The working capital management practices of JSE-listed companies

By

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DECLARATION

I, **Farai Kwenda**, declare that:

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DEDICATION

To my children, Blessed and Faith.

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ABSTRACT

Working capital management is a subject that was largely ignored in the theoretical and empirical literature until the 1980s, mainly because it was considered a non-value adding balance sheet item. It has gained pre-eminence, particularly among practitioners, in the wake of the recent global financial crises when access to short-term funds was difficult. The increased pressure on managers to achieve maximised market valuations and the quest for cheaper sources of funds, despite growing evidence of excessive investments in working capital, has made working capital management a key contemporary financial management issue. The main aim of this study was to analyse the working capital investment and financing practices of firms listed on the Johannesburg Stock Exchange (JSE) and investigate whether these practices play a role in alleviating financial constraints in an emerging market with a robust financial system. The study employed the Generalised Method of Moments (GMM) in order to overcome the problem of endogeneity, a major problem in working capital management estimations. It found that despite operating in an environment with a well-developed financial system, South African firms use trade credit as a key short-term financing instrument. These firms pursue target trade credit and short-term financial debt levels and they quickly adjust towards their target. Furthermore, these firms also have optimal working capital investment levels and they endeavour to adjust towards this optimal level. However, for these firms, the adjustment process was found to be relatively slow. The study found that the relationship between working capital investment and firm value is concave due to the benefits and costs associated with working capital investment. The study also found that working capital management plays an important role in alleviating the impact of financial constraints. In light of these findings, it is recommended that executives in South Africa embrace efficient working capital management as part of their overall corporate strategy as this can be a source of funds, competitive advantage and can help them cope with financial constraints; this strategy has enabled Chinese firms to register phenomenal growth. Managers should clearly understand the key drivers of their company's working capital investment because deviating from the target level compromises the value maximisation goal. They should strive to maintain healthy relationships with suppliers as this ensures a continuous supply of goods and access to interest "free"

finance. Poor relationships cause costly disruptions and loss of value through negative market perceptions.

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DEFINITION OF TERMS

ACCTA	Accruals to total assets
AltX	Alternative Exchange
BRICS	Brazil, India, China and South Africa
CATA	Current assets to total assets
CCC	Cash Conversion Cycle
CFFO	Cash flow from operations
CFO	Chief Finance Officer
CMSTA	Cash and marketable securities to total assets
EOQ	Economic Order Quantity
EAR	Effective Annual Rate
ERP	Enterprise Requirements Planning
FIXATA	Fixed assets to total assets
GDP	Gross Domestic Product
GMM	Generalised Method of Moments
JIT	Just-In-Time
LSDV	Least Squares Dummy Variables
LTDTA	Long term debt to total assets
MRP	Material Requirements Planning
NCA	National Credit Act
NDTSTA	Non-debt tax shield to total assets
NGROWTH	Negative sales growth
NLB	Net Liquid Balance
NPV	Net Present Value
NTC	Net Trade Cycle

OCFTA	Operating cash flows to total assets
OCLTA	Spontaneous sources to total assets
OLS	Ordinary Least Squares
PGROWTH	Positive sales growth
PURTA	Purchases to total assets
Q RATIO	Tobin's Q
RGDP	Real Gross Domestic Product
ROA	Return on Assets
ROE	Return on Equity
SADC	Southern Africa Development Community
SMEs	Small to Medium Enterprises
SGR	Sustainable Growth Rate
SKTA	Stock to total assets
STDTA	Short term debt to total assets
TAT	Total Asset Turnover
TCC	Total Cash Cycle
TDTA	Trade debtors to total assets
WCACC	Working capital accruals
WCCC	Weighted Cash Conversion Cycle

CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

In everyday life maintaining a balance between liquid assets and short-term liabilities is an individual preference which could, however, determine the future of one's financial success. The same principle applies to firms and is referred to as working capital management. Several internal and external factors influence the choice of the balance between short-term assets and short-term liabilities. These factors are pronounced in uncertain economic conditions which contemporary literature asserts to be driven by globalisation and internationalisation, among other factors.

> "Charles Swindoll, a theologian, once said life is 10% what happens to us and 90% how we react. In corporate life, the 10% is economic reality. Working capital optimisation can make the difference".
>
> Havoutis (2005) p.33

Olive trees are well-known for their longevity which is a case study in adaptability. They need little water and can be uprooted and replanted with ease. Like olive trees, firms require remarkable adaptive survival skills. They must adapt and brave the elements of any economic climate even though they are beyond the firms' control. The survival and prosperity of any firm in today's business environment which is characterised by rapidly changing short-term financial markets, intense competition, inflation, high cost of capital, rapid regulatory changes and pressure to deliver maximum shareholder value, depends on its ability to adapt and survive these challenges. One key area in firms' adaptability is working capital management because it is within their control. Managing working capital involves decisions regarding the composition and the financing of current assets and these twofold strategies determine the liquidity position of the firm and its ultimate financial success or failure.

The recent global financial crisis and the recession that ensued made working capital management a pre-eminent financial management subject during and after the crisis. The systemic nature of the crisis enhanced the importance of working capital management because it forced many firms to scramble for cash and mine cash from their working capital investments. The difficulty of collecting from customers and converting inventories into sales and the inaccessibility of traditional sources of short-term finance (banks and trade creditors) affected the cash flows of many firms and forced them to reconsider their short-term investment and financing decisions.

This study therefore seeks to unravel the practices followed by companies listed on the Johannesburg Stock Exchange (JSE) in managing their working capital and to provide a theoretical framework and models to contribute to the short term financial management discourse. In doing so, this study draws its framework from the ambits of financial management. Extant and contemporary literature agree on the goal of financial management; shareholder value maximisation. However, different economic styles have different goals and as such working capital management practices may differ. In common with many other countries, South Africa is inclined towards shareholder value creation; this study takes this tendency into account.

Working capital investment and financing decisions play an important role in the realisation of the shareholder wealth maximisation goal, yet they have been largely ignored in both the theoretical and empirical literature. It is generally agreed that there is a paucity of theory on working capital management in academic research. The dearth in the literature was observed by Walker (1964) in the 1950s and continued until the 1980s, when interest in the subject increased (Lyroudi and Lazaridis, 2000). The literature has provided several reasons why working capital management was eclipsed by the other two branches of corporate finance; capital budgeting and capital structure. Working capital was largely viewed as a balance sheet item waiting to be disposed of and that does not contribute to the profits of the firm (Sagner, 2007). Sartoris and Hill (1982) postulate that academic attention to efficient market theory

contributed to the neglect of the subject of working capital management in research and practice. In perfect efficient capital and product markets, there is very little room for short-term financing decisions to make any difference. Firms operating in efficient financial markets can adjust digressions from target working capital policies with relative ease (Etiennot et al., 2012). According to Gentry et al. (1979) the individual impact of working capital decisions was considered to be insignificant because these decisions are frequent, routine and reversible. The lack of attention to working capital management is also attributed to its highly consolidative nature; it touches many aspects of the firm, including goods procurement, the production process, sale of goods, customer and supplier relationships and this makes it difficult to optimise.

1.2 BACKGROUND TO THE STUDY AND OUTLINE OF THE RESEARCH PROBLEM

Finance theory can be discussed under three major distinct topics: capital budgeting, capital structure and working capital management. Much theoretical and empirical work has been undertaken on capital structure and capital budgeting because these decisions are expected to generate future cash flows and determine the firm's market value when discounted at the appropriate required rate of return. However, as noted by Watson and Head (2004), a company's long-term decisions can only succeed if short-term decisions; that is working capital management also receive adequate attention.

1.2.1 WORKING CAPITAL, BUSINESS FAILURES AND SHARE PRICE CRASHES

Despite the recognition of its importance and significant contribution to business failures (Zapalska et al., 2004, Toby, 2007, Berryman, 1983, Lazaridis and Tryfonidis, 2006) working capital management has been neglected in both theoretical and empirical frameworks (Pass and Pike, 1987, Smith, 1980). The improper management of working capital has been identified as a chief cause of business maladies and failure (Berryman, 1983, Pass and Pike, 1987, Weston et al., 1996). Finance literature is dotted with cases of corporate failures, bankruptcies and near collapses of profitable firms due to inappropriate working capital management. The collapse of W.T. Grant in 1976 is attributed to poor working capital management because it was running a

negative operating cash flow for the greater part of the final years of its corporate life (Largay and Stickney, 1980). Weston et al. (1996) cite Trans World Airlines' liquidity problems in raising an expected shortfall of $135million for the year in 1994 as having led to the company's shares plummeting by about 50% in less than four months. Ironically, in December 1993 the company was named one of the best performing airlines. O'Regan (2007) discusses the financial collapse of Cedar, a software group in 2001. Barely 12 months earlier, the company was worth almost £1billion, but was bought for a mere £4.2million in January 2002 by a venture capital firm, Alchemy after warning investors that in the absence of a takeover, bankruptcy seemed inevitable. The short-term causes of Cedar's collapse centred on poor control of sales invoicing and trade debtors, coupled with a cavalier approach to revenue recognition. The massive decline of Amazon's share price in the mid-2000s was attributed to poor working capital management (Filbeck et al., 2007). The most recent case is that of three US automobile manufacturers; Chrysler, Ford Motors, and General Motors, which had to request about US$13.4billion from the government for working capital in order to meet daily expenses and avoid collapse. These cases validate the common saying in financial management circles:

> "A business can generate losses during a number of different periods, but it cannot go on indefinitely with poor cash conversion cycle management".
>
> Mongrut et al. (2007) p.4

Without sound and proper working capital management procedures, firms will find it difficult to remain solvent and are likely to be bankrupt despite their sales growth and profitability potential (Jose et al., 1996, Kargar and Blumental, 1994). According to Watson and Head (2004:278), without the "oil" of liquid assets, the "engine" of fixed assets will not function because liquidity problems may cause disruptions, losses and the ultimate collapse of the firm.

South Africa has experienced its fair share of corporate failures with recent high profile cases including 1time and LeisureNet. The collapse of LeisureNet cost nearly 5 000 jobs and is rated as the biggest liquidation in the South African corporate world. Other cases include Macmed Healthcare and Consolidated News Agency (CNA). Although corporate failure in South Africa is most pronounced among non-listed firms and small businesses, the JSE has also witnessed

corporate failures. While there are several causes of corporate failure in South Africa, working capital management or some of its elements are often cited. Other reasons for corporate failure include fraud (the case of Fidentia), poor corporate governance, and the impact of macroeconomic conditions, etcetra. Table 1 shows the number of JSE-listed firms that failed and were subsequently liquidated during the period 2001 – 2010. Financial failure is one of the reasons why firms delist from (Erasmus, 2010).

TABLE 1 LIQUIDATED LISTED FIRMS BETWEEN 2001 AND 2010

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Number of firms	3	2	9	3	4	7	2	-	3	-

Source McGregor BFA, www.streetdogs.co.za/stdgDelisted.asp

1.2.2 THE PARADIGM SHIFT IN WORKING CAPITAL MANAGEMENT

Technological advancement and the globalisation of many industries have made gaining competitive edge on unit cost reduction and pricing very difficult. There is a paradigm shift in perceptions of working capital management as many corporate boards of directors now regard it as a source of competitive advantage, and part of corporate strategy and the overall liquidity and risk management framework of the company (Yucel and Kurt, 2002, Parkinson, 2011). This paradigm shift and increased attention to working capital management in recent years is attributed to firms becoming more aware of the potential cash flows, cost savings and financial performance that can be generated through the efficient management of a firm's financial supply chain and working capital (Protopappa-Sieke and Siefert, 2010). The focus on increasing cash flows through managing working capital has led to the development and use of software and programmes aimed at optimising working capital management such as the Six Sigma® methodology. Such models target improvements in the financial supply chain; accelerate collections, and reduce the running costs of managing inventories and trade receivables while improving customer service and reducing borrowings and interest expenses (Filbeck and Krueger, 2005b). These working capital optimisation programmes aim to increase firm value

and strengthen the balance sheet through saving costs, improving profits, reducing dependence on external funding and releasing funds to more productive pursuits such as share repurchases, retiring debt, research and development. Efficient working capital management strengthens relationships with customers and suppliers and reduces risk. Some companies have resorted to outsourcing cash management services to specialist treasury service providers while others are investing in new software to manage their liquidity and working capital.

There is no consensus on whether the cash flows generated by such working capital management strategies are permanent or transitory. Siefert and Siefert (2008) state that for an average company, a 30% reduction in working capital can increase its returns on employed capital by 16%. Working capital consulting companies such as REL claim that they have helped their clients release more than $25 billion through working capital optimisation (Sagner, 2007). Some argue that the cash flows realised from working capital optimisation programmes are transient and, therefore, do not represent a key improvement in the internal value creation process or the business model (Fink, 2004, Mulford and Ely, 2003). Waxer (2003) criticised the Six Sigma® methodology and labelled it a "get-rich-slow-scheme" after a study of companies employing this method reported increases in rate of returns ranging between 1.2% and 4.5%.

In common parlance, working capital management is a straightforward subject; it is about ensuring that the firm has adequate resources to run its operations efficiently and effectively. However, in practice it is the Achilles' heel of many firms with many finance managers battling to identify the key determinants and the optimal level of working capital (Harris, 2005). As a result, many finance managers devote much time and effort to bringing non-optimal short-term assets and liabilities levels to optimal levels that balance the conflicting goals of liquidity and risk (Filbeck and Krueger, 2005b, Lamberson, 1995, Wang, 2002). Unlike long-term financing and capital budgeting which involve huge sums of money and are infrequent occurrences, working capital management is largely repetitive, frequent and time-consuming. Working capital management decisions involve assets and liabilities with a relatively short life expectancy as they are rapidly transformed from one form to another in the normal course of

the operations of an enterprise. According to Weston et al. (1996), financial managers commit nearly 60% of their time to working capital management. A study by Firer et al. (2012) found that Chief Financial Officers (CFOs) spent their time as follows: 35% on financial planning, 32% on working capital management, 19% on capital budgeting and 14% on capital structure. Some finance managers have resorted to the use of consultants and working capital efficiency models in order to minimise the time and effort they spent on working capital management. Filbeck and Kruger (2005) argue that such managers still need to identify optimum working capital levels.

Good working capital management balances the conflicting goals of liquidity and profitability in order to maximise shareholder value; that is, holding levels of working capital that increase profitability without jeopardising the solvency of the firm. Excessive levels of working capital investment represent poor utilisation of capital and deliver sub-standard returns, while low levels of working capital lead to liquidity problems (Erasmus, 2010). Determining and attaining the appropriate level of working capital presents a serious challenge to managers (Baños-Caballero et al., 2009, Ding et al., 2013) because working capital management demands that almost all the firm's operations; sales, marketing, collections, production among others, work together. Given the difficulties of determining and attaining optimal working capital levels, it is important to investigate whether firms pursue optimal working capital levels.

The challenges of determining and attaining optimal working capital levels raises questions, relating to the pursuit of target levels and the speed with which firms adjust to reach their optimal levels. These questions are stimulated by growing evidence that firms are overinvesting in working capital. For example, Ernst and Young (2010) estimated that the largest 1000 American firms and 1000 European firms (by sales) held more than US$450 billion and €475 billion respectively in working capital unnecessarily. In its 2009 Working Capital Survey of the top 1000 US companies, REL, a working capital management consulting firm, found that firms were unnecessarily holding approximately US$ 778 billion in working capital. For the Asia-Pacific region, Wasiuzzaman and Arumugam (2013) note that in 2007 the top 850 companies

were holding about $833 billion that was not being used productively. The absence of proper metrics to measure working capital levels and the highly integrative nature of working capital management have been blamed for such overinvestment.

In the course of most financial management decisions, expected future cash flows are discounted at the required rate of return to determine whether value will be created for shareholders. Working capital management decisions are not carried out with the same intensity as capital budgeting and capital structure decisions (Etiennot et al., 2011). In fact, working capital investments are undertaken without expecting a specified return and as a result it is very easy for firms to overinvest in working capital.

The evidence of overinvestment in working capital raises questions such as whether or not firms set target working capital levels or pursue working capital targets that enable them to maximise shareholder value, as suggested by some scholars (Deloof, 2003, Smith, 1980). Over-investment in working capital can lead to liquidity problems and compromised shareholder value. Although there is growing evidence that firms are overinvesting in working capital, the pursuit of optimal or target levels of working capital has not attracted the attention of many researchers. Consequently, there is no empirical work showing that working capital overinvestment is causing compromised shareholder value deviations. This focus of this study is examining the pursuit of target working capital levels, the existence of optimum working capital levels and the impact of deviations from the optimum working capital levels on firms and their performance.

South African firms are exploring ways of reducing their cost of capital because when compared to other markets, the cost of capital in South Africa is relatively high. For example, Power (2004) cites Anglo American, which reduced its cost of capital by moving its listing to the London Stock Exchange[1]. Grandes and Pinaud (2004) attributed the high cost of capital to low savings,

[1] Other companies that have moved to their head listings to the London Stock Exchange are Billiton, South African Breweries, Old Mutual and Didata (Power, 2004).

monetary and exchange rate policies, the rand currency premium and the shallow nature of capital market compared to the G7 countries. Power (2004) also attributed the high cost of capital in South Africa to its high risk free rate and produced a simplified analysis which shows that to be profitable, an ungeared South African company needs economic returns that are almost double that of a British or American company because its required return is twice as high, as shown in Table 2. Working capital can be a cheaper source of funds for South Africa firms given the high cost of funds and the increasing costs of raising funds in capital markets.

TABLE 2 COST OF CAPITAL OF UNGEARED COMPANIES IN SOUTH AFRICA, UK AND USA

Country	Risk free rate	Equity risk premium	Cost of capital
South Africa	10% yield on 10-year SA government bonds	5.5%	15.5%
UK	5% yield on Gilts	4%	9%
USA	4.5% yield on Treasuries	4%	8.5%

Source: Power (2004)

The growing evidence of firms overinvesting in working capital renders corporate liquidity management a contemporary financial management paradox. On the one hand, there is growing evidence that firms are overinvesting in working capital. On the other hand, firms are searching for cheaper sources of funds, and lamenting high borrowing costs and the inaccessibility of credit markets.

1.2.3 WORKING CAPITAL FINANCING IN SOUTH AFRICA

Two major concerns raised by finance managers in corporate financing are accessibility and the cost of finance. The volatile nature of financial markets compounds these challenges for finance managers. In the past, managers could use borrowing as an escape route out of operational difficulties; this has changed due to the tightening of credit markets. Recent developments in financial markets have highlighted that access to finance is a very important area of financial

management. Chiou et al. (2006) assert that the stringent credit policies adopted by lending institutions since the slowdown of the global economy during the late 1990s, have made it more difficult for companies to access cheap credit. Zapalska et al. (2004) attribute the tightening of credit markets to the banks' response to being blamed for helping to provoke the Asian financial crisis in 1997 by channelling reckless lending into the Central and Eastern European emerging markets. Mongrut et al. (2007) state that Latin American companies previously accessed and renewed offshore loans channelled through local banks with relative ease and at low interest rates. Such loans were considered a permanent source of funding. However, during the late 1990s, in particular after 1997, a series of international financial crises disrupted this 'permanent' source of funding, making access to credit both difficult and expensive.

Raising funds in capital markets has proved to be increasingly difficult and costly (Salawu, 2007). Issuance costs incurred when raising external finance make internal financing cheaper for a firm. For example, in raising R3.9 billion through an Initial Public Offering in 2003, Telkom incurred R220 million in expenses which was approximately 6% of the amount raised (Firer et al., 2012). The cost of issuing new securities, the volatility of short term markets, the high cost and the scarcity of funds make working capital financing a very important subject. Financialisation, which is broadly defined as a pattern in which investors make profits through financial channels instead of trade and commodity production (Krippner, 2005), is one of the major causes of the scarcity of funds. Working capital can be considered a reservoir of internal financial resources because funds locked up in working capital can be tapped into and redeployed to support business growth. By pursuing efficient working capital management policies, managers can tap into this hidden reserve of working capital and pursue profitable investment opportunities without going to the capital market to issue expensive and risky securities and avoid the negative signals associated with external securities.

Working capital financing is important for South African firms because of the tightening of the credit market after the implementation of the National Credit Act (NCA) in 2006. South Africa

boasts one of the most well-developed capital markets and banking systems; its financial system is one the most advanced in the world and compares favourably with those of more developed economies (Skerritt, 2009). The banking sector, for example, though oligopolistic in nature, ranks among the world's top ten. The regulatory framework, the depth of financial infrastructure and markets and the vitality of the banking system serve as proof of the advanced nature of the South African financial sector. South Africa is the most liquid emerging bond market in the world and is also the leader in terms of the number of bonds listed and turnover.

Although working capital management is vital to all firms, it has greater importance for firms in emerging markets because they have limited access to external funds due to the underdeveloped financial markets prevalent in these markets (Abuzayed, 2012). However, South Africa is a unique emerging market. Unlike other such markets, the country's financial system is very deep, robust and very liquid. Since 1996, bank credit to the private sector has consistently exceeded the country's Gross Domestic Product (GDP) (120% of the country's GDP) (International Monetary Fund, 2011), which illustrates that the banking sector is important to the private sector. Despite this, big companies in South Africa seem to rely heavily on trade credit. Such dependence is usually associated with firms seeking to overcome credit unavailability from financial institutions or the challenges presented by poorly developed financial sectors (Fisman and Love, 2003, Schwartz, 1974). The extensive use of supplier financing (which is generally more expensive than short-term financial debt when implicit costs are taken into account) in an emerging market with well-developed financial systems makes the subject of working capital financing worth investigating.

The bond and commercial paper market in South Africa has grown phenomenally over the past decade from R49 billion in market capitalisation (nominal value) to R208 billion (van Zyl, 2012). In 2002-2003, the Bankers' Acceptance, one of the major short-term financing instruments, lost its liquidity status. While the overall bond market has grown, the growth of the corporate bond market has been very sluggish. A closer look at the commercial paper market, for example,

shows that very few non-financial services firms issued commercial paper between 2002 and 2010. This reflects a lack of appetite for debt among listed firms, making the subject of working capital financing a subject of interest as obvious questions such as how corporates finance themselves in South Africa arise.

1.2.4 WORKING CAPITAL MANAGEMENT AND FINANCIAL CONSTRAINTS

Winners and losers in the market place are distinguished by the corporate investments they undertake (Boquist et al., 1998). Recent empirical research has attributed the persistent and phenomenal growth of the Chinese economy and firms despite financial constraints to the use of internal resources and good working capital management (Ding et al., 2013, Hale and Long, 2011). There are wide sources of finance for South African firms; the stock market, the bond market and the banking system. Despite the presence of a well-developed capital market and financial system which ranks among the top countries in terms of financial development, South Africa has a very low growth rate, an average of 2.7%. South Africa's rate of growth is below its peers in the Brazil, Russia, India, China and South Africa (BRICS) alliance and some of its peers in the Southern Africa Development Community (SADC) region, who have not achieved its level of financial development. Fixed investments by companies contribute to economic growth. The question of interest here is; does internal finance have any role to play for firms operating in a highly-developed and sophisticated financial system? Second, does working capital alleviate financial constraints in economies where the capital market and the financial system are functioning very well?

1.2.5 THE GLOBAL FINANCIAL CRISIS

The world economy is recovering from one of the worst economic recessions in human history since the Great Depression. This recession and the credit crunch triggered a global financial crisis, making short-term financing an important aspect of working capital management. The global financial crisis rocked financial markets, negatively impacting firms' ability to access funds as more stringent measures were applied by banks to borrowers. The financial downturn highlighted the importance of access to short-term financing and invoked interest in improving

working capital management (Lin et al., 2012). For example, in 2008 three United States automobile manufacturers had to request a bailout from the government to finance running day-to-day expenses to save them from collapse. Their collapse would have resulted in almost 350 000 direct job losses and approximately 4.5 million indirect job losses (Healey et al., 2008). Ironically, in 2006 these companies were reported to be holding more than US$7.6 billion in excess working capital. This case validates the argument that companies usually care less about liquidity positions until they reach the point of bankruptcy or are on the verge of collapse (Nicholas, 1991). Such cases serve to highlight that corporate failure has ripple effects; hence the need to address the subject of working capital financing and investment as an important area of corporate financing. Traditionally, firms overlooked the issue of working capital management during periods of economic growth and scrambled to improve when the economy contracted.

The global economic crisis negatively impacted the cash flows of many companies due to challenges in accessing short-term finance (working capital finance); some firms downsized their operations, slashed capital expenditure and deferred expansion programmes (Kesimli and Gunay, 2011). Good working capital management cushions firms against a credit crunch and reduced access to external funds (Kesimli and Gunay, 2011). During economic downturns, companies with good working capital management practices can implement counter-cyclical measures to build a competitive advantage using internally generated funds to finance their research programmes and expansion (Siddiquee and Khan, 2009). Such companies are better able to withstand economic downturns and could emerge in a stronger position. Given that efficient working capital management enable firms to withstand the impact of economic upheavals (Reason, 2008), this study tests how the global financial crisis impacted on the financing and investment practices of South African firms.

1.3.1 RESEARCH QUESTIONS

The above discussion gives rise to the following research questions:

1. Do JSE-listed companies pursue optimal working capital investment levels?
2. What relationship exists between working capital investment, profitability and firm value?
3. What are the main determinants of the working capital financing instruments adopted by JSE-listed companies?
4. Does working capital management make a difference in alleviating financial constraints in South Africa among JSE-listed companies?
5. How did the global economic crisis affect the working capital financing and investment practices of JSE listed firms?

1.3.2 RESEARCH OBJECTIVES

The specific objectives of this study are to:

1. Establish whether listed firms pursue target working capital investment levels.
2. Analyse the determinants of working capital investment and its relationship with firm value.
3. Analyse the working capital financing practices of companies listed on the JSE.
4. Investigate whether working capital management alleviates financial constraints in South Africa.
5. Investigate the impact of the global economic crisis on the working capital financing and investment practices of JSE-listed firms.

1.4 AIM OF THE STUDY

This study aims to contribute to the short-term financial management discourse, in particular the long-running debate on the liquidity risk-reward trade-off and the cash flow-investment sensitivity debate. To do so, the study examines the working capital financing and investment practices of firms listed on the JSE and how working capital alleviates financial constraints in South Africa.

1.5 PROBLEM STATEMENT

The study investigates the working capital management practices of firms listed on the JSE with a particular focus on factors that influence working capital investment levels and how working capital investment levels are related to a firm's value. It also investigates the working capital financing practices of these listed firms. The study goes on to establish how working capital financing and investment practices help to alleviate financial constraints in South Africa, considering its level of financial development.

1.6 SIGNIFICANCE OF THE STUDY

The JSE is a key part of the South African financial landscape. It has been and continues to be the magnet for foreign investment in South Africa, with more than half of the trading at times attributed to foreign investors (Firer et al., 2012). This study of the working capital investment and financing decisions of listed firms at a time when finance managers are under pressure to deliver more value to their shareholders by attaining high company valuations (Poirters, 2004, Weston and Copeland, 1992) is important in order to ensure that the investment magnet status of the JSE is enhanced.

Despite the strong relationship between working capital management and firm value, this subject has received less attention in empirical research and has therefore not been fully explored. According to Brealey et al. (2008) little is known about working capital investment that maximises firm value. This study contributes to the short-term financial management debate by presenting a new perspective on how the management of working capital affects firm value. The few previous studies on this subject present two conflicting views on working capital management and do not agree on which working capital approach maximises shareholder value. These studies did not take into account the positive effects (benefits) and negative effects (costs) of holding working capital investments. One view is that low levels of working capital investment enable the firm to create value by reducing investments in non-productive assets and by quickly turning over its working capital to generate more revenue. However, low working capital levels may result in lost revenue due to stock-outs, disruption of

the production process and technical insolvency. Another view is that high levels of working capital investment enable the firm to minimise shortage costs but the firm incurs huge opportunity costs. These two conflicting views clearly show that any level of working capital investment has benefits and costs and these have to be taken into account when analysing the relationship between working capital management and firm value. This study presents an analysis of the relationship between firm value and working capital investment, with costs and benefits in mind; as a result this relationship is hypothesised to be non-linear. No studies reviewed have tested this relationship using quadratic equations. Testing the existence of an optimal point justifies the pursuit of an optimal working capital level. Thus this study uses econometric analysis to show how low and high levels of working capital impact on firm value, taking into account that firms have target levels of working capital investment. The existence of benefits and costs of holding working capital means that there is an optimal point that maximises shareholder value and that when firms are on either side (below optimal level and above optimal level) of the optimal point, this reduces firm value. In analysing working capital management, there is a need to consider that firms have target working capital investment levels which they believe will help to maximise shareholder value.

Through efficiently managing their working capital, Chinese firms have recorded phenomenal growth despite financial constraints (Hale and Long, 2011). South Africa presents an ideal case for investigating the role of working capital management in alleviating financial constraints because of its unique setting. South Africa is an emerging market economy with a sophisticated financial system, yet neither the country nor South African firms have been able to produce high growth rates. Developed financial systems make it easier to access funding. Furthermore, while there is a growing literature on cash flow-investment sensitivities (Pawlina and Renneboog, 2005, Guariglia, 2008), very few studies (Fazzari and Petersen, 1993, Ding et al., 2013) have analysed the impact of working capital in alleviating cash flow investment sensitivities. The role of working capital in alleviating cash flow investment sensitivities is important; Ding et al. (2013) found that the growth of Chinese firms can largely be attributed to their working capital management practices.

In South Africa, working capital management as a corporate finance subject is generally not talked about and has very limited empirical research. A search of the literature found only three working capital management and profitability studies (Erasmus, 2010, Smith and Begemann, 1997, Ngwenya, 2012). There is a paucity of research on firms' practices relating to working capital financing in emerging markets (Zapalska et al., 2004) and it is virtually non-existent in South Africa; to the best of our knowledge, no empirical work has been carried out in South Africa. Therefore, to contribute to the literature on access to finance in emerging economies, this study examines working capital finance sources in an economy that has a well-developed capital market and financial services sector. Furthermore, given the South African financial landscape, there is a need to analyse the determinants of working capital financing. The extensive use of trade credit by listed companies (which are supposedly big firms likely facing few financial constraints) while there is an abundant supply of bank credit in South Africa make this matter worthy of investigation.

Most finance managers plan their operations with gross working capital in mind. Working capital represents a large portion of firms' total assets. Although current assets levels differ from one sector to another and differences also exist within an industry, they generally constitute more than half of the total assets for most firms (Appuhami, 2008, Moyer et al., 1995, Raheman and Nasr, 2007). The literature on firm value and gross working capital relationship is very sparse. Most previous studies evaluated the relationship between firm value and the individual components of working capital which considers both the benefits and costs of holding such assets; inventory, receivables (Martínez-Sola et al., 2013b) and cash holdings (Martínez-Sola et al., 2013a).

The estimation of the appropriate working capital investment level is fraught with many challenges and consequently, the firm's working capital investment level may not always be at the desired level. Most existing studies on working capital management assume a static approach; that is, firms can instantaneously adjust their levels of working capital investment.

This study employs a partial adjustment model because the adjustment process towards the real or desired target of working capital management involves both time and costs. It involves a trade-off between being in disequilibrium and the cost of adjusting towards the target. In terms of methodology, this study contributes to the short-term financial management discourse by employing a dynamic approach and uses the Generalised Method of Moments (GMM) as a way of controlling possible endogeneity problems. The highly integrative nature of working capital management means that regression analysis must take into account the problem of endogeneity.

1.7 CONTEXT OF THE STUDY

Since the demise of apartheid South Africa has become a model of a developing country with constitutional democracy and political stability. The South African economy is well-diversified, boasting large industrial and services sectors. Industrial output and mineral production have been the mainstay of South Africa's economy and have made it Africa's economic powerhouse as well as the African country whose economy is most integrated with the global economy due to its gold, platinum and other industrial exports. South Africa is the only emerging market from Sub-Saharan Africa to be part of the G20 and the only African member of the BRICS alliance.

1.8 THE JSE

The study is based on South African JSE-listed firms, the only stock market in the country. The JSE was established in 1887 after the discovery of gold on the Witwatersrand with the main objective of facilitating the raising of capital for gold mining companies. Over the years the JSE has grown to become one of the world's largest stock exchanges and one of the major investible global stock markets. It is ranked as the largest stock market in Africa and among the top 20 stock exchanges in the world in terms of capitalization (Firer et al., 2012). The JSE is the oldest and one of the largest among the emerging markets and compares quite well in delivering value with other stock markets in the BRICS alliance and other emerging markets. In 2006, the JSE demutualised, listed itself on its exchange and changed its name from the Johannesburg Stock Exchange to the JSE Securities Exchange (JSE). The JSE has engaged world-

class technology to manage its operations like the dematerialization of the share ownership, the real time news service and the electronic trading system.

1.9 ASSUMPTIONS OF THE STUDY

This study used data mainly sourced from the year-end financial statements of JSE-listed firms. It was therefore assumed that these year-end financial statements are reflective of the working capital policies and strategies employed by the firm within a trading year. All firms listed on the JSE are required to subject their financial statements to external auditors for independent opinion. It was therefore assumed the financial statements used in this study represented the "true and fair view" of the firms' financial position.

1.10 LIMITATIONS OF THE STUDY

This study used data mainly drawn from financial statements (Income Statement, Balance Sheet and Cashflow Statement). Despite their international recognition and use as sources of information about the performance and well-being of the firm, they have some weaknesses. First, different firms end their financial years at different times and this impacts on working capital levels reported. For example, the sample included firms in the retail sector and this sector holds huge inventory levels and report high revenue figures during the festive season. Second, different firms use different accounting procedures for depreciation (some use reducing balance method and some use straight line method) and inventory (some use First-In First-Out and some use Last-In First-Out). These different account procedures impact on the working capital and profits reported. Third, extraordinary items such as one-time profit from sale of an item may create an impression of improved financial performance. It was difficult to identify "pure plays", that is, companies that specialized in one line of business as most firms on the JSE are hugely diversified and some are conglomerates. Therefore sectoral analysis was to some extent compromised. Sectoral analysis demands that firms strictly fit in one sector.

1.11 ORGANISATION OF THE STUDY

This study comprises five key areas and is structured in following manner. The first part presented the background of the study, the research problem, the rationale for the study, and overall and specific objectives. The context, scope, limitations and assumptions of the study are also presented in this part.

The second part reviews the literature on working capital management and is divided into three sub-chapters. It begins by introducing the reader to foundational working capital management issues; tracing its evolution and the development of theory and efficiency measurements; followed by a discussion on the theoretical and empirical literature on working capital financing and investment policies. This part concludes with a discussion on the interaction between working capital investment, cash flow and fixed investment. A description of the research methodology forms the third part of the study. This describes the research design, data sources and the data analysis tools that were employed to address the study's research questions.

The fourth part presents the findings of the study and comprises four sub-chapters. The first sub-chapter presents; analyses and discusses the findings on working capital structure and financing patterns. The second sub-chapter presents; analyses and discusses the findings on working capital investment. This is followed by a sub-chapter that presents, analyses and discusses the study's findings on working capital financing practices. The findings on the interaction between working capital, fixed investment and financial constraints are covered in the last sub-chapter of this study results section.

The fifth and final part is the conclusion of the study. This summarises the study by outlining its key findings, highlights the major conclusions drawn from the study, makes recommendations to South African managers and discusses the contribution of the study to the short-term financial management discourse. The conclusion offers suggestions for possible future working capital management research areas.

CHAPTER TWO

INTRODUCTION TO WORKING CAPITAL MANAGEMENT

2.1INTRODUCTION

The introductory chapter discussed the background issues related to this study. This chapter lays the foundation for the review of extant literature on working capital management, tracing its history, evolution and the development of the theory. It also discusses working capital management efficiency measurement methods, and reviews both the theoretical and empirical literature on the relationship between working capital management and profitability. This chapter is based on contemporary and extant literature and therefore draws on the diverse views of different scholars and researchers, which facilitates the presentation of a balanced discussion of the subject at hand.

2.2THE HISTORY OF WORKING CAPITAL MANAGEMENT

Unlike other useful managerial concepts, working capital management cannot be easily traced to reflections by early economists. The development of the concept of working capital can be ascribed to Karl Marx (1867), although he conceptualised working capital from a different perspective by referring to it using the terms 'variable capital' and constant capital'. According to Marx, the former meant disbursements of wages given to workers before the completion of the goods they were working on while the latter was nothing but 'dead labour'. This 'variable capital' represented payment to labour that remains "tied-up" in terms of financial management, in work-in-process together with other running costs until it is released through the sale of finished goods. Although he did not state that by providing labour first and being paid afterwards, workers were effectively extending credit to the firm and also funding part of the production process, Marx's concept of working capital, as it is known today, was embedded in his 'variable capital'.

The work of Adam Smith (1776) that distinguished between circulating and fixed capital was among the early work to contribute to the development of working capital management theory. According to Adam Smith:

> "The goods of the merchant yield him no revenue or profit till he sells them for money and the money yields as little till it is again exchanged for goods. His capital is continuously going from him in one shape and returning to him in another, and it is only by means of such circulation, or successive exchanges, that it can yield him any profit. Such capital, therefore, may very properly call circulating capital".
>
> Mehrotra (2013) p.1

2.3 THE ORIGINS OF THE TERM WORKING CAPITAL

According to Weston et al. (1996) the term 'working capital' originated at a time when most industries were closely related to agriculture; firms were only interested in financing their business with loans of not more than one year maturity since the proceeds from the sold products would be used to finance both the purchase and the processing cost.

> "Specifically, the term "working capital" originated with the old Yankee peddler, who would load up his wagon with goods and then go off on his route to peddle his wares. The merchandise was called working capital because it was what he actually sold, or "turned over" to produce his profits. The wagon and horse were his fixed assets. He generally owned the horse and wagon, so they were financed with "equity" capital, but he borrowed the funds to buy the merchandise. These borrowings were called working capital loans, and they had to be repaid after each trip to demonstrate to the bank that the credit was sound. If the peddler was able to repay the loan, then the bank would make another loan and banks that followed this procedure were said to be employing sound banking practices".
>
> (Weston, Besley and Brigham, 1996, pp 333)

2.4 THE EVOLUTION OF WORKING CAPITAL MANAGEMENT

Smith (1980) states that with the unfolding of the industrial revolution at the beginning of the 20th century, the finance function was primarily concerned with ensuring that the bills of the business were paid. Finance dealt exclusively with managing the firm's current liabilities. However, as the magnitude of assets under management grew and competition intensified, the finance function tended to expand in many firms to the extent that financial management was necessarily concerned with not only paying bills but focusing on the entire range of financial resources. That is, finance expanded so that attention was paid to the origins of all financial sources included on the balance sheet's asset side. As the size of the business continued to grow and as competition continued to intensify, the finance function again tended to expand to the degree that it was not only concerned with paying bills and all sources of financing, but also with how the total financial resources of the firm would be invested. This meant that that the finance function had finally reached the point of being involved with the firm's entire balance sheet.

According to Beranek (1988), the subject of working capital probably had its origins in accounting practices in the years prior to 1920. The first of these accounting practices was budgeting (financial planning and short-term financial forecasting), in particular, cash budgeting that focuses on the size and timing of cash inflows and outflows. The concept of controllership (the monitoring of flows and the development of operational budgets) which was initially used for control and ex-post analysis later evolved into strong tools for resource allocation and working capital decision making. Another accounting contribution to working capital management came from the concept of Source and Use of Funds Statement which helped management with monitoring, as it traced the sources and uses of funds. Pro-forma financial statements also contributed to working capital management by helping management to decipher working capital policies' effects on projected income statements and balance sheets. The growing practice of the auditing of financial reports by independent accountants led to further contributions to working capital management. In their reports to management and stockholders, auditors began to comment on the adequacy of reserves for accounts receivable,

the quality of inventory and the adequacy of working capital. Financial ratios began to be stressed, especially the current and the quick ratio – these were widely used as measures of working capital adequacy. Beranek (1988) states that the commercial banking industry also contributed to working capital management as prior to 1920, they were largely advancing working capital loans. The period 1920–1969 witnessed significant contributions to the development of the subject of working capital management such as the work of Keynes (1936) on the motives for holding money; mathematical programming of various aspects of working capital management began to appear, textbooks including the subject of working capital management were published and analytical methods to cash balance versus marketable securities were also developed.

2.5 THE DEVELOPMENT OF WORKING CAPITAL MANAGEMENT THEORY

Realising the need for the development of a working capital management theory, Sagan (1955) produced the first theoretical paper on the subject which accentuated the need for working capital accounts to be properly managed because of their potential effects on a company's financial well-being. Sagan focused on the cash part of working capital, in particular the roles and responsibilities of the money manager in efficiently managing the firm's working capital. Sagan pointed out that in addition to the money managers' primary role of managing the cash flows generated in the normal course of the business, they should be aware of movements in the inventories, receivables and payables as they affect the cash position of the firm. He also indicated that money managers should ensure that the firm has enough resources to meet obligations as and when they mature and make profitable temporary investments using surplus funds. Such activities should be based on the cash budget and the total short-term assets position and not on the conventional liquidity ratios. Efficient money management enables the money manager to avoid external borrowing even when the firm has low levels of working capital.

In response to the paucity of literature on working capital management, Walker (1964) developed a working capital management theory. Walker empirically tested, although partially,

three propositions based on the risk-return trade-off of working capital management. He studied the effect of working capital levels on the return on investment in nine industries for the year 1961 and found that these two factors were inversely related. On the basis of these findings, he developed three powerful propositions which dealt with; the use of debt finance in financing working capital, the risk-return trade-off in using debt/equity in financing working capital and the duration of debt instruments in the debt financing of working capital.

Walker empirically tested only the first proposition. His second proposition was further developed by Weston and Brigham (1972) who divided debt into long-term debt and short-term debt and proposed that, in cases where using short-term debt lowers the average cost of capital, firms should use the latter instead of the former. They intimated that any surplus funds after meeting short-term debt obligations should be invested in cash and marketable securities. Weston and Brigham (1972) further suggested that firms should increase current assets holdings up to the point where the marginal returns on the increase in these assets would just equal the cost of capital required to finance such increases.

Van Horne (1969) attempted to develop a model in terms of probabilistic cash budget for assessing decisions regarding the firm's current assets level and the maturity composition of debt involving risk-return trade-off.

Lambrix and Singhvi (1979) analysed working capital management using the working capital cycle approach and put forward suggestions on the optimisation of investment in working capital. They stated that firms could improve their cash flows by reducing the time interval between the sale of goods and collection from the sale of goods. Working capital optimisation suggestions included improving the payment terms negotiated with suppliers and customers and the elimination of administrative delays due to paperwork which caused time lags between the movement of goods and receipt of cash for goods bought or sold.

According to Mongrut et al. (2007) the modern literature on working capital appears to have lost the glamour the subject generated in the 1960s and '70s. This was a glorious period in the development of working capital management theory, although the models developed during that time were on individual elements of working capital.

2.6 THE CONCEPT OF WORKING CAPITAL

Working capital can be discussed using either the quantitative (gross) concept or the qualitative (net) concept. Each concept has its own points of importance. The quantitative concept refers to the quality and quantum of a firm's current assets or a company's investment in non-fixed assets which are required to operate the firm over its normal business cycle. The gross concept views working capital as all the short-term assets held by the firm (Kesimli and Gunay, 2011). This concept is useful to finance managers' whose main objective is to evaluate the magnitude and the extent of current assets utilisation and the amount of financial resources required to support the firm's level of current assets (Etiennot et al., 2012). The gross concept appeals to the finance manager whose concerns are the sources and uses of funds. Each item on current assets must be financed and it is the responsibility of the finance manager to finance these current assets in line with the company's capital structure. There are two main arguments in support of the gross concept. First, as fixed assets symbolise fixed capital, so current assets symbolise working capital. Second, most managers' business operational plans are formulated in line with this concept since current assets are those that are used to run the business' daily operations.

The qualitative (net) concept refers to net liquid assets (that is, current assets minus current liabilities). This concept appeals to accountants as it is in line with their mathematical accuracy of tallying the two sides of the balance sheet. This concept is useful and appropriate when assessing the liquidity position of a firm and provides an indication of the sources of working capital finance. Net liquid assets represent the component of the firm's current assets which is funded by long-term capital. In cases where the firm has no current liabilities, this means that all current assets are financed by long-term funds. An argument in favour of the net concept of

working capital is that it gives true information on the liquidity of a business which indicates whether the firm has sufficient liquid resources to pay its obligations as and when they mature. It determines whether the firm will be able to survive a depression or meet the contingent needs of the business. It also enables comparison of the financial position of two firms when their current assets are equal. Groups such as creditors, in particular trade creditors, find this concept useful because their main concern could be knowledge about the 'margin of safety' available to them should there be any delays in the liquidation of current assets (Walker, 1964).

A further concept of working capital argues that working capital should be taken to encompass both short-term assets and other non-capital expenditures associated with the firm's operations. It is argued that there are some expenditures or investments whose benefits in terms of sales, profits, and operational efficiency are reaped for a long period of time. Although such expenditures do not involve the acquisition of accounting assets, they have to be financed. Such expenditures or investments include redesigning the human resources management system, product redesign or redesigning the marketing strategy.

2.7 DEFINITION OF WORKING CAPITAL

There is no universally agreed definition of working capital. Some researchers define it as current assets and current liabilities collectively (Brealey et al., 2008). According to Chiou et al. (2006) working capital represents the sources and uses of short-term capital. Padachi (2006) defines working capital as trading capital because it is not maintained in the firm in a specific form for a period of longer than a year. Mehta (1974) states that in practice some assets breach this standard but are still categorised as current assets, for example, US government obligations that are anticipated to be held until maturity date exceeding one year are often lumped together with cash and marketable securities. Others prefer the terms 'circulating capital' or "current capital" which show that the flow of this capital is circular in nature. The circulating capital concept is important because it reflects that working capital is required on a continuous basis and does not end when an operating cycle is complete.

This study defines working capital in terms of the gross concept; that is, working capital represents the firm's investment in current assets and net working capital is the difference between current assets and current liabilities.

2.8 DEFINITION OF WORKING CAPITAL MANAGEMENT

Working capital management is the continuous day-to-day financial decisions and operations which ensures that the firm has sufficient resources to meet maturing obligations, ensuring continuity of its operations and avoiding costly interruptions (Firer et al., 2012, Gill et al., 2010). This involves management decisions regarding the firm's level of current assets investment at any point in time, particularly the size of investment in each type of current assets and how those assets are financed. More specifically, the financing of current assets involves decisions on the specific sources of finance and the mixture of short-term debt and long-term finance that the firm should utilise (Nazir and Afza, 2009c).

2.9 MEASURES OF CORPORATE LIQUIDITY

Working capital management is concerned with ensuring that the firm has adequate liquid resources to pay maturing obligations. The terms 'working capital management' and 'liquidity' are used interchangeably. Advances in financial management over the past decades have also seen considerable changes in the measurement of corporate liquidity. Liquidity used to be viewed as a pyramid of short term investments in decreasing order of easy conversion to cash. This view gave rise to short-term solvency ratios and later to the concept of net working capital calculated from balance sheet amounts.

Corporate liquidity can be analysed using two views: the static view and the dynamic view.

2.9.1 THE STATIC VIEW

This view can be traced back to the early 1900s. It is based on the conventional accounting ratios measuring liquidity, namely, the current and quick ratios calculated using figures from the firm's balance sheet. The calculation of liquidity ratios is shown below.

$$\text{Current ratio} = \text{Current Assets} / \text{Current Liabilities}$$

where Current assets = cash + inventory + trade debtors + prepayments and Current liabilities = trade creditors + short term debt + accruals.

$$\text{Quick ratio /Acid test ratio} = (\text{Current assets} - \text{Inventory}) / \text{Current Liabilities}$$

$$\text{Cash ratio} = \text{Cash} + \text{marketable securities} / \text{Current liabilities}$$

$$\text{Net working capital (NWC)} = \text{Current Assets} - \text{Current Liabilities}$$

The balance sheet equation

$$\text{Assets} = \text{Debt} + \text{Equity}$$

$$\text{Long term debt} + \text{Equity} = \text{Net working capital} + \text{Fixed assets}$$

$$\text{Net working capital} = \text{Cash} + \text{Other current assets} - \text{current liabilities}$$

$$\text{Cash} = \text{Long term debt} + \text{Equity} - \text{Other current assets} - \text{Current liabilties} + \text{Fixed assets}$$

In measuring corporate liquidity, traditional ratios compare the amount of available resources to pay maturing obligations through the realisation of current assets. Therefore liquidity ratios are deemed static because they are based on the business' statement of its financial position, a snapshot of the state of financial affairs of a business at a given point in time. This measure is also static as it indicates the cash resources available to meet the firm's current liabilities at a given point in time (Wang, 2002).

