

https://dspace.org/

Investigation and comparison of the effect of working capital management on firm profitability between companies within different sectors of the JSE

Greenslade, Kayleigh

2018

https://hdl.handle.net/10539/26680

Greenslade, Kayleigh (2018) Investigation and comparison of the effect of working capital management on firm profitability between companies within different sectors of the JSE, University of the Witwatersrand, Johannesburg, <http://hdl.handle.net/10539/26680>

Downloaded from a DSpace repository. https://dspace.org/

Investigation and comparison of the effect of working capital management on firm profitability between companies within different sectors of the JSE

A Research Report submitted by

Kayleigh Greenslade

Student Number: 712023

Cell: 083 6311 937

Email: kayleighgreenslade@gmail.com

Supervisor: Andres Merino

In partial fulfilment of the requirements for the degree of

Master of Commerce

University of the Witwatersrand

ACKNOWLEDGEMENTS

I would like to thank the following people without whom I would not have been able to carry out this study:

- My supervisor Prof. Andres Merino for his feedback and guidance throughout this process
- Avani Sebastian for all her help with statistics and analysis of results
- Prof. Elsa Botha for her advice regarding my statistics

DECLARATION

I, Kayleigh Greenslade, hereby declare that the thesis entitled “Investigation and comparison of the effect of working capital management on firm profitability between companies within different sectors of the JSE”, submitted to the University of the Witwatersrand under the Faculty of Commerce, Law and Management is the record of the original research done by me under the supervision and guidance of Andres Merino, Associate Professor, School of Accountancy, University of the Witwatersrand. I further declare that no part of the thesis has been submitted elsewhere for the award of any degree, diploma or any other title or recognition.

Kayleigh Greenslade

Date: 12/09/2018

ABSTRACT

This study investigated the effect that working capital management has on company profitability within a South Africa context and determined whether the relationship that was found differed depending on the sector to which the entity belonged. In achieving this objective, companies listed on the JSE were investigated over a five year period extending from 2012- 2016. The results of multiple regression analysis revealed that when the relationship between working capital management and profitability was considered for the Johannesburg Stock Exchange (JSE) as a whole, no significant relationship was observed. However, the analysis of the results by sector revealed that the basic materials, industrials and technology sectors had a significant negative relationship between accounts receivable days and profitability. The basic materials sector revealed a significant positive relationship between accounts payable days and profitability and the technology sector revealed a significant positive relationship between inventory days and profitability. It can thus be seen that the relationship that may exist when considering the JSE as a whole may not be true for companies within a specific sector.

KEYWORDS: Working capital, accounts receivable days, accounts payable days, inventory days, sector, JSE

CONTENTS

CHAPTER 1: INTRODUCTION 7
1.1 THE IMPORTANCE OF WORKING CAPITAL MANAGEMENT 7
1.2 PROBLEM STATEMENT 8
1.3 PURPOSE STATEMENT 9
1.4 SIGNIFICANCE OF THE STUDY 9
1.5 RESEARCH QUESTIONS 10
1.6 ASSUMPTIONS, LIMITATIONS AND DELIMITATIONS 11
1.7 DEFINITION OF TERMS 11
CHAPTER 2: LITERATURE REVIEW 12
2.1 INTRODUCTION 12
2.2 WORKING CAPITAL MANAGEMENT 12
2.2.1 MANAGEMENT OF ACCOUNTS RECEIVABLE 13
2.2.2 MANAGEMENT OF ACCOUNTS PAYABLE 14
2.2.3 MANAGEMENT OF INVENTORY 15
2.3 WORKING CAPITAL POLICIES 15
2.4 FACTORS INFLUENCING COMPANY PROFITS 16
2.4.1 FIRM SIZE 16
2.4.2 LEVERAGE 17
2.4.3 SALES GROWTH 17
2.5 INDUSTRY EFFECT ON WORKING CAPITAL MANAGEMENT 17
2.6 WORKING CAPITAL MANAGEMENT BY SECTOR 19
2.6.1 BASIC MATERIALS 19
2.6.2. CONSUMER GOODS 20
2.6.3 CONSUMER SERVICES 21
2.6.4 HEALTHCARE 21
2.6.5 INDUSTRIALS 22
2.6.6 OIL AND GAS 22
2.6.7 TECHNOLOGY 22
2.6.8 TELECOMMUNICATIONS 23
2.7 THE EFFECT OF WORKING CAPITAL MANAGEMENT ON PROFITABILITY 23
CHAPTER 3: METHODOLOGY 26
3.1 POPULATION AND SAMPLE 26
3.1.1 VARIABLES 26
3.1.2 DATA ANALYSIS 29
3.2 VALIDITY AND RELIABILITY 29
3.3 ASSUMPTIONS 30
3.4 SCOPE AND LIMITATIONS 30

CHAPTER 4: RESULTS 31
4.1 DESCRIPTVE STATISTICS 31
4.1.1 DESCRIPTIVE STATISTICS FOR THE JSE AS A WHOLE 31
4.1.2 DESCRIPTIVE STATISTICS PER SECTOR 33
4.2 REGRESSION ANALYSIS 35
4.2.1 REGRESSION RESULTS FOR THE JSE AS A WHOLE 36
4.2.2 REGRESSION RESULTS PER SECTOR 40
CHAPTER 5: CONCLUSION AND AREAS FOR FUTURE RESEARCH 47
REFERENCE LIST 49
APPENDIX 55
APPENDIX 1: DESCRIPTIVE STATISTICS FOR EACH SECTOR ON THE JSE 55
APPENDIX 2: RESULTS OF THE LAGRANGE MULTIPLIER AND F-TEST 58
APPENDIX 3: CORRELATION MATRIX FOR EACH MODEL FOR THE JSE AS A WHOLE AND PER SECTOR 59
JSE AS A WHOLE 59
BASIC MATERIALS 60
CONSUMER GOODS 61
CONSUMER SERVICES 62
HEALTHCARE 63
INDUSTRIALS 64
OIL AND GAS 65
TECHNOLOGY 66
APPENDIX 4: COOKS DISTANCE PLOTS AND NORMAL QQ PLOTS FOR EACH SECTOR AND MODEL 67
THE JSE 67
BASIC MATERIALS 69
CONSUMER GOODS 71
CONSUMER SERVICES 74
HEALTHCARE 76
INDUSTRIALS 78
OIL AND GAS 80
TECHNOLOGY 82
APPENDIX 5: RESULTS OF THE BREUSCH PAGAN TEST FOR HETEROSCEDASTICITY 84
APPENDIX 6: RESULTS OF THE HAUSMAN TEST 85
APPENDIX 7: REGRESSION RESULTS PER SECTOR 86
BASIC MATERIALS 86
CONSUMER GOODS 87
CONSUMER SERVICES 88
HEALTHCARE 90

INDUSTRIALS....91
OIL AND GAS....92
TECHNOLOGY....94
APPENDIX 8: LIST OF COMPANIES THAT FORMED PART OF THE STUDY....96

CHAPTER 1: INTRODUCTION

1.1 THE IMPORTANCE OF WORKING CAPITAL MANAGEMENT

Working capital is defined as the current assets of an entity that are convertible into cash within one year. Net working capital is the difference between current assets and current liabilities. Current liabilities are those liabilities that an entity has to pay within one year and usually consists of accounts payable, accrued expenditure and can sometimes include short term financing such as a bank overdraft (Correia et al., 2015). As net working capital comprises the current assets and liabilities of the entity, decisions regarding working capital are largely short-term in nature. The importance of these short-term decisions should not be disregarded even though the benefits of these assets may be short-lived (Damodaran, 2015). On inspection of the financial statements for 2016 of the Top 10 companies listed on the JSE, it was found that the ratio of current assets to total assets ranged from 15% to a staggering 74%. In Pakistan over half the assets of manufacturing companies consisted of current assets, with the proportions even higher in distribution companies (Raheman and Nasr, 2007). Deloof (2003) also found that inventory and accounts receivable make up a significant portion of an entity's assets. The management of working capital thus forms an integral part of the operations of companies

Not only do current assets make up a substantial portion of company assets, but the management of current assets and current liabilities consistently require management attention. More than 60% of management's time is spent managing the short-term activities of the entity (Gitman and Maxwell, 1985). The ordinary operations of the entity involve the selling of inventory, which may be on credit and the purchase of inventory, on credit in many cases, thus involving management of each of the components of net working capital on a daily basis. These activities occur on a regular, repetitive basis, taking up much of management's time (Raheman and Nasr, 2007).

The composition and level of short-term assets within an entity cannot be altered as is the case with long-term assets. Flexibility can be brought into long term assets by renting assets rather than buying them or simply selling assets when they are no longer required. This, however is not the case with inventory and accounts receivable (Nazir and Afza, 2009). Greater attention is required to manage these assets and liabilities, especially as the level of current assets and liabilities will fluctuate significantly year on year (Damodaran, 2015). The short-term nature and volatility of working capital

requires rapid and effective decision making to ensure company profitability. The management of accounts receivable, accounts payable and inventory is a major contributor to business success, necessitating further research on the subject (Filbeck and Krueger, 2005).

Companies that are listed on the JSE fall into a number of sectors and sub-sectors (JSE, 2013). The companies that fall within these sectors have different risk profiles and are exposed to different factors, both internal and external to the company. The differences that exist between the sectors will result in different working capital practices which could affect the extent to which working capital will alter company profits (Filbeck and Krueger, 2005).

1.2 PROBLEM STATEMENT

Little attention is given to the effect that short-term company decisions could have on firm profitability. Where the relationship between working capital management and firm profits has been considered, research has focused on firm profitability as a whole, without distinguishing results depending on company sector. Where company sector has been considered, results have been restricted to a specific sector, rather than noting differences between the sectors (Deloof, 2003, Raheman et al., 2010, Padachi, 2006, Jagongo and Makori, 2013).

Most research around the subject of how firm profitability can be increased, has focused on the effect that long term decisions, such as capital structure decisions, can have on the profitability of the entity (Modigliani and Miller, 1958, Myers, 1984, Gill et al., 2011). Much less emphasis has been placed on the effect that short term financing and investing decisions can have on firm profitability. Short term decisions have become of greater importance in the prevailing economy due to the increase in competition and substitute goods. According to The World Bank, 162 715 South African businesses registered with The World Bank from 2004-2014 (The World Bank, 2014). With this increase in competition, it is very difficult to find ways of increasing profit margins other than by increasing firm efficiency and thus reducing costs.

Research has been performed regarding the effect of working capital on firm profitability around the world, with a large amount of research yielding conflicting results (Deloof, 2003, Alipour, 2011, Ngwenya, 2012, Gill et al., 2010). Although research has been performed there are still conflicting views as to what the optimal levels of the components of working capital are. A common finding amongst most research is that a shorter cash conversion cycle will result in an increase in firm

profitability (Deloof, 2003, Raheman and Nasr, 2007, Ngwenya, 2012). However, the relationship between firm profitability and the various components of working capital are inconclusive (Deloof, 2003, Gill et al., 2010, Alipour, 2011, García-Teruel and Martínez-Solano, 2007).

Research, to a certain extent, has been conducted in the area of working capital management within a South African context. However, in relation to the research that has been performed in other parts of the world, there is still a shortage in research focused on short-term decisions. Studies carried out within South Africa have focused on the economy as a whole (Erasmus, 2010, Ngwenya, 2012). This research has not addressed how the relationship between working capital management and firm profitability may differ depending on the sector into which the entity falls (Makori and Jagongo, 2013, Padachi, 2006, Raheman et al., 2010).

1.3 PURPOSE STATEMENT

The purpose of this paper is to identify and compare the effect that working capital management has on the profitability of firms listed on the JSE that fall within different sectors.

1.4 SIGNIFICANCE OF THE STUDY

With the political instability that is currently affecting South Africa and the declining rand, many businesses may suffer and be at risk of poor profitability. The recent junk status credit rating of South Africa may lead to investment in South African companies appearing unattractive. With a lack of foreign investment, local companies may struggle to obtain the necessary funding to ensure company growth and financial prosperity (Beckenstein, 2016). The cost of imports will also increase as the Rand declines, resulting in input costs for companies rising significantly, reducing profit margins. The effects of the weakening Rand can be seen in the case of SAA (South African Airways) where the main input is imported jet fuel. SAA exhibits the effects that poor working capital management can have on entity profits. With the increase in the level of competition in the airline industry and cost savings constantly being passed on to the customer, effective working capital management is required. This has not been applied by SAA where daily working capital needs are funded by borrowings (Ensor, 2017). This is not only true of airline companies. The significance of working capital management on performance is especially apparent in the retail sector. Retail company Edcon has suffered a huge decline in sales as a result of stricter credit granting requirements and credit

terms. Credit sales, which make up more than 45% of total sales, have declined by 12.1% (Magwaza, 2015). Better management of accounts receivable may have prevented this.

It has been found that the greater the political instability of a country, the lower the growth in gross domestic product (GDP) per capita (Alesina et al., 1996). With the instability that is often associated with developing countries like South Africa, it is of great importance to determine how these companies can manage their short term assets and liabilities most effectively and efficiently to avoid expensive long term funding and thus maintain and improve profits.

The last quarter of 2016 saw a decline GDP by 0.3%. This has been followed by a decline of 0,7% in the first quarter of 2017 (Statistics South Africa, 2017). Statistics South Africa revealed that the largest contributors to this decline were the mining and manufacturing industries, where production declined by 11.5% and 3.1% respectively. This is of particular interest as these industries are, for the most part, highly reliant on working capital. The repeated decline in GDP is evidence of poor growth prospects into the future for all South African companies. This will place local companies under pressure to continue to remain profitable, thus making it not only interesting but necessary to determine what the key determinants of company profits are to ensure the survival of South Africa's developing economy.

The management of working capital is of particular importance in developing economies such as South Africa where companies are not able to get the funding that they require for operations from financial institutions which are less developed than their more developed counterparts in developed countries such as the USA (Ge and Qiu, 2007). Given the above factors, research is required to provide conclusive evidence of the effect of working capital on profitability, specifically in relation to companies listed on the JSE, so as to allow South African companies to remain globally competitive

1.5 RESEARCH QUESTIONS

1. Is there a significant relationship between working capital management and firm profitability?
2. Does the relationship between working capital management and profitability differ depending on the firm sector?

1.6 ASSUMPTIONS, LIMITATIONS AND DELIMITATIONS

In this study it will be assumed that working capital management of the company will only comprise of the management of accounts receivable, accounts payable and inventory. Other short term assets and liabilities will not be taken into consideration.

The study will not investigate the effect that working capital management has on profitability of all companies within South Africa; the study will be limited to investigating the relationship between working capital management and firm profitability of companies that are listed on the Johannesburg Stock Exchange (JSE). The results may not hold true for unlisted companies.

Companies that fall within the financial sector of The JSE will be excluded from investigation. The results of the study will thus not be representative of the relationship that may exist between working capital management and profitability for these companies. The reason for the exclusion is that companies within the financial services sector are highly regulated. As such they may not have freedom to adjust the levels of working capital that are maintained by them.

1.7 DEFINITION OF TERMS

Working capital management: Working capital management focuses on how short term cash flows are managed by evaluating their timing, risk and effect on firm value (Gitman and Zutter, 2012).

Cash conversion cycle: The cash conversion cycle measures the amount of time required for the entity to convert cash invested in operations to cash received as a result of operations (Gitman and Zutter, 2012).

Accounts receivable: Amounts due to the entity from sales of inventory to customers (Trade debtors).

Accounts payable: Amounts that an entity has to pay the supplier for the purchase of inventory, that is still outstanding at year-end (Trade creditors).

Inventory: Including raw materials, work in progress and finished goods that will be sold in the entity’s ordinary course of business.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

Much research has been performed to try and identify the effect of working capital management on firm profitability (Deloof, 2003, Erasmus, 2010, Padachi, 2006, Lazaridis and Tryfonidis, 2006). Studies have been performed in many companies and sectors over the world with many of these studies revealing different findings. A longer cash conversion cycle could increase firm profitability by increasing sales as people will have a longer period of time to make payment. It could also, however, decrease profitability due to an increase in bad debts. A shorter cash conversion cycle is likely to increase profits as the entity will have cash on hand to meet short term obligations and lower interest will have to be paid to fund a longer cash conversion cycle (Deloof, 2003). Both arguments are acceptable creating the need to investigate further as to whether there is a clear link between specific working capital management policies and profitability.

Working capital includes only the current assets of the entity. Net working capital, on the other hand, results when the current liabilities of the entity are deducted from the current assets of the entity. Current assets and liabilities are those assets and liabilities that will be receivable or payable within 12 months (Correia et al., 2015). The benefits of short-term assets are usually short lived (Damodaran, 2015). When observing an entity's financial statements many current assets can be identified such as short-term investments and tax receivables. The same can be said for current liabilities, where short term payables such as bank overdrafts and accrued expenditure exist. However, there are three main components of net working capital namely: accounts receivable, accounts payable and inventory (Correia et al., 2015). The effects of only these three components of net working capital on company profitability will be investigated in this study.

The literature review will focus on two main areas: the theoretical foundations and background of working capital management and previous research in the area of the effect working capital management and company profits.

2.2 WORKING CAPITAL MANAGEMENT

In the United States of America, companies identified that a key metric used to determine company well-being is working capital management. It was also found that in more than 80% of companies in the USA, management identified that additional attention needed to be given to the management of

working capital within their companies. This emphasizes the need for further investigation into the optimal management of working capital to aid company success (Palmer, 2011).

Working capital management involves the planning of current assets and liabilities that will be needed to sustain an entity's operations as well as controlling the use of the current assets and liabilities within the entity (Raheman and Nasr, 2007). The working capital of the entity should be managed in such a way as to ensure that the entity does not expose itself to unnecessary levels of risk. Thus the entity should take into consideration the effect that a shortage in working capital will have on the operations of the entity as well as the potential effects, should the entity invest too many resources in working capital (Eljelly, 2004). In managing working capital, management should find a balance between the twin goals of the company, which are liquidity and profitability (Kaur and Singh, 2013a). More liquidity may result in a lower risk of defaulting on short-term commitments, but too much cash could mean lost investment opportunities (Padachi, 2006). The management of working capital is not always as simple as buying more or less inventory. The dynamic nature of business makes working capital requirements difficult to predict and with the lag in information available to a company, may result in the entity investing in levels of working capital that are not operationally efficient (Kaur and Singh, 2013a).

Working capital management and liquidity can be measured in a variety of ways. More traditional measures of working capital management consist of the current ratio (current assets/current liabilities) and the acid test ratio (current assets less inventory/current liabilities). The issue with the use of these ratios is that they only give a view of the liquidity of the entity at a specific point in time and don't consider the dynamic and cyclical nature of cash (Eljelly, 2004). A better measure of liquidity is the cash conversion cycle. The cash conversion cycle measures the number of days from the date of purchase of inventory to the date the inventory is realized in cash, when the inventory is sold. The cash conversion cycle consists of accounts receivable days, accounts payable days and inventory days (Lazaridis and Tryfonidis, 2006). The management of working capital thus comprises the management on inventory, accounts receivable and accounts payable.

2.2.1 MANAGEMENT OF ACCOUNTS RECEIVABLE

The level of accounts receivable within the entity can be altered by the credit terms that are offered by the entity as well as the credit granting requirements of the company. The management of accounts

receivable consists of five tasks, namely: risk assessment of the customer, setting credit terms, financing of the debtor, collection of amounts from the debtor and lastly, while all these tasks take place the risk of default will be borne by the company (Mian and Smith, 1992). An entity is able to alter their accounts receivable management by altering these five areas.

There are a number of advantages to selling on credit such as interest income for late payment and increased sales as goods can be resold if repossessed when customers default (Mian and Smith, 1992). Mian and Smith (1992) outline a number of reasons why an entity would choose to sell goods on credit, including: the cost advantage (it may be more convenient to sell goods on credit especially when shipping of goods is required), market power (by selling on credit companies are able to take advantage of price discrimination) and the fact that selling on credit may provide a tax advantage. Many companies are willing to sell goods on credit as a way to increase sales and to receive larger orders (Lazaridis and Tryfonidis, 2006). Although the company will be able to boost sales, it will also encounter liquidity problems as money will now be invested in accounts receivables rather than other areas of the company. Relaxed credit policies may increase sales. However, they may reduce profits due to bad debts and settlement discounts offered by the company to incentivize payment. Relaxed policies may also reduce liquidity as customers take longer to settle their accounts (Deloof, 2003). Another possible reason for extending credit to customers could be as a result of signaling. Granting trade credit signals to customers that products are of good quality if the entity is willing to accept payment later as the entity is in a way guaranteeing the quality of the goods that they supply (Long et al., 1993). Accounts receivable should be managed in such a way to ensure that a balance is met between increased sales and lower liquidity.

2.2.2 MANAGEMENT OF ACCOUNTS PAYABLE

Much attention is given to the management of the assets of the entity. However, essential to working capital are liabilities, in the form of accounts payable. These liabilities have to be managed efficiently and effectively as is the case with the assets of the entity. Accounts payable arise when goods are purchased from suppliers on credit. Increasing accounts payable could be beneficial to the entity as the company will be receiving an interest free, flexible source of financing. However, increasing accounts payable could result in increased costs for the company as the entity will not be able to take advantage of any settlement discounts that are offered by the supplier. By making purchases on

credit, the entity is also able to inspect the quality of the product that they have bought before committing to payment (Deloof, 2003). However, the entity may also suffer in the long term where suppliers may decide not to supply the company on favorable terms or not to supply the company at all as they fail to pay in a timely manner.

2.2.3 MANAGEMENT OF INVENTORY

The last component of working capital management is the management of inventory. Inventory should be managed in such a way so as to ensure that costs are minimized (Deloof, 2003). These costs include holding costs, ordering costs and costs that are incurred should a stock-out occur. Just-in-time (JIT) inventory management focuses on efficient inventory management with minimal amounts of inventory on hand. JIT focuses on total supply chain management where good relations with suppliers are essential and any unnecessary tasks are eliminated. In this way holding costs such as insurance, storage and costs of obsolescence are reduced (Drury, 2012). Although these costs may be reduced, other costs increase. These costs include ordering costs and the cost should the entity have a stock out.

A lot of managements' time is spent managing working capital to ensure that working capital is at the optimal level to allow for the most profitable operations of the entity. Whether or not a particular business will be successful will hinge upon the effective management of working capital by the company's financial manager. Working capital management is critical to company success (Filbeck and Krueger, 2005)

2.3 WORKING CAPITAL POLICIES

An entity may decide on an aggressive working capital policy or a conservative working capital policy. An aggressive working capital policy involves a small proportion of the assets of the entity consisting of current assets. An aggressive working capital policy will also make use of current liabilities as a major source of funding on the entity. A conservative working capital policy on the other hand is characterized by a high level of current assets with more long-term financing being utilized (Nazir and Afza, 2009). The policy that is selected by a company will depend on the industry in which the entity operates as this my affect the company's ability to pay suppliers or to change credit policies (Filbeck and Krueger, 2005). Nazir and Afza (2009) described an aggressive working capital policy as a policy in which the company faces high risks but are likely to achieve high returns. A more conservative

approach to working capital management would ensure the company has lower risk and as a result, lower levels of return. Nazir and Afza (2009) found that although shareholders place greater value on firms with a more aggressive working capital policy, a company could increase profits by adopting a more conservative approach to working capital management.

Different companies will place different levels of focus on the management of working capital. Some companies will have a relaxed approach to the management of working capital, where investment in working capital occurs as a result of necessity. This form of working capital policy is most prevalent in small businesses. Other companies will have well-established formal working capital policies. It has been found that a formal working capital policy will result in a lower chance of business failure and an increase in profitability (Peel and Wilson, 1996).

Research has indicated that as a general rule less profitable companies will focus on credit management. Large firms that are subject to seasonal sales and potential cash flow difficulties will focus on cash management, while smaller companies tend to direct most of their attention to the management of inventory (Lazaridis and Tryfonidis, 2006). Despite the finding in much research that the longer the time taken for the company to make payment the lower the company profits will be, most entities do make use of the extended credit terms that are offered by suppliers (Wilner, 2000).

