exercised\ share\ options}{Average\ employee\ salary} \quad (3)$$

While each of the pay ratios are calculated differently based on the treatment of long-term incentives, it is worthwhile to statistically test whether they are as different as they appear. To do this, Welch's test for the equivalence of means was used (Welch, 1947). It was found that the means are not statistically significantly different (Welch statistic = 2.2066, p=0.1109) at the 5% confidence level. However, this may be due to the lack of disclosure by firms of their long-term incentive plans, which has the effect of making the different pay ratios equal across time periods. Therefore, even though the means are not statistically significantly different, three different pay ratios were still used in the analysis.

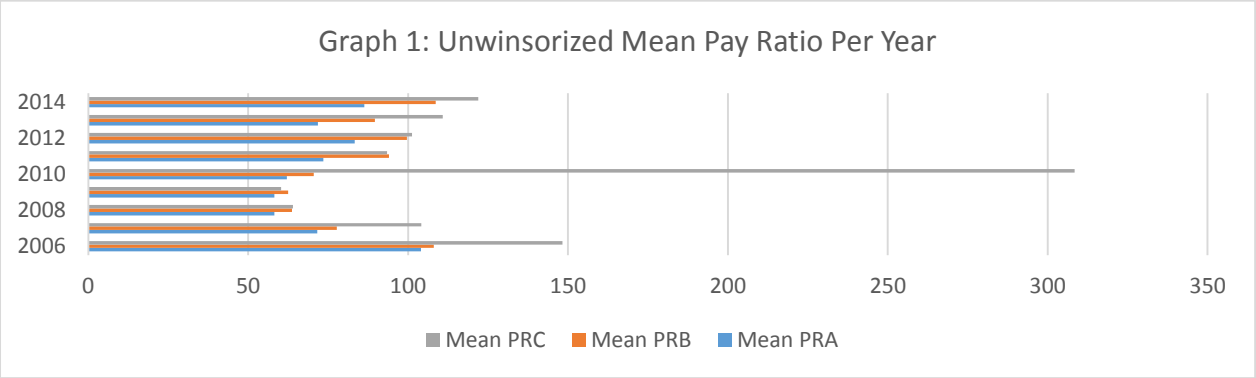
Table 4 on the following page presents a summary of the different pay ratios used, as well as the explanatory variables used in performing the analyses.

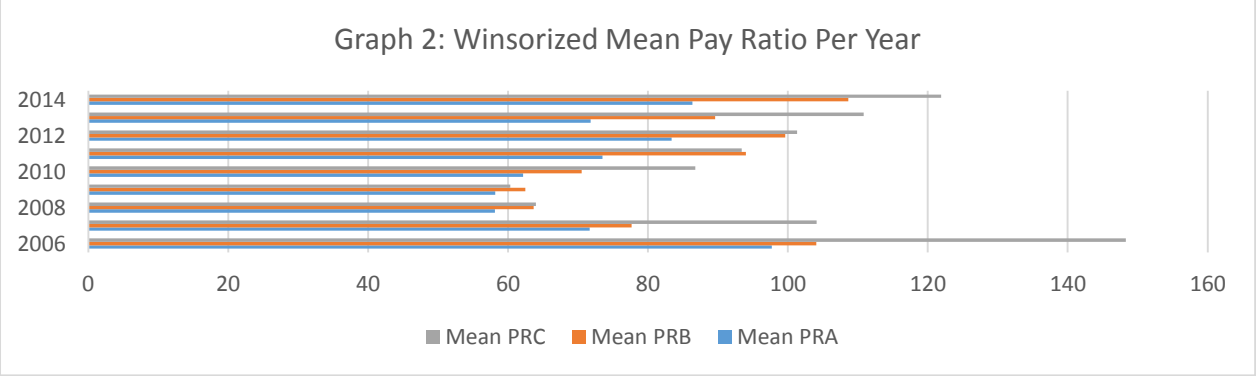
Table 4: Summary of explanatory and response variables used in Stage 1 of the analysis.		
Variable Used:	**Name:**	**Calculated As:**
Explanatory variables		
Board independence	*BoardInd*	Number of non-executive directors/Total number of directors multiplied by 100
Board meetings	*BoardMeetings*	Number of board meetings for the financial year
CEO Age	*CeoAge*	Age of the CEO as at the end of the company's financial year
CEO Tenure	*CeoTenure*	Length of time the current CEO held the position of CEO from the end of each financial year
Industry Pay Ratio	*IndPRA, IndPRB, IndPRC*	The ratio of CEO pay to the pay of the average employee for the industry for each year, excluding the firm being studied
Leverage	*Leverage*	The ratio of the book value of total liabilities to the book value of total assets multiplied by 100
Market-to-Book ratio	*MTB*	The ratio of the market capitalization of each company at each financial year-end to its respective book value of equity at each financial year-end
Number of board members	*BoardMems*	The number of members of the board of directors at each financial year-end for each company
Inflation-Adjusted Turnover	*InfAdjTurnover*	The total turnover earned by each company during each financial year end (measured in billions of Rand), adjusted for CPI inflation
Variables used in calculating response variables		
Average employee salary	*AvgSal*	The employee benefits expense (less remuneration paid to executives) at time T, divided by the average number of employees between times T and T-1
CEO Salary	*CEOSal*	The fixed salary of the CEO as disclosed in the annual report for the financial year-end
CEO Other	*CEOOther*	Remuneration provided to the CEO disclosed as other benefits, exclusive of severance benefits, as disclosued in the annual report for the financial year-end
Total guaranteed package	*TGP*	The sum of CEOSal and CEOOther, reflecting the total guaranteed package received by the CEO for the financial year-end
CEO Bonus	*CEOBon*	The amount of short-term incentives granted to the CEO, as disclosed in the annual report for the financial year-end
CEO Options	*CEOOptions*	Gain on the exercise of share options received by the CEO, as disclosed in the annual report for the financial year-end (where applicable)
IFRS 2 Expense	*IFRS2Exp*	The expense recognized in respect of long-term incentives for the CEO, as disclosed in the annual report for the financial year-end (where applicable)
Response Variables		
Pay Ratio A	*PRA*	(TGP + CEOBon)/AvgSal
Pay Ratio B	*PRB*	(TGP + CEOBon + IFRS2Exp)/AvgSal
Pay Ratio C	*PRC*	(TGP + CEOBon + CEOOptions)/AvgSal

4.2 Preliminary Data Analysis

In order to analyse the data for the purposes of performing the regression analyses, the following techniques were employed. First, a visual inspection of the data was performed. The purpose of this was to highlight any potential anomalies and/or data errors, which would create the need either for correction of data errors or winsorization. Following that, summary statistics and histograms were inspected to assess the distributions of variables, both explanatory and response. This indicated whether any of the data should be transformed to make it more normally distributed to satisfy one of the regression assumptions. In addition, as will be explained in more detail, the correlations between, and the stationarity of, the data were also examined prior to regression.

The primary variable to be visually inspected is the pay ratios of each company, as calculated according to the three different approaches described before. This is presented as a mean value on a year-by-year basis in the graphs below, in both winsorized and unwinsorized forms in Graphs 1 and 2 below.





As can be seen, there appears to be an anomaly in the 2010 year relating to Pay Ratio C (*PRC*). The anomaly is caused by the exercise of share options by Whitey Basson, CEO of Shoprite, who gained R594.5 million from the exercise of options in that year. Therefore, as a means to control for such anomalies, the data were winsorized at the 1% level. This is in line with the approach followed by Shin *et al*. (2015). It is interesting to note that the pay ratio appears to drop during the recent global financial crisis, *i.e.* between 2007 and 2010 inclusive. The spike in *PRC* relative to other measures of the pay ratio in 2007 is likely due to CEOs exercising their share options just before share prices crashed as a result of the crisis. Additionally, the general decline in the pay ratio from 2007 to 2010 is

likely due to the drop in short-term incentive packages, resulting from a decline in company performance indicators.

Histograms and summary statistics were produced for all explanatory and response variables, as this allowed the variables to be assessed for normality. As an additional measure, both the raw variable, as well as the natural logarithm transformation of those variables, were assessed. As with the visual inspection above, the pay ratios are presented in the body of this thesis, while the explanatory variables are presented in Appendix 2. Also included in Appendix 2 is a discussion of some observations noted from the data.34

As can be seen in the histograms in Table 6, as well as the summary statistics in Figure 1, none of the pay ratios are normally distributed. However, performing a natural log transformation of the variables makes them appear more normal, both visually as well as based on the Jarque-Bera test statistics. The Jarque-Bera test (Jarque & Bera, 1987) is a measure of whether the sample data being tested has the skewness and kurtosis of that of a normal distribution. Thus, a high Jarque-Bera test statistic, paired with a low probability, indicates that the data do not have the skewness and kurtosis matching that of a normal distribution, and cannot be assumed to be normally distributed, however the Jarque-Bera statistic is lower for transformed than non-transformed variables. Therefore, as a result of the above, the response variables and some of the explanatory variables were transformed into their natural logs for the purpose of statistical testing, making the resulting model a combined log-linear, log-log model. However, as a result of this transformation, care must be taken in interpreting the results of the regression, specifically with regard to the intercept and coefficients.

Table 7 presents a summary of the descriptive statistics for all variables used in the statistical analysis. The key descriptive statistics of interest are the different pay ratios, specifically pay ratio A (*PRA*), pay ratio B (*PRB*) and pay ratio C (*PRC*). The mean and median of *PRC* is higher than the other pay ratios, which is in line with how it is measured. Additionally, *PRC*'s relatively higher standard deviation also illustrates its sporadic nature, with long-term incentive remuneration only considered "earned" once options are exercised. Conversely, under *PRB*, long-term incentive remuneration accrues over time, yielding a much lower standard deviation. Additionally, the difference between the mean and median of *PRC* is larger than other pay ratios, both on an absolute and a relative basis, which further indicates the presence of outliers causing an increase in the mean compared to the median. Finally, it is interesting to note the lowest pay ratio of 1.57 occurred for Sovereign Foods in their 2012 financial year (Sovereign Foods, 2012). This arose as a result of the company's CEO stepping down and the chairman of their board of directors assuming the role of CEO from August to February.

Figure 1: Distribution of Pay Ratios (winsorised):

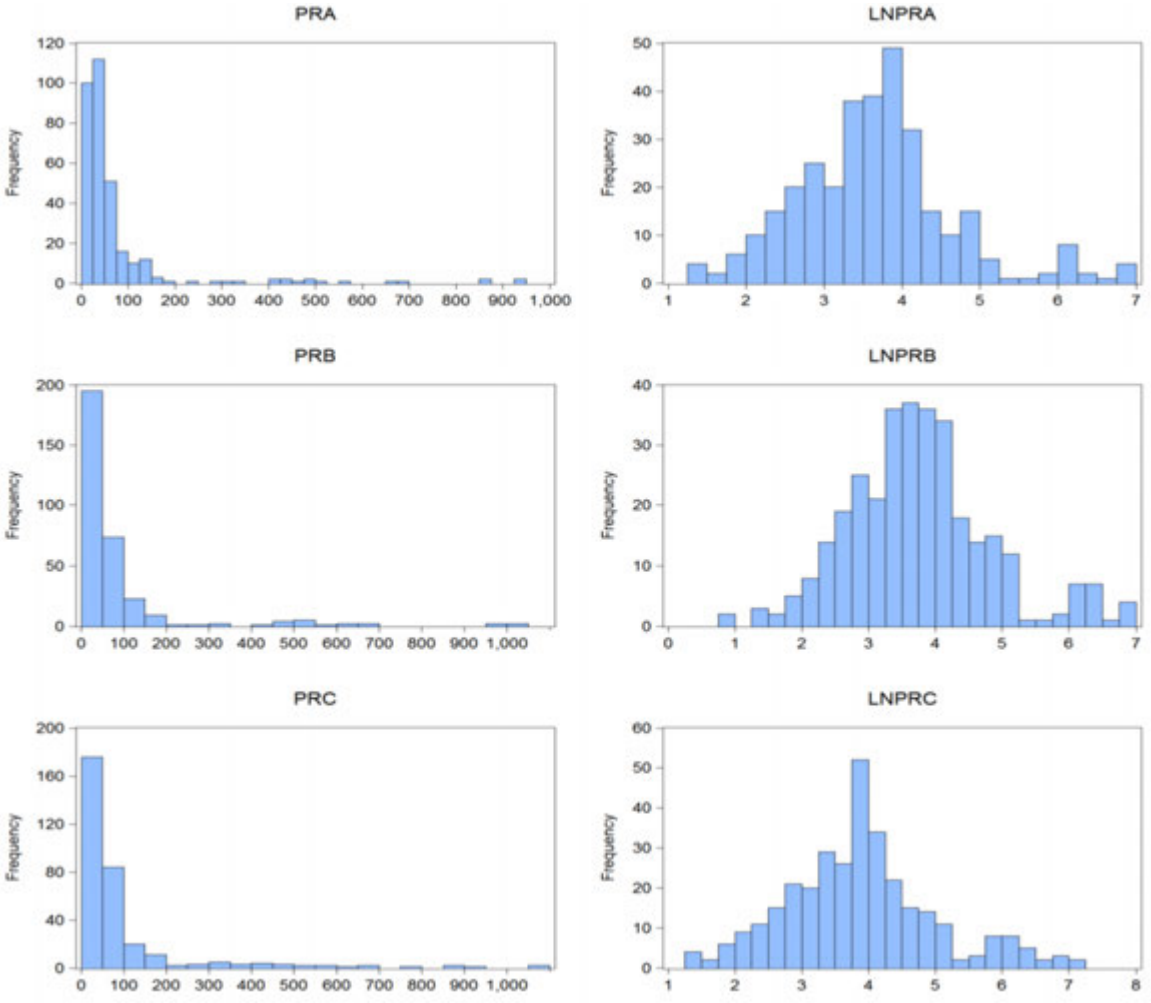


Table 5: Summary Statistics of Pay Ratios (winsorised):