Liquidity ratios have been deemed inadequate and poor measures of the liquidity position of the firm. First, they do not consider the fact that the conversion of current assets into cash is actually a continuous process that takes place within the working capital position of a firm. Second, instead of emphasising the going concern approach to liquidity analysis, these ratios emphasise the liquidation approach as they assume that current assets will be liquidated at their balance sheet value without taking the timing of conversion of those current assets into cash into account. Furthermore, liquidating current assets to pay current liabilities would disrupt the operating cycle of the firm unless the firm is being liquidated. Investors should focus on the firm's ability to pay its maturing debts with cash flows from the conversion of liquid assets like inventory and receivables into cash in the normal course of the firm's operations.

Traditional liquidity ratios do not consider the differences in the qualitative characteristics of the different current assets (Richards and Laughlin, 1980); for example a holding current assets that are largely made up of less liquid trade receivables and stock presents an improving current ratio (hence an improving liquidity position) when in reality it reflects a deterioration in the firm's capacity to meet its current liabilities. Richards and Laughlin (1980) also argue that the so-called more severe liquidity measure (the quick ratio) is a different measure that is not necessarily a more reliable measure of liquidity. The quick ratio is also questionable because, for example if average collection period of trade receivables, a component of the quick ratio, runs into several months rather than several days, the "quickness" attribute of this ratio becomes questionable.

Hawawini et al. (1986) critiqued this calculation of firm liquidity by arguing that the grouping of items as current assets and liabilities on the grounds that they have a close link with the firm's operating cycle is not proper. They argue that cash and marketable securities and overdraft are decision variables that are purely financial in nature which have no direct relationship with the firm's current operational investment needs.

2.9.2 THE DYNAMIC VIEW

The dynamic view was developed in order to address the weaknesses of the static approach to liquidity analysis. This view tries to measure the firm's liquidity position from a time perspective by linking the balance sheet and the income statement. It includes measures like the Cash Conversion Cycle and the Net Trade Cycle.

2.9.2.1 The Cash Conversion Cycle

Gitman (1974) developed the Total Cash Cycle (TCC) and defined it as the time interval between cash flows out of the business in order to produce goods or services and the cash received from the sale of those goods. Gitman and Sachdeva (1984) later refined the TCC and produced the Cash Conversion Cycle (CCC). The CCC combines information from the balance sheet and income statement to produce a measure that focuses on the net time interval between payment and receipt of cash flows (Uyar, 2009, Richards and Laughlin, 1980). It is considered an ongoing liquidity measure because it gives the time interval between payment for raw materials and collections from customers (Deloof, 2003, Padachi, 2006, Emery, 1987). The CCC recognizes that the main operations of the firm relating to liquidity management; procuring goods for production or sale, paying suppliers for those goods, selling the goods and collecting from customers are not fulfilled instantaneously and synchronically (Wang, 2002). Another advantage of the CCC in liquidity analysis is that it enables the firm to segregate working capital management efficiency into three distinct areas, payables period, inventory period and receivables period. The payables period and the receivables period, respectively measure the firm's efficiency in upstream and downstream supply chain management, while the inventory period measures its production or sales efficiency. The disaggregation of working capital management efficiency into these three key areas makes it easy for the firm to identify problematic areas when analysing liquidity management problems. The cash conversion cycle is illustrated diagrammatically in Figure 1.

The Cash Conversion Cycle is calculated as:

$$\text{Cash Conversion Cycle} = \text{Receivables Period} + \text{Inventory Period} - \text{Payables Period.}$$

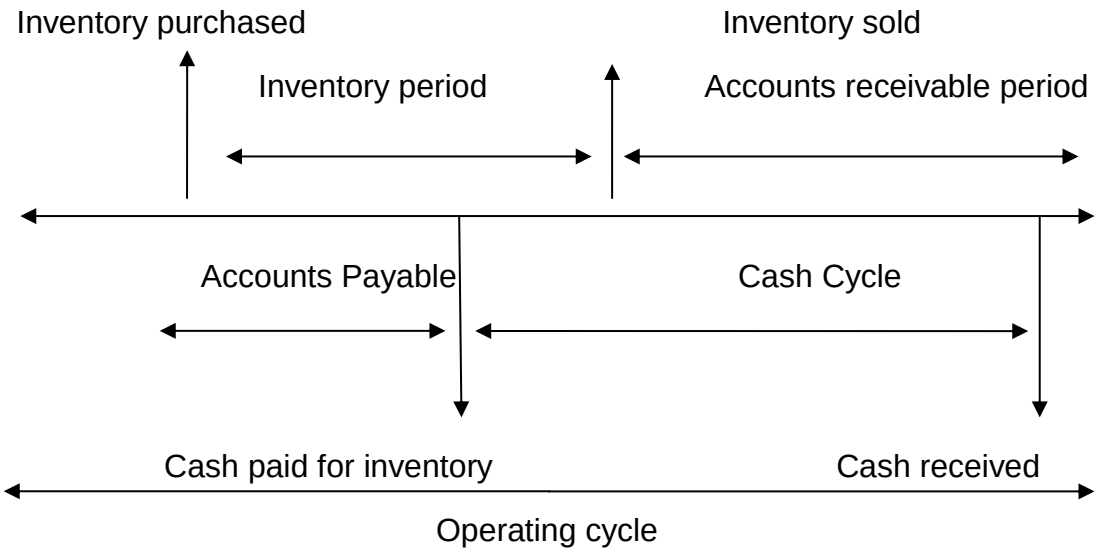
$$\text{Receivables Period} = (\text{accounts receivable} / \text{sales}) \times 365$$

$$\text{Inventory Period} = (\text{inventories} / \text{cost of sales}) \times 365$$

$$\text{Payables period} = (\text{accounts payable} / \text{purchases}) \times 365$$

$$\text{Cash Conversion Cycle} = \left(\frac{\text{Accounts receivable}}{\text{Sales}} \times 365\right) + \left(\frac{\text{Inventory}}{\text{Cost of Sales}} \times 365\right) - \left(\frac{\text{Accounts payable}}{\text{Purchases}} \times 365\right)$$

FIGURE 1: THE OPERATING AND CASH CYCLE



Source: Adapted from Firer et al. (2012) *p. 555*

The operating cycle is the time between the acquisition of inventory, the processing of the inventory, selling the inventory as a finished product and collection for the sale. The operating cycle is calculated as follows:

$$\text{Operating Cycle} = \left(\frac{\text{Accounts receivable}}{\text{Sales}} \times 365\right) + \left(\frac{\text{Inventory}}{\text{Cost of Sales}} \times 365\right)$$

The cash cycle shows that there is a time lag between paying suppliers for merchandise and collection from customers for sales made. The cash cycle is calculated as follows:

$$\text{Cash Cycle } = \text{Operating Cycle} - \left(\frac{\text{Accounts payable}}{\text{Purchases}} \times 365\right)$$

The cash cycle increases as the inventory period (taking too long to turn over the inventory) and receivables period (taking too long to collect from customers following the sale) lengthen. The cash cycle decreases when the firm is able to increase the payables period (delay settling its payments to suppliers). An increasing cash cycle can be an indication of obsolete inventory or difficulties in collecting from customers (Firer et al., 2012). A long cash cycle reduces the total asset turnover (TAT) because the firm would be taking too long to turn over its current assets to generate sales and the reduction in TAT may lead to a decrease in profitability as measured by return on equity (ROE).

$$\text{Total Asset Turnover} = \frac{\text{Sales}}{\text{Total Assets}}$$

$$\text{Return on Equity} = \text{Net Profit Margin} \times \text{Total Asset Turnover} \times \text{Equity Multiplier}$$

Where $\text{Net Profit Margin} = \frac{\text{Net Profit After Tax}}{\text{Sales}}$ and $\text{Equity Multiplier} = \frac{\text{Total Assets}}{\text{Total Equity}}$

The decline in both TAT and ROE may also cause a drop in the firm's sustainable growth rate (SGR).

$$\text{Sustainable Growth Rate (SGR)} = \text{Return on Equity} \times b_o$$

Where b_o is the retention ratio (the proportion of the firm's profits that is ploughed back) and ROE measures the return on shareholders' funds in an accounting period and is calculated as follows:

$$\text{Return on Equity } = \frac{\text{Net Profit after Tax}}{\text{Total equity}}$$

The goal of the firm should be to minimise its CCC because it indicates efficiency in managing its cash flows and reduces the amount of working capital investment. This requires analysing and

taking steps to ameliorate each element of the CCC. However, improving the CCC should be undertaken with caution in order to ensure that it is not achieved at the expense of operational efficiency, depressing sales and denting the firm's reputation with suppliers. Delaying payments to suppliers beyond the agreed terms may lead to a decline in the firm's credit rating with suppliers, while strict credit terms may cause customers to purchase such goods where they consider credit terms to be more favourable.

Gentry et al. (1990) criticised the CCC because its focus is on the duration funds are tied up in the firm's operating cycle and it does not adequately consider the amount of funds invested in the product. They designed an adjusted version of the CCC which they called the Weighted Cash Conversion Cycle (WCCC). The Weighted Cash Conversion Cycle "weights the turnover time of a specific component by considering the portion of the total cash tied up in that component" (Erasmus, 2010) p.3.

The main limitation of the WCCC is that much of the information required for its calculation is not available to researchers, such as the breaking-up of inventory components into raw materials, work-in-progress and finished products (Shin and Soenen, 1998).

In a critique of the CCC, Kiernan (1999) cited the following three weaknesses of the model: 1) its failure to distinctly translate the cash conversion period or days to working capital needs in Rand or Dollar value terms; 2) its failure to distinguish between cash sales and credit sales; and 3) its failure to show the impact of profitability on liquidity. The CCC's failure to distinguish between cash sales and credit sales presents a major limitation of this method. For example, it means that if two firms have the same debtors' period but different credit sales/total sales ratios, ceteris paribus, such firms would have the same CCC. However, from a liquidity point of view, the firm with the higher cash sales/total sales ratio has better capacity to meet maturing obligations because most of its sales are collected sooner and with much more certainty. By focusing on the difference in timing between the point that the firm spends resources in order to generate revenue and the actual receipt of that revenue, the model fails to recognise that

the received revenue will exceed the expenditure by the amount of the profit earned. The profit earned contributes to the improvement of the overall liquidity of the firm because profit represents additional resources available to meet obligations.

The views of Kiernan (1999) on CCC and profitability relationship the hold some water. However, it is worth mentioning that several studies have used the CCC as a proxy for working capital management efficiency when examining the impact of working capital management on profitability. Previous studies (Deloof, 2003, García-Teruel and Martínez-Solano, 2007, Shin and Soenen, 1998, Jose et al., 1996) have generally found a negative relationship between a firm's profitability and the CCC which has been interpreted to mean that more profitable firms invest less in working capital.

Despite the noted limitations of the cash conversion period model, it remains a powerful tool to assess working capital management efficiency and assists in predicting financial bankruptcy. Shin and Soenen (1998) cite the example of Wal-Mart and Kmart. In 1994, their capital structures were similar and the CCC of Wal-Mart and Kmart were 40 days and 61 days, respectively. As a result of its longer CCC, Kmart likely faced additional financing costs of US$ 198.3 million per year, which was an unsustainable situation that eventually contributed to its bankruptcy.

2.9.2.2 The Net Trade Cycle

Shin and Soenen (1998) questioned the suitability of the CCC to measure corporate working capital management efficiency on the grounds that its calculation involves the addition of ratios with different denominations. Consequently the Net Trade Cycle (NTC) was developed. The NTC is similar to the CCC except that the three elements are all expressed as a percentage of sales.

The NTC is calculated as follows:

$$\text{Net Trade Cycle} = \text{Receivables Period} + \text{Inventory Period} - \text{Payables Period.}$$

$$\text{Receivables Period} = (\text{accounts receivable} / \text{sales}) \times 365$$

$$\text{Inventory Period} = (\text{inventories} / \text{sales}) \times 365$$

$$\text{Payables period} = (\text{accounts payable} / \text{sales}) \times 365$$

$$\text{Net Trade Cycle} = \left(\frac{\text{Accounts receivable}}{\text{Sales}} \times 365\right) + \left(\frac{\text{Inventory}}{\text{Sales}} \times 365\right) - \left(\frac{\text{Accounts payable}}{\text{Sales}} \times 365\right)$$

The NTC measures the number of "days' sales" the firm has to pay for its working capital. It is an easy method of calculating additional financial resources with regard to working capital expressed as a percentage of the forecast sales growth (Shin and Soenen, 1998). The NTC is closely linked with the shareholder value creation objective of the firm. A shorter NTC is an indication of working capital management efficiency, reduces the demand for external funding and generates improved financial performance, which leads to a higher present value of net cash flows and higher shareholder value creation.

2.10 WORKING CAPITAL REQUIREMENTS AND NET LIQUID BALANCE

In order to address the shortcomings of the traditional measures of liquidity analysis, Shulman and Cox (1985) and Shulman and Dambolena (1986) developed the Working Capital Requirements (WCR) and Net Liquid Balance (NLB). This approach to liquidity divides the total working capital into the resources required to sustain the firm's operations and its surplus cash resources. Working Capital Requirements is the difference between current operational requirements (trade debtors and stocks), and current operational resources (trade creditors and net accruals). This approach to liquidity analysis is also known as the Net Operating Working Capital approach (Viskari et al., 2011). Both requirements and resources are spontaneous items associated exclusively with the procurement, production and selling of goods (Shulman and Cox, 1985). The NLB is the difference between all liquid financial assets and all liquid financial obligations, thus an absolute dollar NLB may be used as an indicator of a firm's liquidity. A positive NLB value indicates that the firm has ample cash resources to meet its immediate obligations without reducing the resources allocated to its operating cycle. A negative NLB value indicates reliance on outside financing and that the firm will have to acquire

additional working capital or reduce the resources committed to its operating cycle to pay short-term debts. The calculation of the WCR and NLB is shown below:

$$\text{WCR} = (\text{Accounts receivables} + \text{Inventories} + \text{Prepayments} - (\text{Accounts payables} + \text{other payables})$$

$$\text{NLB} = (\text{Cash} + \text{cash equivalents} + \text{short} - \text{term investment}) - (\text{Short} - \text{term debt} + \text{current portion of long term debt payable within a year})$$

This approach to liquidity is superior to traditional measures because it separates financial and non-financial aspects of the firm's working capital and recognises that working capital components have varying degrees of liquidity. In addition, it recognises that the WCR and NLB of a firm are interdependent (Appuhami, 2009). For example, accelerating the collection of receivables increases the cash available; reduces working capital requirements and improves the firm's net liquidity position. The WCR is a better accounting measure of a business entity's resources tied-up in its operating cycle and is an important element in calculating firm liquidity. The superiority of the NLB in liquidity analysis stems from the fact that it can be used to estimate financing requirements and that it recognises that a business' liquidity is not a function of its investments in current assets or its total working capital. The firm's capacity to retire its maturing obligations is reflected by the amount of financial resources remaining once its operating cycle requirements have been met. Thus the Net Liquid Balance is the difference between the firm's readily available cash resources and its non-operating, or negotiated, short-term debt.

$$\text{Net Working Capital} - \text{Working Capital Requirements} = \text{Net Liquid Balance}$$

$$\text{Net Liquid Balance} = \text{Permanent Capital} - \text{Working Capital Requirements.}$$

The main limitation of the NLB model is that the NLB is the balance after the working capital required to maintain the firm's operating cycle is subtracted from total working capital and is affected by changes in Net Working Capital and WCR. Therefore, a way of estimating the

amount of working capital required to sustain the operating cycle is needed to make liquidity analysis using NLB operational.

2.11 THE LIQUIDITY AND PROFITABILITY TRADE-OFF

Working capital management has two main objectives; increasing the firm's profitability while at the same time ensuring that it has sufficient liquid financial resources to pay its maturing short-term obligations. Firm liquidity is concerned with ensuring that the firm has sufficient financial resources or access to financial resources to pay its maturing short-term obligations. Holding liquid resources is necessary for the continuity of firms' operations as insufficient liquidity can lead to insolvency and ultimate business failure (Dunn and Cheatham, 1993). However these operational or transactional motives may result in a firm holding excess liquid resources. Liquidity-promoting decisions (such as carrying high levels of current assets) tend to impede the firm's profitability potential because it would have accumulated funds earning either very low or negative returns (Bhattacharya, 2009).

On the one hand, when finance managers pursue working capital management strategies that focus on liquidity and hold excessive current assets (too much liquidity), they reduce the firm's liquidity risk (and risk of insolvency) but compromise on profitability and deliver inferior ROA (Samiloglu and Demirgunes, 2008, Raheman and Nasr, 2007). On the other hand, when finance managers pursue working capital management profitability-promoting decisions, they tend to choke the liquidity and increase the risk to the firm. This may also cause shortages and disruptions in the firm's daily operations and may result in low credit rating and a potential forced liquidation of assets (Samiloglu and Demirgunes, 2008, Zainudin, 2006).

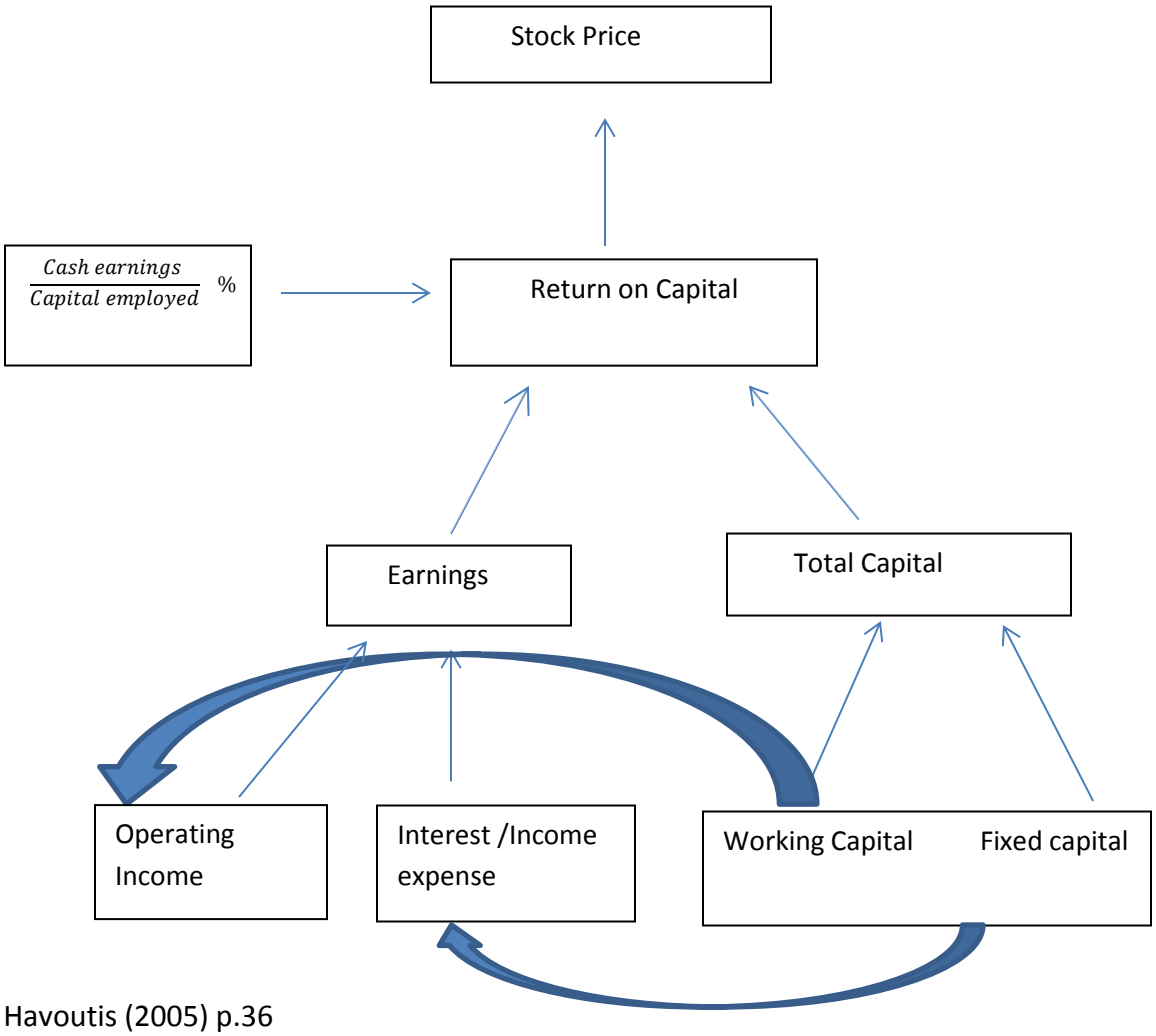
The existence of a liquidity-profitability trade-off is well-acknowledged in the literature and presents a serious challenge to financial managers because it makes balancing the two an absolute necessity (Raheman and Nasr, 2007). Both liquidity and profitability are important for both the long-run and short-run survival of any business. While a firm may survive without making profits in the short run, it will not do so in the long-run. Without liquidity, no firm can

survive (even in the short-run). Efficient working capital management means balancing the conflicting goals of maximising firm value (profitability) and ensuring the firm's survival (liquidity).

2.12 HOW WORKING CAPITAL OPTIMISATION AFFECTS PROFITABILITY

Havoutis (2005) states that working capital optimization strategies improve the firm's bottom line by affecting three key areas; it reduces the capital employed, it increases operating income and reduces the interest expense as shown in Figure 2.

FIGURE 2: WORKING CAPITAL OPTIMISATION AND PROFITABILITY



Source : Havoutis (2005) p.36

2.13 WORKING CAPITAL MANAGEMENT AND PROFITABILITY EMPIRICAL STUDIES

The empirical relationship between working capital management and profitability has been studied extensively, mainly in Asian countries. Although different proxies for efficient working capital management and different measures of profitability were used, most studies found that working capital management efficiency measures are inversely related to firm profitability. Most of these studies concluded that efficient working capital management creates shareholder value. (See Appendix A1 for a summary of the findings).

2.14 CHAPTER SUMMARY

This chapter discussed the evolution and development of working capital management theory. Definitions of working capital and working capital management were presented, as well as a discussion on the traditional and modern methods of measuring corporate liquidity. A discussion on profitability concluded the chapter. This chapter laid the foundation for an examination of working capital management. The next chapter examines working capital financing and investment policies, decisions and their impact on the value of the firm.

CHAPTER THREE

WORKING CAPITAL INVESTMENT AND FINANCING

3.1INTRODUCTION

The finance manager has the important role of ensuring that the working capital level of the firm is optimal at all times; that it is neither too high nor too low. This involves working with other departments like sales, production, procurement and marketing. After determining the firm's short-term assets requirements and its specific components, the financial manager must decide how to finance these current assets. This chapter consists of two sections; the first examines working capital investment which is sub-divided into the nature of working capital investment, the benefits and costs of investing in working capital, the different working capital investment policies and determinants of working capital investment. The second section discusses different working capital financing policies and the different working capital financing instruments. Empirical studies on both working capital financing and investment are also reviewed in this chapter.

3.2 CURRENT ASSETS (WORKING CAPITAL INVESTMENTS)

In this study, the gross concept of working capital (current assets representing the firm's total working capital investment) is used. Therefore, the terms 'current assets' and 'working capital investment' are used interchangeably. Current assets investments have two important characteristics; they have a short life span and are rapidly transformed from one form into another in the normal course of business. Managing current assets investments means ensuring that the firm has the optimal quantity and quality of the current assets it requires to run its operations and that enable it to utilise its investment in fixed assets efficiently and effectively. Current assets comprise cash and marketable securities, trade debtors, inventory, and prepayments.

3.3 FIXED CAPITAL AND WORKING CAPITAL INVESTMENTS

The management of fixed assets and working capital investments is similar in the sense that both involve risk and impact on firm profitability. Fixed assets define a firm's line of business, involve huge amounts of funds and are infrequent occurrences, while working capital investments represent assets employed for the short-term operations of a business. However, there are major fundamental differences. Etiennot et al. (2012) posit that investments in working capital, unlike fixed capital expenditure, are carried out without any analysis to determine that value will be created as a result of holding these investments. Fixed asset investments are expected to generate cash inflows over the long term, while working capital investments are expected to be converted back to cash in less than a year (Cheatham, 1989). Another major difference between fixed assets and current assets is that the former can be minimised by leasing or renting; the same cannot be said of cash, debtors and inventory. For investment in fixed assets to be effectively and efficiently utilised, attention must be paid to appropriate combinations of investment in current assets (Watson and Head, 2004). Cash flows generated by fixed assets investments are uncertain and irregular. Without working capital investments, the firm may experience a liquidity crisis because the cash inflows and outflows of fixed assets investment are unsynchronized and the cash flows expected from fixed assets investments may be disrupted.

3.4 TYPES OF CURRENT ASSETS (WORKING CAPITAL INVESTMENTS)

Current assets investment should comprise the best possible combinations of cash, debtors, inventory, and prepayments. The study and analysis of the composition and nature of working capital can also be referred to as the study of the elements of the current assets structure, and is an important issue that is worthy of consideration (Maness, 1994).

3.4.1 CASH AND MARKETABLE SECURITIES

Cash and short-term securities are the most liquid current assets, are readily available for use and are required to meet the firm's daily obligations. Keynes (1936) identified three motives for holding cash; the transaction motive (making planned expenditure), the precautionary motive

(protecting the business against emergency cash demands) and the speculative motive (holding cash in order to take advantage of specials on raw materials and favourable interest rates and foreign exchange movements). The need to satisfy financial agreements (the contractual motive) has also been identified as one of the motives for holding cash.

Prudential cash management means that the firm keeps sufficient cash on hand to pay for miscellaneous over-the-counter transactions and petty disbursements and invests the remainder in securities which are highly marketable and liquid (Nwankwo and Osho, 2010). The consequences of inadequate cash and liquid resources are severe and far-reaching; liquidity crisis, failure to pay maturing short-term obligations, increasing the risk of insolvency and difficulties in surviving (Chakraborty, 2008). On the other hand, excessive cash holdings compromise returns because cash is a non-earning asset while marketable securities earn low returns on the market. Excessive cash holdings are a sign that a firm has idle funds and such a firm is incurring a cost on such funds because it is difficult to earn a return higher than the cost of funds on current assets (Sagner, 2007). The conflicting consequences of excessive cash holdings and cash shortages mean that the firm must maintain an optimum cash balance that enables it to pay its debts as and when they mature, while ensuring that it does not hold excessive cash levels.

3.4.2 ACCOUNTS RECEIVABLE (TRADE DEBTORS)

Accounts receivable are generated when the firm sells its goods or services on credit[2] (supplying goods/services to customers before payment). Although cash sales are attractive because they allow the firm to minimise the funds locked-up in receivables and eliminate the need to finance receivables, a cash sales policy is costly and impractical. Accounts receivable management involves decisions about and the implementation of firm's credit policy such as

[2]Most firms demand and extend trade credit simultaneously. A deeper discussion on the motives for trade credit is provided in the section on trade credit as a working capital financing instrument.

who the firm should grant credit to, credit limits, length of the credit period, cash discounts and penalties for late payment.

Granting credit to customers has benefits and costs. Credit sales can stimulate sales, help the firm capture market share, ward off competition and enable the firm to charge a higher price, thereby increasing both the profit margin and sales in the short-term (Nadiri, 1969, Smith, 1987, Schwartz, 1974). Credit sales may help the firm maintain consistent sales levels over time because customers purchasing goods and services for cash tend to buy goods when they have cash available, which may result in erratic and perhaps cyclical purchasing patterns. Credit sales help the firm to increase near-term sales and eliminate the need for customers to build up enough cash to purchase goods/services. The extension of trade credit effectively shifts future sales closer to the present time. Granting credit to customers has costs. When credit is extended, the firm must finance the inventory; there is an opportunity cost of funds tied-up in debtors, the risk of non-payment by some customers and the cost of running a credit department (Gitman, 1997, Firer et al., 2012). The benefits and costs of selling goods on credit imply that there exists an optimum point where the benefits of extending credit are offset by the cost of extending credit.

3.4.3 INVENTORY (STOCK)

Inventory is the firm's investment in raw materials, work-in-progress, and finished goods or those held for resale. Raw materials are materials held in their original state for processing and production. Work-in-progress is raw materials which have been partly processed, altering their original state, shape, size or other properties. Finished goods have been completely processed and are ready for sale. Inventory represents the most illiquid yet the most significant component of the firm's current assets (Nwankwo and Osho, 2010) and its management significantly affects both firm liquidity and profitability. Inventory management has two main objectives; lowering the idle-time cost of labour and machinery due to stock-outs of raw materials and reducing inventory ordering and carrying costs, funds tied up in inventories and losses due to obsolescence. Like cash holdings and receivables, inventory holdings there are

benefits and costs of holding too much and too little inventory. Holding high inventory levels enables the firm to run smooth and uninterrupted production schedules and meet any unanticipated increases in sales demand. On the other hand, holding inventory incurs carrying costs and has an opportunity cost of having funds tied-up in non-income-earning assets because such funds could be invested in other profitable investments (Gitman et al., 2010).

A number of inventory management techniques have been used to achieve the goal of minimising total inventory costs. Inventory management techniques include the ABC approach, the Economic Order Quantity (EOQ) model, Material Resource Planning (MRP), Just-In-Time (JIT) and Enterprise Resource Planning (ERP).

3.5 PERMANENT AND TEMPORARY WORKING CAPITAL

Most firms' operations are subject to seasonal fluctuations and working capital needs (current assets) rarely fall to zero. Consequently, the firm's working capital can be divided into permanent (fixed) and temporary (fluctuating) (Gitman, 1997, Nunn, 1991). Fixed working capital is the minimum quantity of liquid assets continuously needed to maintain business operations. Fluctuating working capital is the difference between total working capital and the fixed working capital and represents the resources required to support increased production and sales, largely due to short-run or seasonal changes in the level of business activity.

3.5.1 WORKING CAPITAL INVESTMENT POLICIES

Working capital investment policy refers to decisions regarding the target levels for each category of current assets. The finance literature identifies three working capital policies; the restrictive (also known as aggressive), flexible (also known as conservative) and the compromise (also known as moderate) approach (Nwankwo and Osho, 2010, Weinraub and Visscher, 1998). Under the restrictive policy, the firm maintains a low ratio of current assets to sales with expectations of higher profitability at the cost of higher liquidity risk. Under a flexible policy the firm maintains a high ratio of current assets to sales which reduces the liquidity risk at the expense of some profitability. The compromise policy falls between the aggressive and

conservative policies. After observing that there was little evidence showing which working capital management policies were pursued by industries, Weinraub and Visscher (1998) conducted a study on working capital policies followed by ten industries. They found that different industries employed different working capital investment policies and that these policies were outstandingly static over the study period.

3.5.2 WORKING CAPITAL INVESTMENT AND FIRM VALUE RELATIONSHIP

In their seminal paper, Modigliani and Miller (1958) state that investment and financing decisions are independent of each other in a frictionless world. Under frictionless conditions, the value of the firm is not influenced by its financing policy but by the positive Net Present Value (NPV) projects it undertakes. All working capital investments would be irrelevant under perfect capital markets. Cash holdings are irrelevant (Opler et al., 2001); firms can obtain funds for investment to run the business at "normal" rates. Neither taxes nor a premium for liquidity are assumed; therefore cash holdings would not have either opportunity costs or tax advantages. Trade credit is supposed to be a non-issue in corporate financing (Hill and Satoris, 1992, Lewellen et al., 1980), and inventory holdings would also be irrelevant (Mathuva, 2013). Inventory holdings would be a non-issue because the firm would be able to restock without difficulty should inventory turn to be unexpectedly low.

In an 'ideal' economy, the firm can perfectly forecast its inventories to fulfil production and sales needs, cash to meet maturing obligations and trade credit demand. In such an economy, the perfect forecast of working capital investment would be the theoretical optimum for a profit maximising-firm. Investing in working capital beyond the optimum increases the firm's assets without a proportionate increase in its returns and thus lowers the rate of return on investment. Holding working capital investments below this optimum would lead to difficulty in paying bills on time, disruption to production because of stock-outs and lost sales due to an aggressive credit policy.

Much empirical work has been undertaken assuming real world conditions and imperfect capital market conditions. These concluded that firm value and its financing and investment

decisions have a direct relationship. For example the work of Burton et al. (1999) shows that investment has a direct relationship with firm value. Under imperfect conditions, companies pursuing the shareholder value-maximisation goal trade-off the benefits and costs of holding working capital (Baños-Caballero et al., 2009). Under these conditions, financing and investment decisions are mutually dependent and firms may have optimal amount of working capital investment where the marginal cost is equal to the marginal benefit; this optimal point maximises firm value (Baños-Caballero et al., 2010, Opler et al., 2001). In the real world, managers face several challenges in estimating the most appropriate level of cash, trade receivables and inventories. Consequently, the firm's working capital level may not always be at its optimum level. Managers devote much time and effort to bring off-target working capital investment levels and finance back to the desired levels.

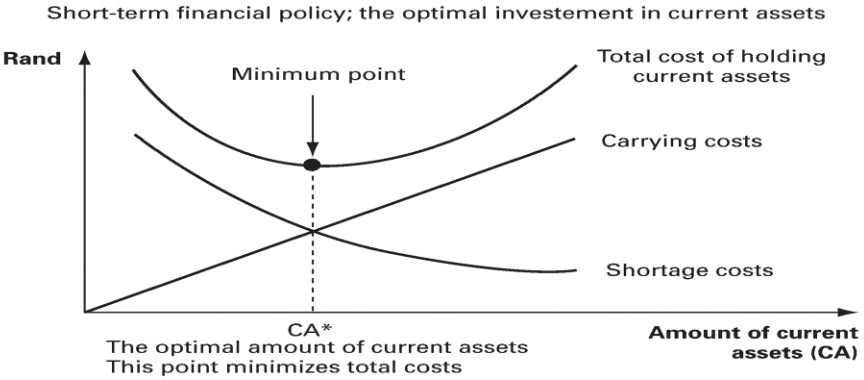
Studies on the relationship between investment and firm value have largely focused on fixed investment (capital budgeting) decisions at the expense of working capital investment decisions. Empirical studies show that working capital investments make up a huge portion of the firm's assets; constituting over 50% of the total assets in a typical manufacturing firm and even more for a distribution company (Appuhami, 2008, Raheman and Nasr, 2007). Working capital constitutes respectively 40%, 50% and 60% of manufacturing, retailing and wholesale firms' total assets (Moyer et al., 1995). In South African manufacturing firms, current assets and current liabilities represent about 40% and 70% of total assets and total financing, respectively (Gitman et al., 2010). These figures clearly show that working capital investments are a crucial component of the firm's total assets and the way they are managed should influence the value of the firm.

3.5.3 THE COST OF HOLDING CURRENT ASSETS

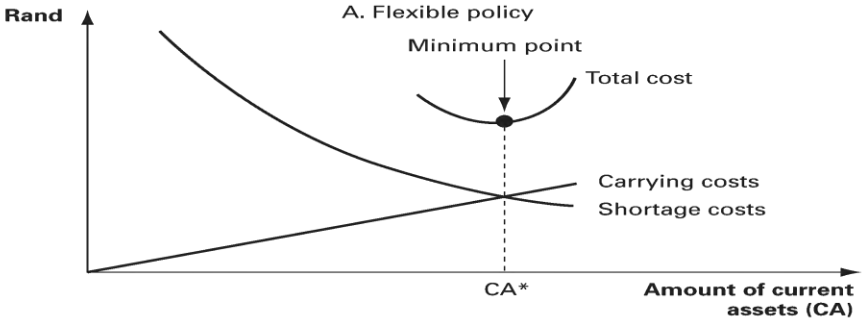
Working capital investments involve a trade-off of costs that rise and those that fall with the level of working capital investment (Firer et al., 2012). Costs that rise with an increasing level of working capital investments are referred to as carrying costs, while those that decline with an increasing level of working capital investments are called shortage costs. Examples of carrying

costs include storage costs, insurance, obsolescence and the general opportunity costs associated with current assets. Shortage costs can be broadly divided into trading costs and costs related to a lack of safety reserves. Trading costs are the costs related to ordering stocks and these are greater when the firm holds a small volume of inventory. Costs related to a lack of safety reserves include lost revenue, lost customer reputation and disruption of production schedules. The aggressive approach to managing working capital results in low carrying costs and high shortage costs. On the other hand, the conservative approach results in high carrying costs and low shortage costs. Irrespective of which working capital investment policy the firm pursues, an optimal level of current assets holdings exists, as shown in Figure 3. The optimal point is where the firm minimises the total costs; that is, shortage costs plus carrying costs. For managers to create value for shareholders, they must pursue a level of working capital investment that enables them to minimise total costs.

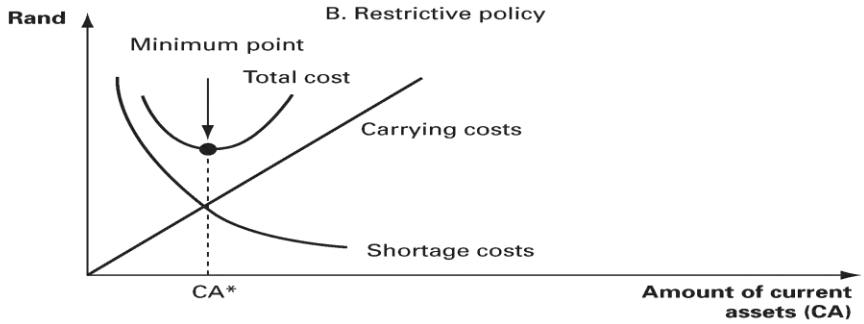
FIGURE 3: THE OPTIMAL INVESTMENT IN CURRENT ASSETS



Carrying costs increase with the level of investment in current assets. They include the cost of maintaining economic value and opportunity costs. Shortage costs decrease with level of increases in the level of investment in current assets. They include trading costs and the costs related to being short of the current asset (for example being short of cash). The firm's policy can be characterized as flexible or restrictive.



A flexible policy is most appropriate when carrying costs are low relative to shortage costs.



A restrictive policy is most appropriate when carrying costs are high relative to shortage costs.

Source: Firer et al. (2012) *p.561*

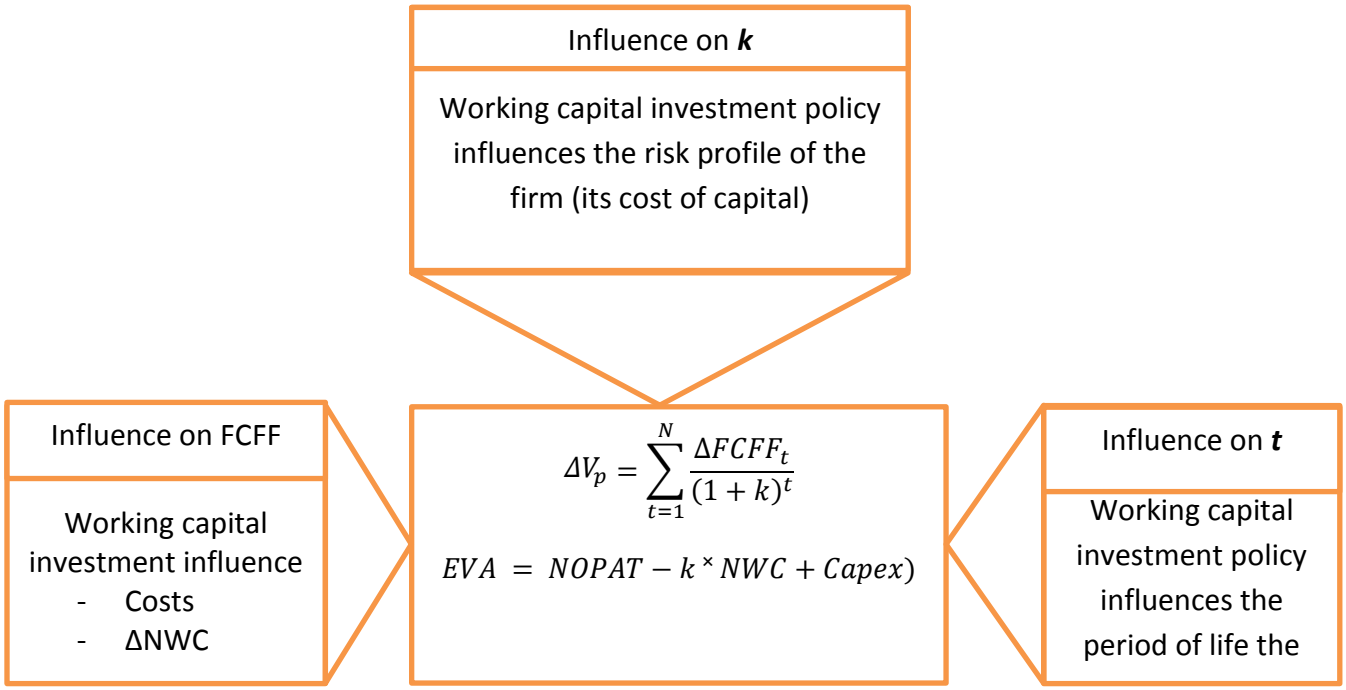
3.5.4 HOW WORKING CAPITAL INVESTMENT INFLUENCES FIRM VALUE

According to Smith (1980) working capital management is important because it influences firm profitability, risk and value. Luo et al. (2009) state that good working capital management can lower the cost of equity, increasing the equity value. Efficient management of working capital

reduces a firm's chances of being financially distressed or getting bankrupt. The reduction of probable bankruptcy/distress costs also lowers the firm's cost of capital, resulting in a higher firm value. As a result, firms have target level of working capital which maximises value and profitability (Deloof, 2003, Howorth and Westhead, 2003, de Almedia and Eid, 2013).

Damodaran (2001) notes that working capital investment impacts on three areas that ultimately affect firm value, namely, cash flows, liquidity risk and operations as shown in Figure 4. He further argues that increasing current assets involve a trade-off between the negative effects on cash flows, the positive effects on reducing liquidity risk and the positive effect of potentially increasing sales. Working capital investments affect the operations of the firm as they influence its ability to meet customer demands for its goods and services.

FIGURE 4: THREE IMPACT AREAS OF WORKING CAPITAL INVESTMENT THAT ULTIMATELY AFFECT FIRM VALUE



Adapted from Michalski (2008) p.188

When the firm has low working capital investment levels, it is able to turn over its working capital faster and generate more cash flows, thereby increasing its value. As working capital investment levels increase, more funds are locked-up in working capital, hampering its ability to generate more cash flows. Thus increases in working capital investment reduce cash flows since money tied up in working capital cannot be invested elsewhere; compromising firm value. While low working capital investments enable the firm to increase its value via increased working capital turnover, the firm faces a high liquidity risk (resulting in problems in paying liabilities on time). At higher levels of working capital investment, the firm faces low risk. A more detailed discussion on this subject is provided in the section on working capital investment policies and firm value.

3.5.4.1 Aggressive working capital investment policy and firm value

Holding low working capital investments (pursuing an aggressive working capital policy), *ceteris paribus*, promotes firm profitability and value and implies high liquidity which also reduces the firm's risk. It minimises working capital investments by reducing the time inventory held on hand, accelerating collections from customers and delaying payments to suppliers. Low investments in working capital result in a short working capital cycle and indicate that the firm is receiving payments from its customers timeously while delaying payments to suppliers close to the due date. It is a sign of more efficient internal operations and a greater availability of internal resources and suggests a good liquidity condition (Gentry et al., 1979).

Aggressive working capital management results in low carrying costs which increase the value of the firm, see Figure 2. Low working capital investment levels allow managers to reduce investments in unprofitable assets such as cash holdings and inventory; this impacts positively on the firm's returns (García-Teruel and Martínez-Solano, 2007). Reducing investments in current assets also enables firms to free up more funds from daily operations and channel them to expansion projects because it generates savings, and reduces financing costs for the firm through less reliance on expensive external funds, resulting in a lower required return on

capital and a higher firm value (Poirters, 2004, Raheman and Nasr, 2007, Filbeck and Krueger, 2005b, Lin et al., 2012).

Luo et al. (2009) argue that a faster working capital turnover rate should lead to higher expected cash flows because the funds freed up from the working capital cycle can be invested again to generate additional income. Jose et al. (1996) support this view by arguing that a shorter CCC corresponds to a higher present value of net cash flows from a firm's assets.

There are adverse effects of holding low working capital investment levels. Low inventory levels may result in disruptions to production, an inability to satisfy customer needs (lost revenues due to stock-outs), lost sales and a loss of customer goodwill (Damodaran, 2001, Firer et al., 2012). When a firm pursues a strict credit policy it forgoes sales that would have been generated from customers who prefer to buy on credit. Holding low cash on hand may result in the inability to pay maturing obligations (cash-outs). Thus low working capital investments reduce the value of the firm.

3.5.4.2 Conservative working capital investment policy and firm value

Pursuing a flexible working capital investment policy (maintaining a high level of current assets) may also increase firm value and profitability. Large inventory levels and a liberal credit policy may enhance a firm's sales and achieve higher firm value and profitability (Deloof and Jegers, 1996, Blinder and Maccini, 1991, Salek, 2005). Trade credit stimulates clients to purchase goods when demand is low, helps firms to build lasting relationships with their clients, enables clients to verify the product(s)' quality before payment and reduces information asymmetry between the seller and the buyer (Cunat, 2007, Emery, 1984, Ng et al., 1999). Keeping large amounts of inventory minimises the likelihood of disruptions in operations and losses due to non-availability of stocks, and hedges against price increases (Blinder and Maccini, 1991, Deloof, 2003). Disruptions in production and supply can be very costly. Firer et al. (2012) give the example of TOYOTA (one of the world's most celebrated case studies of the Just-In-Time (JIT) inventory management technique). The company is believed to have lost approximately ¥200

billion ($2.4 billion) due disruptions caused by an earthquake and tsunami in 2011. Early payments to suppliers reduce supplier financing benefit the firm through cash discounts (Ng et al., 1999, Wilner, 2000, Baños-Caballero et al., 2010).

Holding a high amount of working capital (in particular cash and marketable securities) enables a firm to meet its obligations more easily, which lowers its liquidity and default risk, increases its borrowing capability, lowers the cost of capital and increases its value (Samiloglu and Demirgunes, 2008). Therefore, holding large working capital investments increases both the short-term (profitability) and long-term (firm value maximisation) the firm's financial performance. According to this school of thought, decreasing working capital increases the firm's liquidity risk and increases its costs of borrowing, which lowers the firm's value compared with a firm with a higher amount of working capital. By maintaining large cash holdings, firms can minimise underinvestment costs as internal resources enable it to take advantage of investment opportunities without going to the capital market where funds are expensive (Martínez-Sola et al., 2013a). For this strategy to be effective, the benefits resulting from a high working capital investment level must offset the reduction in profitability and value; otherwise, both firm profitability and value might decrease if the costs of large current assets investments rise at a faster rate than the gains of maintaining a high level of inventory and extending more credit to customers.

High working capital investment level has the following major disadvantages: it carries a financing cost, lost opportunities (as funds will be tied-up in inventories and receivables) (Deloof, 2003) and the high probability of bankruptcy (Shin and Soenen, 1998). Raw materials, work-in-progress and finished goods do not earn any income and incur carrying costs such as storage, insurance, deterioration, obsolescence and opportunity costs (Gitman et al., 2010).

The free cash flow hypothesis advanced by Jensen (1986) states that executives of cash rich businesses are likely to invest in projects that do not benefit shareholders; this compromises the value creation goal. Thus high cash levels cost shareholders and reduce firm value through

agency costs and low money market returns. Marketable securities earn low returns on the money market and are, at best, a zero NPV investment for a tax paying firm, due to the corporate tax payable on the interest received from such an investment (Brealey et al., 2008). This means that the rate of return on cash invested in marketable securities will be less than the business' cost of capital. Sagner (2007) found that as of mid-2006, a typical US public company had a weighted average required rate of return of about 11.5% and a company with cash or near cash investments could only earn about 5% on these assets at prevailing rates, thus incurring a direct loss of about 6.5% on such assets without any possible strategic gain. Holding large amounts of assets that yield sub-optimal returns should increase the cost of equity as shareholders demand a better return on their investment; this increases the required return and decreases the share price.

Trade credit involves the additional administrative expenses of setting up and running a credit department (Mian and Smith, 1994) and exposes the firm to default risk as some clients may not pay (Salek, 2005).

Dev (2001) contends that a firm's working capital management practices influence its credit risk, which is a key driver of shareholder value creation. While poor working capital management (reflected by the slow collection of receivables, overstocking inventory and slow payments to suppliers) increases the credit risk of the firm, thereby increasing its cost of capital and compromising shareholder value, efficient working capital management improves the company's cash flows and creditworthiness and increases shareholder value.