2.4 FACTORS INFLUENCING COMPANY PROFITS

Many factors have been found to affect company profits other than working capital management. These variables need to be controlled when determining the effects that working capital management can have on company profitability. There are three main factors that affect company profitability that have been identified in previous research efforts namely: firm size, leverage and sales growth (Padachi, 2006, Deloof, 2003, Lazaridis and Tryfonidis, 2006, García-Teruel and Martínez-Solano, 2007, Nazir and Afza, 2009).

2.4.1 FIRM SIZE

The size of the company is likely to affect the company profits. The larger the company, the greater the capital available to the company as larger companies will have access to greater sources of funding than smaller companies. As a result larger companies will have an increased level of investment and higher profits (Hall and Weiss, 1967). The size of the company may also affect profits as larger companies are able to make use of economies of scale (Glancey, 1998)

2.4.2 LEVERAGE

Capital structure of the company has been found to have a significant effect on company profits. A study was conducted in Ghana over a five year period and it was found that a negative relationship existed between company profits and leverage, as measured using the ratio of total debt to total equity (Abor, 2005).There are a number of theories regarding the optimal capital structure that should be employed by the entity to ensure that returns are maximized. Among these theories is that of Miller and Modigliani (1958). It is understood, in terms of this theory, that there is an optimal capital structure within the entity that will result in the firm value being maximized (Modigliani and Miller, 1958). Another widely believed theory is the Pecking Order Theory in which there are preferred financing sources within the entity (Correia et al., 2015). The most attractive source of funding would be retained earnings as this would reveal little information about the entity and its operations to external parties (Correia et al., 2015). A more recent development reveals that there may be a range of combinations of debt and equity financing within the entity that ensures that the value of the entity is maximized (Correia et al., 2015). The significant focus on capital structure within the field of corporate finance reveals that capital structure has an effect on profit and firm value and thus should be controlled for in the investigation.

2.4.3 SALES GROWTH

The growth in company sales may have an effect on sales that is not as a result of the investment in working capital. High growth will lead to increased sales and thus increased profits which will allow the company to invest more and grow profits into the future. However, the company may grow too quickly without the required resources or force growth in markets where it cannot be sustained (Steffens et al., 2009). Growth thus has an effect on company profits. Company sales growth should thus be controlled for in investigating the effect that working capital management will have on company profits.

2.5 INDUSTRY EFFECT ON WORKING CAPITAL MANAGEMENT

García-Teruel and Martínez-Solano (2007) found in their study of small and medium-sized enterprises (SMEs) that companies within the mining industry and the services sector have the highest return on assets when compared to other sectors, such as trade and agriculture. They also found that the average accounts receivable days differed significantly between the different sectors. The accounts

receivable period was 38 days for retail and wholesale companies. This differed significantly from the average collection periods of other company sectors with the highest collection period being 145 days in the construction industry. Differing periods were also found between the sectors in regard to the inventory days and accounts payable days. The sector with the longest inventory days was the agriculture sector, while the shortest inventory period was observed in the transport and public services sector. In relation to the accounts payable days, retailers took the shortest time to pay suppliers being 56 days, with construction companies taking in excess of 140 days to pay their suppliers.The difference in the periods observed between the different sectors may be an indication that the significance of the relationship between working capital management and profit may be different depending on the sector to which a particular entity belongs.

Research on the effect of industry on working capital management was performed by Beaumont Smith and Fletcher (2009). The study indicated that when working capital management was measured using net liquid balance and working capital requirements, the industry to which the company belonged did not have a signifcant effect on the working capital management of the company (Beaumont Smith and Fletcher, 2009). These findings were consistent with previous research about the effect that industry can have on working capital management (Chiou et al., 2006).

However, other studies have taken place where it has been found that the industry to which an entity belongs does have a significant effect on the working capial management (Hawawini et al., 1986). In the study conducted by Hawawini, Viallet and Vora (1986) over a period of 19 years, it was found that the industry to which the company belonged did have a significant effect on the working capital management when companies were divided into 36 industries and working capital required was used as a measure of working capital. It was also found that companies tend to adopt the working capital policy that is specific to that particular industry.

Filbeck and Krueger (2005) found that companies within the same industry have distinct levels of working capital and these levels tend to remain constant over time. It was also found that distinct differences do exist between working capital management of different industries over time.The conflicting results on the effect that industry can have on working capital management necessitate further research in this area.

2.6 WORKING CAPITAL MANAGEMENT BY SECTOR

The nature of the operations of entities that fall within different sectors of the JSE are significantly different. These differences in operations may result in a different level of emphasis being placed on working capital management and a different ability to change working capital levels as well as a different relationship being observed between the various components of working capital and profits. There are also likely to be different factors at play affecting profits in some sectors that would not be observed in a different sector. Many factors affect working capital such as the state of the economy and the cost of carrying working capital which is affected by the cost of capital (EY, 2016). It is important to note that industries do compete with one another so while one industry may be trying to increase the amount of time to pay their creditors, those creditors are trying to reduce the amount of time taken to collect cash from customers. The result being that working capital doesn't change and has little effect on profits (EY, 2016).

2.6.1 BASIC MATERIALS

Companies that form part of the basic materials sector are primarily involved in mining and refining of metals as well as forestry and chemical production. The operations of the entities that fall within the basic materials sector are thus subject to fluctuations in the prices of their raw materials and require a strong economy in which to operate to ensure that they are successful into the future. In South Africa included in the basic materials sector are companies such as Anglo American, African Rainbow Metals and AECI (JSE, 2013). Anglo American is one of the largest mining companies in the world, involved in the mining of coal, nickel, copper and many other scarce resources (Anglo American, 2017). It can thus be seen that the profitability of these companies, much like many of the diverse mining companies that are listed, is significantly affected by the prices of these commodities in the market, which is affected by demand for the resources (PWC, 2016) . The fact that the output of these types of companies are globally traded gives rise to risk exposure due to volatility in global markets (Tufano, 1996). AECI is involved in chemicals and explosives and is also very involved in mining. They would thus be exposed to the same economic pressures to which mining companies are exposed. Interestingly, research carried out by PWC (2016) indicated that there has been a decline in the profits of basic materials entities despite these entities tightening their working capital management policies. Research carried out by EY (2015) noted that when profits of mining companies increase, there tends to be a decreased focus by management on working capital of the

business, regardless of the fact that the profits may increase due to effective working capital management especially considering the significant investment mining companies have in working capital. It is also important to note that although these conclusions are made for all mining companies, the working capital relationships may differ depending on the commodity involved, differences in mining practices, processing and sales techniques as well as supply-chain trade-offs (EY, 2015). Research carried out in a global context indicated that the cash conversion cycle increased in 2015 for the mining and oil and gas industries, while the rest of the industries managed to reduce their cash conversion cycles (EY, 2016).

2.6.2. CONSUMER GOODS

In a survey that was carried out by PWC it was found that within the consumer goods sector, management was placing an increased emphasis on the management of working capital to fund future expansion (PWC, 2014). It has been found that within the consumer goods sector there is a large spread between the most efficient companies and the worst companies. What is also troubling, is that despite literature indicating that profits could be improved by effectively managing working capital, on average companies within the consumer goods sector were only able to reduce their cash conversion cycle by 1.7 days per year (The Boston Consulting Group, 2010). It may thus not be possible to manage working capital at the level of efficiency required to ensure improved profits (The Boston Consulting Group, 2010). Again, like the mining sector, it is important to note that within the consumer goods sector, a number of entities have significantly different operating cycles. For example within consumer goods exist the spirits sector, the operations of this sector inherently require greater levels of inventory to be on hand than the food and beverage sector, where the cash conversion cycle would be expected to be shorter (The Boston Consulting Group, 2010). Within the consumer goods sector it is very difficult to maintain effective working capital management in the long term and it has been found that many companies actually end up increasing their cash conversion cycles over time (The Boston Consulting Group, 2010). There has been profound change in the environment in which consumer goods companies operate and thus in order to remain profitable working capital practices will need to change in response (EY, 2010). The consumer goods sector is subject to rising input prices which may not be easy to pass on to customers. Entities that have effective management of working capital are thriving in this changing environment. However with prices increasing and weakening supply chains, an appropriate balance needs to be obtained between lean manufacturing,

lead times and customer service, where there is increasingly more focus as global competition becomes stronger (EY, 2010).

2.6.3 CONSUMER SERVICES

The service sector has grown significantly in recent years, making huge contributions to the GDP of countries all over the world. The size of the service sector requires that research be conducted in this area (Sullivan, 1982). The operations of the service sector are significantly different from sectors such as manufacturing. A key difference is that there is little inventory on hand as the provision of services is primarily involved with the provision of intangible items (Sullivan, 1982). Thus one of the components of the cash conversion cycle is virtually missing in some of the companies within the consumer services sector. Customers are highly involved in the operations of service industries and capacity for service delivery must be available immediately (Sullivan, 1982). Due to the complexity of measurement of outputs, it is difficult to implement control systems within service companies which may in turn impact the level of control that can be affected over working capital management within the service sector (Sullivan, 1982).

2.6.4 HEALTHCARE

There are 7 companies listed on the JSE that form part of the Healthcare sector. These companies include companies such as Aspen and Life Healthcare (JSE, 2013). Aspen is a large pharmaceutical company involved in the supply of medication (Aspen, 2017). On the other hand Life provides hospital services to customers (Life Healthcare, 2017). It is thus apparent that the operations of the entities that fall within the Healthcare sector differ significantly; some companies are involved in service delivery while others are involved in the development and sale of pharmaceuticals and as discussed above the operations of the service sector differ significantly from other sectors. Although the operations may be different these companies have much the same customer base and their operations would be integrated with one another. It thus follows that these companies would be affected by many common factors. The PWC report on working capital identifies that the healthcare sector has managed to reduce their levels of net working capital from 2012 by over 4%, however, they do note that the working capital performance of entities within this sector differ significantly (PWC, 2017).

2.6.5 INDUSTRIALS

Industrial companies comprise of companies such as ARB, Esor and Nampak (JSE, 2013). ARB is involved in the supply of electric cables, Esor is a civil engineering and construction group and Nampak is a leading packaging company. The operations of each of these entities include high levels of inventory, despite the fact that they are involved in a large variety of different businesses. These industrial firms are involved in manufacturing and as a result it would be expected that the operating cycle is higher than those non-manufacturing companies. Research into the effect of working capital management in the manufacturing sector found that lower profits were associated with a higher level of accounts receivable and inventory (Padachi, 2006). In manufacturing companies the focus is on inventory when trying to improve working capital management (PWC, 2014). Again there is a huge range in the working capital levels of the companies within the manufacturing sector. This is due to the different operations of the sub-sectors into which companies fall (PWC, 2014).

2.6.6 OIL AND GAS

In recent years oil and gas companies have experienced lower profits due to the decline in the oil price (PWC, 2015). This results in the need to reduce costs and manage working capital effectively to ensure that there is cash on hand to allow growth in the industry (PWC, 2015). With the drop in oil prices, many company projects are becoming unprofitable, resulting in the cost of debt increasing. It is for this reason that an alternative source of funding needs to be found, in this case cash generated from effective working capital management (PWC, 2015). Results of the survey carried out by PWC on oil and gas companies across the globe indicate that profits have declined and the cash efficiency has also declined. It is important to note that improvements need to be made in working capital management in companies all over the world, but particularly in Africa as the efficiency of African companies' cash management are far behind those of their American and European counterparts (PWC, 2015). The effect of working capital management on the profitability of oil and gas companies was investigated in Pakistan and it was found that a company could improve profits by managing their working capital and keeping the cash conversion cycle as short as possible (Shah and Sana, 2005).

2.6.7 TECHNOLOGY

The companies that are listed on the JSE that form part of the technology industry include companies such as Adapt IT, Datacentrix and Mustek. Mustek is involved in the assembly and distribution of

personal computers, while the former two companies are involved in providing customers with IT solutions. Again it can be seen that although these companies form part of the same industry classification on the JSE, their operations are significantly different, with some companies carrying out services and others distribution and sales. The working capital requirements are likely to differ for these companies. Research carried out in India indicates that there is a strong negative relationship between the cash conversion cycle and company profitability when considering companies that form part of the IT sector (Kaur and Singh, 2013b)

2.6.8 TELECOMMUNICATIONS

Included in the telecommunications sector are companies such as MTN and Vodacom. These companies are service providers and as such have little to no inventory on hand (Sullivan, 1982). This means that for these companies a major component of the working capital cycle i.e. inventory, is missing. Telecommunication companies make use of complex billing arrangements and installment sales agreements, all of which place additional pressure on the management of working capital and the ability to change working capital levels (EY, 2014). Again a large variance was noted in the working capital management of the different companies within the telecommunications industry (EY, 2014). The major area of focus for increased working capital efficiency in telecommunications industry is the management of accounts receivable (EY, 2014).

2.7 THE EFFECT OF WORKING CAPITAL MANAGEMENT ON PROFITABILITY

Deloof (2003) tested the relationship between working capital management and profitability of 1009 Belgian firms over the period extending from 1992-1996. A negative relationship was observed between trade payable days and profitability, as measured by gross operating profit (Deloof, 2003). A possible explanation put forward by Deloof for the relationship observed was that less profitable firms will take longer to pay their debts. This finding is an indication that the firm profits drive the working capital management and not the converse. However, an explanation of how the working capital will affect profits is that if companies take an extended period of time to pay trade debtors, they will not be able to take advantage of early settlement discounts that are offered by a number of companies. Deloof (2003) found that when analyzing the relationship between accounts receivable days and profit as well as the relationship between inventory days and profits, a negative relationship existed. Possible explanations posed by Deloof (2003) are that in less profitable companies, customers

require more time to inspect products for quality, resulting in a longer time to receive payment; also the negative relationship with inventory days could be as a result of declining sales, causing a greater level of inventory to be on hand. With a greater level of inventory on hand, many costs increase such as inventory holding costs and costs of obsolescence. With an increase in costs, profits will decrease.

The results of Deloof (2003) were echoed in a Greek environment (Lazaridis and Tryfonidis, 2006). The negative relationship between accounts payable days and firm profits was thought to be as a result of less profitable companies making use of the extended credit terms of suppliers. This links back to the explanation that was posed by Deloof (2003) and hints to the fact that the firm profits may in fact affect the working capital of the entity, rather than the other way round. An interesting explanation posed for the negative relationship between inventory days and firm profitability is that firms that have longer inventory days have more money tied up in working capital and as a result the management of the entity is unable to move those funds to other areas of the entity to ensure the increased profitability of the entity (Lazaridis and Tryfonidis, 2006). The relationship between inventory and profits was, however, considered to be insignificant. Although the findings of Deloof (2003) and Lazaridis and Tryfonidis (2006) reflect the same results in two different economic environments, this is not the case for all investigations that have taken place in the field of working capital management.

Garcia-Teruel and Martinez-Solano (2007) found that like Deloof (2003), when working capital management is measured with reference to the cash conversion cycle, the shorter the cash conversion cycle the greater the profit will be. However, it was found that no significant relationship existed between accounts payable days and firm profits.

Results in conflict to the above three research efforts were found by Alipour (2011). In a study that was conducted on the Tehran stock exchange, a negative relationship was observed between the cash conversion cycle and firm profit (which was measured using gross operating profit). On closer inspection of these results it was found that a negative relationship existed between the accounts receivable days and inventory days and profits and a positive relationship existed between the accounts payable days and gross operating profit (Alipour, 2011). This finding is of particular interest as it is contrary to previous findings where accounts payable days were negatively related to firm

profitability. An entity will thus be able to increase profits by increasing the amount of time that the entity takes to pay its short term liabilities.

This relationship between accounts payable days and firm profits was also observed in research performed by Ngwenya (2012). In a study that took place over a period of five years, 69 firms listed on the JSE were investigated to determine the effects of working capital management on company profitability. It was found that a negative relationship existed between the cash conversion cycle and gross operating profit. Although this relationship was observed, it was also found that the longer the accounts payable days of the entity, the greater the profitability of that entity (Ngwenya, 2012).

Common to all the research discussed up to this point is that a negative relationship exists between the cash conversion cycle of the company and the profitability of the company. However, the individual relationship between each of the components of working capital and profitability has differed. Research into how each of the components of working capital affects profits is required, rather than looking at the cash conversion cycle in totality.

Up to this point most of the research discussed has indicated that the longer the cash conversion cycle of the company, the greater the profitability of the company will be. However, this finding is not true in other research that has been carried out to date.

Working capital management when measured using the cash conversion cycle has a significant positive relationship to gross operating profit (Gill et al., 2010). The research that took place on the New York Stock Exchange yielded results that differed substantially from previous research. Although it was found that a significant relationship existed between working capital as measured using the cash conversion cycle and profits, the direction of the relationship differed. The positive relationship between working capital management and firm profits was observed in an emerging economy environment as well (Abuzayed, 2012).

Research to date has not been conclusive on the specific working capital policy that will ensure increased company profitability. However, what is common to all research that has been discussed in this literature review is that working capital management is a significant determinant of company profitability.

CHAPTER 3: METHODOLOGY

The objective of this paper is to identify whether a significant relationship exists between working capital management and profitability and to determine whether this relationship will differ depending on the sector to which the entity belongs. Two research questions were asked:

1. Is there a significant relationship between working capital management and firm profitability?
2. Does the relationship between working capital management and profit differ depending on the firm sector?

To answer the research questions a quantitative approach was adopted. The data was analyzed using descriptive statistics and multiple regression analysis. Calculation of descriptive statistics took place in Microsoft Excel. All regression analysis took place using the statistical package R. Regression analysis took the form of multiple regression analysis using either ordinary least squares (OLS) or panel data analysis. Panel data regression takes into consideration the heterogeneity of the companies that are investigated. Panel regression also allows for the control of variables that have not been directly observed.

3.1 POPULATION AND SAMPLE

To conduct this study, the population comprised of the companies that are listed on the JSE. The companies were divided into sectors in accordance with the sector classifications as defined by InetBFA. There are 8 main sectors that will be investigated namely: Basic Materials, Consumer Goods, Consumer Services, Healthcare, Industrials, Oil and Gas, Technology and Telecommunications. The financial sector will not be included in the analysis because the working capital policies of financial companies are highly regulated. The sample of the study will thus consist of 192 companies that are listed on the JSE after removing companies that did not have any of the components of working capital that were investigated. The period of the study was the five year period extending from 2012-2016. This is consistent with previous research, where a five year period has been used (Deloof, 2003, Eljelly, 2004, Lazaridis and Tryfonidis, 2006)

3.1.1 VARIABLES

The variables that were used in this study have been informed by previous research. Variables used in this study were extracted from InetBFA. Microsoft Excel was used to calculate the values of the variables. Results were stored in Microsoft Excel and Microsoft Word.

Independent Variables

The independent variables in this study are measures of the working capital management of the entity. The independent variables are calculated using annual year-end balances extracted from the entities' financial statements. The variables used in this study have been used effectively in previous research (Deloof, 2003, Lazaridis and Tryfonidis, 2006, García-Teruel and Martínez-Solano, 2007). There are 4 independent variables that have been used in this study namely:

- Accounts receivable days: Accounts receivable days is defined at the time taken from the date of sale of inventory to the date that cash is received from the customer (Correia et al., 2015). In this study accounts receivable days will be measured as (Accounts receivable/sales) x 365.
- Accounts payable days: Accounts payable days is defined as the time, in days, from the date that inventory is purchased from the supplier to the date that payment for these goods is made (Correia et al., 2015). Accounts payable days will be measured as (Accounts payable/cost of sales) x 365.
- Inventory days: Inventory days is defined as the time from the date of purchase of the inventory to the date of sale of the inventory (Correia et al., 2015). Inventory days will be calculated as (Inventory/cost of sales) x 365.
- Cash conversion cycle: The cash conversion cycle is the most complete measure of working capital (Deloof, 2003). The cash conversion cycle is the combination of the above three measures of working capital and should give a holistic view of the working capital management that is employed by the entity. The cash conversion cycle is calculated as account receivable days plus inventory days less accounts payable days (Correia et al., 2015)

Dependent Variable

The dependent variable in this study will be firm profitability. Firm profits will be measured using return on assets which is defined as: earnings before interest and Tax (EBIT) divided by the total assets of the entity (García-Teruel and Martínez-Solano, 2007, Padachi, 2006). Earnings before interest and tax include the profits that are generated from the ordinary operating activities of the entity. By using this measure of profitability the profit, which is the dependent variable, is aligned with the independent variable being working capital, as working capital decisions are as a result of the ordinary operating

activities of the entity (Lazaridis and Tryfonidis, 2006). The use of operating profit will also minimize the effects that capital structure may have on profit. The use of return on assets as a measure of company profitability will also enable the user to identify how well the entity has used their assets, which include working capital, to generate profits for the entity. Return on assets will allow for an absolute measure of profitability which will be comparable amongst entities.

Control Variables

- Firm size: Firm size is measured as the natural logarithm of sales (Deloof, 2003, Padachi, 2006).
- Sales growth: sales growth is measured as the increase in sales from the prior year: $(sales_1 - sales_0)/sales_0$ (Deloof, 2003, García-Teruel and Martínez-Solano, 2007).
- Leverage: The level of debt financing within an entity will be used as a control variable and will be measured using the debt ratio defined as total debt/ total assets (Deloof, 2003, Lazaridis and Tryfonidis, 2006).

Table 1: Summary of variables, their measures and abbreviations

Return on Assets	Profitability	ROA
Accounts receivable days	Working Capital Management	ARD
Accounts payable days	Working Capital Management	APD
Inventory days	Working Capital Management	ID
Cash conversion cycle	Working Capital Management	CCC
Sales Growth	Control variable: Growth	G
Firm Size	Control variable: Size	S
Debt Ratio	Control variable: Leverage	D
Sector variable	Dummy variable to determine how the relationship will vary according to the company sector	SC
Intercept	Measures the intercept of the regression model	α
Error	Measures the error term in the regression model	e
Beta	Beta is used to determine the direction as well as the strength of the relationship between dependent and independent variables	β

3.1.2 DATA ANALYSIS

The first research question that was answered is: Is there a relationship between working capital management and profits? To answer this question, the four models below were tested. Each of the components of the cash conversion cycle and their relationship to firm profits was tested separately as the significance of the relationship of each component on profits may have differed (García-Teruel and Martínez-Solano, 2007, Gill et al., 2010). Consistent with previous research, company profitability was modelled against the four measures of working capital management (Nazir and Afza, 2009, Padachi, 2006, Deloof, 2003, García-Teruel and Martínez-Solano, 2007)

Model 1: $ROA_{it} = \alpha + \beta_1 ARD_{it} + \beta_2 G_{it} + \beta_3 S_{it} + \beta_4 D_{it} + SC + e_{it}$

Model 2: $ROA_{it} = \alpha + \beta_1 APD_{it} + \beta_2 G_{it} + \beta_3 S_{it} + \beta_4 D_{it} + SC + e_{it}$

Model 3: $ROA_{it} = \alpha + \beta_1 ID_{it} + \beta_2 G_{it} + \beta_3 S_{it} + \beta_4 Dit + SC + e_{it}$

Model 4: $ROA_{it} = \alpha + \beta_1 CCC_{it} + \beta_2 G_{it} + \beta_3 S_{it} + \beta_4 D_{it} + SC + e_{it}$

The next research question that was answered is: Does the relationship between working capital management and profit differ depending on the firm sector? To answer this question multiple regression was again performed. However, to test the second research question, the four models described above were tested for each sector individually to determine whether the relationship observed between working capital management and profitability for the JSE as a whole differed depending on the sector to which the particular entity belonged.

There were only 5 companies within the telecom industry. Accounts receivable days could be calculated for all five companies for all 5 years under review. However, for all the companies over all 5 years there were only 6 observations for the remaining three measures of working capital management. This is an insufficient sample and thus telecommunication companies were excluded from the analysis.

3.2 VALIDITY AND RELIABILITY

Multiple regression analysis is based on a number of assumptions. Appropriate tests were conducted on the variables before panel data analysis was performed to ensure that the results of the multiple

regression analysis are valid and reliable. Correlation matrices were generated for each of the models that were used in the study to determine whether any multicollinearity existed between the independent variables (Pallant, 2013). Cook's Distances were used to identify any outliers in the data and these outliers were removed before conducting the multiple regression analysis (Pallant, 2013). Normal Q-Q plots were generated to test for normality for each model (Pallant, 2013). The Breusch-Pagan test was performed for each model in order to detect any heteroscedasticity (Gujarati, 1995). To test whether any autocorrelation existed, the Hausman test was performed (Gujarati, 1995). In deciding whether panel data analysis or ordinary least squares should be used, the F-test and the Lagrange Multiplier tests were performed (Torres-Reyna, 2010). The study took place over a period of five years. This eliminates any year-on-year fluctuations that may occur.