	PRA	LNPRA	PRB	LNPRB	PRC	LNPRC
Mean	73.03	3.65	85.37	3.74	97.41	3.87
Median	37.13	3.61	38.36	3.65	46.77	3.85
Maximum	926.34	6.83	1 033.74	6.94	1 098.20	7.00
Minimum	3.76	1.32	2.35	0.85	3.76	1.32
Std. Dev.	132.16	1.01	152.72	1.09	163.90	1.11
Skewness	4.36	0.62	3.97	0.51	3.59	0.45
Kurtosis	23.81	4.00	20.33	3.69	17.32	3.33
Jarque-Bera	6 873.80	34.05	4 901.99	20.66	3 462.79	12.44
Probability	-	-	-	0.00	-	0.00
Sum	23 661.37	1 182.34	27 659.96	1 211.51	31 562.35	1 252.49
Sum Sq. Dev.	5 641 669.00	330.13	7 533 251.00	380.94	8 676 411.00	400.55
Observations	324	324	324	324	324	324

The correlation matrix depicted in Table 7 was used to identify whether any of the explanatory variables were correlated. The largest correlations identified were those between CEO age and CEO tenure, and between turnover and leverage. The former is fairly obvious, while the latter could possibly be explained by larger (*i.e.* higher turnover) firms having cheaper and easier access to large

Table 6: Descriptive Statistics of Variables Used (winsorised)							
	PRA	**PRB**	**PRC**	**INDPRA**	**INDPRB**	**INDPRC**	**BOARDIND**
Mean	73.55	85.70	122.03	73.55	85.70	122.03	0.67
Median	37.13	38.36	46.77	72.66	86.24	93.63	0.69
Maximum	1098.20	1142.05	9077.33	143.64	150.24	463.01	0.89
Minimum	1.57	1.57	1.57	30.21	30.94	33.27	0.25
Std. Dev.	135.89	154.90	522.31	28.64	37.63	100.99	0.12
Skewness	4.57	4.07	15.71	0.40	0.14	2.59	-0.58
Kurtosis	26.46	21.53	268.48	2.61	1.78	9.09	3.10
Jarque-Bera	8555.51	5527.83	964814.20	10.79	21.16	861.71	18.15
Probability	-	-	-	0.00	0.00	-	0.00
	BOARDMEETINGS	**BOARDMEMS**	**CEOTENURE**	**CEOAGE**	**LEVERAGE**	**TURNOVER (R'bil)**	**MTB**
Mean	4.62	10.85	7.57	51.70	0.55	12.83	5.35
Median	4.00	10.50	6.00	52.00	0.52	6.52	3.85
Maximum	8.00	18.00	35.00	71.00	1.49	136.00	82.57
Minimum	2.00	4.00	-	36.00	0.03	0.18	-176.37
Std. Dev.	1.06	2.91	6.62	7.34	0.21	19.03	17.28
Skewness	0.50	0.19	1.61	0.07	0.60	2.95	-5.50
Kurtosis	3.59	2.75	5.99	2.67	3.46	13.69	66.86
Jarque-Bera	18.00	2.76	260.07	1.74	22.32	2010.75	56678.86
Probability	0.00	0.25	-	0.42	0.00	-	-

Table 7: Correlations between variables														
	BOARDIND	**BOARDMEETINGS**	**BOARDMEMS**	**CEOAGE**	**CEOTENURE**	**LEVERAGE**	**MTB**	**TURNOVER**	**PRA**	**PRB**	**PRC**	**INDPRA**	**INDPRB**	**INDPRC**
BOARDIND	1	0.4180	0.2757	-0.0503	-0.1552	-0.2032	0.0240	-0.1823	-0.0193	0.0282	0.0232	-0.2935	-0.3366	-0.0969
BOARDMEETINGS	0.4180	1	0.1698	0.0432	-0.1458	-0.2313	-0.0634	-0.0433	-0.0798	-0.0891	-0.0514	-0.4151	-0.4311	-0.2395
BOARDMEMS	0.2757	0.1698	1	0.0109	0.0058	0.1594	0.0258	0.3042	0.1109	0.0791	0.1126	-0.1389	-0.1642	-0.0293
CEOAGE	-0.0503	0.0432	0.0109	1	0.5057	0.0044	-0.0182	0.0861	0.2633	0.2774	0.2484	0.0224	0.0095	-0.0600
CEOTENURE	-0.1552	-0.1458	0.0058	0.5057	1	-0.0809	0.0765	0.2770	0.3348	0.3516	0.3647	0.0662	0.0749	-0.0108
LEVERAGE	-0.2032	-0.2313	0.1594	0.0044	-0.0809	1	0.0876	0.5227	0.0558	0.0281	0.0625	0.2664	0.2718	0.1013
MTB	0.0240	-0.0634	0.0258	-0.0182	0.0765	0.0876	1	0.0782	0.0277	0.0387	0.0536	0.0160	0.0333	-0.0140
TURNOVER	-0.1823	-0.0433	0.3042	0.0861	0.2770	0.5227	0.0782	1	0.2523	0.2095	0.2438	0.1027	0.1456	0.0275
PRA	-0.0193	-0.0798	0.1109	0.2633	0.3348	0.0558	0.0277	0.2523	1	0.9434	0.8686	-0.0119	0.0009	-0.0283
PRB	0.0282	-0.0891	0.0791	0.2774	0.3516	0.0281	0.0387	0.2095	0.9434	1	0.8699	-0.0045	0.0020	0.0055
PRC	0.0232	-0.0514	0.1126	0.2484	0.3647	0.0625	0.0536	0.2438	0.8686	0.8699	1	-0.0458	-0.0381	-0.0474
INDPRA	-0.2935	-0.4151	-0.1389	0.0224	0.0662	0.2664	0.0160	0.1027	-0.0119	-0.0045	-0.0458	1	0.9710	0.3470
INDPRB	-0.3366	-0.4311	-0.1642	0.0095	0.0749	0.2718	0.0333	0.1456	0.0009	0.0020	-0.0381	0.9710	1	0.3309
INDPRC	-0.0969	-0.2395	-0.0293	-0.0600	-0.0108	0.1013	-0.0140	0.0275	-0.0283	0.0055	-0.0474	0.3470	0.3309	1

amounts of debt and thus being more leveraged. Thus, the regression output from models incorporating both leverage and turnover, as well as both CEO age and CEO tenure, should be interpreted with caution.

A stationary time series has constant statistical properties (mean, variance, and so on) over time. This is an important data attribute, as non-stationary data can have the effect of creating spurious relationships in regression analyses. One of the remedies for non-stationarity of variables is first differencing. However, this process is costly due to the loss of observations. The stationarity of the explanatory and response variables were tested using the Phillips-Perron Fisher unit root test (Phillips & Perron, 1988) which was chosen above the ADF test because the former is robust to heteroscedasticity in the error term, while the latter is not. It was found that all variables used in the statistical testing exhibited stationarity at the 5% confidence level, thus satisfying this regression assumption. The output from this test can be found in Appendix 3.

4.3 Stage 1: Determinants of the Pay Ratio

The purpose of Stage 1 of the analysis was to identify the determinants of the pay ratios of consumer goods and services companies listed on the JSE for the period 2006 – 2014. A regression, using the different definitions of pay ratios as response variables, was run against various explanatory variables covering corporate governance and economic characteristics of companies, as well as CEO characteristics.

In line with Shin *et al*. (2015), as well as other relevant South African and international literature on CEO compensation, this thesis used the following explanatory variables as hypothesized determinants of the pay ratio, as shown in Table 8 below:

Table 8: Hypotheses Tested

Hypothesis Number	Variable	Expected Relationship with Pay Ratio
1	CEO Age	Positive
2	CEO tenure	Positive
3	Industry pay ratio	Positive
4	Leverage	Positive
5	Market-to-Book ratio	Positive
6	Inflation-Adjusted turnover	Positive
7	Number of directors	Negative
8	Board Independence	Negative
9	Number of board meetings	Negative

A more detailed description of the hypotheses is provided at the end of the literature review. It is worth noting the selection of inflation-adjusted turnover as a measure of company size, as this is a departure from Shin *et al*. (2015). Firstly, there is a large number of explanatory variables being used, which gives rise to the potential for multicollinearity between some of those variables (for example, total assets and the debt ratio, market capitalization and the market-to-book ratio). As turnover is not as correlated with other variables as total assets (the measure used by Shin *et al*. (2015)), it was decided that it would be a better indicator of company size. Secondly, in order to avoid possible spurious relationships in the regression results, turnover was inflation-adjusted to the 2006 base year (the first year of analysis), using inflation data provided by the World Bank (2015). This would ensure that non-stationarity of turnover would not compromise the results of the analysis.

Some key variables used by Shin *et al*. (2015) and Faleye *et al*. (2012) were not available from South African companies' financial statements as they are not subject to disclosure requirements. These variables include the probability of promotion, unionization rate of employees, employee tenure, and the percentage of workforce comprised of administrative staff (Shin *et al*., 2015).

The response variables to be used in this part of the analysis are the three different definitions of pay ratio, namely *PRA*, *PRB* and *PRC*.

Based on the above, the following regression equation was used to estimate a regression model, which in turn was used to explain the pay ratio:

$$PRX_t = B_1 CEOAge_t + B_2 CEOTenure_t + B_3 IndPRX_t + B_4 Leverage_t + B_5 MTB_t + B_6 Turnover_t + B_7 BoardMems_t + B_8 BoardInd_t + B_9 BoardMeet_t + c + \varepsilon_i \quad (4)$$

Where X is either A, B, or C depending on the pay ratio being tested.

A panel data model was chosen as a means of analysing the data, which is the method suggested by De Jager (2008) for data of this nature. Additionally, other studies in the same field follow the same approach (see, for example Shin *et al*., 2015, and Bradley, 2013). The period fixed approach was initially tested as opposed to random effects, as fixed effects account for omitted variable bias (De Jager, 2008). Thus, the first model employed used the natural log transformations of each of the pay ratios, regressed against all explanatory variables previously identified, with controls in place for year fixed effects. Tests on the different models were conducted as follows:

First, the redundant fixed effects likelihood test was performed to confirm whether fixed period effects have significant explanatory power. Thereafter, random period effects were tested by means

of a Hausman (1978) test to check whether random effects should be used instead of fixed effects. In order to test random period effects, the number of periods has to exceed the number of variables being tested. In the data set, there are nine time periods and nine explanatory variables. Therefore, in order to perform the Hausman test, *CEOAge* was dropped from the model as it is highly correlated with *CEOTenure*, and would likely create spurious regression results.

As evidenced by Table 10, it seems most appropriate to use the random period effects specification in the model. However, the problem is that the Durbin-Watson (1971) test indicates that there is autocorrelation of residuals from using either a fixed or random period effects model. This is a violation of one of the key assumptions behind ordinary least squares regression analysis. Unfortunately, it is not possible to correct for this in either the random or fixed period effect panel data model by means of using Generalized Least Squares (GLS) period weighting. In the case of random period effects, this is because the period effects are captured in the error term. In the case of fixed period effects, this is due to the unbalanced nature of the data in question, which means that different cross sections (companies) have different numbers of observations (years). Therefore, in order to create a more robust model that meets the assumptions underlying ordinary least squares regression, the data had to be pooled for the regression analysis.

In the pooled ordinary least squares regression model, serial correlation of residuals is corrected for by using SUR (Seemingly Unrelated Regressions) GLS period weighting, with unbalanced SUR approximation. The SUR technique (Zellner, 1962), in this context, allows for residuals to be robust to serial correlation for specific cross-sections across time periods, and thus adjusts for the problem of autocorrelation of residuals. Standard errors were also adjusted based on the White period-corrected methodology (White, 1980), which ensures that residuals are robust to heteroscedasticity across time periods.