3.5.5 EMPIRICAL STUDIES ON WORKING CAPITAL INVESTMENT AND FIRM VALUE

There is a paucity of empirical research on the firm value-working capital investment relationship (Baños-Caballero et al., 2013). Wang (2002) studied liquidity management and corporate value relationship using Japanese and Taiwanese firms and found that firms with Q ratios greater than one had significantly lower CCCs than firms with Q ratios less than one.

Following the model used by Faulkender and Wang (2006) to analyse the marginal value of cash values, on panel data of US corporations from 1994 to 2004 and using stock's excess returns to represent firm value, Kieschnick et al. (2013b) found that on average, a dollar invested in net operating working capital reduces firm value. de Almedia and Eid (2013) also used Faulkender and Wang (2006) model on Brazilian public companies listed on BM&FBOVESPA. They found that an extra Real (R$) of investment in working capital is on average worth significantly less than an extra Real (R$) of investment in cash and that increasing working capital at the beginning of the year reduces company value.

Nazir and Afza (2009b) analysed the effects of working capital financing and investment policies on firm profitability and value using 204 Karachi Stock Exchange-listed firms and found that conservative working capital policy and firm profitability and firm value (as measured by Tobin's Q) had a positive relationship. The implication of this result is that aggressive working capital investment destroys a firm's profitability and value. In terms of working capital financing policy, they found an inverse relationship between restrictive working capital financing policy and firm profitability and a positive relationship between restrictive working capital financing policy and firm value.

Mohamad and Saad (2010) explored the effects of working capital components on firm performance or value (represented by the Tobin's Q) on 172 Malaysian listed firms. The study found significant inverse relationships between working capital variables and firm performance. Luo et al. (2009) argue that the negative CCC which Dell reported in August 2001 suggests that it is possible for Dell not to realise any profits from selling its products and services but still be able to generate profits by efficiently managing its working capital through investing the cash generated by its negative CCC in short-term marketable securities. Dell outperforms its peers in both accounting and stock performance because in line with its JIT model, it does not manufacture a computer until the cash for an order is received; as a result it has reported a negative CCC.

The few existing studies on the valuation effects of working capital investment suggest a linear relationship between firm value and working capital investment. Most of these studies incline towards the view that aggressive working capital investment creates shareholder value, while conservative working capital policy compromises shareholder value. The main limitation of these studies is that they do not consider the fact that investing in working capital has benefits and costs and consequently find this relationship to be linear. Wasiuzzaman and Arumugam (2013) state that each of the components of working capital investments (cash holdings, debtors and stock) has its own benefits and costs. When a firm holds low levels of working capital investment, it benefits from low carrying costs such as storage costs but suffers from high shortage costs such as lost customer goodwill, due to the failure to satisfy customer demand for goods, while a restrictive credit policy may result in loss of revenue. Therefore when analysing the valuation effects of working capital investment, the benefits and costs have to be taken into account.

3.5.6 FACTORS INFLUENCING WORKING CAPITAL INVESTMENT

The management of working capital is influenced by several quantitative and qualitative, internal and external factors. Among others, firm-specific factors include; the nature of the business, the size of the business, credit terms and policies, payables management, the production process and cycle, the firm's investment policy and the corporate governance of the firm. External factors include the political climate, the availability of short term credit, interest rates, inflation, industry working capital policies, technology etcetra.

3.5.6.1 Leverage

Previous studies have found that leverage and working capital investment have an inverse relationship (Erasmus, 2010, Chiou et al., 2006, Raheman and Nasr, 2007). Two factors have been cited to explain why leverage has a negative association with working capital investment. First, external capital is more costly than internal resources; therefore firms with creeping leverage levels closely monitor working capital levels in order to minimise resources which could invested in other valuable projects being tied-up in its operating cycle (Nazir and Afza,

2009c, Wasiuzzaman and Arumugam, 2013). Second, it does not make business and economic sense to hold large volumes of low-earning assets financed by high-cost funds (borrowed capital) (Baños-Caballero et al., 2010).

3.5.6.2 Firm Size

Firm size influences the amount of resources a firm commits to working capital. Larger businesses require larger current assets investment because of their larger sales levels and the larger scale of their operations (Kieschnick et al., 2006). Firm size is also used as a proxy for capital markets access (Hill et al., 2010). Large firms have fewer borrowing constraints and enjoy easier access to capital than small firms due to less information asymmetry because they are closely monitored by analysts. Therefore, large firms can pursue flexible working capital investment policies. Chiou et al. (2006) assert that large firms can use their superior access to capital markets to maintain low cash balances. On the other hand, larger firms can use their size to build relationships with suppliers which enable them to hold low working capital investments (Baños-Caballero et al., 2010, Nwankwo and Osho, 2010). Large firms have better capacity to manage their CCCs (Moss and Stine, 1993). Empirical evidence on the firm size-working capital investment relationship has produced mixed results. Three proxies for firm size have been used; the natural logarithm of sales or total assets (Chiou et al., 2006, Wasiuzzaman and Arumugam, 2013, Baños-Caballero et al., 2010) and the natural logarithm of market capitalisation (Hill et al., 2010).

3.5.6.3 Economic conditions

The state of the economy affects a firm's investment in current assets. Carpenter et al. (1994) state that the Gross Domestic Product growth rate affects firms' level of working capital investment. For example, inventory holdings fall drastically during recessions because most firms run down their inventory to generate cash (Lamberson, 1995, Blinder and Maccini, 1991). Firms experience challenges in expanding smoothly, turning over inventory quickly and collecting receivables during recessions (Chiou et al., 2006), consequently the level of working

capital investment may be maintained at high levels in order to ensure that the operations of the firm are run without disruptions.

The level of business during expansion is usually high; therefore working capital needs during such periods are also high. Wasiuzzaman and Arumugam (2013) argue that during economic expansion, it is easier for firms to access financing; as a result, they may pay less attention to working capital investment levels or cash locked-up in the cash cycle. Recessions are characterised by relatively tight cash supply and as a result firms try to mine cash from wherever possible and shorten their cash-to-cash cycle (Chiou et al., 2006, Baños-Caballero et al., 2010). Sathyamoorthi and Wally-Dima (2008) argue that firms manage their working capital in line with macroeconomic fundamentals, pursuing aggressive and conservative policies in times of low and high business volatility, respectively.

3.5.6.4 Sales growth

Working capital investments support operational activities which generate sales. Working capital needs increase with a growth in sales and the expansion of the business. According to Hill et al. (2010), "the direction of influence of sales growth on working capital investment is difficult to determine with precision because of potential endogeneity problems. For example, liberal credit and inventory policies can stimulate sales, causing reverse causality when using contemporaneous sales growth as an independent variable". Firms may accumulate inventory in anticipation of future sales growth (Nwankwo and Osho, 2010, Kieschnick et al., 2006).

3.5.6.5 Nature of business

The type of business activity determines a firm's working capital investments and level; for example, manufacturing firms invest large amounts of working capital in inventory and spare parts and may have a large receivables' book. A grocery store will generally have large inventory levels but low or no accounts receivables. The nature and amount of the current assets investment of a manufacturing firm is different from service firms, information technology firms and public utilities. It is evident that a manufacturing company needs a well-

defined receivables management policy, unlike a grocery store which may not extend credit at all to customers. Public utilities tend to make huge investments in fixed assets and less investment in current assets. Empirical evidence suggests that the working capital policies adopted by firms are a function of the industry the firm is operating in (Hawawini et al., 1986, Filbeck and Krueger, 2005a). Trade receivables and payables and inventory policies tend to be different across industries, but tend to be the same within an industry (Smith, 1987, Niskanen and Niskanen, 2006, Ng et al., 1999).

3.5.6.6 Internal resources

The capacity of a firm to generate internal resources from the normal course of its operations influences its ability to fund its working capital investment. Firms with high operating cash flows can pursue flexible working capital investment policies because they have more resources to finance their working capital investment and internal resources with lower costs than external funds (Hill et al., 2010, Fazzari and Petersen, 1993). Firms with low and negative operating cash flows require financial resources from additional sources to support their working capital; hence, such firms face constraints in their working capital investments (Mathuva, 2013). Appuhami (2008) found that firms with an increasing in operating cash flow tend to reduce their working capital investment.

3.5.6.7 Seasonality of operations

In industries such as agriculture and food processing, production is seasonal. Investment in working capital for such companies will be cyclic, increasing during the peak season and declining when operations are off-peak. In cases where the supply of raw materials is seasonal, the firm has to buy and stock-pile raw materials because buying them during peak-season might be costly. Firms with operations that are not affected by seasons have stable working capital investments (Nwankwo and Osho, 2010).

3.5.6.8 Fixed investment

The level of a firm's fixed investment influences its working capital investment because, for a financially constrained firm, there is competition for a limited pool of funds between capital expenditure and working capital investment (Fazzari and Petersen, 1993). Mathuva (2013) states that an increase in inventory holdings may be followed by additional investment in tangible and/or intangible assets such as warehouses and technology. On the other hand, increasing inventory investment may also result in a decline in fixed investment. When fixed investment opportunities arise, firms reduce their demand for working capital requirements and increase their liquidity in order to avoid issuing securities in the capital markets at short notice (Appuhami, 2009, Palombini and Nakamura, 2012).

3.5.6.9 Supply chain

If the supply of goods for production or resale is reliable and certain, the firm can commit fewer funds to inventory investments. However, if the supply is erratic, unreliable or seasonal, more financial resources have to be invested in inventory in order to ensure uninterrupted production.

3.5.6.10 Corporate governance and Management ability

The ability of management to co-ordinate the activities of the firm from the procurement of goods to distribution to customers as sales significantly influences the firm's working capital investment. Poor co-ordination of the production and distribution of goods may increase the need for working capital, as more funds will be tied up in inventory and trade debtors.

Other important factors include the firm's production policy, cycle and plans, credit availability and credit policy.

3.5.7 EMPIRICAL STUDIES ON WORKING CAPITAL INVESTMENT

Much empirical work has been conducted on the factors influencing the working capital investment of the firm with most studies using WCR as the dependent variable. Appendix A2 presents a summary of these studies and their findings.

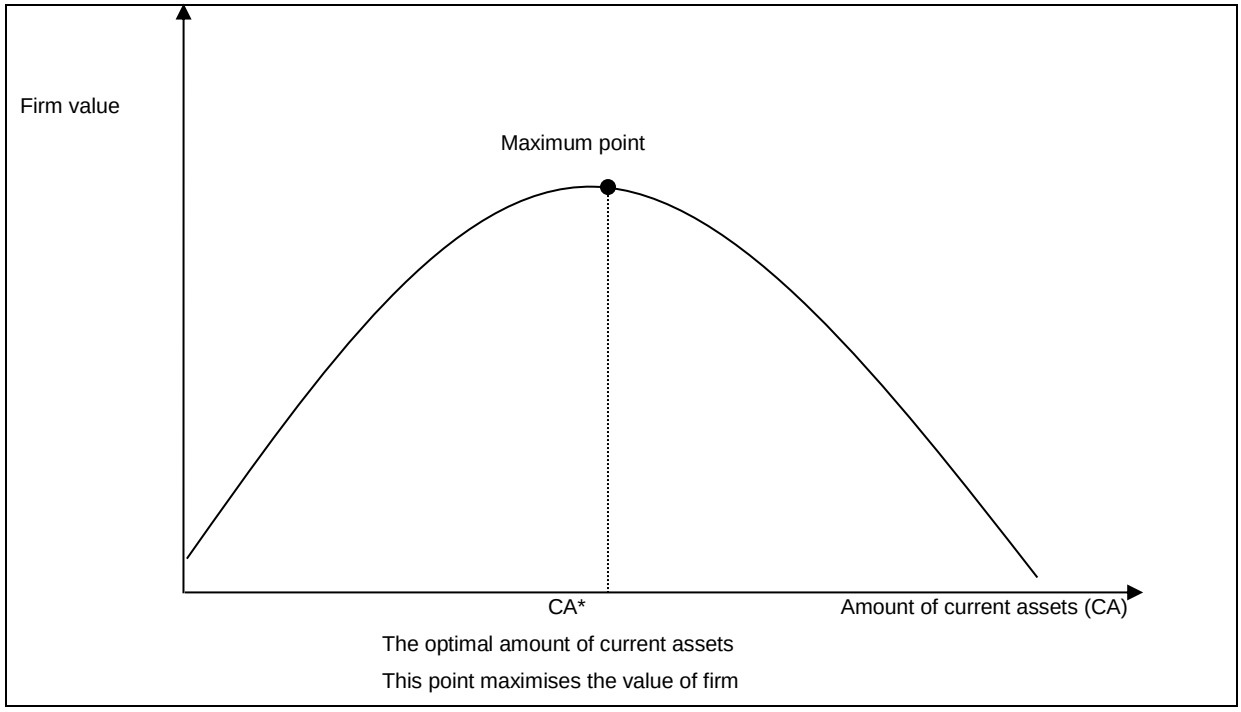
3.5.8 ANALYSIS OF THEORETICAL AND EMPIRICAL LITERATURE ON WORKING CAPITAL INVESTMENT

The review of the theoretical and empirical literature presented above has revealed important working capital management issues and has several working capital management implications. Holding current assets has benefits and costs; therefore the firm must balance the benefits against the costs of holding large working capital investments. The optimal current assets investment point is a result of a trade-off between the benefits and the costs; it exists where the marginal costs of working capital investments offset the marginal benefits. This optimal investment point is illustrated in Figure 5. If managers pursue shareholders' best interests, they must adopt working capital investment policies that maximise firm value; that is, they must purse the target or optimum working capital investment level where they maximise firm value; this is the primary goal of financial management.

The existence of an optimal point implies that the working capital investment level may not always be at the desired level. It is difficult for managers to forecast purchases, sales and the working capital investment level with clear precision. The working capital investment level can be either above or below the optimal level and managers must take steps to bring the below-optimal and above-optimal to the optimal level. When working capital investment is below the optimal point, managers should bring the working capital investment level to the optimal point by increasing the amount of working capital investments (through increasing cash holdings, extending more trade credit and holding more inventory). When the working capital investment level is above the optimal point, managers should bring the working capital investments to the optimal level by reducing working capital investment (through reducing cash holdings, accelerating receivables and cutting down on inventory). The process of adjusting

from the real working capital investment level to the optimal level also has time and cost implications. One of the key objectives of this study is to establish whether South African firms pursue a target level of working capital investments and how quickly they adjust from the real to the target working capital investment level.

FIGURE 5: THE OPTIMAL INVESTMENT IN WORKING CAPITAL INVESTMENTS AND FIRM VALUE



Source: Author's views

When firms pursue a target working capital investments level, the determinants of working capital investments are better understood using a partial adjustment model rather than a linear model. Most existing studies on working capital management use linear models to examine the determinants of working capital management; this implies that firms are always at their optimum working capital investment level or can instantaneously adjust their working capital investments. Empirical studies on individual working capital investments assets suggest that firms follow a partial adjustment process. These include studies on accounts receivable by

Garcia-Teruel and Martinez-Solano (2010), inventory holdings by Mathuva (2013) and cash holdings (Opler et al., 2001, Garcia-Teruel and Martinez-Solano, 2008).

There are several qualitative factors that influence the firm's working capital investments that cannot be measured, most of which are beyond the firm's control. Therefore, when analysing working capital investments, there is need for a model that captures such factors as well as firm-specific factors that influence its working capital investment level.

3.6 WORKING CAPITAL FINANCING

Having determined the firm's current assets requirements and structure, the financial manager must decide how to finance these current assets. The relative contribution of each source to total working capital funds reflects the importance of a specific financing instrument and influences the financing working capital pattern. According to Etiennot et al. (2012), working capital investments are carried out without conducting proper investment analysis and the financing alternatives are not adequately appraised. This section examines different working capital financing policies and instruments.

3.6.1 WORKING CAPITAL FINANCE AND CURRENT LIABILITIES

Working capital finance enables the firm to keep inventory (raw materials and finished products) in order to run its operations smoothly by meeting obligations as they arise. It also enables the firm to extend credit and continue operations while awaiting collections from its customers. Without working capital finance, the firm would have to stop all its operations until it receives payment from credit sales. Much of the working capital finance is contributed by short-term finance; current liabilities which are claims or obligations that must be redeemed within a trading year. These include overdrafts, short-term loans; accruals trade creditors (accounts payable), dividends payable and tax payable. The liquidation of current liabilities is achieved by either converting some current assets to cash or creating other current assets and / or other current liabilities. The difference between current assets (or total working capital

investment) and current liabilities represents working capital finance obtained from long term debt or equity.

3.6.2 WORKING CAPITAL FINANCING POLICIES

Working capital financing policy refers to decisions on how the firm finances its current assets investments and can be classified as conservative, aggressive and moderate (Nazir and Afza, 2009b, Nwankwo and Osho, 2010). The three working capital financing policies are illustrated in Figure 6.

3.6.2.1 The aggressive financing policy

The firm invests in small quantities of marketable securities and finances both permanent and temporary current assets with a high proportion of short-term debt relative to long term capital. Firms pursuing a very aggressive policy finance part of their fixed assets with short-term debt. During the peak period, the firm borrows to finance current asset needs. As working capital needs decline, the firm repays the short-term borrowings.

3.6.2.2 The conservative financing policy

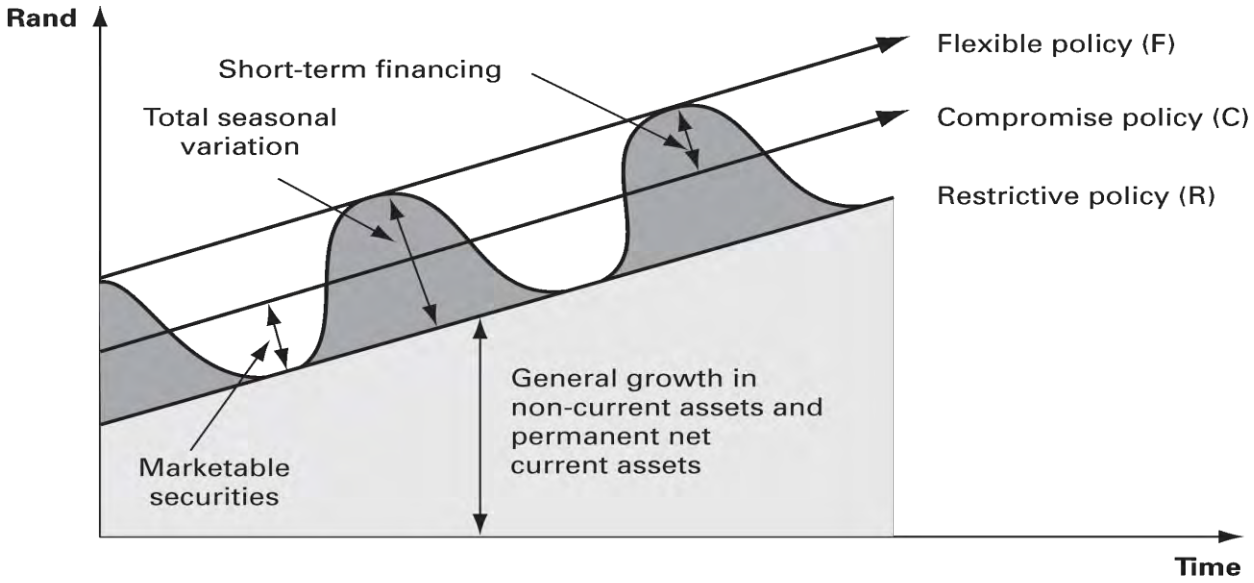
Firms pursuing this policy use relatively more long-term capital and less short-term debt to finance large holdings of permanent working capital and a portion of seasonal current assets. The firm invests in cash and marketable securities during the off-peak period and liquidates these cash and marketable securities to finance current asset needs during the peak period. Thus short term investments are used as a buffer against working capital needs.

3.6.2.3 The Compromise or Moderate financing policy

The conservative working capital financing policy assumes that the firm holds short-term investments but does not use short-term debt, while the aggressive working capital financing policy assumes that the firm uses short-term debt and never holds cash and marketable securities. These working capital financing policies are two extreme cases and are impractical. In practice, firms use both short-term debt and hold short-term investments. Under the

compromise approach, working capital is financed by both short-term and long-term funds. Short-term borrowings are used to cover peak current assets such as inventories, while long-term funds are used to support non-current assets and permanent working capital. The firm keeps a cash reserve in the form of short-term marketable investments during the off-peak season.

FIGURE 6: A COMPROMISE FINANCING POLICY



With a compromise policy, the firm keeps a reserve of liquidity that it uses to initially finance seasonal variations in net current asset needs. Short-term borrowing is used when the reserve is exhausted.

Source: Firer et al. (2012) *p.564*

3.6.3 WORKING CAPITAL FINANCING AND RISK

The type of capital a firm uses to finance its current assets has a direct influence on its risk and profitability. Using only equity enables firms to reduce risk (since equity holders cannot force a company into liquidation). However, this subdues its opportunity for higher gains as equity capital is more expensive than the cost of debt (Gitman et al., 2010). Using only debt to finance working capital enables firms to enjoy the opportunity for higher gains but also increases the

risk assumed by the firm since failure to pay debt obligations results in bankruptcy or insolvency.

3.7 SOURCES OF WORKING CAPITAL FINANCE

There are several ways to finance a firm's working capital investment; most firms employ a variety of financing instruments rather than depending on one or two sources of working capital finance. The fixed and fluctuating nature of working capital requirements means that a firm has to finance these requirements using different sources of different types and terms. Long-term sources of funds like term loans, equity, reserves, and other forms of long term funds typically finance permanent working capital, while fluctuating working capital is financed as the need arises, on a short term basis by accounts payable credit, commercial paper, bank credit, factoring among others.

Equity finance is the major source of funding for young firms because they may find the capital market inaccessible. Consequently, equity capital finances both fixed and current assets. As the firm grows, several financiers may be willing to extend loans to the firm, thereby increasing its pool of finance. The increased and wider pool of finance does not diminish the importance of equity capital in current assets financing. Throughout its lifetime, the firm maintains the "equity-cushion" for stability and security reasons.

Working capital can be financed by spontaneously-generated finance, debt, or equity. The forms of working capital finance can be categorised as either long-term or short-term finance and can also be classified as internal and external sources.

3.8 LONG-TERM SOURCES OF WORKING CAPITAL FINANCE

Long-term financing generally funds a relatively small portion of working capital requirements and should support only the permanent portion of working capital (Gitman et al., 2010, Padachi et al., 2010). Long-term capital typically finances the excess of current assets over current

liabilities. Long-term capital can be further sub-divided into internal (retained earnings and provision for depreciation) and external (bonds, equity capital and long-term loans) sources. While practitioners know which long-term capital has been used to support current assets, analysts and researchers can only examine the extent to which these funds have been used to finance current assets.

3.8.1 Long-term internal sources

Retained earnings and depreciation are the main sources of long-term internal finance. Retained earnings are the firm's undistributed profits and are determined by factors such as the life of the business, the tax rate, dividend policy and method of appropriation of profits. Depreciation provision is a non-cash expense; therefore, cash recovered as depreciation provision can be used as a source of finance for relatively long periods.

3.8.2 Long-term external sources

These sources of finance are employed by the company in accordance with its long-term capital structure policy and include equity, term loans, off-balance sheet financing and asset-based financing. Equity is capital provided by ordinary shareholders. Long term debt or term loans can be defined as medium-term debts which are extended to the firm by lenders for durations that typically range from three to five years. Repayment of the principal loan amount can take several forms; some loans have fixed principal payment during the life of the loan, while others have fixed (equal) instalments or balloon payment on maturity. Asset-based financing is a secured long-term loan that uses both current assets (short-term marketable investments, debtors, stocks) and fixed assets (machinery, land and buildings) as security for loans. Off-balance sheet financing is usually used by firms who want to maintain clean financial statements and not warp their financial ratios; these include unfunded pension liabilities, leases, and unconsolidated subsidiary debt, in-substance defeasance of debt and project financing with unconditional commitment arrangements, and factoring (Gallinger and Healey, 1987, Hill and Satoris, 1992).

Factoring

Factoring is the sale of the debtors' book at a discount by a company (the vendor or borrowing firm) to a third party, called the factor. The sale of receivables can be with or without recourse depending on the type of arrangement negotiated. Factored accounts receivables become the property and responsibility of the factor which implies that factoring enables the firm to shift the collection costs and the default risk to a third party, the factor. The borrowing firm receives most[3] of the proceeds of sales once the goods have been shipped to the vendee or buyers.

Factoring has several advantages over straight accounts receivable financing. Factoring accounts receivable eliminate the need for credit and collection departments, thus saving the firm the cost of setting up and managing its own collection system. Factoring makes it possible for the firm to predict its cash flows from sales. It shortens the firm's operating cycle because it reduces its receivables period. Factoring increases financing and the borrowing capacity of the firm since it is off-balance sheet financing. Consequently, factoring may allow room for the firm to access other forms of external finance despite more indebtedness. Factoring increases the financing options of firms like small businesses that have few ways of financing receivables due to their limited capacity to raise funds through other short-term instruments like issuing commercial paper (Hill et al., 2010). Factoring addresses the liquidity challenges of most small businesses that are caused by late payment of sales invoices (Bhattacharya, 2009). The risk assessment for bank financing revolves around the firm's (borrower's) creditworthiness; in factoring, the factor' risk assessment revolves around the quality of the firm's clients (their profile, creditworthiness and the integrity of the sales invoices).

Factoring has its own disadvantages. The price the firm may pay for the immediate receipt of cash from receivables can be substantial, making factoring costs sometimes higher than a direct loan. The involvement of a third party in the buying or selling transaction and the collection/payment process may result in loss of control of the firm and customer relationship.

[3]The word "most" is used here because there will be a discount to the invoice value representing a charge and usually a hold-back amount until the account is actually collected.

Customer relationships can be affected, especially when the third party's collection practices are not the same as those of the seller. Customers who fear being dunned by a professional collector may shift their business to firms that collect their receivables themselves. Stancill (1971) contends that the argument that costs are saved by eliminating the need for a screening and collection department is "specious" as the factor charges for these services. While acknowledging that the factor's charges for this service might be less than the firm would incur, it is not a "no-cost" proposition. While factoring receivables enable the firm to generate cash and use the proceeds to meet current obligations, caution should be exercised as this could lead to cash shortages in the long-run. According to Bhattacharya (2009), factoring may raise perceptions challenges on the part of buyer organisations. Handing over the debtors' ledger to a factor might be perceived by buyers as an indication that the supplier is financially distressed, has low creditworthiness and therefore cannot be considered a reliable supplier. These perception challenges have been mitigated by the entry of banks and other traditional financial institutions to the factoring business.

3.9 SHORT-TERM SOURCES OF WORKING CAPITAL FINANCE

Short-term sources of finance are employed to address the firm's cyclical working capital requirements. These can be divided into internal and external sources and or spontaneously-generated and non-spontaneously generated sources. Short term internal sources include dividend provision, tax provision and other short term provisions like employees' compensation funds. Short term external sources consist of trade credit (accounts payable), accruals, bank credit, advances from sources other than banks, and short-term securities like commercial paper. Secured short-term borrowings are usually made up of short term bank loans, overdrafts, and loans. Unsecured financing is short-term loans obtained from the money market on the strength of the firm's financial statements (hence it is also known as financial statements lending). Spontaneous sources are "cost, security and formalities free," and arise from the ordinary course of business. Trade creditors and other payables increase in tandem with an increase in sales because of the increased purchases necessary to produce at higher levels.

3.9.1 ACCRUALS

Accruals are other short-term obligations other than trade credit and represent another non-discretionary spontaneous, unsecured interest-free source of financing. These include taxes or dividends, wages and salaries. Accruals are liabilities that result from the periodic payment (usually weekly, monthly, quarterly or annually) for non-trade goods and services after such goods have been delivered and/or such services have been rendered, (Asch and Kaye, 1989, Nwankwo and Osho, 2010). Firms pay for services rendered by employees on a weekly, fortnightly, or monthly basis; therefore, employees give the firm an interest-free loan for the pay period. A longer payment interval of an expense implies a larger amount of accrual funds. Collecting sales-tax money (Value Added Tax [VAT]) provides access to a spontaneous source of credit as these funds may be used, interest-free, until the payment date. Employees' income taxes (pay-as-you-earn [PAYE]) and other deductions also provide limited, interest-free, spontaneous sources of credit as these must be paid within a certain period of the payroll date. As a source of finance, accruals tend to expand with the firm's scope of operations. Accrued taxes increase with an increase in profits while accrued labour or wages increase as sales and labour costs increase. There is limited room for stretching accruals – late salaries payments may dampen employees' morale, and compromise their work efficiency and commitment to their jobs. Delaying tax payments usually attracts penalties from the tax authorities.

3.9.2 TRADE CREDIT (ACCOUNTS PAYABLE)

Trade credit (which creates accounts payable) originates when sellers/suppliers deliver goods to buyers and allow them a short credit period before the payment is due. A discount for earlier payment called a cash discount may be extended by the supplier. Trade credit does not avail cash to recipients, but does enable them to possess goods without making immediate payment. Therefore, it can be viewed as an in-built source of financing tied in terms of both "timing and value to the exchange of goods" between a supplier and its customers which also varies with the production cycle (Ferris, 1981, Van Horne, 2002). Trade credit is important to most firms because of its dual nature; most companies buy their goods on credit and sell their goods on credit.

Trade credit is the most common short-term working capital financing instrument in both developed and developing financial markets (Van Horne, 2002). It constitutes more than 40% of the short-term obligations of the average non-financial firm, which makes it the largest single conduit for cash outflow in most businesses (Borde and McCarthy, 1998, Gallinger and Healey, 1987).

Trade credit is the primary source of funds used to finance inventory acquisition and is available only in proportion to the size of the orders of goods and services the firm makes under the given terms of trade and practices of the industry to which a firm belongs. It is an internal, spontaneous, self-adjusting source of financing because it finances the firm's operations on an ongoing basis in the normal course of the business and fluctuates with changes in the firm's operating activities (Hill and Satoris, 1992, Richards and Laughlin, 1980). As a spontaneous, self-adjusting source of financing, trade credit is usually insufficient during seasonal peaks of activity; therefore, the finance manager has to raise funds from other forms of financing to finance this shortfall (Stancill, 1971).

3.9.3 TRADE CREDIT THEORIES

Lewellen et al. (1980) show that in perfect financial and product markets, trade credit should not exist. Firms would want to sell their goods and services for cash rather than on credit. A number of theories have been propounded as explanations why buyers accept and sellers offer trade credit despite its high costs after factoring implicit costs. These theories include; the financing theory (Emery, 1984); the signaling theory (Alphonse et al., 2006), the macroeconomic conditions theory (Schwartz, 1974); the price discrimination theory (Nadiri, 1969) and the transaction costs theory (Ferris, 1981). Modern financial management theory has begun to question the validity of these theories as some seem to have largely been overtaken by technological advancement while others seem to have lost their relevance. Below is a discussion of trade credit theories and counter-arguments against these theories.

3.9.3.1 The financing theory

This theory is premised on the reasoning that suppliers have advantages over traditional lenders in extending credit. Petersen and Rajan (1997) identified three cost advantages that make suppliers superior to lenders in granting credit to their clients.

First, the trading relationship gives suppliers an informational advantage in assessing the buyer's creditworthiness and monitoring the buyer more closely. Suppliers are closer to their buyers and understand the nature of their business. Suppliers can assess the condition of the buyer's business and creditworthiness based on transactions information like the size of orders and timing and the discounts the customer takes or forgoes. Banks rely on financial statements or accounting information. Bank can also gather information about the buyer, but at a higher cost and slower pace than suppliers. This argument has been criticised by some scholars who question why, if suppliers have better expertise in assessing the creditworthiness of buyers, they do not extend credit beyond the value of the goods.

Second, the supplier has more leverage over the buyer if they have an established, ongoing relationship as their threat to cut supplies in order to enforce payment has greater impact on the buyer's operations than a bank's threats to not provide finance in the future.

Thirdly, in the event of default by the buyer, the supplier can repossess the goods supplied. It is argued that the liquidation process followed by suppliers is quicker and more effective However, this ability to seize goods from customers depends on the durability of the goods. Non-perishables can be repossessed and sold to another customer without any additional processing. While banks can also use repossessed assets to pay the loan, they do not have the same networks as suppliers to sell repossessed assets.

3.9.3.2 The quality guarantee theory

Proponents of this theory posit that information asymmetries between buyers and sellers relating to the quality of product, results in suppliers extending trade credit. Receiving goods

before payment allows the customer to check whether the goods delivered conform to the agreed standard in terms of quality and quantity (Smith, 1987, Long et al., 1993). Supplying goods before payment can be viewed as an implicit guarantee that if the goods delivered do not meet the agreed standard, the customer can return the goods or refuse to pay. Cash purchases weaken the position of the buyer should the product turn out to be of poor quality or substandard. Warranties or guarantees offered by suppliers do not mitigate the situation because they take too long to be enforced, which causes losses to the customer.

The validity of this theory is also questionable because while it should hold in the first round of purchases, it is difficult to justify in cases of longstanding relationships between buyers and sellers where the quality of the product is well-known. If the quality guarantee theory holds, one would expect trading partners to shift from trade credit to cash on delivery as trade between the parties increases. Errant suppliers that sell poor quality products will not last long in today's highly competitive business environment as the market can quickly penalise them for such bad behaviour.

3.9.3.3 The transaction costs theory

This theory holds that it is expensive for suppliers to make collections from customers as soon as goods are consumed and it is also costly for customers to make payments when there are frequent deliveries. Therefore, supplying or consuming goods or services before payment is an operational tool that reduces the costs associated with frequent transactions or deliveries. One payment is made at the end of the month or a trading period for several deliveries collectively; this allows for flexibility in payment (Ferris, 1981). While this theory held until the 1980s, the advent of electronic payment systems means that firms can pay for products as they consume them. Electronic payment systems should have resulted in noticeable changes in the demand and supply of trade credit. Empirical evidence suggests otherwise; the use of and demand for trade credit seems to be on the rise as the search for cheap finance continues.

3.9.3.4 The price discrimination theory

This theory was put forward by Nadiri (1969) who stated that in highly competitive markets, suppliers compete for customers using fronts other than price. The supplier can charge different customers different prices. Such tactics are used by firms with significant market power in an industry. Trade credit practices tend to be similar within an industry; any firm that deviates from industry trade credit norms potentially faces resistance from the market.

3.9.3.5 The signaling theory

Trade credit acts as a signal to more financial institutions to support the firm (Alphonse et al., 2006, Biais and Gollier, 1997, Cook, 1999). This theory holds that as financial institutions observe the firm's access to and use of trade credit, they upgrade their perceptions of the firm and are willing to support previously bank credit-constrained firms. If the signaling theory holds, the expectation would be that this only occurs in the first round. Trade credit should play a diminishing role as the firm grows and accesses finance from banks. Older firms are expected to depend less and less on trade credit.

3.9.3.6 The macroeconomic conditions theory

Blinder and Maccini (1991) state that trade credit stimulates sales during periods of low demand. The validity of this argument is extremely questionable because periods of low demand tend to affect both suppliers and their customers. Economic slowdowns tend to be systemic, affecting both the supplier and customer, making it unreasonable for the customer to increase demand for goods when it is struggling to increase its own rate of stock turnover.

3.9.3.7 The substitution hypothesis

Trade credit helps firms to overcome the challenges presented by poorly developed or underdeveloped financial systems (Danielson and Scott, 2004) and the non-availability of bank finance (Fisman and Love, 2003). The substitution hypothesis states that trade credit is a substitute for bank credit (Burkart and Ellingsen, 2004). In developing countries, limited access to formal credit amplifies the significance of supplier credit in financing the short-run

operations of the firm (Fisman, 2001). If this theory holds, the expectation would be that in countries with advanced financial systems, firms have low accounts payable balances compared with their counterparts in countries with poorly-developed financial systems. Empirical evidence seems to contradict this; for example, despite the presence of well-developed financial markets, in the United States suppler financing is the dominant short-term financing instrument (Petersen and Rajan, 1997). In many US firms aggregate accounts payable exceed the aggregate of inventories largely because of the liberal credit policies of large firms in the face of the rather stringent credit standards of banks and financial institutions. In the UK, a country with well-developed financial markets, more than eight per cent of transactions are conducted on credit.

3.9.4 TRADE CREDIT USAGE AND ITS ADVANTAGES

As the firm increases (decreases) its production and purchases, accounts payable increase (decrease) and provide part of the funds required to finance the increase in production (Danielson and Scott, 2004). This is not a discretionary source of financing; it depends on the purchasing plans of the firm which are also determined by its production cycle (Van Horne, 2002). As a source of funding, supplier credit is limited to the amount of credit purchases made and the credit period negotiated. Thus, it is important for managers to seek out and negotiate the most friendly credit terms. A positive correlation between capacity utilisation and short-term credit was found in a study by Fisman (2001). This was premised on the reasoning that firms lacking trade credit face inventory shortages (as trade credit is mainly used to finance inventory), resulting in lower capacity utilisation. Marotta (1997) states that the use and significance of trade credit differs from country to country, although it is more important in manufacturing-oriented countries.

The major incentive for firms to depend on trade credit is that there is no explicit cost of finance as long as payment is made within the stipulated period (Soenen, 1993, Weston et al., 1996). Trade creditors do not normally require interest on the credit provided as they receive their financial reward through their profit margin on the goods and services supplied. When

implicit costs, higher prices charged by sellers and foregoing cash discounts are considered, this seemingly "interest free" financing may turn out to be very expensive. Trade credit is a readily and continuously available form of financing. Suppliers view occasional default on trade credit with a far less critical eye than does a banker and other lenders (Van Horne, 2002). Huyghebaert et al. (2007) argue that suppliers are more lenient in liquidating default customers than financial institutions. Fafchamps (1997) adds that trade creditors rely on trust and reputation, unlike financial institutions which demand formal collateral when extending credit.

Deferring payment to creditors for long periods, also known as stretching, gives the firm more time to use these "interest free funds". Therefore, there are incentives for managers to defer payments as long as possible. However, deferring payment beyond the given credit period may cost the firm its credit reputation and may result in suppliers downgrading its credit rating or in the firm being declined credit and relegated to a cash-on-delivery client. However, the pressure to sell may force suppliers to continue supplying goods even when the company stretches its accounts payable (within reasonable limits). Reducing supplier financing by making early settlements on trade credit obligations enables the firm to obtain important discounts (Ng et al., 1999, Wilner, 2000).

3.9.5 BANK CREDIT

Bank credit form the largest part of short term financial debt and has been an important working capital financing instrument all over the world, particularly in India (Majumdar, 1996). Narasimhan and Vijayalakshmi (1999) note that excessive dependence on the banking system to provide working capital financing exerts some pressure on banks. For example, in the 1970s the Indian corporate sector excessively used bank credit to finance working capital to the extent

> “that the desired correlation between bank credit and the holding of inventory and book debt was hampered in most cases. The Reserve Bank of India instituted several study groups (Dehejia Study Group, Tandon Study Group, Chore Study Group, Marathe

Committee, Chakraborty Committee) among others to correct the use of bank credit by the corporate sector".

Majumdar (1996) p.104

All these study groups recommended 'restraining' the use of bank credit in financing working capital.

3.9.5.1 Changes in short-term debt

The firm's short-term financial debt level changes due to either the size effect or the substitution effect (Fosberg, 2012). The size effect is premised on the matching principle that states that current assets should equal current liabilities. Growth in current assets can be financed by spontaneous sources; trade credit and accruals. However, these spontaneous sources may be insufficient to cover all the growth in current assets; hence the need for additional short-term funds to support current assets growth. When current assets equal current liabilities, the firm has a Rand/Dollar in current assets to pay off every Rand/Dollar in current liabilities. However, as a risk management technique, firms tend to maintain a current ratio higher than one, requiring more funding, and this portion is met using long-term funds.

The substitution effect implies that spontaneously-generated resources and short-term debt financing have an inverse relationship. Holding current assets constant, an increase in spontaneously-generated resources reduces the need for short-term financial debt financing and vice-versa. Theoretically speaking, short-term financial debt is an alternative to trade credit because they perform the same function of financing short-term assets. However, in practice short-term financial debt complements trade credit. Financial planning models such as the Percentage of Sales (PoS) (for details see p.86 of Firer et al. (2012)) assume that the growth in current assets is partly financed by spontaneously-generated resources and the shortfall comes from equity, short-term and long-term debt, in accordance with the firm's financing choices and constraints.

Financing the working capital requirements of firms is one of the key functions of financial institutions, in particular commercial banks; as a result, working capital advances constitute a

major part of banks' loan portfolios. In financing a firm's working capital requirements, banks examine factors such as sales and production plans and a desirable current assets level and then a set a credit limit, which is the maximum amount which a firm can access for working capital purposes from the bank. Banks normally approve different limits for 'peak season' and 'off-peak season' for firms with seasonal fluctuations. Working capital advances are normally provided in the following forms; cash credit, overdraft, letter of credit, loans, bills financing and working capital demand loans against the security of the borrowing firm's liquid assets.

3.9.5.2 Cash Credit

This is a loan facility which is similar to a line of credit, except that under the cash credit facility, the borrowing firm establishes a cash account which it can draw on up to the predetermined limit. The cash account enables the borrowing firm to utilise the facility to meet periodic needs; this helps the firm to minimise interest obligations because it is payable on the amount utilised rather than on a predetermined limit. Repayment can be made any time during the tenure of the facility, which is usually a year.

3.9.5.3 Overdraft

This is a formal arrangement where the bank allows the firm to make withdrawals exceeding its credit balance from its current account up to a specific, agreed limit (Nwankwo and Osho, 2010). Interest on this facility depends on the borrower's risk profile and security and is payable on the amount actually utilised at any given point in time. According to Firer et al. (2012), South Africa's strongest public firms are able to secure overdraft interest rates at the prime lending rate. Although the overdraft facility can be recalled on demand by the lending institution, it is classifiable as a permanent source of funds because companies use it on a continuous basis and it is a permanent feature on the balance sheet.

3.9.5.4 Line of credit

This financing instrument can be defined as an open-ended facility where a firm is given a borrowing limit to draw against and is allowed to repay at any time during the term of the loan.

This facility offers the firm the benefit of borrowing the exact amount required to meet needs that arise which makes it ideal to address the fluctuating working capital needs of the firm. Such loans normally run for a period of a year and are renewable subject to the annual assessment and commendation of the lender. The two main advantages of a line of credit are that it offers the flexibility of borrowing as the need arises which enables the firm to minimise both the principal borrowed and the interest obligations. In addition, the firm pays interest on the amount borrowed only. The main disadvantages of a line of credit are that the annual renewal subject to the lender's approval may introduce uncertainty with regard to availability of funds and make it unsuitable to finance permanent working capital needs. In addition, there are potentially higher borrowing costs in the form of a high compensating balance that the lenders might demand.

3.9.5.5 Commercial Paper

This financing instrument is a short-term debt instrument issued directly to investors by large, creditworthy corporate borrowers in the money market. Its main advantage is that it gives highly rated corporate borrowers greater access to cheaper funds than they could obtain from banks while still providing institutional investors with higher interest earnings than they could obtain from the banking system. Money raised by such instruments can effectively be used to fund short-term requirements.

3.9.5.6 Banker's Acceptance

A banker's acceptance is a short-term debt instrument issued by a firm which is accepted and guaranteed by a bank to pay a certain sum of money. These agreements typically arise when a seller sends a bill or draft to a customer. The customer's bank accepts this bill and notes the acceptance on it, which makes it an obligation of the bank. In this way, a firm that is buying goods from a supplier can effectively arrange for the bank to pay the outstanding bill.

3.9.6 BANK CREDIT VERSUS TRADE CREDIT

The following is an analysis of the superiority of bank credit to trade credit and vice-versa. While bank credit is flexible and can be used for any purpose, trade credit is limited because it is only available as part of goods purchased. From the point of the lender, trade credit is better due to its non-flexibility which renders the chances of abuse of the credit by the beneficiary almost nil. The flexibility of bank credit makes it prone to abuse by the borrower. Trade credit must be settled when the credit period ends, while various forms of bank credit (like overdrafts) can be renegotiated. There is no explicit interest on trade credit as long as payment is made within the given credit period. Bank credit has explicit interest, which at first glance make it more expensive than trade credit. However, when implicit interest is factored in, supplier credit is more costly than bank credit. Huyghebaert et al. (2007) state that bank debt is cheaper than supplier financing because banks operate in an extremely competitive environment and earn small margins on loans and advances. The cost of foregoing cash discounts can be very high (Danielson and Scott, 2004). For example, a firm may give its clients the following terms; "2/10, net 30"; meaning that the credit period allowed is 30 days. Should the client settle the debt within ten days, they receive a 2% discount on the invoice amount. The cost of foregoing such a discount translates into interest of more than 43% on an annualised basis as shown in the calculations below. By ignoring the discount, the buyer will be paying an effective annual rate (EAR) of:

$$\begin{aligned} \text{EAR} &= ((1 + (2/98)) \text{ ^ } (360/20) - 1 \\ &= (1 + 0.01010) \text{ ^ } (18) - 1 \\ &= 43.86\% \end{aligned}$$

This example clearly shows that trade credit financing is expensive, making its acceptance by buyers and offering by sellers difficult to understand (Borde and McCarthy, 1998). Foregoing cash discounts and delaying payment can be advantageous in periods of high inflation as payment will be made when the invoice value of the goods is less than the purchasing power of money.

There are no security requirements when the firm uses trade credit unlike banks (in particular short-term loans), where the firm might be required to pledge liquid or moveable assets. In such a case, the borrowing firm can neither use the same assets to raise further loans nor can these be sold until the loan is repaid in full. Trade credit terms vary across industries, while bank credit is extended on terms and conditions which are generally the same for all types of businesses.

3.9.7 LONG-TERM DEBT AND SHORT-TERM DEBT

Working capital financing can be done using either long-term or short-term debt. Each has advantages and disadvantages. Term loans are best-suited to finance medium-term permanent working capital and working capital requirements associated with sales growth. Long-term debt is beneficial as it ensures the availability of a pre-determined amount of funds for a pre-determined period of time, enabling the firm to finance long-term working capital needs. The availability of funds at all times is very crucial, especially during a credit crunch where access to finance is very difficult. Failure to access funds during such times may lead to the collapse of a firm. When a firm suffers sporadic huge losses, declining market demand or an industry-specific slowdown, it may find it difficult to access funds from banks or other lenders of short-term finance due to loss of creditworthiness.

This availability of funds lowers the risk of an abrupt shortage of finance and the strain of meeting all short-term obligations which reduces the risk of bankruptcy. Using long-term debt locks in the interest rate. Term loans are usually repaid over several years which spread the cash flow required for loan repayment over many years, thereby reducing the pressure of meeting obligations.

The major disadvantage of term loans is that the costs are higher than short-term loans because the term structure of interest rates states that the yield curve is generally upward sloping; therefore they attract higher interest rates than short-term debt (Brick and Ravid, 1985). Lenders require more compensation for the risk they are exposed to in lending money

over a long period. As an interest rate risk management technique, lenders prefer the provision of term loans at a floating interest rate instead of the fixed rate. This exposes the firm to greater interest rate risk because the probability of a rise in interest rates increases when the loan repayment period is long. Long-term debt is inflexible because it can only be refunded if the debt agreement includes prepayment provisions and prepayment penalties can be expensive. In addition, firms incur interest expenses even during times when they are not using the funds such as during off-peak or off-season periods (Gitman et al., 2010). While the short-term debt interest rates are generally lower than long-term debt (making it cheaper), they tend to be more volatile, increasing the risk. Heavy dependence on short term debt exposes the firm to a risk of bankruptcy because its inability to repay may hinder the firm's access to more funding, thereby forcing the firm into bankruptcy. In order to guard against the deterioration of the financial health of the firm, lenders include protective covenants in the loan agreements during the life of the loan. These covenants and collateral requirements cannot be easily reversed, thus imposing substantial financial constraints on a business. Protective covenants limit the freedom of the borrower such as requiring the borrower to maintain working capital or liquidity ratios at a certain minimum level and maximum debt-to-equity ratios (Gitman et al., 2010, Firer et al., 2012). The lead time for negotiation and interest payment of term loans can also be protracted.

There are several benefits of using short term debt. The firm borrows and uses funds when the need arises which enables it to reduce idle capital thereby reducing the financing cost. Short-term debt is more flexible as funds can be raised only when the need arises and can be repaid when there is no longer a need. Generally, short-term finance lenders do not interfere with the management of the borrower, which means that management retains control over decision-making. Long term financiers impose covenants which prohibit management from doing certain things during the life of the loan.

3.9.8 ACCOUNTS RECEIVABLE FINANCING

This type of financing involves borrowings that are secured by a firm's accounts receivable. It is used by businesses that lack creditworthiness to borrow without pledging collateral. The maximum loan size is limited to a percentage of the debtor's book of the borrowing firm. Repayment of such loans comes from the liquidation of the receivables. The borrowing ratio depends on the age and the credit quality of the firm's receivables. Lenders extend loans ranging between 50% and 80% of the accounts receivable face value depending on the quality of its receivables. A firm with sound clients can access a loan as high as 80% of its accounts receivable. When extending accounts receivable loans, lenders are also concerned with the size of the accounts receivable. The transaction costs theory dictates that small transactions are expensive to administer.

