POLITICAL COST HYPOTHESIS AND EARNINGS MANAGEMENT: EVIDENCE FROM THE SOUTH AFRICAN CONSTRUCTION INDUSTRY

by

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LIMITED-SCOPE DISSERTATION

Submitted in the partial fulfilment of the requirements for the degree

MAGISTER COMMERCII

in

INTERNATIONAL ACCOUNTING

in the

FACULTY OF ECONOMIC AND FINANCIAL SCIENCES

at the

UNIVERSITY OF JOHANNESBURG

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Abstract

This study investigated the political cost hypothesis in the South African construction industry during periods of political scrutiny (event period). Specifically, it investigated whether JSE listed construction firms used earnings-decreasing accruals to manage earnings in order to reduce political visibility and associated costs during the Competition Commission's investigations.

It tested the political cost hypothesis for the full industry, for the large and mid-cap firms and for the firms fined by the Competition Commission. The discretionary component of total accruals was used as proxy for earnings management – calculated by using the Modified Jones Model.

It was found that, in the event period, no earnings-decreasing discretionary accruals could be detected for the full industry and the large-mid cap firms. However, there were earnings-decreasing accruals for firms fined by the Competition Commission although the results were not statistically significant.

Keywords

Political Cost Hypothesis; Earnings Management; Construction Industry

Declaration of original work

I, Vuyo Happy Booi, declare that this dissertation is my own unaided work. Any assistance that I have received has been duly acknowledged in the dissertation. It is submitted in the fulfilment of the requirements for the degree Master of Commerce at the University of Johannesburg. It has not been submitted before for any degree or examination at this or any other university.

ACKNOWLEDGEMENTS

Thank you to Professor Nerine Stegmann, my supervisor, for her guidance and encouragement; and to my colleague, Phomolo Maraisane, for his support.

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1 Study Overview

This chapter introduces the research topic of the political cost hypothesis and earnings management in the context of the economic environment of the South African construction industry. It explains the main aspects of the research problem, research objectives, research methodology and the scope of this study.

1.1 Background

The 2010 FIFA World Cup was more than the world's biggest sports gathering. It was also a means to improve the lives of South Africans and citizens of other African countries (Alexander, 2010). This was the vision of the South African government for bidding to host the 2010 FIFA World Cup. The government said that all developments, transport infrastructure in particular, were not only aimed at 2010, but well beyond the World Cup in an effort to create sustainable infrastructure growth (Alexander, 2010). The government estimated that the 2010 FIFA World Cup has added one percentage point to South Africa's economic growth for 2010/11, when spending on stadia and infrastructure is taken into account (BUA NEWS, 2010). South Africa's government injected R33 billion into preparations for the World Cup (BUA NEWS, 2010). The Finance Minister said the investment formed part of a long-term development plan for the country, rather than the funding of a once-off event (BUA NEWS, 2010).

The biggest beneficiary of the programme was the construction industry. According to a PricewaterhouseCoopers (PwC) report that highlights trends in the construction sector, the industry experienced significant revenue growth between 2007 and 2013 on the back of global economic growth and the infrastructure development leading up to the 2010 FIFA World Cup in South Africa (PwC, 2013). Most importantly, revenue grew from just below R60 billion in 2007 to more than R140 billion in 2013 with profits rising from R3 billion to over R7 billion for the same period (PwC, 2013).

However, this tremendous growth in the sector was accompanied by concerns of escalating costs and irregularities from the South African government and regulatory bodies. South Africa's 2010 FIFA World Cup cost escalation was significant. The initial cost estimate was calculated at R2.3 billion and was to be paid by the South African government, largely to fund the construction of stadia and related infrastructure. However, the 2010 estimated total cost (and this is likely to be much higher) for the South African government was R39.3 billion - an enormous 1 709% increase from the original estimate (Cottle, Capela & Meirinho, 2013).

According to an opinion survey that was done in 2007 relating to the ethical behaviour of the key stakeholders in the construction industry, South African contractors are notoriously known to have a reputation for unethical conduct (Bowen, Akintoye, Pearl & Edwards, 2007). A range of identified problems giving rise to this bad reputation includes collusion, bribery, negligence, fraud, dishonesty and unfair practices. Another study from University of Cape Town (UCT) found the prevalence of corruption in the industry flourishing virtually in all the phases engaged in by participants at every level (Shakantu, 2006). The most significant sign of problems in the construction sector was exposed by a case involving Murray and Roberts who were implicated in a cartel that had been operating in the industry for years (Mark, 2014). Having uncovered the collusion in the construction industry involving some of the top construction firms, the sector came under the radar of the Competition Commission of South Africa[1] (CCSA) (Mark, 2014).

Based on, inter alia, the cost concerns from the government and the corruption allegations, the CCSA undertook an investigation of the industry. The CCSA identified 300 collusion cases between the period 2006 to late 2009 for projects worth R47bn in total, eventually leading to 15 construction and engineering firms being fined for an amount totalling R1,46 billion. The infringements covered a period of 10 years and included World Cup stadia and roadwork programmes (Mark, 2014).

[1] The Competition Commission is a statutory body constituted in terms of the Competition Act, No 89 of 1998 by the Government of South Africa empowered to investigate, control and evaluate restrictive business practices, abuse of dominant positions and mergers in order to achieve equity and efficiency in the South African economy

The high-returns, unethical behaviour, corruption allegations, cartel cases and collusion investigations meant that firms in the construction sector were now subject to high levels of political scrutiny from regulatory bodies (specifically the CCSA). It also meant that concerns had to be raised about financial statement representation to stakeholders in the industry. Consequently, the presence of political scrutiny and potential political costs in the industry provides a great opportunity to study the political cost hypothesis. The political cost hypothesis predicts that firms (especially large firms) facing the possibility of wealth transfer (political costs) in the form of taxes, fines or penalties from state authorities are more likely to use accounting choices that reduce reported profits (Watts & Zimmermann, 1990). The question to be asked is whether South African construction firms made accounting choices to manage earnings in order to mitigate for political costs from the CCSA?

1.2 Research Problem

Past studies have looked at the impact of political (government) scrutiny on the representation of financial statements. Such studies tested the political cost hypothesis for the following scenarios:

- Firms facing price regulation (Jones, 1991);
- Firms seeking import relief (Hall, 1993);
- Firms seeking to avoid additional taxes due to high regulated oil prices (Han & Wang), 1998;
- Firms investigated for monopoly related activities (Gill-de-Albornoz & Illueca, 2005); and
- Firms requesting anti-dumping investigations to obtain a favourable ruling (Yip, Van Staden & Cahan, 2011).

A research paper closely related to this study is the one by Han and Wang (1998). The study investigated whether firms in the oil and gas industries, during the 1990 Persian Gulf crisis, experiencing rapid price increases used accrual accounting to reduce earnings (Han & Wang, 1998). They analysed accruals of firms during the period of the price increases and found that oil firms that expected to make significant profit due to the price increases used accruals to reduce their reported earnings in order to reduce political sensitivity (Han & Wang, 1998).

Another more recent similar study tested whether political sensitivity and ethics played a role in earnings management by comparing the levels of Corporate Social Responsibility (CSR) disclosure and earnings management between firms in different political environments (Yip, et al., 2011). The results showed that firms in the oil industry had a negative relationship between CSR disclosure and earnings management compared to food industry firms who had the opposite (Yip et al., 2011) indicating that the oil industry is more politically sensitive than the food industry. The researcher is aware of a 2014 South African study that explored the relationship between CSR and earnings management for firms listed on the JSE. Therefore, this scenario will not be explored (Jordaan, 2014).

From the above analysis and findings, there is scope to explore the political cost hypothesis from a uniquely South African point of view due to the various factors that arose in the construction sector and to analyse the accounting implication that might have occurred. Hence, the research question is as follows:

- Is there empirical evidence that JSE listed firms in the construction industry used earnings-decreasing accruals to manage earnings in order to minimise political costs that would arise as a result of investigations for collusion by the CCSA?

1.3 Research Objectives

The primary objective of this study is to investigate the political cost hypothesis to detect earnings management in the construction industry. More precisely, the study seeks to establish whether there is empirical evidence that JSE-listed firms in the construction industry used earnings decreasing accrual-based earnings management to decrease earnings with the goal/objective of reducing political visibility and associated costs. The main objective was divided into the following sub-objectives:

- To investigate whether earnings-decreasing accrual-based earnings management was present in the industry during the event period (political scrutiny period);
- To investigate whether earnings-decreasing accrual-based earnings management was more prevalent for the large and mid-cap construction firms during the event period; and
- To investigate whether earnings-decreasing accrual-based earnings management was more prevalent in the firms (firms fined by the CCSA) directly affected by the political process during the event period

1.4 Research Methodology

The aim of the research methodology section is to provide a framework to investigate the relationship between political costs and the use of accounting accruals to manage earnings. A positive research framework is adopted for this study.

Coetsee (2011) postulates that the hypothesis can be based on an existing developed hypothesis or could be developed through a deductive reasoning process. This study is based on the former i.e. the hypothesis is based on the already established political cost hypothesis. As mentioned, the hypothesis predicts that firms (especially large firms) facing the possibility of heavy fines from regulators (as is the case with the construction firms investigated by the CCSA) are more likely to make accounting choices that reduce reported earnings (Watts & Zimmerman, 1990). The Modified Jones Model is used to detect if earnings-decreasing accruals were used to manage earnings.

Research design

There are three research designs commonly used in the earnings management literature. They include those based on aggregate accruals, those based on specific accruals and those based on the distribution of earnings after management, that is, unmanaged earnings will follow a normal distribution while managed earnings do not (McNichols, 2001). The aggregate accruals method is mainly based on models that estimate the discretionary component of accruals contained in the reported earnings and uses the presence of discretionary accruals to assess whether earnings management has occurred. This study is based on the research design that uses aggregate accruals.

The model of aggregate accruals proposed by Jones (1991), hereafter referred to as the Modified Jones Model, provides the most powerful test for earnings management (Dechow, Sloan & Sweeney, 1995). This model is adopted for this study in order to test the political cost hypothesis.

Modified Jones Model

When assessing the usefulness of models used for discretionary accruals, Ronen and Yaari (2008) compare the specification and the power of commonly used test statistics. The specification test which examines the frequency of type I errors (error of detecting an effect that does not exist) that arose when no earnings management were hypothesised by the study is not accepted when in fact it should have been.

Furthermore, the power test is examined by evaluating the frequency of type II errors (error of failing to detect an effect that does exist) which arise when no earnings management hypothesis is accepted when in fact it should not be. Their (Ronen & Yaari, 2008) results found that the Modified Jones Model generated the fewest type II errors compared to the other models.

The following equation is the formula applied by the Modified Jones Model:

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right) \quad [1]$$

This model is an improvement of the original Jones Model (other studies refer to this model as the Jones Standard Model) which assumes that revenue is non-discretionary and therefore estimate discretionary accruals with an error when earnings are managed through revenue (Dechow et al., 1995).

Period

The first phase of the CCSA investigation's scope was for all construction projects after 2006 and settlements (fines) that were finalised in 2013. During this period, it is feasible to predict that construction firms would not have managed as the investigations were in retrospect therefore firms were not under political scrutiny when financial reporting occurred. However, in the subsequent periods (2014 onwards), firms were now aware of the high political scrutiny and would have had the biggest incentive to manage earnings.

This study focuses on the period 2007-2015. The period 2007-2013 will be the estimation period where no earnings management presumably occurred and 2014-2015 as the event period where earnings are predicted to have been managed.

Data and Sample

The study is based solely on data from a sample of all construction firms listed on the JSE. This sample includes the listed firms fined by the CCSA. Data for the listed firms are obtained from the McGregor database for annual reports and financial statements.

1.5 Motivation for the study

Given that economic conditions that result in political scrutiny are usually due to factors that are extraordinary, rare or unique, studies of this nature should be undertaken whenever the opportunity arises. Secondly, the political environment in South African is more sensitive given the inequality that exists (Lehohla & Shabalala, 2014). Thirdly, the majority of the studies on this topic have covered phenomena that occurred in developed countries as opposed to African countries where the political environment is more volatile. Based on the above factors, this paper will make the following contribution:

- Provide empirical evidence of the financial reporting response of construction firms to political scrutiny in an African context; and
- Provide the CCSA with useful insights on the possible financial reporting reactions of entities implicated in their (CCSA) investigations.

1.6 Ethical Considerations

The proposal was sent to the Ethics Committee of the Faculty of Economic and Financial Sciences of the University of Johannesburg (UJ) for approval before the commencement of the study. The data used in the study are available publicly and the names of the companies used in the study are not mentioned (codes are used to represent the company names) to adhere to the principle of anonymity and confidentiality.

1.7 Limitation of the study

The key limitation of this study is that it only examines a single industry for a specific political process incident that occurred in a limited period. Because of this, the results of the study cannot be generalised to other industries or other political processes affecting firms' financial reports.

1.8 Outline of the Chapters

Chapter 1-Background

This chapter provides the background information on the research topic of the political cost hypothesis and earnings management in the context of the economic environment of the South African construction industry. It provides justification about why the political cost hypothesis should be investigated and the framework in which such a study should be conducted. Lastly, it explains the main aspects of the research problem, research objectives, research methodology and the scope of this study.

Chapter 2-Literature Review

This chapter reviews, analyses and evaluates the theories, methods, empirical evidence and findings of previous studies in relation to the political cost hypothesis and earnings management. It provides background information on the South African construction industry, the theoretical background on the political cost hypothesis and earnings management and the empirical evidence on the political cost hypothesis and earnings management.

Chapter 3-Research Methodology

This chapter discusses the research methodology that will allow the best outcome to understand the relationship between political costs and earnings management. It mainly discusses the research philosophy for the study, the development of the hypotheses to be tested, the research design for earnings management and the Modified Jones Model.

Chapter 4-Results

This chapter presents the results of the data collected based on the positive research methodology and uses statistical methods to analyse the data in the context of the research hypotheses. Specifically, it analyses the discretionary accruals (which signify the presence of earnings management) using the Modified Jones Model.

Chapter 5- Discussion, Findings and Conclusion

The aim of this chapter is to discuss and explain the results of the study and relate it to the literature thus proving the significance thereof. It provides a discussion on the actual results based on the hypotheses developed (true or false) and assesses whether or not the objectives of the study have been met and how they support the research problem. Lastly, it provides the key findings, presents the conclusion and makes recommendations for future research.

2 Literature Review

This chapter initially provides information on the background to the South African Construction Industry. Secondly, it provides theoretical background on the political cost hypothesis and earnings management. Lastly, it critically reviews the empirical evidence on the political cost hypothesis and earnings management in developed and developing economies.

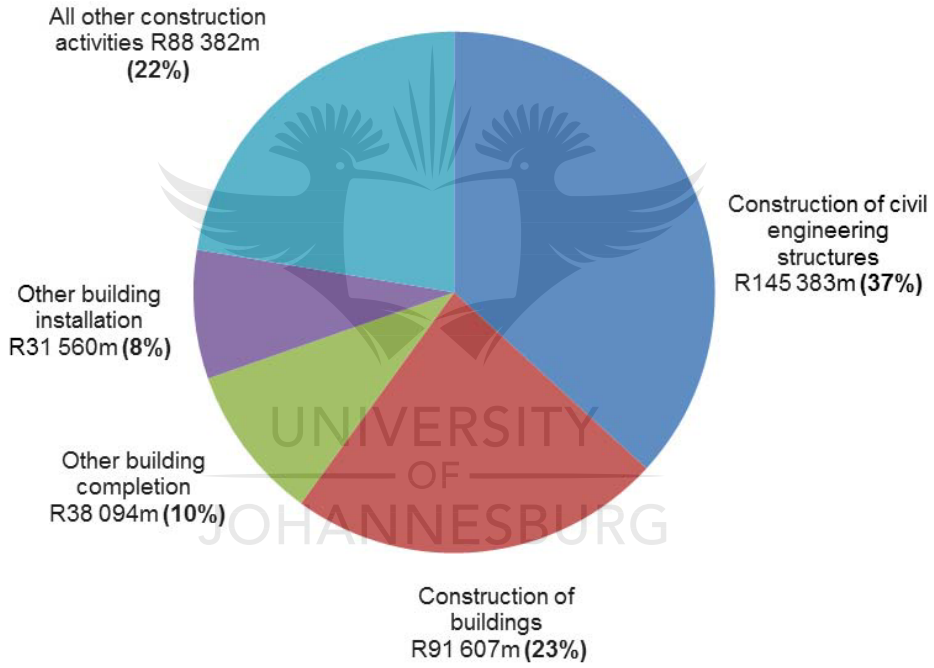
2.1 The South African Construction Industry

2.1.1 Background

The construction industry is a significant contributor to the South African economy in both the private and public sectors. Growth in the industry has been significant since the dawn of democracy and this boom was accelerated by the infrastructure developments leading up to the 2010 FIFA World Cup (Wilson, 2015). According to Statistics South Africa's (Stats SA) most recent economic figures, the construction industry contributed 4.1% to South Africa's total Gross Domestic Product (GDP) in 2014 (Stats SA, 2015). The industry's importance is underlined by its contribution to employment in the country. In 2014, the construction sector formally employed more than half a million persons (Stats SA, 2015). The government also sees investment in infrastructure as a key driver of economic growth and the construction industry is key to furthering this policy (Bowen et al., 2007). The role played by the industry in the public sector is understood by the South African government which, through the National Development Plan, had committed a further R847 billion to public infrastructure for the three years 2015-2017 (PwC, 2014).