In choosing explanatory regression variables to be used, two different models were created for each type of pay ratio – a model using all explanatory variables, and a model using only the statistically significant explanatory variables (at 5%). The models using all explanatory variables are called *LnPRAAll, LnPRBAll, LnPRCAll* for each pay ratio, which is shown in Table 11. Then, in order to find the explanatory variables that hold the most predictive power, a stepwise backward elimination approach was undertaken and variables were removed from the model, one by one, if their associated p-value was less than 5%. The models resulting from this, containing only variables that are significant at the 5% level, were estimated (*LnPRABest, LnPRBBest, LnPRCBest*). Finally, the explanatory variables were tested for stationarity by means of panel unit root tests. In the event of non-stationarity of variables,

and to avoid the costly process of first-differencing, the variables were transformed by means of a natural log transformation (as necessary) based on the results of the tests. Several further assumptions underlying ordinary least squares regression were tested once the overall pooled regression was performed. These assumptions and their associated tests are outlined in Table 9 below:

Table 9: Residual Diagnostics	
Assumption	**Test**
Residuals are homoscedastic	White (1980)
Residuals are independent (*i.e.* not serially correlated)	Durbin & Watson (1971)
Residuals have a mean of zero	Student's T-Test
Residuals are normally distributed	Jarque & Bera (1987)

Each of the above statistical tests was conducted at the 5% significance level. The results of the tests are presented in Table 10 on the following page for each of the models concerned. As shown in Table 10, the only two tests which presented potential violations of the assumptions are the Durbin-Watson test for serial correlation of residuals, and the Jarque-Bera test for normality of residuals. The results of the Durbin-Watson test indicate that only the models that included all explanatory variables show some uncertainty about the autocorrelation of residuals. This does not affect the overall results of this study, as only the residuals from the so-called, "best," models will be used in the next stage of the study. The Jarque-Bera test for normality of residuals indicates that the residuals of none of the models are normally distributed. However, as stated in the Gauss-Markov Theorem (Chipman, 2014), provided that the assumptions of homoscedasticity, independence and zero mean of residuals hold, ordinary least squares provides the best linear unbiased estimator of coefficients. Therefore, the violation of the assumption of the normality of residuals is not likely to jeopardize the model significantly, given that the other assumptions hold.

4.3.1 Regression Results

The results from the regression models are presented in Table 10 on the following page. All regression equations use the natural logarithm of the appropriate pay ratio as the response variable. All coefficients have been transformed where the explanatory variable has not been log-transformed, in order to make interpretation more intuitive. For the first stage of the analysis, the models have been split into two components – models using all explanatory variables in the dataset (Table 11), and models using only explanatory variables that were significant at the 5% level (Table 12).

Table 10: Testing of Models: Stage 1						
Model	**LnPRA All**	**LnPRA Best**	**LnPRB All**	**LnPRB Best**	**LnPRC All**	**LnPRC Best**
Pay ratio definition: Response variable	A	A	B	B	C	C
Explanatory variables[7]						
BOARDIND	Yes	No	Yes	No	Yes	No
BOARDMEETINGS	Yes	No	Yes	No	Yes	No
BOARDMEMS	Yes	Yes	Yes	No	Yes	No
CEOAGE	Yes	No	Yes	No	Yes	No
CEOTENURE	Yes	Yes	Yes	Yes	Yes	Yes
LEVERAGE	Yes	No	Yes	No	Yes	No
LNINDPR	Yes	No	Yes	Yes	Yes	No
LNMTB	Yes	Yes	Yes	Yes	Yes	Yes
INFADJTURN	Yes	Yes	Yes	Yes	Yes	Yes
Period Fixed Effects	No	No	No	No	No	No
Period SUR GLS Weights	Yes	Yes	Yes	Yes	Yes	Yes
Redundant Fixed Year Effects test						
F-statistic	0.5198	0.5083	0.5666	0.4944	1.9050	1.6235
P-value	0.8414	0.8499	0.8051	0.8600	0.0589	0.1173
Hausman (1978) Test for Random Year Effects						
Chi-Squared Statistic	1.9904	0.9398	1.6607	1.6835	8.3538	5.6986
P-value	0.9813	0.9188	0.9897	0.7937	0.3997	0.1272
White (1980) test for heteroskedasticity of residuals						
P-value	0.5796	0.5067	0.8180	0.6547	0.0769	0.1017
F-stat	0.5463	0.6813	0.2010	0.4242	2.5861	2.3020
Durbin-Watson (1971) test for autocorrelation of residuals						
D-Statistic	1.7965	1.8524	1.8079	1.8787	1.8561	1.8994
DupperCrit	1.8744	1.8414	1.8744	1.8414	1.8744	1.8349
DlowerCrit	1.7577	1.7903	1.7577	1.7903	1.7577	1.7967
Jarque-Bera (1987) test for normality of residuals						
P-value	293.2929	301.9362	204.5421	208.0597	72.0883	97.0920
Test Statistic	-	-	-	-	-	-
T-Test: Mean is not significantly different from zero						
T-stat	0.4873	0.3915	0.6229	0.5016	0.3839	0.1061
P-value	0.6954	0.8581	0.4923	0.6728	0.8720	1.6206

[7] "Yes," and "No," have been used to indicate whether the variable has been included or excluded from each model respectively.

Table 11: Using All Explanatory Variables[8]			
Pay ratio definition	**A**	**B**	**C**
C	2.838*** (*0*)	23.1922*** (*0*)	6.5824*** (*0.0027*)
BOARDIND	0.3275 (*0.2208*)	0.6938* (*0.0948*)	1.1924** (*0.0406*)
BOARDMEETINGS	0.0309 (*0.4171*)	0.0244 (*0.5131*)	0.0162 (*0.7093*)
BOARDMEMS	0.019* (*0.0855*)	0.0159 (*0.1589*)	0.0283* (*0.099*)
CEOAGE	-0.0017 (*0.8211*)	-0.0035 (*0.6257*)	0.0087 (*0.3789*)
CEOTENURE	0.0361*** (*0.0001*)	0.0415*** (*0*)	0.0388*** (*0.0003*)
LEVERAGE	0.002 (*0.4215*)	0.0037 (*0.1203*)	-0.0339 (*0.4443*)
LNINDPR	-0.0799 (*0.3567*)	-0.1676** (*0.0269*)	-0.0008 (*0.8005*)
LNMTB	0.1283** (*0.0154*)	0.2477*** (*0.0001*)	0.2134*** (*0.0071*)
INFADJTURN	6.33E-06** (*0.0219*)	3.51E-06 (*0.1371*)	8.01E-06** (*0.0348*)
Adjusted R squared	0.132111	0.16002	0.130453

Before interpreting the results, it is important to note that the models have natural-log transformed response variables. Therefore, non-logged explanatory variables such as *CEOTenure* will, for example, be interpreted as follows: a one year increase in *CEOTenure* results in a 3.61% change in *PRA*. Logged variables, such as *MTB* are, for example, interpreted as follows: a 1% change in the *MTB* ratio results in a 0.1283% change in *PRA*.

The intercept is significantly higher for *PRB* and *PRC* compared to *PRA*, which excludes options. The corporate governance variables (board independence, number of board meetings and number of board members) were generally not found to be statistically significantly correlated (at the 5% level) with the pay ratio. Board independence is statistically significantly related only in the case of *PRC*. This positive relationship between CEO pay ratio and level of board independence (at least when share options are also considered) appears to be counter-intuitive and is inconsistent with Shin *et al*. (2015), who found no relationship between the pay ratio and the degree of board independence. Similarly, Faleye *et al*. (2012) found no relationship between corporate governance variables and the pay ratio. However, amongst the executive suite it was found that pay dispersion is greater when the board contains a greater proportion of non-executive directors (Rajgopal & Srinivasan, 2006), which appears to be consistent with the results obtained in this study when using *PRC*.

CEO tenure was found to be statistically significantly correlated with all three definitions of the pay ratio, which is consistent with the results obtained by Bradley (2013). A CEO who works at a company for a longer period of time has more experience and thus can add more value to the company. Another

[8] Significance of variables is denoted by ***, ** and * for the 1%, 5% and 10% level respectively.

reason for this correlation is that underperforming CEOs are more likely to be fired and in these cases, the remuneration, in particular *PRC*, would be negatively affected. CEO tenure subsumed the effects of CEO age as an explanatory variable, which is likely due to CEOs who hold their position for longer periods of time having more political influence on the board, which can be used to motivate an increase in their remuneration.

Consistent with the results of Faleye *et al*. (2012), but contrary to Shin *et al*. (2015), no statistically significant relationship was found between the amount of leverage of a firm (as measured by the debt ratio) and the pay ratio. The reason for the lack of relationship in the present context could be that leverage affects CEO compensation and average employee compensation in the same way. In other words, an increase in leverage by a company may result in the same percentage increase in CEO compensation as the increase in employee compensation. Additionally, South African companies have been found to exhibit significantly lower levels of leverage than their international counterparts (Correia & Cramer, 2008), which may affect the nature of this relationship.

Statistically significant industry effects were only found for *PRB*, for which a negative relationship was found between companies' pay ratios and the pay ratios of their industry peers. The reason for only *PRB* exhibiting industry effects may be that this measure is far more consistent year-on-year than the *PRC* definition, which has occasional once-off gains as opposed to a smooth increase in compensation over time. Therefore, industry effects can result if sector peers also use share-based long-term incentives for their CEOs. The nature of the relationship between the pay ratio and the industry pay ratio is the complete opposite of what was found by Shin *et al*. (2015), who identified a positive relationship between the industry pay ratio and individual companies' pay ratios. One possible explanation for this inconsistency may be due to homogeneity between the subsectors of consumer goods and consumer services. Perhaps these two industries, although classified separately by BFA McGregor and the JSE, are fairly homogenous. Interestingly, the definition of CEO compensation used by Shin *et al*. (2015) is consistent with that of *PRB*, which could explain why both that study and this thesis have identified a significant relationship between the industry pay ratio and company pay ratios.

The market-to-book ratio was found to be significantly positively related to all measures of the pay ratio, which is consistent with Shin *et al*. (2015). This is consistent with the hypothesis that the pay ratio will be positively related to the market-to-book ratio, which is an indicator of the skill needed on the part of the CEO in order to realize the gains from future investment opportunities. In terms of interpreting the coefficients, in the context of pay ratio A, a 1% increase in the market-to-book ratio is associated with a 0.12% increase in the pay ratio, starting with a base pay ratio of 2.838.

Company size, as measured by inflation adjusted turnover (measured in billions of Rand), was found to be positively correlated with each of the pay ratios, albeit with a very small coefficient. Therefore, firm size, as measured by turnover, is significantly related to the pay ratio of companies, but does not explain much of the variation of pay ratios between companies. This result is consistent with the findings of Shin *et al*. (2015) and Faleye *et al*. (2012).

Finally, the adjusted R^2 of the models is significantly lower than that of the other studies on pay disparity (specifically Shin *et al*., 2015, and Faleye *et al*., 2012). This is likely to be due to the unavailability of certain key variables that were effectively used in predicting pay disparity in those studies. For example, it was not possible to consistently calculate the probability of promotion to CEO, a key variable in the determination of pay structure under tournament theory from South African company's financial statements.

Table 12 below presented the regression results of using explanatory variables that are significant at the 5% level to explain CEO pay ratios.

Table 12: Using Explanatory Variables significant at 5%			
Pay ratio Definition	**A**	**B**	**C**
C	15.5296*** (*0*)	57.2139*** (*0*)	21.6413*** (*0*)
BOARDMEMS	0.0271** (*0.015*)	N/A	N/A
CEOTENURE	0.0344*** *(0*)	0.0365*** (*0*)	0.0401*** (*0*)
LNMTB	0.1353*** (*0.0063*)	0.2296*** (*0*)	0.1966*** (*0.0059*)
INFADJTURN	0.0058** (*0.0128*)	0.0044** (*0.0308*)	0.0069** (*0.0323*)
LNINDPR	N/A	-0.2333** (*0.0116*)	N/A
Adjusted R squared	0.136037	0.156924	0.107638

Using the stepwise regression technique previously discussed, the variables in the above table were found to be significant at the 5% confidence level in predicting the pay ratios of companies. Interestingly, the only change to have taken place from the previous set of tests is that a significant relationship was found to exist between the *PRA* and the number of board members in a company. All other relationships that exist in this set of results are consistent with the relationships from the previous set of results, aside from the coefficients and intercepts.

The number of board members was found to be positively related to *PRA*, which seems counter-intuitive, as one would expect a larger board of directors to be able to limit the extent to which the CEO can inflate their pay levels. Additionally, this result is inconsistent with Shin *et al*. (2015), who found companies having smaller boards to have higher pay ratios and Faleye *et al*. (2012), who found there to be no relationship between any of the corporate governance variables and the pay ratio.

However, other studies that focussed exclusively on CEO compensation rather than the CEO pay ratio, found that companies with larger boards generally had CEOs earning higher levels of compensation (see, for example, Ozkan, 2007 and Core *et al*., 1999). Therefore, while seemingly surprising, this result is not in conflict with the existing literature on CEO compensation, and could indicate a dilution of board-power relative to the CEO as board size increases.

In summary, based on the results above, the CEO pay ratio of the sample companies is consistently affected by the CEOs tenure, the company's market-to-book ratio, and inflation-adjusted turnover. Depending on the measure of compensation used, the number of board meetings or industry effects can also be significant in having an impact on the CEO pay ratio. It is important to note, however, that the way researchers choose to define and measure CEO compensation, which is fraught with complexity and inconsistencies, has a significant effect on the result. This highlights the need for innovative measurement, consistency and transparency in this regard.