Accounts receivable financing offers several benefits to the firm. Since the loan limit is tied to the total accounts receivable, the firm's capacity to borrow automatically increases with a growth in sales. This form of financing is particularly valuable to fast-growing firms because it provides them with ready financial resources to finance expanded sales. The borrowing firm relies on the credit strength of its customers to access finance which could be valuable for a firm with customers who have a better credit standing than the firm itself.

3.9.9 INVENTORY FINANCING

Inventory financing is a secured loan where inventory is used as collateral. Inventory financing is not easily accessible because inventory as collateral is a risk due to obsolescence challenges, the speed of loss of value associated with some goods and the poor resale value of partially processed goods. This type of financing is best-suited to support firms with inventory standardised goods like motor vehicles and household furniture or appliances, which generally have predictable prices. The size of the loan is based on market price stability, how marketable and perishable the inventory is, and the challenges and costs of disposing of the inventory (Van Horne and Wachowicz, 2004). For firms whose inventory is a major constituent of its current assets, inventory financing can be an ideal option to finance working capital. However, this

comes with higher transaction and administrative costs. The common types of inventory loans are blanket inventory lien trust receipt and field warehouse financing.

3.9.10 PUBLIC DEPOSITS

Public deposits have also been used by the corporate sector in India. The use of public deposits for working capital finance started in the 1930s, then slumped in the 1950s before regaining prominence in the 1970s (Majumdar, 1996). For corporate borrowers, public deposits represent a cheaper source of financing than bank loans. However, they expose the innocent investing public to the trap of unscrupulous deposit taking companies.

3.10 WORKING CAPITAL FINANCING EMPIRICAL STUDIES

Majumdar's (1996) study of corporate working capital financing patterns in India analysed 10 companies from the private sector and 10 from the public sector over the period 1981 to 1990. The study found that the current assets of each firm were financed by bank credit, public deposits, accounts payables, loans and ordinary shareholders' capital. The use of different sources was influenced by the fixed and fluctuating nature of working capital, the age of the firm and stability and security concerns.

Weinraub and Visscher (1998) studied diverse industries' working capital financing policies and found that industries that followed restrictive working capital investment policies simultaneously followed relatively flexible working capital financing policies.

Zapalska et al. (2004) strategic analysis of corporate working capital funding alternatives in emerging markets indicated that management should fund domestic working capital requirements with domestic currencies at the early stages of market development. As emerging markets evolve and become more integrated in the global economy, covered arbitrage opportunities dissipate and currency stabilisation occurs. In this phase of market evolution, working capital funding alternatives expand to include other international currencies, as other funding sources become more attractive for multinational enterprises.

A study of 101 small to medium enterprises (SMEs) in Mauritius over the period 1998 to 2003 by Padachi et al. (2010) found that the contribution of short-term finance to working capital was on an upward trend. The study found that working capital was largely financed by trade credit and other payables. Padachi et al. (2010) posit that the heavy reliance of SMEs on these sources of working capital finance is due to pronounced information asymmetries which create challenges in accessing external finance.

A number of empirical studies have been conducted on the determinants of trade credit. Most of these studies assume that firms instantaneously adjust their level of trade payables. Appendix A3 presents a summary of these studies and their findings.

3.11 FACTORS INFLUENCING WORKING CAPITAL FINANCING

Like working capital investment, the financing of working capital is influenced by several quantitative and qualitative, internal and external factors. Among others, firm-specific factors include; the nature of the business, the size of the business, the cash cycle, the firm's access to capital and financial markets, the production process and the firm's investment policy. External factors include the political climate, interest rates, inflation and technology.

3.11.1 Market power or size

Market power influences the terms of both purchases and sales. Firms with significant market power have the capacity to negotiate and secure more liberal credit terms with suppliers. Suppliers are likely to give trade credit to large firms as they consider them to be low risk customers (Delannay and Weill, 2004). Small firms find contracts with industry leaders very valuable. Industry leaders can use their market power to stretch the credit terms extended by suppliers with minimal negative consequences (Hill et al., 2010).

3.11.2 The working capital cycle

As measures of operational efficiency, the Operating Cycle and the Cash Cycle significantly influence a firm's working capital financing. A negative CCC means that firm is receiving cash from its customers faster than it is paying its suppliers, while a positive CCC means that the firm is paying its suppliers faster than it is collecting from its customers and has to borrow as it awaits payments from its debtors. The CCC provides management with a good indication of the duration the company must fund its operating cycle with non-spontaneous sources of finance of either debt or equity capital.

For example, if a firm has an accounts receivables period of 45 days, inventory turnover period of 50 days and pays its trade creditors in 35 days, then its CCC is 60 days (45 days + 50 days – 35 days). In other words, this firm will need to fund its inventory and receivables from its own resources for a period of 60days. Firms with longer CCCs are expected to hold large working capital investments (inventories and receivables) and require more external financing to maintain their operations, which bear more financing costs than firms with shorter CCCs. A short CCC put the firm in a better position to generate cash flows than a long CCC.

3.11.3 Business cycle

The business cycle refers to changes in general economic performance in the long-term development of an economy. During periods of economic expansion, businesses expand, resulting in a need for more working capital due to increased investment opportunities. During periods of recession or depression less working capital finance may be required because of low business activity. On the other hand, a recession may result in the firm experiencing challenges in generating internal resources from its operations, thereby increasing its accounts payable as it struggles to pay its trade credits. Furthermore, during recessions, the ability of the firm to raise funds is restricted. For example, one of the major consequences of the recent global economic crisis of 2008 – 2009 was limited access to short term finance for most firms. During times of rapid price increases, the working capital financing required to support current assets also increases.

3.11.4 Operating Cash flow

Working capital financing is also influenced by management decisions in line with profit projections. Adequate profit aids in the generation of cash which enables finance managers to retain some of the profits in the firm and gather considerable internal financial resources. These internal financial resources enable businesses to finance working capital needs and adopt a more flexible working capital policy which facilitates the future growth of sales (Hill et al., 2010). Myers (1984) and Myers and Majluf (1984) Pecking Order Theory has been used to explain managers' financing preferences. The theory states that managers prefer internal funds, followed by safe debt, then risky debt and equity is issued as a last option (Wasiuzzaman and Arumugam, 2013). Following the Pecking Order Theory, firms are expected to use retained earnings to finance their working capital first, then safe debt (trade credit and bank credit) and risk debt (long-term debt) and equity. Firms that generate more internal resources will require less external resources, especially supplier financing (Hill et al., 2010, Deloof and Jegers, 1999). Firms with limited or no internal financial resources must finance their working capital needs using other sources.

3.11.5 Sales growth

A growth in the level of sales creates financing pressures and is a major determinant of the demand for short-term finance. Firms experiencing high sales growth are likely to employ more short-term debt as spontaneous sources may not be sufficient to meet the new current asset requirements (Delannay and Weill, 2004). As the sales volumes increase there is need for an increase in working capital to finance both inventory and receivables.

3.11.6 Creditworthiness

Creditworthy and larger firms are subjected to fewer borrowing constraints, have better access to capital markets and have better capacity to finance the working capital gap from external sources (Hill et al., 2010, Whited, 1992). A firm's reputation in the capital markets affects the amount of working capital it will hold in order to ensure that its investment plans are not

interrupted. Calomiris et al. (1995) found that highly-rated firms in both long-term and short-term credit markets have low inventories and financial working capital. High credit quality firms have no need to accumulate working capital as a cushion against fluctuations in cash flow because they can easily access external finance at favourable terms. Calomiris et al. (1995) show that, given a high (long term) bond rating, only large firms with low earnings variance, high cash flows and/or cash flows and/or large stocks of liquid assets have access to the commercial paper market. Large firms are expected to be more creditworthy and less of a risky investment (Delannay and Weill, 2004).

3.11.7 Term structure of interest rates

Interest is tax deductible expense; this creates an interest tax shield and enhances firm value. An upward sloping term structure encourages the use of short term debt (Gitman et al., 2010). Brick and Ravid (1991) contend that firms employ less short-term bank borrowing when the term structure is upward sloping and *vice-versa*; consistent with the tax liability argument which states that an upward sloping yield curve favours long-term debt usage so that they benefit from the higher tax shield generated by a higher tax liability (thereby increasing the value of the firm).

3.11.8 Non-debt tax shields

These are measured by depreciation and amortization and reduce the amount of debt financing that a firm employs because they reduce the expected interest tax shield the debt will generate. Non-debt tax shields serve as a substitute for interest expenses, which are deductible in the calculation of corporate tax and have a negative correlation to the debt capital employment in a firm's capital structure.

3.12 CHAPTER SUMMARY

The chapter reviewed the literature on working capital investment policies, the different types of working capital investments; the benefits and costs of holding working capital and the theoretical and empirical on the valuation effects of working capital investments. Once the firm has set its current assets level, it must make decisions on how to finance these current assets. In light of this, the chapter reviewed the theoretical and empirical literature on working capital financing. Different working capital financing policies and their impact on risk and profitability were also discussed. This chapter presented an in-depth analysis of the different working capital financing sources and instruments.

CHAPTER FOUR

WORKING CAPITAL, FIXED INVESTMENT AND FINANCIAL CONSTRAINTS

4.1 INTRODUCTION

The awareness of cash flow investment sensitivity dates back to the late 1950s and its debate was largely stimulated by the seminal work of Modigliani and Miller (1958) on capital structure and investment decisions which stated that under perfect capital markets conditions, there is no capital rationing; external financing can be accessed without any friction. They argued that, under these conditions, investment decisions are independent of the firm's financial status; that is its liquidity, leverage and dividend policy. When there is no capital rationing, the availability of internal funds should not affect the firm's investment, as internal and external finance are perfect substitutes. This proposition implies that the firm's growth rate and capacity to undertake fixed capital investment should only be influenced by its expected future profitability.

Under imperfect capital market conditions, information asymmetry and the agency problem play a key role in allocating resources for firms and when they increase, financial constraints also increase (Kassim and Menon, 2003, Lin and Huang, 2011). Market frictions like issuing costs, agency costs and information asymmetry make external finance more costly than internal finance. These drive a wedge between the costs of internal resources and external capital (Myers, 1984). The Pecking Order Theory is premised on the logic that internal resources have a "cost advantage" over funds raised externally (Cleary, 1999). The transaction costs of issuing debt and equity which include underwriting fees, registration fees, taxes and accounting fees can be substantial, making it expensive to depend on external finance. Underwriting fees generally constitute the single largest direct cost element of issuing securities and can be as high as 2.5% of the amount to be raised (Firer et al., 2012).

External funds are less desirable because they tend to be underpriced in relation to the asymmetry level; for example, they decrease the price of new bonds to be issued. External

funds send signals to the market; new bond issues tend to send positive signals. New equity issues tend to send negative signals about the company; they signal that the company has too much debt or little liquidity (Firer et al., 2012). Two South African studies found that the share price decline as a result of new equity issues announcements was within the range of 2.0% to 3.5% (Bhana, 1998, Youds et al., 1993).

Information asymmetries and agency costs potentially cause either underinvestment or overinvestment (Baños-Caballero et al., 2009). The conflict between shareholders and bondholders (the agency costs problem) stems from the limited liability of shareholders and the priority of creditors in event of bankruptcy impacts on the cost of external funds. Shareholders' limited liability might induce them to undertake more risky investment projects since they gain from the firm's higher value (as a result of high risk investments) at the expense of creditors who might incur possible losses (Jensen and Meckling, 1976). In contrast, creditors' preference in the event of liquidation may force shareholders to abandon profitable projects with positive NPVs when the NPV of the investment is less than the amount of debt issued. As a result, firms have to pay a risk premium, resulting in external funds being more expensive. According to Bernanke and Gertler (1989) the quality of the firm's balance sheet influences the agency costs of external finance. When its liquidity decreases or when the prospects of future sales deteriorate, the cost of external finance rises.

Information asymmetry indicates that insiders (managers) know more, are assumed to know more or have all the information concerning the future performance of the firm's investment prospects and value, than investors (Myers and Majluf, 1984). Although investors/outsiders may have correct perception about the investment potential of a population of firms, they cannot differentiate good projects from bad projects or the quality of individual firms. Since outsiders do not have full information on the individual firm or its projects, when new securities are issued, they discount them, assuming the average project outcome in order to ensure that they do not invest in overpriced securities. This results in the underpricing of securities, including those backing good projects. Given this undervaluation, the cost of externally-funded

projects is higher than the cost of internally-funding project. Outsiders may demand a discount that is so large that management may find it more economic not to issue securities and abandon the investment instead. This supports the argument that informational asymmetries may induce financial market inefficiencies that spill over to the real side of the economy. Therefore information asymmetries make it more difficult to raise external funds and increase the costs of such funds, making internal financing preferable to external financing.

In the credit market, information asymmetries between firms and investors in competitive markets create adverse selection and moral hazard challenges; causing lenders to ration credit (resulting in its availability at a high cost/premium) (Stiglitz and Weiss, 1981).

Modern financial and economic theories and empirical evidence concur that real investment may be influenced by financial factors such as internal resources availability, the accessibility of external finance from financial markets and financing costs, among other factors. Internal resources and external capital are not substitutes; firms may prefer internal funds over external funds because they are cheaper. This view is supported by several previous studies (Fazzari et al., 1988, Cleary, 1999, Moyen, 2004).

Firms are unable to exploit arising investment opportunities when they have insufficient internal liquid resources and the "perishable" nature of projects means that the liquidity position of a company significantly impacts on its ability to undertake investment projects (Boyle and Guthrie, 2003).

The Pecking Order Theory has been widely used to explain the financing preferences of managers in contemporary financial management. The theory states that managers follow a hierarchical pattern of financing sources where they first rely on internal finance when available; and external funds are used only when internal resources are exhausted. In terms of external funds, debt is preferred to external equity.

The Pecking Order Theory has three main implications. First, the firm's capital structure is determined by its need for outside finance, which dictates the amount of debt the firm will have. Therefore, firms have no optimal capital structure. Second, profitable companies have more internally generated resources; therefore they have less need for external funding. According to Firer et al. (2012), empirical evidence on capital structure seems to support this conclusion. Third, companies build a cash reservoir, financial slack, which they draw on to finance new projects as they emerge.

4.2 CASH FLOW INVESTMENT SENSITIVITY

The pioneering work of Fazzari et al. (1988) established that financially-constrained firms displayed high cash flow investment sensitivity. They classified firms in terms of their dividend payout ratios, with financially constrained firms (non-financially constrained firms) defined as low (high) dividend payout firms. Fazzari et al. (1988) found that positive sensitivity of investment to cash flow was higher for financially constrained firms. Their contention was that when there are financial constraints, external finance is not always available and internal resources will be used to finance investment. They concluded that financial factors like the availability of internal resources, access to external funds or the cost of financing may influence the firm's investment decisions. Studies by Cleary (1999) and Carpenter et al. (1994) supported the Pecking Order Theory and Fazzari et al. (1988) by demonstrating that internal financing affects the amount of corporate investment.

Kaplan and Zingales (1997) challenged the work of Fazzari et al. (1988). Using a different classification of financially and non-financially constrained firms in their analysis, Kaplan and Zingales (1997) concluded that higher sensitivities of investment to cash flow should not be regarded as evidence of more financially constraints. Several studies (Clearly et al., 2007, Hovakimian and Hovakimian, 2009, Firth et al., 2012, Islam and Mozumdar, 2007) have found a non-linear relationship between internal resources and fixed investment and have supported Kaplan and Zingales (1997).

Guariglia (2008) explained that one of the major reasons for the different conclusions reached by studies on cash flow investment sensitivity is disagreement on how financial constraints are measured. A financially constrained firm is one with limited access to external capital or a firm that finds it costly to borrow in the financial markets. Studies whose results supported Fazzari et al. (1988), used measures such as size, age, dividend payout ratio or bond ratings information – as proxies for difficulties in accessing external finance; that is measures of degrees of external financial constraints. Studies whose results support Kaplan and Zingales (1997) used variables that classified firms on the basis of their internal funds – these measures considered as proxies for the degree of internal financial constraints. Guariglia (2008) concluded that the degree of internal and external financial constraints has different effects on cash flow investment sensitivity.

4.3 MEASURES OF FINANCIAL CONSTRAINTS

Several proxies for financial constraints have been used by previous studies as ways of classifying firms as financially constrained or not as there is no a universally agreed measure of such constraints. Below is a discussion of some of the proxies that has been used as measures of financial constraints.

4.3.1 Dividends

This variable has been used to identify firms' degree of financial constraints. Financially constrained firms tend to pay zero or low dividend payout ratios as a way of reducing the need to raise external funds in the future. Low (high) dividend payout firms are classified as financially constrained (non-financially constrained) (Almeida et al., 2004).

4.3.2 Size

Creditworthy and larger firms face few borrowing constraints and have better capital markets access (Faulkender and Wang, 2006, Guariglia, 2008), face lower borrowing costs in the capital and financial markets and are better positioned to finance the working capital gap externally (Hill et al., 2010, Whited, 1992).

4.3.3 Cost of external financing

Financially constrained firms are likely to borrow at high rates in the external markets (Fazzari et al., 1988, de Almedia and Eid, 2013).

4.3.4 Interest coverage

Interest coverage, calculated as profit before interest and tax to interest charges has also been used to classify firms as financially constrained or not (Whited, 1992, Guariglia, 2008). A high interest cover ratio indicates that the firm has good capacity to repay its debts; hence, it can be regarded as less financially constrained.

4.3.5 Cash flow

Cash flow is another measure used as a proxy for financial constraints. Moyen (2004) states that, unlike dividends, using cash flows allows one to use the resources available at the beginning of the firm's trading period. Dividends also take into account the investment and financial decisions taken by the firm during that period.

4.3.6 Tangibility ratio

The tangibility ratio is another method of classifying firms as financially constrained or not. According to Bhagat et al. (2005), firms with fewer tangible assets face greater information asymmetry when communicating their value to outsiders and, hence are more likely to face a higher degree of financial constraints.

4.3.7 Age

The duration a firm has been operating is another ways of classifying firms as financially constrained or not. Young firms are likely to be more financially constrained because of their low credit ratings.

4.4 WORKING CAPITAL, FIXED INVESTMENT AND FINANCIAL CONSTRAINTS

According to Gentry et al. (1979) working capital management activities are interrelated to long-term financial planning, though in reality they are taken as independent of the former or they are subsumed under long-term financial planning. The way a firm manages its working capital therefore can significantly influence its long-term financial planning and in particular how it copes with financial constraints.

Financially constrained firms only undertake investments when they have ample internal resources and will be compelled to reduce their investment when they experience a reduction in their cash flow. When a financially constrained firm experiences a negative cash flow shock it may decide against forgoing long-term investment in the short run instead of working capital investment (Rao, 2005). Rao (2005) states that financially constrained firms do not divert long-term funds; they reduce their working capital investment and forgo short-term profits. Thus, efficient working capital management may be crucial for financially constrained firms in order to maintain relatively high and smooth fixed investment levels. However, the degree by which working capital can facilitate fixed investments smoothing depends on the firm's level of working capital. This means that a decline in working capital negatively impacts fixed investment directly, since it implies a fall in internal resources, and indirectly raising the cost of external funds, while huge investments in working capital capacitate the firm to smooth fixed investments(Fazzari and Petersen, 1993).

Using the example of the financially constrained Chinese firms, Ding et al. (2013) posit that efficient management of working capital could be very important for such firms to maintain relatively high and smooth levels of fixed investment and can provide an important avenue to mitigate the impact of financing constraints.

According to Chan (2010), "working capital represents a significant component of firms' financial needs, especially in developing countries; therefore, it is likely to be an important mechanism by which financial constraints can affect firm behaviour". Appuhami (2009) states

that uncertainty in capital markets has made working capital an important determinant of capital investments. Working capital represents both a source and a use of short-term financial resources, and is a readily reversible store of liquidity, which a firm can use to smooth its fixed investment if it experiences a cash flow shock or becomes financially constrained (Ding et al., 2013). Fazzari and Petersen (1993) emphasised working capital's high reversibility, stating that working capital investment can temporarily be negative (when raw materials consumption is faster than its replacement) and can be improved by intensifying collections efforts and tightening credit policies on new sales. More efficient management working capital mean less requirement for external financing and better financial performance (Shin and Soenen, 1998).

Fazzari and Petersen (1993) found that United States firms used their working capital to smooth fixed investments. Since adjusting fixed capital investment has huge costs, firms benefit from maintaining smooth fixed investment. When they experience negative cash flow shocks and face financing constraints firms that maintain high working capital levels can absorb such shocks without cutting their fixed investment. Their regression analysis results showed that working capital investment as an independent variable had a negative coefficient; they concluded that working capital and fixed assets investment compete for limited funds. In addition, working capital is more sensitive to cash flow than fixed investment.

Ding et al. (2013) used a panel of 121 237 firms in China to study the fixed and working capital investment relationship in the presence of financial constraints. Their study found that firms characterised by high working capital displayed high sensitivities of investment in working capital to cash flow and low sensitivities of investment in fixed capital to cash flow. According to Ding et al. (2013), "despite binding external financing constraints, firms with low fixed capital to cash flow and high working capital to cash flow have the highest fixed investment rates, suggesting that sound working capital management may help firms to ease the impact of financing constraints on fixed investment".

Non-financially constrained firms have better capacity to finance their net working capital than financially-constrained firms. Therefore the optimal level of a non-financially constrained firm will be higher than that of financially constrained firms. Ding et al. (2013) state that the effects of financial constraints on cash flow investment sensitivity can be ameliorated by maintaining high working capital levels. However, it should be borne in mind that high net working capital has to be financed (Hill et al., 2010). On its own high net working capital represents a good liquidity position but it might also mean poor utilisation of resources. Therefore, when testing how working capital alleviates financial constraints, consideration must also be given to the profitability of the firm. In the true sense, working capital makes a difference in alleviating financial constraints when one considers high working capital firms that are delivering value to shareholders.

Bushman et al. (2007) explored the effect of working capital on fixed investment from a slightly different perspective. Unlike other studies' analysis of investment-cash flow which use cash flow as accounting earnings before depreciation, they decomposed cash flow into a cash component, cash flow from operations (CFFO), and a non-cash component, working capital accruals (WCACC). They argued that working capital accruals principally reflect the net investment in non-cash working capital like trade debtors and stocks. Working capital accruals measure changes in non-cash working capital and directly represent near-term investment in working capital, which is in turn directly related to fixed investment rather than financing constraints. Bushman et al. (2007) concluded that, "the documented pattern in investment-cash flow sensitivities is driven by the working capital investment component, not the cash component (CFFO)".

The amount of working capital holdings that ensure the smooth flow of production and the implementation of investment plans depends on the firm's reputation in the financial markets, among other factors. Calomiris et al. (1995) state that firms that are considered to have high long-term and short-term credit quality have lower stocks of inventories and financial working capital. Such firms do not need to accumulate working capital as a buffer against fluctuations in

cash flow as they can easily obtain external funds at favourable terms like the commercial paper market.

Luo (2011) presented an argument that financial constraints have a brighter side in influencing how managers spend cash. Luo (2011) argued that, in the absence of financial constraints, management of cash-rich firms are likely to use it for projects that do not create value. Financial constraints force managers to spend cash on value adding projects. In the same manner, financial constraints force managers to set optimal working capital at levels that are not too high.

4.5 CHAPTER SUMMARY

This chapter examined the theoretical and empirical literature on the cash flow fixed investment sensitivity of financially constrained firms. The main source of disagreement on the cash flow fixed investment sensitivity relation is a result of studies using different proxies as measures of financial constraints. The few existing studies on the influence of working capital on fixed capital investment were also reviewed as a way of exploring the impact of internal resources on fixed investment. The next chapter discusses the method used to carry out this study.

CHAPTER FIVE

RESEARCH METHOD

5.1INTRODUCTION

This chapter presents the research tools and methods used in achieving the goals of this study; that is, analysing the working capital financing and investment practices of JSE-listed firms and how these decisions (working capital financing and investment) relate to fixed investment and financial constraints. The previous chapters presented both the theoretical and empirical literature on working capital management. Research methodology is the system of collecting data for research projects and these data may be collected for either theoretical or practical research. This chapter is organised into five sections: research design, model specification, data collection, data analysis and conclusion.

5.1 DATA SOURCES

Testing any economic or finance theory or hypothesis requires the collection and the sampling of data from the target population. The next section describes the data collection technique employed, the target population and the sample used in this study.

5.1.1 DATA COLLECTION

This is a quantitative research project based on secondary data collected at firm level. Secondary data collection involves gathering information collected by someone else; such information would have undergone a statistical process. The study was based on both accounting data and market information which was collected from the online database, McGregor BFA Library. The relevant data for this study were financial statements: the Statement of Financial Position, the Income Statement and the Cash Flow Statement of the firms listed on the JSE from 2001 to 2010. The financial statements were used to construct the necessary variables. Sector sales were obtained from the StatsSA online database while the data on bonds yield was accessed from South African Reserve Bank online database.

Using panel data methodology, the study ascertains the importance of hypothetical variables which influence working capital financing and investment decisions. Panel data involves the collection of observations on cross sections of units over several time periods, which makes it superior to cross-sectional and time series data in a number of ways. First, panel data are more informative data that offer more variability, reduce the collinearity among the explanatory variables and increase the degrees of freedom, providing a more efficient estimation (Baltagi, 2008, Brooks, 2008). Second, panel data suggest that firms are heterogeneous, which enables the researcher to control for the unobservable heterogeneity; in turn, enabling the elimination of biases arising from the existence of individual effects (Baltagi, 2008, Hsiao, 2003). Third, panel data enable the researcher to analyse the adjustment process of the dependent variable in response to changes in the values of the independent variable. Thus panel data provide good estimates for dynamic equations. Fourth, panel data enable the researcher to solve an omitted variables problem in the regression results.

5.1.2 TARGET POPULATION

The JSE Equities market has three main markets on which a firm can list; namely the Main Board, the Alternative Exchange (AltX) and the Africa Board. The Main Board is the market for well-established firms, while the AltX caters for small to medium companies and start-up firms with no prior trading profit record. The Africa Board is a market for non-resident South African firms[4] and offers trade in a wide range of investment instruments focused on Africa outside of South Africa. The sample comprises 305 JSE Main Board-listed firms over the period 2001 – 2010. The McGregor BFA Library online database classifies the 305 firms on its online database listed on the JSE in the categories shown in Table 3.

[4]From April 2012, the JSE moved the companies listed on its Africa Board directly to the JSE's Main Board. Smaller and medium-sized companies in the rest of Africa fulfilling the criteria of AltX were encouraged to list on the AltX (previously the Africa Board only catered for Main Board listings. As a result, there is now no differentiation (for listing purposes) between African and non-African companies. The JSE actively markets and profiles the African companies that are already listed (twelve of these at the last count).

TABLE 3 CATEGORIES LISTED ON THE LISTED JSE MAIN BOARD (2001 – 2010)

Sector	**Number of companies**
Industrial goods and services	66
Mining	50
Financials (banks, financial services, investment instruments& insurance)	45
Real Estate	33
Consumer goods	25
Retail	23
Travel and Leisure	12
Technology	11
Industrial Metals and Mining	9
Health Care	8
Chemicals	6
Consumer services	5
Telecommunications	5
Forestry and Paper	4
Oil and Gas	3
Total	305*

*Number fluctuates due to new listings and delistings.

Source: McGregor BFA Library

The sample data was constructed in the following manner. First, all financial sector firms (banks, insurance companies and asset management companies), real estate and real estate investment trusts, travel, health care, telecommunications and utilities were excluded from the study because the nature of their operations did not fit the typical working capital cycle discussed in Chapter Two under the CCC. A typical working capital cycle involves four main

operations: procuring goods for production or sale, paying suppliers for those goods, selling the goods and collecting from customers. Second, in order to produce a balanced panel, all firms with any missing observations for any variable in the model during the sample period were eliminated

5.2 DATA ANALYSIS

Data analysis involves the application of appropriate statistical techniques to the collected data in order to explain the ideas and theories which triggered the investigation. The data collected using the techniques described above was analysed using the STATA 11.0 statistical package. The study employed three main methods to analyse the data; correlation analysis, trend analysis and regression analysis. Correlation analysis was conducted using the Pearson correlation matrix. Trend analysis was used to establish whether there were any structural changes in the pattern in working capital during the ten-year period. Regression analysis was employed to analyse the following relationships; the working capital investment-firm value relationship, determinants of working capital financing and the interactions between cash flow, fixed and working capital investment.

5.2.1 MODEL SPECIFICATION

Studies on factors influencing working capital management have firstly looked at the individual components of working capital; stock holdings, trade debtors, trade creditors and cash holdings. An integrated approach, the Working Capital Requirements and the Net Liquid Balance, has been used in other studies (Appuhami, 2008, Chiou et al., 2006, Hill et al., 2010, Nazir and Afza, 2009a) among others. A review of the existing literature shows that very few studies have examined the factors influencing working capital using the gross concept approach for both working capital financing and investment. A search of the literature on the factors influencing working capital investment found only one study on firms in India by Gupta (2003).

In the preliminary stages of this study working capital management efficiency was measured using the CCC. The use of the CCC requires that the cost of sales figure be available and the estimation of the purchases figure.

$$\text{Cash Conversion Cycle} = \left(\frac{\text{Accounts receivable}}{\text{Sales}} \times 365\right) + \left(\frac{\text{Inventory}}{\text{Cost of Sales}} \times 365\right) - \left(\frac{\text{Accounts payable}}{\text{Purchases}} \times 365\right)$$

Some firms on the McGregor BFA Library online database do not disclose their cost of sales (probably for competition reasons). Using the CCC substantially reduced the sample size; therefore it was dropped. This study adopted the gross concept of working capital where all current assets are taken as working capital investment. In addition to increasing the sample size, the gross concept was considered appropriate for a number of reasons. First, most business managers plan their operations using the gross concept, that is, total current assets, because it tells them the amount of assets that are required to sustain operations on a daily basis. Second, the firm has direct control of its working capital investment, current assets. Strategies to optimise working capital through techniques such as delaying payments to suppliers can be very harmful to the firm. Siefert and Siefert (2008) state that it has been observed that firms that antagonize suppliers by stretching payments risk missing out on innovations, losing capacity and most important, they risk facing supply chain disturbances. Supply chain disruptions can produce negative stock market reactions such as a drop in the market capitalisation as high as 10% (Siefert and Siefert, 2008). Therefore any working capital optimisation strategy must involve what is directly under the firm's control. In addition, when a firm adopts a strategy such as delaying payments to suppliers it should be borne in mind that its suppliers could be accelerating collections from customers (that is, the firm) particularly in times of economic crisis. Finally, Etiennot et al. (2012) state that distinguishing between working capital financing and investment helps to understand the key drivers of these decisions.

The working capital investment models used by Gupta (2003) assume a static framework. The present study assumed a dynamic framework; that is it was assumed that firms have a target level of current assets and current liabilities. In dynamic panel data estimation, the lagged dependent variable is also an explanatory variable in the sense of being predetermined.

The firm's actual current assets level may not always be at the desired level; therefore the firm takes time to adjust from real to desired levels. Variances between real and desired levels exist because of the difficulties in estimating with certainty the level of sales and the level of current assets required to support the sales.

The literature has shown that firms have or should have a target working capital investment level which maximises profitability; (Deloof, 2003, Filbeck and Krueger, 2005b). The existence of the liquidity-profitability trade-off means that firms should have a working capital level that enables them to balance these conflicting goals. Over-investing in working capital (holding too much liquid assets), results in the firm delivering sub-standard returns. Low working capital levels result in losses (due to stock-outs) and increase the risk of insolvency. As the firm increases (decreases) its working capital investment, carrying costs increase (decrease) while shortage costs decrease (increase). This means that the firm must always counterweight the carrying costs and the shortage costs of investing in working capital. Baños-Caballero et al. (2009) studied the determinants of working capital management using net trade cycle as the dependent variable and found that firms pursue target working capital levels and take steps to align their current level to their optimal level because the adjustment process involves time and costs. Thus the static framework of understanding the determinants of working capital investment may not fully reflect the dynamics of the firm's working capital.

TABLE 4: SUMMARY OF THE VARIABLES

Variables Symbol	**Variables Description**
CATA	Total current assets to total assets
CLTA	Total current liabilities to total assets
FIXTA	Fixed investment during the year to total assets
RGDP	National income as measured using RGDP (at constant prices)
SGR	Sales growth rate
P_{GROWTH}	Positive sales growth

N_{GROWTH}	Negative sales growth
LEVERAGE	Total debt to total assets
MKTPOWER	Market power
OCFTA	Operating cash flows to total assets
SIZE	The natural log of market capitalization and/or total assets as a proxies for size
MTB	Market to book ratio
VALUE	Tobin's Q ratio as a proxy for the value of the firm
TCTA	Trade creditors to total assets
ACCTA	Accruals to total assets
SKTA	Stock to total assets
CMSTA	Cash and marketable securities to total assets
TDTA	Trade debtors to total assets
STDTA	Short-term debt to total assets
LTDTA	Long-term debt to total assets
PURTA	Purchases to total assets
OCLTA	Spontaneous sources of finance to total assets
NDTSTA	Non-debt tax shield to total assets
LNAGE	Natural logarithm on age
EBITTA	Earnings before interest and tax to total assets
FIXATA	Fixed assets to total assets
INV	Fixed investment by firm during year *t*
ΔW	Change in net working capital
K	Beginning of the year fixed assets
CF/K	Operating cash flow to fixed assets

Source: Author's construction

5.2.2 THE WORKING CAPITAL INVESTMENT MODEL

The firm's working capital investment is explained by the following factors.

Working capital investment (current assets) = f (short-term financing, sales growth, operating cash flows, fixed investment, size, leverage, market power, business cycle)

$$cata = f(clta, pgrowth, ngrowth, ocfta, fixta, size, leverage, mktpower, rgdp) \ldots\ldots Equation\ 1$$

5.2.3 JUSTIFICATION, CONSTRUCTION AND HYPOTHESIS OF THE VARIABLES

5.2.3.1 Lagged working capital investment

The lagged working capital investment, $CATA_{it-1}$ is included the regression model because the working capital level in the previous year influences the level of investment in the current year. The lagged dependent variable's inclusion in the estimation model helps in determining whether the working capital investment levels are persistent over time. Firms have target levels of working capital investment and they invest time and effort in achieving this level. This study uses the gross concept of working capital; therefore total current assets represent the working capital investment which is the dependent variable.

5.2.3.2 Short-term financing

In an imperfect capital market, the investment decisions the firm makes would be influenced by the availability of financial resources, among other factors. Following the maturity hedging principle, working capital investments are financed by short-term funds. A positive association between working capital investment and short-term finance is expected as firms with more access to short-term funds are expected to hold more current assets. An increase in current assets mirrors an increase in current liabilities as these are used to finance the current assets.

H_0: A positive relationship exists between working capital investment and short-term financing.

5.2.3.3 Sales growth

Sales, which represent the accelerator, were included as an explanatory variable because the working capital investment level depends on the sales volume. An increase in sales causes an increase in working capital investment, especially inventory and accounts receivable. Hill et al. (2010) noted that the sales growth and working capital investment relationship can suffer from endogeneity problems given that working capital investment can influence sales growth. For example, sales growth can be stimulated by liberal credit and inventory policies. On the other hand, in order to sustain a sales high level, the firm must hold in more current assets. Another problem is that the impact of sales growth can be immediate, delayed or both (Gupta, 2003). Following Hill et al. (2010) and other previous studies, sales growth rate (SGR) was calculated as:

$$SGR = \frac{Sales_t - Sales_{t-1}}{Sales_{t-1}}$$

H_0: There is a positive relationship between sales growth and working capital investment.

5.2.3.4 Operating cash flow

This variable represents internally generated financial resources. Internal funds are an important source of working capital financing. Firms with more internally generated cash flows are able to finance their current assets. Operating cash flow was calculated as follows:

$$Operating\ cash\ flow = Operating\ income - taxes + depreciation.$$

H_0: A positive relationship exists between internal financing and working capital investment.

5.2.3.5 Market Power

Market power impacts on the firm's investment in current assets. A supplier with greater market power can impose short credit terms on their customers, which reduces the firm's investment in receivables. Market power also influences the firm's investment in inventory, as

being a customer with greater negotiating power enables the firm to hold fewer inventories. Market power was calculated as given below:

$$Market\ power = \frac{Firm's\ annual\ sales}{Total\ Industry\ Annual\ Sales}$$

H_0: Market power is inversely related to working capital investment.

5.2.3.6 Fixed Investment

Fixed investment were used as an explanatory variable to examine whether fixed and working capital compete for investment funds or complement each other. If fixed investment competes for funds with working capital investment, a negative coefficient is hypothesised. A positive coefficient means that fixed investment and working capital complement each other.

H_0: A negative relationship exists between fixed investment and working capital investment.

5.2.3.7 Firm size

As firm size the increases, the current assets investment level must increase in order to sustain operations at a higher level. These current assets have to be financed partly by short-term finance. The working capital gap is financed by long-term funds, which could be either equity or debt. Following the Pecking Order Theory, when internal resources and short-term external funds are not sufficient to fund current assets, firms employ long-term capital. The firm's capability to raise external long-term funds therefore affects its working capital investment. Creditworthy and large firms enjoy superior access to external funds and are therefore better positioned to finance their working capital investments. The capacity to raise external capital depends on the associated information asymmetries. Large firms are subject to extensive coverage and analysis by analysts which reduces information asymmetries. Following Hill et al. (2010) this study uses the natural log of market value of equity as a proxy for size.

H_0: There is a positive relationship between firm size and working capital investment.

5.2.3.8 Business cycle

The level of current assets investment is affected by the level of economic activity in the country. However, the direction of influence of the business cycle is difficult to hypothesise. A slowdown in the economy reduces the firm's ability to turn over its current assets to generate sales, resulting in large current asset holdings. For example a contraction in the economy affects the firm's ability to collect its receivables and to turn over inventory into sales; resulting in high inventory investment. In an expansion phase, firms increase their working capital investment in order to sustain an increase in business activity. Receivables increase as a result of more sales and could also increase as a result of liberal credit policies. In a favourable economic phase, firms can grant their customers liberal credit terms, resulting in increased receivables. In order to control the influence of the business cycle, the Real Gross Domestic Product growth rate which measures the growth of the South African economy was included in the regression.

5.2.4 THE EMPIRICAL MODEL

The study used a dynamic approach following in the footsteps of García-Teruel and Martínez-Solano (2010) in analyzing the determinants of accounts payable.

It was assumed that firms have an optimum level of current assets or working capital investment.

Let y_{it} represent working capital investment level; $CATA$.

The target working capital investment level for firm i, at time t denoted as y_{it}^{*} will be specified as a vector of firm and time-varying variables; these variables determine the firm's target working capital investment level as well as firm and time-specific effects represented by firm and time dummy variables. The study allows y_{it}^{*} to vary across firms and over time. The factors which influence y_{it}^{*} may change over time; it is likely that y_{it}^{*} itself may move over time for the same firm.

The change in the actual working capital investment level for firm i, at time $t-1$ to t will be equal to the change required to attain the target level at time t as shown below.

$$y_{i,t} - y_{i,t-1} = \left(y_{i,t}^{*} - y_{i,t-1}\right) \ldots\ldots\ldots\ldots Equation\ 2$$

It was then assumed that firms adjust their working capital investment according to the degree of adjustment coefficient λ in order to approach their target level:

$$y_{i,t} - y_{i,t-1} = \lambda\left(y_{i,t}^{*} - y_{i,t-1}\right) \quad 0 \leq \lambda \leq 1 \ldots\ldots\ldots\ldots Equation\ 3$$

The expression $y_{it}^{*} - y_{it-1}$ is the adjustment needed by the firm to move from its real level to its desired or target working capital investment level. The coefficient λ measures the firm's capacity to reach its desired investment level. The coefficient λ has an inverse relationship with adjustment costs and takes values between 0 and 1. If λ is 0, then $y_{i,t} = y_{i,t-1}$ indicating that firms face high adjustment costs such that the current level of working capital investment remains as in the former period. Conversely, if λ is 1, then $y_{it-1} = y_{it}^{*}$, indicating that firms immediately adjust their working capital investment to their target.

The target working capital investment model is estimated as follows:

$$y_{it}^{*} = \alpha + \sum_{k} \delta_k X_{kit} + v_{it} \ \ldots\ldots\ldots\ldots Equation\ 4$$

where subscript represents $i = 1, \ldots, N$ firms and $t = 1, \ldots, T$ represents time by and X_{it} is a $K \times 1$ vector of explanatory variables, δ_k is a vector of the unknown parameters to be estimated and v_{it} the random disturbance.

There are several individual characteristics that might significantly influence the firm's working capital financing and investment decisions which are difficult to measure and are included in Equation (4). These unobservable individual effects include the nature of the firm's business or products, management's entrepreneurial skills and risk tolerance. Such characteristics vary

across firms but are assumed constant over time. The study introduced the variable η_i to capture such effects. It also includes the time dummy variable η_t in the model in order to control for both observable and unobservable time effects which may affect the firm's working capital investment and financing decisions which the firm cannot control like inflation, exchange rates and interest rates. The time dummy variable is assumed to change over time, but is equal for all firms in each time period under consideration. The introduction of the firm's unobservable individual effects and the time dummies results in the following estimation model:

$$y_{it}^{*} = \alpha + \sum_{k} \delta_k X_{kit} + \eta_i + \eta_t + v_{it} \ \ldots\ldots\ldots\ldots\ldots Equation\ 5$$

The time horizon of this study was considered relatively small ($T = 10$), therefore, the time effects were modelled by using a set of year dummy variables, with each defined as $z_{mt} = 1$ for $m = t$, and $z_{mt} = 0$ otherwise. Expressing $\eta_t = \sum_{m=1}^{10} c_m^{*} z_{mt}$ means Equation (6) can be expressed as:

$$y_{it}^{*} = \alpha + \sum_{k} \delta_k X_{kit} + \eta_i + \sum_{m=2}^{10} c_m^{*} z_{mt} + v_{it} \ \ldots\ldots\ldots\ldots\ldots Equation\ 6$$

Substituting (6) into (4) yields an equation that expresses the working capital investment model as determined by the following expression:

$$y_{it} = \rho + \beta_0 y_{it-1} + \sum_{k=1} \beta_k X_{kit} + \lambda\eta_i + \sum_{m=2}^{10} \lambda c_m^{*} z_{mt} + \varepsilon_{it} \ \ldots\ldots\ldots\ldots\ldots Equation\ 7$$

where $\rho = \alpha\lambda;\ \beta_0 = (1-\lambda); \beta_k = (1-\lambda\delta_k)$ and $\varepsilon_{it} = \lambda v_{kit}$ (where λv_{kit} has the same properties as ε_{it}).

The empirical working capital investment model

$$\begin{aligned} CATA_{it} = {} & \beta_0 + \beta_1 CATA_{it-1} + \beta_2 CLTA_{it} + \beta_3 P_{GROWTH\,it} + \beta_4 N_{GROWTH\,it} + \beta_5 SIZE_{it} \\ & + \beta_6 INV_{it} + \beta_7 OCFTA_{it} + \beta_8 LEVERAGE_{it} + \beta_9 RGDP_{it} + \beta_{10} MKTPOWER_{it} \\ & + \eta_i + \lambda_t + \varepsilon_{it} \ \ldots\ldots\ldots\ldots Equation\ 8 \end{aligned}$$

where $CLTA_{it}$ is current liabilities to total assets, $P_{GROWTH_{it}}$and $N_{GROWTH_{it}}$ represent positive and negative sales growth respectively, $SIZE_{it}$ is the natural logarithm of market capitalisation, a proxy for firm size, I_{it} is fixed investment during the year t deflated by total assets, $OCFTA_{it}$ is operating cash flows to total assets; $LEVERAGE_{it}$ is the amount of debt employed by the firm and is deflated by total assets; $RGDP_{it}$ is the Real GDP growth rate, $MKTPOWER_{it}$ is the market power of the firm and η_i represents unobservable heterogeneity, λ_t are the time dummy variables and ε_{it} is the error term.

The study repeated the estimation of Equation (8) using the disaggregated approach the working capital finance sources, $CLTA_{it}$ comprising accounts payable, short-term debt and accruals.

5.2.5 ECONOMETRIC ISSUES

The empirical model was estimated using the Generalised Method of Moments (GMM) in first differences as proposed by Arellano and Bond (1991). First differencing eliminates firm-specific effects, thereby removing the correlation between the individual firm effects η_i and the lagged dependent variable $y_{i,t-1}$ and other right-hand-side variables as shown below.

$$\Delta y_{it} = \Delta\rho y_{i,t-1} + \Delta X_{it}\beta' + \Delta\varepsilon_{it} + \sum_{m}^{10} \lambda c_m^* z_{mt} \quad \ldots\ldots\ldots\ldots Equation\ 9$$

for $\mathbf{t} = \mathbf{2}$, …,T.

where $c_m = \lambda c_m^*$.

GMM in first differences proposed by Arellano and Bond (1991) was preferred to Ordinary Least Squares (OLS) because in Equation (8), the lagged dependent variable is also an explanatory variable. OLS regressions of such equations lead to biased and inconsistent estimates because the explanatory variables are not independent of the error term. The dependent variable y_{it} is a function of η_i which follows that y_{it-1} is also a function η_i. Therefore y_{it-1} is correlated to

the error term. This correlation does not disappear when N in the sample gets larger or T increases (Bond, 2002).

GMM in first differences was considered superior to the alternative approach of estimating Equation (5) the fixed-effects model, the least-squares dummy variables (LSDV). Although the Fixed Effects estimator, eliminates the firm-specific effects η_i through the within transformation, it does not eliminate bias. The transformed lagged dependent variable $y_{i,t-1} - y_{i.-1}$ will still be correlated with $(\varepsilon_{it} - \bar{\varepsilon}_{i.})$; where $y_{i.-1} = \sum_{i=2}^{T} \frac{y_{i.-1}}{T} - 1$, even if the random disturbances are not serially correlated because $y_{i,t-1}$ is correlated with $\bar{\varepsilon}_{i.}$ by construction. ε_{it} is correlated with $\overline{y}_{i.}$ because the latter contains y_{it}. The fixed effect estimator produces biased but consistent estimates when T tends to infinity and not when N tends to infinity. This is known as the dynamic panel bias or the Nickell bias (Nickell, 1981). While the LSDV fails to deal with the problem of $E(\Delta y_{i,t-1}\Delta\varepsilon_{i,t}) \neq 0$, Generalised Method of Moments takes care of this problem by using the lagged dependent variable $(y_{i,t-s}\ for\ s \geq 2)$ in level as instruments.

Using OLS regression on first differenced equations produces biased and inconsistent estimates of the parameters because $(y_{i,t-1} - y_{i,t-2})$ and $(\varepsilon_{it} - \varepsilon_{i,t-1})$ are correlated through the terms $y_{i,t-1}$ and $\varepsilon_{i,t-1}$. The fixed effects estimator fails to produce consistent estimates when N tends to infinity and T is fixed. GMM in first differences produces consistent estimates because it was designed for N tends to infinity and T is fixed; that is, small-T and large-N panels.

The Instrumental Variable (IV) estimator as suggested by Anderson and Hsiao (1981), produces consistent and efficient estimates in a dynamic panel. The IV estimator takes the first differenced equation and finds a set of variables, the instruments, to apply the instrumental variable estimator. Instruments are used to eliminate the correlation between the regressors and the disturbances because they must be correlated with the regressors but uncorrelated with the disturbances. In this case, since $(y_{i,t-1} - y_{i,t-2})$ and $(\varepsilon_{it} - \varepsilon_{i,t-1})$ are correlated, $(y_{i,t-2})$ or $(y_{i,t-2} - y_{i,t-3})$ are used as an instrument for $(y_{i,t-1} - y_{i,t-2})$ because they are

uncorrelated with $(\varepsilon_{it} - \varepsilon_{i,t-1})$ but correlated with $(y_{i,t-1} - y_{i,t-2})$. Anderson and Hsiao (1982) suggest that as long the error terms are not serially correlated $y_{i,t-2}$ is the obvious choice for an instrument for $(y_{i,t-1} - y_{i,t-2})$.