The construction industry's performance in the private investment sector has also been significant. Based on a 2014 PwC construction sector report that highlights industry trends, the market capitalisation of the top 16 JSE listed construction firms was over R65 billion (PwC, 2014). The total income of the industry was R395 026 million which represented a 14% increase from the last time the survey had been done in 2011 (Figure 1.) (Stats SA, 2015).

Figure 1. Income in the construction sector 2014



***Source**: Statistics South Africa*

2.1.2 Regulatory Environment

Different acts and regulators affect the construction industry. The construction industry is specifically regulated by the Construction Industry Development Board (CIDB) which is a public entity (CIDB, 2015). The entity was established under the CIBD Act of 2000 (No. 38 of 2000) in order to implement an integrated strategy for the reconstruction, growth and development of the construction industry (CIDB, 2015). At a more general level the Construction Sector Charter on Black Economic Empowerment provides guidelines on the transformation of the sector while the Preferential Procurement Policy Framework Act allows government to use procurement in the sector to advance the interest of previously disadvantaged groups (PwC, 2014) (Bowen et al., 2007). These regulations, inter alia, provide the regulatory framework within which the construction industry operates.

2.1.3 Ethics, Corruption and Collusion

Unfortunately, the construction industry, like so many other aspects of modern society, is plagued by a lack of ethics, corruption and illegal activities. According to a study that analyses corruption in the sector, the construction industry has been identified as one of the most corrupt industries in the world (Bowen, Edwards & Cattell, 2012). Recent research papers on the sector discovered that collusion in the South African industry was endemic (Wilson, 2015). These findings are hardly surprising because as early as 2006, Shakantu claimed that corruption in the sector was present at all levels of construction projects (Shakantu, 2006). Subsequent to Shakantu's study, an opinion survey revealed that ethical standards in the industry were a cause for concern with ethical issues ranging from collusion and fraud to unfair practices (Bowen et al., 2007).

Given the above allegations and findings, perhaps it came as no surprise when in 2007 the CCSA initiated cartel investigations against some companies in the construction industry. These investigations included companies involved in the construction of the 2010 FIFA World Cup Stadia (CCSA, 2015). Following these initial investigations, in 2009, the CCSA increased its scope to the entire construction industry as it reached the conclusion that cartel conduct was systematic (Wilson, 2015). Having discovered the scale of the collusion, the CCSA made an "invitation" to all firms implicated to make voluntary disclosures to the extent of their involvement. Through this process, the CCSA eventually concluded settlement with 15 firms and imposed penalties totalling R1,46 billion (CCSA, 2015). Based on all the above allegations and investigations outcomes in the industry, stakeholders in the industry should be concerned about the integrity and quality of the financial information reported by the firms in the industry and the extent to which firms would go to conceal profits from regulators.

2.2 Political costs hypothesis

2.2.1 Background

Modern positive accounting research began flourishing in the 1960s when Ball and Brown (1968), Beaver (1968), and others introduced empirical finance methods to financial accounting (Watts & Zimmerman, 1990). In the 1970's, the fundamental principles of Positive Accounting Theory (PAT) were established by Watts and Zimmerman which, unlike the normative theories that are prescriptive, had the objective of explaining and predicting accounting practices (Watts & Zimmerman, 1978) (see also discussion on positive theories on section 3.1). Under the framework of PAT, Watts and Zimmerman proposed the Political Cost Hypothesis which predicts that in the presence of a political process that has the potential to transfer wealth from firms to the government or regulator, the former will use accounting strategies to reduce the size of the transfer by reducing their profit (Watts & Zimmerman, 1986). They discovered that larger firms had the greatest motivation to conceal profits because they had higher political visibility (Watts & Zimmerman, 1986). Since then, there has been significant empirical research that supports the

hypothesis, that is, found that the size of a firm correlates with political costs, especially the early research (Chen, Li, Liang & Wang, 2011). However, as Chen et al. (2011) highlighted, a limitation of early research on political costs is that the studies did not focus on specific political events and processes.

2.2.2 Role of political processes in proving the political cost hypothesis

As suggested by Watts and Zimmerman (1990), in order to improve positive research in accounting choices tighter links between theory and empirical evidence are required. This seems to suggest that it is not sufficient to just use the size of a firm as proxy for political costs and predict any accounting manipulation as a result of it. Instead, researchers need to identify a specific political process that is linked to firms that are studied. This view is further supported by evidence from China, where the empirical results of studies on the political cost hypothesis based on firm size were mixed and in some cases not supported (Chen et al., 2011). To circumvent the shortcomings of earlier research, Gill-de-Albornoz and Illueca (2005) observed that recent research concentrated on firms implicated in a specific political process, that is, recent studies are directly considering the political environment that firms are involved in and are avoiding the size proxy for political costs. Recently, studies testing the political cost hypothesis using specific political processes have ranged from firms facing anti-trust investigations and seeking import relief from government to firms facing environmental crises or facing new regulations (Jones, 1991; Cahan, 1992; Yip et al., 2011; Key, 1997).

2.2.3 The political process affecting the South African Construction sector

In order to overcome the limitations cited by Watts and Zimmerman (1990), when testing the political cost hypothesis, this study will combine the firm size proxy with a specific political process or event. The political process identified in this study is the CCSA's investigations on collusion in the construction sector. Using the findings of the CCSA, the financial reports of the 15 firms that were fined will be used to test the political cost hypothesis. This approach has the advantage of studying the largest firms and also firms with a tighter (closer) political link (refer section 3.2).

This study's test of the political cost hypothesis is further strengthened by the direct reliance of the CCSA on financial reports in its investigations. Based on a recent study done by Felet and Moiloa (2014) for the CCSA, the use of profitability analysis (which is based on accounting numbers) has been an important aspect of the CCSA's market investigations for some time, particularly in the assessment of market power. Generally, empirical evidence shows that during political scrutiny financial information is used (in some cases it is figures that are cited and in other cases it is references in the wording), this highlights the importance of accounting information in the political process (Key, 1997).

In the context of this study, the political cost hypothesis prediction focuses on whether firms listed on the JSE that were fined by the CCSA used accounting choices to reduce earnings in order to minimise wealth transfer in the form of penalties and fines. The subsequent section on earnings management discusses literature relating to different methods that researchers used to detect managed earnings and explores in detail the method that will be adopted in this study.

2.3 Earnings management

2.3.1 Importance of the earnings threshold in financial reporting

Earnings management is one of the suspicious practices present in financial reporting today because stakeholders use the earnings benchmark as a key decision making tool (Healy & Wahlen, 1999; Akhoondnejad, Garkaz & Shoorvarzi, 2013). Earnings is an accounting performance measure of an entity over a reporting period (IAS 33, par 11). In other words, it provides stakeholders of an entity an indication of the profitability of the company within a given period.

2.3.2 Difference between financial reporting earnings management and real earnings management

According to Schipper (1989) as cited by Beneish (2001), managing earnings is "*a purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain (as opposed to say, merely facilitating the neutral operation of the process)*". Beneish (2001) argues that this definition includes 'real' earnings management which is achieved by timing investment or financing decisions to manage earnings.

A commonly cited definition by Healy and Wahlen states that *"earnings management occurs when managers use judgement in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers"* (1999, p.368). This definition makes an explicit link between earnings management and accounting numbers (or financial reporting). Therefore, it is the underlying definition that underpins the term earnings management as used in this study. It also uses the term "mislead" which implies that managements' actions are deliberate and seek to deceive stakeholders. This is important as this study approaches the earnings management phenomenon in the construction sector focusing on unethical behaviour by the firms fined by the CCSA.

Detecting earnings management

Having explained earnings management, this section lists the methods to measure or detect earnings management. The literature identifies the following approaches to evaluate the presence of earnings management: distribution approach, rounding of earnings per share, analysis of a single account and total or aggregate accruals (Ronen & Yaari, 2008; Beneish, 2001).

The distribution approach assumes that unmanaged earnings have a normal distribution and observes deviation from this distribution as earnings management (Ronen & Yaari, 2008). Studies using this approach investigate discontinuance around thresholds and make predictions based on these thresholds (Beneish, 2001). A study by Burgstahler and Dichev (1997) used this approach to test if corporate managers avoided reporting losses or declines in earnings through the managing of earnings (Burgstahler & Dichev,1997). However, Healy and Wahlen (1999) argued that this approach does not capture the magnitude of earnings management. This is because the approach only inspects the distribution of earnings and does not identify abnormal accruals.

Earnings per share is expressed with 2 digits after the period i.e. *xx.xy* (IAS 33). Firms can manipulate the *y* through rounding so that EPS can increase or decrease accordingly (Ronen & Yaari, 2008). Similar to the distribution method, earnings management is identified by comparing the distribution of *y* when earnings are hypothesised to be managed or when they are not (unmanaged) (Ronen & Yaari., 2008).

The approach to use a single accrual account requires a researcher to examine a material account that management could manipulate to manage earnings within the principles of GAAP (Ronen & Yaari, 2008). McNichols and Wilson (1988) pioneered this approach based on the provision for bad debts to test for earnings manipulation and found evidence that firms used this account to decrease earnings when earnings were extreme. Even though this approach can give a researcher insight into the key factors that drive an account, thus providing better results, its main disadvantage is that the nature of the test (single account) is prone to an error of accepting the

hypothesis that no earnings management exists when in fact it is false (Beneish, 2001; Ronen & Yaari, 2008). Given that only one account is used, it is possible to declare that no earnings management exist while it could be present in other accounts (Ronen & Yaari, 2008).

Lastly, a common approach to detect earnings management is to use total or aggregate accruals (McNichols, 2001). Earnings are made up of cash flows from operations and total accruals. Accruals are the main product of accounting standards and principles. Moreover, if earnings are to be managed, it will more likely be through the use of accruals rather than from cash flows from operations (Beneish, 2001). Because of the flexibility that accounting standards and principles permit, accrual accounting can be affected by management's discretion (Subramanyam, 1996). Therefore, total accruals consist of a combination of discretionary and non-discretionary accrual components. The aggregate accrual approach uses the discretionary component of accruals as a proxy for earnings management , that is, the presence of discretionary accruals in the earnings figure is assumed to represent managed earnings (McNichols, 2001). Studies that use this approach try to detect discretionary accruals based on the relationship between aggregate accruals and hypothesised explanatory factors (Beneish, 2001).

Studies that use the discretionary component of accruals as a proxy for earnings management usually need a model that can estimate the discretionary element of earnings reported (Dechow, et al., 1995). Models range from basic models where total or aggregate accruals are assumed to be discretionary, to more complex models where the model attempts to separate total accruals between discretionary and non-discretionary components (Dechow et al., 1995). Based on a study that was done to evaluate the performance of these models (predictive ability), only the original Jones Model and the Modified Jones Model succeeded in estimating discretionary accruals that had attributes of deliberate management manipulation or accruals that boosted earnings (Guay, Kothari & Watts, 1996). The other models were found to separate total accruals into discretionary and non-discretionary randomly (Guay et al., 1996). Other similar studies found estimation results of the Modified Jones Model to be more consistent and provided the most powerful test for earnings management (Dechow, et al., 1995; McNichols, 2001).

Table 1 below lists the aggregate accruals models that use discretionary accruals as a proxy for earnings management. Table 1 also lists the Modified Jones Model which is discussed in detail in the next section as it forms the basis of this study.

Table 1. Aggregate accruals models - Summary

Authors	**Discretionary accrual proxy**
Healy (1985)	Total accruals
DeAngelo (1986)	Change in total accruals
Jones (1991)	Residual from regression of total accruals on change in sales and property, plant and equipment
Modified Jones Model from Dechow et al. (1995)	Residual from regression of total accruals on change in sales and on property, plant and equipment, where revenue is adjusted for change in receivables in the event period

***Source**: McNichols, 2001*

2.3.3 Evaluation of the Modified Jones Model

The original Jones Model was introduced to test for earnings management in United States (US) firms seeking to benefit from import-relief regulations (Jones, 1991). It introduced a regression approach to control for non-discretionary factors affecting accruals by assuming a linear relationship between aggregate accruals and changes in revenue (working capital accruals) and changes in property, plant and equipment (depreciation accrual) (Ronen et al., 2008; McNichols, 2001).

The model uses a two-stage approach to separate discretionary and non-discretionary accruals. In the first stage, total accruals are regressed on the changes in revenue and property, plant and equipment (PPE) during a series of periods where earnings management is not hypothesised to have occurred (Dechow et al., 1995). Then in the second stage, during the event period of hypothesised earnings management, the estimated variables (coefficients β1, β2, β3) from the first stage are combined into total accruals, change in revenue and change in PPE information in the event period to determine the component of discretionary accruals (Dechow et al., 1995). In simple terms, the second stage separates (through deduction) from total accruals the non-discretionary component of accruals, represented by revenue

and PPE changes, in order to remain with only the discretionary accruals portion which indicate possible earnings management.

The assumption behind using revenue and PPE changes as factors that explain non-discretionary accruals is that they are unmanaged. If a firm were to use revenue to manage earnings, then the estimated discretionary accrual using this model would contain an error (Dechow et al., 1995). In order to address this problem, the Modified Jones Model was proposed. The modification was designed to adjust revenue in the event period with accounts receivable to eliminate the discretionary component (Peasnell, Pope & Young, 2012). In essence, the Modified Jones Model is identical to the original Jones Model except for the treatment of revenue. This study adopted the Modified Jones Model to detect earnings management for construction firms under political scrutiny.

The next section provides literature on studies that investigated the political cost hypothesis and earnings management.

2.4 Political costs and earnings management: Empirical evidence

Section 2.2 provided background and discussion on the political cost hypothesis while section 2.3 dealt with the literature on earnings management. This section reviews studies that investigated the political cost hypothesis and earnings management in different contexts and geographical regions.

The political cost hypothesis has been extensively studied in the Western context However, evidence from emerging economies has been very limited (Chen et al., 2011). The political environment and economic differences between developed countries and developing countries is significant, for example, legal systems in emerging countries tend to be weak and large companies have significant influence over political processes (Chen et al., 2011). Another example is the political reasons to manage economies. Emerging countries' governments try to promote employment and tax revenues whereas developed countries attempt to avoid monopolies and promote environmental regulations (Chen et al., 2011). For these reasons, this study has separated research evidence on the political cost influence on earnings

management between the Western developed economies (evidence from United States) and developing economies (evidence from Iran and China).

2.4.1 Political costs and earnings management: Evidence from Western Developed Economies

The USA is listed as one of the most developed countries in the world and has one of the largest economies in the world (World Bank, 2015). Different political cost proxies have been used in research studies. These include the firms' size, anti-trust investigations and pending regulations. Below is a review of the different US studies that used these proxies to test the political cost hypothesis.

Political cost proxy: Firm size

Large firm size was originally the political cost proxy used to test the political cost hypothesis. Hall investigated whether large US oil firms, in an attempt to reduce political visibility, used accounting policies to reduce their earnings (Hall, 1993). Using changes in accounting policies (for example, changing depreciation methods) as a method to detect earning manipulation, he found that, in periods of higher oil prices, large firms tend to use accounting policies to reduce earnings (Hall, 1993). The obvious limitation of this study is that it did not only uses firms size as a political cost proxy, but being an early study, it does not recognise that accounting standards have since evolved to require extensive disclosure when there has been an accounting policy change. If such accounting policy changes were made in recent times, a disclosure note showing the effect on current and prior periods would be required, thus revealing the true effect of the change in policy (IAS 8).

An improved subsequent study is that of Han and Wang (1998) which also speculated that, during the Gulf crisis' high oil prices, large firms with high political visibility were expected to reduce their earnings downward (Han & Wang, 1998). The strength of this study over Hall's is that, instead of focusing on accounting policy change, it used the original Jones Model to detect earnings management. Consistent with the political cost hypothesis, the study found that petroleum firms showed

significant negative discretionary accruals (earnings-decreasing accruals) during the Gulf crisis.

However, the above studies were only using firm size as an indicator that a firm will attract political costs. Improved studies have used firms facing actual investigations or imminent adverse regulations from government as a political cost indicator. The next section reviews these studies.

Political cost proxy: Investigations

Anti-trust investigations (monopoly investigations) provide a better indicator of political costs than firm size and it should be a better alternative to test the political cost hypothesis. Cahan (1992) conducted a study that investigated whether firms facing anti-trust investigations had discretionary accruals during the period of investigation when compared to other periods (Cahan, 1992). His sample consisted of 48 firms investigated over a 13-year period. He used the original Jones Model to detect the presence of discretionary accruals (Cahan, 1992). Cahan (1992) used the period of investigations as the event period (earnings management period) and the period prior to investigations as the estimation period (period of no earnings management).The study was unique compared to other studies in that its sample comprised firms that were actual targets of a political action (Cahan, 1992). His findings supported the political cost hypothesis.