4.4 Stage 2: Performance Effects of Deviations from the Expected Pay Ratio

Following the approach of Shin *et al*. (2015) and Rajgopal and Srinivasan (2006), this stage of the study involved using the residuals from the models from the previous section that have the most explanatory power (namely, *LnPRABest, LnPRBBest* and *LnPRCBest*) as proxies for the deviation from the expected pay ratios. The structure of this section will be as follows. First, the transformation of residuals will be dealt with for use in this stage of the analysis. Then, the explanatory variables, representing indicators of subsequent company performance, will be discussed and linked to the relevant literature. Finally, the regression model used, incorporating the explanatory company performance variables, as well as the dependant variable – deviation from expected pay ratio – will be discussed.

4.4.1 Transformation of residuals

The residuals calculated from the regression analysis in Stage 1 were calculated as the difference between the natural logarithmic transformations of the pay ratios less the predicted natural logarithmic transformations of the pay ratios. Therefore, in order to better understand the relationship between deviations from the expected pay ratio and company performance, the actual and fitted pay ratios were transformed using the following formula:

$$Transformed\ value = e^{Raw\ value} \quad (5)$$

Thereafter, the differences between the actual and predicted pay ratios were calculated as deviations from the predicted pay ratios. Finally, these residuals were used as inputs into the regression model

and regressed against company performance variables, after controlling for other factors which could influence company performance.

4.4.2 Hypotheses Tested and Variables Used

There are two hypotheses being tested in this stage of the analysis, namely:

Hypothesis 10:

Deviations from the expected pay ratio will negatively affect company performance.

Hypothesis 11:

Deviations resulting from a higher than expected pay ratio (positive residual) will have a greater negative impact than deviations from a lower than expected pay ratio (negative residual).

Company performance variables were used as explanatory variables for the deviations from the expected pay ratios. In order to be consistent with prior pay disparity literature (Shin *et al*., 2015, and Rajgopal and Srinivasan, 2006), two different measures of performance were used, namely total shareholder return and return on assets, representing market-based and accounting-based measures respectively. Return on assets was defined as operating profit divided by total assets, which is consistent with the South African pay-for-performance literature (*e.g.* De Wet, 2012). These two measures of performance were controlled for factors that are likely to influence them, in order to isolate as much as possible the effect of deviations from the expected pay ratio on company performance.

The control variables used were based on approaches and findings reported in the South African and international academic literature. In contrast to Shin *et al*. (2015) and Rajgopal & Srinivasan (2006), who used the market-to-book ratio, the book-to-market ratio was used as it has been found to have significant explanatory power for returns on the JSE (Basiewicz & Auret, 2010). In line with Shin *et al*. (2015) and Rajgopal and Srinivasan (2006), company size, represented by market capitalization and the level of leverage, represented by debt ratio, were used as control variables for total shareholder return and return on assets. Market capitalization numbers were adjusted for inflation in order to avoid non-stationarity, which would otherwise potentially cause spurious regression. Additionally, the annualized standard deviation of share returns were used as a control for total shareholder returns as a proxy for risk, again in line with Shin *et al*. (2015).

Residuals were incorporated into the regression as explanatory variables for company performance as follows, using the same method as Shin *et al*. (2015) and Rajgopal & Srinivasan (2006). The absolute values of the residuals were calculated as a means to test whether any deviation from the expected

pay ratio would result in a change in company performance. Additionally, a dummy variable series was created from the residuals from Stage 1 to indicate whether residuals were positive or negative. This was used to test if there was a difference in company performance from paying the CEO more (in the case of positive residuals) or less (in the case of negative residuals), respectively. The rationale behind this is that the investor outrage costs should cause a drop in share price

Following Shin *et al*. (2015) and Rajgopal & Srinivasan (2006), the deviations from the expected pay ratio were lagged by one year relative to all of the company performance variables and their controls. Unfortunately, due to the timing of this study, not all residuals from Stage 1 could be included in the data set as not all interim results were available from the BFA McGregor database at the time of writing. Thus, the number of usable data points shrunk from 324 in Stage 1 to 309 in Stage 2.

4.4.3 Specification and Testing of Models

A total of twelve regression models were used in this part of the analysis, based on the three different pay ratios (*PRA*, *PRB* and *PRC*), the two different measures of company performance (total shareholder return and return on assets) and the treatment of residuals (absolute values, or a dummy variable representing whether the residual was positive or negative). The generic format of the regression equations used is given in Section 4.4.4. As a similar process was followed for all the models used as in the first stage of the study, the discussion will be kept fairly brief to the extent that various aspects have already been discussed.

Initially, a panel data fixed period effects model was employed in estimating a regression equation for each model, as discussed in the first stage of the analysis. The redundant fixed effects likelihood ratio was calculated for each of the models in order to ascertain whether it was appropriate to control for period fixed effects. While the fixed effects likelihood ratio showed that all equations should incorporate period fixed effects, the models using return on assets as the explanatory variable were found to exhibit significant positive autocorrelation of residuals, as evidenced by the Durbin-Watson (1971) test statistic. Therefore, all models using return on assets as response variables were not controlled for fixed period effects, and instead the SUR technique was used to handle between-period correlation of residuals (Zellner, 1962). The models using total shareholder return explanatory variables random period effects rather than fixed period effects by means of the Hausman (1978) test. For all models using total shareholder return as the explanatory variable, the results of the Hausman (1978) test indicated that fixed period effects rather than random period effects should be incorporated into the model. All models were specified to use the White (1980) methodology of between-period heteroscedasticity, as discussed in the first stage of the analysis. The results of the aforementioned tests are displayed in Table 13 on the following page.

Once the models had been specified, their residuals were tested in the same manner as in the first stage for normality, bias, autocorrelation and heteroscedasticity. As with the previous stage of the analysis, the residuals from none of the models were found to be normally distributed. However, as discussed previously, this does not significantly jeopardize the statistical validity of the models provided the other assumptions are met. The only assumptions not met were that of heteroscedasticity of residuals where total shareholder return was used as the response variable. This has been documented in the South African literature (*e.g.* Kulikova & Taylor, 2010). However, the means by which to model the observed heteroscedasticity (see Sigauke, Makhwiting & Lesaoana, 2014) is very complicated and outside of the scope of this thesis. Therefore, the results of the regressions using total shareholder return as a response variable should be interpreted with caution due to the heteroscedasticity of residuals.

4.4.4 Regression Equations

There are two broad types of equations that were used in this part of the analysis – equations using total shareholder return as the response variable, and equations using return on assets as the response variable, as shown below:

$$TSR_{t+1} = B_1 Residual_t + B_2 BTM_{t+1} + B_3 Leverage_{t+1} + B_4 MarketCap_{t+1} + B_5 AnnVol_{t+1} + B_6 TSR_t + Fixed\ Year\ Effects + c + \varepsilon \quad (6)$$

$$ROA_{t+1} = B_1 Residual_t + B_2 BTM_{t+1} + B_3 Leverage_{t+1} + B_4 MarketCap_{t+1} + c + \varepsilon \quad (7)$$

All variables were previously defined in Table 4 on page 31.

The residuals are deviations from the expected pay ratio derived from the previous stage of the analysis. In the above equation, the residuals take the form of either the absolute value of the deviation from the expected pay ratio, or they are dummy variables that indicate whether the residual is positive or negative.

Table 13: Specification and testing of models to be used in Stage 2 of the analysis.												
Pay Ratio Definition	**A**	**A**	**A**	**A**	**B**	**B**	**B**	**B**	**C**	**C**	**C**	**C**
Residuals used as explan var (t)	|Residual|	ResidualPos	|Residual|	ResidualPos	|Residual|	ResidualPos	|Residual|	ResidualPos	|Residual|	ResidualPos	|Residual|	ResidualPos
Response Variable (t+1)	TSR	TSR	ROA	ROA	TSR	TSR	ROA	ROA	TSR	TSR	ROA	ROA
Explanatory Variables:												
BTM (t+1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Leverage (t+1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market Cap (t+1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annualized volatility of share price at (t+1)	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No
Total shareholder return (t)	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No
Period fixed effects	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No
Period SUR GLS Weights	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Redundant Fixed Year Effects test												
F-statistic	11.7748	11.8110	N/A	N/A	11.7589	11.7864	N/A	N/A	11.5484	12.1317	N/A	N/A
P-value	-	-	N/A	N/A	-	-	N/A	N/A	-	-	N/A	N/A
Hausman (1978) Test for Random Year Effects												
Chi-Squared Statistic	41.1353	93.7187	N/A	N/A	52.2535	21.9219	N/A	N/A	63.6289	72.3552	N/A	N/A
P-value	0	0	N/A	N/A	0	0.0013	N/A	N/A	0	0	N/A	N/A
White (1980) test for heteroscedasticity of residuals												
P-value	0.0000	0.0000	0.1803	0.1014	0.0000	0.0000	0.1713	0.2147	0.1305	0.0000	0.1522	0.0000
F-stat	33.9786	33.9786	1.7229	2.3057	34.0509	32.7809	1.7748	1.5462	2.0502	34.1555	1.8945	34.1555
Durbin-Watson (1971) test for autocorrelation of residuals												
D-Statistic	1.9516	1.9342	1.8841	1.8878	1.9525	1.9366	1.8864	1.8875	1.9502	1.9363	1.8784	1.8837
Dupper Crit	1.8531	1.8531	1.8397	1.8397	1.8531	1.8531	1.8397	1.8397	1.8531	1.8531	1.8397	1.8397
Dlower Crit	1.7740	1.7740	1.7873	1.7873	1.7740	1.7740	1.7873	1.7873	1.7740	1.7740	1.7873	1.7873
Jarque-Bera (1987) test for normality of residuals												
P-value	0	0	0	0	0	0	0	0	0	0	0	0
Test Statistic	158.2279	146.0082	67.4037	58.2773	158.1308	146.1295	66.7721	66.5027	162.5658	133.5245	59.0435	63.8055
T-Test: Mean is not significantly different from zero												
T-stat	-0.0000	-0.0000	-0.9027	-0.8101	0.0000	0.0000	-0.9310	-0.7917	0.0000	0.0000	-0.7329	-0.8242
P-value	1.0000	1.0000	0.3674	0.4185	1.0000	1.0000	0.3526	0.4292	1.0000	1.0000	0.4642	0.4105

4.4.4 Results

This section presents the findings from the second stage of the analysis, which involved regressing the deviations from the expected pay ratios against company performance variables. Factors which are known to impact on company performance are controlled for. As discussed previously, a total of twelve different regression models were run, based on the performance measure used (return on assets or total shareholder return), the three pay ratio definitions used, and the residuals used (absolute value of residuals or a dummy variable representing whether the residual is positive or negative respectively). The models based on the absolute value of residuals will be discussed first, and models using dummy variables for positive or negative deviations from the expected pay ratio will be discussed thereafter.

Tables 14 and 15 present the regression results from the use of the absolute value of residuals as an explanatory variable, with total shareholder return and return on assets being used as response variables respectively in each table.

Table 14: Models using TSR(t+1) as response variable, absolute value of residuals			
Pay ratio Definition	**A**	**B**	**C**
Intercept	10.2805 (*0.4336*)	10.2091 (*0.3602*)	10.5987 (*0.3458*)
|Residual|(t)	-0.0193*** (*0.0005*)	-0.017*** (*0.0006*)	-0.0205*** (*0.0001*)
TSR(t)	0.1386 (*0.1609*)	0.1397 (*0.159*)	0.1412 (*0.1538*)
AnnualizedVol(t+1)	0.6162* (*0.0544*)	0.6215* (*0.0509*)	0.619* (*0.0525*)
Leverage(t+1)	-0.075 (*0.3624*)	-10.7315 (*0.2155*)	-10.6199 (*0.2208*)
MarketCap(t+1)	0.1427*** (*0.0001*)	0.1405*** (*0.0001*)	0.1483*** (*0*)
BTM(t+1)	-0.2184*** (*0.0065*)	-22.0915*** (*0.0061*)	-22.2738*** (*0.0058*)
Adjusted R squared	0.292686	0.29241	0.294548

Table 15: Models using ROA (t+1) as response variable, absolute value of residuals			
Pay ratio Definition	**A**	**B**	**C**
Intercept	18.7067 (*0*)	18.6877 (*0*)	18.2825 (*0*)
|Residual|(t)	-0.0062** (*0.0281*)	-0.0054** (*0.0411*)	-0.0018 (*0.4781*)
BTM(t+1)	-0.0474*** (*0.0001*)	-0.0476*** (*0.0001*)	-0.0468*** (*0.0002*)
MarketCap(t+1)	0.0055 (*0.7129*)	0.0047 (*0.7499*)	0.0026 (*0.8516*)
Leverage(t+1)	-0.0819** (0.*0186*)	-0.081** (*0.0193*)	-0.0774** (*0.0252*)
Adjusted R squared	0.119498	0.119027	0.106915

As shown in the preceding tables, the absolute value of residuals was found to be negatively and, with the exception of *PRC* and *ROA*, statistically significantly related to subsequent company performance using both *TSR* and *ROA* as performance measures. These results are consistent with the findings of Shin *et al*. (2015), who also found a significant negative relationship between deviations from the expected pay ratio and company performance. The exception above could be due to *PRC*'s definition, which only recognises long-term incentive-based remuneration once share options are actually exercised. As the payoff from exercising the options are dependent on movements in the share price, total shareholder returns will most likely be used as a basis for exercising the options rather than return on assets.