3.3 ASSUMPTIONS

In calculating the accounts receivable days, the assumption made is that all sales that are made by the entity during the year are credit sales. The same assumption is made when calculating accounts payable days.

The assumption made is that all purchases made by the entity are made on credit. A further assumption is that the cost of sales will be equal to the credit purchases during the year. In reality, this may not be the case.

3.4 SCOPE AND LIMITATIONS

Service companies will form part of the investigation that will be carried out. These companies may not have tangible inventories, which may result in outliers in the results**.** Current assets and liabilities such as accrued expenditure and income received in advance are ignored in the study, even though these may form a large portion of the entities financial statements.

CHAPTER 4: RESULTS

4.1 DESCRIPTVE STATISTICS

The analysis of results for this study will first make reference to descriptive statistics that were calculated to determine the effects of working capital management on profitability. The descriptive statistics were calculated after the outliers that were identified from the Cook's Distance plots were removed from the data set. The table below details the descriptive statistics for the dependent and independent variables of the study to determine the relationship that exists between working capital management and company profitability.

4.1.1 DESCRIPTIVE STATISTICS FOR THE JSE AS A WHOLE

Table 2: Descriptive Statistics for the independent and dependent variables used in the study for all companies listed on the JSE

	Accounts Receivable Days	Accounts Payable Days	Inventory Days	Cash Conversion Cycle	Return on Assets	Size	Growth	Leverage
Mean	92.19	150.91	75.28	16.55	0.08	15.06	0.11	0.47
Standard Error	5.56	16.65	2.71	12.53	0.00	0.07	0.02	0.01
Median	61.71	88.30	63.49	33.20	0.09	15.18	0.08	0.46
Mode	12.22	50.78	26.22	-12.34	0.05	14.70	0.08	0.45
Standard Deviation	151.57	453.55	73.77	341.42	0.12	1.90	0.46	0.17
Range	2310.95	7419.60	617.87	6022.04	1.47	11.04	11.00	1.26

The information included in the table 2 above allows for inferences to be made about the relationship that exists between working capital management and profitability measured using return on assets.

Inspection of the descriptive statistics used in the study indicate that on average companies, regardless of the industry into which they fall, take 92.19 days to receive cash after they have sold goods to customers. The descriptive statistics also indicate that on average, entities take 150.91 days to pay their creditors. It can be inferred from these results that it is most beneficial for entities to increase the amount of time that they take to pay their creditors and as far as possible to minimize the

amount of time that it takes for them to collect debts from their customers, as this is the practice that is followed by most of the entities that are listed on the JSE. The primary objective of an entity is to make a profit (Drury, 2012). It thus follows that the practice that is employed by the majority of the companies on the JSE would be in pursuit of this primary profit objective. It may thus be inferred, based on descriptive statistics, that a shorter cash conversion cycle may increase the profitability of the company.

The range of the accounts receivable days is very high. There is a range of 2310.95. The mean is significantly lower than this range. This may indicatethat the majority of the companies employ a policy of collecting accounts receivables from customers as soon as possible. This is echoed by the mode which shows that the number of accounts receivable days that exists the most in the sample is 12.22 days.

The same can be said for the inventory days. On average companies that are listed on the JSE take 75.28 days to sell their inventory from the date of purchase. The range for inventory days is 617.87. In order for the inventory days to be as low as it is in relation to the range of the sample, the practice of most companies that were investigated would seem be to make inventory days as short as possible. This can be seen in the mode as well, where most companies take 26 days to sell inventory from the date of purchase of this inventory. This is consistent with the view that the shorter the cash conversion cycle the higher the profits of the entity will be.

4.1.2 DESCRIPTIVE STATISTICS PER SECTOR

Table 3: Company sectors and the number of companies in each sector after taking out companies that do not have any components of the cash conversion cycle

Sector	Number of companies
Basic Materials	46[1]
Consumer Goods	19
Consumer Services	40[2]
Healthcare	7
Industrials	64[2]
Oil and Gas	6[1]
Technology	9
Telecommunications	5

Descriptive statistics indicate that most of the firms that were included in the study form part of the industrials sector. The results of the descriptive statistics for the JSE as a whole do not show equal representation of each of the sectors and thus the conclusions that have been drawn from the descriptive statistics for the JSE as a whole may not hold true for all the sectors into which companies fall. The discussion that follows will investigate whether this is the case.

The analysis of the descriptive statistics for each sector identifies that the relationship between the working capital management and profitability is consistent with that observed on the JSE as a whole. The descriptive statistics for each sector are included in Appendix 1. It can be seen that for all sectors the accounts receivable days is lower than the accounts payable days. As an entity has a primary objective of making a profit, one can conclude that the management of working capital would be carried out in a way that ensures that company profits are in fact maximized. The fact, that for all the sectors under review, accounts receivable days are lower than accounts payable days indicates that shortening the accounts receivable days and lengthening the accounts payable days will maximize profits.

[1] Harmony Gold and DRD Gold are included in both the basic materials sector and oil and gas sector
[2] Winhold and Grindrod are included in the consumer services and industrials sectors

When considering the descriptive statistics, it should be noted that there is a huge range of outcomes within each sector. This indicates that within each sector. Companies manage their working capital differently. This may be due to the fact that the sectors include companies that have very different operations. An example of this would be the consumer services sector, where companies range from clothing retailers such as Woolworths to Comair, an airline company.

Although the relationships that are observed between the components of working capital management seem to be similar, the significance of this relationship may differ depending on the sector. From the descriptive statistics, it can be seen that the median accounts receivable days, accounts payable days and inventory days differ substantially depending on the sector. For example, the industrial sector has a median accounts payable days of 91.09 and a median accounts receivable days of 69.57. This is substantially different from the Healthcare sector where the median accounts receivable days is 101.95 and median accounts payable days is 154.96. This may be due to the different regulations that are imposed on the healthcare sector and the different levels of power that these sectors may have to encourage consumers to pay earlier and to delay the payment to suppliers. This differing ability to affect working capital levels may affect the significance of the effect that working capital management can have on firm profitability. This will be explored in greater detail in the sections that follow.

One should also consider the median cash conversion cycle for each of the sectors under review. The cash conversion cycle for the industrial sector is 40.92. This is substantially lower than the cash conversion cycle of the Healthcare sector, where it takes 78.46 days to get cash from customers after inventory has been purchased. This is also significantly different to the median cash conversion cycle of the consumer services sector where the cycle is only 11.73 days. The differences are seen in the remaining four sectors as well. These differences may indicate that the strength of the relationship, if any, between working capital management and profit may differ depending on the company sector.

Up to this point it appears that the relationship between working capital management and profitability is the same regardless of the sector to which an entity belongs. However, a conclusion cannot be based on descriptive statistics alone as the mean may not be representative of the sample as a whole. It is for this reason that regression analysis will be used to determine whether the relationship observed within the descriptive statistics is in fact true.

4.2 REGRESSION ANALYSIS

The decision to use panel data analysis or pooled ordinary least squares (OLS) to determine the relationship between working capital management and profitability was made on a model by model basis. In deciding whether pooled OLS should be used or the fixed effects model should be used the F Test was conducted. In determining whether OLS or the random effects model should be used the Lagrange Multiplier test was carried out (Torres-Reyna, 2010). The results of The Lagrange Multiplier and F Test are included in Appendix 2. Pooled OLS is appropriate where the companies within the sector are very similar. It is thus not necessary to distinguish between each of these companies through the use of panel data.

There are a number of assumptions upon which multiple regression analysis is based. If these assumptions were not tested for and the required steps taken, the results of the regression would not be reliable. Before the regression analysis was performed, the independent variables were tested for multicollinearity. Multicollinearity exists when the independent variables are highly correlated to one another (Pallant, 2013). A correlation matrix was generated for the independent variables for each model for each sector to determine whether any multicollinearity existed between the independent variables. The correlation coefficient was used to determine the strength and direction of the relationship between independent variables (Pallant, 2013). The correlation matrices for each model are included in Appendix 3. It was found that the independent variables are not highly correlated as the r values were below 0.9 for each variable (Pallant, 2013). Thus no multicollinearity was found to exist (Pallant, 2013).

The variables to be used in the study, both independent and dependent, have been tested for any outliers. Outliers were detected through the use of Cook's Distances (Pallant, 2013). The Cook's Distance plots are included in Appendix 4. The outliers that were found for each model were removed from the data before the regression analysis took place.

One of the main assumptions of regression is normality (the residuals should follow a normal distribution around the dependent variables). To test for normality, normal Q-Q plots were generated (Pallant, 2013). The normal Q-Q plots for each of the regression models run are included in Appendix 4. The normal Q-Q plots that were generated identified that the distribution of the residuals approximated a normal distribution for each of the models that were run for each sector. The next

assumption of multiple regression analysis is homoscedasticity (the variances of the residuals around the predicted dependent variable should be the same for all the predicted values). Homoscedasticity was tested using the Breusch-Pagan Test (Gujarati, 1995). The Breusch-Pagan Test reveals whether the variances of the residual values are the same. Where it was found that no homoscedasticity existed, robust covariance estimation was used to estimate the test statistic (Croissant and Millo, 2008). The results of the Breusch-Pagan Test are included in Appendix 5. Lastly, there should be no autocorrelation (autocorrelation states that there should be no correlation between the dependent variables that are observed overtime, this is also known as serial correlation) (Pallant, 2013). To test whether autocorrelation exists between the variables, the Hausman (1987) Test was performed. The Hausman Test involves testing the null hypothesis that no autocorrelation exists. If, when the test is performed, a statistically significant result is found, the null hypothesis must be rejected indicating that there is autocorrelation (Gujarati, 1995). If no autocorrelation exists the random effects panel data regression model will be used. However, if it is found that autocorrelation does exist between the dependent variables, the fixed effects panel data regression model must be used (García-Teruel and Martínez-Solano, 2007). The results of the Hausman Test are included in Appendix 6.

The results of the multiple regression analysis for each model, after all the assumptions upon which multiple regression analysis is based were met, are included in the sections that follow.

4.2.1 REGRESSION RESULTS FOR THE JSE AS A WHOLE

The results of the regression of the 4 models for all the companies listed on the JSE are detailed in the tables that follow. No sector dummy variable was included when the regression analysis was performed for the four models described in chapter 3, as when the Hausman Test was performed it was identified that model 1 to 3 required the fixed effects model to be used. The nature of the fixed effects model dictates that only variables that vary over time will be considered. The sector would remain constant over the five year period under review and the sector variable would be dropped from the fixed effects model. The use of panel data analysis does away with this problem as the model takes into consideration differences that may exist between sample observations.

Table 4: Regression results of Model 1: the effect of accounts receivable days on profit

Variable	Estimate	Standard Error	t value	Pr(>ltl)
Accounts receivable days	-1.0079e-06	1.0598e-06	-0.9510	0.3419560
Growth	7.7660e-03	3.8085e-03	2.0391	0.0418155 *
Size	1.5748e-02	4.2664e-03	3.6911	0.0002407 ***
Leverage	-2.5733e-01	5.2119e-02	-4.9373	9.914e-07 ***

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

The above results indicate that when the companies that are listed on the JSE are considered as a whole there is not a significant relationship between accounts receivable days and profitability as measured using return on assets. The relationship that is identified is that a negative relationship exists between accounts receivable days and return on assets. This is consistent with prior research where it was found that the shorter the accounts receivable days, the higher the profits of the entity would be (Deloof, 2003, Alipour, 2011, Ngwenya, 2012). Possible reasons for this relationship is that companies that have longer accounts receivable days have lower quality goods and the customer requires an extended period of time to inspect the goods for any faults (Deloof, 2003). Another reason could be that while the accounts receivables are outstanding the business will not have cash on hand to invest in the daily operations of the entity and thus profitability is sacrificed (Correia et al., 2015). This is also consistent with the notion of an aggressive working capital management policy. In terms of an aggressive policy the entity aims to keep as few current assets on hand as possible. This ensures the entity does not incur unnecessary costs such as bad debt expense and ensures that the entity has sufficient funds to invest for higher returns (Nazir and Afza, 2009). Although this is a high risk policy, the result is high returns.

Although it can be seen that the shorter the accounts receivable days, the higher the profits of the company will be, the relationship is not significant. That is, whether the entity decides to adopt an aggressive or a conservative approach to management of accounts receivables, the profits of the company will remain largely unchanged. This result may be due to the fact that a number of industries were included in the sample. These industries all vary considerably in their structure and operations. It thus follows that a single relationship may not be identified between profits and accounts receivable days as entities within the sample may not have the same level of control over the working capital

within their businesses. The nature of the goods sold by the entity such as mines is significantly different to the goods sold by entities in the consumer goods industry.

Table 5: Regression results model 2; the effect of accounts payable days on profit

Variable	Estimate	Standard Error	t value	Pr(>ltl)
Accounts Payable Days	1.3673e-05	1.4940e-05	0.9152	0.360490
Growth	2.5976e-02	1.3218e-02	1.9653	0.049870 *
Size	7.5078e-03	2.6610e-03	2.8214	0.004948 **
Leverage	-2.1812e-01	7.3539e-02	-2.9661	0.003143 **

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

The table above details the results of the panel data analysis of model 2 to determine the effects of accounts payable days on profitability. As was the case when considering the effect of accounts receivable days on profitability, when considering all companies listed on the JSE regardless of the sector to which they belong, the relationship between accounts payable days and profitability was found to be insignificant. The relationship that was observed indicated that the longer the accounts payable days of the company, the higher the profitability of that company is expected to be. This is in line with literature, where accounts payable allows the entity to obtain a flexible interest free source of financing (Deloof, 2003). The use of higher accounts payable within the operations of the business is indicative of an aggressive working capital management policy which allows higher returns to be achieved as a result of the higher level of risk that is taken on by the entity. The results are in line with prior research (Ngwenya, 2012, Alipour, 2011). The fact that the relationship between accounts payable days and profit is insignificant is also consistent with many research efforts (García-Teruel and Martínez-Solano, 2007, Deloof, 2003).

Table 6: Regression results Model 3: the effect of inventory days on profit

Variable	Estimate	Standard Error	t value	Pr(>ltl)
Inventory Days	1.4383e-04	7.9235e-05	1.8152	0.07004
Growth	1.1733e-02	8.6821e-03	1.3514	0.17712
Size	3.2013e-02	4.5032e-03	7.1090	3.692e-12***
Leverage	-1.9875e-01	3.3478e-02	-5.9368	5.182e-09 ***

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

The results of model 3 indicate that the longer the inventory days, the higher the profitability of the entity will be. The relationship observed between the inventory days and company profitability, as measured using the return on assets, is not significant. This is consistent with prior research where the length of time from the date of purchase of the inventory to the date of sale is not a significant determinant of the profitability of the company (Lazaridis and Tryfonidis, 2006). Although the significance is consistent with prior research, the direction of the relationship between inventory days and profitability is different to the one expected. The positive relationship observed between inventory management and profitability could be due to the fact that when more inventory is on hand, there is a lower chance of stock outs, which allows lower costs and higher profits (Correia et al., 2015). The possible reason for the inconsistencies observed could be due to the fact that a number of industries are included in the investigation. These industries include companies such as mines and other manufacturing companies where inventory takes a significant amount of time to get ready for sale.

Table 7: Regression results of Model 4; the effect of the cash conversion cycle on profit

Variable	**Estimate**	**Standard Error**	**t value**	**Pr(>ltl)**
(Intercept)	-1.5309e-01	4.9018e-02	-3.1231	0.001859 **
ccc	-1.6328e-05	1.3423e-05	-1.2164	0.224229
size	2.0509e-02	3.1857e-03	6.4378	2.176e-10 ***
growth	1.1511e-02	4.6726e-03	2.4635	0.013985 *
leverage	-1.8375e-01	2.6525e-02	-6.9274	9.302e-12 ***

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 7 above indicates that the shorter the cash conversion cycle the higher the company profitability will be. This is in line with prior research and literature, where it has been found that an aggressive working capital policy with a small base of net working capital will result in a company that experiences higher levels of profitability. However, contrary to most research that has been performed to date, the negative relationship between working capital management and profitability has been found to be insignificant.

4.2.2 REGRESSION RESULTS PER SECTOR

4.2.2.1 BASIC MATERIALS SECTOR

Table 47, in Appendix 7 details the results of model 1 for the basic materials sector. The results indicate that, like the JSE as whole, there is a negative relationship that exists between accounts receivable days and company profitability. This is expected as a more risky, aggressive working capital policy, where debts are collected quickly, is thought to result in increased profits (Nazir and Afza, 2009). Unlike the JSE as a whole, the relationship that has been observed between the accounts receivable days and return on assets is significant at a 10% level of significance. The significant relationship that has been observed could be attributable to the level of commodity risk and currency risk that the basic materials sector is exposed to as well as the volatility of the global markets (Tufano, 1996). It would thus make sense within this context that the quicker the accounts receivables are received from customers the greater the profits will be as the time of exposure to these risks would be reduced.

As Mian and Smith (1992) stated, the accounts receivable days of the entity can be altered by the credit granting requirements of the company as well as the credit terms that are offered by the entity. Both of these factors are within the control of the entity and it would thus be relatively easy to adjust the accounts receivable days to a level that is most profitable to the entity. This is in contrast to accounts payable days and inventory days where reliance has to be placed on external parties such as suppliers to a large extent.

The relationship between accounts payable days and return on assets is detailed in table 48 in Appendix 7.The relationship that has been observed is a significant positive relationship. The direction of this relationship is in line with the relationship that was observed on the JSE as a whole. However, the relationship that exists between accounts payable days and profitability is significant at a 10% level of significance. This again could be explained by the fact that the basic materials sector is subject to a huge amount of exposure to the global economic climate. Thus, by the entity delaying payment to suppliers these firms are able to wait for the global economy to become favourable before making payment. By delaying payment there is a greater chance that the currency will become more favourable to the entity thus enabling lower costs and higher profits to be achieved.

Another possible reason for the positive significant relationship between accounts payable days and profitability could be the size of these basic materials companies. Most companies that fall within this sector are huge multinational organizations. The global reach of these companies may enable them to have economies of scale and they may have power over the supplier enabling the achievement of favourable credit terms. Again the positive relationship is expected, as by lengthening the time from the date of purchase from the supplier to payment, the entity is able to achieve an interest free source of finance (Deloof, 2003).

No significant relationship was found between inventory days and company profitability as measured by return on assets. A possible explanation for this relationship is that within the basic materials sector the output is not perishable and is not usually subject to obsolescence. The holding period would thus not significantly affect profits other than storage costs. This could again be linked to the volatility of the global market for the output of these operations also makes it difficult to control inventory days. It thus makes it unlikely that the entity will be able to manage inventory days in a way that will enable maximum profits.

It has been found that there is no significant relationship between the cash conversion cycle and profitability for companies that fall within the basic materials sector on the JSE. The fact that both the accounts receivable days and accounts payable days were significant, but the inventory days were not significant, which resulted in the cash conversion cycle not being significant indicates that the global decline in demand for commodities has a huge effect on the profit of these basic materials companies (PWC, 2016).

4.2.2.2 CONSUMER GOODS SECTOR

The regression results for the consumer goods sector are given in Tables 51 to 54 in Appendix 7. When looking at the consumer goods sector, no significant relationship was found between any of the components of working capital management and company profitability. The consumer goods sector is subject to rising input prices (EY, 2010). These rising prices place pressure on consumer goods firms and may result in the entity placing attention on other areas and directing their attention away from the effective management of working capital (Correia et al., 2015). This non-significant relationship links to research carried out by The Boston Consulting Group (2010) where it was found that consumer goods companies have great difficulty managing working capital in the long-term. There

thus may not be an effective way to manage working capital to ensure that company profits are maximized. It has been found that the cash conversion cycle of many consumer goods companies has increased in the long-term and that the profit has continued to increase due to other factors (EY, 2010). The cash conversion cycle thus has little effect on the company profitability.

4.2.2.3 CONSUMER SERVICES SECTOR

The results of the regression analysis for the consumer services sector are found in Tables 55-58 in Appendix 7. The results indicate that there is a significant negative relationship at a 10% level of significance between the cash conversion cycle and company profitability, as measured using return on assets. This relationship is consistent with previous research (Deloof, 2003, García-Teruel and Martínez-Solano, 2007, Lazaridis and Tryfonidis, 2006, Ngwenya, 2012). The negative relationship that has been observed means that the profits of the consumer services companies will increase where the amount of time from the date of purchase of inventory to the date of receipt of cash from customers is minimized.

To explain this relationship between the cash conversion cycle and profitability, the relationships with the separate components of the cash conversion cycle, namely: accounts receivable days, accounts payable days and inventory days need to be investigated.

The results in Table 55 indicate that there is a positive relationship between the accounts receivable days and profit. This relationship is not significant. The consumer services sector includes companies such as Woolworths and Lewis. These companies typically have accounts open for customers to purchase goods. Given the fact that the South African economy has been on the decline in recent years with many people having less disposable income, it would make sense that the higher accounts receivable days would lead to higher company profits as the only way that consumers may be willing or even able to purchase goods would be on credit (Statistics South Africa, 2017). One should also note that the companies that fall within the consumer goods sector are extremely varied. It thus may not be appropriate to reach a conclusion on the relationship for the sector as a whole.

Table 56 indicates that there is a non-significant positive relationship between the accounts payable days and profitability as measured using return on assets. This is consistent with prior literature and the results that were observed on the JSE as a whole. By increasing the number of accounts payable

days, the entity is able to make use of interest-free funding to buy raw materials and expand operations (Correia et al., 2015).

Table 57 in Appendix 7 indicates that there is a non-significant negative relationship between inventory days and profitability. Within the consumer services sector there are companies such as Woolworths. These types of companies rely highly on trends to sell their clothing. If these goods are on the shelf for an extended period of time, they will become undesirable and thus will not be sold, reducing profits. Companies such as Pick ‘n Pay, that also form part of the consumer services sector, have a significant amount of inventory on hand that could expire. Thus if these goods are on the shelf for too long they will not be sold, resulting in significant losses. Less stock on hand also allows for holding costs such as storage and insurance to be reduced (Drury, 2012).

Considering the above information it can be concluded that inventory and accounts payable seem to be the major contributors to the significant negative relationship that was found to exist within the consumer services sector. This is reasonable as based on the nature of the operations of the entity there is a significant amount of inventory that is required for these types of businesses. This inventory is then linked to a need to incur trade credit and a reliance on suppliers.

4.2.2.4 HEALTHCARE SECTOR

Table 59 in Appendix 7 indicates that there is not a significant relationship within the Healthcare sector between the level of accounts receivable days and the company profitability as measured using return on assets. In order to understand these results it is necessary to consider the nature of the companies that form part of the Healthcare sector. As discussed in the literature review, the nature of the operations of the entities that form part of the healthcare industry differ significantly. Some companies are involved in the provision of goods while others are involved in the provision of services. Within the Healthcare sector there is a huge reliance on health insurance companies. There is a delay from the date the claim is submitted by the patient to the day that cash is actually received by the hospital or pharmacy. The healthcare sector may thus not be able to exercise as much control over the management of accounts receivable as other sectors may be able to, thus making the effect of accounts receivable days on profit insignificant. Inspection of the results contained in Table 60, 61 and 62 in appendix 7 indicate that there is not a significant relationship between accounts payable days and profitability, inventory days and profitability and the cash conversion cycle and profitability.

4.2.2.5 INDUSTRIALS SECTOR

The results of the regression analysis for the industrials sector are included in Appendix 7 from Table 63 to Table 66. Inspection of the results identifies that profitability is not significantly related to accounts payable days, inventory days or the cash conversion cycle. The results provided in Table 63, however, do indicate that there is a significant negative relationship between accounts receivable days and profitability at a 1% level of significance. This relationship is again consistent with prior research (Alipour, 2011, Lazaridis and Tryfonidis, 2006, García-Teruel and Martínez-Solano, 2007). A possible explanation for this negative relationship could be that goods that are of a higher quality require less time to be inspected and the customer is willing to pay for these goods after a shorter period of time (Deloof, 2003). If accounts receivables are too high, the entity will have too much cash tied up in accounts receivable and will not be able to invest this cash in other areas of the business (Lazaridis and Tryfonidis, 2006). These results were found to be true in other research that focused specifically on the industrial sector (Padachi, 2006).