The Anderson and Hsiao (1981) estimator (henceforth termed the AH estimator) when the dimension of a panel is $(N \times T)$ can be written as

$$\delta_{AH} = (Z^1X)^{-1}Z^1Y \;) \ldots\ldots\ldots\ldots Equation\ 10$$

where Z is a $K \times N\ (T - 2)$ matrix of instruments, X is a $K \times N\ (T - 2)$ of regressors and Y is a $N\ (T - 2) \times 1$ vector of dependent variables.

$$Z = \begin{bmatrix} Y_{i,1} & \Delta x_{i,3} \\ . & . \\ . & . \\ Y_{i,T-2} & \Delta x_{i,T} \end{bmatrix} X = \begin{bmatrix} \Delta Y_{i,2} & \Delta x_{i,3} \\ . & . \\ . & . \\ \Delta Y_{i,T-1} & \Delta x_{i,} \end{bmatrix} Y = \begin{bmatrix} \Delta Y_{i,3} \\ . \\ . \\ \Delta Y_{i,T} \end{bmatrix} \ldots\ldots\ldots\ldots Equation\ 11$$

$$Z = \begin{bmatrix} Z_1 \\ . \\ . \\ Z_N \end{bmatrix} X = \begin{bmatrix} X_1 \\ . \\ . \\ X_N \end{bmatrix} Y = \begin{bmatrix} Y_1 \\ . \\ . \\ Y_N \end{bmatrix} \ldots\ldots\ldots\ldots Equation\ 12$$

The IV estimation produces consistent estimates if the error term in levels is not serially correlated. However, its weakness is that it fails to use all the available moments, which means that it does not necessarily result in more efficient estimates.

GMM in first differences as advanced by Arellano and Bond (1991) produces more efficient and consistent estimates, hence its preference over the AH estimator. It deploys additional instruments obtained by applying the moment conditions that exist between the lagged dependent variable and the disturbances. The number of moment conditions depends on T, the time periods, which are derived from the first differenced equation. Generalised Method of Moments uses the lagged dependent variables plus the lagged values of exogeneous regressors

as instruments and a weighting matrix which takes into account the moving averages (MA) (1) process in the differenced error term and the general heteroscedasticity. As a result, the Generalised Method of Moments estimates result in smaller variances than those associated with the AH type instrumental variable estimators.

The Generalised Method of Moments estimator can be expressed as follows

$$\hat{\theta}_{GMM} = (X^1 Z^* A_N Z^{*^1} X)^{-1} X^1 Z^* A_N Z^{*^1} Y \ \ldots\ldots\ldots\ Equation\ 13$$

Where $\widehat{\theta}$ is vector of coefficient estimates of exogeneous and endogeneous regressors, $\bar{X}$ and $\bar{y}$ are the vectors of first differenced regressors and dependent variables, respectively, Z is a vector of instruments and A_N is a vector used to weight the instruments.

$$X = \begin{bmatrix} X_1 \\ . \\ . \\ X_N \end{bmatrix} \ Y = \begin{bmatrix} Y_1 \\ . \\ . \\ Y_N \end{bmatrix} \ \ldots\ldots\ldots\ Equation\ 14$$

Generalised Method of Moments uses an instrument matrix of the form,

$$Z_i = \begin{bmatrix} [y_{i0}, \Delta x_2' & 0 & \cdots & 0 \\ 0 & [y_{i0}, y_{i2}, \Delta x_3'] & \ddots & 0 \\ \vdots & & & 0 \\ 0 & 0 & 0 & [y_{i0}, \ldots, y_{iT-2} \Delta x_T' \end{bmatrix} \ \ldots\ldots\ldots\ldots Equation\ 15$$

where the rows correspond to the first differenced equation for the period $t = 3, 4, \ldots, T$ for individual i and exploit the moment conditions,

$$E[Z_i' \Delta \varepsilon_i] = 0 \ \ldots\ldots\ldots\ldots Equation\ 16 \ \ for \ \ i = 1, 2, \ldots, N$$

where $\Delta \varepsilon_i = (\Delta \varepsilon_{i3}, \Delta \varepsilon_{i4}, \ldots, \Delta \varepsilon_{iT})'$.

Arellano and Bond (1991) proposed two estimators; the one-step estimator and the two-step estimator (henceforth termed GMM1 and GMM2, respectively). GMM2 is the optimal estimator. GMM1 turns out to be optimal when the residuals are homoscedastic. If there is heteroscedasticity, GMM1 of instrumental variables continues to be consistent; however,

carrying the estimation in two steps increases efficiency. The weight matrix of a GMM1 is given by;

$$A_{1N} = \left(\frac{1}{N}\sum_{i=1}^{N} Z_i^{*\prime} H Z_i^{*}\right)^{-1} \ldots\ldots\ldots\ldots Equation\ 17$$

where H is a T – 2 square matrix with twos in the main diagonals, minus ones in the first sub diagonals, and zeros otherwise.

The weight matrix of a GMM2 if given by,

$$A_N = \left(\frac{1}{N}\sum_{i}^{N} Z_i^{*\prime} \Delta\hat{\varepsilon_i}\Delta\hat{\varepsilon_i}' Z_i^{*}\right)^{-1} \ldots\ldots\ldots\ldots Equation\ 18$$

Where $\Delta\hat{\varepsilon}_i = \Delta\hat{\varepsilon}_i \ldots, \Delta\hat{\varepsilon}_{iT}$ are the residuals from a consistent GMM1 of Δy_i.

5.3 WORKING CAPITAL AND FIRM VALUE RELATIONSHIP ESTIMATION MODEL

The preceding section presented the working capital investment model development and the estimation technique that was used in testing the hypothesis that firms pursue a target investment level was tested. The goal of financial management is shareholder value maximisation. Therefore, the pursuit of a target investment level helps in the realisation of the key objective of maximising firm value. In order to determine if there is an optimum working capital investment level where the shareholder value maximisation goal is achieved, the relationship between the value of the firm and working capital investments was also analysed. The following section presents how the hypothesis was developed and the estimation techniques that were used in estimating the working capital investment-firm value relationship.

It is hypothesised that, initially, an increase in working capital investments typically increases firm value because the reduction in shortage costs (the commercial, financial and operational benefits) is likely to exceed the increase in carrying costs. Consequently, at lower working capital investment levels, the relationship between working capital investment and firm value is positive. As the firm increases its working capital investment, at some point, holding all other

things constant, the value of the firm is maximised and this is the optimal working capital investment level. Beyond this point, any additions to working capital investments reduce firm value because increases in carrying costs (financing and opportunity costs) outweigh the reduction in shortage costs. It is therefore hypothesised that the relationship between the working capital investment level and the value of the firm is concave as a result of benefits (at lower levels) and costs (at higher levels).

The hypothesised non-linear relationship between working capital investment and firm value was tested by regressing firm value was against working capital investment represented by CATA, $CATA^2$ and control variables. CATA and its square were included in the estimation model to help determine the breakpoint of the working capital investment-value relationship; that is, the benefits of working capital investment and the negative effects of investing excessively in working capital. In estimating the working capital investment-firm value relationship, the study followed the models used by Tong (2008) to study the relationship between optimal Chief Executive Officer (CEO) ownership and firm value, (Martínez-Sola et al., 2013b) to estimate the relationship between trade credit policy and firm value and (Martínez-Sola et al., 2013a) to estimate the cash holdings and firm value relationship. The estimation equation for the working capital investment-value relationship is given below;

$$VALUE_{it} = \beta_0 + \beta_1 CATA_{it} + \beta_2 CATA_{it}^2 + \beta_3 SIZE_{it} + \beta_4 LEVERAGE_{it} + \beta_5 MTB_{it} + \eta_i + \lambda_t + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots Equation\ 19$$

where $VALUE_{it}$ the dependent variable is the firm value as proxied by the Tobin's Q. The Tobin's Q was calculated as the market value of the enterprise's equity plus the book value of interest-bearing debt to the replacement cost of its fixed assets. The main independent variables of interest are $CATA_{it}$ which represents current assets to total assets (working capital investments) holding by firm i at time t and $CATA^2_{it}$ (current assets to total assets squared). $CATA^2$ was included in the regression model in order to test the quadratic relationship between the level of working capital investment and firm value. The level of working capital investment can also be measured with respect to the level of sales. Therefore, an alternative working

capital investment measure, current assets to sales; CAS_{it} and its square CAS^2_{it} were used in the alternative estimation regression model as a way of testing the robustness of the findings. The study also included control variables; $SIZE_{it}$, $LEVERAGE_{it}$ and MTB_{it}. Two proxies for firm size; the natural logarithm of market capitalization (LNMCAP) and and the natural logarithm of total assets (LNTA) were used in this study. MTB_{it}, calculated as the ratio of market value of equity to book value of equity is used as a proxy for growth opportunities. $LEVERAGE_{it}$ measuring the level of debt employed by the firm and calculated as the proportion of total debt to total assets held by the firm. η_i and λ_t capture unobservable heterogeneity and time effects respectively. ε_{it} is the error term.

If an optimal level exists, this means that when a firm deviates from the optimal point it reduces its value. In order to test whether deviating from the target reduces firm value, the working capital investment model (Equation 8) from the previous section was re-estimated in a linear form. The resultant equation is given below.

$$CATA_{it} = \beta_0 + \beta_{12}CLTA_{it} + \beta_{13}P_{GROWTH\,it} + \beta_{14}N_{GROWTH\,it} + \beta_{15}SIZE_{it} + \beta_{16}I_{it} + \beta_{17}OCFTA_{it} + \beta_{18}LEVERAGE_{it} + \beta_{19}RGDP_{it} + \beta_{20}MKTPOWER_{it} + \eta_i + \lambda_t + \varepsilon_{it} \ldots\ldots\ldots\ldots Equation\ 20$$

All the variables in the equation remained as they were previously defined.

The residuals obtained from the linear working capital investment model were taken as deviations from the target level of working capital investment. The residuals were termed DFT and were the absolute values of the residuals obtained from the linear estimation model of the working capital investment model in Equation 20. Residuals obtained when LNMCAP was used as a proxy for size were be termed DFT_1 and the residuals obtained when LNTA was used as a proxy for size were be termed DFT_2. These residuals were included in the working capital investment-firm value model and replaced the variables CATA and $CATA^2$ and the alternative; CAS and CAS^2. The resultant model is given below.

$$VALUE_{it} = \beta_0 + \beta_1 DFT_{it} + \beta_2 SIZE_{it} + \beta_3 LEVERAEGE_{it} + \beta_4 MTB_{it} + \eta_i + \lambda_t + \varepsilon_{it} \ldots\ldots\ldots\ldots Equation\ 21$$

where all the other variables; ($SIZE_{it}$, $LEVERAGE_{it}$ and MTB_{it}) are as they were previously defined and are the control variables in the equation. DFT_{it} is the absolute value of residuals of estimation results of the working capital investment equation re-estimated in a linear form. DFT_{it} is the focus independent variable and is expected to be inversely related to the value of the firm, because when firms deviate from their optimum level of working capital investment they reduce their value.

In order to study how both positive (above optimal working capital investment level) and negative (below optimal working capital investment level) deviations affect the value of the firm a dummy variable; Dummy DFT was introduced. Dummy DFT was defined as above-optimal working capital investment level * DFT. Dummy DFT takes the form 1 (for positive residuals to represent above-optimal) and 0 otherwise. The resultant estimation model is shown below

$$VALUE_{it} = \beta_0 + \beta_1 DFT_{it} + \beta_2 Dummy\ DFT_{it} + \beta_3 SIZE_{it} + \beta_4 LEVERAGE_{it} + \beta_5 MTB_{it} + \eta_i + \lambda_t + \varepsilon_{it} \ldots\ldots\ldots\ldots Equation\ 22$$

5.4 THE EMPIRICAL WORKING CAPITAL FINANCING MODEL

In estimating working capital financing, the study will focus on the two main sources of working capital finance, trade credit and short-term financial debt. As in the working investment model, a dynamic approach was assumed in estimating the determinants of trade credit and short-term financial debt. The empirical trade credit model is given below:

$$TCTA_{it} = \beta_0 + \beta_1 TCTA_{it-1} + \beta_2 OCFTA_{it} + \beta_3 SIZE_{it} + \beta_4 P_{GROWTH\,it} + \beta_5 N_{GROWTH\,it} + \beta_6 STDTA_{it} + \beta_7 LTDTA_{it} + \beta_8 LNAGE_{it} + \beta_9 RGDP_{it} + \beta_{10} PURTA_{it} + \beta_{11} CATA_{it} + \eta_i + \lambda_t + \varepsilon_{it} \ldots\ldots\ldots\ldots Equation\ 23$$

Where $TCTA_{it}$ represents trade credit to total assets, $OCFTA_{it}$ is operating cash flows to total assets, $SIZE_{it}$ is the natural log of the market capitalisation (the proxy for size of the firm); $P_{GROWTH_{it}}$ is positive sales growth $N_{GROWTH_{it}}$ is negative sales growth, $STDTA_{it}$represents short-term financial debt scaled to total assets, $LTDTA_{it}$represents long-term debt to total assets; $LNAGE_{it}$ is the natural logarithm of the number of years since incorporation, $PURTA_{it}$it is purchases to total assets; $RGDP_{it}$ is real GDP growth rate and $CATA_{it}$ is investment in current assets.η_i and λ_t were introduced in the model in order to control for both observable and unobservable time effects that may affect the firm's short-term borrowing decisions which the firm cannot control. ε_{it} is the error term.

The empirical short-term financial debt model is given below

$$STDTA = \beta_0 + \beta_1 STDTA_{(it-1)} + \beta_2 OCLTA_{it} + \beta_3 EBITTA_{it} + \beta_4 SIZE_{it} + \beta_5 P_{GROWTH_{it}} + \beta_6 N_{GROWTH_{it}} + \beta_7 NDTSTA_{it} + \beta_8 FIXATA_{it} + \beta_9 RGDP_{it} + \beta_{10} CATA_{it} + \eta it + \lambda it + \varepsilon it \ldots\ldots\ldots\ldots Equation\ 24$$

where $STDTA_{it}$ represents short-term financial debt to total assets, $OCLTA_{it}$ represents spontaneous sources scaled to total assets, $SIZE_{it}$ is the size of the firm proxied by natural log of the market capitalisation; $CATA_{it}$ is investment in current assets to total assets, $NDTS_{it}$ is non-debt tax shield to total assets, $EBITTA_{it}$ is earnings before interest and tax to total assets, $P_{GROWTH_{it}}$ is positive sales growth $N_{GROWTH_{it}}$ is negative sales growth and $FIXATA_{it}$ is fixed assets to total assets. η_i and λ_t capture unobservable heterogeneity and time effects respectively. ε_{it} is the error term.

5.5 FINANCIAL CONSTRAINTS, WORKING CAPITAL AND FIXED INVESTMENT RELATIONSHIP

The firm's working capital investment and financing decisions may affect its fixed investment and how it manages financial constraints; hence the study of the influence of working capital and fixed investment. In the working capital investment model, it was indicated that a negative fixed investment coefficient means that there is competition for funds between working capital investment and fixed investment.

The first step involved estimating the sensitivity of fixed investment to cash flow using Equation 25.

$$INV/K_{it} = \beta_0 + \beta_1 CF/K_{it} + \beta_2 QRATIO_{it} + \eta_i + \lambda_t + \varepsilon_{it} \ \ldots\ldots\ldots\ldots Equation\ 25$$

INV_{it} denotes fixed investment for firm *i* at time *t*, K_{it} represents beginning of the year fixed assets, CF_{it} is its cash flow Q_{it} ratio is the Tobin's Q η_i is the unobserved heterogeneity that is likely to affect the fixed investment of the firm, λ_t is time specific component and $\boldsymbol{\varepsilon}_{it}$ is the error term.

To test the sensitivity of working capital to cash flow, the study followed both Fazzari and Petersen (1993) and Ding et al. (2013)[5] who produced Equation (26) in which change in working capital was the dependent variable, ΔW. Other variables were as previously defined and change in working capital (ΔW) was calculated as net working capital (NWC) (current assets – current liabilities) at the end of the year minus net working capital at the beginning of the year ($NWC_{it} - NWC_{it-1}$).

$$\Delta W/K_{it} = \beta_0 + \beta_1 CF/K_{it} + \beta_2 QRATIO_{it} + \eta_i + \lambda_t + \varepsilon_{it} \ \ldots\ldots\ldots\ldots Equation\ 26$$

Equation 27 estimates the sensitivity of total investment (IW) (fixed plus working capital) to cash flow.

$$IW/K_{it} = \beta_0 + \beta_1 CF/K_{it} + \beta_2 QRATIO_{it} + \eta_i + \lambda_t + \varepsilon_{it} \ \ldots\ldots\ldots\ldots Equation\ 27$$

Equation 28 evaluates the sensitivity of fixed investment to cash flow and investment in working capital. The inclusion of $\Delta W/K_{it}$ helps to determine if investment in working capital competes with fixed investment for funds. It is hypothesised that $\Delta W/K_{it}$ is inversely related to I/K if investment in working capital competes for funds with fixed investment.

[5]Ding et al. (2013) did not include the Tobin's Q because the study was based on firms not listed on a stock exchange.

$$INV/K_{it} = \beta_0 + \beta_1 CF/K_{it} + \beta_2 QRATIO_{it} + \beta_3 \Delta W/K_{it} + \eta_i + \lambda_t + \varepsilon_{it} \ldots\ldots\ldots\ldots Equation\ 28$$

The sensitivity of working capital to cash flow fluctuations and the sensitivity of fixed capital to cash flow were tested after classifying firms as high and low working capital firms. High (low) working capital firms are those firms that are above (below) the sample median, ΔW. It was hypothesised that the cash flow of firms characterised by high working capital is more sensitive to working capital investment compared with their counterparts. Dummy variables; HIWK and LOWK were created to represent firms characterised by high working capital and firms characterised by low working capital, respectively. These dummies were interacted with the variable CF/K in order to determine the sensitivity of cash flows to fixed and working capital for both high and low working capital firms. If working capital is used to smooth fixed investment cash flow fluctuations, then the sensitivity of low working capital firms is expected to be higher than that of high working capital firms. Firms characterised by low working capital cannot use working capital to mitigate the impact of cash flow shocks on fixed investment.

Equation 29 evaluates the sensitivity of working capital to cash flow fluctuations after classifying firms as high and low working capital firms.

$$\Delta W/K_{it} = \beta_0 + \beta_1 (CF/K)_{it} * LOWK + \beta_2 (CF/K)_{it} * HIWK + \beta_3 QRATIO_{it} + \eta_i + \lambda_t + \varepsilon_{it} \ldots\ldots\ldots\ldots Equation\ 29$$

Equation 30 evaluates the sensitivity of fixed investment to cash flow fluctuations to working capital after classifying firms as high and low working capital firms.

$$INV/K_{it} = \beta_0 + \beta_1 (CF/K) LOWK_{it} + \beta_2 (CF/K) HIWK_{it} + \beta_3 QRATIO_{it} + \eta_i + \lambda_t + \varepsilon_{it} \ldots\ldots\ldots\ldots Equation\ 30$$

5.5.1 Working capital and profitability and financial constraints

High working capital on its own may represent inefficient use of capital. In order to test whether working capital alleviates financial constraints at the same time as the firm is

delivering good returns to investors, working capital levels were interacted with the profitability level. Profitability was measured by the Return on Assets (ROA). Return on Assets was calculated as follows;

$$ROA = \frac{Net\ Profit\ after\ Tax}{Total\ Assets}$$

High (low) profitability firms are those firms that are above (below) the sample median ROA. It was hypothesised that the cash flow of firms characterised by high working capital and high profitability are more sensitive to working capital investment compared with firms characterised by low working capital and low profitability. Dummy variables; HIGHROA and LOWROA were created to represent firms characterised by high profitability and low profitability, respectively. These dummies were interacted with the variable CF/K*HIWK in order to determine the sensitivity of cash flows to fixed and working capital for both high / low working capital firms and high or low profitability firms.

Equation 31 evaluates the sensitivity of working capital to cash flow fluctuations after classifying firms as high working capital /high profitability firms and low working capital / low profitability firms.

$$\Delta W/K_{it} = \beta_0 + \beta_1(CF/K)_{it} * LOWK * LOWROA + \beta_2(CF/K)_{it} * HIWK * HIGHROA + \beta_3 QRATIO_{it} + \eta_i + \lambda_t + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots Equation\ 31$$

Equation 32 evaluates the sensitivity of fixed investment to cash flow fluctuations to working capital after classifying firms as high working capital /high profitability firms and low working capital / low profitability firms.

$$INV/K_{it} = \beta_0 + \beta_1(CF/K)LOWK_{it} * LOWROA + \beta_2(CF/K)HIWK_{it} * HIGHROA + \beta_3 QRATIO_{it} + \eta_i + \lambda_t + \varepsilon_{it} \ldots\ldots\ldots\ldots Equation\ 32$$

5.5.2 Test for robustness

The previous section presented the model used to demonstrate that working capital can palliate the impact of cash flow shocks on fixed investment. This section seeks to illustrate that

the cash flow investment sensitivity of firms with high working capital facing low financial constraints is lower than the sensitivity of firms with low working capital facing binding financial constraints.

A number of proxies for financial constraints have been used and these include; dividends, size, age, and intangible assets (Faulkender and Wang, 2006, Guariglia, 2008, Fazzari et al., 1988, Almeida et al., 2004, Moyen, 2004). The expectation is that the sensitivity of investment of firms to cash flow of bigger firms (using total assets as a proxy for size) holding large working capital is less than that of smaller firms with low working capital. Using age as an alternative measure of financial constraints, it is hypothesised that the sensitivity of investment of firms to cash flow of mature or older firms holding large working capital is less than that of younger firms with low working capital. In this study, age was used as a proxy for financial constraints because older firms are expected to be more creditworthy than younger firms; they might have forged relationships with banks and suppliers and have wider sources of finance. The variable CF/K LOWK (from the previous section) is interacted with the size dummy, SMALL for firms with total assets below the mean and the variable CF/K HIWK (from the previous section) is interacted with the size dummy, LARGE for firms with total assets above the mean. The resultant estimation model is given below.

$$INV/K_{it} = \beta_0 + \beta_1(CF/K)_{it} * LOWK * SMALL + \beta_2(CF/K)_{it} * HIWK * LARGE + \beta_3 QRATIO_{it} + \eta_i + \lambda_t + \varepsilon_{it} \ldots\ldots\ldots\ldots Equation\ 33$$

The variable CF/K*LOWK is also is interacted with the age dummy, YOUNG for firms below the mean age of the sample and the variable CF/K HIWK is interacted with the age dummy, OLD for firms above the mean age of the sample. The resultant estimation model is given below.

$$INV/K_{it} = \beta_0 + \beta_1(CF/K)_{it} * LOWK * YOUNG + \beta_2(CF/K)_{it} * HIWK * OLD + \beta_3 QRATIO_{it} + \eta_i + \lambda_t + \varepsilon_{it} \ldots\ldots\ldots\ldots Equation\ 34$$

5.6.1 Testing for overidentifying restrictions

In a study of this nature, there is a need to test the legitimacy of the instruments and whether the model is correctly specified. The Sargan test (also known as the J test) and the Hansen test were used to test for overidentifying restrictions. Under the null of instrument validity, this test is asymptotically distributed as a Chi-square with degrees of freedom equal to the number of instruments less than the number of parameters. For a GMM2 estimator, the Sargan test is given by;

$$s = \hat{\varepsilon}' Z (\sum_{i=1}^{N} Z_i' \hat{\varepsilon}_i \hat{\varepsilon}_i' Z_i)^{-1} Z' \hat{\varepsilon}_{\bar{a}} \chi^2_{p-k} \ \ldots\ldots\ldots\ldots Equation\ 35$$

And for a GMM1 estimator

$$s_1 = \frac{1}{\hat{\sigma}^2} \tilde{\varepsilon}' Z (\sum_{i=1}^{N} Z_i' H_i Z_i)^{-1} Z' \hat{\varepsilon} \ldots\ldots\ldots\ldots Equation\ 36$$

5.6.2 Testing for autocorrelation

The validity of the instrument selected depends on the absence of serial correlation; hence the need to test for autocorrelation. If the model is correctly specified, the variables in the instrument set should be uncorrelated with the error term in the relevant equation. The study assessed the presence of the n[th]-order serial correlation in the instruments using the $m(n)$ test which is asymptotically distributed as a standard normal under the null of no second order serial correlation of the differenced residuals. The m_2 is asymptomatically distributed as a standard normal under the null of no second order-order serial correlation of the differenced residuals and provides a further check on the specification of the model on the legitimacy of the variables dated $t-2$ as instruments in the differenced equation. In the presence of serial correlation of order *n* in the differenced residuals, the instrument set needs to be restricted to lags $n+1$ and deeper. The latter instruments are valid in the absence of serial correlation of order $n+1$ in the differenced residuals (Roodman, 2006).

The test statistic for second-order serial correlation based on residuals from the first difference equation takes the form

$$m_2 = \frac{\hat{\varepsilon}'_{-2}\hat{\varepsilon}_*}{\hat{\varepsilon}^{1}/_{2}} \tilde{a}\ N\ (0,1)\ \ldots\ldots\ldots\ Equation\ 37$$

under $E\left(\varepsilon_{it}\varepsilon_{i(t-2)}\right) = 0$, where $\hat{\varepsilon}$ is given by

$$\hat{\varepsilon} = \sum_{i=1}^{N} \hat{\varepsilon}'_{i(-2)}\, \widehat{\varepsilon_i} * \widehat{\varepsilon_i}' * \hat{\varepsilon}'_{i(-2)} - 2\hat{\varepsilon}'_{-2}X_*(X'ZA_NZ'X)^{-1}X'ZA_N\left(\sum_{i=1}^{N} Z'_i\widehat{\varepsilon_i}\widehat{\varepsilon_i}' * \hat{\varepsilon}'_{i(-2)}\right) + \hat{\varepsilon}'_{-2} + X_*av\hat{a}r\left(\hat{\delta}\right)X'_*\hat{\varepsilon}'_{-2}\ \ldots\ldots\ldots\ Equation\ 38$$

5.7 CHAPTER SUMMARY

The aim of this chapter was to present a clear and concise description of how the study was conducted. The chapter discussed the target population of the research study and how the sample was drawn, such as dropping firms in sectors that were deemed not suitable for the study as well as firms with missing variables needed to conduct this study. The econometric models that will be used to analyse the relationships important in this study were also presented. The next chapter presents and analyses the results obtained from running the regressions using the models and specification tests outlined in this chapter.

CHAPTER SIX

WORKING CAPITAL STRUCTURE AND FINANCING PATTERN

6.1 INTRODUCTION

This chapter analyses the working capital structure and financing pattern of JSE-listed companies over the period 2001 to 2010. Such an analysis shows whether the working capital investment level and the source of working capital finance exhibited any pattern and whether there were any structural changes. It also shows which current assets constitute the largest proportion of working capital investment and which current liabilities contribute the largest proportion of working capital finance. The major contributors to working capital investment and finance significantly influence the liquidity, risk and profitability of the firm.

6.2 WORKING CAPITAL STRUCTURE AND LIQUIDITY RANKINGS

The working capital investment structure refers to the distribution of the working capital and seeks to show which current asset constitutes the largest proportion of the working capital investment. The study examined the distribution of the working capital over the ten-year period to establish whether the level of investment in the four components exhibited any pattern and whether there were any structural changes.

6.2.1 DISTRIBUTION OF CURRENT ASSET VALUES

Table 5 presents the results of the distribution in working capital. The results show that the average investment in working capital was distributed as follows; inventory 34%, trade receivables 39%, cash holdings 21% and other current assets 7%. Inventory and trade receivables constituted nearly three-quarters of the total working capital investment which clearly shows that on average, these firms maintained much of their working capital in inventory and receivables.

The proportion of inventory or stock to total current assets (SKCA) did not follow a well-defined pattern but fluctuated between 33% (the lowest proportion in 2005) and 41% (the highest

proportion in 2003). The proportion of trade debtors or receivables (TDCA) to total current assets generally followed a downward trend over the ten-year period from the highest proportion of 43% recorded in 2001 to the lowest of 35% in the years 2008 and 2009. The downward trend in TDCA suggests that over the ten-year period, these firms were probably moving from liberal to tight credit extension policies, or they intensified their collections or sold their goods more on cash than credit; hence the reduction in their investments in trade receivables. The proportion of cash and marketable securities to current assets (CMSCA) trended upwards from 18% in 2001, peaking at 23% in 2006 and almost followed a downward trend for the remainder of the study period. Other current assets (OTCA) averaged 6% in the first five years of the study and then trended upwards from 5% in 2006 to 12% in 2010.

6.2.2 LIQUIDITY RANKINGS

The different components of working capital investments impact on the liquidity of a company because these components have varying degrees of liquidity. An attempt was made to assess overall liquidity by using a comprehensive test based on the sum of scores (liquidity ranks) of separate individual rankings under the four criteria; TDCA, CMSCA, SKCA and OTCA. The category of current assets that constitutes the largest portion of total current assets will inevitably affect the firm's liquidity in a significant way. Rankings have been done in the following order; a high value of TDCA, CMSCA, and OTCA indicates greater liquidity, while a high value of SKCA shows a less favourable position (because inventory is considered the least liquid current asset). Liquidity rankings were calculated as follows; first, each individual current asset was assigned a ranking and then the individual scores in each year were summed up to come up with total rank for the year. The total ranks for each year were then compared to come up with the ultimate liquidity rank (LR).

Table 5 shows the final LR for the ten years; the results show that 2005 and 2006 were the most favourable years and the least favourable year was 2003. The LR of 2005 is not surprising as this has been rated as the best economic period in the post-apartheid era. The liquidity ranking of 2003 can also be attributed to the performance of the economy during this period which was

characterised by high inflation, high interest rates and a general slowdown in the economy as shown by the quarter on quarter growth in GDP figures in the table in Appendix A4. Appendix A4 shows that growth in GDP quarter on quarter between 2002 and 2003 declined from the second quarter of 2002 to the second quarter of 2003. The economy recovered in the last two quarters of 2003. The prime lending rate reached a peak of 17% (it averaged 15.75% in 2002 and 15.3% in 2003) while the repo rate averaged 12.25% and 11.45% in 2002 and 2003 respectively (see Appendix A5).

The major focus of most firms during a recession is reducing the most illiquid current asset, inventory, in order to improve their liquidity position (Lamberson, 1995). This study analysed how firms handled their inventory during the slowdown in the economy in the periods 2002-2003 and 2008-2009. Prior to each of the two recessions (2002-2003) and (2008-2009), South African firms held huge inventory investments, with higher holdings in 2002–2003 than 2008-2009. Post-2004 it was observed that the proportion of inventory to current assets was 33%, (representing a 7 percentage points reduction) while post-2009, it was also 33% (representing a 1 percentage point reduction). These findings are consistent with the views of Blinder and Maccini (1991) that recessions are characterised by stock cut-downs.

The 2008 and 2009 liquidity rankings can be attributed to the global economic crisis. An economic slowdown impacts on firms' ability to turn over their stock, grant/access credit, settle payables, collect receivables and access short-term finance. Periods of expansion in the economy have the direct opposite effect on the company. Correia et al. (2011) give examples of listed firms (Reunert, Barloworld, Omnia) that reduced their working capital investments by cutting down on inventory holdings and intensifying collections during the recent global economic crisis. This explains why 2010 has a good ranking in the ten-year period. The post-recession periods (2005 and 2010) show that these firms have strong liquidity positions; this suggests that during an economic crisis, firms try to improve their current asset structure. This adds weight to the assertion that working capital management receives more attention during an economic crisis than when the economy is expanding (Reason, 2008).

TABLE 5: DISTRIBUTION OF CURRENT ASSET VALUES AND LIQUIDITY RANKINGS

	Distribution of Current Asset Values				**Liquidity Rankings**					
Year	Stock /current assets (SKCA)	Trade debtors / current assets (TDCA)	Cash holdings / current assets (CMSCA)	Other /current assets (OTCA)	Stock /current assets Liquidity Rankings	Trade debtors /current assets Liquidity Rankings	Cash holdings / current assets Liquidity rankings	Other /current assets Liquidity rankings	Total Rank	Final Rank
2001	0.3282	0.4298	0.1838	0.0581	5	1	9	9	24	6
2002	0.3279	0.4176	0.1837	0.0708	4	2	10	4	20	4
2003	0.4053	0.4053	0.1970	0.0631	10	3	8	7	28	10
2004	0.3981	0.3981	0.2193	0.0692	9	4	3	5	21	5
2005	0.3251	0.3908	0.2203	0.0638	1	6	2	6	15	1
2006	0.3266	0.3937	0.2282	0.0516	3	5	1	10	19	2
2007	0.3316	0.3803	0.2165	0.0626	6	7	4	8	25	8
2008	0.3373	0.3465	0.2021	0.0800	7	8	6	3	24	6
2009	0.3412	0.3465	0.2154	0.0969	8	10	5	2	25	8
2010	0.3258	0.3584	0.1989	0.1170	2	9	7	1	19	2
Overall	**0.3119**	**0.3867**	**0.2065**	**0.0733**						

Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

The cash holdings for the period 2005-2007 (a period characterised by low inflation levels and remarkable economic growth) were higher than the cash holdings during the periods 2002-2003 and 2008-2009 (periods characterised by economy slowdown, high inflation and lending rates). Consequently, the liquidity rankings of cash holdings during expansion periods were more favourable than during recession periods, suggesting that firms hold high levels of cash and marketable securities during good economic times consistent with economic theory. Such cash holdings enable the firm to take advantage of expansion opportunities. During inflationary periods, holding cash is not worthwhile because of high negative real interest rates. The focus tends to be on improving the liquidity position of the firm as access to external finance tends to be limited.

6.2.3 SECTORAL ANALYSIS OF CURRENT ASSETS

The average current assets to total assets ratio (CATA), of the sample was 64% as shown in Table 6. This figure is consistent with studies by Lamberson (1995) on small businesses in the USA and García-Teruel and Martínez-Solano (2007) on small businesses in Spain. These studies found that current assets represented over 60% of the total assets held by these firms. The mean CATA ratio (64%) is slightly less than median value CATA (66%), indicating a scattering towards the left tail; that is, some firms held slightly less working capital investments than others. An industry-wide analysis was conducted to establish the performance levels of the different sectors in terms of their working capital investments. The mining sector had the lowest CATA ratios with a mean of 56%, while the technology sector has the highest current assets ratios with a mean of 88%. Studies such as Appuhami (2008) and Raheman and Nasr (2007) found that current assets constitute over 50% of the total assets for a typical manufacturing firm and this is even higher for a distribution company. Moyer et al. (1995) found that in the manufacturing, retailing and wholesale industries, working capital constitutes 40%, 50% and 60%, respectively of a firm's total investment in assets.

TABLE 6: CURRENT ASSETS SUMMARY STATISTICS FOR EACH SECTOR

	Number of firms	Number of observations	Mean	Median	*10 percentile*	*90 percentile*
Sample	92	920	0.6431	0.6570	0.3313	0.9121
Chemical and Oil	6	60	0.6431	0.6044	0.3506	0.7508
Consumer goods	18	180	0.5868	0.6137	0.2665	0.8767
Retail	14	140	0.7314	0.7449	0.5573	0.8997
Industrials	23	230	0.6479	0.6567	0.3484	0.9000
Construction	9	90	0.6167	0.6561	0.3704	0.8086
Mining	13	130	0.5571	0.5716	0.1723	0.9551
Technology	5	50	0.8822	0.9065	0.7472	0.9644
Leisure & recreation	4	40	0.7267	0.6906	0.3082	1.4184

Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

6.2.4 SECTORAL ANALYSIS: COMPOSITION OF CURRENT ASSETS AND LIQUIDITY RANKINGS

Table 7 shows a sectoral analysis of the composition of working capital investments and the liquidity rankings of the different sectors. The highest ten-year averages were reported as follows; stock 39% in the retail sector, trade debtors 50% in the technology sector and the construction sector, cash and marketable securities 29%, other 37%. The mining sector has the highest other current assets at 11%. The lowest ten-year averages were reported as follows; stock 27% in the technology sector, trade debtors 33% in the mining sector and the retail sector. The industrial goods and services sector had the lowest cash and marketable securities at 16%, while the chemical and oil sector had other current assets at a paltry 2.41%.

TABLE 7: SECTORAL ANALYSIS OF THE COMPOSITION OF CURRENT ASSETS

Sector	Stock /current assets	Stock / current assets Liquidity rankings	Trade debtors / current assets	Trade debtors / current assets Liquidity rankings	Cash holdings / current assets	Cash holdings / current assets Liquidity rankings	Other /current assets	Other /current assets Liquidity rankings	Total Rank	Final Rank
Chemical & oil	0.3831	7	0.4383	3	0.1758	7	0.0241	7	24	7
Consumer	0.3451	4	0.3613	6	0.1985	5	0.0991	2	10	5
Retail	0.3939	8	0.3272	7	0.1967	6	0.0703	4	25	8
Industrial	0.3632	6	0.4453	2	0.1506	8	0.0654	5	21	6
Construction	0.2758	3	0.4255	4	0.2928	2	0.0585	6	15	3
Mining	0.3507	5	0.3254	8	0.2099	4	0.1139	1	18	4
Technology	0.2747	2	0.5003	1	0.2647	3	0.0074	8	14	2
Leisure & recreation	0.2304	1	0.3628	5	0.3666	1	0.0707	3	10	1

Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

The most liquid sectors were leisure and recreation technology, largely due to their high levels of the most liquid current assets, cash holdings and low investment levels of inventory, the most illiquid current asset. As was expected, the most illiquid sectors were retail, chemical and oil and industrial, because much of their working capital investment is in the form of inventory.

6.3 COMPOSITION OF CURRENT LIABILITIES

The financial manager continuously faces the challenge of deciding on the size and means of financing the current assets as each financing instrument impacts on firm profitability and risk. Short term finance (current liabilities) is the main source of finance used to support the level of working capital investment. Most firms pursue the matching principle where short-term finance is used to support short-term assets and short-term assets are used to pay off maturing short-term liabilities. The study examined the distribution of working capital finance over the ten-year period to establish whether the level of financing of any particular components exhibited any pattern and whether there were any structural changes during the study period.

Table 8 shows the trends and composition of current liabilities over the ten-year period. The results in Table 8 show that trade credit to current liabilities (TCCL) fluctuated between 67% and 72%, without following a well-defined trend. The average TCCL (68%) was more than three and six times higher than the contributions of short-term financial debt to current liabilities (STDCL) and accruals to current liabilities (ACCL), respectively. Reliance on trade credit as a financing instrument is typical for emerging markets (Demirgüc-Kunt and Maksimovic, 2001) and adds support to the view that trade creditors have some cost advantages over traditional financiers in extending credit to their clients. These cost advantages lie in an informational advantage as a result of the continued trading relationship, the ability to control the buyer's actions and the capability to seize the goods if the buyer defaults (Petersen and Rajan, 1997, Bhattacharya, 2009). The sample comprised very large firms; therefore it is possible that the heavy reliance on trade credit could be a result of competition amongst suppliers competing for the business of listed firms, which works to the advantage of these firms.

Short-term financial debt did not follow a particular pattern in the first five years of the study period. From 2006 to 2009, there was a general increase short-term debt's contribution to total short-term financing. The average STDCL was 20% and the minimum and maximum contributions were reported respectively as follows; 16% in 2005 and 21% in 2009. These data suggest that these firms borrowed less when short-term interest rates were low and increased their borrowings when interest rates were high. Appendix A5 shows that lending rates were high in 2009 and low in 2005.

TABLE 8: COMPOSITION OF CURRENT LIABILITIES

Year	Trade credit /Current Liabilities	Short-term financial debt /Current Liabilities	Accruals /Current Liabilities
2001	0.6820	0.2019	0.1161
2002	0.6961	0.1850	0.1189
2003	0.6778	0.1960	0.1262
2004	0.6823	0.1767	0.1410
2005	0.6857	0.1633	0.1510
2006	0.6728	0.1761	0.1510
2007	0.6728	0.1905	0.1376
2008	0.6699	0.1996	0.1305
2009	0.6976	0.2052	0.0981
2010	0.7212	0.1836	0.0952
Overall	**0.6820**	**0.2019**	**0.1161**

Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

These results suggest that a liquidity-constrained firm may borrow at punitive interest rates in order to maintain operations. The results are in line with the tax hypothesis which posits that when the term structure of interest rates is upward sloping, firms rely on more short-term debt

finance and use more long-term debt when the term structure is downward sloping (Brick and Ravid, 1985). Using long-term debt when the term structure is upward sloping lowers the firm's tax obligation and increases its value (because of the tax shield) as the firm pays more interest in the initial periods and less interest in the later periods. When short-term interest rates are higher than long-term interest rates, the use of short-term debt generates a higher tax shield (thereby increasing firm value) than long-term debt. Over the ten-year period, the contribution of accruals to total short-term finance showed an upward trend, from 11.6% in 2001, peaking at 15.10% in 2005 and then trended downwards during the last five years of the period under review.

6.3.1 PERCENTAGE COMPOSITION OF WORKING CAPITAL FINANCE

Table 9 shows the composition of working capital finance; Trade Credit to Current Assets (TCCA), Short Term Debt to Current Assets (STDCA), Accruals to Current Assets (ACCA) and Long Term Funds to Current Assets, (LTFCA). CLCA is a sum of TCCA, STDCA and ACCA and shows the extent to which firms used short-term funds to finance current assets. Approximately three-quarters of the current assets were funded by short-term finance and the remainder was funded by long-term funds.

The analysis shows that firms financed approximately 50% of their current assets using trade credit. On average, short-term debt and accruals respectively financed less than a fifth and a tenth of the current assets held by these firms. Supplier credit used to support current assets was at its lowest in 2009, suggesting that the global recession had a negative impact on supplier financing received by these firms during the crisis.

Net Working Capital represents the proportion of working capital investment financed by long-term funds. On average these firms financed nearly a quarter of their current assets using long-term funds. The period 2006 to 2010 witnessed increased usage of long-term funds to finance current assets (an increase of 11 percentage points). This suggests that these firms followed a more conservative working capital financing policy; financing current assets using more long-term funds than short-term funds.

The trend exhibited in Table 9 suggests that these firms switched from trade credit to long-term funds to finance current assets as the increasing use of long-term funds is almost matched by the decline in the reliance on trade credit to finance current assets over the period 2006-2010. There was a notable increase (five percentage points) in the use of long-term capital to finance working capital investment between 2008 and 2009. In 2009, firms used more long-term capital to support their working capital investment, which explains the challenges of accessing short-term funds during times of crisis. Internal resources and access to external long-term funds play a crucial role in supporting working capital investment during a credit crunch like the 2009 global financial crisis when access to short-term funds was very limited.

TABLE 9 : PERCENTAGE COMPOSITION OF WORKING CAPITAL FINANCE

Year	Trade Credit /Current Assets	Short-term Debt / Current Assets	Accruals / Current Assets	Current Liabilities / Current Assets	Long-term Funds /Current Assets
2001	0.5092	0.1725	0.0780	0.7597	0.2403
2002	0.5180	0.1537	0.0872	0.7590	0.2410
2003	0.5187	0.1933	0.0882	0.8002	0.1998
2004	0.5160	0.1629	0.1018	0.7807	0.2193
2005	0.5061	0.1535	0.1101	0.7698	0.2302
2006	0.5144	0.1640	0.1160	0.7943	0.2057
2007	0.5024	0.1706	0.1070	0.7801	0.2199
2008	0.4929	0.1738	0.0934	0.7601	0.2399
2009	04755	0.1677	0.0647	07079	0.2921
2010	0.4852	0.1479	0.0611	0.6942	0.3058
Overall	**0.5038**	**0.1660**	**0.0908**	**0.7606**	**0.2394**

Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

The literature review discussed the concept of permanent and temporary working capital. Permanent working capital is the minimum level of current assets that is required to sustain operations and is usually supported by long-term sources of finance (debt or equity). Temporary working capital is the seasonal variations in working capital that is supported by short-term sources of finance. Assuming that these firms pursue this matching principle, it can be inferred that their distribution of permanent and temporary working capital is approximately 75% and 25%, respectively. The cost of a financing instrument is one of the key determinants of its feasibility and potentially plays an important role in its selection. When implicit costs are ignored (the cost of foregoing cash discounts), trade credit is considered the least costly short-term financing instrument, while short-term debt is the most expensive. On the basis of the cost of finance only, it becomes clear why trade credit finances much of the working capital. The average short-term lending rate for the study period 2001-2010 was 13% (see Appendix A5). The average short-term bank debt to trade credit ratio was 30%, which means that for every one rand of trade credit, there was only 30 cents of short-term debt, a clear indication that short-term debt lagged far behind trade credit in financing current assets.

One evident outcome of these working capital trends is that South African firms have wider sources of finance and seem to have the ability to switch from one source to another in line with changes in macroeconomic fundamentals or when the need arises. While large firms have wider sources of finance and can easily switch from one source to another, Small to Medium Enterprises are heavily constrained and have limited access to finance (Padachi et al., 2012).

6.3.2 WORKING CAPITAL FINANCING POLICY

The results of working capital financing policies that were pursued over the ten-year period are presented in the Table 10. During this period, current liabilities were at least 47% of total assets, indicating that these firms used short-term finance to finance nearly half of their total assets. Trade credit financed nearly a third of total assets, while short-term financial debt and accruals respectively financed 9% and 5%. Consistent with Kestens et al. (2012), this study found that trade credit declined during the global financial crisis.

TABLE 10: WORKING CAPITAL FINANCING POLICY

Year	Current Liabilities / Total Assets	Trade Credit /Total Assets	Short-term Debt / Total Assets	Accruals /Total Assets
2001	0.4702	0.3183	0.1004	0.0515
2002	0.4707	0.3308	0.0878	0.0523
2003	0.4970	0.3346	0.1083	0.0541
2004	0.4750	0.3307	0.0848	0.0595
2005	0.4792	0.3340	0.0793	0.0702
2006	0.4834	0.3274	0.0859	0.0702
2007	0.4762	0.3168	0.0972	0.0621
2008	0.4662	0.3155	0.0957	0.0549
2009	0.4261	0.3009	0.0885	0.0366
2010	0.4144	0.3026	0.0763	0.0355
Overall	**0.4658**	**.0.3212**	**0.0904**	**0.0542**

Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

6.3.3 WORKING CAPITAL FINANCING PATTERNS

The financing patterns of working capital for the study period are presented in Table 11. While this study could not determine whether these firms used long-term debt or equity to finance their working capital gap, an analysis was made of the extent to which long-term capital were used to support working capital investment by expressing the working capital gap as a percentage of the long-term funds available. Over the ten years, the sample firms used on average 14% of their long-term capital to support their working capital investments. The findings do not show a well-defined pattern: the lowest reported figure was 7% in 2002 and the highest was 20% in 2009. These figures are far higher than the ranges of public limited liability

firms and government companies in India reported by Majumdar (1996) which were 2.0%-5.0% and 0.05%-0.16%, respectively.

TABLE 11: FINANCING PATTERNS OF WORKING CAPITAL

Year	Current Assets R 000	Current Liabilities R 000	Net Working Capital (NWC) R 000	Long Term Funds R 000	NWC to long-term funds %
2001	2 572 262	2 055 614	516 649	4 149 266	0.1245
2002	2 966 687	2 591 302	375 385	5 145 108	0.0730
2003	2 791 588	2 445 038	346 550	4 607 351	0.0752
2004	2 953 684	2 385 586	568 098	4 695 500	0.1210
2005	3 489 656	2 791 014	698 642	5 177 580	0.1349
2006	4 058 550	3 590 316	468 234	5 701 183	0.0821
2007	5 022 099	4 412 695	609 404	7 519 620	0.0810
2008	7 477 892	6 008 195	1 469 698	9 586 680	0.1533
2009	7 274 831	5 130 888	2 143 942	10 500 000	0.2042
2010	7 271 611	4 933 664	2 337 946	11 600 000	0.2015
Overall	**4 587 886**	**3 634 431**	**953 455**	**6 872 050**	**0.1387**

Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

6.3.4 TRADE CREDIT AND SHORT-TERM FINANCIAL DEBT AS SOURCES OF FINANCE

Table 12 compares the extent to which short-term debt and accounts payable are used to finance current assets and total assets and their contribution to short-term finance (total current liabilities) and total debt financing. Trade credit respectively financed at least 48% and 30% of the current assets and total assets held by these firms. Initially, the amount of supplier credit used to finance current assets (trade credit to current assets (TCCA)) followed an upward

trend, peaking at 52% in 2003. With the exception of 2006, TCCA then followed a downward trend until 2010. The lowest and highest ratios of TCCA were recorded in 2009 and 2003, respectively. The overall contribution of trade credit to current liabilities and total debt was at least 67% and 53%, respectively. These data illustrate the heavy use of trade credit as a financing instrument. The proportion of trade credit to total debt trended downward between 2002 and 2004, stabilised for three years and aside from 2010, the downward trend continued for the remainder of the study period.