The results from the models using a dummy variable to capture whether a deviation from the expected pay ratio is positive or negative, is presented in Tables 16 and 17 below.

Table 16: Models using TSR(t+1) as response variable, positive dummy variable for residuals			
Pay ratio Definition	**A**	**B**	**C**
Intercept	7.2079 (0.5251)	7.5047 (0.5053)	4.9031 (0.6653)
ResidualPos(t)	0.1383 (0.16)	0.1399 (0.1611)	0.1408 (0.1561)
TSR(t)	2.7178 (0.4817)	2.3134 (0.577)	6.7084* (0.0901)
AnnualizedVol(t+1)	0.6254** (0.0493)	0.6231* (0.0504)	0.6437** (0.0371)
Leverage(t+1)	-0.084 (0.3067)	-0.086 (0.2989)	-0.0869 (0.3011)
MarketCap(t+1)	0.1108** (0.0219)	0.1116** (0.0205)	0.1087* (0.06)
BTM(t+1)	-0.2243*** (0.0049)	-0.2223*** (0.0053)	-0.2311** (0.0029)
Adjusted R squared	0.290109	0.28979	0.296372

Table 17: Models using ROA (t+1) as response variable, positive dummy variable for residuals			
Pay ratio Definition	**A**	**B**	**C**
Intercept	17.6608*** (0)	17.9778*** (0)	18.2953*** (0)
ResidualPos(t)	0.4152 (0.6233)	-0.9162 (0.3107)	-0.9037 (0.2616)
BTM(t+1)	-0.0448*** (0.0003)	-0.0417*** (0.0006)	-0.0436*** (0.0004)
MarketCap(t+1)	-0.0003 (0.98)	-0.0686** (0.0452)	-0.072** (0.0366)
Leverage(t+1)	-0.0719** (0.0325)	0.0024 (0.8599)	0.0006 (0.9688)
Adjusted R squared	0.09221	0.091161	0.096853

Based on the tables above, it is clear that there is no case where there is a difference in company performance resulting from having a higher or lower pay ratio than was expected. This is evidenced by the lack of statistically significant coefficients relating to the *ResidualPos* variables, which are dummy variables that are assigned a value of 1 or 0 depending on whether the residual is positive or

negative respectively. This result is robust to different measures of the pay ratio and is not consistent with the findings of Shin *et al*. (2015), who found that either positive or negative residuals were differently correlated with company share performance. The implication of this is that in order for a company to perform optimally, it should have a pay ratio that fits its circumstances. Subsequent company performance does not differ based on whether the pay ratio is either higher or lower than expected – any deviation from the expected pay ratio, whether positive or negative, will have the same effect on company performance.

4.5 Stage 3: Pay Ratio-Performance Relationship

The traditional approach to analysing the relationship between the CEO pay ratio and company performance involves regressing the pay ratios of companies against accounting and market-based performance measures. In this study the purpose of this regression is to identify whether the pay ratios of companies in the South African consumer goods and consumer services subsectors of the JSE are better explained by tournament theory or behavioural theories of pay disparity. This is important, because if the relationship is explained by tournament theory, a higher pay ratio should result in better company performance, as this has the effect of making employees more competitive as they strive for a promotion (Lazear & Rosen, 1981). If the relationship is better explained by behavioural theories of pay disparity, then a higher pay ratio is more likely to result in poorer company performance, as "rank and file" employees feel unhappy about the gap between what their superiors are receiving compared to them, so they put less effort into their work (Adams, 1963).

The approach taken in this stage of the analysis is to use six different models, based on the pay ratio tested (*PRA, PRB and PRC*), as well as the measure of company performance being tested (*TSR* and *ROA*) in order to test the relationship between the pay ratio and company performance.

4.5.1 Hypothesis and Variables

Hypothesis 12:

The pay ratio will be either positively or negatively related to measures of company performance.

The relationship between companies' pay ratios and its resultant performance has been found to be concave in prior research of this nature (*e.g.* Mahy *et al*., 2011; Faleye *et al*., 2012 and Shin *et al*., 2015), and thus a quadratic model was used. Additionally, as discussed in Stage 1 of the analysis, natural logarithmic transformations were applied to the pay ratios to ensure normality. A slight departure from Shin *et al*. (2015) in this study is that industry factors were not controlled for in this part of the analysis, specifically because industry effects were in Stage 1 found to be largely insignificant within this relatively homogeneous sample.

The explanatory variables used are discussed in more detail in Stage 2 of the analysis, with the inflation-adjusted market capitalization, the book-to-market ratio and the debt ratio used as controls for company performance. These variables have been found to be significantly related to share returns and return on assets.

4.5.2 Specification and testing

The same sequence of tests was followed as in Stage 2 of the analysis, which is briefly outlined below. The models are named as follows: the first three letters represent the definition of pay ratio used (*PRA*, *PRB* or *PRC*) and the last three letters represent the response variable (*ROA* or *TSR*).

First, a panel data fixed period effects model was used as a means to estimate a regression equation for each model. To check whether the use of a fixed effects model was justified, a redundant fixed effects likelihood ratio was calculated for each of the models. It was found that all models with total shareholder return as response variables should incorporate fixed period effects on this basis. The Hausman (1978) test was performed after substituting random effects for fixed effects to confirm this, and fixed period effects are the most appropriate on this basis. The models with return on assets as the response variable were also tested for random year effects. However, implementing this resulted in significant positive autocorrelation of residuals as evidenced by a Durbin-Watson (1971) statistic of *circa* 1. Therefore, as a means to ensure the independence of residuals, the SUR technique was employed on all models having return on assets as explanatory variables to control for between-period autocorrelation of residuals (Zellner, 1962).

After having specified the models, their residuals were tested for any violations of the assumptions underlying ordinary least squares regression involving normality, bias, autocorrelation and heteroscedasticity. A summary of the results of the tests conducted, of which a more detailed description can be found in the methodology of Stage 1, is shown in Table 19 on the following page. It can be seen that the only assumptions of OLS regression violated are those of normality of residuals and homoscedasticity of residuals, with the latter only being an issue for models using total shareholder return as a response variable. These violations were also found for the second stage of the analysis, and the reader is referred to page 42 for a discussion on its causes and implications. The assumption of normality, as previously discussed in the first stage of the analysis, is not a major issue in ordinary least squares regression, provided that the other assumptions are met. Therefore, the models to be used to estimate the regression equations are generally statistically sound, with the only minor concern being the heteroscedasticity of residuals in the models using total shareholder return as response variable.

The following regression equation was used in this stage of the analysis.

$$TSR_{t+1} = B_1 PRX^2{}_t + B_2 PRX_t + B_3 BTM_{t+1} + B_4 Leverage_{t+1} + B_5 MarketCap_{t+1} + B_6 AnnVol_{t+1} + B_7 TSR_t + Fixed\ Year\ Effects + c + \varepsilon \quad (8)$$

$$ROA_{t+1} = B_1 PRX^2{}_t + B_2 PRX_t + B_3 BTM_{t+1} + B_4 Leverage_{t+1} + B_5 MarketCap_{t+1} + c + \varepsilon \quad (9)$$

The variables used in the regression equations are the same as those used in the preceding stages. Table 18 below shows the results of the tests of the model.

Table 18: Specification and Testing of Models						
Model Name	**PRA-ROA**	**PRA-TSR**	**PRB-ROA**	**PRB-TSR**	**PRC-ROA**	**PRC-TSR**
Fixed period effects?	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**
Period SUR GLS weights?	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
F-Test for redundant fixed year effects						
F-statistic	1.6270	11.0531	1.4086	10.8962	1.5984	10.7741
P-value	0.1166	-	0.1922	-	0.1247	-
Hausman (1978) Test for random year effects						
Chi-Squared Statistic	11.9495	24.1814	9.5031	28.4240	12.4069	30.1779
P-value	0.0355	0.0011	0.0906	0.0002	0.0296	0.0001
White (1980) test for heteroscedasticity of residuals						
P-value	0.6225	0.0000	0.3988	0.0000	0.3981	0.0000
F-stat	0.4748	31.9462	0.9220	30.8869	0.9239	31.1476
Durbin-Watson (1971) test for autocorrelation of residuals						
D-Statistic	1.8803	1.9807	1.8735	1.9844	1.8799	1.9820
DupperCrit	1.8397	1.8531	1.8397	1.8531	1.8397	1.8531
DlowerCrit	1.7873	1.7740	1.7873	1.7740	1.7873	1.7740
Jarque-Bera (1987) test for normality of residuals						
P-value	-	-	-	-	-	-
Test Statistic	56.5015	239.4490	52.9334	248.1570	50.3150	247.8570
T-Test: Mean is not significantly different from zero						
T-stat	-0.8587	0.0000	-1.0067	0.0000	-0.6456	-0.0000
P-value	0.3912	1.0000	0.3149	1.0000	0.5190	1.0000

4.5.3 Results

In this section the results of the direct regression of company performance variables (against CEO pay ratios is discussed. The findings described in this section are intended to shed some light on whether tournament theory (Lazear & Rosen, 1981) or the behavioural theories (Adams, 1963) best explains the relationship between pay ratios and companies' performance in the South African context. As previously mentioned, the importance of this is that if performance is better explained by tournament theory, then companies would benefit from having higher pay ratios, whereas if behavioural theories better explain the relationship, then companies would benefit from having lower pay ratios. The results of the regressions are presented in Tables 19 and 20 on the following page:

Table 19: Models using TSR(t+1) as response variable			
Pay ratio Definition	**A**	**B**	**C**
Intercept	-0.7851 (*0.9677*)	6.1898 (*0.7444*)	-1.1288 (*0.953*)
Ln(PayRatio^2) (t)	-1.0103 (*0.3572*)	-0.5988 (*0.5672*)	-1.1403 (*0.261*)
Ln(PayRatio) (t)	7.2738 (*0.4194*)	3.6972 (*0.6677*)	7.8801 (*0.3583*)
AnnualizedVol(t+1)	0.58*** (*0*)	0.5663*** (*0*)	0.572*** (*0*)
TSR(t)	0.1151** (*0.0312*)	0.1143** (*0.0318*)	0.1167** (*0.0288*)
MarketCap(t+1)	0* (*0.0731*)	0* (*0.0635*)	0** (*0.0443*)
Leverage(t+1)	-11.9141 (*0.2795*)	-10.7503 (*0.3334*)	-11.3197 (*0.3054*)
BTM(t+1)	-21.1807*** (*0*)	-20.8721*** (*0*)	-21.1736*** (*0*)
Adjusted R squared	0.255268	0.254451	0.257149

Table 20: Models using ROA (t+1) as response variable			
Pay ratio Definition	**A**	**B**	**C**
Intercept	15.2507*** (*0.0001*)	18.2104*** (*0*)	17.9635*** (*0*)
Ln(PayRatio^2) (t)	-0.4703 (*0.0468*)	-0.2347 (*0.2427*)	-0.2181 (*0.2266*)
Ln(PayRatio) (t)	3.9169** (*0.0351*)	2.1891 (*0.1556*)	2.1092 (*0.1713*)
MarketCap(t+1)	0 (*0.7813*)	0 (*0.9992*)	0 (*0.9182*)
Leverage(t+1)	-16.3607*** (*0*)	-16.261*** (*0*)	-16.0189*** (*0*)
BTM(t+1)	-5.6221*** (*0*)	-5.5256*** (*0*)	-5.5369*** (*0*)
Adjusted R squared	0.207271	0.200971	0.19725

The results presented above indicate that there is generally no relationship between company performance, as measured by total shareholder returns or return on assets, and the CEO pay ratio. However, performance measured by return on assets is found to be positively related to *PRA*. The implication of this is that if the pay ratio is measured to exclude long-term incentive-based compensation, then paying CEOs more relative to employees will result in superior company performance. It appears as though tournament theory better explains the link between the pay ratio and company performance in this context. This result is differs from that of Shin *et al*. (2015), which is likely due to the latter researchers using a pay ratio measure similar to *PRB* in this thesis.

Overall, there appears to be little relationship between the pay ratio and company performance, except perhaps when the pay ratio is measured to exclude CEO long-term incentives completely, and return on assets is used as the response variable. To get a better understanding of this pay ratio-performance relationship in the South African context, it would be useful to study a larger sample, especially with the view to getting a sufficient number of observations in which companies disclose their CEOs' remuneration in line with definition B of the pay ratio.

Chapter 5: Limitations, Conclusion and Recommendations

One of the key limitations of this thesis is the limited availability of data in financial statements of companies. Not all companies made sufficient disclosure in order for the pay ratio under each definition to be calculated. Additionally, not all companies disclosed the number of employees that work for them. Thus, the results are inherently biased based on companies' self-selection, which has also been identified by Faleye *et al*. (2012) from having performed similar research in the USA.

On a related note, the results from all of the regressions cannot all be reliably compared to results from studies conducted in other countries. This is due to the different measurement bases used in this study, which is a result of the limited disclosure by companies in their financial statements.

The data used in this thesis was collected only for companies categorized in the consumer goods and consumer services subsectors of the JSE, which are two fairly homogenous subsectors based on the regression results. Thus, the results of this thesis cannot be reliably generalized to other subsectors of the JSE.