Included in the industrials sector are a number of construction companies such as: Aveng, Basil Read and Group Five. The operations of these entities include high levels of accounts receivables. It would thus make sense that accounts receivables would have a significant effect on the profits of these entities. Other entities such as Bell and ELB are involved in the provision of heavy machinery. These machines are usually very expensive for the customer and would be associated with accounts receivables being created.

4.2.2.6 OIL AND GAS SECTOR

Inspection of the results of the oil and gas sector reveals that there is not a significant relationship between working capital management and company profitability. Research carried out by PWC (2015) indicates that these oil and gas companies have experienced a decline in cash efficiency. It thus appears that oil and gas companies do not give a significant amount of attention to the management of working capital. The lack of active management may be the cause of the lack of relationship between working capital and profitability.

4.2.2.7 TECHNOLOGY SECTOR

The results of the regression analysis for the technology sector are included in Table 71 to Table 74 in Appendix 7. Table 71 reveals that there is a significant negative relationship between the accounts

receivable days and profitability at a 5% level of significance. This is in line with previous research as well as the results of many of the other sectors where a negative relationship was observed.

A more interesting result that has been observed within the technology sector is that a significant positive relationship exists between the inventory days and the profitability at a 10% level of significance. This is unexpected as technology is usually associated with fast moving inventory that is subject to obsolescence. Included within the technology sector are companies such as Alviva, Cognition, and Datacentrix. These companies are primarily involved in ICT solutions. This involves providing communication and data sharing technologies to clients. In providing these types of solutions to clients, there is usually a lot of client interaction and data and technology solutions need to be tailored to the specific clients' business and strategy (Datacentrix, 2017). Tailored solutions mean that inventory days would increase. The longer inventory days could lead to increased profitability as by spending more time at the customer, the entity may be able to better design ITC solutions to meet the client's needs which could ensure future business.

Within the technology sector, no significant relationship was found between accounts payable days and profitability or the cash conversion cycle and profitability.

4.2.2.8 SUMMARY OF SECTOR RESULTS

	Accounts Receivable days	Accounts payable Days	Inventory Days	Cash Conversion Cycle
JSE	Non-significant	Non-significant	Non-significant	Non-significant
Basic Materials	Significant negative (10%)	Significant positive (10%)	Non-significant	Non-significant
Consumer Goods	Non-significant	Non-significant	Non-significant	Non-significant
Consumer Services	Non-significant	Non-significant	Non-significant	Significant negative (10%)
Healthcare	Non-significant	Non-significant	Non-significant	Non-significant
Industrials	Significant negative (1%)	Non-significant	Non-significant	Non-significant
Oil and Gas	Non-significant	Non-significant	Non-significant	Non-significant
Technology	Significant negative (5%)	Non-significant	Significant positive (10%)	Non-significant

The significance level of the relationship is included in brackets ().

CHAPTER 5: CONCLUSION AND AREAS FOR FUTURE RESEARCH

The results included in chapter 4 indicate that within a South African context, there is not a significant relationship between working capital management and profitability when looking at the JSE as a whole. The results are contradictory to much research that has been carried out in the area of working capital management and profitability, where it was found that working capital should be managed effectively and efficiently to ensure that a company's profits are maximized (Deloof, 2003, García-Teruel and Martínez-Solano, 2007, Nazir and Afza, 2009, Ngwenya, 2012). The lack of relationship between working capital management may be due to the difficulty that is associated with the effective management of working capital levels (Nazir and Afza, 2009).

When considering each sector individually it was found that working capital management and in particular accounts receivable management could significantly affect the company profitability, where three out of the seven sectors under review exhibited a significant negative relationship between accounts receivable days and profitability. The three sectors that had a significant relationship between accounts receivable management and profitability were: basic materials, industrials and technology. The basic materials sector and the industrials sector are the two largest sectors on the JSE. Thus of the 192 companies that were investigated, 119 companies, more than half the companies investigated, exhibited a significant negative relationship between accounts receivable days and profitability. The dominance of a significant relationship between accounts receivable days and profitability may be reflective of the relative ease with which accounts receivable days can be altered in comparison to the other components of net working capital, where the entity is unable to exercise extensive control. An entity would be able to alter the accounts receivable days quite easily through the adjustment of credit terms and credit granting decisions (Mian and Smith, 1992). In answering the question; "does the relationship between working capital management and profitability differ depending on the company sector?" the results indicate that the relationship does seem to be affected by the industry sector. In sectors such as consumer goods, working capital management seemed to have no significant effect on the profit of the company, while in the consumer services sector it was found that the cash conversion cycle significantly affected the company's profitability. The technology sector, unlike any of the other sectors under review, exhibited a significant positive relationship between inventory days and profitability. However, one should consider that there were

only 9 companies in the technology sector, thus cementing the fact that management of accounts receivable days would have the strongest effect on profitability for most companies under review.

The degree to which the relationship between working capital management and profitability differed between sectors does not seem to be very large, especially as it can be seen that the relationship between accounts receivable days and return on assets was common to many sectors under review.

This research has not delved into how factors specific to each specific company would affect the relationship between working capital management and profitability. As the sector classifications used within this study are very broad, an area for further research could be to inspect how within each sector the relationship between working capital management and profitability would be affected by company specific factors. In addition to this a t test could be performed to determine the significance of the difference between the relationship between working capital management and profitability that has been observed within the various JSE sector.

REFERENCE LIST

ABOR, J. 2005. The effect of capital structure on profitability: an empirical analysis of listed firms in Ghana. *The Journal of Risk Finance,* 6**,** 438-445.

ABUZAYED, B. 2012. Working capital management and firms' performance in emerging markets: the case of Jordan. *International Journal of Managerial Finance,* 8**,** 155-179.

ALESINA, A., ÖZLER, S., ROUBINI, N. & SWAGEL, P. 1996. Political instability and economic growth. *Journal of Economic Growth,* 1**,** 189-211.

ALIPOUR, M. 2011. Working Capital Management and Corporate Profitability: Evidence from Iran. *World Applied Sciences Journal,* 12**,** 1093-1099.

ANGLO AMERICAN. 2017. *Anglo American at a Glance* [Online]. Available: https://www.angloamerican.com/about-us/at-a-glance [Accessed 23 October 2017.

ASPEN. 2017. *Aspen Holdings* [Online]. Available: http://www.aspenpharma.com/# [Accessed 24 October 2017.

BEAUMONT SMITH, M. & FLETCHER, L. 2009. Factors influencing working capital management in South Africa. *Management Dynamics: Journal of the Southern African Institute for Management Scientists,* 18**,** 15-24.

BECKENSTEIN, J. 2016. South Africa Country Risk Report 2017. *In:* LEWIN, L. (ed.). London: Business Monitor International Ltd.

CHIOU, J.-R., CHENG, L. & WU, H.-W. 2006. The determinants of working capital management. *Journal of American Academy of Business,* 10**,** 149-155.

CORREIA, C., FLYNN, D., ULIANA, E., WORMALD, M. & DILLON, J. 2015. *Financial Management,* Cape Town, Juta & Company Ltd.

CROISSANT, Y. & MILLO, G. 2008. Panel data econometrics in R: The plm package. *Journal of Statistical Software,* 27**,** 1-43.

DAMODARAN, A. 2015. *Applied Corporate Finance,* New York, John Wiley and Sons Inc.

DATACENTRIX. 2017. *Datacentrix Who we are* [Online]. Available: www.datacentrix.co.za [Accessed 20 Novemenber 2017 2017].

DELOOF, M. 2003. Does Working Capital Managment Affect the Profitability of Belgian Firms? *Journal of Business Finance and Accounting,* 30**,** 573-587.

DRURY, C. 2012. *Management and Cost Accounting,* Hampshire, Cangage Learning

ELJELLY, A. M. 2004. Liquidity-profitability tradeoff: An empirical investigation in an emerging market. *International Journal of Commerce and Management,* 14**,** 48-61.

ENSOR, L. 2017. SAA projects net loss of R853 million. Available: http://www.timeslive.co.za/local/2017/05/15/SAA-projects-net-loss-of-R853-million [Accessed 19 May 2017].

ERASMUS, P. D. 2010. Working capital management and profitability : the relationship between the net trade cycle and return on assets. *Management Dynamics : Journal of the Southern African Institute for Management Scientists,* 19**,** 2-10.

EY. 2010. *Cash on the table: Working capital challenges for consumer products companies* [Online]. Available: http://www.ey.com/gl/en/services/transactions/cash-on-the-table--working-capital-challenges-for-consumer-products-companies [Accessed 23 October 2017.

EY. 2014. *Cash on the line: Telecommunications operators and working capital management 2014* [Online]. EY. Available: http://www.ey.com/Publication/vwLUAssets/EY-cash-on-the-line-2014/$FILE/EY-cash-on-the-line-2014.pdf [Accessed 25 October 2017.

EY. 2015. *Cash in the ground: Working capital management in the mining sector* [Online]. EY. Available: http://www.ey.com/Publication/vwLUAssets/EY-cash-in-the-ground/$FILE/EY-cash-in-the-ground.pdf [Accessed 23 October 2017.

EY. 2016. *All tied up: Working capital management report 2016* [Online]. EY. Available: http://www.ey.com/Publication/vwLUAssets/ey-all-tied-up-working-capital-management-2016/$FILE/ey-all-tied-up-working-capital-management-2016.pdf [Accessed 24 October 2017.

FILBECK, G. & KRUEGER, T. 2005. Industry related differences in working capital management. *Mid-American Journal of Business,* 20**,** 11-18.

GARCÍA-TERUEL, P. J. & MARTÍNEZ-SOLANO, P. 2007. Effects of working capital management on SME profitability. *International Journal of Managerial Finance,* 3**,** 164 - 177.

GE, Y. & QIU, J. 2007. Financial development, bank discrimination and trade credit. *Journal of Banking & Finance,* 31**,** 513-530.

GILL, A., BIGER, N. & MATHUR, N. 2010. The Relationship Between Working Capital Management And Profitability: Evidence From The United States. *Business and Economics Journal,* 2010**,** 1-9.

GILL, A., BIGER, N. & MATHUR, N. 2011. The effect of capital structure on profitability: Evidence from the United States. *International Journal of Management,* 28**,** 3-15.

GITMAN, L. J. & MAXWELL, C. E. 1985. Financial activities of major US firms: Survey and analysis of Fortune's 1000. *Financial Management***,** 57-65.

GITMAN, L. J. & ZUTTER, C. J. 2012. *Principles of managerial finance,* New York, Prentice Hall.

GLANCEY, K. 1998. Determinants of growth and profitability in small entrepreneurial firms. *International Journal of Entrepreneurial Behavior & Research,* 4**,** 18-27.

GUJARATI, D. 1995. *Basic Econometrics,* New York, McGraw-Hill.

HALL, M. & WEISS, L. 1967. Firm size and profitability. *The Review of Economics and Statistics***,** 319-331.

HAWAWINI, G., VIALLET, C. & VORA, A. 1986. Industry influence on corporate working capital decisions. *Sloan Management Review***,** 15-24.

JAGONGO, A. & MAKORI, D. 2013. Working Capital Management and Firm Profitability: Empirical Evidence from Manufacturing and Construction Firms Listed on Nairobi S ecurities Exchange, Kenya. *International Journal of Accounting and Taxation,* 1**,** 1-13.

JSE. 2013. *SA Sector* [Online]. Available: https://www.jse.co.za/services/market-data/indices/ftse-jse-africa-index-series/sa-sector [Accessed 4 April 2017].

KAUR, H. V. & SINGH, S. 2013a. Managing Working Capital Efficiency in Capital Goods Sector in India *Global Business Review,* 14**,** 343-355.

KAUR, V. & SINGH, S. 2013b. Working Capital Management and Profitability: An Empirical Analysis of Information Technology Sector in India. *International Journal of Accounting and Financial Management Research,* 3**,** 211-222.

LAZARIDIS, I. & TRYFONIDIS, D. 2006. Relationship Between Working Capital Management and Profitability of Listed Companies in the Athens Stock Exchange. *Journal of Financial Management and Analysis,* 19**,** 26-35.

LIFE HEALTHCARE. 2017. *Life Healthcare Hospitals* [Online]. Available: http://www.lifehealthcare.co.za/hospitals/ 24 October 2017].

LONG, M. S., MALITZ, I. B. & RAVID, S. A. 1993. Trade credit, quality guarantees, and product marketability. *Financial Management***,** 117-127.

MAGWAZA, N. 2015. Edcon in battle to up credit sales. Available: http://www.iol.co.za/business-report/companies/edcon-in-battle-to-up-credit-sales-1821952 [Accessed 19 May 2017].

MAKORI, D. M. & JAGONGO, A. 2013. Working Capital Management and Firm Profitability: Empirical Evidence from Manufacturing and Construction Firms Listed on Nairobi Securities Exchange, Kenya. *International Journal of Accounting and Taxation,* 1**,** 1-14.

MIAN, S. L. & SMITH, C. W. 1992. Accounts Receivable Management Policy: Theory and Evidence. *The Journal of Finance,* 47**,** 169-200.

MODIGLIANI, F. & MILLER, M. 1958. The cost of capital, corporate finance and the theory of investment. *American Economic Review,* 48**,** 261-97.

MYERS, S. C. 1984. The capital structure puzzle. *Journal of Finance,* 39**,** 575-592.

NAZIR, M. S. & AFZA, T. 2009. Impact of Aggressive Working Capital Management Policy on Firms' Profitability. *IUP Journal of Applied Finance,* 15**,** 19-30.

NGWENYA, S. 2012. The Relationship Between Working Capital Management and Profitability of Companies Listed on the Johannesburg Stock Exchange. *Journal of Modern Accounting and Auditing,* 8**,** 1204-1213.

PADACHI, K. 2006. Trends in Working Capital Management and its Impact on Firms' Performance: An Analysis of Mauritian Small Manufacturing Firms. *International Review of Business Research Papers,* 2**,** 45 -58.

PALLANT, J. 2013. *SPSS survival manual,* Berkshire, McGraw-Hill.

PALMER, B. 2011. WHERE IS YOUR WORKING CAPITAL TODAY? *Business Credit,* 113**,** 40.

PEEL, M. J. & WILSON, N. 1996. Working capital and financial management practices in the small firm sector. *International Small Business Journal,* 14**,** 52-68.

PWC. 2014. *Cash for Growth: Working Capital in he Consumer Goods Sector* [Online]. Available: https://www.pwc.nl/nl/assets/documents/pwc-cash-for-growth-working-capital-consumer.pdf [Accessed 24 October 2017.

PWC. 2015. *Bridging the Gap: 2015 Annual Global Working Capital Survey of the Oil & Gas sector* [Online]. PWC. Available: http://www.pwc.com/gx/en/business-recovery-restructuring-services/working-capital-management/working-capital-survey/2015/assets/2015-working-capital-gas-survey.pdf [Accessed 24 October 2017.

PWC. 2016. *Review of the global trends in the mining industry* [Online]. PWC. Available: https://www.pwc.com/gx/en/mining/pdf/mine-2016.pdf [Accessed 25 October 2017.

PWC. 2017. *Pressure in the system Working Capital Study* [Online]. Available: https://www.pwc.com/gx/en/working-capital-management-services/assets/working-capital-opportunity-2017-2018.pdf#page=6 [Accessed 23 October 2017.

RAHEMAN, A., AFZA, T., QAYYUM, A. & BODLA, M. A. 2010. Working capital management and corporate performance of manufacturing sector in Pakistan. *International Research Journal of Finance and Economics,* 47**,** 156-169.

RAHEMAN, A. & NASR, M. 2007. Working Capital Management And Profitability – Case Of Pakistani Firms. *International Review of Business Research Papers,* 3**,** 279-300.

SHAH, S. A. & SANA, A. 2005. Impact of working capital management on the pofitability of oil and gas sector of Pakistan. *Editor-In-chief or e,* 15**,** 301-307.

STATISTICS SOUTH AFRICA. 2017. *GDP in the fourth quarter of 2016 contracted by 0,3%* [Online]. Available: http://www.statssa.gov.za/?p=9631 [Accessed 19 May 2017.

STEFFENS, P., DAVIDSSON, P. & FITZSIMMONS, J. 2009. Performance configuration over time: Implications for growth-and profit-orientated strategies. *Entrepreneurship Theory and Practice,* 33**,** 125-148.

SULLIVAN, R. S. 1982. The Service Sector: Challenges and Imperatives for Research in Operations Management. *Journal of Operations Management,* 2**,** 211-214.

THE BOSTON CONSULTING GROUP. 2010. *Keep Your Working Capital Working* [Online]. Available: https://www.bcg.com/documents/file62795.pdf [Accessed 25 October 2017.

THE WORLD BANK. 2014. *New Businesses Registered (Number)* [Online]. Available: http://data.worldbank.org/indicator/IC.BUS.NREG [Accessed 22 March 2017].

TORRES-REYNA, O. 2010. *Getting Started in Fixed/Random Effects Models using R* [Online]. Available: https://dss.princeton.edu/training/Panel101.pdf [Accessed 20 Noevember 2017 2017].

TUFANO, P. 1996. Who manages risk? An empirical examination of risk management practices in the gold mining industry. *the Journal of Finance,* 51**,** 1097-1137.

WILNER, B. S. 2000. The exploitation of relationships in financial distress: The case of trade credit. *The Journal of Finance,* 55**,** 153-178.

APPENDIX

APPENDIX 1: DESCRIPTIVE STATISTICS FOR EACH SECTOR ON THE JSE

Table 8: Descriptive statistics for the basic materials sector

	Accounts receivable days	Accounts Payable days	Inventory days	Cash Conversion Cycle	Return on Assets	Size	Growth	Leverage
Mean	63.41	109.01	68.37	22.77	0.01	14.81	0.10	0.46
Standard Error	3.30	9.53	4.41	7.98	0.01	0.15	0.06	0.01
Median	54.17	79.85	66.96	28.49	0.05	14.92	0.05	0.44
Mode	57.97	132.34	95.49	21.12	0.13	15.71	0.08	0.49
Standard Deviation	46.97	135.46	62.68	113.39	0.16	2.06	0.90	0.21
Range	322.27	1158.41	617.37	1212.36	1.47	8.88	13.43	1.86

Table 9: Descriptive statistics for the consumer goods sector

	Accounts Receivable Days	Accounts Payable Days	Inventory Days	Cash Conversion Cycle	Return on Assets	Size	Growth	Leverage
Mean	76.28	93.38	109.17	92.07	0.12	15.86	0.12	0.43
Standard Error	5.55	6.72	12.13	13.98	0.01	0.15	0.01	0.01
Median	60.78	81.80	82.84	61.38	0.10	16.02	0.10	0.43
Mode	N/A	N/A	N/A	N/A	N/A	N/A	0.10	N/A
Standard Deviation	47.70	57.78	104.38	120.24	0.06	1.28	0.11	0.12
Range	280.17	441.04	541.85	846.91	0.23	5.94	0.56	0.49

Table 10: Descriptive Statistics for the consumer services sector

	Accounts receivable days	Accounts Payable Days	Inventory Days	Cash Conversion Cycle	Return on Assets	Size	Growth	Leverage
Mean	108.76	242.40	72.55	-61.09	0.14	15.48	0.10	0.48
Standard Error	22.26	74.61	3.85	54.56	0.01	0.16	0.02	0.02
Median	39.41	86.36	64.74	11.73	0.12	15.57	0.11	0.49
Mode	16.82	N/A	89.91	N/A	N/A	13.19	0.12	N/A
Standard Deviation	258.65	866.91	44.72	633.93	0.11	1.85	0.18	0.21
Range	2310.95	7398.11	191.97	5629.30	0.51	7.88	1.48	0.73

Table 11: Descriptive Statistics for the Healthcare Sector

	Accounts receivable days	Accounts Payable days	Inventory Days	Cash Conversion Cycle	Return on Assets	Size	Growth	Leverage
Mean	98.85	152.00	131.21	78.05	0.10	16.26	0.21	0.51
Standard Error	7.63	6.73	21.54	22.78	0.01	0.27	0.05	0.02
Median	101.95	154.76	139.31	78.46	0.10	16.54	0.15	0.50
Mode	N/A	N/A	N/A	N/A	N/A	N/A	0.18	N/A
Standard Deviation	29.56	26.05	83.41	88.23	0.03	1.06	0.21	0.09
Range	108.25	88.73	279.50	269.21	0.12	2.89	0.75	0.32

Table 12: Descriptive Statistics for the Industrials Sector

	Accounts Receivable days	Accounts payable Days	Inventory Days	Cash Conversion Cycle	Return on Assets	Size	Growth	Leverage
Mean	97.06	121.69	74.96	50.34	0.09	14.69	0.17	0.46
Standard Error	6.85	11.07	4.98	7.01	0.01	0.11	0.05	0.01
Median	69.57	91.09	59.21	40.92	0.09	14.40	0.09	0.47
Mode	N/A	N/A	N/A	N/A	0.00	N/A	0.00	N/A

Standard Deviation	105.65	170.71	76.83	108.22	0.08	1.75	0.74	0.15
Range	897.56	1992.72	602.94	1126.08	0.71	9.85	10.53	0.72

Table 13: Descriptive Statistics for the Oil and Gas Sector

	Accounts Receivable Days	Accounts payable Days	Inventory Days	Cash Conversion Cycle	Return on Assets	Size	Growth	Leverage
Mean	102.50	103.45	25.22	24.26	0.03	16.13	-0.01	0.42
Standard Error	58.17	36.06	2.33	43.80	0.02	0.68	0.07	0.06
Median	22.00	50.73	27.47	9.42	0.05	16.54	0.06	0.36
Mode	N/A	N/A	N/A	N/A	N/A	N/A	0.16	N/A
Standard Deviation	217.66	134.94	8.73	163.87	0.07	2.54	0.25	0.23
Range	829.24	448.15	27.15	803.90	0.27	9.80	0.88	0.74

Table 14: Descriptive Statistics for the Technology Sector

	Accounts Receivable Days	Accounts Payable Days	Inventory Days	Cash Conversion Cycle	Return on Assets	Size	Growth	Leverage
Mean	84.06	119.48	37.79	2.38	0.10	14.77	0.14	0.54
Standard Error	2.97	7.00	5.46	9.27	0.01	0.24	0.03	0.03
Median	85.82	115.36	32.58	14.57	0.12	15.38	0.11	0.57
Mode	N/A	N/A	N/A	N/A	N/A	N/A	0.08	N/A
Standard Deviation	17.08	40.23	31.38	53.26	0.06	1.38	0.15	0.16
Range	72.42	167.10	109.72	220.77	0.30	4.86	0.63	0.57

APPENDIX 2: RESULTS OF THE LAGRANGE MULTIPLIER AND F-TEST

JSE as a whole			
Model 1	Model 2	Model 3	Model 4
Panel (< 2.2e-16**)	Panel (< 2.2e-16**)	Panel (< 2.2e-16**)	Panel (< 2.2e-16**)
Basic Materials			
Model 1	Model 2	Model 3	Model 4
Panel (< 2.2e-16**)	Panel (4.084e-16**)	Panel (< 2.2e-16**)	Panel (4.624e-13**)
Consumer Goods			
Model 1	Model 2	Model 3	Model 4
Panel (6.129e-13**)	Panel (1.275e-13**)	Panel (2.629e-12**)	Panel (2.135e-12**)
Consumer Services			
Model 1	Model 2	Model 3	Model 4
Panel (< 2.2e-16**)	Panel (< 2.2e-16**)	Panel (< 2.2e-16**)	Panel (< 2.2e-16**)
Healthcare			
Model 1	Model 2	Model 3	Model 4
Panel (0.005648**)	OLS (0.2642)	OLS (0.3166)	OLS (0.9041)
Industrials			
Model 1	Model 2	Model 3	Model 4
Panel (< 2.2e-16**)	Panel (< 2.2e-16**)	Panel (< 2.2e-16**)	Panel (< 2.2e-16**)
Oil and Gas			
Model 1	Model 2	Model 3	Model 4
OLS (0.8064)	OLS (0.9097)	OLS (0.9184)	OLS (0.9088)
Technology			
Model 1	Model 2	Model 3	Model 4
Panel (0.00117**)	Panel (0.0009399**)	Panel (0.0007648**)	Panel (0.001311**)

The p-value that was yielded from the above tests is included in brackets () in the table.