A subsequent similar study that came to the same conclusion dealt with anti-trust investigations by Makar and Alam (1998), using the same method and a sample comprising of investigated firms. However, unlike Cahan (1992), their study took into account the effect of business cycles on the political cost hypothesis. They argue that, based on previous literature, regulators support consumers during high economic growth but will protect firms during recessions (Makar et al., 1998). By considering business cycles, they predict that discretionary accruals of investigated firms will be earnings-decreasing during recessions and earnings-increasing during expansionary periods (Makar et al., 1998). The results were consistent with their predictions. They also found that firms that settle their cases with the regulator

would continue to reduce their earnings to prevent further wealth transfers (Makar et al., 1998).

Political cost proxy: Regulation threat

Jones (1991) was one of the early studies that investigated the effect of pending import-relief regulations on the political cost hypothesis. This was a pioneer study as it introduced the original Jones Model to detect earnings management. She predicted that domestic US firms that would benefit from import protection regulations make earnings-decreasing accounting choices during periods where the regulator is making investigations (Jones, 1991). Although her findings substantiate the political cost hypothesis, the limitations of her study are the weak connection between the political process and financial reporting. In her study, she concedes that the regulator uses other sources of information during investigations and do not rely on accounting numbers to assess a firm's financial conditions (Jones, 1991). Subsequent studies have used pending regulations as a political proxy to test the political cost hypothesis. These include Cahan, Chavis and Elmendorf (1997) who studied chemical firms facing environmental legislation and a study by Key (1998) that investigated the cable industry facing Congressional scrutiny, and unlike Jones, the strength of this study was the direct use of accounting information by Congress in their investigation (Key, 1998). The results of both these studies are consistent with the political cost hypothesis.

Interestingly, when studies of firms facing regulation (especially environmental regulation) are conducted, but with the impact of environmental disclosure added as an explanatory factor, the results are surprising. The first of such studies is one by Mitra and Crumbley (2003) which investigates US Oil firms' reaction to an oil spill in 1989. They predicted that due to high political exposure, oil firms would engage in accrual adjustments that reduce their reported earnings during this period compared to other periods (Mitra & Crumbley, 2003). The results of the study found no evidence of discretionary accruals adjustments during this period. They concluded that this was because of firms having extensive environmental disclosure and therefore being less inclined to use reduced earnings to minimise political exposure

(Mitra & Crumbley, 2003). A subsequent study investigating US oil firms during the Arab oil crisis also found that there was a negative relationship between CSR disclosure and earnings management when political costs are high; that is, firms with extensive CSR disclosure will conduct less earnings management and the opposite also applies (Yip et al., 2011). This study used the original Jones Model and tested the hypothesis by regressing earnings management on CSR disclosure while keeping other factors that may impact earnings management constant (Yip et al., 2011).

The above section provided a detailed discussion on the literature of different US studies on political cost hypothesis and earnings management. The political processes ranged from regulation threat to pending investigations for a variety of industries with differing methodologies and models adopted to execute the studies. Table 2 below provides a summary of the US studies on the political cost hypothesis and lists the different earnings management models adopted for each of the studies:

Table 2. Studies that test the political costs hypothesis by analysing firms subject to a previously identified political process

Study	Predictions/Objective	Sample	Methodology	Results
Jones (1991)	Test whether import relief firms decrease earnings during investigations	23 Import relief investigated firms	Jones Standard Model	Consistent with political cost hypothesis
Cahan (1992)	Investigated if firms manage earnings downward to reduce possibility of adverse ruling	48 US Anti-trust investigated firms	Jones Standard Model	Consistent with political cost hypothesis
Hall (1993)	Firms make accounting choices to reduce the political costs that arise from high oil prices	10 US Oil firms	Healy Model -Total accruals used as proxy for discretionary accruals	Hypothesis confirmed
Cahan et al. (1997)	Pending legislation affects firms' earnings management	53 US chemical firms	Jones Standard Model	Hypothesis confirmed
Han and Wang (1998).	Firms with high political visibility will manage earnings downward	26 US Oil firms	Adjusted Jones Model	Consistent with political cost hypothesis
Makar et al (1998).	Investigated firms manage earnings downward to reduce the possibility of adverse ruling	123 US firms	Jones Standard Model	Consistent with prediction
Key, (1998)	Firms use accounting choices to mitigate potential regulation	26 US cable television firms	Jones Standard Model	Consistent with political cost hypothesis
Mitra, (2003).	Extent of environment disclosure and levels of earnings management	40 firms facing regulatory threat	Modified Jones Model	Inverse relationship between hypothesis and disclosure

***Source**: Ronen & Yaari, 2008*

2.4.2 Political cost and earnings management: Evidence from Emerging economies

According to the World Bank, both Iran and China are classified as developing countries (World Bank, 2015). Iran has the second largest economy in the Middle East and North Africa (World Bank, 2015). China has the second largest economy in the world by nominal GDP (IMF, 2014). Empirical evidence on the political cost hypothesis from these countries has been used as a representation of developing economies.

Political cost proxy: Firm size

Akhoondnejad, Garkaz and Shoorvarzi (2013) tested the political cost hypothesis on 158 firms in various industries listed on Iran's Tehran Stock Exchange. Their objective was to investigate the motives for earnings management in listed Iran firms. Their study adapted the original Jones Model and tested data for the period 2006 to 2011. They discovered a significant relationship between political costs and earnings management (Akhoondnejad et al., 2013). The limitation of this study was the lack of a direct political process between the data and the sample of firms. The other criticism of the study could be that it used the original Jones Model. If other improved models were to be used, results could have been different (Akhoondnejad et al., 2013).

Political cost proxy: State entities v Private firms

A 2011 empirical study on the political cost hypothesis in the context of China is that of Chen, Li, Liang and Wang (2011) entitled: *Macroeconomic control, political costs and earnings management: Evidence from Chinese listed real estate companies* (Chen et al., 2011). In their study, they predicted that the potential for earnings-decreasing earnings management is greater in private (non-state owned) listed real estate firms than in state-owned ones. Their sample included all listed real estate firms and they employed the Modified Jones Model to test their hypothesis. They argue that, unlike most of the Western studies that use firm size as a proxy for political costs, the Chinese government actually encourages firms to grow as large as possible. Therefore, the size of a firm does not attract political cost. Instead, they

suggest that macroeconomic policies (for example, housing price control & land allocation) by the government will have a greater effect on listed real estate firms' earnings reporting behaviour. Their results suggest that in order to avoid the adverse impact of tightening government regulations, private real estate firms as opposed to state owned ones would adopt earnings-decreasing earnings management (Chen et al., 2011).

The studies from Iran and China on the political cost hypothesis are the most relevant and significant studies that relate to this study. No other significant studies could be found.

2.5 Summary

In summary, this chapter provides insights on the economic and regulatory background of the South African construction industry with particular emphasis on the ethical issues plaguing the industry. It then introduces the literature on the political cost hypothesis as developed by Watts and Zimmerman (1990) which found that firm size was a predictor for the political cost hypothesis, that is, large firms will manage earnings downward to avoid political costs. However, subsequent literature enhanced this hypothesis by emphasising that specific political processes affecting firms were a better predictor for the political cost hypothesis. Literature on the phenomena of earnings management is then discussed with the different earnings detecting methods reviewed. Based on this review, the Modified Jones Model was found to be the most consistent method to test for earnings management. Lastly, empirical studies on the political cost hypothesis and earnings management from both developed and developing countries are reviewed with a range of predictors (size, investigations, regulations, et cetera) tested. The following chapter will provide the research methodology that will be adopted to test the political cost hypothesis and earnings management for this study.

3 Research Methodology

The main objective of this study was to establish whether construction firms used accruals to reduce reported earnings in order to conceal political visibility and political costs during the period in which the CCSA conducted the investigations. In the previous chapter, the integrity and quality of financial reports in the construction industry was questioned due to regulatory investigations and ethical issues present in the industry. With this as background, the political cost hypothesis was applied in this study to predict whether Johannesburg Securities Exchange (JSE) listed construction firms managed earnings downward to reduce wealth transfers (fines and penalties) during the period of the CCSA investigations. The literature also revealed that the detection of discretionary accruals present in the aggregate accruals is the most common approach to detect earnings management with the Modified Jones Model being the most appropriate model to estimate the discretionary element in earnings reported.

The aim of this chapter is to provide a framework that would allow the best method to test the relationship between political costs and earnings management. The chapter is structured as follows: The research philosophy for the study is introduced followed by a section on the development of the hypotheses to be tested. The research design for earnings management section is subsequently discussed including details of the Modified Jones Model; justification of the period to be tested and the description of the sample and data used in this study. The chapter concludes with information on the limitations of the study.

3.1 Research philosophy & approach

The objective of this study was to test the political cost hypothesis. This hypothesis was developed by Watts and Zimmerman (1978) as one of the hypotheses in the Positive[2] Accounting Theory (PAT). PAT provides a view on why firms would choose one particular accounting method over another when confronted with a choice (Deegan & Unerman, 2006). PAT is a positive[2] theory as it seeks to explain and predict accounting policies and therefore falls under the positivist research framework (Deegan & Unerman, 2006). As this study tests a hypothesis developed by a positive theory, it was logical to adopt positivist research framework as a methodology to conduct the study.

Henning, van Rensburg and Smit (2004) define positivism as: "*a philosophical position that holds that the goal of knowledge is simply to describe, to explain and also to predict the phenomena that we experience whether quantitative or qualitative.*" The main feature of this research framework is that it attempts to explain and predict a phenomenon. Inanga and Schneider (2005) state that positive theories involve empirical observations of the relevant phenomena from which a problem is defined. Data relating to the problem is then collected and a hypothesis is formulated and tested using an independent method. It is clear from the above explanations that positive theories must have predictive abilities; hence the formulation of hypotheses.

The following process of positivistic research as stated by Inanga and Schneider (2005) was adopted in this study:

[2] As used by Deegan (2006), this study uses the lower case term 'positive' to relate to the research framework and upper case 'POSITIVE' when referring to Watts & Zimmerman's particular theory of accounting, PAT, which developed the political cost hypothesis. As Deegan explains PAT is an example of a type of positive theory of accounting.

As noted by Coetsee (2001), the hypothesis can be based on an existing developed hypothesis or could be derived through a deductive reasoning process. This study was based on the former, that is, it tested an already established hypothesis (the political cost hypothesis). Another key feature of a positivistic research framework is that it generally uses a quantitative approach and is characterised by a large number of empirical observations (Pearson, 2012). This feature also characterised this research study (refer discussion on 3.5 Sample and Data).

Inanga and Schneider (2005) argue that the predictive ability of positive theories is the positivistic research framework's major strength. However, they warn that in some instances, where samples have characteristics different from the general population that it represents, incorrect generalisation from findings can be made. This study considered this issue by limiting the results and findings to the construction sector (Refer discussion on 3.6 Limitations of study).

3.2 Hypothesis development

The purpose of this study was to establish if there was empirical evidence that listed firms in the construction industry used accruals to decrease earnings in order to minimise political costs that could arise during the investigations of the CCSA. The period during which such investigations were done and the motivation for the period (event and estimation period) chosen to conduct this study is discussed and explained in section 3.4 of this chapter. Based on the political cost hypothesis, the following predictions were made about the construction sector during the investigations:

> H1: Earnings-decreasing accrual-based earnings management was present during the event period.

Due to the construction of soccer stadia for the FIFA World Cup and other related government construction projects in 2010, most firms in the construction sector benefited from the boom in the sector as a whole (Stats SA, 2015). This hypothesis suggests that there was an incentive for the industry as a whole (or most firms) to have used earnings-decreasing accruals during CCSA investigations.

> H2: Earnings-decreasing accrual-based earnings management was more prevalent in larger firms during the event period.

Han and Wang (1998) found that large firms facing political scrutiny used earnings-decreasing discretionary accruals to reduce earnings in an attempt to reduce political visibility. This study tested this hypothesis in the South African construction sector context during the CCSA investigations period. Market capitalisation was used to rank the firms in terms on size (refer section 4.1).

> H3: Earnings-decreasing accrual-based earnings management was more prevalent in the firms fined by the CCSA during the event period

Studies that have researched firms facing anti-trust investigations for earnings management found results that were consistent with the political cost hypothesis (Cahan, 1992; Jones, 1995). These studies were unique as they used samples of actual firms that the regulators were investigating. This study replicated this approach by testing the hypothesis for actual firms in the construction industry fined by the CCSA.

3.3 Research Design

The research design adopted to detect earnings management was based on the aggregate accruals method which uses discretionary accruals as a proxy for managed earnings (Jones, 1991; Dechow et al., 1995; Ronen et al., 2008; McNichols, 2001). As per the literature, the relatively superior Modified Jones Model was chosen to be used to estimate discretionary accruals for this study (Dechow et al., 1995; Ronen et al., 2008).

3.3.1 Modified Jones Model

The Modified Jones Model aims to separate total accruals between non-discretionary accruals (NDA) and discretionary accruals (DA) using regression analysis in the periods where earnings are hypothesised to have been managed (Guay et al., 1996; Dechow et al., 1995; Jones, 1995).

The model assumes that earnings management occurs only in the event period and not in the estimation period (McNichols, 2001; Dechow, et al., 1995). In this study, the event period was the most recent years of the CCSA investigation and the estimation period were the years preceding that (refer to 3.4 discussions on Period).

Once the DA amounts were computed for the event period, t-tests (statistical analysis) were performed on DA means to establish or test the predicted hypothesis.

Below is the formula for the Modified Jones Model:

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right) \quad [1]$$

Where:
TA = Total Assets
Rev = Revenue, Sales
PPE = Gross Property, Plant and Equipment
A = Total Assets
DA = Discretionary Accruals
Rec = Accounts Receivable
ß1-3 = Coefficients
i = Index for firm where i= 1,2,3…N
t = Index for period (year)

The following process and related equations were used to apply the model and perform the tests:

a) Compute Total Accruals (TA)

Total accruals were computed by obtaining data from the cash flow statement and the statement of profit or loss and other comprehension income (Han & Wang, 1998). Cash flows from operating activities (CFO_{it}) (excluding discontinued operations) were deducted from earnings before discontinued operations ($EBXI_{it}$) in order to compute total accruals (TA_{it}). By eliminating the cash component from earnings, the residual amount remaining is the accrual component. This cash-flow approach, as opposed to using successive statements of financial position (balance sheet approach), is better as it avoids items that might not affect earnings for the period due to mergers or acquisitions (Cornett, Marcus & Tehranian, 2008).

$$TA_{it} = EBXI_{it} - CFO_{it} \quad [2]$$

b) Determine coefficients ($\boldsymbol{\beta_1, \beta_2, \beta_3}$)

Coefficients explain the relationship between the dependant variable and the independent variable. In order to compute coefficients *($\beta_1, \beta_2, \beta_3$),* total accruals (dependant variable) are regressed on independent variables which are non-discretionary accruals (NDA) during the estimation period (Dechow et al., 1995). In equation [3] ΔRev and PPE are meant to explain NDA (Jones, 1995). Change in revenue (ΔRev) captures working capital accruals and Property, Plant and Equipment (PPE) controls for depreciation (Jones, 1995). Jones (1995) argues that NDA depend on changes in business conditions and are not susceptible to manipulation by management (Jones, 1995).

It is important to note that the estimates for the coefficients are obtained from the original Jones Model (no adjustment is made to revenue) at this stage (Dechow et al., 1995). As stated, DA during the estimation period is assumed to be nil; that is, earnings are not managed. In equation [3], DA is represented by the error term $\varepsilon_{i,t}$. Lastly, all variables in equation [3] were lagged with $A_{i,t-1}$ in order to eliminate differences in size between variable amounts in different periods (heteroscedasticity) (Jones, 1995).

$$\frac{TA}{A_{i,t-1}} = \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{\Delta Rev}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}} + \varepsilon_{i,t} \quad [3]$$

c) Determine Non-Discretionary Accruals (NDA)

The coefficients computed in the estimation period using the original Jones Model *($\beta_1, \beta_2, \beta_3$)* from equation [3] are used to compute NDA in the event period in equation [4]. The adjustment of the Modified Jones Model on the original model is made by adjusting change in revenue (ΔRev) with change in receivables (ΔRec) in the event period (Dechow et al., 1995). As discussed in the literature review chapter, the modified model attempts to address the issue of earnings that are managed via credit sales, which the original model did not.

$$NDA = \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}} \quad [4]$$

d) Calculate Discretionary Accruals (DA) using TA & NDA

Once all the variables are obtained, DA can be computed using equation [5] by deducting lagged TA from NDA in the event period. A negative DA from each firm year means earnings are managed downward. This is because revenue (income) is positively correlated with total accruals and depreciation (an expense) reduces total accruals (Makar & Alan, 1998; Jones, 1995; Dechow et al., 1995).