The statistical model that was used showed signs of significant heteroscedasticity of residuals when total shareholder return was used as a response variable, which could jeopardize the validity of results in such instances.

Additionally, the method used for stage two of the modelling process, while well-supported by the literature, may provide inaccurate results if variables have been omitted. This is because residuals comprise all missing information from the model, not just the deviation from the expectation, so there may be a risk of omitted variable bias, particularly with the limited information available in South African financial statements.

Notwithstanding these limitations, this study is the first attempt to investigate the CEO pay ratio in a South African context, which is a nation of extreme inequality as measured by its adjusted Gini coefficient (Rossouw, Claassens & Plessis, 2010). It is an empirical investigation into the prevalence of two competing theories that are said to link pay structure within companies to their performance – tournament theory and behavioural theories. Tournament theory predicts that having a higher pay gap will incentivize employees to be more competitive, causing them to work harder with the potential to earn the prize of a promotion and thus resulting in better company performance. In contrast, the behavioural theories predict that having a higher pay disparity within companies causes the lower-paid employees to feel a sense of deprivation and to act out on it, causing a decline in company performance.

As a means to investigate these relationships, this study involved replicating an earlier study that was performed in South Korea on the determinants and performance effects of the CEO pay ratio (Shin *et al*., 2015), and adopting it to the South African context. One of the key challenges in replicating this study was the limited availability of data, specifically in terms of the measurement and accounting of share options that were granted to the CEO. In spite of this, revisions were made and the data set reduced to incorporate only the compensation received by the CEO, rather than that of the average executive as used by Shin *et al*. (2015).

It was found that, using data from the Consumer Goods and Consumer Services subsectors of the JSE for the period 2006 – 2014, the number of members of the board of directors and industry effects were related to company's pay ratios, depending on the definition of pay ratio used. The number of years for which a CEO worked at a company, the company's future investment opportunities (as measured by the market-to-book ratio) and the company's size (as measured by inflation-adjusted turnover) are all determinants of company's CEO pay ratios, irrespective of the definition of pay ratio used.

In terms of the subsequent performance effects of the deviations from the expected pay ratio, it was found that companies that had pay ratios that were different to what was expected based on a number of variables, suffered adverse performance effects. This was the case for the use of a market-based measure of performance (total shareholder return) and accounting-based performance (return on assets), which held for all measures of the pay ratio bar one. There was found to be no difference in company performance based on whether the pay ratio was higher or lower than expected. In other words, CEOs that were, "overpaid," relative to employees did not fare any worse in terms of the performance of the company that they worked for, than CEOs that were, "underpaid," relative to employees.

Finally, the traditional approach to studying the performance effects of the CEO pay ratio was used, meaning that company performance variables were regressed against CEO pay ratios, along with control variables. The relationship between the CEO pay ratios and company performance was modelled to be concave, which is in line with prior literature. It was found that there is generally no relationship between the CEO pay ratio and company performance, except in a limited case. The only instance of a significant relationship occurred when company performance was measured by return on assets, and the CEO pay ratio was measured to exclude long-term incentives completely. The nature of the relationship in this case was found to be positive, indicating that, in this limited case, tournament theory better explains the CEO pay ratio-performance relationship than behavioural theories. This is in contrast to the study by Shin *et al*. (2015), which found the opposite.

Overall, the issue of executive compensation is highly emotive and the general consensus among people around the world is that CEOs should be paid less, and that people generally under-estimate what the actual pay gap is between CEOs and employees of companies (Kiatpongsan & Norton, 2014). However, while CEOs are almost always paid several times more than what the average, "rank and file," employee gets paid, this in itself does not necessarily jeopardize the company's ability to generate wealth for shareholders. Additionally, the way in which CEOs' remuneration is defined can have a significant influence on the relationship between pay and performance, which is particularly true for long-term incentive contracts, the value of which is difficult to determine. At the same time, it is worth noting the limitations of this study and indeed the information made public in financial statements regarding executive compensation.

Perhaps the most significant recommendation to come out of this thesis is that companies should be required to make more comprehensive disclosures of their compensation schemes (on a per-director basis) as well as data relating to their employees.

As noted by PWC (2015) in a survey of financial statements of JSE-listed companies, it was found that disclosures of long-term incentive contracts in South Africa is not up to international standards, which highlights the need for more comprehensive disclosure. Companies should disclose both the gain from share options exercised on a per-director basis, as well as the IFRS 2 expense on a per director basis. This will provide shareholder with the flexibility to choose which remuneration metric is more appropriate for their own analysis of companies and will provide greater transparency to other stakeholders as well. It will also facilitate international comparability between what CEOs are being paid, as in almost all other studies on the CEO pay ratio use the IFRS 2 approach to calculating CEO remuneration.

Additionally, South Africa needs to make more comprehensive disclosure relating to its employees. From financial statements in South Korea, it is possible to extract very useful information about a company's workforce from their financial statements, such as employee tenure, unionization rates and their median wage (Shin *et al*., 2015). This will help all stakeholders become more informed about how companies are treating their employees. It will inform investors about whether or not to invest in the company, potential employees about whether or not to work there and potential consumers about whether or not they want to support the company's labour practices.

Lastly, the following have been identified as potential areas for future research in the line of vertical pay disparity and company performance.

It would be worthwhile to research the managerial power hypothesis in more detail in the South African context, specifically regarding where management use significant severance packages as a means of concealing their remuneration.

Furthermore, the differences in the risk-return profiles of investors and directors of companies who hold employee share options could be investigated further to better understand the relationship between executive remuneration and company performance.

In the preliminary data analysis, it was noted that there is a large standard deviation in the pay ratios for all definitions. This could be further analysed to understand why some CEOs are paid more than others.

Additionally, it would be interesting to perform a study in much the same way as Bell & Reenen (2012), who investigated pay disparity across the corporate hierarchy to find its effect on company performance. This is likely to be challenging and resource-intensive, but will provide valuable insight as to how South African employees respond to different pay levels at an organization.

The sample of this study could be expanded into other industries, with mining being of particular interest due to the controversy surrounding it. The main issue here is the difficulty in collecting data, as outsourcing used in the mining industry is likely to cause inaccuracies in the calculation of average wage.

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Appendix 1: The Challenges Presented by Share-Based Payments

This appendix is split between two components. The first component presents a discussion on how share options are measured, as well as the challenges faced in performing executive compensation research with the inclusion of share options. The second component is a detailed example of how share options and share appreciation rights are accounted for and disclosed in company's financial statements. These two components are presented below:

Measurement of share options and challenges faced

Share options and share appreciation rights that are granted under share-based payment transactions can be measured using one of two models – the Black-Scholes model, or the Binomial model, with the former being far more common than the latter. The details behind these models are beyond the scope of this thesis - an in-depth analysis of these two option pricing models is available from Blake (1989).

The biggest challenge in dealing with share-based payments is that most companies do not report the IFRS 2 expense of share-based payments on a per-director basis in their remuneration disclosure. Instead, it is far more common for companies to disclose the remuneration earned by directors from share options as the difference between the market price of the shares and the current exercise price. This is commonly referred to as, "Gains from exercise of share options," in the financial statements of companies, which is very different from the amounts recognized as an expense in the company's financial statements. A report by PWC (2015) found that disclosure of executive remuneration by companies listed on the JSE, particularly with regard to long-term incentives, was not up to international standards. Most of the international studies on executive compensation (*e.g.* Shin *et al*., 2015; Faleye *et al*., 2012, and Bell & Reenen, 2012) used the IFRS 2 method of calculating remuneration from share-based payments, which gives a very different amount to the, "Gain from exercise," approach. The implication of this is that executive remuneration will likely be overstated in this study compared to international studies.

It is worth noting that even though the disclosure of executive remuneration is fairly limited in that it does not disaggregate the IFRS 2 expense on a per-director basis, companies are still IFRS 2 compliant. This is because, in aggregate, the effects of the share options on financial statements are correctly reported. Additionally, as mentioned in Practice Note 180.5 to the Guide to the Application of King 3 (Institute of Directors, 2012), the value realized from options exercised or share based payment awards settled should be disclosed on a per-director basis for the period under review. While this is useful information for shareholders, it would be even more useful to also include the IFRS 2 expense incurred per director as an alternative perspective on what directors are earning.

LTIPs are also very complicated, which is best illustrated in the Clicks Group's financial statements, an extract of which is presented below:

"Appreciation units are allocated to participants in the scheme based on a multiple of the annual guaranteed pay. The base value for each appreciation unit is calculated at the date of allocation by multiplying the group's reported diluted headline earnings per share (HEPS) by an internal price earnings ratio of 12. An exercise value is determined at the end of the three-year period by multiplying the published diluted HEPS for the year by the factor of 12. The difference between the exercise value and the base value is the amount paid out in cash. Participants are required to apply 25% of the after-tax cash settlement value to purchase Clicks Group shares in the open market and to retain these shares for a minimum of one year. Units are forfeited if an executive resigns within the three-year period." (Clicks Group, 2014)

Interestingly, based on a global survey of senior executives by PWC (2012), it has been found that 66% of executives would prefer a performance measure resulting in a smaller reward but offering a greater degree of certainty. Additionally, the increase in pay might not result in an increase in performance, as executives discount long-term incentives and deferred bonus plans by as much as 50% compared to their economic value (PWC, 2012). The effect of this is that complex schemes cost more for companies than simple schemes. However, in spite of these shortcomings, there has been a move towards incentive-based pay in South Africa (PWC, 2013).

An interesting example of SAR measurement occurred with Comair, who's CEOs earned negative long-term remuneration relating to their share appreciation rights due to a decline in the share price between 2008 and 2009.

Accounting for share-based payments – an example

Examples of the accounting treatment of two different types of share-based payment instruments (cash-settled and equity settled) will be illustrated below, as well as how their disclosure will appear in the company's financial statements in terms of disclosure.

Assume that on 1 January 2010 the CEO of Company A is granted 100 share options, with a strike price of R50 and a Black-Scholes value at that date of R15. In addition to this, she is granted 100 share appreciation rights that have a strike price of R50 and a Black-Scholes value of R15. Shares in Company A are currently trading at R55 in the market, with an annualized standard deviation of returns of 19%. Both the share options and the share appreciation rights have a vesting period of 2 years, which is based on the requirement that the CEO needs to remain in the employ of Company A for that entire two year period in order to become entitled to exercise the options. From the date of vesting, the

options have a three year life, which means that they can be exercised up to three years from the vesting date.

The CEO exercises all 100 of her share options and 5 of her share appreciation rights at 31/12/2012.

Assuming all else remains constant, the following is how the share options and share appreciation rights will be accounted for and disclosed in the financial statements of Company A for each year.

Table 21: Share option example		
Date	**Share price**	**Value of share option and share appreciation right**
01/01/2010	R 55.00	R 15.00
31/12/2010	R 60.00	R 19.36
31/12/2011	R 75.00	R 33.51
31/12/2012	R 70.00	R 12.24

The increase in the value of the share options from the beginning 2010 to the end of 2011 is due to the increase in the share price during that time. The drop in the value of the option from the end of 2011 to the end of 2012 is due to two factors – the drop in the share price, as well as the fact that there are only two years remaining in which to exercise the share option. The same reasoning can be applied to the value of the share appreciation rights.

The share options will be accounted for as follows:

1. Measure the fair value of the options at the grant date:

   R15 per option as at 01/01/2010, and with 100 options granted, the total grant amounts to R1 500.

2. Measure the carrying value of the options as the grant date fair value of the options multiplied by the proportion of the vesting period that has elapsed.

   The carrying value as at 31/12/2010 is calculated as R1 500 * ½ = R750, since half of the vesting period has elapsed.

   The carrying value as at 31/12/2011 is calculated as R1 500 * 1 = R1 500, as the entire vesting period has elapsed.

3. Recognize an expense for the year based on the change in carrying values between years.

   The carrying value has changed from R0 to R750 from 01/01/2010 to 31/12/2010, resulting in an expense of R750.

There is no effect on the company's financial statements when the 50 options are exercised, as the full grant date fair value of all of the options has already been expensed, aside from a potential reclassification adjustment to equity.

However, the CEO has essentially made a gain on the exercise of the share options as at 31/12/2012, as she would have paid R50 for shares that were currently trading in the market for R70. Thus, she would have a gain on exercise of share options of R2 000 in total (100*(70-50)).

The share appreciation rights will be accounted for as follows:

1. Measure the fair value of the share appreciation rights at the grant date.

   R15 per share appreciation right as at 01/01/2010, and with 100 share appreciation rights having been granted, the total value of the grant amounts to R1 500.

2. Measure the carrying value of the share appreciation rights at each reporting date (i.e. each financial year-end), which is the number of share appreciation rights held multiplied by their individual fair values at each year end, multiplied by the proportion of the vesting period elapsed.

   For the year ended 31/12/2010, there are 100 share appreciation rights held at a fair value of R19.36 per right, meaning that the total fair value of all share appreciation rights is R1 936. Since half of the vesting period has elapsed, the carrying value of these share appreciation rights is calculated as R1 936* ½ = R968.00.

   For the year ended 31/12/2011, each of the 100 share appreciation rights held have a fair value of R33.51, resulting in a total value of all of the share appreciation rights held as R3 351. Since the entire vesting period has elapsed, the carrying amount of the share appreciation rights as at this date is R3 351 * 1 = R3 351.00.