APPENDIX 3: CORRELATION MATRIX FOR EACH MODEL FOR THE JSE AS A WHOLE AND PER SECTOR

JSE AS A WHOLE

Table 15: Correlation matrix for model 1: The effect of accounts receivable days on profit

	ARD	Size	Growth	Leverage
ARD	1.00000000	-0.16166239	0.03416050	-0.05268331
Size	-0.16166239	1.00000000	-0.07093433	0.22169752
Growth	0.03416050	-0.07093433	1.00000000	0.02763689
Leverage	-0.05268331	0.22169752	0.02763689	1.00000000

Table 16: Correlation matrix for model 2: The effect of accounts payable days on profit

	APD	Size	Growth	Leverage
APD	1.0000000	-0.23341901	-0.05427320	0.15385092
Size	-0.2334190	1.00000000	-0.08557583	0.26022859
Growth	-0.0542732	-0.08557583	1.00000000	0.03415907
Leverage	0.1538509	0.26022859	0.03415907	1.00000000

Table 17: Correlation matrix for model 3: The effect of inventory days on profit

	ID	Size	Growth	Leverage
ID	1.00000000	-0.07051241	0.05522210	-0.12637630
Size	-0.07051241	1.00000000	-0.03169018	0.27102368
Growth	0.05522210	-0.03169018	1.00000000	-0.01076124
Leverage	-0.12637630	0.27102368	-0.01076124	1.00000000

Table 18: Correlation matrix for model 4: The effect of the cash conversion cycle on profit

	CCC	Size	Growth	Leverage
CCC	1.00000000	0.12153166	0.01900744	-0.25351943
Size	0.12153166	1.00000000	-0.08811405	0.22377167
Growth	0.01900744	-0.08811405	1.00000000	0.05520577
Leverage	-0.25351943	0.22377167	0.05520577	1.00000000

BASIC MATERIALS

Table 19: Correlation matrix for model 1: The effect of accounts receivable days on profit

	ARD	Size	Growth	Leverage
ARD	1.0000000	-0.26805764	-0.22030757	-0.11772039
Size	-0.2680576	1.00000000	0.06057740	-0.06015363
Growth	-0.2203076	0.06057740	1.00000000	0.01529091
Leverage	-0.1177204	-0.06015363	0.01529091	1.00000000

Table 20: Correlation matrix for model 2: The effect of accounts payable days on profit

	APD	Size	Growth	Leverage
APD	1.0000000	-0.31986233	-0.257850144	0.286998160
Size	-0.3198623	1.00000000	0.047642780	-0.087702206
Growth	-0.2578501	0.04764278	1.000000000	0.005959824
Leverage	0.2869982	-0.08770221	0.005959824	1.000000000

Table 21: Correlation matrix for model 3: The effect of inventory days on profit

	ID	Size	Growth	Leverage
ID	1.000000000	0.040507951	-0.009756895	-0.085905983
Size	0.040507951	1.000000000	-0.002817814	-0.091987799
Growth	-0.009756895	-0.002817814	1.000000000	0.001048625
Leverage	-0.085905983	-0.091987799	0.001048625	1.000000000

Table 22: Correlation matrix for model 4: The effect of the cash conversion cycle on profit

	CCC	Size	Growth	Leverage
CCC	1.00000000	0.178525031	-0.093888767	-0.632363703
Size	0.17852503	1.000000000	-0.002817814	-0.091987799
Growth	-0.09388877	-0.002817814	1.000000000	0.001048625
Leverage	-0.63236370	-0.091987799	0.001048625	1.000000000

CONSUMER GOODS

Table 23: Correlation matrix for model 1: The effect of accounts receivable days on profit

	ARD	Size	Growth	Leverage
ARD	1.00000000	-0.47281496	0.03050842	-0.2893068
Size	-0.47281496	1.00000000	0.07844623	0.4306530
Growth	0.03050842	0.07844623	1.00000000	0.0206876
Leverage	-0.28930677	0.43065305	0.02068760	1.0000000

Table 24: Correlation matrix for model 2: The effect of accounts payable days on profit

	APD	Size	Growth	Leverage
APD	1.0000000	0.4649859	0.1254213	0.2976318
Size	0.4649859	1.0000000	0.1040530	0.4475215
Growth	0.1254213	0.1040530	1.0000000	0.1737040
Leverage	0.2976318	0.4475215	0.1737040	1.0000000

Table 25: Correlation matrix for model 3: The effect of inventory days on profit

	ID	Size	Growth	Leverage
ID	1.00000000	0.14938466	0.02601003	-0.3302852
Size	0.14938466	1.00000000	0.06969759	0.4402295
Growth	0.02601003	0.06969759	1.00000000	0.1526742
Leverage	-0.33028519	0.44022951	0.15267421	1.0000000

Table 26: Correlation matrix for model 4: The effect of the cash conversion cycle on profit

	CCC	Size	Growth	Leverage
CCC	1.00000000	-0.28331831	0.05263885	-0.5863026
Size	-0.28331831	1.00000000	0.06969759	0.4402295
Growth	0.05263885	0.06969759	1.00000000	0.1526742
Leverage	-0.58630258	0.44022951	0.15267421	1.0000000

CONSUMER SERVICES

Table 27: Correlation matrix for model 1: The effect of accounts receivable days on profit

	ARD	Size	Growth	Leverage
ARD	1.0000000	-0.3680313	-0.22575966	0.20167506
Size	-0.3680313	1.0000000	0.12265896	0.32074998
Growth	-0.2257597	0.1226590	1.00000000	-0.06181226
Leverage	0.2016751	0.3207500	-0.06181226	1.00000000

Table 28: Correlation matrix for model 2: The effect of accounts payable days on profit

	APD	Size	Growth	Leverage
APD	1.0000000	-0.4181236	-0.2358430237	0.2711680778
Size	-0.4181236	1.0000000	0.2110925525	0.3794808030
Growth	-0.2358430	0.2110926	1.0000000000	0.0003588099
Leverage	0.2711681	0.3794808	0.0003588099	1.0000000000

Table 29: Correlation matrix for model 3: The effect of inventory days on profit

	ID	Size	Growth	Leverage
ID	1.0000000	-0.4117666	0.05642710	-0.25754551
Size	-0.4117666	1.0000000	0.13640402	0.44898103
Growth	0.0564271	0.1364040	1.00000000	0.07815812
Leverage	-0.2575455	0.4489810	0.07815812	1.00000000

Table 30: Correlation matrix for model 1: The effect of the cash conversion on profit

	CCC	Size	Growth	Leverage
CCC	1.000000000	0.317705	0.002534629	-0.27964487
Size	0.317705032	1.000000	0.136404020	0.44898103
Growth	0.002534629	0.136404	1.000000000	0.07815812
Leverage	-0.279644873	0.448981	0.078158116	1.00000000

HEALTHCARE

Table 31: Correlation matrix for model 1: The effect of accounts receivable days on profit

	ARD	Size	Growth	Leverage
ARD	1.00000000	0.05935046	0.12543302	0.1342387
Size	0.05935046	1.00000000	-0.03768969	0.6415279
Growth	0.12543302	-0.03768969	1.00000000	0.1086793
Leverage	0.13423870	0.64152788	0.10867930	1.0000000

Table 32: Correlation matrix for model 2: The effect of accounts payable days on profit

	APD	Size	Growth	Leverage
APD	1.00000000	-0.3421693	0.4010031	-0.03162459
Size	-0.34216934	1.0000000	-0.1945941	0.67920389
Growth	0.40100307	-0.1945941	1.0000000	0.30274768
Leverage	-0.03162459	0.6792039	0.3027477	1.00000000

Table 33: Correlation matrix for model 3: The effect of inventory days on profit

	ID	Size	Growth	Leverage
ID	1.00000000	0.04948413	0.2788627	0.1714524
Size	0.04948413	1.00000000	-0.1945941	0.6792039
Growth	0.27886268	-0.19459413	1.0000000	0.3027477
Leverage	0.17145241	0.67920389	0.3027477	1.0000000

Table 34: Correlation matrix for model 4: The effect of the cash conversion cycle on profit

	CCC	Size	Growth	Leverage
CCC	1.00000000	0.08985849	0.2384402	0.1862601
Size	0.08985849	1.00000000	-0.1945941	0.6792039
Growth	0.23844018	-0.19459413	1.0000000	0.3027477
Leverage	0.18626011	0.67920389	0.3027477	1.0000000

INDUSTRIALS

Table 35: Correlation matrix for model 1: The effect of accounts receivable days on profit

	ARD	Size	Growth	Leverage
ARD	1.00000000	-0.29058523	-0.05035653	0.02207841
Size	-0.29058523	1.00000000	-0.09309983	0.49772136
Growth	-0.05035653	-0.09309983	1.00000000	-0.03111684
Leverage	0.02207841	0.49772136	-0.03111684	1.00000000

Table 36: Correlation matrix for model 2: The effect of accounts payable days on profit

	APD	Size	Growth	Leverage
APD	1.0000000000	-0.1365061	0.0002473846	0.14562667
Size	-0.1365061267	1.0000000	-0.1190779707	0.52546143
Growth	0.0002473846	-0.1190780	1.0000000000	-0.02830603
Leverage	0.1456266663	0.5254614	-0.0283060318	1.00000000

Table 37: Correlation matrix for model 3: The effect of inventory days on profit

	ID	Size	Growth	Leverage
ID	1.00000000	-0.2245121	0.07245703	-0.08120036
Size	-0.22451213	1.0000000	-0.12155980	0.52839247
Growth	0.07245703	-0.1215598	1.00000000	-0.02878848
Leverage	-0.08120036	0.5283925	-0.02878848	1.00000000

Table 38: Correlation matrix for model 4: The effect of the cash conversion cycle on profit

	CCC	Size	Growth	Leverage
CCC	1.00000000	-0.1544172	0.03440923	-0.18173890
Size	-0.15441723	1.0000000	-0.12238788	0.52730054
Growth	0.03440923	-0.1223879	1.00000000	-0.02943007
Leverage	-0.18173890	0.5273005	-0.02943007	1.00000000

OIL AND GAS

Table 39: Correlation matrix for model 1: The effect of accounts receivable days on profit

	ARD	Size	Growth	Leverage
ARD	1.0000000	-0.47423820	0.345320854	-0.303931889
Size	-0.4742382	1.00000000	0.083943493	0.620244534
Growth	0.3453209	0.08394349	1.000000000	0.001744144
Leverage	-0.3039319	0.62024453	0.001744144	1.000000000

Table 40: Correlation matrix for model 2: The effect of accounts payable days on profit

	APD	Size	Growth	Leverage
APD	1.0000000000	0.04750207	-0.0002336593	0.5479519
Size	0.0475020670	1.00000000	0.2917693631	0.6823057
Growth	-0.0002336593	0.29176936	1.0000000000	0.2048079
Leverage	0.5479518697	0.68230568	0.2048078823	1.0000000

Table 41: Correlation matrix for model 3: The effect of inventory days on profit

	ID	Size	Growth	Leverage
ID	1.0000000	-0.7420679	-0.2861936	-0.8371248
Size	-0.7420679	1.0000000	0.2917694	0.6823057
Growth	-0.2861936	0.2917694	1.0000000	0.2048079
Leverage	-0.8371248	0.6823057	0.2048079	1.0000000

Table 42: Correlation matrix for model 4: The effect of the cash conversion cycle on profit

	CCC	Size	Growth	Leverage
CCC	1.0000000	-0.6740870	-0.0941783	-0.4980458
Size	-0.6740870	1.0000000	0.2917694	0.6823057
Growth	-0.0941783	0.2917694	1.0000000	0.2048079
Leverage	-0.4980458	0.6823057	0.2048079	1.0000000

TECHNOLOGY

Table 43: Correlation matrix for model 1: The effect of accounts receivable days on profit

	ARD	Size	Growth	Leverage
ARD	1.0000000	-0.2005614	-0.1063877	0.6295956
Size	-0.2005614	1.0000000	0.1497411	0.4149423
Growth	-0.1063877	0.1497411	1.0000000	-0.1136648
Leverage	0.6295956	0.4149423	-0.1136648	1.0000000

Table 44: Correlation matrix for model 2: The effect of accounts payable days on profit

	APD	Size	Growth	Leverage
APD	1.0000000000	-0.61760753	0.0007238031	-0.01275468
Size	-0.6176075276	1.00000000	-0.0323942235	0.63570183
Growth	0.0007238031	-0.03239422	1.0000000000	-0.18311985
Leverage	-0.0127546753	0.63570183	-0.1831198523	1.00000000

Table 45: Correlation matrix for model 3: The effect of inventory days on profit

	ID	Size	growth	leverage
ID	1.0000000	0.4211523	-0.2826729	0.5742571
size	0.4211523	1.0000000	0.1326687	0.6457200
growth	-0.2826729	0.1326687	1.0000000	-0.1313558
leverage	0.5742571	0.6457200	-0.1313558	1.0000000

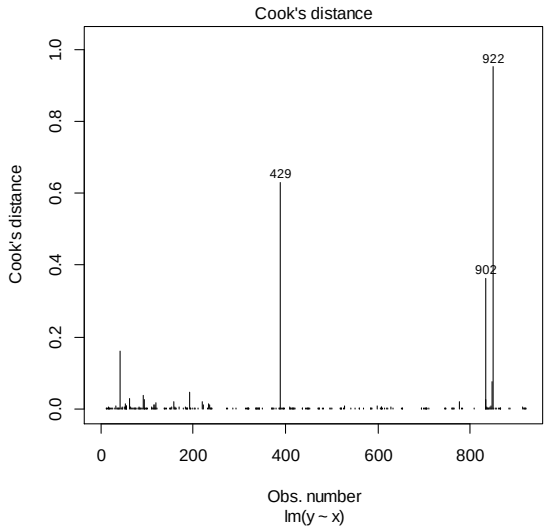
Table 46: Correlation matrix for model 4: The effect of the cash conversion cycle on profit

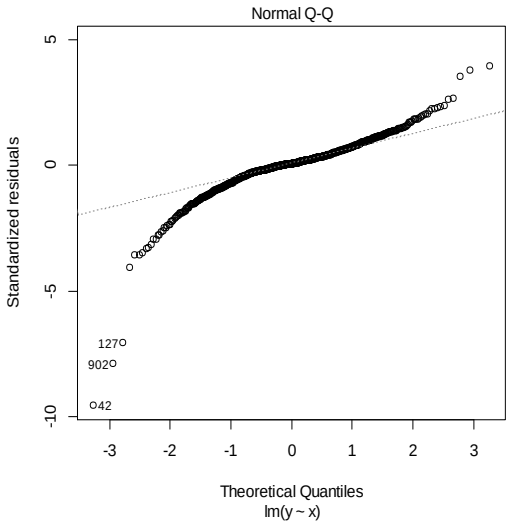
	CCC	Size	Growth	Leverage
CCC	1.00000000	0.7745842	-0.02002113	0.6864302
Size	0.77458416	1.0000000	0.13266870	0.6457200
Growth	-0.02002113	0.1326687	1.00000000	-0.1313558
Leverage	0.68643019	0.6457200	-0.13135583	1.0000000

APPENDIX 4: COOKS DISTANCE PLOTS AND NORMAL QQ PLOTS FOR EACH SECTOR AND MODEL

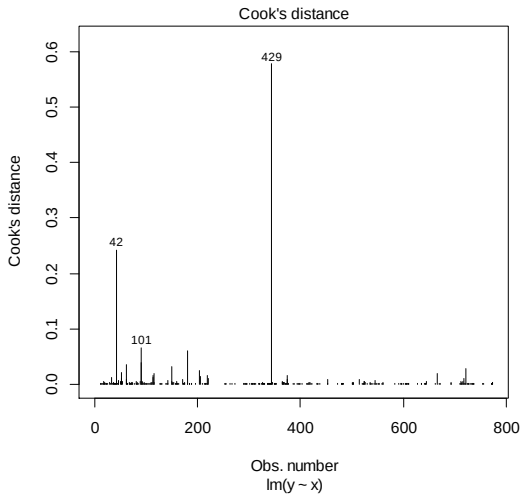
THE JSE

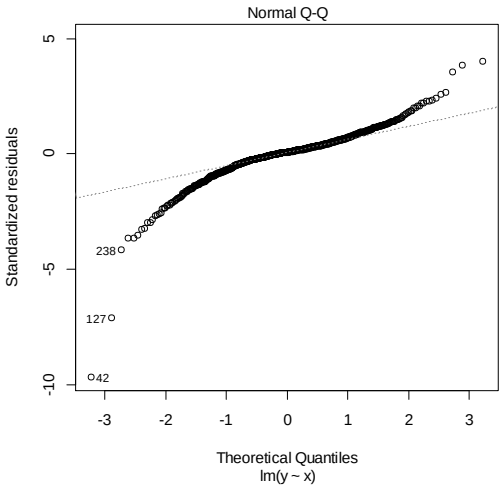
MODEL 1: THE EFFECT OF ACCOUNTS RECEIVABLE DAYS ON PROFIT



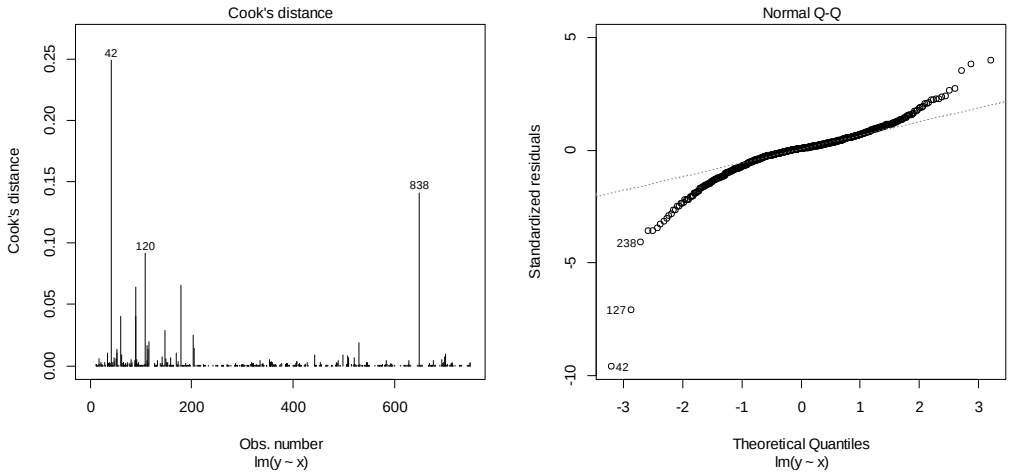


MODEL 2: THE EFFECT OF ACCOUNTS PAYABLE DAYS ON PROFIT

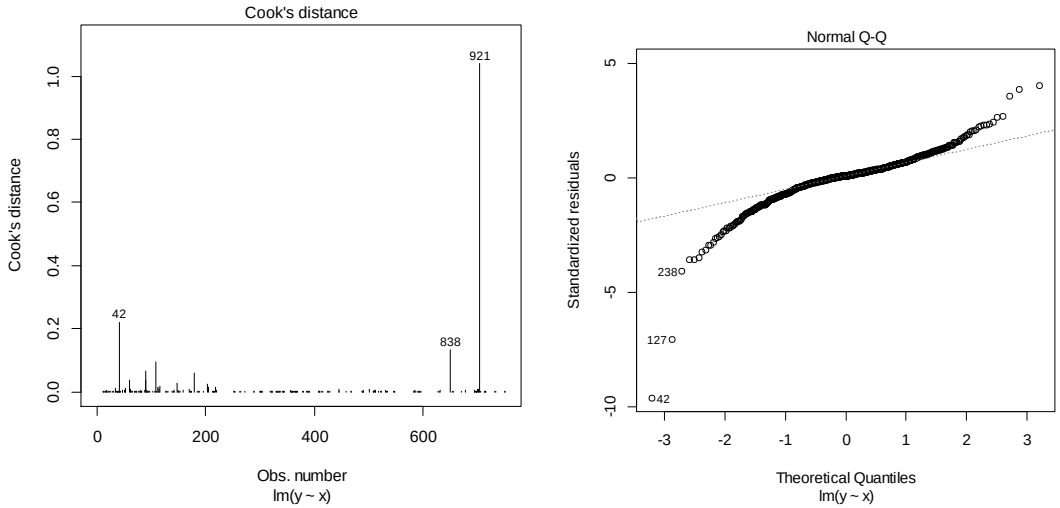




MODEL 3: THE EFFECT OF INVENTORY DAYS ON PROFIT

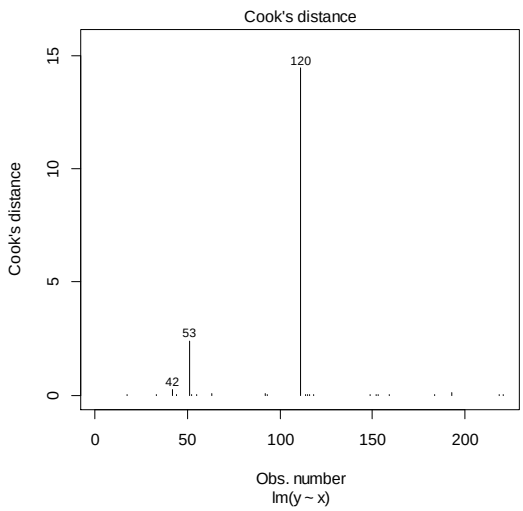


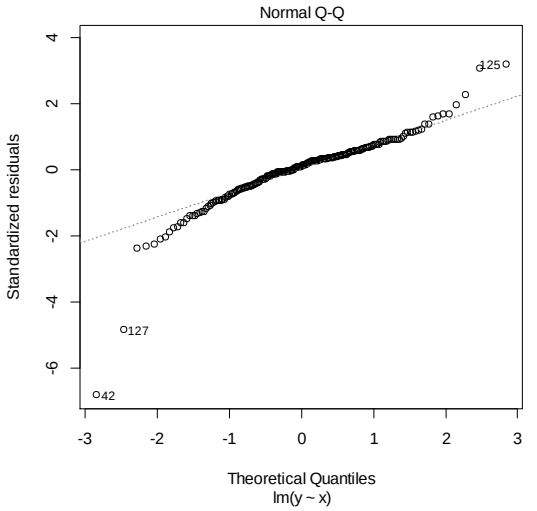
MODEL 4: THE EFFECT OF THE CASH CONVERSION CYCLE ON PROFIT



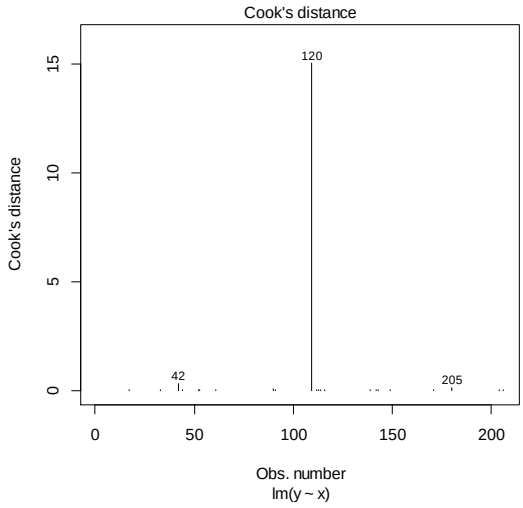
BASIC MATERIALS

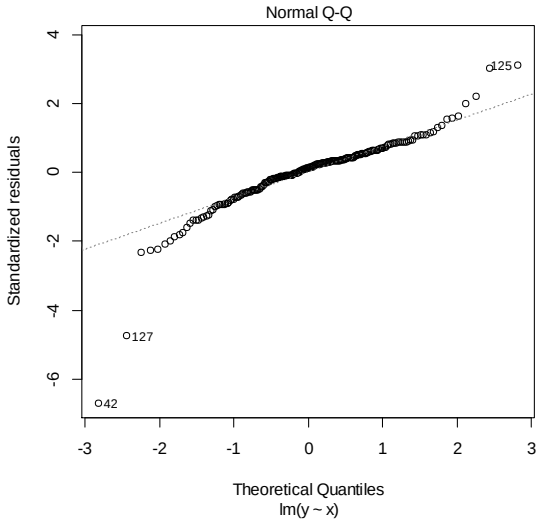
MODEL 1: THE EFFECT OF ACCOUNTS RECEIVABLE DAYS ON PROFIT



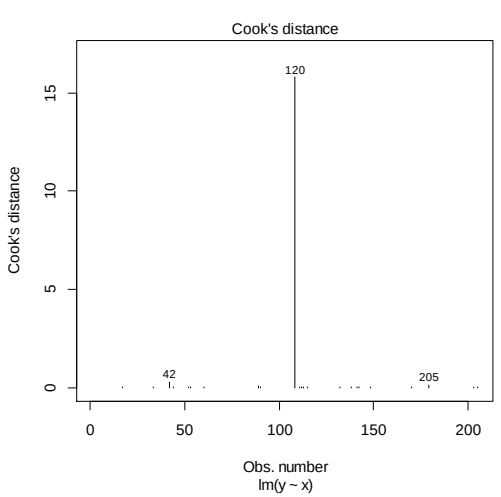


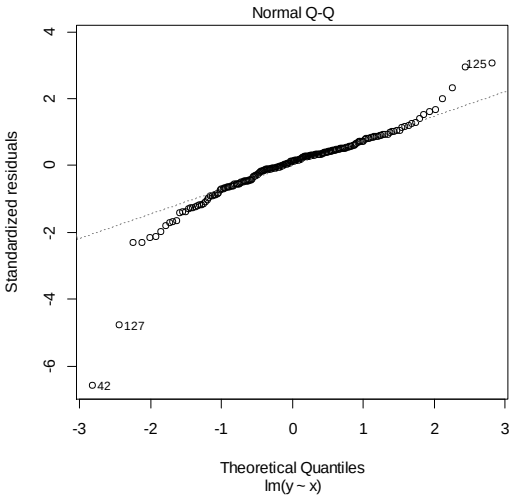
MODEL 2: THE EFFECT OF ACCOUNTS PAYABLE DAYS ON PROFIT