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right) \quad OR \quad DA = \frac{TA}{A_{i,t-1}} - NDA \quad [5]$$

e) Perform T-test (statistical significance)

A t-test on DA means (average) was performed for the event period to determine the following:

H1: Establish whether earnings-decreasing accrual-based earnings management was present during the event period.

H2: Establish whether earnings-decreasing accrual-based earnings management was more prevalent in larger firms during the event period.

H3: Establish whether earnings-decreasing accrual-based earnings management was more prevalent in the firms fined by the CCSA during the event period.

3.4 Period

This section discusses the period that was used to test the hypotheses and apply the model. The estimation period and event period had to be established to apply the model in order to test for earnings management. Prior studies were used as guidance for selecting the specific years.

In testing the hypothesis for firms facing import relief investigations, Jones (1995) used the year when the investigations were completed (year 0) and the prior year (year -1) (the most recent years) as event period (Jones, 1995). She argues that investigators had an emphasis on the most recent financial performance of firms and thus concluded that this was the period where managers had the greatest incentive to lower earnings (Jones, 1995). In this study, Phase 1 of the CCSA investigation's scope was for all construction projects after 2006 and settlements (fines) were finalised in 2013 with Phase 2 still ongoing according to the CCSA's 2015 Annual Report (CCSA, 2015). Using Jones's logic, the most appropriate event period for this study was the reporting periods ended 2014 and 2015. During this period, firms would have already been aware of the ongoing investigations (and some would already have suffered the 2013 penalties) and thus had both the incentive and opportunity to decrease earnings. CCSA investigations for years prior to 2014 and 2015 were done in retrospect. Therefore, it is unlikely that firms would have lowered their earnings in anticipation of the investigations.

The estimation period is the period before the event period where no earnings management is predicted. Choosing the duration of the period requires a balance (and compromise) between improving estimation efficiency, structural changes happening during the period and data availability (Jones, 1995; Guay et al., 1996). Prior studies used estimation period ranging between 5 and 15 years (Jones, 1995; Dechow et al., 1995; Han & Wang, 1998). A compromise period of seven years was chosen for the estimation period in this study, that is, 2007-2013.

3.5 Sample and Data

This study examined financial statements of construction firms that were listed on the JSE for the period 2007 – 2015. Data for the fields required for the Modified Jones Model of the listed firms was obtained from the McGregor database. To establish the list of firms in the construction sector the JSE Index sector code 2350 for Construction & Material was used. Firms with fewer time-series observations (fewer in this study is considered to be less than 5 years) in the estimation period were excluded as the estimation of the coefficient could be statistically compromised (Jones, 1995).

3.6 Limitations

The following research limitations apply to this study:

- As this study is based on a single industry, the results of the study cannot be generalised to other industries;
- Earnings management could already be present in the estimation period thus affecting the accuracy of discretionary accruals in the event period (Dechow et al., 1995);
- Incentives of managers could fluctuate across periods, leading to misstated non-discretionary accruals and incorrect conclusions relating to discretionary accruals (Dechow et al., 1995);
- Time series observation used in the estimation period may not be sufficient to provide reliable coefficient estimates (Jones, 1995); and
- The Modified Jones Model has a tendency of overstating earnings management (Ronen et al., 2008).
- As this study is based only on the listed firms in construction industry and concentrates on construction firms that were fined by the CCSA, the sample size is reduced. This limitation could affect the significance of the results.

4 Results

The previous chapter discussed the most appropriate research methodology that was adopted in this study in order to achieve the research objectives. As previously stated, the aim of this research was to establish whether there is empirical evidence that JSE listed firms in the construction industry used earnings-decreasing accrual-based earnings management to reduce political visibility and associated costs. This chapter presents the results of the data collected based on the positive research methodology and uses statistical methods to analyse the data in the context of the research hypotheses.

The chapter was structured to firstly describe the main features of the sample used and then discuss the descriptive statistics of key data relating to discretionary accruals for both the estimation and test periods. This was followed by an analysis of the discretionary accruals (DA) computed using the Modified Jones Model and lastly, t-tests were used to assess the significance of these results for each of the research hypotheses as formulated in the previous chapter.

4.1 Sample and Data Description

As per the sample criteria set in the previous chapter, this study used data from financial statements of construction firms that were listed on the JSE for the period 2007 – 2015 obtained from the McGregor BFA research database. The financial statement reports were generated for the Construction and Materials sector code 2350 and downloaded into a single consolidated Excel spreadsheet.

Data in the consolidated spreadsheet was compared to the data on the McGregor database website to confirm its completeness and validity. A random check of the data was also done between the consolidated spreadsheet and the published financial statements from the company websites. Both checks served to confirm that the data were correctly transferred. These data were used to extract the fields needed to apply the Modified Jones Model.

Industry Firms (Full sample)

The original sample had 18 firms for the JSE sector code 2350 for Construction and Material for the period 2007-2015. Three firms with incomplete data (they produced results that were less than 7 years - refer to section 3.4) were then excluded from the sample to leave the remaining sample of 15 firms for the population sample. This sample was used to test the first hypothesis.

Large-Mid Capitalisation Firms

The sample was further fragmented between different firm sizes using market capitalisation information per the JSE. The JSE uses the Top40-index to classify large cap firms and ranks firms between 41 to 100 as mid cap firms with the remaining firms considered small caps (JSE, 2015). It also has an alternative way for defining small, medium and large caps: firms with market capitalisation of over R10 billion are large cap; small caps are below R1 billion with the remainder with market capitalisation between R1 billion and R10 billion considered mid cap (JSE, 2015). This latter approach was used to categorise firms in Table 3. For the purpose of this study, the sample of eight Large-Mid cap firms was used to classify large firms in order to test the second hypothesis.

Table 3. JSE Market Capitalisation

Company Code	Market Capitalisation Average (ShareData, 2015)	Classification
AFT	R 2,115,083,953	Mid Cap
AEG	R 8,740,991,302	Mid Cap
BSR	R 842,843,398	Small Cap
CGR	R 1,365,689,500	Mid Cap
DAW	R 1,996,603,958	Mid Cap
ESR	R 197,592,715	Small Cap
GRF	R 3,920,695,954	Mid Cap
KDV	R 183,116,680	Small Cap
MAS	R 219,425,914	Small Cap
MZR	R 213,842,733	Small Cap
MUR	R 10,784,850,862	Large Cap
PPC	R 17,749,731,279	Large Cap
RBX	R 4,131,202,369	Mid Cap
SSK	R 1,582,699,477	Mid Cap
WBO	R 8,910,000,000	Mid Cap

***Source**: Author's own analysis*

CCSA Fined Firms

The third sample category was for those firms that were fined by the CCSA for collusions. The CCSA fined 15 construction firms with settlement finalised in 2013. A sample of seven of those firms was listed on the JSE and was used to test the third hypothesis.

4.2 Descriptive statisitics

The descriptive statistics presented were based on the estimation period of 2007-2013 and the event periods of 2014 and 2015. Tables 4, 5 and 6 summarise the average changes in accruals, earnings, cash flows from operations and revenue lagged with total assets for the different sample categories. The changes were computed as the first difference between the year observed and the previous year divided by total assets of the previous year. An average was then computed for all the periods in both the estimation period (2007-2013) and the event period (2014-2015).

4.2.1 Descriptive statistics for the construction industry (full sample)

Table 4 shows the changes in the variables for the full sample of construction firms. There was no significant change in the mean of accruals in the estimation period as the values were close to zero. This was to be expected as the mean changes in both earnings and cash flows were also close to zero except for the mean of revenue that increased slightly. Contrary to the study's expectation that total accruals would be negative in the event period, total accrual changes in the event period were also positive and slightly higher than the estimation periods. The mean for revenue changes, which should affect the level of total accruals, has also increased despite the negative means for earnings and cash flow changes. Viewed in isolation, it appears that there was no use of earnings-decreasing accruals in both the estimation and event periods.

Table 4. Descriptive statistics for discretionary accruals variables (scaled by total assets of the previous period)- Full Sample (Construction Industry)

	Total Accrual Changes	***Earnings Changes***	***Cash Flow Changes***	***Revenue Changes***
Estimation Period				
Mean	0.000	0.004	0.004	0.148
Median	0.015	-0.002	0.011	0.191
Standard Deviation	0.082	0.073	0.052	0.137
Minimum	-0.158	-0.079	-0.064	-0.039
Maximum	0.113	0.149	0.079	0.343
Event Period				
Mean	0.005	-0.004	-0.009	0.043
Median	0.005	-0.004	-0.009	0.043
Standard Deviation	0.003	0.019	0.022	0.106
Minimum	0.003	-0.017	-0.025	-0.032
Maximum	0.008	0.010	0.007	0.118

Source: ***Author's own analysis***

4.2.2 Descriptive statistics for the large-mid cap firms

Table 5 shows the changes in the variables for the large-mid cap firms sample. The average total accrual changes in the estimation period were below zero compared to the event period where they were positive. This is despite the mean revenue change of 0.179 in the estimation period which would have been expected to cause total accruals to also increase. The positive mean of total accruals in the event period was in line with the other changes of earnings and cash flows which were negative. This analysis also contradicts the expectation that negative accruals will be used in the event period as opposed to the estimation period. Viewed in isolation, it appears that there were earnings-decreasing accruals in the estimation but not in the event period.

Table 5. Descriptive statistics for discretionary accruals variables (scaled by total assets of the previous period)- Large-Mid Cap Sample (Size)

	Total Accrual Changes	***Earnings Changes***	***Cash Flow Changes***	***Revenue Changes***
Estimation Period				
Mean	-0.005	0.007	0.009	0.179
Median	0.016	-0.003	0.011	0.212
Standard Deviation	0.083	0.074	0.062	0.156
Minimum	-0.172	-0.067	-0.064	-0.036
Maximum	0.096	0.159	0.111	0.355
Event Period				
Mean	0.009	-0.004	-0.013	-0.003
Median	0.009	-0.004	-0.013	-0.003
Standard Deviation	0.002	0.016	0.014	0.177
Minimum	0.007	-0.015	-0.022	-0.128
Maximum	0.010	0.007	-0.003	0.122

Source: ***Author's own analysis***

4.2.3 Descriptive statistics for the CCSA fined firms

Lastly, Table 6 shows the changes in variables for the sample of CCSA fined firms. The total accrual changes means here were positive for both the estimation and event periods. In the estimation period, revenue changes have significantly increased which could explain the increase in total accruals. Cash flows and earnings were closer to zero which was surprising as the expectation would have been for cash flows to also be higher. In the event period, both the revenue and earnings mean changes were below zero. Cash flows were also below zero with total accruals being positive but closer to zero. Viewed in isolation, it appears that there were no earnings-decreasing accruals in both the estimation and event period.

Table 6. Descriptive statistics for discretionary accruals variables (scaled by total assets of the previous period)- CCSA Fined Firms Sample

	Total Accrual Changes	*Earnings Changes*	*Cash Flow Changes*	*Revenue Changes*
Estimation Period				
Mean	0.001	0.015	0.014	0.223
Median	0.001	-0.010	-0.005	0.254
Standard Deviation	0.102	0.111	0.069	0.171
Minimum	-0.200	-0.099	-0.054	-0.026
Maximum	0.139	0.249	0.110	0.385
Event Period				
Mean	0.003	-0.006	-0.009	-0.034
Median	0.003	-0.006	-0.009	-0.034
Standard Deviation	0.010	0.021	0.011	0.161
Minimum	-0.003	-0.021	-0.017	-0.148
Maximum	0.010	0.009	-0.001	0.080

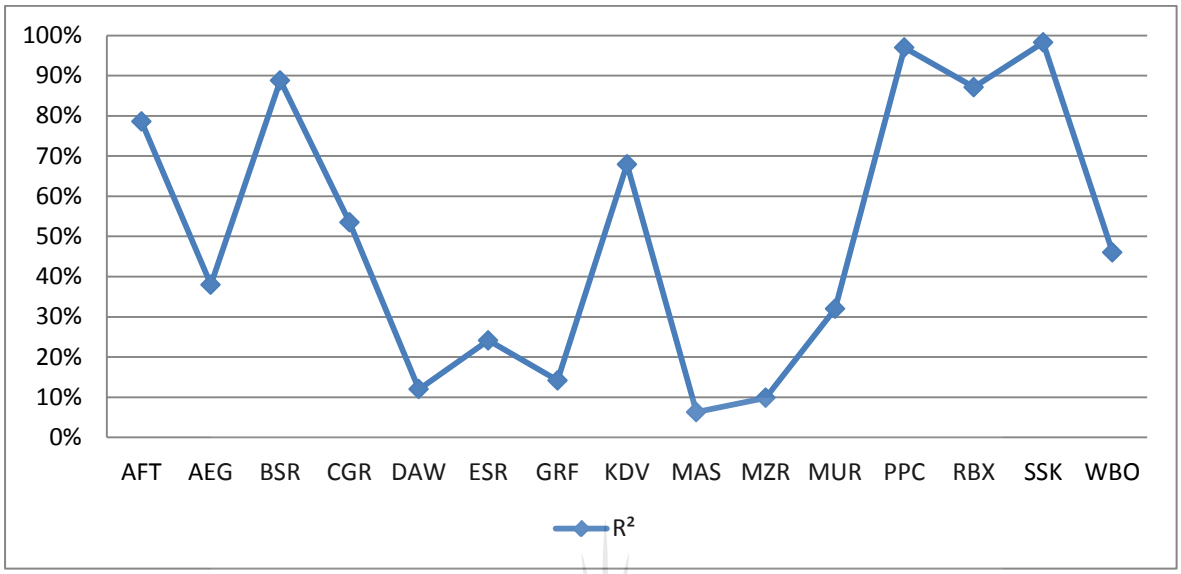
Source: ***Author's own analysis***

4.3 Firm results (Modified Jones Model)

4.3.1 Correlation Coefficients

Figure 2 below indicates the correlation coefficient (R^2) for each of the firms. The average R^2 is 50%, meaning that the regression equation of the Modified Jones' Model explained (on average) 50% of the estimates of discretionary accruals (DA). Quartile 3 and Quartile 1 were 82% and 20% respectively. Based on this, five companies had correlation better than 82% while four had correlation worse than 20%. For the large-mid cap firms and the CCSA fined firms the mean correlation coefficient was 59%, which was higher than the average for the full industry.

Figure 2. Correlation Coefficient Each Firm Graph-Full Sample



Source: Author's own analysis

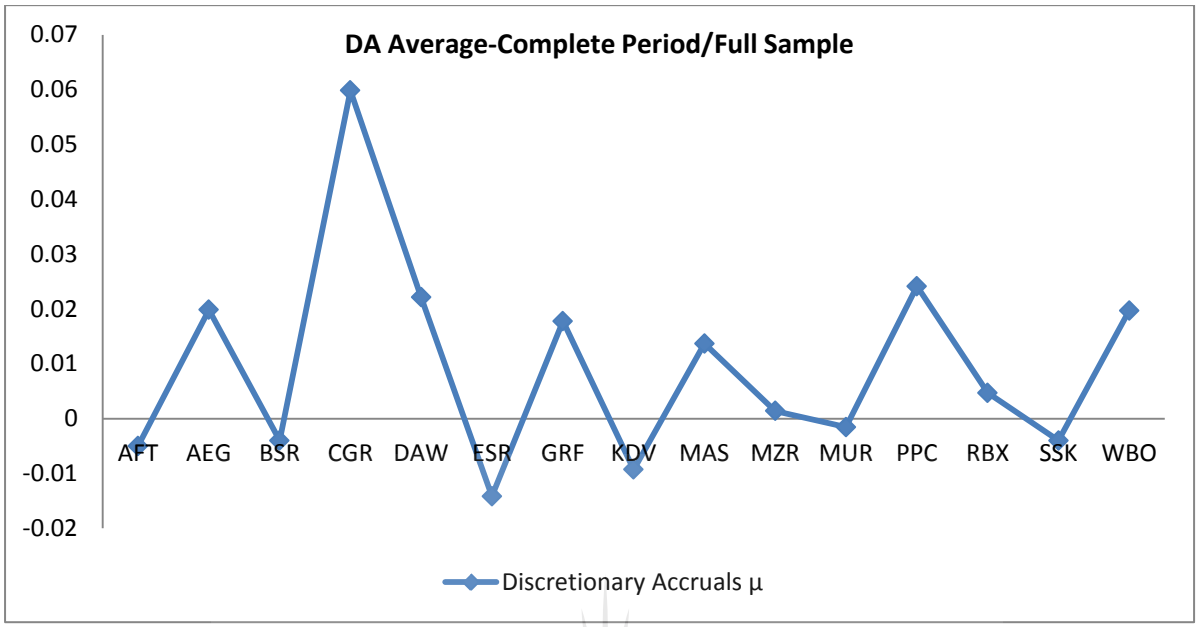
4.3.2 Discretionary Accruals

Appendix A presents the discretionary accruals (DA) for each of the firms for the period 2007-2015 (estimation and event periods) calculated using the Modified Jones Model, equation [1].