Overall, short-term debt financed less than a tenth and trade credit financed nearly a third of the total assets held by these firms. The average proportion of trade credit to both current liabilities and total debt was approximately four times that of short-term debt. On the basis of these data, it can be stated that supplier credit is the more dominant financing instrument and short-term debt plays a complementary rather than a substitution role. Without following a specific pattern, short-term debt fluctuates between 15% and 19% in financing current assets and 8% and 11% in financing total assets. The proportion of short-term financial debt to total debt followed a declining trend between 2003 and 2006, picking up in 2007 and then declining throughout the remainder of the study period. From 2005 to 2009, the proportion of short-term debt to total current liabilities increased by five percentage points from 16% to 21%.

The trend analysis section has revealed that the two major short-term financing instruments are trade credit and short-term financial debt. A deeper analysis of the determinants of these financing instruments follows in the next section.

TABLE 12: TRADE CREDIT AND SHORT TERM DEBT AS SOURCES OF FINANCING

Year	Trade Credit / Current Assets	Short term debt / Current Assets	Trade credit to total assets	Short term debt / total assets	Trade Credit / Current Liabilities	Short term debt / Current liabilities	Trade credit / total debt TCTD	Short term debt / Total debt
2001	0.5092	0.1725	0.3183	0.1004	0.6820	0.2019	0.5611	0.1570
2002	0.5180	0.1538	0.3308	0.0877	0.6921	0.1850	0.5746	0.1415
2003	0.5187	0.1933	0.3346	0.1083	0.6778	0.1960	0.5709	0.1800
2004	0.5160	0.1629	0.3307	0.0848	0.6823	0.1767	0.5666	0.1474
2005	0.5061	0.1535	0.3340	0.0793	0.6857	0.1633	0.5486	0.1322
2006	0.5144	0.1640	0.3274	0.0859	0.6728	0.1761	0.5487	0.1313
2007	0.5024	0.1706	0.3168	0.0973	0.6718	0.1905	0.5487	0.1601
2008	0.4929	0.1738	0.3155	0.0958	0.6699	0.1996	0.5302	0.1523
2009	0.4755	0.1667	0.3009	0.0885	0.6967	0.2052	0.5292	0.1464
2010	0.4852	0.1479	0.3026	0.0763	0.7217	0.1836	0.5540	0.1324
Overall	**0.5038**	**0.1660**	**0.3212**	**0.0904**	**0.6856**	**0.1878**	**0.5554**	**0.1479**

Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

6.4 CHAPTER SUMMARY

This chapter examined the working capital structure and financing pattern of JSE-listed firms operating in eight different sectors for the period 2001 to 2010. The study found that trade credit is the dominant short-term financing instrument and plays an important role in financing working capital investments. Short-term debt plays a complementary role, contributing about a fifth to short-term finance and financing about a fifth of the working capital investments over the study period for the sample firms. Overall, the study found that these firms have wider sources of finance and are able to switch from one source to another.

The global financial crisis affected both the working capital financing and investment of the sample firms. The results show that firms in different economic sectors use different approaches to manage their current assets; some sectors employ aggressive working capital approach and others are conservative their working capital management. Firms in this study appeared to align both working capital investment and financing strategies with macroeconomic fundamentals like inflation and interest rates. The results obtained suggest that the economy's performance impacts on the firms' inventory, payables and receivables management and other various components of working capital. This conclusion is still tentative, however; and will be investigated more deeply using econometric models of firms' financing and investment strategies in the coming chapters.

CHAPTER SEVEN

WORKING CAPITAL INVESTMENT: PRESENTATION AND ANALYSIS OF RESULTS

7.1 INTRODUCTION

The preceding chapter analysed the working capital financing and investment trends in order to establish whether there were any structural changes over the study period. This chapter presents and analyses the results of working capital investment obtained using the econometric model discussed in the methodology chapter with the main aim of understanding the driving factors of the working capital investment practices of JSE-listed firms. The descriptive statistics results are presented first followed by the regression analysis results.

7.2WORKING CAPITAL INVESTMENT DESCRIPTIVE STATISTICS

The descriptive statistics of the variables used in analysing working capital investment are presented in Table 13. On average, the CATA ratio was 64% with a median value of 66% and a standard deviation of 22% with the range of 2.06% and 173%. The CATA ratio for the 10 per centile and the 90 per centile were 33% and 91%, respectively. Trade debtors were 25% of total assets; this figure is less than the trade creditors / accounts payable to total assets ratio of 32%, which shows that these firms are net receivers of trade credit. Inventory was 22% of total assets, with a median value of 20%. Cash holdings to total assets were on average 13% (median value of 12%).

The average sales growth was 22% with a median value of 13%. Variables P_{GROWTH} and N_{GROWTH} were created in order to cater for positive sales growth and negative sales growth, respectively. The respective averages of P_{GROWTH} and N_{GROWTH} were 26% and -3.5% which shows that on average, positive sales growth was far higher than negative sales growth. The average operating cash flows to total assets were 20% with a median value of 17% and a low volatility of 17% (measured using the standard deviation) within the range of -87% and 143%. The average fixed investment to total assets was 6% with a median value of 5%. The 10 per centile have an

almost negligible amount of fixed investment while the 90 per centile fixed investment to total assets was 15%.

TABLE 13: WORKING CAPITAL INVESTMENT DESCRIPTIVE STATISTICS

Variable	Definition	Mean	Standard Deviation	*10 Percentile*	Median	*90 Percentile*
CATA	Current assets / total assets	0.6431	0.2230	0.3312	0.6570	0.9127
SKTA	Stock/ total assets	0.2248	0.1434	0.0511	0.2030	0.4319
CMSTA	Cash holdings / total assets	0.1326	0.1175	0.0117	0.1090	0.2864
TDTA	Trade debtors / total assets	02480	0.1368	0.0943	0.2293	0.4357
OTTA	Other current assets /total assets	0.0458	0.0957	0.0000	0.0079	0.1268
CLTA	Current liabilities / total assets	0.4658	0.2199	0.2090	0.4309	0.7385
STDTA	Short term debt /total assets	0.0904	0.1104	0.0003	0.0596	.2190
TCTA	Trade creditors / total assets	0.3212	0.1823	0.1264	0.2862	0.6074
ACCTA	Accruals / total assets	0.0542	0.0712	0.046	0.0348	0.1112
FIXTA	Fixed investment / total assets	0.0640	0.0859	0.0027	0.0485	0.1546
OCFTA	Operating cash flows /total assets	0.1983	0.1658	0.0792	0.1697	0.3535
LEVERAGE	Total debt / total assets	0.5937	0.2861	0.3100	0.5700	0.8400
GROWTH	Sales growth	0.2221	0.6387	-0.1100	0.1300	0.5000
P_{GROWTH}	Positive sales growth	0.2576	0.6071	0	0.1300	0.5000
N_{GROWTH}	Negative sales growth	-0.0354	0.1454	-0.1100	0.0000	0
SIZE	Market capitalisation (000 000s)	16 000	49 600	113	2 150	28 800
RGDP	RGDP growth rate	0.035	0.0066	-	-	-
MKTPOWER	Firm sales / sector sales (annual)	0.0934	0.1434	0.002	0.0027	0.2900

Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

Approximately 60% of the assets of the sample firms were financed by debt as shown by the mean debt ratio. The 10 and 90 per centile used debt to finance 30% and 84% of their total

assets respectively. On average, current liabilities to total assets are 47% with a median value of 43%. Trade creditors to total assets (TCTA) were 32% (and a median value of 29%) which means that nearly a third of the total assets of the sample firms were financed trade credit. Trade creditors to total assets was approximately four times the short-term debt to total assets (STDTA) ratio and more than double the long-term debt to total assets (LTDTA) ratio, which shows that these firms' dependence on supplier financing is far higher than both short-term debt and long-term debt. This reflects that in corporate financing trade credit is very important in South Africa. The mean STDTA was 9% (median value is 6%), which means that short-term debt finances less than a tenth of total assets of the sample firms. The 10 per centile have an almost negligible amount of short-term debt and the 90 per centile finance 22% of their assets using short-term debt. A comparison of the 10 and 90 per centiles of STDTA and TCTA clearly shows that the STDTA per centiles figures are far below the 10 and 90 per centiles of trade credit, which are 13% and 61%, respectively; this further suggests greater use of trade credit than short-term debt. The market power mean obtained was 9% and the median value is 3%, which shows that many firms in this study do not have significant market power. This analysis is confirmed by a high standard deviation of 14% and the market power per centiles. The 10 per centile have very negligible market power, while the 90 per centile have substantial market power of 30%.

The average market capitalisation of firms in the sample was R16 billion, which shows that the sample comprised large firms. On, the average South African economy grew by 3.5% between 2001 and 2010.

7.3 WORKING CAPITAL INVESTMENT CORRELATION MATRIX

Table 14 presents the results of the correlation analysis between the variables used. The correlation between CATA and independent variables in the correlation matrix follows the expected signs (with the exception of leverage), although some are statistically insignificant. In addition, the study does not find high correlation between independent variables which could

lead to the problem of multi-collinearity and inconsistent estimations. According to Gujarati (1995), multi-collinearity problems exist when the correlations' value exceeds 0.80.

A positive correlation was found between current assets and short-term financing demonstrating the importance of short-term finance in financing short-term assets and how firms follow the matching principle where they match assets maturities with liabilities maturities. Short-term finance is used to support investments in short-term assets; therefore, as the level of short-term financing increases; the level of current assets also increases. On the other hand, short-term assets are used to pay off short-term liabilities. Disaggregated short-term finance into accounts payable, short-term debt and accruals show statistically significant positive correlations with current assets. The statistically significant positive correlation between current assets and accounts payable can also be considered as a reflection of the importance of suppliers in "financing" working capital investments.

The proxy for firm size used in this study (natural logarithm of market capitalisation) shows a statistically significant negative correlation with current assets, suggesting that large firms hold less working capital. The negative correlation supports the view that bigger firms are better positioned to manage the supply chain Palombini and Nakamura (2012) and can employ experts in working capital management; hence they hold less working capital. The correlation between CATA and RGDP, the performance of the economy, is positive as anticipated but not statistically significant. Similarly, the correlation between CATA and market power is negative as expected, but insignificant.

Fixed investment and working capital investment are statistically significantly inversely related, supporting the view that competition for funds exists between fixed investments and working capital investments. Sales growth and working capital investment have a statistically significant positive relationship, which means that firms with growing sales hold more working capital investments. However, the study did not find any statistically significant relationship between CATA and both positive and negative sales growth.

Although CATA and short-term financial debt, STDTA, are positively correlated as expected, their level of correlation is not as high as the association between CATA and spontaneous sources of finance (trade credit and accruals). This suggests that firms take advantage of spontaneous sources of finance (which are interest free and formalities free) and only use discretionary sources (short-term debt) to supplement their working capital investments. This view is consistent with most financial planning models.

TABLE 14: WORKING CAPITAL INVESTMENT PAIRWISE CORRELATION MATRIX

	CATA	CLTA	TCTA	STDTA	ACCTA	FIXTA	LNMCAP	OCFTA	RGDP	LEVERAGE	PGROWTH	NGROWTH	MKTPOWER
CATA	1.00												
CLTA	0.58***	1.00											
TCTA	0.55***	0.81***	1.00										
STDTA	0.10***	0.50**	0.01	1.00									
ACCTA	0.20***	0.24***	-0.08**	-0.04	1.00								
FIXTA	-0.34***	-0.10***	-0.13**	0.07**	-0.08**	1.00							
LNMCAP	-0.20***	-0.02	-0.16**	0.04	0.30***	0.04	1.00						
OCFTA	0.06*	0.09***	-0.19***	0.10***	0.60***	-0.03	0.27***	1.00					
RGDP	0.02	0.07**	0.04	-0.01	0.13***	0.06*	0.02	0.12***	1.00				
LEVERAGE	0.18***	0.62***	0.54***	0.34***	0.01	-0.08***	0.01	-0.03	0.04	1.00			
P_{GROWTH}	0.02	0.10***	0.07**	0.07**	0.02	0.10***	0.02	0.00	0.01	0.13***	1.00		
N_{GROWTH}	-0.01	0.05	0.04	-0.01	0.06***	0.16***	0.05	0.05	0.11***	-0.03	0.10***	1.00	
MKTPOWER	-0.01	0.16***	0.16***	0.05	-0.002	0.06*	0.41***	-0.03	-0.02	0.15***	0.05	0.08***	1.00

, ** and * denote significance at 10%, 5% and 1%, respectively.*

Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

7.4 WORKING CAPITAL INVESTMENT UNIT ROOTS TESTS

As the use of non-stationary data produces spurious regression results (Granger and Newbold, 1974), it is important to test for stationarity. The data was tested for stationarity using the Augmented Dickey-Fuller Fisher-type procedure for panel unit roots and the results of the tests are presented in Table 15. The Augmented Dickey-Fuller Fisher type tests for stationarity under the null hypothesis that all panels contain unit roots; that is, the series is not stationary. The results indicate that all variables in the model are integrated of order 0, which suggests the absence of unit roots in the data; this means that regressing the data in levels will not lead to spurious regressions and wrong inferences.

TABLE 15: WORKING CAPITAL INVESTMENT FISHER-TYPE UNIT ROOT TEST RESULTS

Variable	P	Z	Pm	L*	Order of integration
CATA	479.86***	-12.82***	-12.965***	15.42***	0
CLTA	514.51***	-13.66***	-13.97***	17.23***	0
P_{GROWTH}	852.66***	-22.18***	-24.45***	34.86***	0
N_{GROWTH}	858.64***	-22.18***	-24.60***	35.11***	0
TCTA	510.03***	-13.69***	-14.00***	17.00***	0
STDTA	695.85***	-17.84***	-1949***	26.68***	0
ACCTA	547.08***	-1436***	-14.96***	18.93***	0
OCFTA	655.02***	-17.68***	-18.53***	24.55***	0
LNMCAP	576.11***	-15.11***	-15.91***	20.44***	0
FIXTA	811.02***	-20.92***	-23.18***	32.69***	0
DEBT RATIO	524.49***	-14.06***	-14.37***	17.50***	0
MKT POWER	480.63***	-12.51***	-12.67***	15.46***	0
RGDP	566.88 ***	-16.17***	-16.06***	19.96***	0
MTB	504.27***	-13.76***	-13.74***	16.70***	0
QRATIO	504.22***	-13.72***	-13.70***	16.70***	0

, ** and * denote significance at 10%, 5% and 1%, respectively.*
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

The study also used the Harris-Tzavalis (HT) procedure type as an alternative to test for the presences of unit roots in the dataset. The Harris-Tzavalis panel unit root test is designed for cases where N is relatively large. Here we test whether all the variables contain a unit root using all 92 companies that make up the sample. The results obtained from the Harris-Tzavalis procedure unit root test are presented in Table 16. These results support the results obtained using the Fisher type, with the exception of market power. Therefore the null hypothesis of a unit root is strongly rejected.

TABLE 16: WORKING CAPITAL INVESTMENT HARRIS-TZAVALIS PANEL UNIT ROOTS TEST RESULTS

Variable	Statistic	Z	P-Value	Order of integration
CATA	0.6367***	-3.51518	0.0008	0
CLTA	0.5398***	-6.5231	0.0000	0
P_{GROWTH}	-0.0790***	-28.0574	0.0000	0
N_{GROWTH}	-0.1034***	-28.9034	0.0000	0
TCTA	0.5028***	-7.8110	0.0000	0
STDTA	0.3353***	-13.6379	0.0000	0
ACCTA	0.3837***	-11.9555	0.0000	0
OCFTA	0.1951***	-18.5162	0.0000	0
LNMCAP	0.6381***	-3.1036	0.0010	0
FIXTA	0.0564***	-23.3450	0.0000	0
DEBT RATIO	0.5391***	-6.5472	0.0000	0
MKT POWER	0.7417	0.5020	0.0000	0
RGDP	0.0000***	-25.3066	0.0000	0
MTB	0.3673***	-12.5261	0.0000	0
QRATIO	0.5266***	-6.9824	0.0000	0

, ** and * denote significance at 10%, 5% and 1%, respectively.*
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

7.5 DETERMINANTS OF WORKING CAPITAL INVESTMENT ESTIMATION RESULTS

With the same dependent variable (CATA), all equations were estimated using the first-difference GMM approach proposed by Arellano and Bond (1991). The coefficient estimates of the working capital investment model (Equation 8) are presented in Table 17.

Column I presents estimation results of Equation 8 excluding time dummies. In models 2 and 4, time dummies were included and the explanatory variable Real GDP growth rate was dropped because it was correlated with the time dummies. Column 3 repeated the estimation of Equation 8 disaggregating short term finance, current liabilities to total assets (CLTA) into three components: trade credit, short-term debt and accruals, but without time dummies.

The consistency of the estimations was confirmed because no second-order serial correlation in first difference residuals was detected using the m_2 statistic. The test for overidentifying restrictions using the Sargan test was used and also indicates the absence of correlation between the instruments and error term with exception of Model 2 where the null hypothesis is rejected at 5%.

7.5.1 The Lagged dependent variable, Current Assets to Total Assets ($CATA_{it-1}$)

In Table 17 the coefficient of $CATA_{it-1}$; is positive and statistically significant at 1% in all models, confirming the principal argument of this study. $CATA_{it-1}$ is statistically significant in all models; therefore the dynamic approach used in this study is justified. South African firms pursue target working capital investment level and they partially adjust their working capital investment level in an attempt to reach this target. The adjustment coefficient, which is given by 1 minus the coefficient of $CATA_{it-1}$ is 0.41 in model 1, provides some evidence that the speed of adjustment of South African firms towards their target working capital investment level is relatively slow. In model 3, the short-term financing structure; current liabilities were disaggregated into accounts payable, short-term financial debt and accruals. The coefficient of $CATA_{it-1}$ is also statistically significant at 1%, further supporting the principal argument of this study.

TABLE 17: DETERMINANTS OF WORKING CAPITAL INVESTMENT

	(1)	(2)	(3)	(4)	(5)
$CATA_{it-1}$	0.588***	0.518***	0.473***	0.477***	0.585***
	(3.26)	(3.67)	(2.95)	(3.47)	(3.20)
CLTA	0.311***	0.258***	-	-	0.285**
	(2.67)	(2.79)	-	-	(2.42)
TCTA	-	-	0.402***	0.401***	-
	-	-	(2.84)	(2.73)	-
STDTA	-	-	0.229**	0.176**	-
	-	-	(2.30)	(2.31)	-
ACCTA	-	-	0.445***	0.334***	-
	-	-	(3.01)	(2.97)	-
P_{GROWTH}	0.003	0.001	0.003	0.002	0.004
	(0.43)	(0.22)	(0.58)	(0.47)	(0.59)
N_{GROWTH}	0.021	0.013	0.018	0.007	0.16
	(1.12)	(0.75)	(1.01)	(0.41)	(094)
$SIZE_{(LNMCAP)}$	-0.003	0.019**	-0.004	0.013	-0.004
	(-0.39)	(2.29)	(-0.55)	(1.81)	(-0.49)
FIXTA	-0.266***	-0.270***	-0.237***	-0.247***	-0.279***
	(-3.26)	(-3.77)	(-3.03)	(-3.45)	-3.32
OCFTA	0.003	-0.004	-0.007	-0.013	0.007
	(0.06)	(-0.10)	(-0.15)	(-0.29)	0.14
RGDP	0.104	-	0.023	-	0.150
	(0.80)	-	(0.17)	-	(0.73)
LEVERAGE	-0.134*	-0.087*	-0.152**	-0.110**	-0.142**
	(-1.86)	(-1.66)	(-2.38)	(-2.35)	(-2.06)
MKTPOWER	-0.041	-0.070	-0.028	-0.039	-0.536
	(-0.85)	(-1.17)	(-0.59)	(-0.63)	(-1.06)
CRISIS	-	-	-	-	0.004
	-	-	-	-	(0.54)
CONS	0.285	-0.113	0.361	-0.014	0.329
	(1.28)	(-0.61)	(1.74)	(-0.08)	(1.47)
Time dummies	-	Yes	-	Yes	-
m_2	0.264	0.182	0.302	0.178	0.236
Sargan test	26.21	32.42	26.69	31.56	30.37
Df	20	20	20	20	20
p-values	0.147	0.039	0.144	0.05	0.064

*t statistics in parenthesis. *, ** and *** denote significance at 10%, 5% and 1%, respectively.*
Time dummies' coefficients not reported for brevity.
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

The adjustment coefficient is 0.53, which is slightly higher (8 percentage points) than those reported in model 1, and could be an indication that the speed of adjustment is affected by the nature of the short-term financing mix used by these firms. In models 2 and 4, time dummies were included and the respective speeds of adjustment towards the target working capital investment level reported were 0.48 and 0.42, respectively.

These results also show that working capital investment levels are persistent over time. The statistical significance of $CATA_{it-1}$ means that the working capital investment achieved at any point in time can also be explained by working capital investment decisions taken in the previous period.

These results are consistent with the findings of Baños-Caballero et al. (2010) who analysed the working capital management Spanish SMEs using the Cash Conversion Cycle. However, Baños-Caballero et al. (2010) found that the speed of adjustment of these SMEs was very fast (about 0.8). This study found South African adjust towards the target level relatively slow (0.5), providing some evidence that working capital management is more important for SMEs than large firms, since this study sample comprised very large firms listed on the JSE.

Baños-Caballero et al. (2009) state that the adjustment process is a trade-off between the cost of adjusting towards the desired level and the cost of being in disequilibrium. If the costs of being off-target are higher than the costs of adjusting towards the target, firms adjust very quickly and vice-versa. The findings of this study suggest that listed firms in South Africa adjust slowly, which implies that they face low costs of being off-target. These findings might further suggest that for SMEs, the costs of being off-target are higher than for larger firms. Baños-Caballero et al. (2009) found that the costs of being in disequilibrium for SMEs in Spain were greater than the costs of adjusting towards the target and attributed this to the bank-oriented Spanish financial system where firms are charged low transaction costs when obtaining funds from banks. South Africa boasts of a very robust and deep money and capital market and a well-functioning banking system. The presence of both a well-developed capital market and a

banking system probably explains this moderate speed of adjustment, whereby firms have access to both the banking system and the capital market.

The adjustment costs are inversely related to the speed of adjustment. Firms that quickly adjust towards their target face low adjustment costs and vice-versa. The average speed of adjustment is about 0.5; it can be said that South African listed firms face moderate costs of adjusting towards their target working capital investment level. The average speed of adjustment of 0.5 also suggests that South African firms take time to adjust towards their target.

This study used gross working capital (current assets). It is possible that the speed of adjustment could be influenced by the firm's working capital investment structure (inventory, trade debtors and cash holdings and other current assets). Each of these elements of working capital investments has its own speed of adjustment, with some adjusting towards the target faster than others. Table 6 shows that different sectors hold different proportions of current assets. The elements of working capital investment have varying degrees of liquidity and varying speeds of adjustment towards their target. Therefore the speed of adjustment obtained in Table 16 can be regarded as a weighted average speed of adjustment which is a function of the weight individual current assets and the speed of adjustment of each individual current asset.

If the speed of adjustment and the adjustment costs are affected by the current asset structure (inventory, receivables, cash holdings and other current assets) then the following equation would hold, holding all other things constant:

$$SOA = W_{inv}S_{inv} + W_{rec}S_{rec} + W_{cash}S_{cash} + W_{otca}S_{otca} \ldots\ldots\ldots\ldots\ldots\ldots \textit{Equation 39}$$

Where

SOA = the firm's speed of adjustment towards the target working capital investment

W_{inv}= the inventory proportion of working capital investment

S_{inv} = the speed of adjustment of inventory

W_{rec}= the receivables proportion of working capital investment

S_{rec} = the speed of adjustment of receivables

W_{cash}= the cash holdings proportion of working capital investment

S_{cash} = the speed of adjustment of cash holdings

W_{otca}= the other current assets proportion of working capital investment

S_{otca} = the speed of adjustment of other current assets

Therefore a firm holding a high proportion of a current asset that adjusts slowly towards the target will adjust more slowly towards its target level than a firm holding a small proportion of a slow-adjusting asset. Sectors that have large proportions of slow-adjusting assets such as inventory (for example, the retail sector) will take more time to adjust and confront more adjustment costs than sectors such as the technology sector which maintains low inventory levels.

The literature has demonstrated two important issues: investing in working capital involves costs and impacts on the value of the firm. Working capital investments involve a trade-off between carrying costs and shortage costs (Firer et al., 2012). Carrying costs rise with an increasing level of working capital investments while shortage costs decline with an increasing level of working capital investments. The optimal point is where the firm minimises shortage and carrying costs. Therefore, these findings indicate that these firms pursue a target working capital investment level which enables them to minimise carrying and shortage costs.

The level of working capital investment influences firm value (Damodaran, 2001). Firms set target levels of working capital investment which they believe helps them maximise value and profitability (Deloof, 2003, Smith, 1980). Therefore, these findings also suggest that South African firms pursue a level of working capital investments that enables them to maximise shareholder value and profitability. Whether the target level enables the firm to simultaneously

minimise shortage and carrying costs and maximise shareholder value, is not the focus of this study.

7.5.2 Leverage

The positive correlation between leverage and CATA is not confirmed because leverage and CATA have a statistically significant inverse relationship in all four models. In models 1 and 2, leverage is significant at 10%. In models 3 and 4, where current liabilities were disaggregated into accounts payable, short-term financial debt and accruals, leverage is statistically significant at 5%. These findings are consistent with previous studies that regressed working capital requirements to total assets against leverage (Akinlo, 2012a, Nazir and Afza, 2009a, Palombini and Nakamura, 2012, Chiou et al., 2006). Baños-Caballero et al. (2010) measured working capital management efficiency using the CCC and also found that leverage was inversely related to the CCC. These findings mean that, with increasing debt levels, South African firms reduce their levels of working capital investment. In other words, leveraged firms are more efficient in managing their working capital. Leverage increases the attention that South African firms pay to the working capital investment level to avoid overinvestment and minimise funds tied-up in working capital. External debt attracts interest; therefore, there are incentives for firms to reduce working capital investment. Following the Pecking Order Theory, using borrowed funds is an indication of a lack of internal resources and a lack of funds to support daily activities (Wasiuzzaman and Arumugam, 2013). This result means that when South African firms use borrowed funds they exercise much caution in managing their working capital to avoid aggravating the shortage of funds. Poor management of working capital leads to more borrowings which further attract more financing costs and increased monitoring from the providers of finance.

Leverage has a significant economic impact[6], as an increase of one standard deviation in LEVERAGE, working capital investment decreases by 17% and 19% in models 1 and 2,

[6]The economic impact was calculated as the coefficient of a statistically significant independent variable multiplied by its standard deviation divided by the standard deviation of the dependent variable.

respectively. In models 3 and 4, the same increase in leverage produces a decrease in working capital investment by 11% and 14%, respectively. The high economic impact of the variable is consistent with the assertions and findings of capital structure studies on South African listed firms. Studies such as Fosu (2013) support the observation of van Zyl (2012) that South African firms are generally underleveraged. A study by Erasmus (2009) on the pre-1994 and post-1994 capital structures of listed industrial firms attributes debt aversion on the part of South Africa firms to the volatility of market interest rates and the unstable South African Rand / US$ dollar exchange rate.

The question of interest is why South African firms become more efficient in managing their working capital when leverage levels increase. The use of external funds attracts outside monitoring by lenders; for example, lenders critically evaluate the creditworthiness of the borrowing firm before extending credit. Managers using debt incur real agency costs such as the high cost of debt should the lender assume that the company will issue more debt (thereby lowering the value of current debt) and seek to extract a premium (making debt more expensive), and the indirect cost of flexibility because the firm might be barred from investing in certain projects or using certain types of financing.

Bondholders take steps to protect themselves by including protective covenants in bond agreements. These often require that certain financial conditions be maintained, thereby limiting managers' freedom to run the company; for example, preventing the issuer from issuing more debt or ordering the company to maintain working capital at a particular level. Covenants represent interference in the management of the business, which explains why management may prefer internal funds over external debt in order to maintain control over business operations and assets. Following the free cash flow theory of Jensen (1986), increasing debt limits managers' freedom to dispose of free cash flow and subjects them to market discipline. Increasing financial leverage is one of the possible ways of reducing the agency costs associated with equity. Shareholders may increase leverage as a way of controlling managers.

According to Grossman and Hart (1983), high leverage levels force managers to work hard in order to generate cash flows to repay debt. Since borrowing could be a sign of inefficient liquidity management and given the negative association between leverage and working capital investment, it is possible that working capital investment is one of the areas managers can easily improve when they use debt finance.

Generally, South African firms are underleveraged (van Zyl, 2012), pointing to a preference for equity over debt. The debt aversion of listed firms is quite evident when one examines the slow growth of the South Africa corporate bond market and the limited participation of listed firms in the commercial paper market – that is, the long-term and short-term bond markets. Erasmus (2009) found that in most years of the study period, 1989 -2008, long-term debt averaged 10% or less of the overall capital requirement. It can be speculated that South African firms reduce their working capital investment when leverage increases because they are more reliant on equity than debt. They pursue efficient working capital management practices to avoid issuing new shares because they are already heavily dependent on equity. Palombini and Nakamura (2012) argue that firms with high leverage pursue a more efficient liquidity management policies to avoid issuing new securities. As leverage increases, South African firms become more efficient in their working capital management approach in order to obviate issuing debt, thereby maintaining the tradition of low leverage. Empirical evidence in South African studies shows that declines in share prices were within the range of 2% to 3.5% as a result of new equity issues announcements (Bhana, 1998, Youds et al., 1993). On the basis of these arguments, South African firms, like firms in other parts of the world, reduce their working capital investments as leverage increases in order to minimise resources invested in other profitable projects being tied-up in working capital. External capital is more costly than internal resources and using expensive external funds to support low-returning earning assets (working capital investments) does not make economic and business sense.

7.5.3 Fixed investment

The regression analysis results confirm the negative correlation between fixed investment and working capital investment obtained earlier. In all four models, the relationship between working capital investment and fixed assets investment, FIXTA, was negative and statistically significant at 1%. This validates the hypothesis developed earlier, that working capital and fixed investment compete for funds. This concurs with previous studies (Fazzari and Petersen, 1993, Kieschnick et al., 2013b). In financially-constrained firms, working capital and fixed investment compete for a limited pool of funds. Holding all other things constant, when a financially-constrained firm increases its working capital investment, its fixed investment will decrease and vice-versa. Gupta (2003) found a statistically significant inversee relationship between fixed investment and working capital investment in a study of firms in the food processing industry in India for the periods 1989-90 and 1996-97. Appuhami (2008) found a similar relationship between capital expenditure and working capital requirements in a study of firms in Thailand. Appuhami explained that when firms are presented with growth opportunities, they reduce their working capital requirements in order to improve their liquidity positions and undertake corporate investments.

Fixed investment has a significant economic impact, since working capital investment declines by 10% on average when FIXTA increases by one standard deviation. The competition for funds between working investment and fixed investments presents a serious challenge to finance managers because they have to make optimal use of limited or scarce and expensive capital by allocating it between fixed and working capital investment in order to deliver value to shareholders.

7.5.4 Short-term financing

The coefficient of current liabilities to total assets (CLTA) was positive and statistically significant at 1% in Models 1 and 2 and statistically significant at 5% in Models 5. As firms access more short-term finance, they hold more or invest more assets in working capital. The positive association between CATA and CLTA provides further evidence that South African firms

follow the matching principle. This ensures that cash flows generated by assets can adequately cover the periodic debt defrayments. According to Myers (1977), the matching of assets and liabilities helps firms to minimise the agency problem between debt holders and shareholders.

Short-term finance comprises three main elements; spontaneously generated resources (trade credit and accruals) and discretionary sources; short-term debt. The study explored which of the three sources are mainly used to finance working capital investment. Marx et al. (2011) state that spontaneous sources of financing arise during the ordinary course of business, are directly related to sales levels and increase or decrease in direct proportion to sales. Spontaneous sources significantly explain the working capital investment level of these listed firms better than short-term financial debt. Trade credit is positive and statistically significant at 1%. The importance of spontaneous sources is probably one of the reasons why there is very limited participation or a lack of appetite for bonds, particularly the commercial paper market, among South African listed firms. The researcher investigated commercial paper issues by listed firms between 2002 and 2012 and found that less than 10% of listed firms had issued commercial paper during this period. Commercial paper issues were largely dominated by financial services firms. As noted and discussed earlier in the literature review, trade credit offers numerous advantages (Petersen and Rajan, 1997). One of the advantages of listing on the stock exchange is an improved corporate image. Therefore it is possible that these listed firms enjoy favourable credit terms and conditions from their suppliers because being listed on the stock exchange enhances image and reputation among suppliers, customers and lenders.

The economic impact of the two spontaneous sources is more significant than short-term debt. A one standard deviation increase in TCTA results in an increase in working capital investment of 33% for both models 3 and 4. The same magnitude of increase in the standard deviation in accruals produces an increase of 14% and 11% for model 3 and model 4, respectively. These figures are higher than the economic impact of short-term debt which produces an increase in working capital investment of 11% and 9% for model 3 and model 4, respectively.

7.5.5 Operating cash flows

Contrary to expectations, this study found a statistically insignificant relationship between CATA and operating cash flows to total assets; OCFTA. The expectation was that firms with more internal resources are better positioned to finance their working capital investment as observed by some previous studies (Chiou et al., 2006, Hill et al., 2010). In column 1, the relationship is positive while in the rest of the models, the relationship is negative and statistically insignificant, consistent with Nazir and Afza (2009c). These findings might suggest that listed firms in South Africa do not adhere to the Pecking Order Theory in financing their working capital investment. Under the Pecking Order Theory, firms only use external finance when the internal resources have been exhausted. In financing their working capital, it seems that firms exhaust external sources such as trade credit and accruals (which are interest and formalities free) before using internal resources. Alternatively, these findings are an indication of the wider sources of finance available to these large firms or they suggest that firms do not necessarily accumulate resources to finance their working capital. The insignificance of operating cash flows might add weight to the view that being listed enhances the image of the company which widens its sources of finance.

7.5.6 Size

The variable LNMCAP, a proxy for firm size is positive and statistically significant at 5%, providing some evidence that firm size affects working capital investment, consistent with findings of Hill et al. (2010) and Jose et al. (1996). However, this is contrary to some previous studies (Nazir and Afza, 2009c, Palombini and Nakamura, 2012). Firm size influences the working capital investment level in a number of ways. Bigger firms hold more working capital investment in order to sustain operations at a higher level. Large firms have the capacity to manage their supply chain more efficiently than small firms; therefore, they do not invest much in working capital. Size can also be a proxy for access to financial markets, with bigger firms expected to have better access.

7.5.7 Market power

The relationship between market power and the working capital investment of sample firms is negative as expected, but statistically insignificant. Hill et al. (2010) and Kieschnick et al. (2013a) also found that market power did not have any statistically significant relationship with net operating working capital. The expectation was that firms with more market power hold low working capital investments (low inventory levels and low receivables) because such firms have more bargaining power over their suppliers and customers. The descriptive statistics reveal that the mean and median market power values of the sample firms are 9% and 3% respectively, which shows that most firms in this sample do not have significant market power. The statistically insignificant negative coefficient of the regression and correlation between market power and working capital investment probably suggests that the market power of sample firms might not large enough to influence their level of working capital investment. In other words, the sample comprised firms with limited bargaining power over their suppliers and customers.

7.5.8 Sales growth

The results obtained show that neither negative nor positive sales growth had any significant relationship with CATA. Sales growth rate and growth opportunities tend to wane as the firm becomes older and more established (Chiou et al., 2006). The statistically insignificant relationship obtained is attributable to the fact that the sample was comprised large well-established firms experiencing lower growth rates. Padachi et al. (2010) suggest that the non-significance of sales growth on working capital can be a result of firms not pursuing a clear sales growth path.

7.5.9 The state of the economy

The statistically insignificant correlation between working capital investment and business cycle was also confirmed by the positive but statistically insignificant relationship in the regression results. This is consistent with some previous studies (Nazir and Afza, 2009a, Lamberson, 1995, Akinlo, 2012a) which did not find any evidence that the working capital investment level depends on the prevailing business cycle. However, this finding is contrary to Abuzayed (2012),

whose study of Jordanian firms found that working capital management efficiency depends on prevailing economic conditions. Lamberson (1995) argues that finance managers generally need more time to adjust to economic conditions. Economic conditions tend to change faster than the ability of firms to alter their levels of working capital investment. The study used annual financial statements and annual real GDP growth; a different result might have been obtained had quarterly financial statements been regressed against quarterly real GDP to capture the impact of peaks and troughs. Semi-annual financial statements are the shortest period available from JSE listed firms that are required to publish interim and final financial statements. Most interim financial reports do not provide some of the variables that were used in this study. In analysing the relationship between working capital management and the state of the economy, Chiou et al. (2006) found that working capital management was sensitive to the state of the economy when they used quarterly data.

7.5.10 Economic crisis

An attempt was made to assess the 2008-2009 financial crises' impact on working capital investment levels of South African listed firms. In model 5 the dummy variable, CRISIS, which took the form 1 (and 0 otherwise) to represent the period of the financial crisis; the years 2008 and 2009 was introduced. A possible explanation for the non-significance of the dummy variable CRISIS could be that reductions in working capital investments were not universal during 2008-2009. Correia et al. (2011) state that some firms did not reduce their working capital investment and use the example of Cashbuild which did not change its inventory levels during the recent global economic crisis. Another possible explanation for these results is the fact that the economic crisis did not last very long. The South African government declared that the economy had officially entered a recession in May 2008, long after developed economies had done so. The Gross Domestic Product figures in Appendix A4 show that South Africa had negative quarter-on-quarter figures between the last quarter of 2008 and the second quarter of 2009. Thus, these results are not consistent with the trend analysis and the liquidity rankings in Table 5, which pointed to changes in working capital investment as the business cycles changed.

7.6 ROBUSTNESS CHECK

The findings of this study were subjected to some robustness tests. Alternative estimations were conducted using the natural logarithm of total assets as a proxy for firm size. The estimations results are reported in Table 18. The findings obtained using this alternative proxy show that there were no significant changes to the lagged dependent variable; suggesting that the speed of adjustment did not change with this alternative estimation. The speed of adjustment ranges between 0.46 and 0.6 when the natural logarithm of total assets was used, which is within the range of the main model. In addition to the above, there were no changes to the coefficient signs of the explanatory variables as a result of using another proxy for firm size. No new variables assumed significance in the alternative estimation. The specification tests; test for auto-correlation and the validity of instruments, did not exhibit any problem.

TABLE 18: DETERMINANTS OF WORKING CAPITAL INVESTMENT: ALTERNATIVE ESTIMATION

	(1)	(2)	(3)	(4)
$CATA_{it-1}$	0.460**	0.541***	0.384*	0.496***
	(2.32)	(3.52)	(2.00)	(3.43)
CLTA	0.330***	0.259**	-	-
	(3.94)	(2.55)		
TCTA	-	-	0.426***	0.434***
			(4.47)	(2.88)
STDTA	-	-	0.236***	0.162*
			(2.82)	(2.00)
ACCTA	-	-	0.465**	0.321**
			(2.98)	(2.60)
P_{GROWTH}	0.0002	-0.0002	0.002	0.001
	(0.35)	(-0.02)	(0.65)	(0.19)
N_{GROWTH}	0.020	0.015	0.0154	0.006
	(0.84)	(0.70)	(0.69)	(0.33)
LNTA	-0.012	0.021	-0.010	0.0272
	(-0.87)	(0.58)	(-0.75)	(0.86)
FIXTA	-0.244***	-0.268***	-0.226***	-0.248***
	(-3.27)	(-3.16)	(-3.15)	(-3.03)
OCFTA	-0.004	-0.010	-0.009	-0.015
	(-0.08)	(-0.20)	(-0.17)	(-0.32)
RGDP	0.110	-	0.045	-
	(0.82)		(0.32)	
LEVERAGE	-0.141**	-0.084	-0.159***	-0.107**
	(-2.22)	(-1.53)	(-3.06)	(-2.17)
MKTPOWER	-0.061	-0.082	-0.045	-0.049
	(-1.29)	(-1.34)	(-1.02)	(-0.73)
CONS	0.476	-0.032	0.482	-0.143
	(1.59)	(-0.06)	(1.58)	(-0.30)
Time dummies	-	Yes	-	Yes
m_2	0.316	0.215	0.372	0.179
Sargan test	27.64	36.80	28.82	34.30
df	20	20	20	20
p-values	0.118	0.0124	0.092	0.024

*t statistics in parenthesis. *, ** and ***denote significance at 10%, 5% and 1%, respectively.*
Time dummies' coefficients not reported for brevity.
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

7.7 WORKING CAPITAL INVESTMENT AND FIRM VALUE ESTIMATION RESULTS

The preceding section showed that firms pursue target working capital investment levels; this helps them in achieving the key objective of maximising shareholder value. In order to establish if there is an optimum level of working capital investment that helps to achieve this key objective, the relationship between firm value and working capital investment was analysed in this section. This section also presents some justification for the establishment and pursuit of target working capital investment levels. Firm value was regressed against working capital investment represented by current assets to total assets; CATA, $CATA^2$ and control variables. CATA and its square were included to help in determining the turning point of the firm value-working capital investment relationship; that is the benefits of working capital investment and the negative effects of investing excessively in working capital.

Table 19 presents the results of the working capital investment-firm value regression (Equation 19) using two different proxies for size. In columns 1 and 2 with CATA and $CATA^2$ are the focus independent variables. Column 3 and Column 4 present the regression results where CAS and its square are the main explanatory variables.

7.7.1 Working capital investment and its square

Table 19 presents the regression results. As hypothesised, CATA is positive and statistically significant at 1% ($\beta_1 > 0$) in Model 1 and Model 2. $CATA^2$ is negative and statistically significant at 1% and 5% ($\beta_2 < 0$) in Model 1 and Model 2, respectively. These results support the principal hypothesis of this study; working capital investment and firm value have a non-linear relationship. The concave relationship is the result of the positive and negative effects of investing in working capital. Increasing working capital investment increases firm value up to a certain point (the optimal point), after which further increases in working capital investment compromise the value of the firm. As a result of the positive and negative effects, the relationship between working capital investments and firm value is non-monotonic.

TABLE 19: WORKING CAPITAL INVESTMENT AND FIRM VALUE ESTIMATION RESULTS

	(1)	(2)	(3)	(4)
	VALUE	VALUE	VALUE	VALUE
CATA	7.187***	5.737***	-	-
	(4.87)	(4.35)	-	-
$CATA^2$	-1.907***	-1.524**	-	-
	(-2.75)	(-2.46)	-	-
CAS	-	-	2.629***	3.963***
	-	-	(2.59)	(4.19)
CAS^2	-	-	-1.480***	-1.806***
	-	-	(-2.98)	(-3.44)
SIZE (LNMCAP)	-0.292**	-	-0.231**	-
	(-2.63)	-	(-2.45)	-
SIZE (LNTA)	-	-0.268	-	-1.159***
	-	(-1.21)	-	(-5.93)
LEVERAGE	0.961***	0.674***	0.969***	0.437**
	(6.85)	(3.97)	(7.88)	(2.72)
MTB	0.183***	0.199***	0.196***	0.210***
	(14.56)	(15.63)	(13.72)	(11.28)
m_2	0.424	0.386	0.407	0.508
Hansen	50.58	47.49	45.62	42.82
df	43	43	43	43
p-values	0.199	0.295	0.364	0.479

*t statistics in parenthesis. *, ** and *** denote significance at 10%, 5% and 1%, respectively.*
Time dummies' coefficients not reported for brevity.
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

Columns 3 and 4 in Table 19 provide more supporting evidence for the principal argument of this study. An alternative to CATA; current assets to sales, CAS and its square; CAS^2, were used. The study found that CAS is positive and statistically significant at 1% in both models 3 and 4. In model 1, the natural logarithm of market capitalisation is used to proxy size while model 2 uses the natural logarithm of total assets to proxy size. CAS^2 is negative and statistically significant at 1% in both models 3 and 4, which gives more support to the non-linear relationship hypothesized. Therefore, the concave firm value-working capital investment hypothesised in this study is not rejected.

All four models in Table 19 show that the coefficients of the two different measures of working capital investment (CATA and CAS) are positive and statistically significant, while their squares ($CATA^2$ and CAS^2) are negative and statistically significant; this demonstrates the robustness of the findings regarding the quadratic relationship between working capital investment and firm value.

Both $CATA^2$ and CAS^2 have a significant economic impact. A one standard deviation increase in both $CATA^2$ and CAS^2 results in a reduction in firm value ranging between 20% and 30%. This means that an additional investment of R1 million in working capital beyond the optimal point results in a reduction in firm value by between R200 000 and R300 000. These findings are consistent with Kieschnick et al. (2013b), who used panel data of US corporations from 1990 to 2006 to examine how working capital management affects firm value. Using stock's excess returns to represent firm value, their study found that on average, a dollar invested in net operating working capital reduces firm value and vice-versa. Their estimation equations showed that excess working capital investment of $1 000 000 reduces firm value by about $120 000 to $130 0000.

An attempt was made to establish the turning point[7] for the sample. The results obtained seem to suggest that the optimal point of working capital investment is when current assets are 88% of sales (based on model 3). Results obtained from models 1, 2 and 4[8] provide a turning point that is when current assets are above 100% of total assets (for model 1 and 2) and 100% of sales (for model 4). Such results suggests that although the relationship is non-linear, the turning point is either unattainable or falls with a certain range and is not at a specific point. These findings in a way provide supporting evidence to the challenges managers face in achieving an optimal working capital investment point.

[7] In a quadratic equation the turning point is calculated as $-\beta_1/2\beta_2$

[8] The turning points were 188% for both models 1 and 2and 110% for model 4.

Low levels of working capital investment represent an aggressive working capital management approach, while high levels of working capital investment represent a conservative working capital management approach. Therefore, these findings are consistent with the view that aggressive working capital policy (reflected by a short CCC) creates more shareholder value, while conservative working capital management compromises shareholder value. Wang (2002) found that firms with a Q ratio > 1 had a lower CCC than firms with Q ratio < 1 and concluded that aggressive liquidity management (reduction of CCC) increases operating performance and creates more shareholder value.

Low working capital investments (low inventory levels and low receivables balances), result in a shorter Operating Cycle (OC) and are associated with greater working capital efficiency. Luo et al. (2009) argue that low levels of working capital investment enable the firm to turn over its working capital faster, leading to higher expected cash flows. In addition, money freed up (by investing less in working capital) can be reinvested to generate additional income. Conversely, high working capital investment has opportunity costs of resources that could have been deployed in profitable, long-term investments. It also reduces the chances of a firm getting into financial difficulties or becoming insolvent; this lowers expected financial distress costs thereby lowering the cost of equity and increasing firm value.

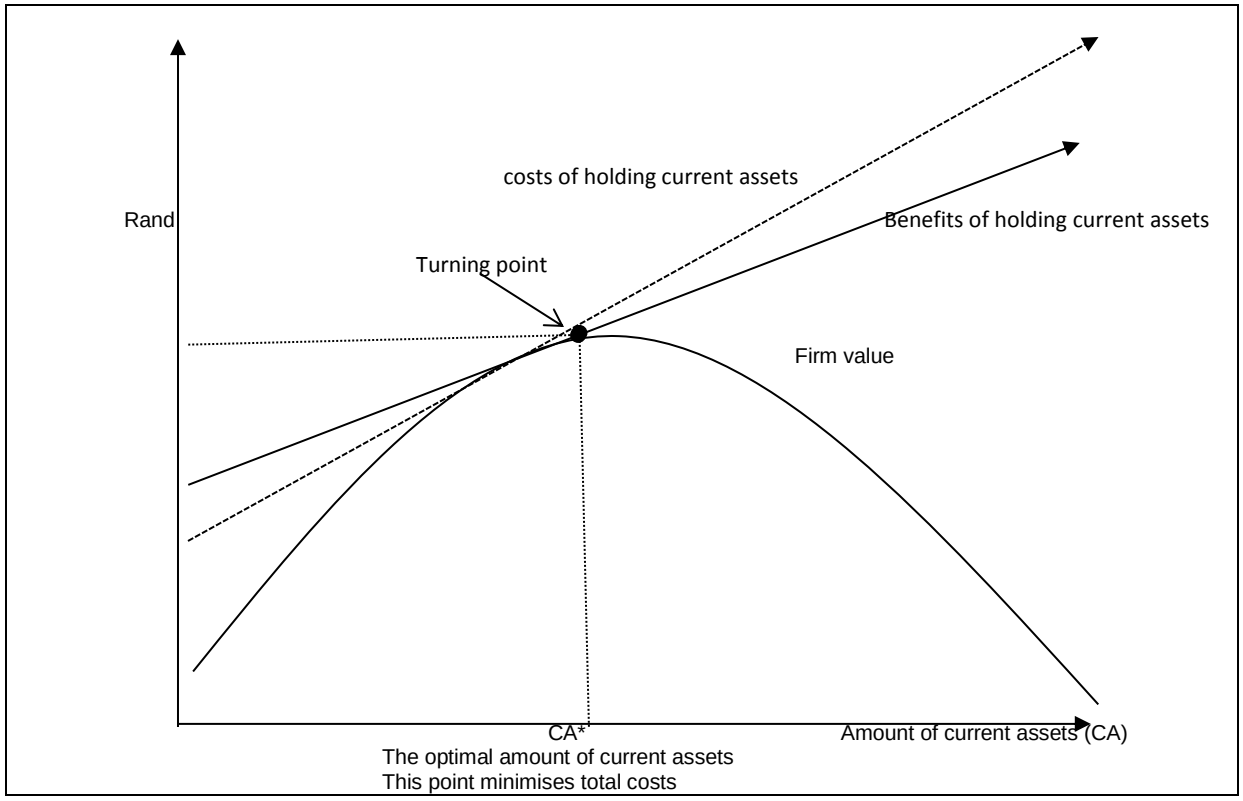
These results suggest that at low levels, the firm value-working capital investment relationship of South African firms is positive because the benefits of increasing working capital investments exceed the costs. The benefits include the potential to stimulate sales and achieve higher profitability (Deloof, 2003, Shin and Soenen, 1998). Trade credit induces customers to buy products during times of low demand and "help firms to strengthen long-term relationships with their customers" (Ng et al., 1999, Blinder and Maccini, 1991, Emery, 1987). According to Blinder and Maccini (1991), by holding high stock levels the firm reduces the possibility of costly production process disruptions, loss of revenue due to stock-outs and hedges against price fluctuations. This increases the firm's borrowing capacity and decreases its default risk, which consequently reduces the required rate of return and increases in firm value (Samiloglu and

Demirgunes, 2008). Decreasing working capital increases the firm's liquidity risk and its cost of borrowing which lowers the firm's value compared with a firm with a higher amount of working capital.