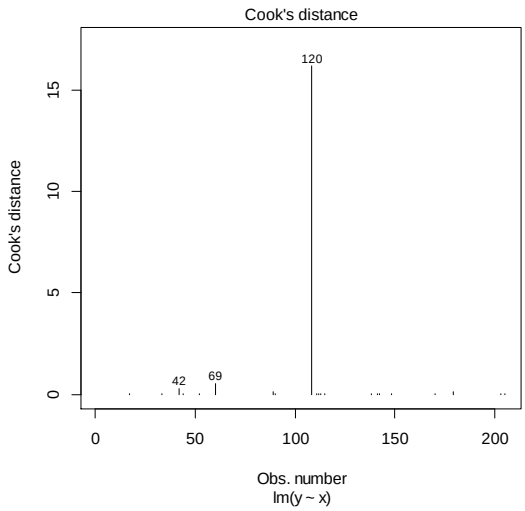


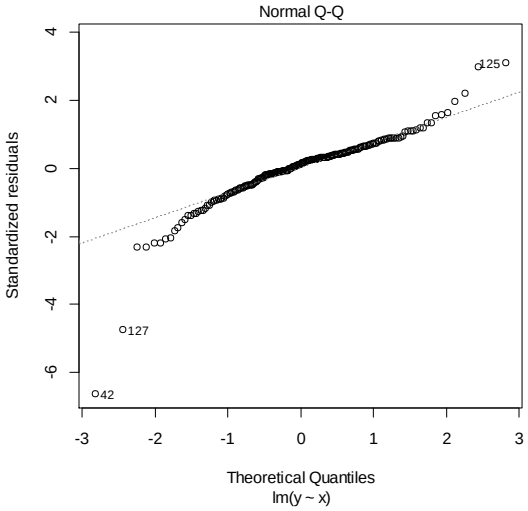
MODEL 3: THE EFFECT OF INVENTORY DAYS ON PROFIT





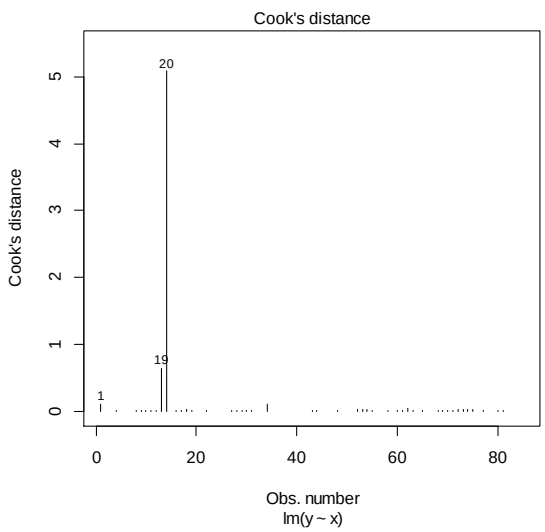
MODEL 4: THE EFFECT OF THE CASH CONVERSION CYCLE ON PROFIT

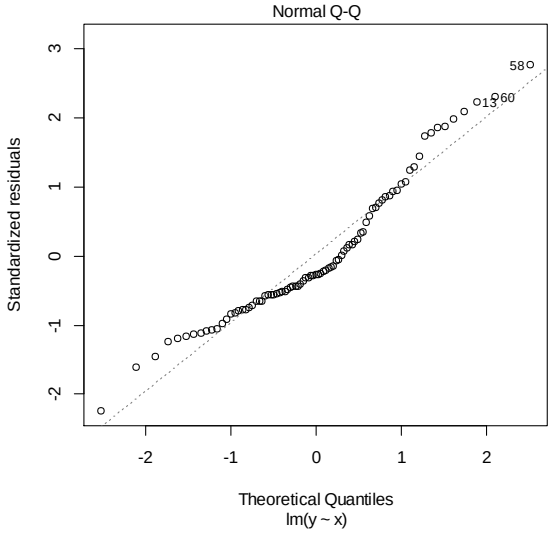




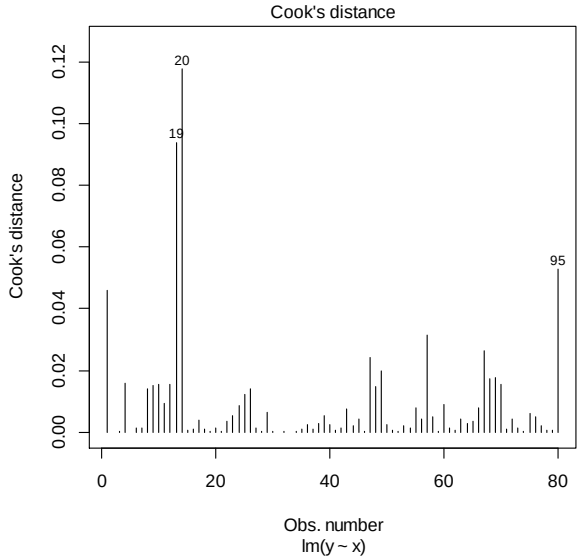
CONSUMER GOODS

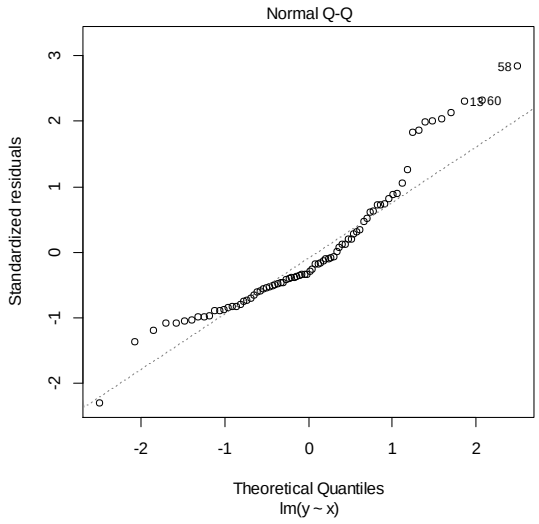
MODEL 1: THE EFFECT OF ACCOUNTS RECEIVABLE DAYS ON PROFIT



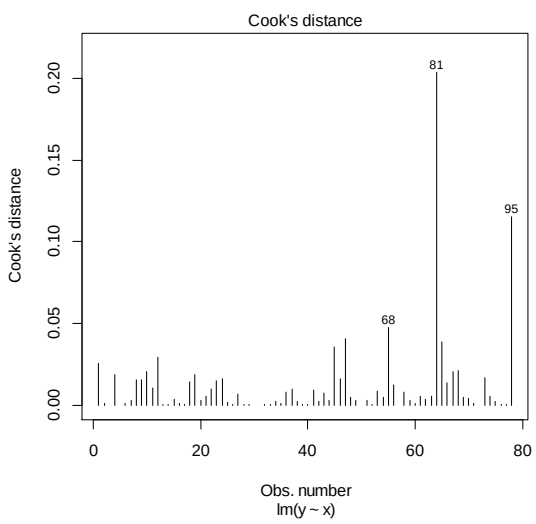


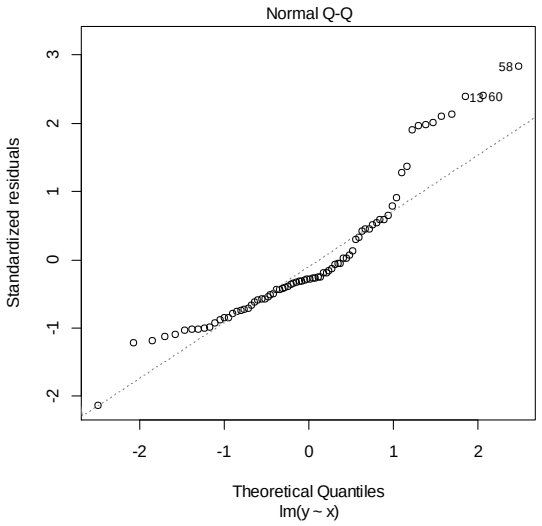
MODEL 2: THE EFFECT OF ACCOUNTS PAYABLE DAYS ON PROFIT



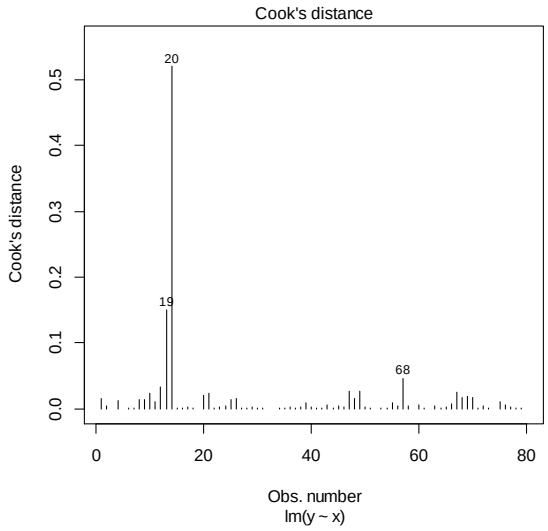


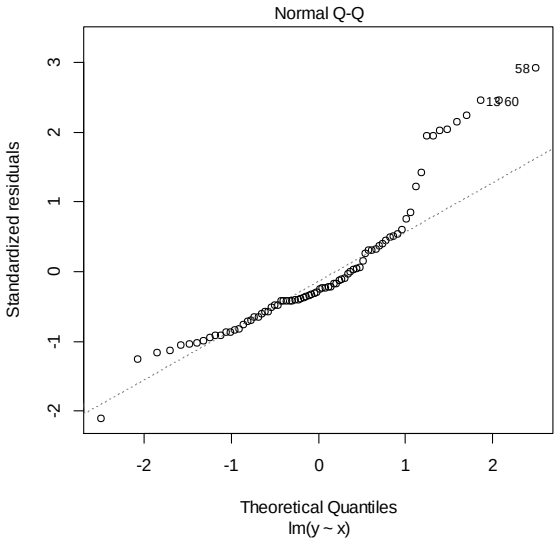
MODEL 3: THE EFFECT OF INVENTORY DAYS ON PROFIT





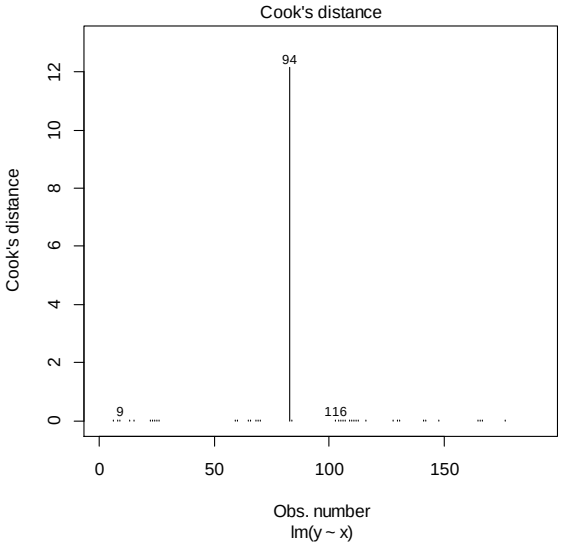
MODEL 4: THE EFFECT OF THE CASH CONVERSION CYCLE ON PROFIT

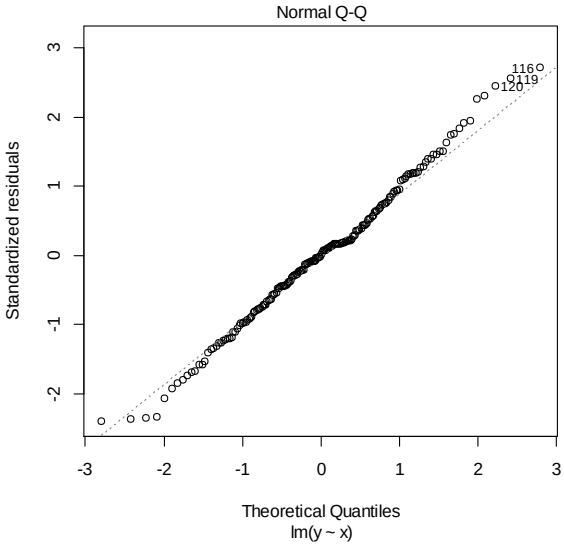




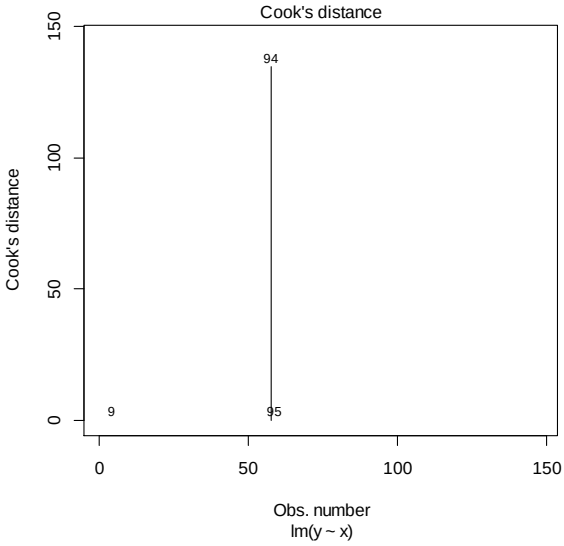
CONSUMER SERVICES

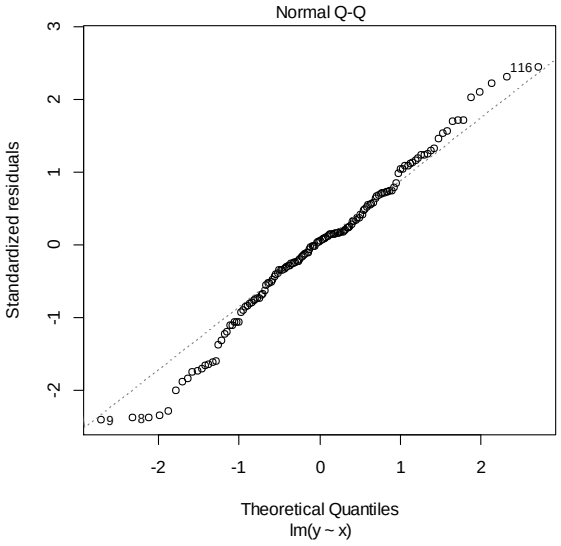
MODEL 1: THE EFFECT OF ACCOUNTS RECEIVABLE DAYS ON PROFIT



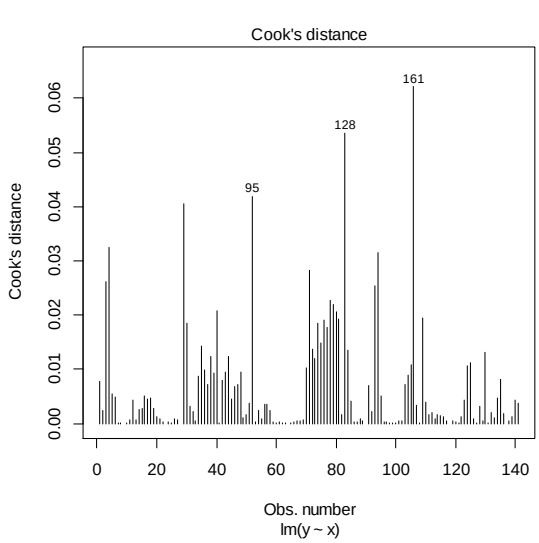


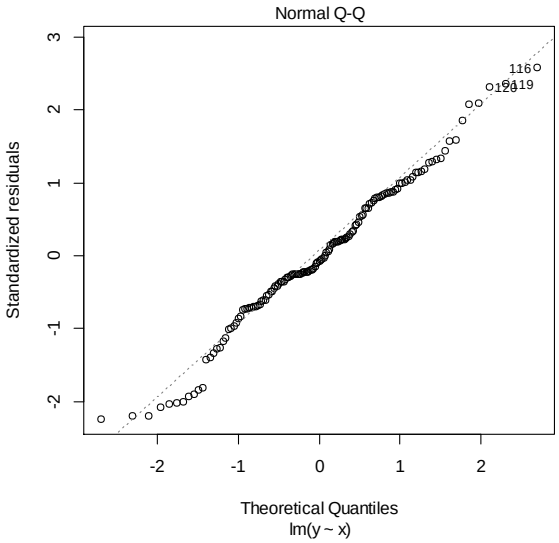
MODEL 2: THE EFFECT OF ACCOUNTS PAYABLE DAYS ON PROFIT



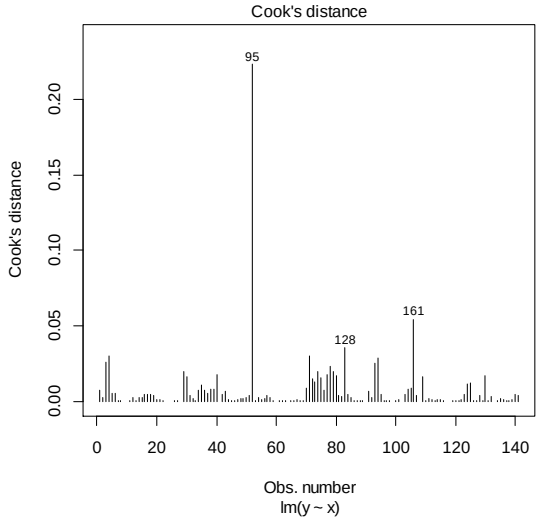


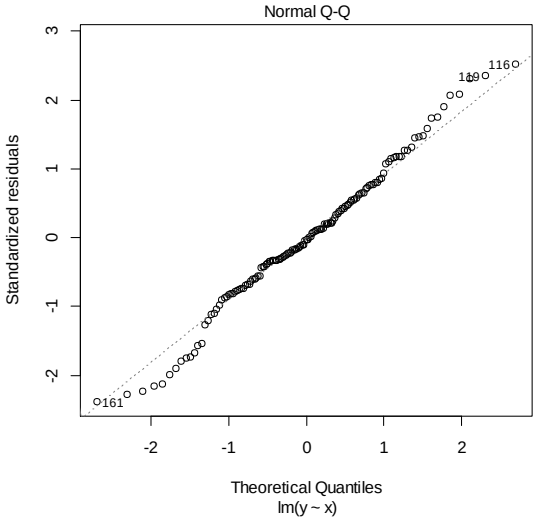
MODEL 3: THE EFFECT OF INVENTORY DAYS ON PROFIT





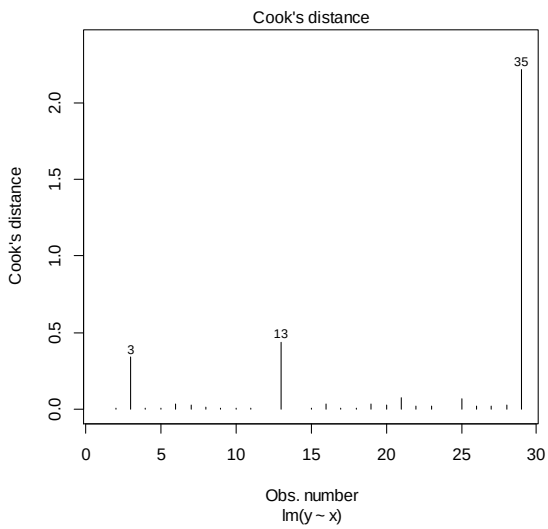
MODEL 4: THE EFFECT OF THE CASH CONVERSION CYCLE ON PROFIT

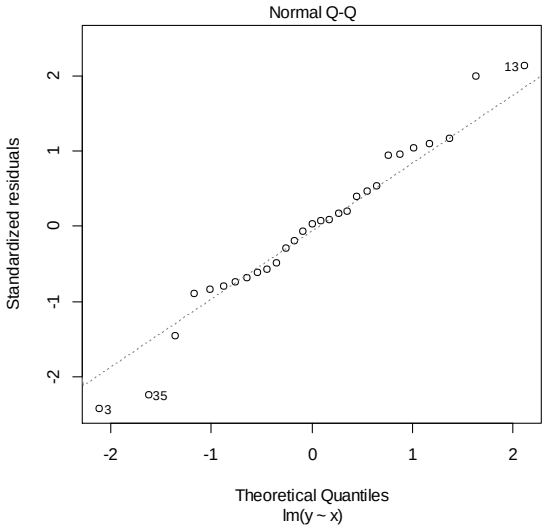




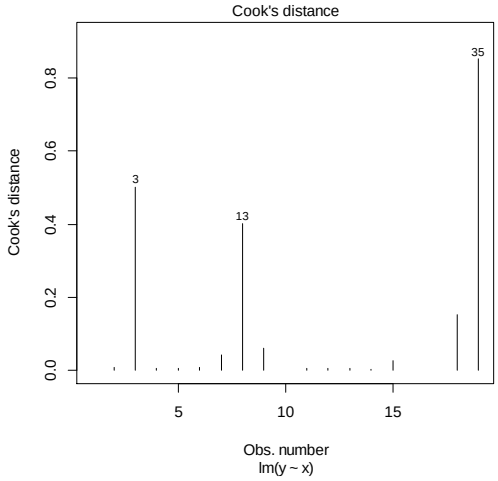
HEALTHCARE

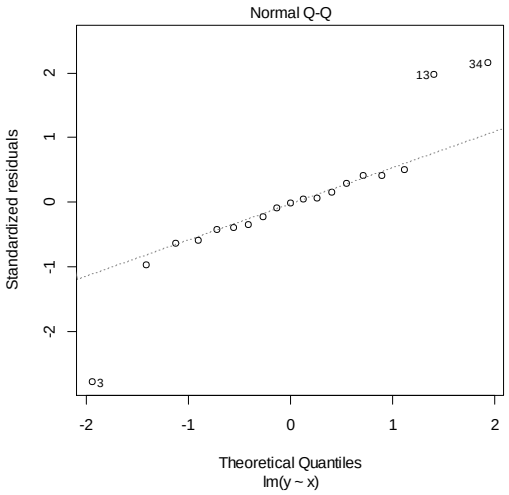
MODEL 1: THE EFFECT OF ACCOUNTS RECEIVABLE DAYS ON PROFIT



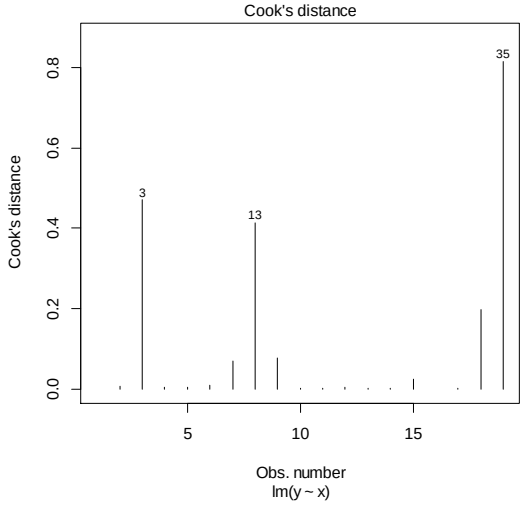


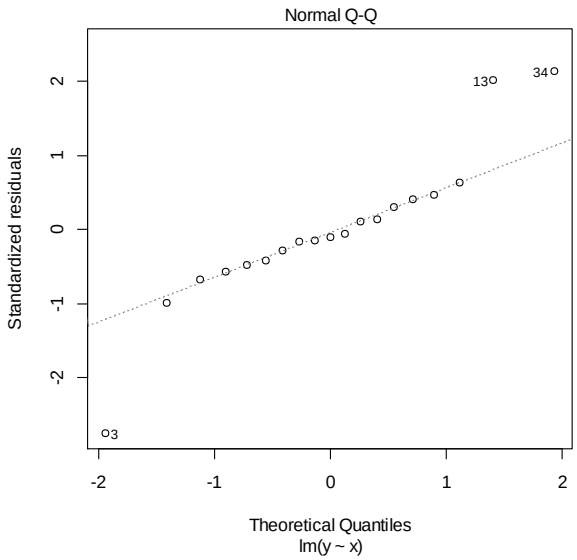
MODEL 2: THE EFFECT OF ACCOUNTS PAYABLE DAYS ON PROFIT