Discretionary Accruals Average Full Period-Construction Industry (Full Sample)

Figure 3 graphically illustrates the DA average based on the full period of 2007-2015 for each of the firms. The graph shows positive DA for most of the firms with only six firms with negative DA.

Figure 3. DA Average Graph-Full Sample & Complete Period

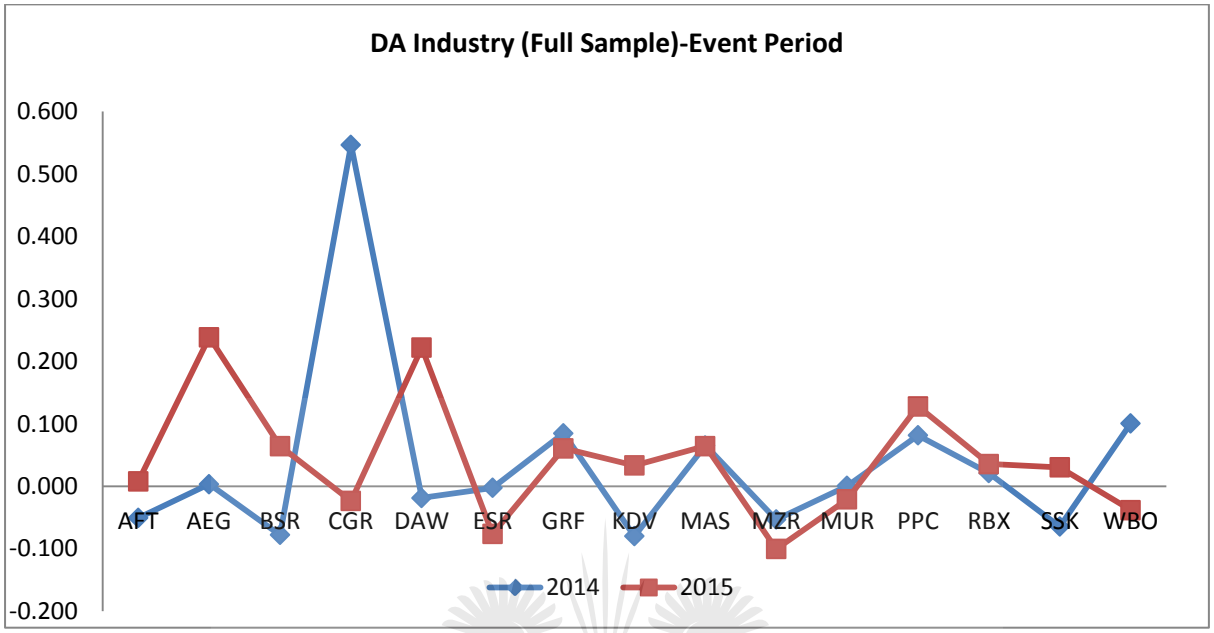


***Source**: Author's own analysis*

Discretionary Accruals -Event Period-Construction Industry (Full Sample)

Figure 4 below illustrates the actual DA figures for the event period of 2014 and 2015 for all the firms. In 2014, the majority of the firms had DA that was either negative or close to zero with the only outlier being CGR which had a positive DA of 0.547 (analysing the raw data, CGR may be an outlier due to the significant negative cash from operations in 2014). In 2015, the trend was similar. However, there were fewer firms with negative DA (only five) and the outliers were firms AEG and DAW (similar to CGR, for AEG and DAW it appears this is caused by significant negative cash flows from operations).

Figure 4. DA-Full Sample (Construction Industry)

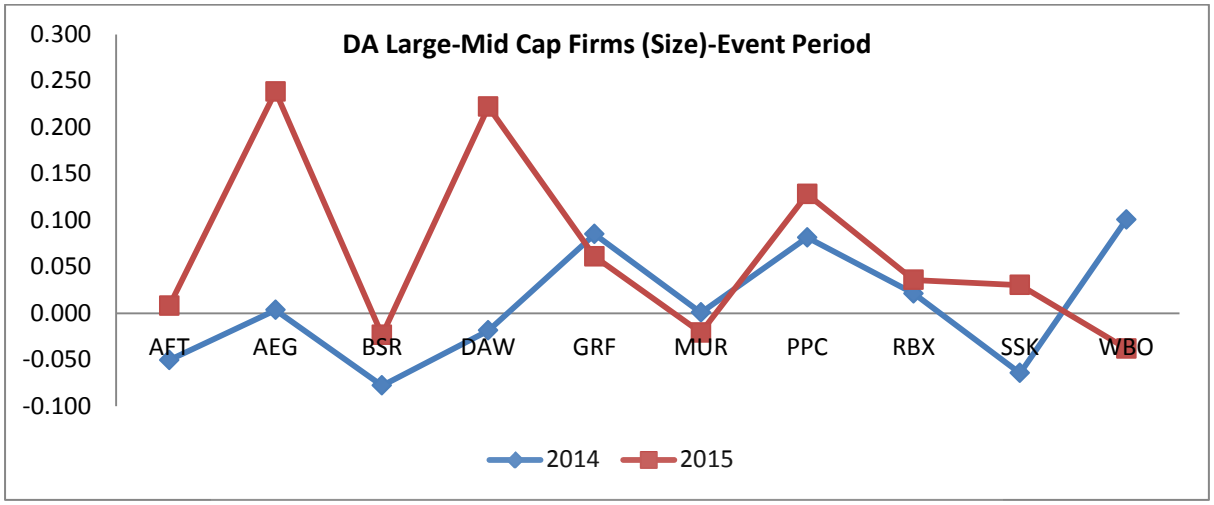


***Source**: Author's own analysis*

Discretionary Accruals- Event Period-Large-Mid Cap Firms (Size)

Figure 5 illustrates the DA amounts for the event period of 2014 and 2015 for the large-mid cap firms. In both 2014 and 2015, there was large variability in the DA figures and in both years there were no outliers. For some firms, there was negative DA for both years (BSR and MUR) while for others DA was positive for both years (AEG, GRF, PPC and RBX). For the remaining firms, the DA alternate between the two periods which is logical given the reversing nature of accruals.

Figure 5. DA-Large-Mid Cap Firms

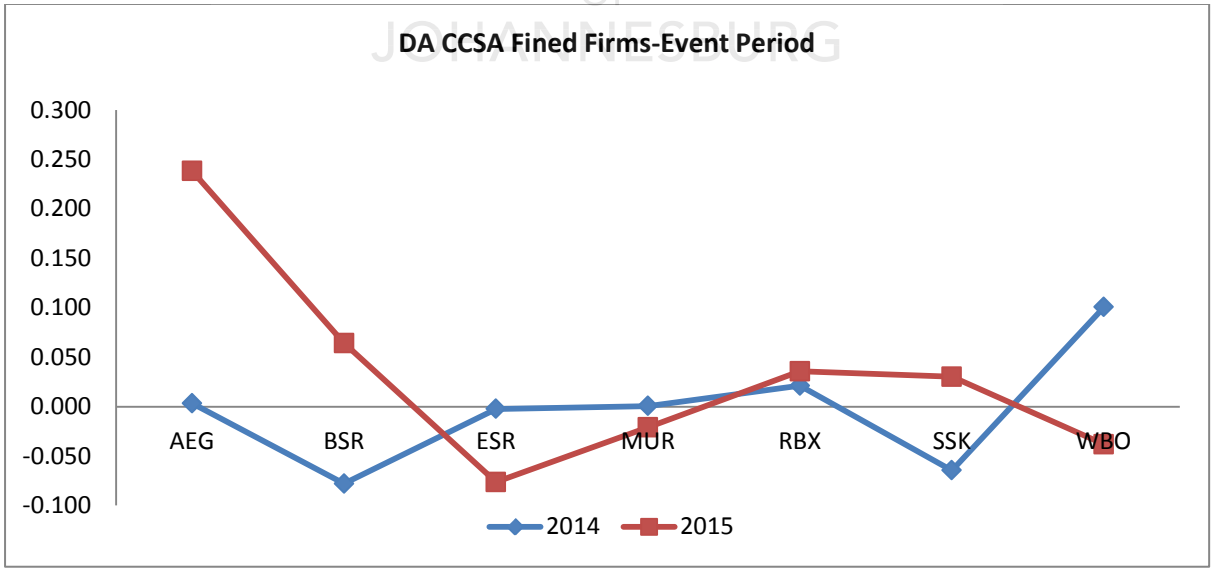


***Source**: Author's own analysis*

Discretionary Accruals- Event Period-CCSA Fined Firms

Lastly, Figure 6 illustrates the DA amounts for the firms that were fined by the CCSA for the event period. In 2014, only WBO had a noticeable positive DA with most of the other firms having either a negative DA or a DA very close to zero with no outlier firms. In 2015, the results were similar with the exception of the one outlier (AEG).

Figure 6. DA-CCSA Fined Firms



***Source**: Author's own analysis*

4.4 T-Test (Hypothesis testing)

4.4.1 H1: Earnings-decreasing accrual-based earnings management was present during the event period

H1 aimed to assess whether DA $\mu_{\text{Construction industry}} < 0$.The null hypothesis of the test was H0: DA $\mu_{\text{construction industry}} \geq 0$

The discretionary accruals for the full sample of firms (construction industry) were found to be earnings-increasing in the event period. This is indicated by the positive DA μ (mean) of 0.037 for 2014 and 0.042 for 2015 in Table 7. This result is contrary to the H1 hypothesis which predicted that earnings-decreasing accrual-based earnings management was present in the event period. As this result went in the opposite direction of the H1 hypothesis prediction, it cannot be statistically significant (this is the case because the study used a one-tailed t-test and made the prediction as to the direction of the result i.e. the DA μ values will be negative).

Thus, because discretionary accruals were found to be actually earnings-increasing in the event period, the H1 hypothesis cannot be accepted and the political cost hypothesis has been rejected for the full sample of construction firms.

Table 7. Discretionary Accruals mean (average) based on the full sample of firms the event periods 2014 & 2015

Average (Full Sample)	**μ_{2014}**	**μ_{2015}**	**No. of firms**	**Sample**
DA	0.037	0.042	15	Full Sample

Source: ***Author's own analysis***

4.4.2 H2: Earnings-decreasing accrual-based earnings management was more prevalent in large and mid-cap firms during the event period.

H2 aimed to assess whether DA $\mu_{\text{large-mid cap}} < 0$.The null hypothesis of the test was H0: DA $\mu_{\text{large-mid cap}} \geq 0$

The discretionary accruals for the large-mid cap firms sample were found to be earnings-increasing in the event period. This is indicated by the positive DA μ (mean) of 0.008 for 2014 and 0.064 for 2015 in Table 8. This result is also contrary to the H2 hypothesis which predicted that earnings-decreasing accrual-based earnings management was more prevalent in large-mid cap firms in the event period. As this result went in the opposite direction of the H2 hypothesis prediction, it cannot be statistically significant (this is the case because the study used a one-tailed t-test and made the prediction as to the direction of the result i.e. the DA μ values will be negative).

Therefore, because discretionary accruals were found to be actually earnings-increasing in the event period, the H2 hypothesis cannot be accepted and the political cost hypothesis is rejected for the large-mid cap firms in the construction industry.

Table 8. Discretionary Accruals mean (average) based on the sample of large-mid cap firms for the event periods 2014 & 2015

Average	μ_{2014}	μ_{2015}	No. of firms	Sample
DA	0.008	0.064	10	Mid-Large Cap Sample

Source: ***Author's own analysis***

4.4.3 H3: Earnings-decreasing accrual-based earnings management was more prevalent in the firms fined by the CCSA during the event period

H3 aimed to assess whether DA $\mu_{\text{fined firms}} < 0$.The null hypothesis of the test was H0: DA $\mu_{\text{fined firms}} \geq 0$

The discretionary accruals of the firms fined by the CCSA were found to be earnings-decreasing in 2014 and earnings-increasing in 2015. The 2014 result is indicated by the negative DA μ (mean) of -0.003 and the 2015 earnings-increasing DA μ is indicated by the value of 0.033 in Table 9.

Table 9. Discretionary Accruals mean (average) based on the sample of firms fined by the CCSA for the event periods 2014 & 2015

Average (Full Sample)	**μ_{2014}**	**μ_{2015}**	**No. of firms**	**Sample**
DA	-0.003	0.033	7	CCSA Fined Firms

Source: ***Author's own analysis***

The negative DA μ in 2014 suggest that firms fined by the CCSA used earnings-decreasing accruals earnings management in at least one of the years of the event period. This result confirms the H3 hypothesis. To test whether result of the H3 hypothesis was statistically significant; a t-test was performed. Table 10 shows the result of the t-test, the t-statistic was -0.121 with a critical value of -1.943 and a corresponding one-tailed P-value of 0.453 indicates that the result was not statistically significant at the 5% level of significance. This result means that even though firms fined by the CCSA had earnings-decreasing discretionary accruals in 2014, the result is not statistically significant enough to be conclusive. The limitation of the study that relates to the limited sample size had an impact on the significance of this result.

The 2015 result is contrary to the H3 hypothesis which predicted that earnings-decreasing accrual-based earnings management was more prevalent firms fined by the CCSA in the event period. As this result went in the opposite direction of the H3 hypothesis prediction, it cannot be statistically significant.

Table 10. Results of null hypothesis between means of discretionary accruals in the event period for the firms fined by the CCSA

CCSA fined firms	**Discretionary Accruals (DA)-2014**
Degrees of freedom:	6
T-Test Statistic	-0.121
Critical t-value (one-tailed):	-1.943
One-tailed probability P(h < x):	0.546
One-tailed probability P(h > x):	0.453
p-value < 5%	No
Null Hypothesis @ 5% level	Not Reject

Source: ***Author's own analysis***

4.5 Summary

The main results of the statistical are summarised below and will be discussed in detail in the Chapter 5:

- The average correlation coefficient for the full sample was 50% and 59% for the large-mid cap firms and CCSA fined firms;
- DA μ (mean) result for full industry and large-mid cap firms' samples was found to be positive i.e. earnings-increasing therefore H1 and H2 hypotheses were rejected;
- DA μ result for the sample of CCSA fined firms was also found to be positive i.e. earnings-increasing in 2015 thus H3 was rejected. However, the DA μ result was actually negative i.e. earnings-decreasing in 2014 (the first year in the event);
- Applying t-test to the 2014 results, the H3 hypothesis had to also be rejected as it was not statistically significant.

5 Discussion, Findings and Conclusion

The primary objective of this study was to investigate the political cost hypothesis using earnings management for the construction industry to establish whether there is empirical evidence that JSE-listed firms in the construction industry used earnings-decreasing accrual-based earnings management to reduce political visibility and associated costs. The main objective was divided into the following sub-objectives:

- To investigate whether earnings-decreasing accrual-based earnings management was present in the industry during the event period (political scrutiny period);
- To investigate whether earnings-decreasing accrual-based earnings management was more prevalent in large-mid cap construction firms during the event period; and
- To investigate whether earnings-decreasing accrual-based earnings management was more prevalent in the firms (firms fined by the CCSA) directly affected by the political process during the event period.

The previous chapter presented the results of the above investigation generated by applying the positivistic research methodology to the sample obtained from the construction industry. This chapter discusses the results from the processed data for discretionary accruals (DA) and the related hypotheses and evaluates them against the literature on political cost hypothesis and earnings management. Lastly, it produces findings based on the discussed results to formulate a conclusion.

The structure of this chapter will therefore be as follows: section 5.1 discusses the sample results; section 5.2 discusses the use of the Modified Jones Model to obtain the results. Sections 5.3 to 5.5 discuss the actual results based on the three hypotheses that are based on the research objectives. The key findings are made in section 5.6 and finally, section 5.8 presents the conclusion and make recommendations for future research.

5.1 Sample

The population comprised of 18 JSE listed construction firms. The final sample consisted of 15 firms after excluding firms with incomplete data for the period under investigation. Data consisted of 135 (15 firms x 9 years) firm-years observations for the analysis.

Compared to previous studies, the firm observations are lower. The Jones study on import relief investigations had 23 firms over 14 years (322) and Chen et al. (2011) had 232 observations in their study (Jones,1995; Chen et al.,2011).

Due to the restricted nature of the study, based on the requirements of a limited scope dissertation, a specific industry under direct and proven political scrutiny was targeted. Furthermore, a trade-off between firm observations and the validity of applying the political cost hypothesis had to be made. As observed in the Jones' (1995) study, the closer the link to a political process, the more restricted the firm observations will be.

Overall, the sample seemed sufficient to conduct the study successfully.

5.2 Modified Jones Model

The discretionary accruals (DA) were calculated for each of the firms for both the estimation and event periods using the Modified Jones Model. There is high variability in the results with some firms presenting positive DA (earnings-increasing accruals) and other having negative DA (earnings-decreasing accruals). The DA μ (mean) for both the industry sample and the large-mid cap firms' sample is found to be positive which contradicts the political cost hypothesis theory. The DA μ (mean) for CCSA firms is negative which confirms the political cost hypothesis. These results are unsurprising as the link to the political process of the industry and large-mid cap sample samples is not as strong as of that of the CCSA firms.