At low levels of working capital investments, South African listed firms benefit from low carrying costs but suffer huge shortage costs. Low levels of inventory shortage costs result in inability to satisfy customers' needs, loss of goodwill, and loss of sales and revenue. A tight credit policy results in loss of revenue / sales while low levels of cash hamper the firm's ability to pay maturing obligations on time (Damodaran, 2001, Firer et al., 2012). These reduce the value of the firm. Therefore, there are advantages to increasing the level of working capital investment because the benefits of additional investments exceed the cost of holding working capital investments.

The benefits of increasing working capital investments rise faster than the costs of increases in working capital investments until it reaches a turning point. As these firms continue to invest in working capital beyond its optimal working capital investment point, the costs rise faster than the benefits, causing a reduction in their value. These costs include low or negative returns on cash and marketable securities, the additional cost of financing receivables, handling costs of inventory and the opportunity cost of money locked-up in stocks and receivables. All form of inventory do not earn any income and incur carrying costs like storage, insurance, deterioration, obsolescence and inventory holding opportunity costs (Gitman et al., 2010). Marketable securities earn low returns on the money market and are at best, a zero Net Present Value investment for a tax-paying firm due to the corporate tax payable on the interest received from such investments (Brealey et al., 2008). The average nominal return on South African money market securities has been around 6% (Firer et al., 2012) and the average cost of capital for an ungeared firm is 15% (Grandes and Pinaud, 2004, Power, 2004) This means that a company holding money market investments suffers a direct loss of 9%. The more money invested in inventory and receivables, the less money a firm has to undertake profitable investments (Martínez-Sola et al., 2013b)

FIGURE 7: OPTIMAL INVESTMENT IN CURRENT ASSETS: BENEFITS AND COSTS



Source: Author's views

Huge working capital investments reduce firm value because the firm may be relying on external capital which is more costly than internal funds. Shin and Soenen (1998) posit that despite the fact that Wal-Mart and Kmart had the same capital structures, Kmart likely faced additional financing expenses of approximately $200 million annually because its cash conversion cycle was 21 days longer than Wal-Mart's 40 days. Poor working capital investment (as shown by the longer CCC) has been attributed to Kmart's eventual bankruptcy.

7.7.2 Leverage

Leverage is significantly related to firm value, consistent with Modigliani and Miller (1963) tax shield argument and the free cash flow argument put forward by Jensen (1986). The tax shield theory states that debt is valuable to the firm as interest on debt is tax deductible; this increases the value of the firm. Consequently, a levered firm has a higher value than an otherwise identical unlevered firm. Jensen (1986) contents that debt plays a crucial role in

improving organisational efficiency by reducing free cash flow agency costs; that is, it reduces resources available for spending at the discretion of managers.

7.7.3 Growth opportunities

The study found a positive relationship between market to book ratio (proxy for growth opportunities) and firm value in all four models, consistent with previous studies (Martínez-Sola et al., 2013b, Maury and Pajuste, 2005, La Porta et al., 2002).

7.7.4 Size

Consistent with Martínez-Sola et al. (2013a), the study found that both proxies for firm size (LNMCAP and LNTA) are inversely related to firm value, except in column 2 of Table 18.

7.8 ROBUSTNESS TESTS

The robustness of the findings obtained in the preceding section was tested by analysing what happens when South African listed firms overinvest or underinvest in working capital. The study has so far established that firms pursue target working capital investment levels and the existence of a turning point or an optimal point of working capital investment. This implies that digressions from the target level would reduce firm value.

In order to test whether deviating from the target reduce firm value, the working capital investment model was re-estimated in a linear form and the results are presented in Table 20. LNMCAP and LNTA were used as proxy for size in Column 1 and Column 2 of Table 20 respectively.

TABLE 20: LINEAR ESTIMATION WORKING CAPITAL INVESTMENT RESULTS

	(1)	(2)
	CATA	CATA
CLTA	0.097***	0.099***
	(7.70)	(5.04)
PGROWTH	0.007***	0.012**
	(3.50)	(3.00)
NGROWTH	-0.059***	-0.045**
	(-4.56)	(-2.82)
OCFTA	0.067***	0.080***
	(6.37)	(5.57)
$SIZE_{(LNMCAP)}$	0.003	-
	(0.66)	-
$SIZE_{(LNTA)}$	-	-0.004
	-	(-0.24)
FIXTA	0.005	0.025
	(0.22)	(0.68)
MKTPOWER	-0.263***	-0.337***
	(-3.64)	(-3.00)
LEVERAGE	-0.056***	-0.061***
	(-11.03)	(-7.83)
m_2	0.844	0.803
Hansen	65.15	59.40
df	64	56
p-values	0.44	0.35

*t statistics in parenthesis. *, ** and *** denote significance at 10%, 5% and 1%, respectively.*
Time dummies' coefficients not reported for brevity.
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

The residuals obtained from the linear working capital investment model were taken as deviations from the target level of working capital investment. The residuals were termed DFT and were the absolute values of the residuals obtained from the linear estimation model of the working capital investment model in Equation 20. Residuals obtained when LNMCAP and LNTA were used as proxies for size were termed DFT_1 and DFT_2 respectively. The residuals were included in the working capital investment-firm value model and replaced the variables CATA and $CATA^2$ and the alternative; CAS and CAS^2.

7.9 DEVIATIONS FROM THE OPTIMAL INVESTMENT LEVEL

In Table 21 the study presents the results which show the impact of deviations from the optimum working capital investment level on firm value (Equation 21).

TABLE 21: DEVIATION FROM THE OPTIMAL WORKING CAPITAL INVESTMENT LEVEL

	(1) VALUE	(2) VALUE	(3) VALUE	(4) VALUE
DFT_1	-2.862**	-2.293**	-	-
	(-2.35)	(-2.04)	-	-
DFT_2	-	-	-3.041**	-2.211
	-	-	(-2.33)	(-1.90)*
$SIZE_{(LNMCAP)}$	-0.340**	-	-0.268	-
	(-2.14)	-	(-1.76)*	-
$SIZE_{(LNTA)}$	-	-0.864***	-	-0.824***
	-	(-2.99)	-	(-2.86)
MTB	0.190***	0.206***	0.187***	0.201***
	(10.99)	(13.44)	(11.01)	(13.97)
LEVERAGE	0.727***	0.360	0.732***	0.383*
	(5.50)	(1.94)	(5.29)	(2.06)
m_2	0.312	0.348	0.312	0.334
Hansen	50.33	46.97	50.36	47.34
df	36	36	36	36
p-values	0.06	0.11	0.06	0.10

*t statistics in parenthesis. *, ** and *** denote significance at 10%, 5% and 1%, respectively.*
Time dummies' coefficients not reported for brevity.
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

7.9.1 Deviations from the optimal working capital investment level

Column 1 and Column 2 of Table 21 present the results when Equation 21 was estimated using the natural logarithm of market capitalisation as a proxy for size, while in columns 3 and 4 deviations are generated when Equation 21 was estimated using the natural logarithm of total assets. As hypothesised, the coefficient of DFT, (both DFT_1 and DFT_2) is negative, which confirms that when South African listed firms move away from their target working capital investment level, the firm value decreases. All the models except model 4 (which is significant at 10%) show that deviations are significant at 5%, which indicates an inverse relationship between firm value and deviation from the optimal target.

7.9.2 Control variables

The proxy for size is not significant in Column 3. Consistent with Martínez-Sola et al. (2013a), both proxies for firm size have an inverse relationship with the value of the firm. MTB is precisely defined in all four models. Leverage is not statistically significant only in model 2.

7.10 POSITIVE AND NEGATIVE DEVIATIONS FROM THE OPTIMAL LEVEL

The major weakness of the previous estimations (estimations using Equation 21) is that it does not differentiate between positive and negative deviations. In order to study how both positive (above optimal working capital investment level) and negative (below optimal working capital investment level) deviations affect the value of the firm, a dummy variable; Dummy DFT was introduced. Dummy DFT is defined as above optimal working capital investment level * DFT. Dummy DFT takes the form 1 (for positive residuals to represent above-optimal) and 0 otherwise. Dummy DFT_1 and Dummy DFT_2 are the respective dummy variables created when LNMCAP and LNTA were used as proxy for firm size.

Of interest here is the effect of DFT and the sum of DFT + Dummy DFT on firm value; that is, the coefficient of β_1 and the sum of coefficients $\beta_1 + \beta_2$. It is expected that both coefficients; β_1 and $\beta_1 + \beta_2$ will be negative because both above-optimal and below-optimal deviations negatively impact on firm value. In the case that residuals are positive, the above-optimal variable takes the value 1, and $\beta_1 + \beta_2$ accounts for the effect on firm value. Otherwise, when residuals are negative, the above-optimal variable takes the value 0. Therefore Dummy DFT is zero, and β_1 accounts for the effect.

Table 22 shows that while both DFT_1 and DFT_2 are negative and statistically significant in all cases, both Dummy DFT_1 and Dummy DFT_2 are negatively related to firm value in all cases, although not always statistically significant. Tong (2008) states that the coefficient of the dummy variable, Dummy DFT can be positive since positive and negative residuals offset each other.

TABLE 22 : POSITIVE AND NEGATIVE DEVIATIONS FROM THE OPTIMAL WORKING CAPITAL INVESTMENT LEVEL

	(1) VALUE	(2) VALUE	(3) VALUE	(4) VALUE
DFT_1	-3.019***	-2.031**	-	-
	(-2.66)	(-1.99)	-	-
Dummy DFT_1	-0.125	-0.154	-	-
	(-0.73)	(-0.76)	-	-
DFT_2	-	-	-3.047**	-2.220**
	-	-	(-2.45)	(-1.94)
Dummy DFT_2	-	-	-0.396*	-0.461**
	-	-	(-2.06)	(-2.25)
$SIZE_{(LNMCAP)}$	-0.233	-	-0.238*	-
	(-1.76)	-	(-2.00)	-
$SIZE_{(LNTA)}$	-	-0.511	-	-0.647*
	-	(-1.82)	-	(-2.43)
LEVERAGE	0.814***	0.595**	0.799***	0.538**
	(6.25)	(3.10)	(5.60)	(2.77)
MTB	0.191***	0.198***	0.186***	0.193***
	(12.30)	(14.34)	(12.26)	(13.99)
m_2	0.352	0475	0.353	0.435
Hansen	58.32	61.81	59.28	59.88
df	43	43	43	43
p-values	0.06	0.031	0.50	0.045
F-test	3.73(0.05)	2.95(0.06)	2.06(0.13)	1.17(0.35)

*t statistics in parenthesis. *, ** and ***denote significance at 10%, 5% and 1%, respectively*
Time dummies' coefficients not reported for brevity.
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

The subject of interest here is the sum of the coefficients $\beta_1 + \beta_2$. The F-test refers to a test on the null hypothesis that the sum of the coefficients of DFT + Dummy DFT is zero. An F test proves that $\beta_1 + \beta_2$ remains negative and statistically significant. Indeed, the F-test reveals that the sum of these two coefficients is significant at higher than the 5% level, supporting the hypothesis that deviations on either side of the optimal working capital investment point reduce firm value.

In Column 1 and Column 2 of Table 22, DFT_1 is negative and statistically significant, and Dummy DFT_1 is not statistically significant. This finding means that the value of South African listed firms can be increased by increasing the working capital investment in circumstances when they are below-optimal working capital investment level and by reducing their working capital investment level if they are above-optimal.

7.11 IMPACT AREAS OF WORKING CAPITAL INVESTMENT ESTIMATION RESULTS

Damodaran (2001) states that three impact areas of working capital investment ultimately affect firm value, namely, cash flows, liquidity risk and operations. Damodaran further argues that increasing working capital investment involves a trade-off between the negative effects on cash flows against the positive effects of reducing liquidity risk and potentially increasing sales. To examine the effects of working capital investment on the three key impact areas, CATA and $CATA^2$ was regressed against cash flows, liquidity risk and operations.

Working capital investment affects the cash flows operations of the firm. It was hypothesised operating cash flows to total assets, OCFTA has positive and negative relationships with CATA and $CATA^2$ respectively. The reasoning is that at low working capital investment, the firm is able to turn over its working capital faster and generate more cash flows, while at higher levels the firm will have more funds invested in working capital, hindering its ability to generate more cash flows.

CATA was hypothesized to have negative relationship with the proxy of liquidity risk, while $CATA^2$ was expected to have a negative association with liquidity risk. At lower levels of working capital investment, the firm faces high liquidity risks (resulting in difficulties in paying liabilities on time) and at higher levels there is low risk. The study uses current liabilities to current assets; CLCA as a measure of liquidity risk. Gupta (2003) used current liabilities to current assets; CLCA (the inverse of the current ratio), to measure the risk of financing working capital.

Working capital investment affects the operations of the firm. Profitability (as measured ROA) was therefore hypothesised that CATA is positively related to profitability (reflecting the positive effect of a tight credit policy and keeping low inventory levels) while $CATA^2$ was hypothesised to be negatively related to profitability (reflecting the negative effect of a generous credit policy and holding high inventory levels).

The estimation results of the relationship between working capital investment and its three impact areas namely; operating cash flows, liquidity risk and profitability are presented in Table 23.

In Column 1 the coefficients of both CATA and $CATA^2$ have expected signs that are statistically significant. Low levels of working capital investment create value because, as noted by Damodaran (2001), working capital investment impacts on cash flows. Working capital investment represents money that is tied up and cannot be used. Therefore a reduction in working capital investment means more cash flows are available which can be deployed to more productive uses. Jose et al. (1996) support this line of thought by arguing that a shorter CCC is associated with a high valuation of cash flows from the firm's assets. Reducing investments in current assets also enables firms to free up more funds from daily operations and channel them to other expansion projects because it generates savings and reduces financing costs for the firm through less reliance on expensive external funds, resulting in a lower required return on capital and higher firm value (Filbeck and Krueger, 2005b, Nazir and Afza, 2009a, Poirters, 2004).

Consistent with expectations, in Column 2 CATA and $CATA^2$ have respective negative and positive coefficients. Both coefficients are statistically significant at 1%. Low working capital investment levels mean low liquidity levels and therefore higher liquidity risk. Low working capital investment levels, in particular, low cash levels hamper the firm's ability to pay maturing obligations on time (Firer et al., 2012, Damodaran, 2001). Increasing working capital

investments (in particular cash and marketable securities) enables the firm to meet its obligations more easily, thus reducing its liquidity risk.

TABLE 23: IMPACT AREAS OF WORKING CAPITAL INVESTMENT LEVEL

	(1) OCFTA	(2) CLCA	(3) ROA
CATA	0.378***	-2.476***	0.618***
	(2.77)	(-9.47)	(4.15)
$CATA^2$	-0.213**	0.988***	-0.284***
	(-2.25)	(9.45)	(-5.28)
SIZE (LNMCAP)	0.034***	-0.102***	0.044***
	(2.96)	(-7.74)	(5.50)
SGR	0.007	0.036**	-0.0228**
	(0.87)	(2.88)	(-2.85)
LEVERAGE	-	0.272***	-0.026*
	-	(13.84)	(-2.10)
m_2	0.655	0.604	0.387
Hansen	43.33	38.26	35.24
df	36	43	43
p-values	0.216	0.677	0.794

*t statistics in parenthesis. *, ** and *** denote significance at 10%, 5% and 1%, respectively*
Time dummies' coefficients not reported for brevity.
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

As expected, in Column 3 the coefficient of CATA is positive and $CATA^2$ is negative which is consistent with the argument that aggressive working capital management may yield more returns while a conservative approach compromises profitability. Holding low inventory levels and a tight credit policy may lower carrying costs and this may increase profitability. However, it may lead to the inability to serve customers and a loss of value. A liberal inventory and credit policy may increase carrying costs (increasing inventory levels and accounts receivable) which negatively affects revenues (Damodaran, 2001).

These findings also demonstrate the trade-offs associated with investing in working capital. At lower levels of working capital investment, South African firms enjoy positive effects on cash

flows, but suffer the negative effects of increased liquidity risk and the potential of losing sales while at higher levels they suffer the negative effects on cash flows, but enjoy the positive effects of reducing liquidity risk and potentially increasing sales.

The increase in working capital investment has a negative effect on cash flows, but a positive effect on liquidity and operations; managers should increase working capital investment when the positive effect on liquidity and operations outweighs the negative effect on cash flows. In cases where the negative effect on cash flows exceeds the positive effect on liquidity and operations, working capital investment should be reduced.

The interdependence of the effects of either increasing or decreasing working capital investment makes the job of the finance manager more challenging (Poirters, 2004). In addition, the effect of some working capital increases cannot be observed directly, but manifest themselves in several ways. For example, one of the operational effects of increasing accounts receivable is that the firm incurs administration costs and collection costs; this influences the liquidity risk of the firm by increasing the cash locked-up in the firm's working capital cycle.

7.12 CHAPTER SUMMARY

The aim of this chapter was to analyse the working capital investment practices of firms listed on the JSE. The major findings of this study show that the sample firms hold most of their working capital investment in the form of trade receivables and inventory. The study period 2001 – 2010 included two periods of economic slowdown and the results obtained from the trend analysis suggest that firms attempted to improve their liquidity positions by reducing their inventory holdings.

The results obtained from the regression analysis suggest that firms pursue a target level of working capital investment. The findings obtained indicate that that these firms adjust at a moderate speed towards their target. These results suggest that these firms face moderate adjustment costs. Fixed investment clearly competes for funds with working capital investment.

Short-term financing, in particular trade credit, was found to significantly influence the level of working capital investment. Leverage was found to be significantly negatively related to working capital investment levels, which suggests that when firms use borrowed funds, they efficiently manage their working capital. The study did not find any evidence to suggest that the level of working capital investment is influenced by growth opportunities, operating cash flows, the market power of the firm and business cycle.

The study found that the working capital investment-firm value relationship is non-linear and this quadratic relationship is a result of the positive effects at lower levels and negative effects at higher levels. The study found that above-optimal and below-optimal deviations compromise shareholder value. It was also found that working capital investment impacts four key areas of the firm; sales, operating cash flows, liquidity risk and profitability. There are trade-offs in working capital investment; at higher levels there are negative effects on cash flows, positive effects of reducing liquidity risk and the positive effect of potentially increasing sales.

Working capital management involves two key decisions; financing and the investment decisions. This chapter dealt with the working capital investment decisions and their valuations effects. Once decisions have been made about the level of working capital investment, finance managers have to make decisions on how to finance that working capital investment. The next chapter analyses the financing decisions of the firm.

CHAPTER EIGHT

WORKING CAPITAL FINANCING: PRESENTATION AND ANALYSIS OF RESULTS

8.1 INTRODUCTION

The previous chapter analysed the working capital investment practices of JSE listed firms; focusing on the determinants of working capital investment and its valuation effects. This chapter focuses on another important area of short-term financial management, the financing of working capital investment. Once finance managers have decided on the firm's working capital investment structure, they need to make decisions on how to finance these current assets. Trend analysis and regression analysis were used to analyse the working financing decisions of the sample firms.

8.2 DESCRIPTIVE STATISTICS

Table 24 presents the descriptive statistics[9]. The average CLTA to total assets is 47% (median value is 43%). On average, spontaneous sources scaled to total assets (OCLTA); (total current liabilities less short-term debt), were 38%. The average TCTA was 32% (median value is 29%), which means that for most firms in this study, the median was closer to the mean. Accruals, another spontaneous source of short-term finance, have a mean of 5% (median of 3%).

The average STDTA was 9% (median value 6%), which means that short-term debt finances were less than a tenth of the total assets of the sample firms. The 10 per centile have an almost negligible amount of short-term debt and the 90 per centile finance 22% of their assets using short-term debt. A comparison of 10 and 90 per centiles of TCTA and STDTA shows that the per centiles of STDTA are far below those of trade credit which are 13% and 61%, respectively, which further suggests greater use of trade credit than short-term debt. The respective averages of long-term and short-term financial debt financing of total assets were 13% and 9%.

[9] All variables described in the previous chapter are omitted in this section to avoid repetition.

TCTA is approximately four times STDTA and is more than double the ratio of long-term debt to total assets (LTDTA). These figures show that these firms' use of supplier financing is far higher than both short-term debt and long-term debt, reflecting the importance of trade credit. The average purchases of firms in the sample are R6 billion, which shows that larger firms make up the sample. The mean age of sample firms is 45 years (with a median value of 40), an indication that the sample comprises well-established firms.

The average earnings before interest and tax to total assets (EBITTA) were 21% with a median value of 17%. The respective averages of CATA and fixed assets to total assets (FIXATA) were 64% and 28%. On average the South African economy grew by 3.5% between 2001 and 2010.

All variables have median values less than the mean, which indicates a scattering towards the right of the tail, suggesting that some companies' variables have values that are less than others.

TABLE 24: WORKING CAPITAL FINANCING DESCRIPTIVE STATISTICS

Variable	Description	Mean	Standard Deviation	*10 Percentile*	Median	*Percentile 90*
STDTA	Short-term debt /total assets	0.0904	0.1104	0.0003	0.0596	0.2190
CLTA	Current liabilities /Total assets	0.4658	0.2199	0.2090	0.4309	0.7385
OCLTA	(Current liabilities-Trade credit) / Total assets	0.3754	0.2535	0.1539	0.3210	0.6635
TCTA	Trade credit / Total assets	0.3212	0.1823	0.1264	0.2862	0.6074
ACCTA	Accruals / Total assets	0.0542	0.0712	0.046	0.0348	0.1112
LTDTA	Long-term debt / Total assets	0.1348	0.2065	0.0074	0.0809	0.3036
NTDSTA	Non-debt tax shield / Total assets	0.0345	0.0244	0.0083	0.03	0.0623
AGE	Age of the firm	45	30	10	40	87
FINCOST	Finance cost / Total assets	-1.3407	62.1982	0.0168	0.0809	0.2423
FIXED ASSETS	Fixed assets / Total assets	0.2793	0.2056	0.0511	0.2351	0.5997
PURTA	Purchases /Total assets	1.2339	0.8257	0.3385	1.1134	2.7735
EBITTA	Earnings before interest and Tax /Total assets	0.2110	0.2037	0.0581	0.1703	0.4041
OCFTA	Operating cash flows /Total assets	0.1983	0.1658	0.0792	0.1700	0.3535

Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

8.3 WORKING CAPITAL FINANCING CORRELATION MATRIX

Table 25 presents the pairwise correlation analysis results. Most of the correlations in the correlation matrix follow the expected signs. There is a positive correlation between current assets and trade credit (accounts payable), meaning that as the level of current assets increases, the level of accounts payable increases. Disaggregated current assets investments into inventory, trade debtors and cash and marketable securities show statistically significant positive correlations with accounts payable. Long-term debt shows a statistically significant negative correlation (-0.06) with accounts payable. Tobin's Q ratio is positively correlated (0.21) with accounts payable, suggesting that as firms' growth opportunities increase, demand for more trade credit rises.

Operating cash flows, positive sales growth, the age of the firm and investment in short term assets are significantly related to the level of the short-term financial debt of the firm. Trade receivables are the only current assets that are significantly related to short-term debt.

The study did not find any statistically significant correlation between accounts payable and the following variables: short-term financial debt, financing costs and the performance of the economy. No statistically significant correlation was found between short-term financial debt and the following variables: spontaneous resources, stock cash holdings, firm size, negative sales growth, term structure of interest rates, and fixed assets.

TABLE 25: WORKING CAPITAL FINANCING PAIRWISE CORRELATION MATRIX

	TCTA	OCLTA	OCFTA	LNMCAP	P_{GROWTH}	N_{GROWTH}	STDTA	LTDTA	LNAGE	FINCOST	DEPTA	FIXATA	PURTA	RGDP	CATA	SKTA	TDTA	CMSTA
TCTA	1.00																	
OCLTA	0.93***	1.00																
OCFTA	-0.19***	0.05	1.00															
LNMCAP	-0.16***	-0.04	0.27***	1.00														
P_{GROWTH}	0.07**	0.08*	0.00	0.02	1.00													
N_{GROWTH}	0.04	0.06*	0.05	0.05	0.10***	1.00												
STDTA	0.01	0.00	0.10***	0.04	0.07**	-0.01	1.00											
LTDTA	-0.06*	-0.08**	0.02	0.09**	0.07**	-0.08**	0.12***	1.00										
LNAGE	-0.25***	-0.20***	0.01	0.34***	-0.05	-0.01	0.06	0.04	1.00									
FINCOST	0.03	0.04	0.01	-0.01	0.01	-0.01	0.03	0.02	-0.03	1.00								
DEPTA	-0.15***	-0.20***	-0.07***	-0.06*	-0.03	-0.02	-0.01	0.13***	0.01	0.00	1.00							
FIXATA	-0.42***	-0.48***	-0.10***	0.03	-0.01	0.02	0.01	0.16***	0.07**	-0.01	0.65***	1.00						
PURTA	0.69***	0.67***	-0.09***	-0.16***	0.04	0.04	-0.02	-0.19***	-0.15***	0.04	-0.01	-0.29***	1.00					
RGDP	0.04	0.09***	0.12***	0.02	0.01	0.11***	-0.01	-0.02	-0.03	0.01	0.01	-0.02	0.01	1.00				
CATA	0.55***	0.60***	0.06*	-0.20***	0.02	-0.01	0.10***	-0.22***	-0.16***	0.02	-0.45***	-0.78***	0.49***	0.02	1.00			
SKTA	0.38***	0.35***	-0.03	-0.10***	-0.01	0.00	0.05	-0.13***	-0.05	0.03	-0.24***	-0.46***	0.49***	0.00	0.55***	1.00		
TDTA	0.37***	0.35***	0.00	-0.21***	0.01	0.03	0.12***	-0.06*	-0.21***	0.02	-0.11***	-0.41***	0.22***	0.06**	0.57***	0.20***	1.00	
CMSTA	0.21***	0.30***	0.12***	-0.06*	0.03	-0.06*	-0.02	-0.14***	-0.11***	-0.03	-0.15***	-0.29***	0.12***	0.03	0.43***	-0.06*	0.07**	1.00

, ** and * denote significance at 10%, 5% and 1%, respectively*

Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

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8.4 WORKING CAPITAL FINANCING UNIT ROOT TESTS

Prior to regression analysis, the data was tested for stationarity using the Fisher-type unit-root test. In order to help control for contemporaneous correlation, the cross-sectional means are removed. Table 26 presents the unit roots test results. The table indicates that all variables in the model are integrated of order 0, suggesting that there is no presence of unit roots in the data, which may lead to spurious regressions and wrong inferences. All four tests strongly reject the null hypothesis that the entire panel contains unit roots.

TABLE 26: WORKING CAPITAL FINANCING FISHER-TYPE UNIT-ROOT TESTS

Variable	P	Z	Pm	L*	Order of integration
CATA	479.86***	-12.82***	-12.965***	15.42***	0
SKTA	561.72***	-15.54***	-15.76***	19.69***	0
TCTA	570.14***	-15.42***	-15.87***	20.13***	0
STDTA	618.66***	-16.43***	-17.30***	22.66***	0
OCLTA	483.51***	-13.08***	-13.14***	15.61***	0
TCTA	510.03***	-13.69***	-14.00***	17.00***	0
STDTA	695.85***	-17.84***	-19.49***	26.68***	0
ACCTA	547.08***	-1436***	-14.96***	18.93***	0
P_{GROWTH}	852.66***	-22.18***	-24.45***	34.86***	0
N_{GROWTH}	858.64***	-22.18***	-24.60***	35.11***	0
OCFTA	655.02***	-17.68***	-18.53***	24.55***	0
LNMCAP	576.11***	-15.11***	-15.91***	20.44***	0
EBITTA	605.81***	-16.43***	-16.99***	21.99***	0
NDTS	559.03***	-14.37***	-15.21***	19.55***	0
FINCOST	5128.85***	-67.01***	-147.56***	257.77***	0
PURTA	598.21***	-15.64***	-16.44***	21.28***	0
LNTA	476.38***	-11.81***	-12.37***	15.24***	0
LTDTA	636.17***	-16.77***	-17.48***	23.57***	0

, ** and * denote significance at 10%, 5% and 1%, respectively.*
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

An alternative test, the Harris-Tzavalis panel unit root test was also conducted to check the validity of the unit root test results obtained using the Augmented Dick-Fuller tests. The results presented in Table 27 show that all variables with the exception of the natural logarithm of total assets are stationary in levels.

TABLE 27: WORKING CAPITAL FINANCING HARRIS-TZAVALIS PANEL UNIT ROOT TEST RESULTS

Variable	Statistic	Z	Order of integration
CATA	0.6367	-3.51518***	0
SKTA	0.3725	-12.3441***	0
TDTA	0.4674	-9.0440***	0
CMSTA	0.3560	-12.9182***	0
OCLTA	0.5336	-6.7399***	0
TCTA	0.5028	-7.8110***	0
STDTA	0.3353	-13.6379***	0
ACCTA	0.3837	-11.9555***	0
P_{GROWTH}	-0.0790	-28.0574***	0
N_{GROWTH}	-0.1034	-28.9034***	0
OCFTA	0.1951	-18.5162***	0
LNMCAP	0.6381	-3.1036***	0
EBITTA	0.2437	-168261***	0
NDTS	0.4504	-9.6326***	0
FINCOST	0.0002	-25.3128***	0
PURTA	0.3366	-13.5952***	0
LNTA	0.7586	-1.0911	0
LTDTA	0.4867	-8.3697***	0

, ** and * denote significance at 10%, 5% and 1%, respectively.*
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

All equations were estimated using the first-difference two-stage GMM approach suggested by Arellano and Bond (1991) with the dependent variable, trade credit to total assets, TCTA. Table 28 presents the estimation results of Equation 23. In all six models, no second-order serial correlation as measured by the m_2 was found in any test, which means our estimations are consistent. No problems were detected when the validity of the instruments was tested using the Sargan test. In Models 3 and 4, time dummies are included and the explanatory variable Real Gross Domestic Product is dropped because it is correlated with the time dummies.

8.5.1 The lagged dependent variable, Trade Credit to Total Assets ($TCTA_{it-1}$)

The coefficient of $TCTA_{it-1}$ is precisely defined in model 1, which supports the principal argument of this study. $TCTA_{it-1}$ is positive and statistically significant at 1% in model 1; therefore the dynamic approach used in this study is not rejected. South African firms have target levels of trade credit usage and they partially adjust towards this target in an attempt to reach the target. The adjustment coefficient, which is calculated as 1 minus the coefficient of $TCTA_{it-1}$ (1 – 0.39) is 0.61 in model 1, providing some evidence that the speed of adjustment by South African firms towards their target trade credit usage level is relatively fast. In model 2, the current assets investments were disaggregated into cash holdings, inventory and trade debtors. The coefficient of the lagged dependent $TCTA_{it-1}$ is also statistically significant at 5%, further supporting the principal argument of this study. The adjustment coefficient is 0.72, which is higher than that reported in model 1 and could be an indication that the speed of adjustment is influenced by the firm's current assets structure. In models 3 and 4, time dummies are included and the respective speeds of adjustment towards the accounts target level drop to 0.54 and 0.66, respectively.

The costs of deviating from the target trade credit usage level are significant and the accounts payable levels are persistent over time. The coefficient of $TCTA_{it-1}$ is less than 0.5, which means that the adjustment process of these firms is not very costly. Firms trade-off the cost of

being off target (being in disequilibrium) and the adjustment costs of reaching their target (Ozkan, 2001). If the costs of being in disequilibrium are higher than the cost of adjusting towards the target, the adjustment coefficient would be close to 1.

If the adjustment costs are higher than the cost of being in disequilibrium, the adjustment coefficient would be close to 0. Based on this, it can be said that South African firms face high costs of being off-target. The possible costs of being in disequilibrium include the impact on short-term solvency, the impact on the reputation of the firm in both the goods and financial markets and market discipline. It has been demonstrated that trade credit is a key source of short-term finance; therefore being in disequilibrium could be harmful to the reputation of the firm. Siefert and Siefert (2008) noted that news of antagonistic supply chain relationships could lead to a decline of as much as 10% in the firm's share price. Trade credit is a signal of firm's quality and facilitates its access to advances from banks (Alphonse et al., 2006, Demirgüc-Kunt and Maksimovic, 2001). Therefore, being in disequilibrium negatively impacts the firm's reputation and its credit ratings and ultimately access to bank debt. Companies that are in disequilibrium are subject to market discipline (Damodaran, 2001) When the firm is below its target level, the market might view this as poor utilisation of "interest free" finance. When the firm exceeds its optimal target, the market may view this as a sign of liquidity problems or of the firm being in trouble. These are some of the possible explanations for the high costs of being in disequilibrium and these firms' high speed of adjustment.

TABLE 28: DETERMINANTS OF TRADE CREDIT (ACCOUNTS PAYABLE)

	(1) TCTA	(2) TCTA	(3) TCTA	(4) TCTA	(5) TCTA	(6) TCTA
$TCTA_{t-1}$	0.312***	0.255*	0.355***	0.339***	0.312***	0.257**
	(2.74)	(1.75)	(2.62)	(2.57)	(2.84)	(2.00)
OCFTA	-0.070**	-0.070**	-0.072**	-0.071	-0.078***	-0.083***
	(-2.35)	(-2.20)	(-2.13)	(-1.56)	(-2.58)	(-2.58)
LNMCAP	-0.004	0.002	-0.006	0.001	-0.004	0.003
	(-0.86)	(0.42)	(-0.88)	(0.18)	(-0.70)	(0.56)
P_{GROWTH}	0.000	0.001	0.0003	0.002	0.0003	0.0014
	(0.03)	(0.73)	(0.14)	(1.20)	(0.18)	(0.90)
N_{GROWTH}	-0.005	-0.001	-0.007	-0.004	-0.006	-0.002
	(-0.61)	(-0.11)	(-1.32)	(-0.70)	(-0.93)	(-0.20)
STDTA	-0.130***	-0.110***	-0.131***	-0.113***	-0.133***	-0.122***
	(-4.14)	(-3.77)	(-3.73)	(-3.67)	(-4.04)	(-3.72)
LTDTA	0.006	-0.012	0.001	-0.020	0.010	-0.005
	(0.11)	(-0.18)	(0.02)	(-0.32)	(0.15)	(-0.07)
LNAGE	-0.004	-0.013	-0.008	-0.016	-0.009	-0.022
	(-0.21)	(-0.70)	(-0.39)	(-0.76)	(-0.41)	(-0.89)
FINCOST	0.003**	0.004***	0.002	0.003**	0.003**	0.003**
	(2.31)	(2.81)	(1.62)	(2.33)	(2.31)	(2.48)
RGDP	0.252***	0.152*	-	-	0.316**	0.252**
	(2.82)	(1.67)	-	-	(2.54)	(2.07)
PURTA	0.041***	0.017	0.034***	0.008	0.038***	0.015
	(2.71)	(0.77)	(2.57)	(0.49)	(3.66)	(0.71)
CATA	0.250***	-	0.249***	-	0.245***	-
	(6.71)	-	(5.73)	-	(6.14)	-
SKTA	-	0.065	-	0.066**	-	0.062
	-	(1.53)	-	(1.98)	-	(1.60)
TDTA	-	0.374***	-	0.357***	-	0.374***
	-	(4.80)	-	(3.96)	-	(4.72)
CMSTA	-	0.011	-	-0.011	-	0.010986
	-	(0.20)	-	(-0.22)	-	(0.20)
CRISIS	-	-	-	-	0.00360	0.00601
	-	-	-	-	(1.16)	(1.23)
_CONS	0.127	0.123	0.180	0.160	0.140	0.140
	(1.10)	(1.00)	(1.16)	(1.07)	(1.48)	(1.07)
Time dummies	-	-	Yes	Yes	-	-
m_2	0.30	0.32	0.31	0.30	0.29	0.30
Sargan test	11.32	18.83	12.20	15.01	10.69	16.86
df	20	20	20	20	20	20
p-values	0.94	0.53	0.91	0.78	0.95	0.66

*t statistics in parenthesis. *, ** and ***denote significance at 10%, 5% and 1%, respectively*
Time dummies' coefficients not reported for brevity.
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

8.5.2 Operating cash flows

The study found some evidence that the availability of internal and external funds influences the use of trade credit. In all the models, except Model 4 and Model 5, the study found that operating cash flows (a proxy for the availability of internal resources) had a statistically significant negative relationship with $TCTA$, meaning that as firms generate more internal resources, they reduce their dependence on trade credit financing rely less on trade credit. This finding is consistent with findings from studies which used profit instead of operating cash flows (Delannay and Weill, 2004, Akinlo, 2012a) and found a negative relationship between trade credit and profit. The economic impact of operating cash flows to total assets (OCFTA) is significant because trade credit to total assets ($TCTA$) decreases by an average 7% as a result of a one standard deviation increase in operating cash flows to total assets.

8.5.3 Short-term and long-term debt

Of the two external sources of debt finance, short-term and long-term debt, the study found that only the former is statistically significant at 1% in all six models. When internal funds are exhausted, the most likely first choice of finance for firms is trade credit because it is cheaper than short-term financial debt. The employment of more trade credit in short-term financing results in less use of short-term debt, which means that, consistent with previous studies (Deloof and Jegers, 1999, García-Teruel and Martínez-Solano, 2010), trade credit is a good substitute for short-term debt. The substitution relationship is expected because both are forms of short-term financing. Alternatively, these results mean that in cases where South African firms have access to more short-term borrowings they depend less on trade credit. The economic impact of short-term debt is significant; a one standard deviation increase results in a 7% decline in the dependent variable. This magnitude of the economic impact of short-term debt is almost the same as the one obtained by García-Teruel and Martínez-Solano (2010) in their study of British small to medium-sized firms. The short-term debt and trade credit substitution relationship was further supported by the statistically significant positive relationship between financing costs and trade credit, which means that when the cost of the short-term financial debt increases, firms switch to trade credit as an alternative. The study did

not find any evidence to suggest that there is a relationship between trade credit and long term debt, contrary to the findings of García-Teruel and Martínez-Solano (2010) and Deloof and Jegers (1999). Both studies found a statistically significant negative relationship between trade credit and long-term debt and concluded that trade credit is a substitute for both long- and short-term debt.

8.5.4 Asset maturity

The study found a very strong positive relationship between current assets investments and trade credit, consistent with previous studies (Niskanen and Niskanen, 2006, Petersen and Rajan, 1997). The more a firm invests in current assets, the more it uses trade credit from suppliers. The amount of current assets held by firms mirrors the amount of trade credit used. The high statistical and economic significance of the coefficient of current assets is also an indication of the extent to which South African firms pursue the matching principle (Myers, 1977). On average, trade credit increases by 30% when current assets increase by one standard deviation, which demonstrates the strong economic impact of current assets.

In Column 2, Column 4 and Column 6 of Table 28, the relationship between accounts payable and investment in current assets was further analysed using the disaggregated components of currents assets (inventory, trade receivables, and cash and marketable securities). Of the three, only inventory and trade receivables debtors had a statistically significant relationship with trade credit, which suggests that, trade credit is affected by inventory holdings and the level of trade receivables. Trade credit primarily supports the acquisition of inventory and trade receivables; therefore, the statistically significant relationship is neither surprising nor unique. These findings are similar to those of Petersen and Rajan (1997) who found that the accounts payable and inventory association was statistically significant at 1% in a study of American small businesses. The economic impact of both inventory and trade receivables is huge; a one increase standard deviation in each of the two variables produces an increase in the accounts payable by an average of 30%. These figures suggest the significant importance of trade credit in supporting inventory and receivables. The statistically insignificant relationship between cash

and marketable securities contradicts the findings of (Deloof and Jegers, 1999). Since the study found substitution effect between accounts payable and short-term debt from banks, this means that these investments can also be explained by both the use of and access to other forms of short-term financing. The statistically significant relationship between trade credit and short-term assets might also suggest that South African firms match the short-term maturities of assets and liabilities (they pursue the matching principle) (Myers, 1977, Van Horne, 2002).

8.5.5 Supply of trade credit

The use of supplier financing by the firms in this study was found to be significantly influenced by the supply of trade credit as proxied by purchases, shown by a 5% level of significance in Model 1 and Model 3. The economic impact of the variable is quite large; a one unit increase in the standard deviation of purchases to total assets (PURTA) results in a 30% increase in accounts payable. This finding suggests that South African firms take advantage of credit supply when it is available, consistent with previous studies (Niskanen and Niskanen, 2000, García-Teruel and Martínez-Solano, 2010). This study used a sample of large JSE-listed firms; therefore the assumption that all purchases are on credit is not very restrictive as large firms generally buy goods on credit (Khan et al., 2012).

8.5.6 Macroeconomic conditions

The positive statistically significant relationship between trade credit and the real GDP growth rate in both Model 1 and Model 2 suggests that the firms' level of accounts payable increases as growth in real GDP increases. This provides some evidence that South African firms use more suppliers financing under favourable economic conditions. Good economic performance offers a conducive environment for the extension and use of trade credit. During expansion, suppliers may be liberal with credit and firms might also demand more trade credit in order to build up inventory. In an economic slowdown, suppliers may tighten credit extension and firms may demand less trade credit due to low stock turn over. Like García-Teruel and Martínez-Solano (2010), this study found that the economic impact of the variable was not very large. A one unit increase in the standard deviation in real GDP results in a 1% increase in TCTA.

8.5.7 Economic crisis

An attempt was made to analyse the impact of the recent global financial crisis on the use of trade credit by listed firms in South Africa. In Model 5 the dummy variable which took the form 1 (and 0 otherwise) to represent the period of the financial crisis; the years 2008 and 2009 was introduced. The coefficient of the dummy variable; CRISIS is positive but statistically insignificant, suggesting that the global financial crisis had an impact on the use of trade credit although the effect may not have been large enough to produce a statistically significant impact. The positive impact of the crisis might suggest that South African firms temporarily delayed or stopped settling their debts, resulting in further credit accumulation, a plausible explanation offered by Love (2011) in a commentary on the global financial crisis. The extent to which these firms temporarily delayed paying their debt could have been small; hence the statistically insignificant positive relationship. Another possible explanation is the short period of time the South African economy was in recession during the period of the financial crisis.

8.5.8 Sales growth

Growth in sales and current assets must be financed and supplier financing is a key source of short-term finance. In the exploratory stages of the study, regression analysis was conducted on the influence of sales growth on the demand for supplier financing without distinguishing between positive and negative sales growth. The study did not find any statistically significant relationship between sales growth and trade credit received. The results of this analysis are not reported for the sake of brevity. Sales growth was distinguished into positive and negative sales growth. The coefficients of both P_{GROWTH} and N_{GROWTH} were statistically insignificant, suggesting that growth opportunities (a proxy for the need for funding) do not affect the supplier financing received, consistent with (Niskanen and Niskanen, 2006). The non-influence of growth and investment opportunities may not be surprising because the sample comprised large listed firms; growth opportunities diminish with firm size (Petersen, 1997). High growth and investment opportunities are usually associated with small and young firms and such firms are expected to partially finance their investments with trade credit. The statistical insignificance of the P_{GROWTH} contradicts the proposition and the findings of Delanny and Weill (2004) and

Petersen and Rajan (1997) that suppliers are prepared to grant credit to firms experiencing positive sales growth and vice-versa.

8.5.9 Creditworthiness and access to external funds

The hypothesis that larger firms face fewer constraints when accessing financial markets; hence they depend on less trade credit is not confirmed. Firm size was found to be insignificantly related to trade credit, contradicting Delannay and Weill (2004) and Akinlo (2012a) who found firm size inversely related to trade credit. raising the possibility that these larger firms also depend on supplier financing as a source of funds. Larger firms have significant bargaining power in their relationships with suppliers and can stretch their credit terms with few or no repercussions (Hill et al., 2010). The statistically insignificant association between accounts payable and the firm size might also suggest that these firms are not using their bargaining power in their relationships with their suppliers. These findings may also be explained by the low level of market power (as shown in the descriptive statistics) these firms have over the suppliers.

The age of the firm was used as a proxy for firm creditworthiness with the expectation that the older firms depend less on supplier credit since they enjoy wider access to sources of finance. Consistent with previous studies (Deloof, 1999, Niskanen and Niskanen, 2000), the study did not find that creditworthiness influences the use of trade credit.

8.5.10 Cost of alternative capital or Interest expense

Using financing costs (the interest expenses reported in the income statement) may not fully capture the impact of interest expenses on the use of supplier financing because no distinction is made between interest on short-term debt and that on long-term debt. Therefore short-term lending rate was used. The minimum lending rate used in this study was the Government 91days treasury bills rate. The coefficients were not reported for brevity. Consistent with previous studies, the study found a positive association between accounts payable and the cost of alternative capital, which suggests that an increase in short-term interest rates affects the

demand side of trade credit (Niskanen and Niskanen, 2000, Khan et al., 2012). This suggests that when the cost of short-term finance increases, firms demand more trade credit. The fact that these firms increase trade credit could be an indication that they consider trade credit cheaper than bank finance.

8.5.11 Financing cost

The financing cost has a positive association with trade credit although it is not always statistically significant. Since the study found the substitution effect of short-term debt on trade credit, this means that when the cost of short-term bank debt increases, firms switch to supplier financing as an alternative.

After examining the determinants of trade credit, a similar analysis was performed for another important source of working capital finance, short-term financial debt. The analysis and results of the determinants of short-term debt are presented in the next section.

8.6 DETERMINANTS OF SHORT-TERM FINANCIAL DEBT ESTIMATION RESULTS

Short-term financial debt is one of the key financing instruments for most firms. Several studies have examined the relationship between trade credit and short-term financial debt, in particular bank credit. Some found that bank credit is a substitute for trade credit (Burkart and Ellingsen, 2004). Others found that the relationship is complementary, (Demirgüc-Kunt and Maksimovic, 2001, Alphonse et al., 2006). This study examined the extent to which trade credit and short-term debt share similar characteristics as substitutes or complements.

This study employed a dynamic approach in exploring the determinants of short-term financial debt like the one used in the previous section. García-Teruel and Martínez-Solano (2010) found that small and medium-sized UK firms have a target level of accounts payable and partially adjust towards this target level. Since short-term debt is considered a complement or substitute to trade credit (and by implication may have similar properties), tests were conducted to establish whether short-term financial debt also follows the same adjustment process. Short-term debt shares the same characteristics as long-term debt in a number of respects. For example, although an overdraft is classified as short-term debt and is repayable on demand, it is a permanent feature on the firm's balance sheet and therefore qualifies to be treated the same way as long-term debt. Interest on both forms of debt is tax-deductible. Like long-term financial debt, short-term financial debt can be used to finance permanent current assets if the firm decides to take advantage of lower interest rates. Estimating the level of sales and the current assets required to support the sales level is fraught with difficulties. Since current assets are supported by short-term financing, short-term finance may also not always be at the desired level.

Table 29 presents the estimation results our model carried out using the first difference two-stage GMM proposed by Arellano and Bond (1991). In all six models, no second-order serial correlation as measured by the m_2 was found in any test, which means our estimations are consistent. The test for the validity of the instruments using the Sargan test did not exhibit any problems.