   For the year ended 31/12/2012, each share appreciation right has a fair value of R12.24 and with 100 still outstanding just prior to exercise, a carrying value of R12.24 * 100 = R1 224.00 will prevail.

3. Recognize an expense for the year based on the change in carrying values between years.

   For the year ended 31/12/2010, the carrying value of share appreciation rights changed from R0 to R968.00, resulting in an expense of R968.00 for that financial year-end.

   For the year ended 31/12/2011, the carrying value of share appreciation rights changed from R968.00 to R3 351.00, resulting in an expense of R2 383.00.

   For the year ended 31/12/2012, the carrying value of share appreciation rights changed from R3 351.00 to R1 224.00, resulting in an income of R2 227.00. There is no effect, in the 2012

financial year, from the exercise of the share appreciation rights, other than the carrying value decreasing from the beginning of the 2013 financial year.

As can be seen in the above example, the key difference between equity-settled share-based payment schemes like share options and cash-settled share-based payment schemes like share appreciation rights is that the cash-settled financial instruments are continuously re-measured to their fair value. In contrast, equity-settled share-based payment schemes are only measured to fair value at the grant date and not subsequently.

A summary of the above example is presented below, which shows what the company would have recorded as an expense in their financial statements (IFRS 2 expense), as well as what could be disclosed as remuneration relating to long-term incentives on a per-director basis in the notes to the financial statements.

Table 22: Share option example continued

	2010	**2011**	**2012**
IFRS 2 Expense: Share options	R 750.00	R 750.00	R -
IFRS 2 Expense: Share appreciation rights	R 968.00	R 2 383.00	R -2 227.00
Total IFRS 2 Expense (Disclosed as remuneration)	R 1 718.00	R 3 133.00	R -2 227.00
Gain from exercise of options (Disclosed as remuneration)	R 0.00	R 0.00	R 2 000.00

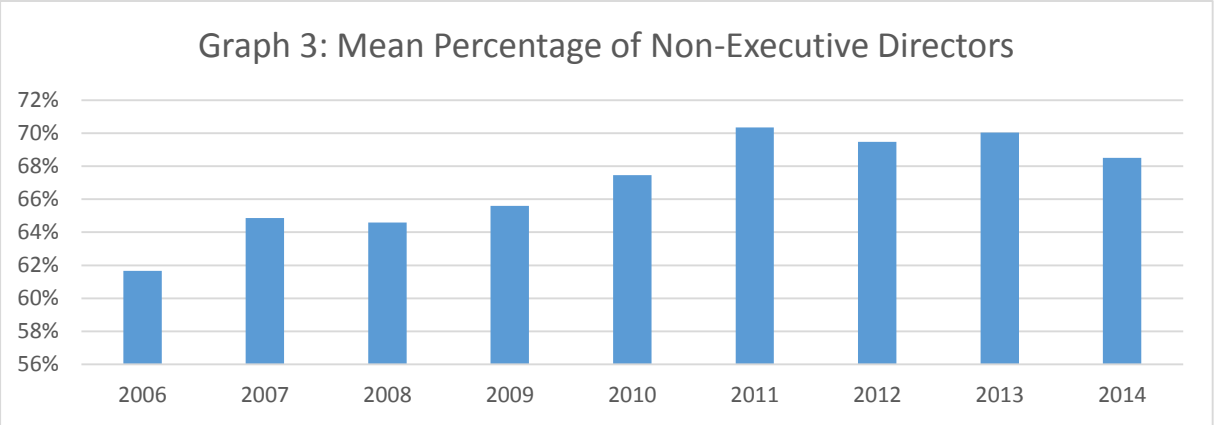
As can be seen in the above diagram, a company can show very different amounts based on their choice regarding disclosure (total IFRS 2 expense or gain from exercise of options), as well as the instrument selected as a means to provide executives with a long-term incentive (equity-settled share options or cash-settled share appreciation rights). Also, the share appreciation rights exercised are completely omitted from the gain from exercise of options measure. The majority of companies selected in the sample chose to disclose the gain from exercise of share options as their long-term incentive remuneration.

Appendix 2: Descriptive statistics

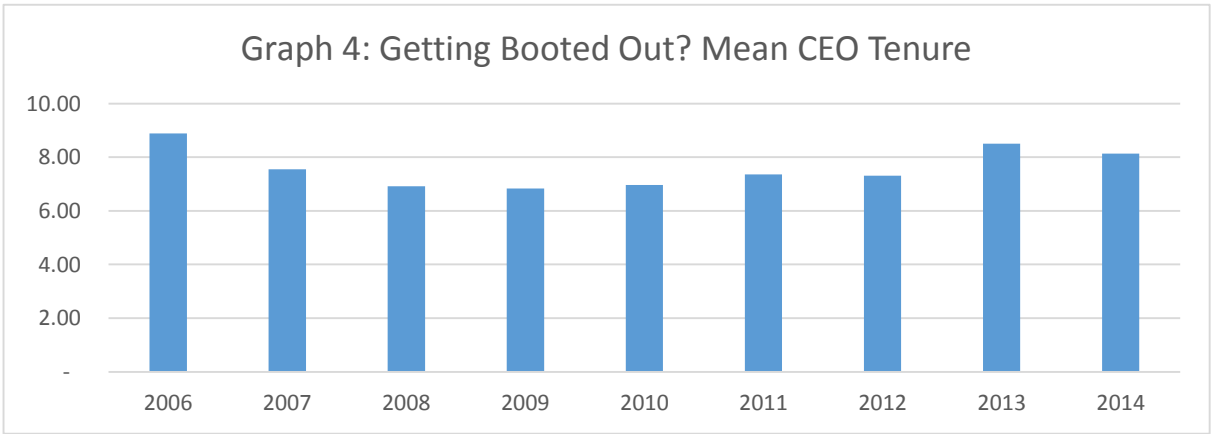
This appendix is split into two components. The first component is a discussion of some observations made regarding the data used in this thesis. The second component presents histograms and summary statistics of the data used as the explanatory variables in this thesis.

Some Observations

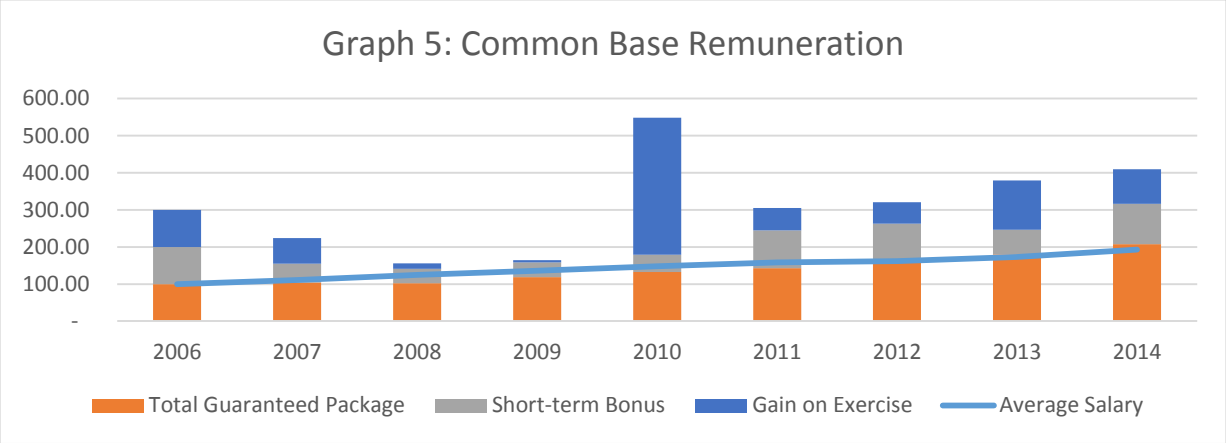
There has been a general increase in the mean percentage of non-executive directors on boards of directors since the year 2009, as illustrated in Graph 3 below. It seems that there are two potential reasons for this. Firstly, the King Code III was implemented in 2009, which had explicit requirements about the composition of the board of directors, requiring a certain percentage to be independent. This likely resulted in companies appointing more independent directors to their boards. Secondly, it may be a move from companies to strengthen deficiencies in their boards following the financial crisis, thus lowering their risk exposure.



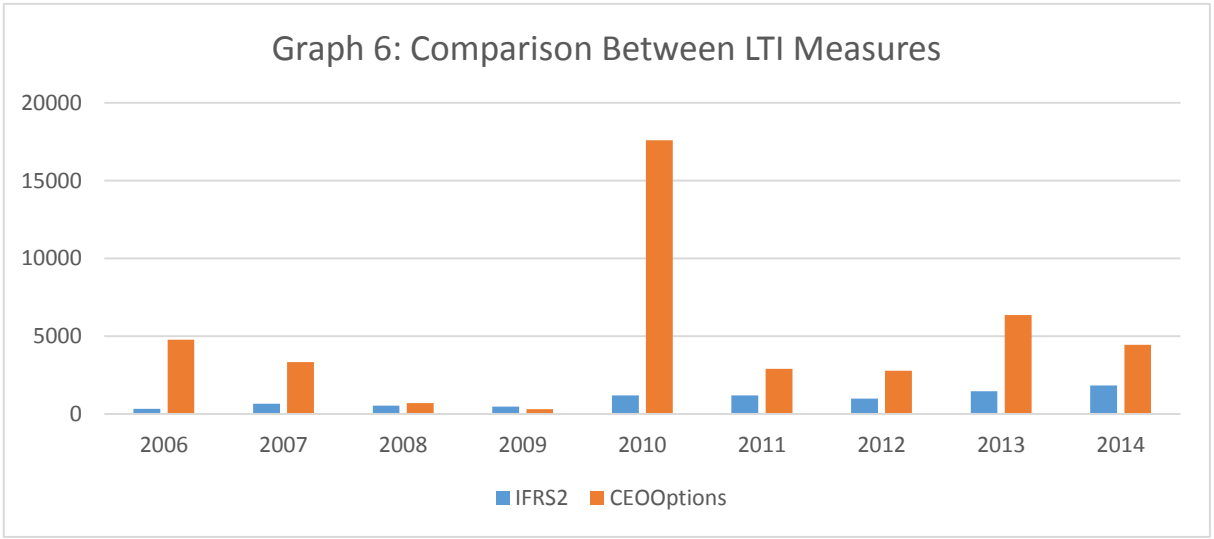
The mean CEO tenure dropped markedly during the crisis period, from 2007 to 2009, as displayed in Graph 4 below. This was likely due to CEOs being removed from office as companies changed their strategic direction to a more risk-averse trajectory. Following the crisis, the mean CEO tenure hovered at around 8 years, meaning that following the crisis, the CEOs appeared to hold on to their positions.



Graph 5 below shows CEO remuneration and average employee salary at their indexed values, where 2006 amounts represented 100. As illustrated above, CEOs' total guaranteed packages have increased very much in line with average employee wages. The factors that push the increase in CEO compensation beyond the increases in employee salaries are the short-term bonuses and long-term incentive packages.

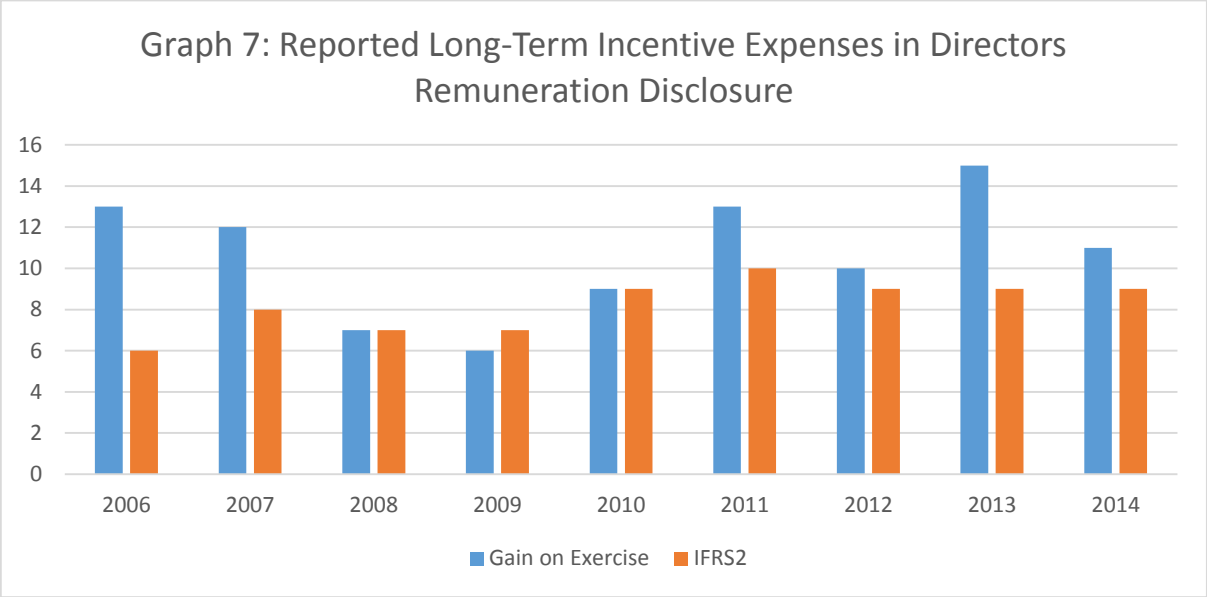


Graph 6 shows the difference between the two ways in which companies disclose their long-term compensation packages. Clearly, the, "options exercised," approach shows remuneration to be far higher than the IFRS 2 approach in general. It highlights the need for consistency between companies' reporting of long-term incentive payments to their executives.