Section 5.3 discusses the above results when t-tests (test for statistical significance) were performed to them for each of the sample categories and related hypothesis.

5.3 Hypothesis 1: Earnings-decreasing accrual-based earnings management was present in the construction industry during the event period

H1 aimed to assess whether DA $\mu_{\text{Construction industry}} < 0$.The null hypothesis for the test was H0: DA $\mu_{\text{construction industry}} \geq 0$.

This hypothesis was based on a sample of the whole construction industry. It was formulated to achieve the objective of investigating whether earnings' decreasing accrual-based earnings management was present in the industry during the political scrutiny period (event period).

The calculated DA μ (mean) for the industry sample is positive meaning that is was earnings-increasing. Therefore, the H3 hypothesis had to be rejected.

Based on these results it appears that, in the event period, there was no earnings-decreasing earnings management in the construction industry as a whole thus rejecting the political cost hypothesis. This result contradicts the evidence of Akhoondnejad et al. (2013) that discovered that there was a significant relation between political costs and earnings management in the Tehran Stock Exchange. However, in the context of this study, this result is not surprising as the CCSA investigation was targeted at specific firms. Therefore, the political cost is lower for the industry in general (there was no obvious incentive to manage earnings).

5.4 Hypothesis 2: Earnings-decreasing accrual-based earnings management was more prevalent in large and mid-cap firms during the event period

H2 aims to assess whether DA $\mu_{\text{large-mid cap}} < 0$. The null hypothesis of the test is H0: DA $\mu_{\text{large-mid cap}} \geq 0$.

This hypothesis was based on a sample of the large-mid cap firms. It was formulated to meet the objective of investigating whether earnings' decreasing accrual-based earnings management was more prevalent in large firms during the political scrutiny period.

The calculated DA μ (mean) for the large-mid cap sample was positive i.e. earnings-increasing. Therefore, the H2 hypothesis is rejected.

According to the above results, it appears that, in the event period, there was no earnings-decreasing earnings management for large-mid cap firms of the construction industry; thus rejecting the political cost hypothesis. This result conflicts several studies that investigated the political cost hypothesis for large firms and found that large firms showed negative discretionary accruals during periods of political scrutiny (Hall, 1993; Han & Wang,1998). This result remains true even when only the DA of the large cap firms is considered (excluding the mid-cap).

5.5 Hypothesis 3: Earnings-decreasing accrual-based earnings management was more prevalent in the firms fined by the CCSA during the event period

H3 aims to assess whether DA $\mu_{\text{fined firms}} < 0$.The null hypothesis of the test is H0: DA $\mu_{\text{fined firms}} \geq 0$.

This hypothesis is based on a sample of construction firms fined by the CCSA and formulated to meet the objective of investigating whether earnings-decreasing accrual-based earnings management was more prevalent in firms directly affected by the political process during the event period because of CCSA investigations.

The calculated DA μ (mean) for the CCSA fined firms was negative (earnings-decreasing) in one of the years of the event period (2014), thus confirming the H3 hypothesis that CCSA fined firms used accruals earnings management. However, when a t-test was performed, the results were found not to be statistically significant. Therefore, the H3 hypothesis had to be rejected for 2014. In the other year of the event period (2015), the result was positive (earnings-increasing) therefore the H3 hypothesis was also rejected.

The above results indicate that, at least in 2014 of the event period, where there are political costs (CCSA fines and investigations), earnings-decreasing earnings management could be detected thus confirming the political cost hypothesis. These results are consistent with the findings of studies that tested the political cost hypothesis where there is a direct political process (Cahan,1992; Jones,1995; Han & Wang,1998). However, as the results were not statistically significant, the result could not be taken to be conclusive. One of the limitations of this study that impacts on the result is the limited number of firm observations that is due to the s number of listed firms that were fined by the CCSA.

5.6 Key Findings

This study found that there were no earnings-decreasing earnings management for the construction industry as a whole during the event period. It also found that firm size was not a significant indicator of political scrutiny as large-mid cap firms were also found not to have earnings-decreasing earnings management. Although some studies have used size to confirm the political cost hypothesis, this study found evidence that this was not a significant factor in the event period.

However, the study found inconclusive evidence of earnings-decreasing earnings management for construction firms that were fined by the CCSA during the event period. This finding is consistent with the studies that tested the political cost hypothesis for firms under direct political scrutiny. This result is not conclusive as it was not statistically significant due to the limited sample size.

5.7 Conclusion and Recommendations

This study examined the impact that political costs had on earnings management during the period of political scrutiny in the construction industry. Specifically, it investigated the effect that CCSA investigations had on construction industry firms' reported earnings. The evidence obtained found that JSE listed firms that were fined by the CCSA had discretionary accruals which confirmed the political cost hypothesis.

However, the results are limited due to the following key reasons: Firstly, the evidence obtained is limited to the construction industry firms that were fined by the CCSA, and therefore constricting a generalisation to other industries or other political processes. Secondly, due to the limited firm observations and small sample size, the results were not statistically significant and therefore not conclusive.

The above limitations indicate that there is scope for future research. This study tested for earnings management only in the event period. It is possible that earnings could have been managed before that period i.e. in the estimation period, and a different study could be undertaken that addresses this. Secondly, the issue relating to the limited sample size could be addressed by future studies that expand the research into all industries that have similar conditions. Lastly, this study was based on the political process from the CCSA. Future studies could look into political costs from other regulatory or government bodies.

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Appendices

A. Individual Company Results (Correlation Coefficient and Discretionary Accruals)

Company Code	Year	Accounts Receivable (AR)	Gross PP&E	Total Assets (TA)	Revenue	Net Income (NI)	Cash From Operations	Prior TA	Prior AR	Prior Revenue	Total Accruals (NI-CFO)	Total Accruals/ Prior TA	Chg Cash Revenue /Prior TA	PPE/Prior TA	β1 (intercept)	β2 (ChgCashRev)	β3 (PPE)	Non Discretionary Accruals (NDA)	Discretionary Accruals (DA)
AFT	2006	0	0	0	0	0	0	0	0	0	0	0	0	0	-0.0024023	0.172597235	-0.24164	-0.002402315	0.00240
AFT	2007	110,812	190,531	550,069	349,032	53,388	75,875	0	0	0	-22,487	0	0	0	-0.0024023	0.172597235	-0.24164	-0.002402315	0.00240
AFT	2008	120,474	309,675	766,202	602,252	95,409	114,526	550,069	110,812	349,032	-19,117	-0.03475	0.442777	0.562975	-0.0024023	0.172597235	-0.24164	-0.062017234	0.02726
AFT	2009	132,367	382,539	860,369	687,091	58,097	119,505	766,202	120,474	602,252	-61,408	-0.08015	0.095205	0.499267	-0.0024023	0.172597235	-0.24164	-0.106612836	0.02647
AFT	2010	130,956	385,261	843,286	761,147	72,913	166,495	860,369	132,367	687,091	-93,582	-0.10877	0.087715	0.447786	-0.0024023	0.172597235	-0.24164	-0.095465797	-0.01330
AFT	2011	157,121	403,980	952,881	854,496	76,541	164,949	843,286	130,956	761,147	-88,408	-0.10484	0.079669	0.479055	-0.0024023	0.172597235	-0.24164	-0.104410187	-0.00043
AFT	2012	163,548	425,906	1,000,377	996,137	90,917	175,395	952,881	157,121	854,496	-84,478	-0.08866	0.1419	0.446967	-0.0024023	0.172597235	-0.24164	-0.085915588	-0.00274
AFT	2013	195,788	503,615	1,201,264	1,337,585	103,777	216,585	1,000,377	163,548	996,137	-112,808	-0.11277	0.309091	0.503425	-0.0024023	0.172597235	-0.24164	-0.070701469	-0.04206
AFT	2014	307,242	665,347	1,479,417	1,893,129	162,966	310,756	1,201,264	195,788	1,337,585	-147,790	-0.12303	0.369686	0.553872	-0.0024023	0.172597235	-0.24164	-0.072433137	-0.05060
AFT	2015	288,758	727,896	1,567,670	1,985,884	200,342	349,087	1,479,417	307,242	1,893,129	-148,745	-0.10054	0.075191	0.492015	-0.0024023	0.172597235	-0.24164	-0.108314972	0.00777

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.886522
R Square	0.785921
Adjusted R Square	0.700289
Standard Error	0.026113
Observations	8

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right)$$

Company Code	Year	Accounts Receivable (AR)	Gross PP&E	Total Assets (TA)	Revenue	Net Income (NI)	Cash From Operations	Prior TA	Prior AR	Prior Revenue	Total Accruals (NI-CFO)	y Total Accruals/ Prior TA	x Chg Cash Revenue /Prior TA	x PPE/Prior TA	β1 (intercept)	β2 (ChgCashRev)	β3 (PPE)	Non Discretionary Accruals (NDA)	Discretionary Accruals (DA)
AEG	2006	3,463,800	2,083,200	10,013,500	16,053,700	589,400	1,959,000	0	0	0	-1,369,600	0	0	0	-0.063109851	0.546982186	-0.00947	-0.06311	0.06311
AEG	2007	3,940,900	2,533,300	19,509,400	22,093,300	7,484,600	2,834,700	10,013,500	3,463,800	16,053,700	4,649,900	0.464363	0.5555	0.252988	-0.063109851	0.546982186	-0.00947	0.238343	0.22602
AEG	2008	5,345,600	3,512,900	22,008,200	29,621,600	2,309,200	4,760,000	19,509,400	3,940,900	22,093,300	-2,450,800	-0.12562	0.313879	0.180062	-0.063109851	0.546982186	-0.00947	0.106871	-0.23249
AEG	2009	6,320,900	5,062,200	22,715,200	33,771,700	2,101,400	3,300,500	22,008,200	5,345,600	29,621,600	-1,199,100	-0.05448	0.144255	0.230014	-0.063109851	0.546982186	-0.00947	0.013617	-0.06810
AEG	2010	6,862,900	5,146,100	24,142,200	33,981,100	1,872,300	2,198,700	22,715,200	6,320,900	33,771,700	-326,400	-0.01437	-0.01464	0.226549	-0.063109851	0.546982186	-0.00947	-0.07326	0.05890
AEG	2011	8,132,000	6,020,600	24,553,400	34,323,600	1,173,400	626,700	24,142,200	6,862,900	33,981,100	546,700	0.022645	-0.03838	0.249381	-0.063109851	0.546982186	-0.00947	-0.08647	0.10911
AEG	2012	10,442,200	6,664,400	27,948,400	40,885,500	523,200	1,495,200	24,553,400	8,132,000	34,323,600	-972,000	-0.03959	0.173161	0.271425	-0.063109851	0.546982186	-0.00947	0.029036	-0.06862
AEG	2013	13,052,000	6,860,000	30,413,000	51,704,000	459,000	255,000	27,948,400	10,442,200	40,885,500	204,000	0.007299	0.293709	0.245452	-0.063109851	0.546982186	-0.00947	0.095219	-0.08792
AEG	2014	11,797,000	6,432,000	30,987,000	52,959,000	-376,000	131,000	30,413,000	13,052,000	51,704,000	-507,000	-0.01667	0.08253	0.211489	-0.063109851	0.546982186	-0.00947	-0.01997	0.00330
AEG	2015	11,853,000	5,626,000	27,519,000	43,930,000	-518,000	-929,000	30,987,000	11,797,000	52,959,000	411,000	0.013264	-0.29319	0.18156	-0.063109851	0.546982186	-0.00947	-0.2252	0.23846

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right)$$

Regression Statistics	
Multiple R	0.616254
R Square	**0.379769**
Adjusted R Square	0.131677
Standard Error	0.168268
Observations	8

Company Name	Year	Accounts Receivable (AR)	Gross PP&E	Total Assets (TA)	Revenue	Net Income (NI)	Cash From Operations	Prior TA	Prior AR	Prior Revenue	Total Accruals (NI-CFO)	Total Accruals/ Prior TA	Chg Cash Revenue /Prior TA	PPE/Prior TA	β1 (intercept)	β2 (ChgCash Rev)	β3 (PPE)	Non Discretionary Accruals (NDA)	Discretionary Accruals (DA)
BSR	2006	137,692	176,438	630,948	1,162,198	54,960	145,438	0	0	0	-90,478	0	0	0	-0.02241	-0.28393	-0.16179	-0.02241	0.02241
BSR	2007	274,722	489,021	1,319,756	2,010,559	117,642	404,194	630,948	137,692	1,162,198	-286,552	-0.45416	1.1274	0.775058	-0.02241	-0.28393	-0.16179	-0.46791	0.01375
BSR	2008	486,411	761,470	2,476,719	3,474,831	205,842	708,971	1,319,756	274,722	2,010,559	-503,129	-0.38123	0.949102	0.576978	-0.02241	-0.28393	-0.16179	-0.38524	0.00401
BSR	2009	1,261,296	798,490	4,190,576	4,662,492	270,910	613,952	2,476,719	486,411	3,474,831	-343,042	-0.13851	0.166662	0.322398	-0.02241	-0.28393	-0.16179	-0.12189	-0.01661
BSR	2010	1,345,405	873,390	4,377,471	5,389,769	252,218	490,353	4,190,576	1,261,296	4,662,492	-238,135	-0.05683	0.15348	0.208418	-0.02241	-0.28393	-0.16179	-0.09971	0.04288
BSR	2011	1,863,179	1,166,213	4,899,737	6,230,456	134,707	213,172	4,377,471	1,345,405	5,389,769	-78,465	-0.01792	0.073767	0.266413	-0.02241	-0.28393	-0.16179	-0.08646	0.06854
BSR	2012	1,385,190	1,272,127	5,388,436	6,834,146	-196,141	1,063,794	4,899,737	1,863,179	6,230,456	-1,259,935	-0.25714	0.220763	0.259632	-0.02241	-0.28393	-0.16179	-0.1271	-0.13004
BSR	2013	1,437,342	1,143,877	4,718,514	6,304,580	100,491	267,744	5,388,436	1,385,190	6,834,146	-167,253	-0.03104	-0.10796	0.212284	-0.02241	-0.28393	-0.16179	-0.02611	-0.00493
BSR	2014	1,551,982	1,086,074	4,275,777	6,584,810	-742,218	-46,081	4,718,514	1,437,342	6,304,580	-696,137	-0.14753	0.035094	0.230173	-0.02241	-0.28393	-0.16179	-0.06962	-0.07792
BSR	2015	1,465,502	922,446	3,622,361	5,621,409	191,638	-87,143	4,275,777	1,551,982	6,584,810	278,781	0.0652	-0.20509	0.215738	-0.02241	-0.28393	-0.16179	0.000915	0.06429

Regression Statistics	
Multiple R	0.94225
R Square	**0.887835**
Adjusted R Square	0.842968
Standard Error	0.069936
Observations	8

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right)$$

Company Code	Year	Accounts Receivable (AR)	Gross PP&E	Total Assets (TA)	Revenue	Net Income (NI)	Cash From Operations	Prior TA	Prior AR	Prior Revenue	Total Accruals (NI-CFO)	Total Accruals/ Prior TA	Chg Cash Revenue /Prior TA	PPE/Prior TA	β1 (intercept)	β2 (ChgCash Rev)	β3 (PPE)	Non Discretionary Accruals (NDA)	Discretionary Accruals (DA)
CGR	2006	0	0	0	0	0	0	0	0	0	0	0	0	0	0.015493	0.220677	-4.55266	0.015493	-0.01549
CGR	2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0.015493	0.220677	-4.55266	0.015493	-0.01549
CGR	2008	188,487	9,175	479,631	316,677	31,409	-70,521	0	0	0	101,930	0	0	0	0.015493	0.220677	-4.55266	0.015493	-0.01549
CGR	2009	96,587	15,593	571,137	233,054	6,022	97,079	479,631	188,487	316,677	-91,057	-0.18985	0.017257	0.03251	0.015493	0.220677	-4.55266	-0.12871	-0.06114
CGR	2010	61,962	12,643	397,547	188,726	15,488	2,519	571,137	96,587	233,054	12,969	0.022707	-0.01699	0.022137	0.015493	0.220677	-4.55266	-0.08904	0.11174
CGR	2011	61,005	10,508	393,422	281,849	16,955	53,280	397,547	61,962	188,726	-36,325	-0.09137	0.236651	0.026432	0.015493	0.220677	-4.55266	-0.05262	-0.03875
CGR	2012	122,487	9,621	595,883	514,913	65,380	67,371	393,422	61,005	281,849	-1,991	-0.00506	0.436127	0.024455	0.015493	0.220677	-4.55266	0.000402	-0.00546
CGR	2013	190,347	9,988	809,121	798,394	91,304	56,072	595,883	122,487	514,913	35,232	0.059126	0.361851	0.016762	0.015493	0.220677	-4.55266	0.019035	0.04009
CGR	2014	441,107	8,355	1,097,537	784,943	105,695	-252,755	809,121	190,347	798,394	358,450	0.443012	-0.32654	0.010326	0.015493	0.220677	-4.55266	-0.10358	0.54659
CGR	2015	406,014	7,497	1,330,465	932,205	145,629	148,294	1,097,537	441,107	784,943	-2,665	-0.00243	0.166149	0.006831	0.015493	0.220677	-4.55266	0.02106	-0.02349