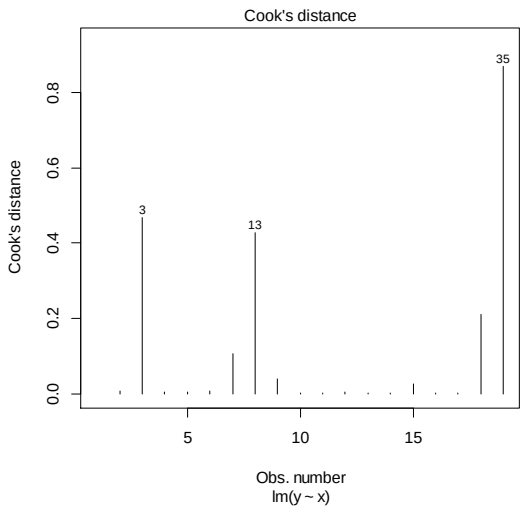


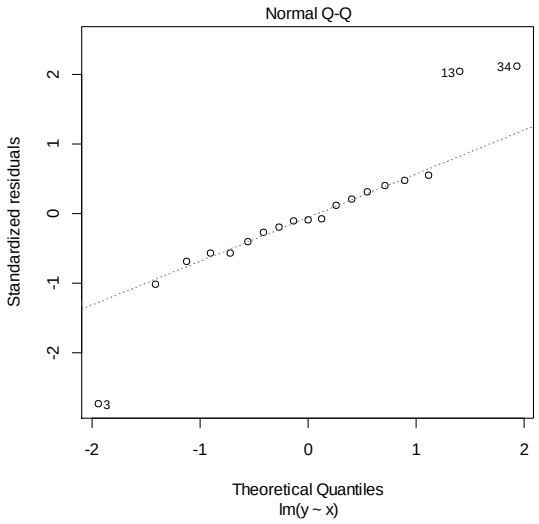
MODEL 3: THE EFFECT OF INVENTORY DAYS ON PROFIT





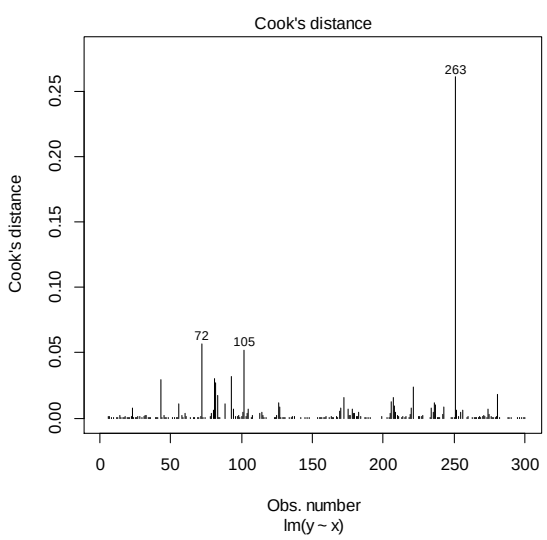
MODEL 4: THE EFFECT OF THE CASH CONVERSION CYCLE ON PROFIT

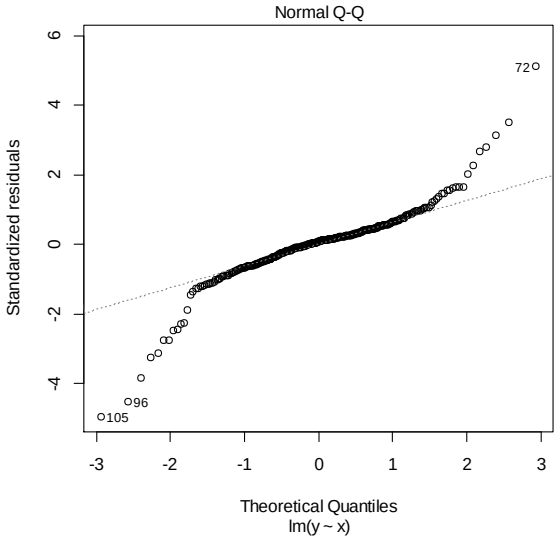




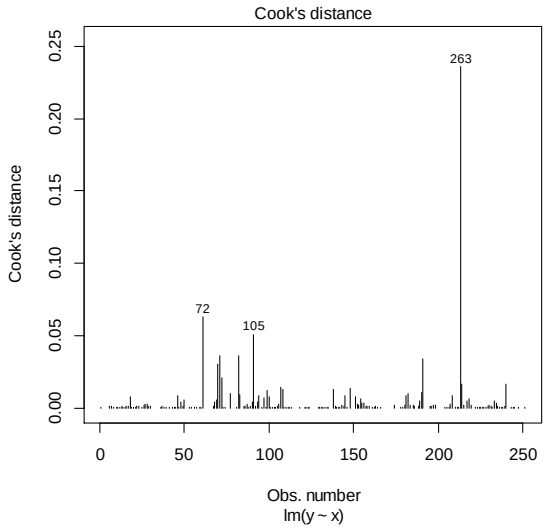
INDUSTRIALS

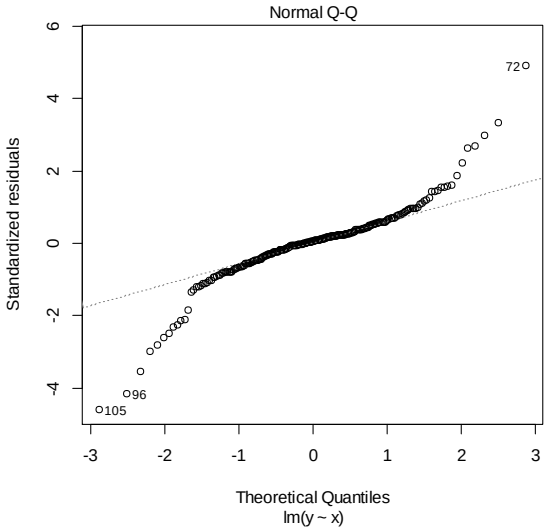
MODEL 1: THE EFFECT OF ACCOUNTS RECEIVABLE DAYS ON PROFIT



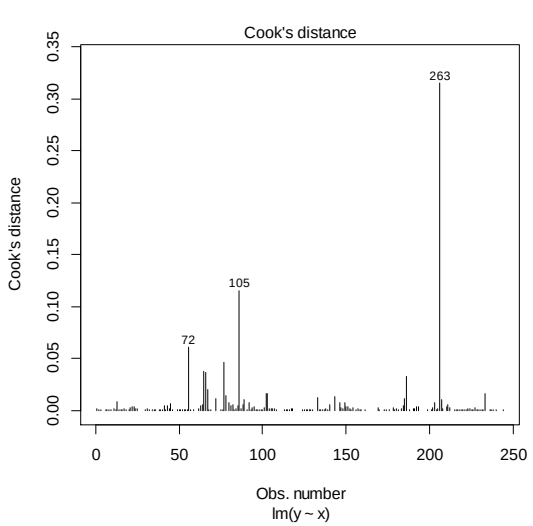


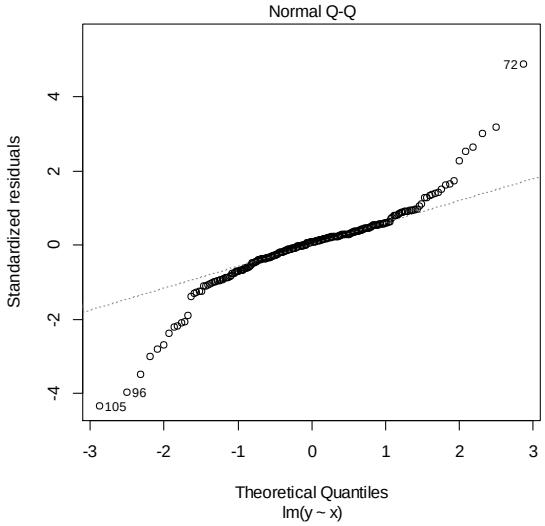
MODEL 2: THE EFFECT OF ACCOUNTS PAYABLE DAYS ON PROFIT



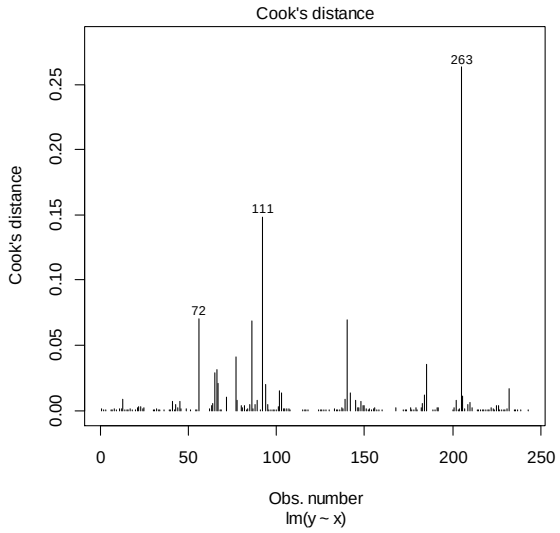


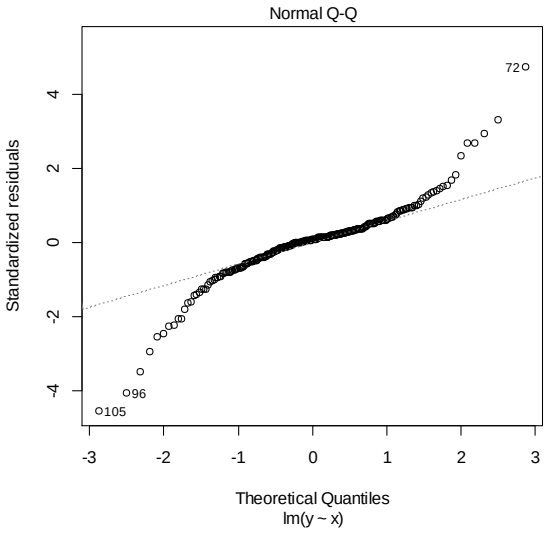
MODEL 3: THE EFFECT OF INVENTORY DAYS ON PROFIT





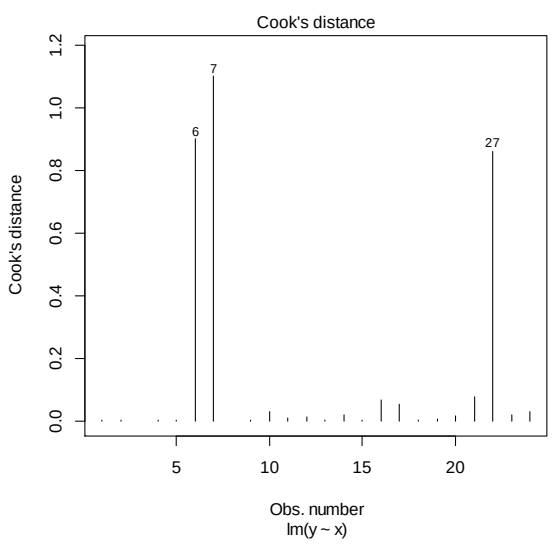
MODEL 4: THE EFFECT OF THE CASH CONVERSION CYCLE ON PROFIT

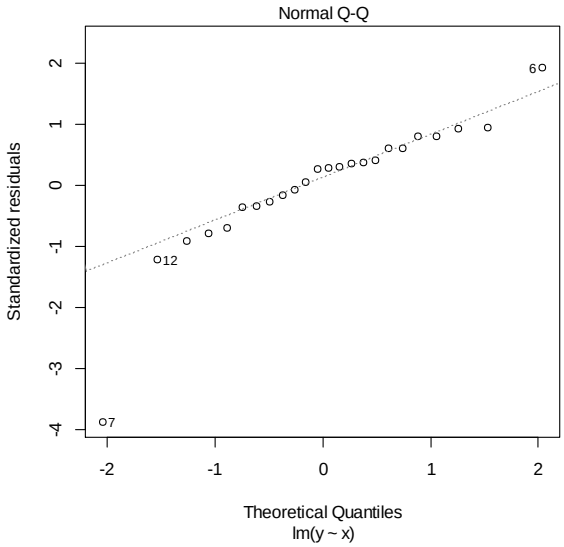




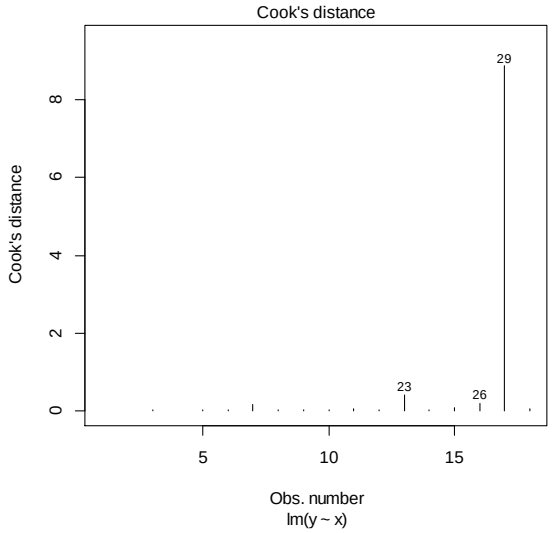
OIL AND GAS

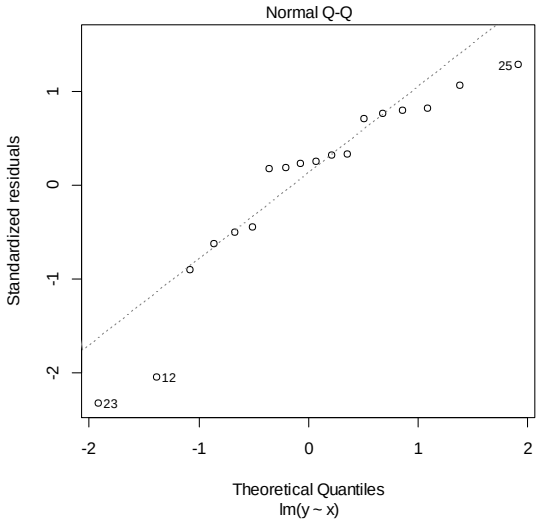
MODEL 1: THE EFFECT OF ACCOUNTS RECEIVABLE DAYS ON PROFIT



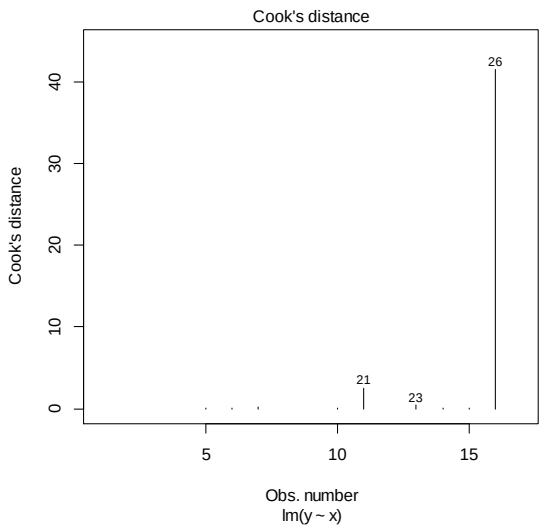


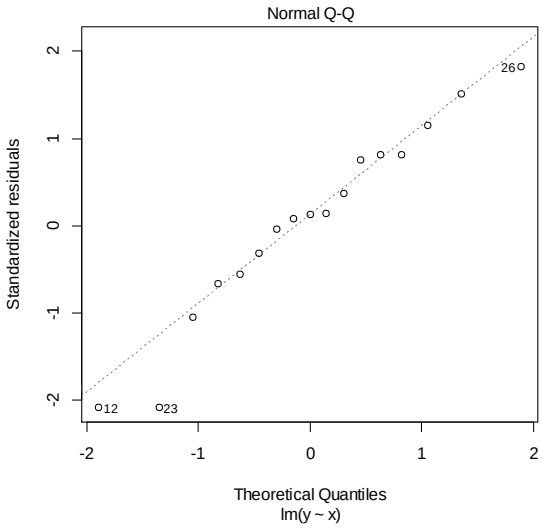
MODEL 2: THE EFFECT OF ACCOUNTS PAYABLE DAYS ON PROFIT



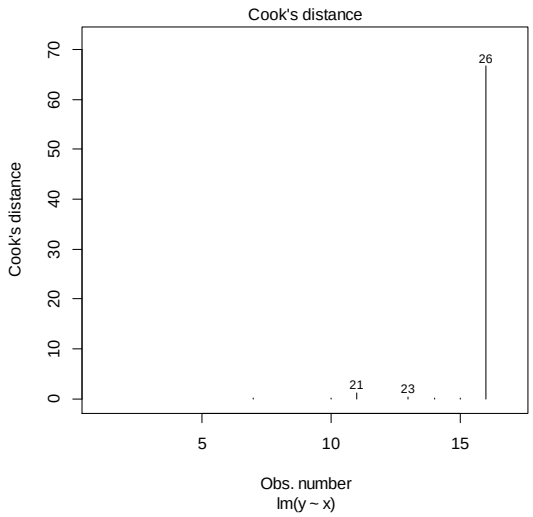


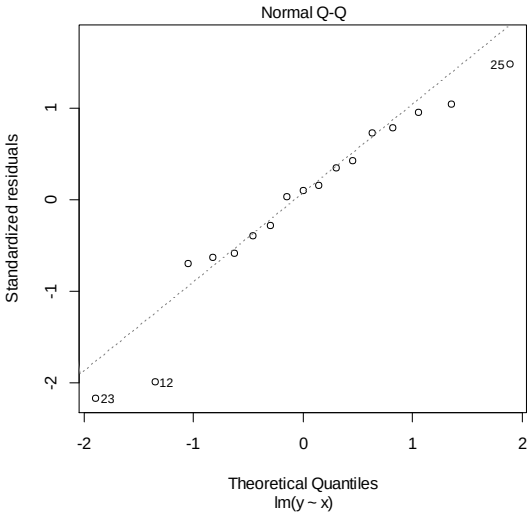
MODEL 3: THE EFFECT OF INVENTORY DAYS ON PROFIT





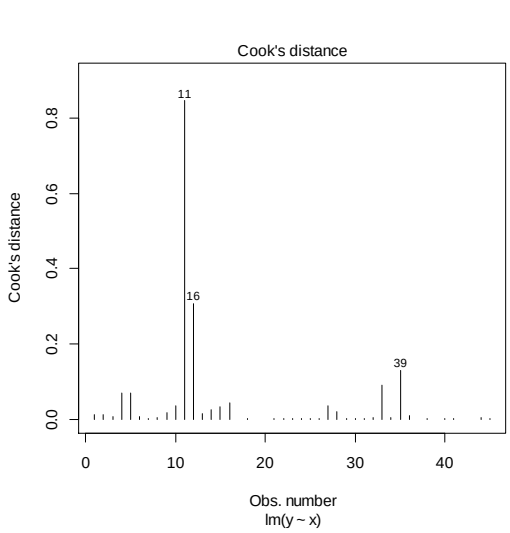
MODEL 4: THE EFFECT OF THE CASH CONVERSION CYCLE ON PROFIT

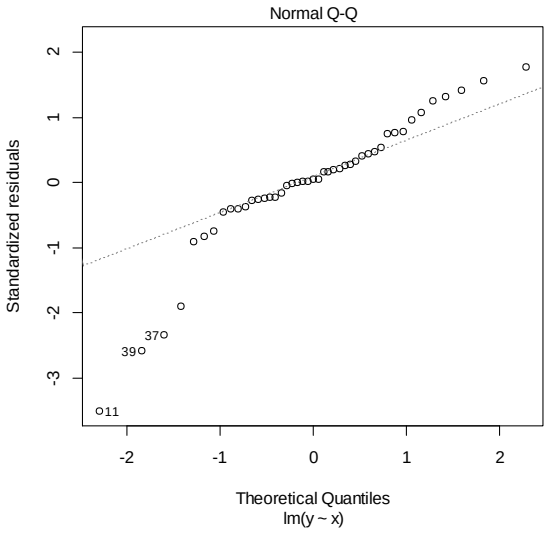




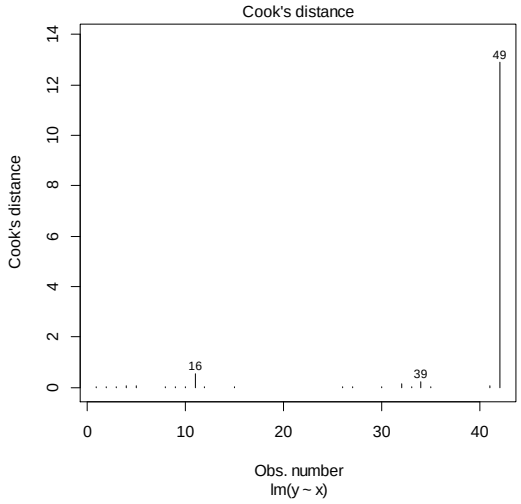
TECHNOLOGY

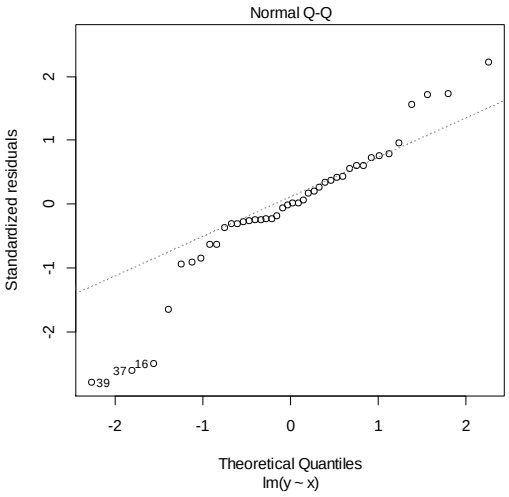
MODEL 1: THE EFFECT OF ACCOUNTS RECEIVABLE DAYS ON PROFIT



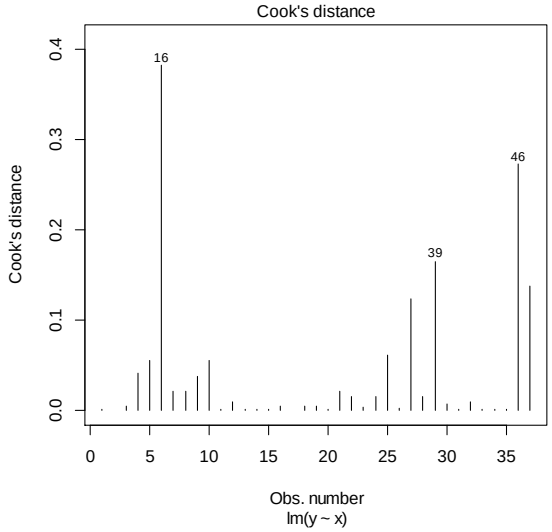


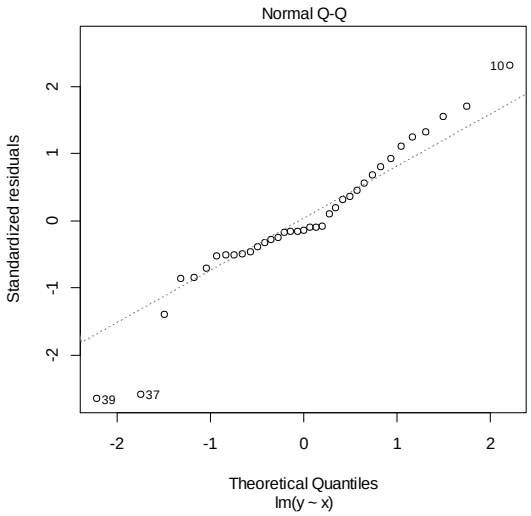
MODEL 2: THE EFFECT OF ACCOUNTS PAYABLE DAYS ON PROFIT