Graph 7 on the following page shows the number of companies on the JSE in the Consumer Goods and Consumer Services subsectors have disclosed their long-term compensation measures on a per-director basis over time. There does not appear to be a clear trend over time, other than that, in general, more companies disclose the gain on options exercised approach than the IFRS 2 approach. This seems counter-intuitive, under the management power hypothesis, as the preceding graph

showed how much more remuneration is earned on average based on the gain on exercise method than the IFRS 2 method. It may be such that if long-term incentive remuneration was disclosed on the IFRS 2 basis rather than the gain from exercise basis, that it could have been even higher.



Summary Statistics and Histograms of Explanatory Variables

Summary statistics and histograms are presented on the pages that follow. For definitions of the variables used, please refer to Table 4 in the body of the thesis.

Summary Statistics

Summary statistics are presented in Table 22 below both for the raw data, as well as the natural log transformation of the raw data.

Table 23: Summary statistics of explanatory variables used

	BOARDIND	LNBOARDIND	BOARDMEETINGS	LNBOARDMEETINGS	BOARDMEMS	LNBOARDMEMS	CEOAGE	LNCEOAGE	CEOTENURE	LNCEOTENURE	LEVERAGE	LNLEVERAGE
Mean	0.67	-0.42	4.62	1.50	10.85	2.35	51.70	3.94	7.57	1.63	54.81	3.93
Median	0.69	-0.37	4.00	1.39	10.50	2.35	52.00	3.95	6.00	1.79	51.60	3.94
Maximum	0.89	-0.12	8.00	2.08	18.00	2.89	70.00	4.25	34.00	3.53	109.50	4.70
Minimum	0.25	-1.39	2.00	0.69	4.00	1.39	36.00	3.58	-	-2.48	15.72	2.75
Std. Dev.	0.12	0.20	1.06	0.24	2.91	0.29	7.33	0.14	6.61	1.02	20.54	0.40
Skewness	-0.58	-1.30	0.50	-0.54	0.19	-0.64	0.06	-0.28	1.60	-0.83	0.44	-0.42
Kurtosis	3.10	5.79	3.59	4.95	2.75	3.61	2.65	2.67	5.91	3.91	2.52	2.88
Jarque-Bera	18.15	195.99	18.00	67.33	2.76	27.10	1.84	5.80	251.63	47.77	13.79	9.49
Probability	0.00	-	0.00	-	0.25	0.00	0.40	0.06	-	-	0.00	0.01
	MTB	**LNMTB**	**TURNOVER**	**LNTURNOVER**	**INDPRA**	**LNINDPRA**	**INDPRB**	**LNINDPRB**	**INDPRC**	**LNINDPRC**		
Mean	5.40	1.41	12 768 184.00	15.46	73.55	4.22	85.70	4.34	122.04	4.60		
Median	3.85	1.36	6 524 920.00	15.69	72.66	4.29	86.24	4.46	93.63	4.54		
Maximum	78.15	4.36	115 000 000.00	18.56	143.42	4.97	150.12	5.01	462.95	6.14		
Minimum	-158.79	-1.83	201 469.00	12.21	30.94	3.43	31.40	3.45	34.02	3.53		
Std. Dev.	16.66	0.96	18 652 421.00	1.48	28.64	0.41	37.63	0.49	100.99	0.60		
Skewness	-5.13	0.23	2.77	-0.29	0.40	-0.31	0.14	-0.38	2.59	0.79		
Kurtosis	62.36	3.60	11.84	2.48	2.61	2.10	1.78	1.83	9.09	4.04		
Jarque-Bera	48 995.25	7.65	1 467.90	8.01	10.80	16.05	21.17	26.44	861.81	48.36		
Probability	-	0.02	-	0.02	0.00	0.00	0.00	0.00	-	-		

Histograms

The histograms in presented in Figure 1 and Figure 2 below are shown for both the raw data used as explanatory variables, as well as the natural log transformation of the data.

Figure 2: Histograms of explanatory variable data

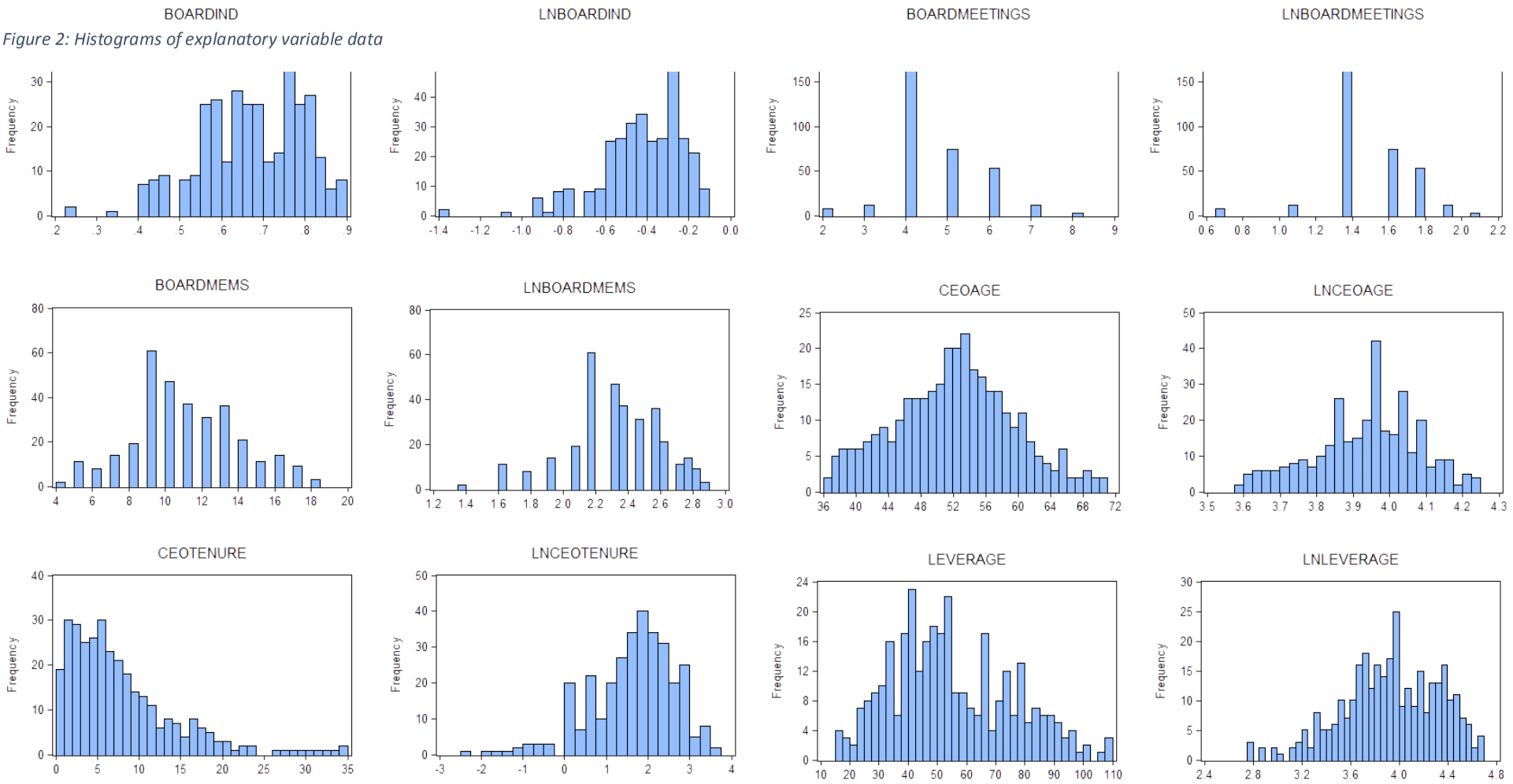
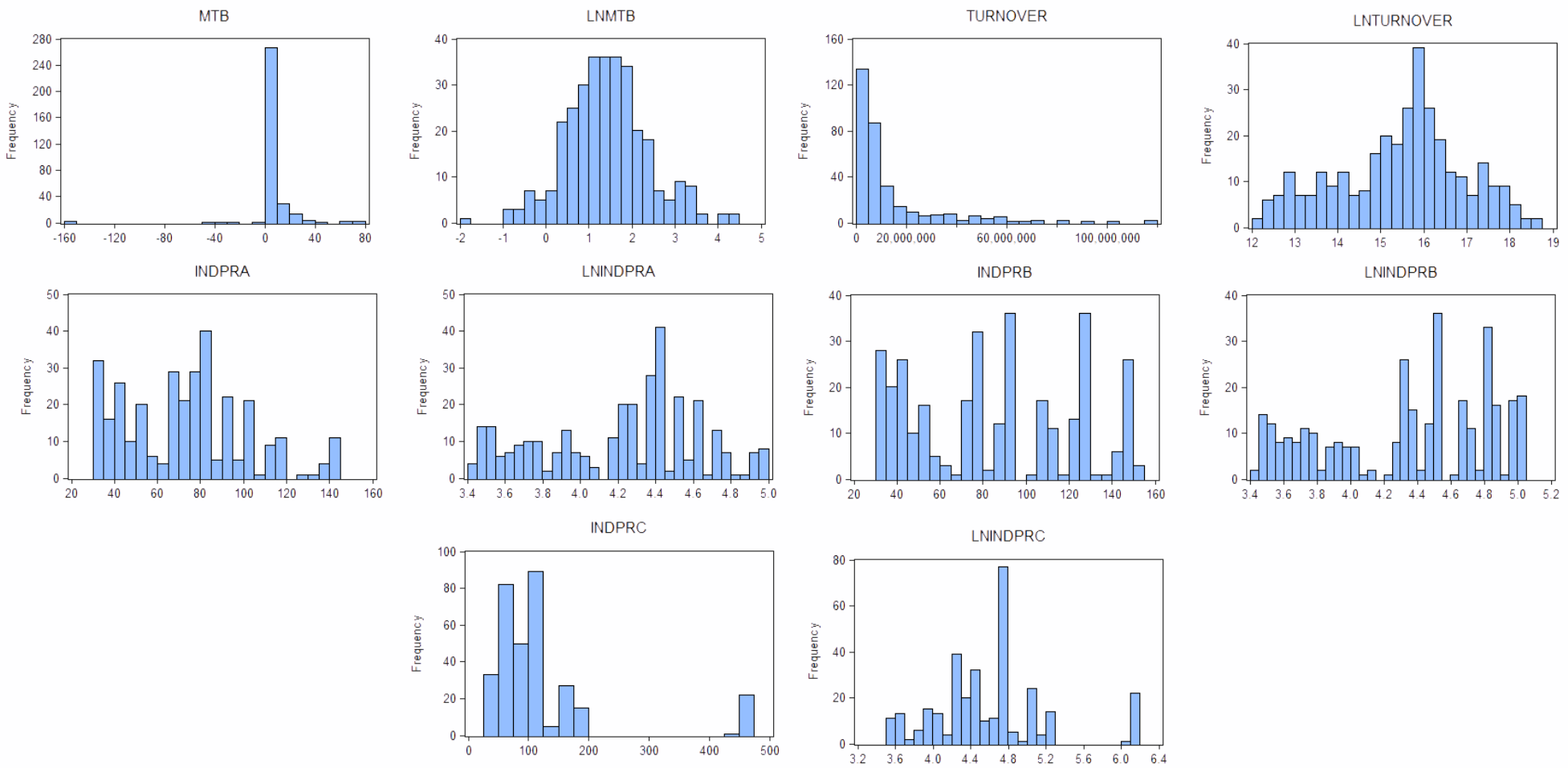


Figure 3: Further histograms of explanatory variable data



Appendix 3: Stationarity of Data

The stationarity of the explanatory and response variables was tested using the Phillips-Perron Fisher unit root test (Phillips & Perron, 1988). It was found that all variables used in the statistical testing exhibited stationarity at the 5% confidence level except for the industry-adjusted pay ratio under definition B. This is likely due to the nature of the way in which share-based payments are accounted for in terms of this definition. The results of the test are presented in the table below.

Table 24: Results of Phillips-Perron Unit Root Test

Variable	**Test statistic**	**P-value**
BoardInd	195.8700***	0.0000
Boardmeetings	128.3110***	0.0000
Boardmems	191.1360***	0.0000
CEOAge	96.1459***	0.0091
CEOTenure	114.0090***	0.0007
InfAdjTurn	450.6100***	0.0000
Leverage	140.9220***	0.0001
LnIndPRA	106.8830**	0.0339
LnIndPRB	95.0563	0.1535
LnIndPRC	206.0860***	0.0000
LnPRA	129.7210***	0.0006
LnPRB	138.0770***	0.0001
LnPRC	156.8670***	0
MTB	140.0210***	0.0001