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right)$$

Regression Statistics	
Multiple R	0.731529
R Square	**0.535135**
Adjusted R Square	0.349189
Standard Error	0.063378
Observations	8

Company Code	Year	Accounts Receivable (AR)	Gross PP&E	Total Assets (TA)	Revenue	Net Income (NI)	Cash From Operations	Prior TA	Prior AR	Prior Revenue	Total Accruals (NI-CFO)	Total Accruals/ Prior TA	Chg Cash Revenue /Prior TA	PPE/Prior TA	β1 (intercept)	β2 (ChgCash Rev)	β3 (PPE)	Non Discretionary Accruals (NDA)	Discretionary Accruals (DA)
DAW	2006	421,678	91,938	1,141,309	1,740,917	143,100	180,915	0	0	0	-37,815	0	0	0	-0.00421	0.009477	-0.29605	-0.00421	0.00421
DAW	2007	591,694	232,268	1,984,869	3,002,544	208,476	284,775	1,141,309	421,678	1,740,917	-76,299	-0.06685	0.956455	0.20351	-0.00421	0.009477	-0.29605	-0.05539	-0.01146
DAW	2008	1,052,429	307,592	2,671,200	3,935,752	275,866	171,934	1,984,869	591,694	3,002,544	103,932	0.052362	0.238037	0.154968	-0.00421	0.009477	-0.29605	-0.04783	0.10019
DAW	2009	690,260	357,489	2,376,267	3,957,256	115,645	355,180	2,671,200	1,052,429	3,935,752	-239,535	-0.08967	0.143633	0.133831	-0.00421	0.009477	-0.29605	-0.04247	-0.04721
DAW	2010	725,471	353,986	2,498,536	3,618,391	114,480	219,208	2,376,267	690,260	3,957,256	-104,728	-0.04407	-0.15742	0.148967	-0.00421	0.009477	-0.29605	-0.0498	0.00573
DAW	2011	773,662	373,996	2,558,797	3,792,631	-28,856	144,838	2,498,536	725,471	3,618,391	-173,694	-0.06952	0.050449	0.149686	-0.00421	0.009477	-0.29605	-0.04804	-0.02148
DAW	2012	834,327	378,031	2,671,385	4,228,261	84,331	267,323	2,558,797	773,662	3,792,631	-182,992	-0.07151	0.14654	0.147738	-0.00421	0.009477	-0.29605	-0.04655	-0.02496
DAW	2013	947,822	440,214	3,082,941	4,588,344	159,235	311,861	2,671,385	834,327	4,228,261	-152,626	-0.05713	0.092307	0.164789	-0.00421	0.009477	-0.29605	-0.05212	-0.00502
DAW	2014	1,007,954	208,621	3,612,836	5,192,228	-11,340	115,762	3,082,941	947,822	4,588,344	-127,102	-0.04123	0.176374	0.067669	-0.00421	0.009477	-0.29605	-0.02257	-0.01866
DAW	2015	1,144,364	252,379	3,701,019	3,951,321	458,162	-240,910	3,612,836	1,007,954	5,192,228	699,072	0.193497	-0.38123	0.069856	-0.00421	0.009477	-0.29605	-0.0285	0.22200

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right)$$

Regression Statistics	
Multiple R	0.346408
R Square	0.119999
Adjusted R Square	-0.232
Standard Error	0.052073
Observations	8

Company Code	Year	Accounts Receivable (AR)	Gross PP&E	Total Assets (TA)	Revenue	Net Income (NI)	Cash From Operations	Prior TA	Prior AR	Prior Revenue	Total Accruals (NI-CFO)	Total Accruals/ Prior TA	Chg Cash Revenue /Prior TA	PPE/Prior TA	β1 (intercept)	β2 (ChgCashRev)	β3 (PPE)	Non Discretionary Accruals (NDA)	Discretionary Accruals (DA)
ESR	2006	28,050	20,463	61,185	125,393	13,339	6,695	0	0	0	6,644	0	0	0	-0.048822	0.009234919	-0.0466	-0.04882	0.04882
ESR	2007	161,549	139,861	465,396	291,392	34,082	41,929	61,185	28,050	125,393	-7,847	-0.12825	0.531176	2.285871	-0.048822	0.009234919	-0.0466	-0.15043	0.02218
ESR	2008	271,914	262,741	758,471	1,017,480	116,002	150,227	465,396	161,549	291,392	-34,225	-0.07354	1.323009	0.564554	-0.048822	0.009234919	-0.0466	-0.06291	-0.01063
ESR	2009	587,069	588,545	1,863,492	1,414,722	143,382	263,282	758,471	271,914	1,017,480	-119,900	-0.15808	0.108227	0.775962	-0.048822	0.009234919	-0.0466	-0.08398	-0.07410
ESR	2010	506,631	596,429	1,647,824	1,857,817	197,641	361,347	1,863,492	587,069	1,414,722	-163,706	-0.08785	0.280942	0.32006	-0.048822	0.009234919	-0.0466	-0.06114	-0.02671
ESR	2011	414,188	565,775	1,464,351	1,366,433	-40,761	133,075	1,647,824	506,631	1,857,817	-173,836	-0.10549	-0.2421	0.343347	-0.048822	0.009234919	-0.0466	-0.06706	-0.03844
ESR	2012	532,396	737,312	1,816,469	1,771,692	18,216	155,460	1,464,351	414,188	1,366,433	-137,244	-0.09372	0.196026	0.503508	-0.048822	0.009234919	-0.0466	-0.07047	-0.02325
ESR	2013	854,439	822,678	2,243,781	2,325,958	87,710	27,077	1,816,469	532,396	1,771,692	60,633	0.03338	0.127843	0.4529	-0.048822	0.009234919	-0.0466	-0.06874	0.10212
ESR	2014	659,928	320,135	1,548,811	2,316,887	-216,339	-88,209	2,243,781	854,439	2,325,958	-128,130	-0.0571	0.082646	0.142677	-0.048822	0.009234919	-0.0466	-0.05471	-0.00240
ESR	2015	559,390	230,932	1,229,067	1,448,363	-99,892	111,687	1,548,811	659,928	2,316,887	-211,579	-0.13661	-0.49586	0.149103	-0.048822	0.009234919	-0.0466	-0.06035	-0.07626

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right)$$

Regression Statistics	
Multiple R	0.491522854
R Square	**0.241594716**
Adjusted R Square	-0.061767398
Standard Error	0.065787985
Observations	8

Company Name	Year	Accounts Receivable (AR)	Gross PP&E	Total Assets (TA)	Revenue	Net Income (NI)	Cash From Operations	Prior TA	Prior AR	Prior Revenue	Total Accruals (NI-CFO)	Total Accruals/ Prior TA	Chg Cash Revenue /Prior TA	PPE/Prior TA	β1 (intercept)	β2 (ChgCash Rev)	β3 (PPE)	Non Discretionary Accruals (NDA)	Discretionary Accruals (DA)
GRF	2006	2,763,834	522,794	4,904,402	5,864,721	169,219	605,159	0	0	0	-435,940	0	0	0	0.014206	0.06926	-0.37581	0.014206	-0.01421
GRF	2007	3,626,823	1,021,382	6,887,774	7,689,168	243,731	94,918	4,904,402	2,763,834	5,864,721	148,813	0.030343	0.19604	0.208258	0.014206	0.06926	-0.37581	-0.05048	0.08083
GRF	2008	4,255,336	1,301,142	9,249,746	8,899,578	457,496	1,817,254	6,887,774	3,626,823	7,689,168	-1,359,758	-0.19742	0.084483	0.188906	0.014206	0.06926	-0.37581	-0.05094	-0.14648
GRF	2009	4,146,471	1,436,915	10,372,870	12,090,236	557,444	1,799,499	9,249,746	4,255,336	8,899,578	-1,242,055	-0.13428	0.356715	0.155346	0.014206	0.06926	-0.37581	-0.01947	-0.11481
GRF	2010	3,823,398	1,368,360	9,950,394	11,337,588	335,779	1,190,994	10,372,870	4,146,471	12,090,236	-855,215	-0.08245	-0.04141	0.131917	0.014206	0.06926	-0.37581	-0.03824	-0.04421
GRF	2011	3,315,795	1,145,121	7,770,978	9,206,998	-141,830	-481,519	9,950,394	3,823,398	11,337,588	339,689	0.034138	-0.16311	0.115083	0.014206	0.06926	-0.37581	-0.04034	0.07448
GRF	2012	3,209,849	893,392	7,589,170	9,093,121	222,729	560,862	7,770,978	3,315,795	9,206,998	-338,133	-0.04351	-0.00102	0.114965	0.014206	0.06926	-0.37581	-0.02907	-0.01444
GRF	2013	3,744,956	950,945	8,804,039	11,199,093	346,654	952,767	7,589,170	3,209,849	9,093,121	-606,113	-0.07987	0.206988	0.125303	0.014206	0.06926	-0.37581	-0.01855	-0.06132
GRF	2014	4,557,386	1,004,182	9,933,050	15,360,444	442,539	372,342	8,804,039	3,744,956	11,199,093	70,197	0.007973	0.380385	0.114059	0.014206	0.06926	-0.37581	-0.00231	0.01029
GRF	2015	4,449,608	954,091	10,265,061	13,875,570	280,401	543,982	9,933,050	4,557,386	15,360,444	-263,581	-0.02654	-0.13864	0.096052	0.014206	0.06926	-0.37581	-0.03149	0.00496

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right)$$

Regression Statistics	
Multiple R	0.376578
R Square	**0.141811**
Adjusted R Square	-0.20146
Standard Error	0.089038
Observations	8

Company Code	Year	Accounts Receivable (AR)	Gross PP&E	Total Assets (TA)	Revenue	Net Income (NI)	Cash From Operations	Prior TA	Prior AR	Prior Revenue	Total Accruals (NI-CFO)	Total Accruals/ Prior TA	Chg Cash Revenue /Prior TA	PPE/Prior TA	β1 (intercept)	β2 (ChgCash Rev)	β3 (PPE)	Non Discretionary Accruals (NDA)	Discretionary Accruals (DA)
KDV	2006	0	0	0	0	0	0	0	0	0	0	0	0	0	-0.03695	-0.34114	0.385068	-0.03695	0.03695
KDV	2007	60,342	23,273	306,555	103,766	2,778	-1,334	0	0	0	4,112	0	0	0	-0.03695	-0.34114	0.385068	-0.03695	0.03695
KDV	2008	67,956	35,914	214,442	440,446	-99,069	25,930	306,555	60,342	103,766	-124,999	-0.40775	1.073432	0.117154	-0.03695	-0.34114	0.385068	-0.35803	-0.04973
KDV	2009	69,506	35,543	195,023	461,236	6,505	38,701	214,442	67,956	440,446	-32,196	-0.15014	0.089721	0.165746	-0.03695	-0.34114	0.385068	-0.00374	-0.14640
KDV	2010	66,122	31,349	203,405	490,652	14,633	18,110	195,023	69,506	461,236	-3,477	-0.01783	0.168185	0.160745	-0.03695	-0.34114	0.385068	-0.03243	0.01460
KDV	2011	68,390	30,765	199,914	483,644	18,179	14,763	203,405	66,122	490,652	3,416	0.016794	-0.0456	0.15125	-0.03695	-0.34114	0.385068	0.036846	-0.02005
KDV	2012	71,366	52,619	233,708	550,920	20,350	33,201	199,914	68,390	483,644	-12,851	-0.06428	0.321638	0.263208	-0.03695	-0.34114	0.385068	-0.04532	-0.01896
KDV	2013	76,306	57,006	258,235	666,218	23,711	13,772	233,708	71,366	550,920	9,939	0.042527	0.472205	0.24392	-0.03695	-0.34114	0.385068	-0.10411	0.14664
KDV	2014	89,893	64,492	337,985	761,739	27,816	61,125	258,235	76,306	666,218	-33,309	-0.12899	0.317285	0.249742	-0.03695	-0.34114	0.385068	-0.04902	-0.07997
KDV	2015	105,858	66,116	388,431	864,568	32,171	37,541	337,985	89,893	761,739	-5,370	-0.01589	0.257005	0.195618	-0.03695	-0.34114	0.385068	-0.0493	0.03341

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right)$$

Regression Statistics	
Multiple R	0.824254
R Square	**0.679395**
Adjusted R Square	0.551153
Standard Error	0.099112
Observations	8

Company Code	Year	Accounts Receivable (AR)	Gross PP&E	Total Assets (TA)	Revenue	Net Income (NI)	Cash From Operations	Prior TA	Prior AR	Prior Revenue	Total Accruals (NI-CFO)	Total Accruals/ Prior TA	Chg Cash Revenue /Prior TA	PPE/Prior TA	β1 (intercept)	β2 (ChgCash Rev)	β3 (PPE)	Non Discretionary Accruals (NDA)	Discretionary Accruals (DA)
MAS	2006	60,625	199,459	353,476	431,962	20,505	47,207	0	0	0	-26,702	0	0	0	-0.00665	0.07293	-0.05759	-0.00665	0.00665
MAS	2007	63,874	231,471	410,057	502,212	38,774	48,440	353,476	60,625	431,962	-9,666	-0.02735	0.189549	0.654842	-0.00665	0.07293	-0.05759	-0.03054	0.00319
MAS	2008	85,884	99,657	492,157	617,360	81,432	60,554	410,057	63,874	502,212	20,878	0.050915	0.227134	0.243032	-0.00665	0.07293	-0.05759	-0.00408	0.05499
MAS	2009	76,447	107,007	482,919	628,746	34,563	51,170	492,157	85,884	617,360	-16,607	-0.03374	0.04231	0.217425	-0.00665	0.07293	-0.05759	-0.01608	-0.01766
MAS	2010	80,808	109,010	495,450	548,521	3,041	31,589	482,919	76,447	628,746	-28,548	-0.05912	-0.17516	0.225731	-0.00665	0.07293	-0.05759	-0.03242	-0.02669
MAS	2011	88,391	107,700	540,330	654,373	9,828	51,772	495,450	80,808	548,521	-41,944	-0.08466	0.198343	0.217378	-0.00665	0.07293	-0.05759	-0.0047	-0.07996
MAS	2012	70,702	112,677	570,492	674,393	31,879	32,903	540,330	88,391	654,373	-1,024	-0.0019	0.069789	0.208534	-0.00665	0.07293	-0.05759	-0.01357	0.01167
MAS	2013	93,165	111,665	599,278	673,236	35,707	20,376	570,492	70,702	674,393	15,331	0.026873	-0.0414	0.195735	-0.00665	0.07293	-0.05759	-0.02094	0.04781
MAS	2014	102,115	112,359	636,525	604,885	22,740	-394	599,278	93,165	673,236	23,134	0.038603	-0.12899	0.187491	-0.00665	0.07293	-0.05759	-0.02685	0.06545
MAS	2015	0	0	0	0	0	0	636,525	102,115	604,885	0	0	-0.78987	0	-0.00665	0.07293	-0.05759	-0.06425	0.06425

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right)$$

Regression Statistics	
Multiple R	0.250979
R Square	0.06299
Adjusted R Square	-0.31181
Standard Error	0.05083
Observations	8

Company Code	Year	Accounts Receivable (AR)	Gross PP&E	Total Assets (TA)	Revenue	Net Income (NI)	Cash From Operations	Prior TA	Prior AR	Prior Revenue	Total Accruals (NI-CFO)	Total Accruals/ Prior TA	Chg Cash Revenue /Prior TA	PPE/Prior TA	β1 (intercept)	β2 (ChgCash Rev)	β3 (PPE)	Non Discretionary Accruals (NDA)	Discretionary Accruals (DA)
MZR	2006	0	0	0	0	0	0	0	0	0	0	0	0	0	-0.00048	-0.01731	0.100037	-0.00048	0.00048
MZR	2007	0	0	0	0	0	0	0	0	0	0	0	0	0	-0.00665	0.07293	-0.05759	-0.00665	0.00665
MZR	2008	25,335	10,359	171,633	177,145	29,992	51,551	0	0	0	-21,559	0	0	0	-0.00665	0.07293	-0.05759	-0.00665	0.00665
MZR	2009	57,388	53,976	251,147	295,632	63,604	54,669	171,633	25,335	177,145	8,935	0.052059	0.503598	0.314485	-0.00665	0.07293	-0.05759	0.011969	0.04009
MZR	2010	49,726	54,612	269,184	267,426	33,768	45,171	251,147	57,388	295,632	-11,403	-0.0454	-0.0818	0.21745	-0.00665	0.07293	-0.05759	-0.02514	-0.02027
MZR	2011	54,605	60,915	261,313	186,769	9,876	-2,987	269,184	49,726	267,426	12,863	0.047785	-0.31776	0.226295	-0.00665	0.07293	-0.05759	-0.04285	0.09064
MZR	2012	50,476	63,377	257,586	229,530	5,801	-12,855	261,313	54,605	186,769	18,656	0.071393	0.17944	0.242533	-0.00665	0.07293	-0.05759	-0.00753	0.07892
MZR	2013	86,085	86,515	364,225	441,488	30,611	33,892	257,586	50,476	229,530	-3,281	-0.01274	0.684622	0.335868	-0.00665	0.07293	-0.05759	0.02394	-0.03668
MZR	2014	75,019	83,868	358,628	470,669	28,413	52,111	364,225	86,085	441,488	-23,698	-0.06506	0.1105	0.230264	-0.00665	0.07293	-0.05759	-0.01185	-0.05322
MZR	2015	57,042	77,794	300,871	371,840	-39,212	9,504	358,628	75,019	470,669	-48,716	-0.13584	-0.22545	0.216921	-0.00665	0.07293	-0.05759	-0.03558	-0.10026