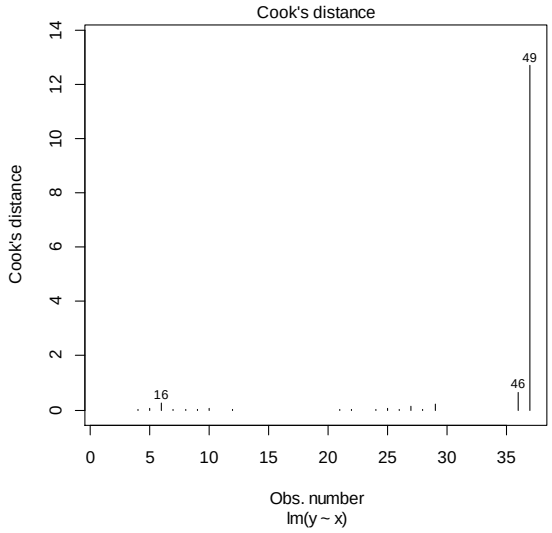


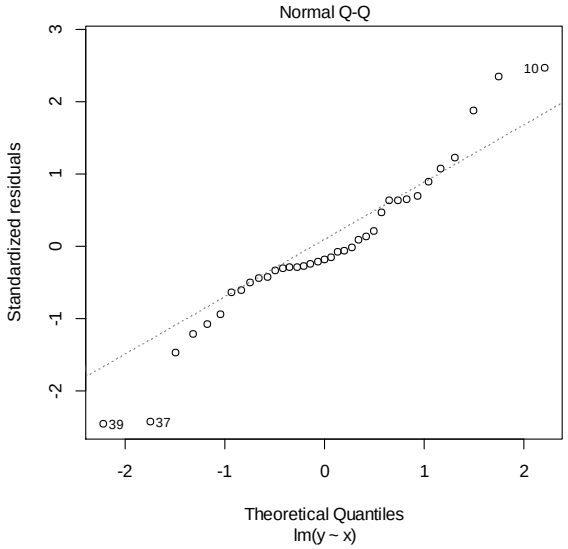
MODEL 3: THE EFFECT OF INVENTORY DAYS ON PROFIT





MODEL 4: THE EFFECT OF THE CASH CONVERSION CYCLE ON PROFIT





APPENDIX 5: RESULTS OF THE BREUSCH PAGAN TEST FOR HETEROSCEDASTICITY

JSE as a whole			
Model 1	Model 2	Model 3	Model 4
Heteroscedasticity (0.03544*)	Heteroscedasticity (0.04006*)	Homoscedasticity (0.08528)	Homoscedasticity (0.7818)
Basic Materials			
Model 1	Model 2	Model 3	Model 4
Homoscedasticity (0.5331)	Homoscedasticity (0.7631)	Homoscedasticity (0.7222)	Homoscedasticity (0.9346)
Consumer Goods			
Model 1	Model 2	Model 3	Model 4
Homoscedasticity (0.5039)	Homoscedasticity (0.9445)	Homoscedasticity (0.815)	Homoscedasticity (0.6185)
Consumer Services			
Model 1	Model 2	Model 3	Model 4
Heteroscedasticity (2.507e-06***)	Heteroscedasticity (0.001012**)	Heteroscedasticity (0.000624***)	Heteroscedasticity (0.0004906***)
Healthcare			
Model 1	Model 2	Model 3	Model 4
Homoscedasticity (0.07574)	Homoscedasticity (0.5821)	Homoscedasticity (0.4464)	Homoscedasticity (0.6047)
Industrials			
Model 1	Model 2	Model 3	Model 4
Homoscedasticity (0.1281)	Homoscedasticity (0.114)	Homoscedasticity (0.2062)	Homoscedasticity (0.1823)
Oil and Gas			
Model 1	Model 2	Model 3	Model 4
Homoscedasticity (0.8871)	Homoscedasticity (0.5823)	Homoscedasticity (0.4112)	Homoscedasticity (0.6004)
Technology			
Model 1	Model 2	Model 3	Model 4
Homoscedasticity (0.4353)	Heteroscedasticity (0.008874**)	Homoscedasticity (0.3078)	Homoscedasticity (0.1844)

The p-values of the above test are included in brackets () in the table.

APPENDIX 6: RESULTS OF THE HAUSMAN TEST

JSE as a whole			
Model 1	Model 2	Model 3	Model 4
Fixed effects (0.00269**)	Fixed Effect (0.03003*)	Fixed Effects (0.0006173***)	Random Effects (0.3708)
Basic Materials			
Model 1	Model 2	Model 3	Model 4
Random effects (0.1019)	Fixed Effects (0.0002992***)	Fixed Effects (0.005568**)	Fixed Effects (0.04517*)
Consumer Goods			
Model 1	Model 2	Model 3	Model 4
Fixed effects (0.01461*)	Random (0.1433)	Fixed Effects (7.118e-05***)	Fixed effects (6.091e-05***)
Consumer Services			
Model 1	Model 2	Model 3	Model 4
Random effects (0.928)	Random effects (0.5754)	Random Effects (0.3985)	Random Effects (0.3454)
Healthcare			
Model 1	Model 2	Model 3	Model 4
Random effects (0.3805)	NA	NA	NA
Industrials			
Model 1	Model 2	Model 3	Model 4
Random Effects (0.9698)	Random Effects (0.9437)	Random Effects (0.5297)	Random effects (0.7174)
Oil and Gas			
Model 1	Model 2	Model 3	Model 4
NA	NA	NA	NA
Technology			
Model 1	Model 2	Model 3	Model 4
Random Effects (0.08138)	Fixed effects (3.359e-05***)	Fixed effects (0.03122*)	Fixed effects (0.0007345***)

The p-value that was yielded from each of the tests is included in brackets (), in the table above.

APPENDIX 7: REGRESSION RESULTS PER SECTOR

BASIC MATERIALS

Table 47: Model 1 regression results: The effect of accounts receivable days on profit

Variable	Estimate	Standard Error	t-value	Pr(>ltl)
(Intercept)	-0.32766850	0.12145380	-2.6979	0.0075372 **
ARD	-0.00025894	0.00015198	-1.7038	0.0898749 .
Size	0.02892825	0.00769149	3.7611	0.0002186 ***
Growth	0.07620469	0.03701443	2.0588	0.0407317 *
Leverage	-0.18008843	0.05515871	-3.2649	0.0012758 **

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 48: Model 2 regression results: the effect of accounts payable days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
APD	1.0319e-04	5.5859e-05	1.8473	0.066633.
Size	4.5849e-02	2.2917e-02	2.0007	0.047198*
Growth	1.0880e-01	3.7232e-02	2.9223	0.004001**
Leverage	-4.4389e-01	7.1932e-02	-6.1709	5.814e-09***

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 49: Model 3 regression results: the effect of inventory days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
ID	7.5679e-05	2.9436e-04	0.2571	0.797455
Size	4.5010e-02	2.2770e-02	1.9767	0.049880*
Growth	1.1041e-01	3.7456e-02	2.9478	0.003706**
Leverage	4.1027e-01	7.4809e-02	-5.4843	1.693e-07***

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 50: Model 4 regression results: the effect of the cash conversion cycle on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
CCC	-0.00016689	0.00018985	-0.8791	0.38075
Size	0.05389331	0.02433036	2.2151	0.02824*
Growth	0.01644812	0.00972882	1.6907	0.09295.
Leverage	-0.32740240	0.10131546	-3.2315	0.00151**

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

CONSUMER GOODS

Table 51: Model 1 regression results: the effect of accounts receivable days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
ARD	0.00008671	0.00023581	0.3677	0.7143828
Size	-0.00623827	0.01752644	-0.3559	0.7231377
Growth	0.02331983	0.03454720	0.6750	0.5022602
Leverage	-0.28997789	0.07395716	-3.9209	0.0002292***

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 52: Model 2 regression results: the effect of accounts payable days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	9.9943e-02	1.5595e-01	0.6409	0.5237
APD	2.7538e-06	1.4998e-04	0.0184	0.9854
Size	6.6884e-03	1.0221e-02	0.6544	0.5150
Growth	3.2864e-02	3.2700e-02	1.0050	0.3183
Leverage	-2.1014e-01	6.9998e-02	-3.0021	0.0037**

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 53: Model 3 regression results: the effect of inventory days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
ID	-0.00011505	0.00020595	-0.5586	0.5787658
Size	-0.05195917	0.02563412	-2.0270	0.0477106*
Growth	0.06511045	0.03954301	1.6466	0.1055635
Leverage	-0.28887289	0.07008462	-4.1218	0.0001328***

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 54: Model 4 regression results: the effect of the cash conversion cycle on profit

variable	Estimate	Standard Error	t-value	Pr(>|t|)
CCC	8.0395e-05	1.9893e-04	0.4041	0.6877362
Size	-5.6100e-02	2.5639e-02	-2.1880	0.0330970*
Growth	7.3408e-02	3.7769e-02	1.9436	0.0572572.
Leverage	-2.9024e-01	7.0092e-02	-4.1408	0.0001248***

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

CONSUMER SERVICES

Table 55: Model 1 regression results: the effect of accounts receivable days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
ARD	3.3684e-05	3.4054e-05	0.9891	0.32426
Size	1.1151e-02	3.3277e-02	0.3351	0.73804
Growth	1.1914e-02	9.6457e-03	1.2351	0.21880
Leverage	-1.9439e-01	7.9104e-02	-2.4574	0.01518*

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 56: Model 2 regression results: the effect of accounts payable days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	4.4230e-02	1.3396e-01	0.3302	0.741763
APD	8.0673e-06	5.2497e-06	1.5367	0.126651
Size	1.2940e-02	9.8489e-03	1.3138	0.191085
Growth	3.9656e-02	2.0043e-02	1.9785	0.049860*
Leverage	-2.4343e-01	7.3529e-02	-3.3107	0.001188**

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 57: Model 3 regression results: the effect of inventory days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	0.06483481	0.15661655	0.4140	0.679577
ID	-0.00009691	0.00031254	-0.3101	0.757001
Size	0.01170660	0.01030081	1.1365	0.257849
Growth	0.05342769	0.02384797	2.2403	0.026766*
Leverage	-0.23326892	0.07281434	-3.2036	0.001707**

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 58: Model 4 regression results: the effect of the cash conversion cycle on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	-8.5912e-03	1.3038e-01	-0.0659	0.947562
CCC	-1.3302e-05	6.7609e-06	-1.9674	0.051262.
Size	1.6532e-02	9.9522e-03	1.6612	0.099088.
Growth	4.6204e-02	2.0130e-02	2.2953	0.023319*
Leverage	-2.5083e-01	7.9232e-02	-3.1657	0.001927**

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

HEALTHCARE

Table 59: Model 1 regression results: the effect of accounts receivable days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	-0.17782716	0.42333058	-0.4201	0.67870
ARD	-0.00059025	0.00063335	-0.9319	0.36195
Size	0.03420897	0.03012447	1.1356	0.26892
Growth	0.03645171	0.07749530	0.4704	0.64294
Leverage	-0.40067726	0.20968013	-1.9109	0.06977.

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 60: Model 2 regression results: the effect of accounts payable days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	-0.19331889	0.30503455	-0.6338	0.5392
APD	-0.00018655	0.00057623	-0.3237	0.7522
Size	0.03017368	0.02175600	1.3869	0.1929
Growth	0.04400842	0.08649769	0.5088	0.6210
Leverage	-0.33610278	0.26389995	-1.2736	0.2291

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 61: Model 3 regression results: the effect of inventory days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	-2.4840e-01	2.5627e-01	-0.9693	0.3532
ID	-9.9332e-05	1.6157e-04	-0.6148	0.5512
Size	3.2721e-02	2.0803e-02	1.5729	0.1440
Growth	4.9239e-02	8.5149e-02	0.5783	0.5747
Leverage	-3.4225e-01	2.5951e-01	-1.3188	0.2140

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 62: Model 4 regression results: the effect of the cash conversion cycle on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	-1.8838e-01	1.1521e-01	-1.6352	0.133063
CCC	5.6546e-05	7.1992e-05	0.7855	0.450393
Size	3.0534e-02	9.3016e-03	3.2827	0.008252**
Growth	7.6807e-02	3.7957e-02	2.0235	0.070565.
Leverage	-4.5378e-01	1.1703e-01	-3.8774	0.003072**

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

INDUSTRIALS

Table 63: Model 1 regression results: the effect of accounts receivable days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	1.8836e-01	6.3260e-02	2.9776	0.003149**
ARD	-1.5074e-04	4.9288e-05	-3.0583	0.002433**
Size	-2.4750e-03	4.5413e-03	-0.5450	0.586169
Growth	5.8128e-03	5.5391e-03	1.0494	0.294856
Leverage	-1.1626e-01	4.3195e-02	-2.6915	0.007524**

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 64: Model 2 Regression results: the effect of accounts payable days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	1.2487e-01	7.1836e-02	1.7382	0.08344.
APD	-4.3788e-05	2.7167e-05	-1.6118	0.10830
Size	2.3003e-03	5.2782e-03	0.4358	0.66336
Growth	6.9024e-03	5.9167e-03	1.1666	0.24451
Leverage	-1.4630e-01	5.1938e-02	-2.8168	0.00525**

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 65: Model 3 regression results: the effect of inventory days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	1.0621e-01	7.4187e-02	1.4316	0.153574
ID	-4.2903e-05	7.7106e-05	-0.5564	0.578451
Size	4.0664e-03	5.3437e-03	0.7610	0.447435
Growth	7.9393e-03	6.0168e-03	1.3195	0.188273
Leverage	-1.6774e-01	5.2196e-02	-3.2138	0.001493**

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 66: Model 4 Regression results: the effect of the cash conversion cycle on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	1.1059e-01	7.0094e-02	1.5777	0.115995
CCC	-9.3488e-06	4.5387e-05	-0.2060	0.836989
Size	3.2995e-03	5.1148e-03	0.6451	0.519502
Growth	8.4303e-03	5.8493e-03	1.4412	0.150858
Leverage	-1.5810e-01	5.2664e-02	-3.0020	0.002974**

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

OIL AND GAS

Table 67: Model 1 regression results: the effect of accounts receivable days on profit

	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	4.0289e-02	9.8580e-02	0.4087	0.6885
ARD	5.2744e-08	3.6333e-06	0.0145	0.9886
Size	-1.4311e-03	7.3429e-03	-0.1949	0.8481
Growth	1.6568e-02	3.1037e-02	0.5338	0.6013
Leverage	-3.5131e-02	9.4423e-02	-0.3721	0.7151

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 68: Model 2 regression results: the effect of accounts payable days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	2.9275e-01	1.4110e-01	2.0747	0.06477.
APD	-8.1127e-05	1.8139e-04	-0.4472	0.66423
Size	-2.1417e-02	1.0538e-02	-2.0324	0.06953.
Growth	4.5039e-03	2.5619e-02	0.1758	0.86396
Leverage	2.0310e-01	1.3398e-01	1.5159	0.16050

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 69: Model 3 regression results: the effect of inventory days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	0.3057875	0.2122102	1.4410	0.18346
ID	-0.0011505	0.0034754	-0.3310	0.74820
Size	-0.0216837	0.0086901	-2.4952	0.03413*
Growth	0.1379789	0.0777176	1.7754	0.10957
Leverage	0.2390354	0.1380406	1.7316	0.11738

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 70: Model 4 regression results: the effect of the cash conversion cycle on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	1.9990e-01	1.4071e-01	1.4207	0.18912
CCC	6.8227e-05	1.3295e-04	0.5132	0.62018
Size	-1.7685e-02	9.7224e-03	-1.8190	0.10227
Growth	1.3163e-01	7.8565e-02	1.6754	0.12818
Leverage	2.6440e-01	1.0049e-01	2.6310	0.02731*

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

TECHNOLOGY

Table 71: Model 1 regression results: the effect of accounts receivable days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
(Intercept)	0.36906669	0.11253735	3.2795	0.00227**
ARD	-0.00034813	0.00016902	-2.0597	0.04652*
Size	-0.00999006	0.00824214	-1.2121	0.23317
Growth	0.03932526	0.04043011	0.9727	0.33703
Leverage	-0.17335519	0.06856738	-2.5282	0.01586*

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 72: Model 2 regression results: the effect of accounts payable days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
APD	0.00034417	0.00025239	1.3636	0.183949
Size	-0.03993270	0.01841246	-2.1688	0.039075*
Growth	-0.03949344	0.04160310	-0.9493	0.350893
Leverage	-0.43020881	0.11916285	-3.6103	0.001229**

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 73: Model 3 regression results: the effect of inventory days on profit

Variable	Estimate	Standard Error	t-value	Pr(>|t|)
ID	0.00100516	0.00058327	1.7233	0.09886.
Size	-0.05694521	0.02246621	-2.5347	0.01888*
Growth	0.00118815	0.05218425	0.0228	0.98204
Leverage	-0.33750841	0.13053774	-2.5855	0.01688*

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Table 74: Model 4 regression results: the effect of the cash conversion cycle on profit

Variable	**Estimate**	**Standard Error**	**t-value**	**Pr(>|t|)**
CCC	-0.00034632	0.00039123	-0.8852	0.38563
Size	-0.03929651	0.02799044	-1.4039	0.17430
Growth	-0.04400742	0.06506522	-0.6764	0.50586
Leverage	-0.29775365	0.13365934	-2.2277	0.03644*

Significance codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

APPENDIX 8: LIST OF COMPANIES THAT FORMED PART OF THE STUDY

Company Name	Sector
AECI	Basic materials
African Oxygen	Basic materials
African Rainbow Minerals	Basic materials
Anglo American Platinum	Basic materials
Anglo American PLC	Basic materials
Anglogold Ashanti	Basic materials
Aquarius Platinum	Basic materials
Assore	Basic materials
Atlatsa	Basic materials
Buildmax	Basic materials
Coal of Africa	Basic materials
Delta EMD	Basic materials
DRD GOLD	Basic materials
EasternPlatinum	Basic materials
Evraz	Basic materials
Exxaro	Basic materials
Glencore	Basic materials
Goldfields	Basic materials
Harmony Gold	Basic materials
Hulamin	Basic materials
Hwange	Basic materials
Impala Platinum	Basic materials
Insimbi	Basic materials
Keaton Energy Holdings	Basic materials
Kumba	Basic materials
Lonmin	Basic materials
Mondi	Basic materials
Mondi PLC	Basic materials
Northham Platinum	Basic materials
Oakbay	Basic materials
Omnia	Basic materials
Pan African Resources	Basic materials
Petmin	Basic materials
Rockwell Diamonds	Basic materials
Rolfes	Basic materials
Royal Bafokeng Platinum	Basic materials
SAPPI	Basic materials
Sasol	Basic materials
Sentula Mining	Basic materials
Sibanye	Basic materials
Spanjaard	Basic materials

Tharisa	Basic materials
Trans Hex Group	Basic materials
Wescoal	Basic materials
York Timber Holdings	Basic materials
ZCI	Basic materials
ABInBev	Consumer Goods
AstralFoods	Consumer Goods
Avi	Consumer Goods
Awethu Breweries	Consumer Goods
British American Tobacco	Consumer Goods
Clover	Consumer Goods
Compagnie Financiere	Consumer Goods
Crookes Brothers	Consumer Goods
Distell Group	Consumer Goods
Metair Investments	Consumer Goods
Nu World	Consumer Goods
Oceana	Consumer Goods
Pioneer Food Group	Consumer Goods
Quantum Foods Holdings	Consumer Goods
Rhodes Food Group	Consumer Goods
Sovereign Food Investments	Consumer Goods
Steinhoff	Consumer Goods
TigerBrands	Consumer Goods
TongaatHulett	Consumer Goods
Advtech	Consumer Services
African and Overseas Enterprise	Consumer Services
African Media Entertainment	Consumer Services
Cashbuild	Consumer Services
Caxton	Consumer Services
Choppies	Consumer Services
City Lodge	Consumer Services
Clicks	Consumer Services
Comair	Consumer Services
Combined Motor Holdings	Consumer Services
Cullinan	Consumer Services
Curro	Consumer Services
Emedia Holdings	Consumer Services
Famous Brands	Consumer Services
Grindrod	Consumer Services
Holdsport	Consumer Services
Homechoice	Consumer Services
IFA Hotels	Consumer Services
Iliad Africa	Consumer Services
Italtile	Consumer Services

Lewis	Consumer Services
Massmart	Consumer Services
Mr Price	Consumer Services
Naspers	Consumer Services
Nictus	Consumer Services
Phumelela Gaming	Consumer Services
Pick n Pay	Consumer Services
Rex Trueform Clothing	Consumer Services
Shoprite	Consumer Services
Spur	Consumer Services
Sun International	Consumer Services
Taste	Consumer Services
Foschini	Consumer Services
Spar	Consumer Services
Truworths	Consumer Services
Tsogo Sun	Consumer Services
Verimark	Consumer Services
Wilderness	Consumer Services
Winhold	Consumer Services
Woolworths	Consumer Services
Adcock	Healthcare
Afrocentric	Healthcare
Ascendis	Healthcare
Aspen	Healthcare
Life	Healthcare
Mediclinic	Healthcare
Netcare	Healthcare
Adcorp	Industrials
Afrimat	Industrials
Allied Electronics	Industrials
ARB	Industrials
Argent	Industrials
Astrapak	Industrials
Aveng	Industrials
Barlo World	Industrials
Basil Read	Industrials
Bell	Industrials
Bowler Metcalf	Industrials
Cafca	Industrials
CalgroM3	Industrials
Cargo Carriers	Industrials
Cartrack	Industrials
Consolidated Infrastructure	Industrials
CSG	Industrials

DAW	Industrials
ELB	Industrials
Ellies	Industrials
ENX	Industrials
Esor	Industrials
Extract	Industrials
Grindrod	Industrials
Group Five	Industrials
Howden	Industrials
Hudaco	Industrials
Imperial	Industrials
Interwaste	Industrials
Invicta	Industrials
KAP	Industrials
Kaydav	Industrials
Marshall Monteagle	Industrials
Masonite	Industrials
Master Drilling Group	Industrials
Mazor	Industrials
Metrofile	Industrials
Micromega	Industrials
Mix Telematics	Industrials
Mpact	Industrials
Murray and Roberts	Industrials
Nampak	Industrials
Net1	Industrials
Novus	Industrials
Onelogix	Industrials
PPC	Industrials
Primeserv	Industrials
Protech	Industrials
Raubex	Industrials
Remgro	Industrials
Reunert	Industrials
Santova	Industrials
Sephaku	Industrials
South Ocean	Industrials
Stefanuti	Industrials
Super Group	Industrials
Bidvest	Industrials
Torre	Industrials
Transpaco	Industrials
Trellidoor	Industrials
Trencor	Industrials

Value Group	Industrials
Wilson Bayly	Industrials
Winhold	Industrials
DRD Gold	Oil and Gas
Erin	Oil and Gas
Harmony Gold	Oil and Gas
Montauk	Oil and Gas
Oando	Oil and Gas
SA Coil	Oil and Gas
Adapt IT	Technology
Alviva	Technology
Cognition	Technology
Datacentrix	Technology
Datatec	Technology
EOH	Technology
Jasco Electronics	Technology
Mustek	Technology
PBT	Technology
Blue Label Telecoms	Telecommunications
Huge Group	Telecommunications
MTN	Telecommunications
Telkom	Telecommunications
Vodacom	Telecommunications