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right)$$

Regression Statistics	
Multiple R	0.314016
R Square	**0.098606**
Adjusted R Square	-0.26195
Standard Error	0.043952
Observations	8

Company Name	Year	Accounts Receivable (AR)	Gross PP&E	Total Assets (TA)	Revenue	Net Income (NI)	Cash From Operations	Prior TA	Prior AR	Prior Revenue	Total Accruals (NI-CFO)	Total Accruals/ Prior TA	Chg Cash Revenue /Prior TA	PPE/Prior TA	β1 (intercept)	β2 (ChgCash Rev)	β3 (PPE)	Non Discretionary Accruals (NDA)	Discretionary Accruals (DA)
MUR	2006	4,352,300	1,991,300	10,385,100	11,919,500	549,500	720,400	0	0	0	-170,900	0	0	0	0.006245	-0.08405	-0.1992	0.006245	-0.00625
MUR	2007	5,212,400	2,536,800	13,010,800	17,873,800	844,400	2,226,300	10,385,100	4,352,300	11,919,500	-1,381,900	-0.13307	0.49053	0.244273	0.006245	-0.08405	-0.1992	-0.08364	-0.04942
MUR	2008	9,319,900	4,175,300	21,648,900	28,175,500	2,039,800	3,608,600	13,010,800	5,212,400	17,873,800	-1,568,800	-0.12058	0.476081	0.32091	0.006245	-0.08405	-0.1992	-0.09769	-0.02288
MUR	2009	8,590,000	4,790,400	23,493,500	35,368,400	2,258,300	2,615,300	21,648,900	9,319,900	28,175,500	-357,000	-0.01649	0.365968	0.221277	0.006245	-0.08405	-0.1992	-0.06859	0.05210
MUR	2010	8,709,000	4,285,100	21,952,300	32,147,500	1,227,100	1,405,600	23,493,500	8,590,000	35,368,400	-178,500	-0.0076	-0.14216	0.182395	0.006245	-0.08405	-0.1992	-0.01814	0.01054
MUR	2011	7,137,100	3,343,400	19,560,500	30,534,800	-982,200	896,100	21,952,300	8,709,000	32,147,500	-1,878,300	-0.08556	-0.00186	0.152303	0.006245	-0.08405	-0.1992	-0.02394	-0.06162
MUR	2012	8,933,000	3,621,800	22,441,400	35,789,000	-511,400	-1,534,600	19,560,500	7,137,100	30,534,800	1,023,200	0.05231	0.1768	0.185159	0.006245	-0.08405	-0.1992	-0.0455	0.09781
MUR	2013	8,898,300	3,054,800	24,531,700	35,574,900	1,211,500	2,119,800	22,441,400	8,933,000	35,789,000	-908,300	-0.04047	-0.00799	0.136123	0.006245	-0.08405	-0.1992	-0.0202	-0.02028
MUR	2014	7,449,300	3,248,400	19,810,600	38,064,400	976,900	1,786,700	24,531,700	8,898,300	35,574,900	-809,800	-0.03301	0.160547	0.132416	0.006245	-0.08405	-0.1992	-0.03363	0.00062
MUR	2015	7,860,800	3,038,300	18,802,900	30,655,100	861,900	1,101,200	19,810,600	7,449,300	38,064,400	-239,300	-0.01208	-0.39478	0.153367	0.006245	-0.08405	-0.1992	0.008873	-0.02095

Regression Statistics	
Multiple R	0.565631
R Square	**0.319938**
Adjusted R Square	0.047913
Standard Error	0.06262
Observations	8

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right)$$

Company Code	Year	Accounts Receivable (AR)	Gross PP&E	Total Assets (TA)	Revenue	Net Income (NI)	Cash From Operations	Prior TA	Prior AR	Prior Revenue	Total Accruals (NI-CFO)	Total Accruals/ Prior TA	Chg Cash Revenue /Prior TA	PPE/Prior TA	β1 (intercept)	β2 (ChgCash Rev)	β3 (PPE)	Non Discretionary Accruals (NDA)	Discretionary Accruals (DA)
PPC	2006	831,800	1,413,600	4,355,500	4,686,400	1,206,300	2,050,800	0	0	0	-844,500	0	0	0	0.007835	-0.15268	-0.34003	0.007835	-0.00783
PPC	2007	698,000	2,178,000	4,882,000	5,566,000	1,429,000	2,242,000	4,355,500	831,800	4,686,400	-813,000	-0.18666	0.232671	0.500057	0.007835	-0.15268	-0.34003	-0.19772	0.01106
PPC	2008	751,000	2,813,000	4,534,000	6,248,000	1,499,000	2,562,000	4,882,000	698,000	5,566,000	-1,063,000	-0.21774	0.128841	0.576198	0.007835	-0.15268	-0.34003	-0.20776	-0.00998
PPC	2009	819,000	3,941,000	5,819,000	6,783,000	1,128,000	2,614,000	4,534,000	751,000	6,248,000	-1,486,000	-0.32775	0.103	0.86921	0.007835	-0.15268	-0.34003	-0.30345	-0.02430
PPC	2010	827,000	4,175,000	6,112,000	6,807,000	1,010,000	2,449,000	5,819,000	819,000	6,783,000	-1,439,000	-0.24729	0.00275	0.717477	0.007835	-0.15268	-0.34003	-0.23655	-0.01074
PPC	2011	901,000	4,287,000	6,419,000	6,826,000	865,000	2,110,000	6,112,000	827,000	6,807,000	-1,245,000	-0.2037	-0.009	0.701407	0.007835	-0.15268	-0.34003	-0.22929	0.02559
PPC	2012	820,000	4,483,000	6,907,000	7,346,000	846,000	2,294,000	6,419,000	901,000	6,826,000	-1,448,000	-0.22558	0.093628	0.698395	0.007835	-0.15268	-0.34003	-0.24394	0.01836
PPC	2013	1,007,000	5,522,000	8,876,000	8,316,000	931,000	2,889,000	6,907,000	820,000	7,346,000	-1,958,000	-0.28348	0.113363	0.799479	0.007835	-0.15268	-0.34003	-0.28132	-0.00216
PPC	2014	1,152,000	7,223,000	11,575,000	9,039,000	849,000	2,601,000	8,876,000	1,007,000	8,316,000	-1,752,000	-0.19739	0.065119	0.813767	0.007835	-0.15268	-0.34003	-0.27881	0.08143
PPC	2015	1,224,000	10,648,000	15,257,000	9,227,000	661,000	2,727,000	11,575,000	1,152,000	9,039,000	-2,066,000	-0.17849	0.010022	0.919914	0.007835	-0.15268	-0.34003	-0.30649	0.12801

Regression Statistics	
Multiple R	0.984754
R Square	0.96974
Adjusted R Square	0.957636
Standard Error	0.019928
Observations	8

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right)$$

Company Code	Year	Accounts Receivable (AR)	Gross PP&E	Total Assets (TA)	Revenue	Net Income (NI)	Cash From Operations	Prior TA	Prior AR	Prior Revenue	Total Accruals (NI-CFO)	Total Accruals/ Prior TA	Chg Cash Revenue /Prior TA	PPE/Prior TA	β1 (intercept)	β2 (ChgCash Rev)	β3 (PPE)	Non Discretionary Accruals (NDA)	Discretionary Accruals (DA)
RBX	2006	0	0	0	0	0	0	0	0	0	0	0	0	0	-0.01462	-0.04249	-0.20287	-0.01462	0.01462
RBX	2007	302,951	290,398	747,120	1,190,860	138,858	203,155	0	0	0	-64,297	0	0	0	-0.01462	-0.04249	-0.20287	-0.01462	0.01462
RBX	2008	442,321	668,365	2,047,181	2,135,778	295,618	448,838	747,120	302,951	1,190,860	-153,220	-0.20508	1.078204	0.894589	-0.01462	-0.04249	-0.20287	-0.24192	0.03684
RBX	2009	762,222	1,212,941	3,453,136	4,162,780	528,854	964,405	2,047,181	442,321	2,135,778	-435,551	-0.21276	0.833879	0.592493	-0.01462	-0.04249	-0.20287	-0.17025	-0.04250
RBX	2010	1,197,773	1,243,360	3,826,410	4,582,883	592,307	797,238	3,453,136	762,222	4,162,780	-204,931	-0.05935	-0.00447	0.360067	-0.01462	-0.04249	-0.20287	-0.08748	0.02813
RBX	2011	1,192,483	1,276,133	4,011,132	4,545,974	447,009	858,489	3,826,410	1,197,773	4,582,883	-411,480	-0.10754	-0.00826	0.333507	-0.01462	-0.04249	-0.20287	-0.08193	-0.02561
RBX	2012	1,460,890	1,353,753	4,386,554	5,032,625	341,197	667,492	4,011,132	1,192,483	4,545,974	-326,295	-0.08135	0.05441	0.337499	-0.01462	-0.04249	-0.20287	-0.0854	0.00405
RBX	2013	1,396,413	1,561,232	4,857,981	5,635,519	318,568	860,044	4,386,554	1,460,890	5,032,625	-541,476	-0.12344	0.15214	0.355913	-0.01462	-0.04249	-0.20287	-0.09329	-0.03015
RBX	2014	1,391,000	1,841,611	5,353,962	6,325,012	379,676	751,420	4,857,981	1,396,413	5,635,519	-371,744	-0.07652	0.143044	0.37909	-0.01462	-0.04249	-0.20287	-0.0976	0.02108
RBX	2015	1,616,019	2,171,829	6,273,382	7,245,259	428,074	785,053	5,353,962	1,391,000	6,325,012	-356,979	-0.06668	0.129853	0.405649	-0.01462	-0.04249	-0.20287	-0.10243	0.03576

Regression Statistics	
Multiple R	0.933449
R Square	0.871326
Adjusted R Square	0.819857
Standard Error	0.034537
Observations	8

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right)$$

Company Code	Year	Accounts Receivable (AR)	Gross PP&E	Total Assets (TA)	Revenue	Net Income (NI)	Cash From Operations	Prior TA	Prior AR	Prior Revenue	Total Accruals (NI-CFO)	Total Accruals/ Prior TA	Chg Cash Revenue /Prior TA	PPE/Prior TA	β1 (intercept)	β2 (ChgCash Rev)	β3 (PPE)	Non Discretionary Accruals (NDA)	Discretionary Accruals (DA)
SSK	2006	0	0	0	0	0	0	0	0	0	0	0	0	0	-0.00164	-0.30932	0.008833	-0.00164	0.00164
SSK	2007	0	0	0	0	0	0	0	0	0	0	0	0	0	-0.00164	-0.30932	0.008833	-0.00164	0.00164
SSK	2008	573,455	358,129	1,832,429	2,544,923	144,418	464,267	0	0	0	-319,849	0	0	0	-0.00164	-0.30932	0.008833	-0.00164	0.00164
SSK	2009	1,567,451	763,246	5,024,040	6,212,899	319,418	1,144,227	1,832,429	573,455	2,544,923	-824,809	-0.45012	1.459254	0.416521	-0.00164	-0.30932	0.008833	-0.44933	-0.00079
SSK	2010	1,568,411	826,202	5,027,783	7,365,023	389,245	793,732	5,024,040	1,567,451	6,212,899	-404,487	-0.08051	0.229131	0.16445	-0.00164	-0.30932	0.008833	-0.07106	-0.00945
SSK	2011	1,778,800	957,093	5,071,386	6,896,418	333,011	269,017	5,027,783	1,568,411	7,365,023	63,994	0.012728	-0.13505	0.190361	-0.00164	-0.30932	0.008833	0.041817	-0.02909
SSK	2012	2,661,103	1,077,583	5,911,032	7,990,718	264,241	97,009	5,071,386	1,778,800	6,896,418	167,232	0.032976	0.041803	0.212483	-0.00164	-0.30932	0.008833	-0.01269	0.04567
SSK	2013	2,674,376	1,199,806	6,199,303	9,329,660	-162,061	313,592	5,911,032	2,661,103	7,990,718	-475,653	-0.08047	0.22427	0.202977	-0.00164	-0.30932	0.008833	-0.06922	-0.01125
SSK	2014	2,444,279	1,215,745	6,298,297	9,423,623	118,824	618,323	6,199,303	2,674,376	9,329,660	-499,499	-0.08057	0.052274	0.19611	-0.00164	-0.30932	0.008833	-0.01607	-0.06450
SSK	2015	2,864,082	1,171,159	6,523,417	10,642,903	259,044	315,890	6,298,297	2,444,279	9,423,623	-56,846	-0.00903	0.126935	0.185949	-0.00164	-0.30932	0.008833	-0.03926	0.03023

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right)$$

Regression Statistics	
Multiple R	0.991037
R Square	**0.982154**
Adjusted R Square	0.975015
Standard Error	0.025125
Observations	8

Company Code	Year	Accounts Receivable (AR)	Gross PP&E	Total Assets (TA)	Revenue	Net Income (NI)	Cash From Operations	Prior TA	Prior AR	Prior Revenue	Total Accruals (NI-CFO)	Total Accruals/ Prior TA	Chg Cash Revenue /Prior TA	PPE/Prior TA	β1 (intercept)	β2 (ChgCash Rev)	β3 (PPE)	Non Discretionary Accruals (NDA)	Discretionary Accruals (DA)
WBO	2006	1,496,103	513,177	3,008,289	5,795,118	229,271	239,965	0	0	0	-10,694	0	0	0				0	0.00000
WBO	2007	1,762,056	752,137	4,248,328	8,127,793	318,304	1,164,459	3,008,289	1,496,103	5,795,118	-846,155	0	0	0				0	0.00000
WBO	2008	3,177,677	1,041,071	7,895,982	10,783,651	762,524	2,502,011	4,248,328	1,762,056	8,127,793	-1,739,487	-0.40945	0.291935	0.245054	0.057396	-0.18891	-0.80036	-0.19389	-0.21557
WBO	2009	3,167,549	1,113,672	9,607,828	14,768,807	962,800	2,053,187	7,895,982	3,177,677	10,783,651	-1,090,387	-0.13809	0.50599	0.141043	0.057396	-0.18891	-0.80036	-0.15108	0.01298
WBO	2010	3,004,848	1,203,768	9,358,093	15,201,095	1,027,511	1,098,140	9,607,828	3,167,549	14,768,807	-70,629	-0.00735	0.061928	0.12529	0.057396	-0.18891	-0.80036	-0.05458	0.04723
WBO	2011	3,527,118	1,433,063	9,491,748	14,766,631	788,766	354,937	9,358,093	3,004,848	15,201,095	433,829	0.046359	-0.10224	0.153136	0.057396	-0.18891	-0.80036	-0.04585	0.09221
WBO	2012	4,903,877	1,657,974	11,246,340	17,893,351	713,160	1,039,399	9,491,748	3,527,118	14,766,631	-326,239	-0.03437	0.184367	0.174675	0.057396	-0.18891	-0.80036	-0.11724	0.08287
WBO	2013	5,154,478	1,949,689	12,337,231	23,773,481	674,905	1,584,228	11,246,340	4,903,877	17,893,351	-909,323	-0.08086	0.500565	0.173362	0.057396	-0.18891	-0.80036	-0.17592	0.09507
WBO	2014	5,885,426	2,163,442	13,397,813	25,776,907	775,267	797,107	12,337,231	5,154,478	23,773,481	-21,840	-0.00177	0.103141	0.175359	0.057396	-0.18891	-0.80036	-0.10244	0.10067
WBO	2015	6,149,164	1,984,417	14,369,164	29,794,065	513,979	2,552,930	13,397,813	5,885,426	25,776,907	-2,038,951	-0.15219	0.280152	0.148115	0.057396	-0.18891	-0.80036	-0.11407	-0.03811

Regression Statistics	
Multiple R	0.678534
R Square	0.460409
Adjusted R Square	0.244572
Standard Error	0.126383
Observations	8

$$DA = \frac{TA}{A_{i,t-1}} - \left(\beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{(\Delta Rev - \Delta Rec)}{A_{i,t-1}} + \beta_3 \frac{PPE}{A_{i,t-1}}\right)$$