8.6.1 The lagged dependent variable, Short-term financial debt ($STDTA_{it-1}$)

The results obtained show that $STDTA_{it-1}$ is positive and statistically significant at 1% in all models, except in Model 5 (where it is significant at 5%). Therefore, the dynamic approach used in this study is justified. Without time dummies, the speed of adjustment as measured by 1 minus the coefficient of the dependent variable $(1-\lambda)$**,** lies between 0.76 and 0.78, which means that firms quickly adjust their levels of short-term debt. This might be because the cost of being in disequilibrium is so high that firms have to adjust quickly. In models 3 and 5, time dummies were included but do not report them. The speed of adjustment in both models is 0.67, suggesting that the adjustment process is affected by time and changes over time. Column 4 reports the results of disaggregated current assets; stock, trade debtors and cash and cash equivalents. No significant changes to the coefficients of $STDTA_{it-1}$, which means that the speed of adjustment is not affected by the firm's current asset structure. These results suggest that the short-term financial debt levels are persistent over time.

The cost of adjusting towards the target level of short-term financial debt and the speed of adjustment are inversely related; firms that face large adjustment costs slowly adjust towards the target level and vice-versa. The speed of adjustment towards the target debt level ranges between 0.68 and 0.78, suggesting that South African firms face low adjustment costs. This finding might not be surprising when one considers the level of development of the South African financial system. South Africa boasts one of the most advanced financial systems that compares favourably with the financial systems of more developed economies which comprise both a well-developed capital market and a well-functioning banking system (Skerritt, 2009). The presence of both a well-developed capital market and banking system may be the reason for the high speed of adjustment because firms have access to both the banking system and the capital market. The speed of adjustment might also reflect the nature of short-term debt; some loans are of a self-liquidating nature as they are paid off from maturing short-term current assets.

TABLE 29: DETERMINANTS OF SHORT-TERM FINANCIAL DEBT

	(1) STDTA	(2) STDTA	(3) STDTA	(4) STDTA	(5) STDTA	(6) STDTA
$STDTA_{t-1}$	0.244***	0.325***	0.225***	0.219**	0.267**	0.255***
	(2.98)	(3.13)	(2.72)	(2.22)	(2.91)	(2.76)
OCLTA	-0.273***	-0.29***	-0.240**	-	-0.260**	-0.269**
	(-2.57)	(-2.94)	(-2.08)	-	(-2.50)	(-2.55)
EBITTA	-0.073***	-0.09***	-0.062**	-0.057**	-0.078**	-0.074**
	(-2.57)	(-2.81)	(-2.46)	(-2.13)	(-2.51)	(-2.20)
LNMCAP	-0.004	-0.006	-0.009	-0.007	0.0007	0.0002
	(-0.40)	(-0.44)	(-0.78)	(-0.54)	(0.07)	(0.01)
P_{GROWTH}	0.020***	0.016	0.018***	0.021***	0.018**	0.017***
	(4.86)	(1.69)	(4.16)	(5.53)	(3.10)	(2.95)
N_{GROWTH}	-0.018	-0.013	-0.013	-0.017	-0.016	-0.015
	(-1.60)	(-0.78)	(-0.96)	(-1.56)	(-1.32)	(-1.25)
LNAGE	-0.014	0.006	0.003	0.002	-0.016	-0.017
	(-0.44)	(0.27)	(0.14)	(0.08)	(-0.49)	(-0.48)
FIXATA	0.046	0.018	-0.071	0.056	0.065	0.068
	(0.58)	(0.23)	(-0.75)	(0.69)	(0.76)	(0.75)
NDTSTA	0.025	0.129	-0.175	-0.155	-0.003	0.151
	(0.05)	(0.24)	(-0.32)	(-0.30)	(-0.01)	(0.31)
RGDP	0.424***	-	0.148	0.231**	-	-
	(2.58)	-	(1.34)	(1.96)	-	-
CRISIS	0.017**	-	-	-	-	-
	(2.31)	-	-	-	-	-
TERM STR	-	-	-	-	-	-0.003*
	-	-	-	-	-	(-1.92)
CATA	0.191**	0.187***	-	0.199***	0.185**	0.203**
	(2.54)	(2.65)	-	(2.78)	(2.22)	(2.53)
SKTA	-	-	0.048*	-	-	-
	-	-	(1.74)	-	-	-
TDTA	-	-	0.069	-	-	-
	-	-	(0.71)	-	-	-
CMSTA	-	-	0.013	-	-	-
	-	-	(0.21)	-	-	-
TCTA	-	-	-	-0.218*	-	-
	-	-	-	(-1.88)	-	-
ACCTA	-	-	-	-0.378*	-	-
		-	-	(-1.71)	-	-
CONS	0.151	0.156	0.330	0.144	0.068	0.066
	(0.60)	(0.49)	(1.19)	(0.51)	(0.30)	(0.22)
Time dummies	-	Yes	-	-	-	-
m_2	0.59	0.32	0.67	0.95	0.50	0.52
Sargan test	21.97	29.92	22.76	26.03	24.16	25.86
df	20	20	20	20	20	20
p-values	0.34	0.071	0.30	0.16	0.24	0.17

*t statistics in parenthesis. *, ** and *** denote significance at 10%, 5% and 1%, respectively.*
Time dummies' coefficients not reported for brevity.
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

The adjustment process is a trade-off between the cost of adjusting towards the target and the cost of being off-target. The high speed of adjustment suggests that firms face huge costs of being in disequilibrium as the adjustment coefficient is closer to 1, which means that the costs of being in disequilibrium are higher than the adjustment costs. This finding is consistent with the finding on trade credit and further supports the substitution relationship between trade credit and short-term financial debt.

8.6.2 Spontaneous sources of finance

Consistent with expectations, the coefficient of spontaneous sources of finance, OCLTA is negative and statistically significant at 1% in Model 2, Model 3 and Model 5 and at 5% in Model 1 and Model 4, which means that as spontaneously generated resources increase, South African firms employ less short-term financial debt. This finding contradicts the findings of Fosberg (2012), who found a positive and statistically significant relationship between spontaneous sources of finance, OCLTA and short-term debt. The results of the disaggregated spontaneous sources; trade credit and accruals and STDTA are presented in model 4. The coefficient of the lagged short-term debt is statistically significant at 5% and both trade credit and accruals are negative and statistically significant at 10%, which confirms the substitute relationship between STDTA and spontaneous sources. The economic impact of OCLTA is very significant because a one standard deviation increase produces a decrease in the dependent variable of between 62% and 67%.

8.6.3 Current assets

The study found that the positive relationship between CATA and short-term financial debt is positive and statistically significant in all models (at 1% in Column 3 and Column 5; and at 5% in Column 1, Column 2 and Column 6), suggesting that South African firms pursue the matching principle. Şen and Oruç (2010) found a strong statistically significant relationship between short-term financial debt and the past level, current level and expected/future level of current assets. However, Andani and Al-hassan (2012) found an inverse relationship between liquid assets and short-term debt. The relationship between STDTA and the three forms of current

assets (inventory, trade receivables and cash holdings) was also analysed. Only the coefficient of inventory was positive and statistically significant at 10%, respectively, suggesting that the increase in inventory is partly financed by short-term debt, consistent with Fosberg (2012) . The study did not find any evidence of any association between trade receivables and cash and marketable securities and short-term debt.

An attempt was made to reconcile the positive relationship between STDTA and CATA in this study with previous studies' findings on trade credit and CATA. Since short-term debt is a considered an alternative or a complement of trade credit, it follows that the relationship between CATA and trade credit should be similar to the relationship between short-term financial debt and trade credit.

A positive relationship was found between current assets and trade credit in previous studies (García-Teruel and Martínez-Solano, 2010, Niskanen and Niskanen, 2006). Similarly, this study finds a positive relationship between CATA and STDTA, which confirms the substitute or complementary role. Generally, short-term debt is either unsecured or secured against liquid assets; therefore the positive relationship can also be interpreted differently. The positive coefficients could also be a result of the use of current assets as collateral against short-term borrowing. If the providers of short-term funds require collateral, an increase in current assets results in increased capacity to borrow more short-term funds ceteris paribus; hence a positive association.

8.6.4 Sales growth

The relationship between sales growth and short-term financial debt was analysed after distinguishing sales growth as positive and negative sales growth. Positive sales growth follow the expected sign, meaning that positive sales growth results in an increase in the amount of short-term borrowings. Current assets increase in tandem with an increase in the level of sales in order to increase production; hence sales growth increases the need for short-term funds. This finding is similar to that of Khan et al. (2012) on the impact of sales growth on trade credit,

confirming the substitution relationship hypothesised. A one unit increase in the standard deviation in P_{GROWTH} produces an average increase in short-term debt of 11%, which shows the strong economic impact of positive sales growth assets on short-term debt.

Negative sales growth was expected to reduce the need for short-term funds. The study did not find any evidence that negative sales growth has any influence on short-term debt. One possible explanation is that negative sales growth could be transitory and therefore firms do not necessarily reduce their demand for short-term debt. In addition, creditors may be willing to support firms going through a lean spell if they consider the phase to be temporary.

8.6.5 Cash flows

The Earnings Before Interest and Tax to Total Assets (EBITTA) coefficient is negative and statistically significant at 5% in most of the models, confirming the inverse relationship with short-term debt. An increase in operating cash flows reduces the need for external finance to support the growth in current assets; consistent with previous studies (Şen and Oruç, 2010, Andani and Al-hassan, 2012). In this respect, short-term financial debt shares the same characteristics as trade credit and is consistent with the Pecking Order Theory on capital structure (García-Teruel and Martínez-Solano, 2010, Niskanen and Niskanen, 2006, Petersen and Rajan, 1997) and debt ratio (Ozkan, 2001). It is important to state that under the partial adjustment assumed in this analysis, firms do not necessarily follow the Pecking Order in their financing; rather they pursue target short-term financial debt level. The economic impact of EBITTA is very significant. On average a one unit increase in the standard deviation in EBITTA results in a 13% decrease of the dependent variable (STDTA).

8.6.6 Term structure

Interest on corporate debt is tax deductible; this creates an interest tax shield which enhances the value of the firm. An upward sloping term structure encourages the use of short-term debt while a downward sloping one encourages the use of long-term debt (Gitman et al., 2010). Term structure was calculated as follows; the ten-year South African bond yield minus three-month South Africa Government Treasury bills yield (see Appendix A6). This study found a

statistically significant negative relationship between short-term financial debt and term structure, suggesting that listed firms in South Africa use less short term borrowings when short-term interest rates are lower than long-term interest rates. These results are consistent with the analysis of Brick and Ravid (1991). Brick and Ravid (1991) argue that firms employ less short-term bank borrowing when the term structure is upward sloping and vice-versa. This is consistent with the tax liability argument which states that an upward sloping yield curve favours the use of long-term debt so that they benefit from the higher tax shield generated by a higher tax liability (thereby increasing the value of the firm). In Singapore, Chen et al. (1999) found no relationship between term structure and short-term bank borrowing and attributed this to the nature of the data (annual data) used in their study.

8.6.7 Macroeconomic conditions

Favourable economic conditions impact positively on the short-term debt levels used by firms, as real GDP is statistically significant at 5%. When the economy is in an expansion phase, firms potentially experience higher stock turnover rates and growth in current assets, which increase the need for funding to support this growth.

8.6.8 The global financial crisis

The dummy variable CRISIS which took the form 1 (and 0 otherwise) to represent the period of the financial crisis; (the years 2008 and 2009) was included in Model 1. The dummy variable's coefficient was positive and statistically significant at 5%, suggesting that the global financial crisis positively impacted the short-term debt levels of these listed firms in South Africa. These results lend support to the trend analysis results reported in Table 12 which show that short-term financial debt levels increased marginally during the period 2008-2009. The result also supports the notion that South African banks were not significantly affected by the crisis, thanks to the implementation of the National Credit Act prior to the crisis, and were probably still able to extend more credit during the crisis period. These findings might also suggest that firms resorted to more bank finance even though interest rates were high, which emphasises the fact that in times of a credit crunch, access to credit is more important than the cost of

credit. Consequently, firms borrow even at high interest rates so that they keep operations running. South African firms have conservative capital structures and low debt levels (Erasmus, 2009); therefore it is possible that these firms were able to increase their debt levels during the crisis.

8.6.9 Fixed assets and other statistically insignificant factors

The study did not find any statistically significant relationship between fixed assets and short-term debt. Most short-term borrowing is either unsecured or secured against current assets or liquid assets; this probably explains the non-significance of fixed assets. The study did not find any influence of size, non-debt tax shields, and creditworthiness on the level of short-term debt used by these firms.

8.7 CHAPTER SUMMARY

The major aim of this chapter was to analyse the working capital financing practices of firms listed on the JSE. Working capital financing of is one of the key areas in short-term financial management. Regression results showed that firms have target levels of both trade credit and short-term financial debt and they quickly adjust towards these target levels. The substitution relationship between trade credit and short-term financial debt was confirmed in this study. In addition, it was noted that these short-term financing instruments share factors that influence their use, such as the availability of internal resources, liquid assets and the state of the economy; which to some extent explain their substitution relationship. Factors such as firm size and creditworthiness were found to be insignificantly related to these two financing instruments.

CHAPTER NINE

WORKING CAPITAL, FIXED INVESTMENT AND FINANCIAL CONSTRAINTS ESTIMATION RESULTS

9.1 INTRODUCTION

One of the areas that have been much debated without resolution in corporate finance is the sensitivity of fixed investment to cash flows. However, in this debate the role of working capital has largely been neglected. Fazzari and Petersen (1993) attempted to incorporate the role of working capital in their investment-financial constraints analysis using US manufacturing firms while a more recent study examined the role of working capital management in alleviating financial constraints in China (Ding et al., 2013). This chapter presents the results of fixed investment, working capital and financial constraints interactions. The main objective is to establish whether working capital makes a difference in alleviating financial constraints, given the South African financial landscape. The way a firm manages its working capital financing and investment decisions may help it to overcome the challenges presented by financial constraints.

Table 30 presents the descriptive statistics. I_{it} denotes fixed investment for firm i at time t, K_{it} represents beginning of the year fixed assets, CF_{it} its cash flow, Q_{it} ratio is the Tobin's Q, change in net working capital (ΔW), was calculated as net working capital (NWC) at the end of the year minus net working capital at the beginning of the year($NWC_{it} - NWC_{it-1}$).

The average fixed investment to fixed capital (INV/K) ratio is 0.26, a median value 0.25 with volatility of 0.23. The average change in investment in the net working capital to fixed capital ($\Delta W/K$) ratio was 0.18 with a median value 0.06 which indicates a scattering to the right of the tail. The standard deviation of $\Delta W/K$ is 0.78, which is far higher than the standard deviation of fixed investment (INV/K) of 0.23. This supports the notion that working capital is reversible but fixed investment is not, particularly in the short run and could be an indication that these firms use working capital to alleviate financial constraints. The average cash flow to fixed capital (CF/K) ratio is 1.33 with a median value 0.73.

TABLE 30: WORKING CAPITAL, FIXED INVESTMENT AND FINANCIAL CONSTRAINTS DESCRIPTIVE STATISTICS

Variable	Mean	Std. Dev.	Median
Q ratio	2.1583	1.7787	1.6200
Fixed investment/fixed capital (INV/K)	0.2554	0.2314	0.2498
Cash flow/Fixed capital (CF/K)	1.3273	1.4161	0.7395
Change in working capital / Fixed capital $(\Delta W/K)$	0.1846	0.7819	0.0613
Total Investment $(INV/K + \Delta W/K) = INVW/K$	0.4400	0.8831	-0.1590
Net working capital / Fixed capital (NWC/K)	7.1667	1.5500	0.6530
Non-cash working capital / fixed capital $(\Delta NCWC/K)$	1.0800	16.3000	0.2578

Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

9.2 CASH FLOW INVESTMENT SENSITIVITY ESTIMATION RESULTS

All equations were estimated in first-differences, to control for firm-specific, time-invariant effects. The use of the first-difference GMM approach suggested by Arellano and Bond (1991) enables the analysis to control for possible endogeneity problems. Two or more lags of each of the regressors were used as instruments.

Column 1 of Table 31 reports the results of Equation 25, determining the sensitivity of investment (INV/K) to cash flows (CF/K). The coefficient of CF/K is positive and significantly different from zero (0.095). The results show that fixed investment of South African firms is strongly sensitive to cash flow. The cash flow elasticity evaluated at the sample mean is 0.5. Elasticity was calculated as follows; the coefficient on CF/K multiplied by mean value of CF/K divided by the mean value of INV/K. A 10% increase in cash flow leads to a 50% increase in fixed investment. The coefficient of CF/K can be interpreted as an indication of financial constraints faced by firms (Ding et al., 2013). The positive coefficient is consistent with previous studies (Guariglia, 2008), albeit far lower than the one obtained by Fazzari and Petersen (1993) who obtained a coefficient of 0.38. . These results suggest that when South African listed firms

experienced negative cash flow shocks, they massively reduce their fixed investment. However, if these firms use working capital to smooth fixed investment, the result obtained in column 1 of Table 30 might be understated.

TABLE 31: CASHFLOW, FIXED INVESTMENT AND WORKING CAPITAL

	(1)	(2)	(3)	(4)
	INV/K	ΔW/K	INVW/K	INV/K
CF/K	0.095***	0.249***	0.341***	0.104***
	(27.47)	(49.42)	(32.76)	(52.02)
QRATIO	0.039***	-0.269***	-0.223***	0.040***
	(7.02)	(-32.51)	(-21.51)	(11.14)
ΔW/K	-	-	-	-0.046***
	-	-	-	(-17.88)
m_2	0.801	0.743	0.720	0.859
Hansen	66.48	71.89	69.93	76.85
df	61	61	61	81
p-values	0.29	0.16	0.20	0.61

*t statistics in parenthesis. *, ** and *** denote significance at 10%, 5% and 1%, respectively.*
Time dummies' coefficients not reported for brevity.
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

Column 2 of Table 31 presents the results of the relationship between cash flow and working capital investment (Equation 26). The coefficient of cash flow is 0.25 and is precisely defined. The results show that investment in working capital is strongly sensitive to cash flow (CF/K). The cash flow elasticity evaluated at sample mean is 1.79. The coefficient and the elasticity are below the ones reported in previous studies (Fazzari and Petersen, 1993, Ding et al., 2013). In their study Fazzari and Petersen (1993) found that the cash flow coefficient was 0.839 and the cash flow elasticity was 1.67. For foreign, private and collective firms in China, the coefficients of cash flow were 0.5, 0.4 and 0.7, respectively, while the elasticities of the same firms were 1.24; 2.35 and 3.76, respectively (Ding et al., 2013).

The coefficient and the elasticity of working capital to cash flow are far higher than the coefficient and elasticity of fixed investment to cash flow; consistent with the expectation that working capital is used to smooth fixed investment. The coefficient (0.25) and the elasticity (1.79) of the change in cash flow on working capital investment are far higher than its coefficient (0.095) and elasticity (0.5) on fixed investment; consistent with the argument that working capital is more reversible than fixed investment (Fazzari and Petersen, 1993) and that working capital investment adjustment costs are lower than fixed capital adjustment costs (Carpenter et al., 1994). In the presence of negative shock on cash flows, firms do not reduce their working capital and fixed investment proportionately. Working capital is highly reversible and net working capital can be temporarily negative if the firm decides to adopt a more aggressive approach to working capital management (Fazzari and Petersen, 1993). In contrast, fixed investment is highly irreversible and the fixed investment level is more costly to adjust. Negative net working capital means that working capital is a source of funds (Chiou et al., 2006) implying that short-term finance is being used to finance not only short-term investments but long-term investments.

These results suggest although South African firms increase their working capital when their cash flows increase, their magnitude of increase is not the same as that of Chinese firms. In the presence of cash flow shocks, South African firms reduce their working capital and fixed disproportionately, cutting more working capital that fixed investment. However, the magnitude of reduction is not comparable to the ones of Chinese firms as shown by the sensitivity of both sensitivity of fixed investment and working capital to cash flow. This possibly explains why South African firms have not reported high growth rates like the Chinese firms. The low sensitivity of fixed investment and working capital to cash flow is probably explained by the presence of good financial system from which firms can access funds when they experience shocks to their cash flow shocks. For example in the preceding chapter, it was established that during the financial crisis, sample firms were able to increase their short-term borrowings when the supply of short-term funds in most financial markets was waning.

Column 3 of Table 31, the results of Equation 27, presents the cash flow and total investment relationship. Total investment is defined as fixed plus working capital and this is divided by fixed capital. By construction the coefficient of cash flow in column 3 (0.349) should be equal to the sum of the coefficients in column 1 (0.0946) and column 2 (0.249). The elasticity of the total investment of the firm calculated at sample means is 1.03.

Column 4 of Table 31 presents the results of Equation 28 where the change in working capital was included in the cash flow-fixed investment regression. Consistent with expectations, ΔW/K has a negative sign (-0.0464). The negative sign suggests that working capital competes with fixed investment for limited funds in a financially constrained firm (Fazzari and Petersen, 1993). The elasticity of ΔW/K is 0.03, which means that when working capital increases by 10%, fixed investment decreases by 0.3%, which suggests that the level of competition is very low. When the instruments were lagged twice and three times, ΔW/K was not significant. When lags were increased to four, ΔW/K became statistically significant. It should be noted that increasing the number of lags may cause over fitting bias. In this case, no over-fitting bias was detected as a result of the introduction of more instruments.

9.3 CASH FLOW INVESTMENT SENSITIVITY OF HIGH/LOW WORKING CAPITAL FIRMS

In order to test whether working capital makes a difference in alleviating financial constraints, regressions were conducted after firms were classified as high and low working capital. High (low) working capital firms were those that were above (below) the sample median change in net working capital, (ΔW). Dummy variables, HIWK and LOWK representing high and low working capital firms respectively were interacted with variable CF/K.

Table 32 presents the results of the empirical test of the sensitivity of cash flow to working capital after the mentioned classification. The sensitivity of investment in working capital to cash flow is significant for both high and low working capital firms. The coefficient of HIWK is higher than that of LOWK, consistent with expectations. The sensitivity of working capital investment to cash flow of firms with large working capital is higher than the sensitivity of firms

with low working capital. These results suggest that among South African listed firms, working capital acts as a 'shock absorber' when cash flows become negative; therefore firms characterised by higher working capital are better positioned to absorb the shock than firms with low working capital.

TABLE 32: CASH FLOW-WORKING CAPITAL SENSITIVITY OF HIGH/LOW WORKING CAPITAL FIRMS

	ΔW /K
CF/K*LOWK	0.049***
	(4.30)
CF/K*HIWK	0.312***
	(39.45)
QRATIO	-0.211***
	(-20.94)
m_2	0.716
Hansen	69.16
df	56
p-values	0.13

*t statistics in parenthesis. *, ** and *** denote significance at 10%, 5% and 1%, respectively.*
Time dummies' coefficients not reported for brevity.
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

In the presence of negative shock to cash flow, both high and low working capital firms adjust their working capital investment. However, the magnitude of adjustment is larger for firms with high working capital levels. The marginal value of working capital for low working capital firms is very high, which means that these firms are not prepared to offset the negative cash flow using their working capital (Carpenter et al., 1994).

Table 33 shows that the sensitivity of investment in fixed capital to the cash flow of low working capital firms is higher than the sensitivity of investment in fixed capital to the cash flow of

higher working capital firms. The cash flow coefficients of high and low working capital firms are 0.12 and -0.048, respectively and are both significant. The marginal value of working capital is relatively low for high working capital firms; therefore when they experience negative cash flow shocks, such firms have better capacity to lower their investment in working capital. Firms with high working capital can draw down their working capital investment until it becomes negative. A negative working capital position implies that the firm is using short-term funds to support both short-term investments and part of fixed or long-term investments as was noted by Etiennot et al. (2012) in entertainment, hotel and catering and personal service firms in Asia, Europe, America and the UK.

TABLE 33: CASH FLOW-FIXED INVESTMENT SENSITIVITY OF HIGH/LOW WORKING CAPITAL FIRMS

	INV/K
CF/K*LOWK	0.120***
	(16.93)
CF/K*HIWK	-0.048***
	(-9.56)
QRATIO	0.049***
	(6.02)
m_2	0.855
Hansen	60.50
df	57
p-values	0.35

*t statistics in parenthesis. *, ** and *** denote significance at 10%, 5% and 1%, respectively.*
Time dummies' coefficients not reported for brevity.
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

As hypothesised, the sensitivity of investment in fixed capital to the cash flow of low working capital firms is higher than their high working capital counterparts because they cannot absorb the shock as much as the latter can. Low working capital firms respond to cash flow shocks by

cutting their capital expenditures because to them working capital has relatively high marginal value and they cannot easily adjust their working capital investment (Ding et al., 2013). Investment projects are 'now-or-never' opportunities which means they are perishable in nature (once they are not undertaken they are lost forever) (Boyle and Guthrie, 2003). The perishable nature of projects results in a higher sensitivity to cash flow fluctuations for low working capital firms (Fazzari and Petersen, 1993).

Ding et al. (2013) analysed the sensitivity of investment of state-owned, foreign, private and collective firms in China. Their study found that while low working capital private and collective firms in China adjusted their fixed investment in the presence of cash flow shocks, low working capital foreign firms did not. They attributed the behaviour of foreign firms to their good financial standing which enables them to access external finance with ease and use such external funds to undertake fixed investments. When they experience negative cash flows, low working capital firms did not cut their fixed investment but used externally sourced funds to fund fixed investment.

Based on these findings, it can be said that when South African firms with high working capital experience cash flow shocks, they cut their working capital more than their counterparts with low working capital. When South African firms with low working capital experience cash flow shocks, they cut their fixed investment more than their counterparts with high working capital. These findings also confirm the hypothesis that working capital is highly reversible. South African firms can maintain high working capital levels that enable them to deal with cash flow shocks. South African firms use working capital to absorb cash flow shocks and reduce the sensitivities of fixed investment to cash flows. The reduction of cash flow sensitivities using working capital means that firms can maintain consistent levels of fixed investment.

9.4 WORKING CAPITAL, PROFITABILITY AND CASHFLOW

This section illustrates the cash flow investment sensitivity of firms considering their profitability and working capital level. High (low) profitable firms are those firms that are above (below) the sample median, Return on Assets (ROA). The results presented in Table 34 Column 1 show that the cash flow working capital sensitivity of firms with high working capital yielding high profitability ($CF/K*HIWK_{HIGHROA}$) is higher (0.22) than the sensitivity of firms with low working capital with low profitability ($CF/K*LOWK_{LOWROA}$) (0.003).

TABLE 34: CASH FLOW-WORKING CAPITAL INVESTMENT SENSITIVITY OF HIGH/LOW PROFITABILITY FIRMS

	(1)	(2)
	ΔW /K	ΔW /K
$CF/K*HIWK_{HIGHROA}$	0.216***	-
	(40.86)	-
$CF/K*LOWK_{LOWROA}$	0.003***	-
	(4.49)	-
$CF/K*LOWROA_{HIWK}$	-	0.090***
	-	(18.35)
$CF/K*HIGHROA_{LOWK}$	-	0.199***
	-	(66.26)
QRATIO	-0.121***	-0.239***
	(-24.69)	(-25.59)
m_2	0.71	0.906
Hansen	78.88	70.82
df	57	57
p-values	0.03	0.10

*t statistics in parenthesis. *, ** and *** denote significance at 10%, 5% and 1%, respectively.*
Time dummies' coefficients not reported for brevity.
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

Column 2 of Table 34 shows that profitable firms with low working capital (CF/K*HIGHROA$_{LOWK}$) have a higher (0.199) cash flow working capital investment sensitivity than less profitable firms with high working capital (CF/K*LOWROA$_{HIWK}$) (0.0903). In the presence of a cash flow shock, profitable firms with low working capital can reduce their working investment more than less profitable firms with high working capital. This shows that despite their good returns, profitable firms are forced to cut their capital expenditure whey they experience a cash flow shock. Less profitable firms with high working capital are better positioned to absorb the shock to their cash flows with their high working capital compared with their counterparts with low working capital. This finding may also explain why profitable firms with poor working capital management can go into bankruptcy, while less profitable firms with good working capital management can weather the storms of economic upheavals.

9.5 WORKING CAPITAL, PROFITABILITY, CASHFLOW AND FIXED INVESTMENT

Table 35 column 1 shows that the cash flow fixed investment sensitivity of firms with high working capital yielding high profitability (CF/K*HIWK$_{HIGHROA}$) is higher (0.037) than the sensitivity of firms with low working capital with low profitability (CF/K*LOWK$_{LOWROA}$) (-0.002). This finding is contrary to expectations because it was expected that firms with low working capital delivering low returns should display a greater sensitivity because such firms reduce their fixed investment when they experience cash flow firms. One possible explanation for this result is that less profitable firms might on average have low fixed investment; hence it is not very sensitive to cash flow.

Column 2 of Table 35 shows that the cash flow fixed investment sensitivity of less profitable firms with high working capital (CF/K*LOWROA$_{HIWK}$) is far lower (0.015) than profitable firms with low working capital (CF/K*HIGHROA$_{LOWK}$) (0.0918). In the presence of a cash flow shock, profitable firms with low working capital cut their fixed investment more than less profitable firms with high working capital. This finding provides more evidence on the role of working capital in alleviating financial constraints. Less profitable firms with high working capital are able to minimise cuts to their fixed investment by absorbing the shock with their high working

capital. Despite recording good returns (as measured by the ROA), profitable firms are forced to cut their fixed investment simply because their "shock absorber" is small.

TABLE 35: CASH FLOW-FIXED INVESTMENT SENSITIVITY OF HIGH/LOW PROFITABILITY FIRMS

	(1)	(2)
	INV/K	INV/K
$CF/K*HIWK_{HIGHROA}$	0.037***	-
	(9.20)	-
$CF/K*LOWK_{LOWROA}$	-0.002***	-
	(-4.10)	-
$CF/K*LOWROA_{HIWK}$	-	0.0147***
	-	(3.79)
$CF/K*HIGHROA_{LOWK}$	-	0.092***
	-	(27.01)
QRATIO	0.071***	0.027***
	(18.89)	(4.15)
m_2	0.703	0.593
Hansen	66.45	58.29
df	57	57
p-values	0.18	0.43

*t statistics in parenthesis. *, ** and *** denote significance at 10%, 5% and 1%, respectively.*
Time dummies' coefficients not reported for brevity.
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

9.6 ROBUSTNESS TESTS

The previous section demonstrated that working capital can ameliorate the impact of cash flow shocks on fixed investment. This section illustrates that the cash flow investment sensitivity of firms with high working capital facing low financial constraints is lower than the sensitivity of firms with low working capital facing binding financial constraints.

This section presents the results where the variable CF/K is interacted with two dummies – the working capital investment level dummy and the size dummy and the age dummy. Column 1 in Table 36 presents the results of the estimation of small firms characterised by low working capital ($LOWK_{LARGE}$) and large firms characterised by high working capital ($HIWK_{LARGE}$). As hypothesised, the cash flow investment sensitivity of low working capital small firms is higher (0.11) than the cash flow investment sensitivity of higher working capital large firms (0.05).

TABLE 36: CASH FLOW-FIXED INVESTMENT SENSITIVITY OF YOUNG AND OLD FIRMS

	(1)	(2)
	INV/K	INV/K
$CF/K*LOWK_{SMALL}$	0.112***	-
	(21.26)	-
$CF/K*HIWK_{LARGE}$	0.056***	-
	(10.21)	-
$CF/K*LOWK_{YOUNG}$	-	0.109***
	-	(3.12)
$CF/K*HIWK_{OLD}$	-	-0.020
	-	(-0.28)
QRATIO	0.039***	0.034
	(5.72)	(1.33)
m_2	0.989	0.829
Hansen	61.67	69.96
df	57	57
p-values	0.33	0.12

*t statistics in parenthesis. *, ** and *** denote significance at 10%, 5% and 1%, respectively.*
Time dummies' coefficients not reported for brevity.
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

Column 2 of Table 36 presents the results of the estimation of young firms characterised by low working capital ($LOWK_{YOUNG}$) and older firms characterised by high working capital ($HIWK_{OLD}$). Again as hypothesised, the cash flow investment sensitivity of low working capital younger, small firms is higher (0.11) than the cash flow investment sensitivity of high working capital old firms (0.02 - absolute value) but the coefficient is not significantly different from zero.

Finally, in this section we present the results where the variable CF/K is interacted with two dummies – the working capital investment level dummy and the size dummy. Column 1 in Table 37 presents the results of the estimation of large firms characterised by low working capital ($LOWK_{LARGE}$) and large firms characterised by high working capital ($HIWK_{LARGE}$). As hypothesised, the cash flow investment sensitivity of low working capital large firms is higher (0.0798) than the cash flow investment sensitivity of higher working capital large firms (-0.0345 - absolute value). However, the coefficient of large firms characterised by high working capital is not statistically significant.

TABLE 37: CASH FLOW INVESTMENT SENSITIVITIES OF LARGE AND SMALL FIRMS

	(1)	(2)
	INV/K	INV/K
$CF/K*LOWK_{LARGE}$	0.080**	-
	(2.62)	-
$CF/K*HIWK_{LARGE}$	-0.035	-
	(-0.98)	-
$CF/K*LOWK_{SMALL}$	-	0.170***
	-	(3.72)
$CF/K*HWK_{SMALL}$	-	-0.096**
	-	(-2.65)
QRATIO	0.066**	0.043
	(2.41)	(1.55)
m_2	0.701	0.702
Hansen	64.71	62.78
df	57	57
p-values	0.26	0.28

*t statistics in parenthesis. *, ** and *** denote significance at 10%, 5% and 1%, respectively.*
Time dummies' coefficients not reported for brevity.
Source: Own calculations using a balanced panel over the period 2001 to 2010. Data obtained from the McGregor BFA library.

Column 2 of Table 37 presents the results of the estimation of small firms characterised by low working capital ($LOWK_{SMALL}$) and small firms characterised by high working capital ($HIWK_{SMALL}$). Again as hypothesised, the cash flow investment sensitivity of low working capital small firms is higher (0.178) than the cash flow investment sensitivity of higher working capital small firms (-0.0962 - absolute value). Both coefficients of small firms characterised by high and small working capital are statistically.

9.7 CHAPTER SUMMARY

The aim of this chapter was to examine the relationship between cash flow, working capital and fixed investment and financial constraints. The results showed that investment in fixed assets is very sensitive to cash flow. However this sensitivity is much lower than the sensitivity of working capital to cash flow. When investment in working capital was included in the cash flow-fixed investment analysis, it was found that it was inversely related to fixed investment, confirming the hypothesis that there is competition for funds between fixed investment and investment in working capital. The study also found that working capital alleviates the impact of cash flow shocks on fixed investment. A further analysis revealed that the sensitivity of fixed investment to the cash flow of low working capital firms is higher than that of higher working capital firms. Tests for robustness were conducted using age and size as proxies for measures of financial constraints. It was found that the sensitivity of fixed investment to cash flow of large firms with high working capital levels is less than that of large firms with low working capital levels. For all young firms, it was noted that the sensitivity of fixed investment to cash flow for firms with low working capital levels is higher than their counterparts with high working capital levels. These results show that working capital plays an important role in alleviating the financial constraints faced by firms. Therefore, it is important for finance managers and firms to adopt sound working capital management practices as this improves their performance and alleviates the challenges of access to resources.

CHAPTER TEN

CONCLUSION AND RECOMMENDATIONS

10.1 INTRODUCTION

The aim of this study was to analyse the working capital management practices of firms listed on the JSE with a particular focus on working capital financing and investment practices and the interactions between working capital, fixed investment and financial constraints. More specifically, this study, examined the determinants of working capital investments and working capital finance (trade credit and short-term financial debt) and analysed whether working capital management alleviates financial constraints.

10.2 SUMMARY OF THE STUDY

The first chapter outlined the background to the study, and presented the research problem and the research objectives. Working capital management was largely neglected in both the empirical and theoretical literature in comparison with capital structure and capital budgeting. This paucity of literature existed despite the acknowledgement that most business failures, particularly among small businesses, are caused by improper working capital management. There has been a paradigm shift in perceptions of how working capital should be managed in both corporate governance and financial management and over the past three decades years; it has been the subject of increased attention by both practitioners and researchers. The recent global financial crisis and the ensuing recession enhanced the importance of working capital management as companies faced cash flow problems due to difficulties in accessing short-term funds, forcing them to mine cash from their working capital investments. The pressure to deliver maximum shareholder value has forced many finance managers to search for cheaper funds. However, this search for cheaper funds presents a new paradox in contemporary financial management as there is growing evidence that companies are holding excessive working capital working investments.

There has been very limited academic research on working capital management in South Africa. The implementation of the National Credit Act in 2006 tightened access to credit which makes the financing of working capital in South Africa an interesting subject. Furthermore, despite a robust financial system, JSE-listed firms depend heavily on trade credit as a key short-term financing instrument. Extensive reliance on supplier financing is usually a feature of firms seeking to overcome the financial constraints presented by under-developed financial systems. However, South African financial markets are classified as highly developed. The financing of working capital is also an interesting subject because when implicit costs are taken into account, supplier financing is an expensive short-term financing instrument.

The management of working capital is now receiving particular attention because working capital can be crucial in alleviating financial constraints. The rapid growth of Chinese firms has been attributed to their efficient management of working capital and use of internally-generated resources. South Africa has failed to match the growth of its partners in the BRICS alliance despite the presence of world-class financial markets. Therefore, the study sought to investigate if working capital management alleviates the impact of financial constraints in a market with sound financial systems among South African listed firms that have several sources of capital available to them.

The recent global financial crisis and the economic recession that followed were a monumental occurrence which left an indelible mark in human economic history. It was therefore considered important to examine whether the financial crisis had any impact on both the working capital investment and financing practices of JSE-listed firms.

A review of the literature traced the history and evolution of working capital management theory. Most studies analysed found an inverse relationship between working capital management and profitability (as measured by return on equity, return on assets) and concluded that aggressively managing working capital yields more profitability and value creation for shareholders. Other studies found that conservative working capital management

also created value and profitability because policies such as holding high levels of inventory and liberal trade credit policies stimulate sales, leading to more profits and value creation for shareholders. The major limitation of these existing studies is that they arrived at their conclusions without taking into account that any level of working capital investment has benefits and costs. When the benefits and costs of working capital investment are included in the working capital investment-firm value relationship, this study suggests that the outcome could be non-linear. Therefore, the empirical analysis employed a quadratic equation to test whether the firm value-working capital investment relationship is non-linear.

The study reviewed factors that influence working capital investment and found that it is influenced by a complex combination of internal and external factors which include the availability of internal resources, leverage, fixed capital expenditure, operational efficiency, the firm size, growth opportunities, and the market power of the firm and its access to external markets. The major limitation of the studies reviewed is that they did not take into account the fact that most firms pursue a target level of working capital investment which they believe helps them maximise shareholder value. The implication of the pursuit of an optimum working capital level is that firms adjusts towards their target level as their working capital level may not always be at the desired level. Thus the dynamic nature of working capital investment was largely ignored in past studies; hence the use of a partial adjustment model in analysing the determinants of working capital investment in this study. Firms take time to adjust towards the target and the adjustment process itself involves time and costs. Since the working capital investment level may not be at the desired level, the level of financial resources supporting it may also not be at the desired level. Therefore the partial adjustment model was also used to analyse the determinants of the two major working capital financing instruments; trade credit and short-term debt.

The highly integrative nature of working capital management means that when estimating working capital management relationships, one has to take into account the problem of endogeneity. In addition, there are several firm-specific factors that influence working capital

financing and investment policies such as the nature of a firm's products or the entrepreneurial skills of management and their risk tolerance. In light of this, the study employed the Generalised Method of Moments estimation technique to manage the endogeneity problem and the dynamic nature of the data used.

10.3 KEY FINDINGS, IMPLICATIONS, CONTRIBUTION TO THE LITERATURE AND RECOMMENDATIONS OF THE STUDY

The study had the following five objectives; to establish whether listed firms pursue target working capital investment levels; to analyse the working capital investment and its relationship with firm value; to analyse the working capital financing practices of companies listed on the JSE; to investigate whether working capital management alleviates financial constraints in South Africa; and to analyse the impact of the global economic crisis on working capital financing and the investment practices of firms listed on the JSE. The following section presents a summary of the key findings, their implications, the contribution to the literature and the recommendations of the study.

10.3.1 First Objective

This study established that South African firms purse a target level of working capital investment and partially adjust towards that target. The speed of adjustment found in this study (0.5) reflects that South African firms adjust relatively slowly towards their target, suggesting that they face high adjustment costs. The speed of adjustment is a trade-off between the cost of being in disequilibrium and the cost of adjusting towards the target. On the basis of these findings, it can be said that for South African listed firms, the costs of being in disequilibrium are very low; hence they slowly adjust towards their optimum working capital level. The slow speed of adjustment probably explains why it is common for firms to have over-investments in working capital.

These findings also probably explain why Chief Finance Officers spend much time trying to bring non-optimal current assets to their optimal levels. For example, when the firm is above its

inventory target level, it has to run down its stocks by running specials or promotions. These initiatives take time and involve costs (shedding some profit margins in order to push stock off the shelves). In addition, the fact that bringing the working capital investment to its optimal level is not the role of the Chief Finance Officer alone but involves other managers may cause the adjustment process to be slow and costly.

10.3.2 Second Objective

The second objective of the study was to establish the relationship between working capital investment and firm value. One of the major findings and contribution of the study to the body of knowledge is the non-linear relationship between working capital investment and firm value. The major limitation of previous firm value-working capital management studies was their failure to take into account both the positive and negative effects of working capital investment. At any level of working capital investment there are benefits and costs and therefore any study analysing how working capital management influences firm value should take this into consideration.

The non-linear firm value-working capital investment relationship found in this study means that South African firms have an optimal working capital investment point. This implies that when a South African firm deviates from the optimal point, it compromises the value of the firm and its profitability. When a firm operates below its optimum working capital investment level, it suffers shortage costs in the form of lost sales and revenue, and experiences difficulties in meeting its obligations. On the other hand, when the firm is above its optimum level, it suffers carrying costs in the form of lost opportunities due to funds being tied up in low-revenue generating assets, and direct costs such as insurance, storage costs, etc. This study found that any additional investment in working capital of R1 million by a South African firm beyond the optimal point leads to a reduction in firm value by between R200000 and R300000.

The non-linear firm value-working capital investment relationship implies that when managers of South African firms increase working capital investment beyond the optimal point, they are

holding working capital investments above the firm's operating needs; this compromises the value creation goal. Therefore, if South Africa managers are to act in shareholders' best interests, they should strive to bring the working capital investment to the optimal level. Managers should increase investment in working capital in those situations where the benefits exceed the costs and reduce it in cases where the costs exceed the benefits.

Increasing or decreasing working capital investments impacts on more than one area of the firm because the components of working capital are interrelated. Therefore managers should develop systems that are able to monitor and capture the ripple effects of adjusting each component of the firm's current assets investment.

The concave firm value-working capital investment relationship found in this study makes it imperative for managers to understand the key drivers of the working capital requirements of their firm in order to create value for their shareholders. Understanding these key drivers would help managers to minimise the time they allocate to working capital management, since they already spend much time on working capital management. Planning, controlling and monitoring the performance of each component of the firm's working capital can make a difference in today's business environment which is highly volatile and competitive as companies continuously explore new ways of stimulating growth and improving their stock market and accounting performance.

10.3.3 Third Objective

The study found that trade credit is the most dominant short-term financing instrument for listed firms in South Africa, followed by short-term financial debt. It found that both trade credit and short-term financial debt follow a partial adjustment process. The adjustment process for trade credit and short-term financial debt is relatively fast. As a substitute and/or a complement of trade credit, short-term financial debt showed that it has the same characteristics as trade credit.

Considering that suppliers are a key source of short-term finance (through trade credit), this study recommends that managers of South African firms should strive to maintain good supply chain relationships as this ensures that the firm continues to enjoy a good supply of goods as well as a good source of finance. In addition, trade credit has to be well-managed because it is like a double-edged sword in that although it provides “cheap finance”, it is also a major source of corporate maladies and failure. Most corporate liquidations among both small and large businesses are a result of their failure to pay their trade creditors. News of antagonistic supply chain relationships has severe consequences such as a stock price decline as high as 10%.

10.3.4 Fourth Objective

The study investigated the role of working capital management in alleviating financial constraints. This was considered an important area of investigation because Chinese firms which operate in poorly-developed financial systems have used working capital management to alleviate financial constraints and have recorded rapid growth rates. This study found that when working capital was included in the cash flow investment sensitivity equation, it was inversely related to fixed investment, which suggests that working capital competes for funds in these firms. However it was found that the level of competition is very low.

The role of working capital management in alleviating financial constraints was tested by classifying firms as high and low working capital. High (low) working capital firms were those firms that were above (below) the sample median Net Working Capital. This study found that South African firms with high working capital display low cash flow fixed investment sensitivity while low working capital firms have high cash flow fixed investment sensitivity. Thus working capital management plays a crucial role in alleviating financial constraints. The cash flow fixed investment sensitivity of high working capital firms which face few financial constraints (using age and size as proxies for financial constraints) is lower than that of high working capital firms that face more financial constraints and low working capital firms that are less financially constrained.

High working capital on its own may represent poor utilisation of resources. Therefore, in analysing the cash flow investment sensitivity of firms, firms were also classified as high profitable and low profitable firms with high (low) profitability firms being firms which were above (below) the sample median Return On Assets. This study found that high working capital South African firms with high profitability display high cash flow working capital investment sensitivity while low working capital firms with low profitability have low cash flow fixed investment sensitivity.

It is therefore important that South African firms pursue sound working capital management policies as this alleviates the effects of financial constraints. The findings of this study imply that there is scope for South African firms to increase their growth rates by pursuing efficient working capital management policies and taking advantage of the country's sophisticated financial system. Although sound working capital management is very challenging because it embraces all aspects of the firm (production, procurement, marketing credit management, etc.), it is very rewarding. It should form part of the overall corporate strategy of the firm and not be viewed simply as a balance sheet item or a peripheral issue. The success stories of companies such as Dell that have outperformed their peers in both stock and accounting performance by pursuing sound working capital management policies should motivate South African executives to embrace efficient working capital management strategies. The success of Chinese firms in using working capital management to mitigate financial constraints should encourage executives in South Africa to embrace and pursue efficient working capital management practices, because this can make a difference since working capital management decisions are frequent, routine and of a reversible nature.

This study found very high cash flow investment sensitivity among JSE-listed firms. The sample comprised large firms which are supposedly well-established, with good financial standing and credit ratings. Therefore it can be inferred that if such firms display high cash flow investment sensitivity, small to medium enterprises which face binding financial constraints, are also likely to have extremely high cash flow investment sensitivity. This makes a case for Government

support for this sector as SMEs play an important role in the economy. Government intervention programmes for the SMEs sector tend to focus on capital expenditure. This study recommends that intervention programmes should also be directed at working capital as working capital management ensures SMEs' survival and profitability. Supporting SMEs could go a long way in enabling them to grow further, contributing to improved overall economic growth.

10.3.5 Fifth Objective

The study did not find any evidence that the working capital investment of South African firms was affected by the global financial crisis. It found that South African firms increased their short-term financial debt during the global financial crisis. Although occurrences like recession and financial crisis are difficult to predict, it is important for regulators to put laws in place that safeguard the national financial system. Managers should pursue working capital policies that enable them to withstand economic upheavals even though they are beyond their control. Firms that can withstand an economic crisis emerge stronger after the crisis.

Therefore managers should adopt working capital management philosophies that they can implement and monitor carefully. Such policies should enable companies to withstand economic upheavals and emerge stronger. The management of working capital largely depends on the specific circumstances of each firm. Therefore managers should adopt working capital policies that suit their situation, as there is no specific manual or toolkit on managing working capital that is applicable to all firms and sectors.

10.4 SUGGESTIONS FOR FURTHER RESEARCH

This study investigated the working capital financing and investment practices of firms listed on the JSE and whether working capital can make a difference in alleviating financial constraints. The study is not exhaustive and other areas need to be examined. There is an optimum working capital investment level that enables a firm to maximise firm value. The costs of investing in working capital are minimised when shortage costs and carrying costs meet. Further research

could investigate whether the optimal point that maximises firm value is the same as the point where the costs of investing in working capital are minimised.

Questions that remain unanswered include how expensive trade credit is in reality. Further research could establish managers' views on trade credit. For example, do they believe it is as expensive as proposed by both theoretical and empirical researchers? If so, why do they still rely on it so heavily? Bank credit is cheaper in the sense that it generates the tax shield created by the interest tax shield. In addition to being expensive, trade credit does not generate a tax shield because the interest is implicit and is therefore not tax deductible.

The growing evidence that firms hold excessive levels of working capital makes one question the capacity of the markets to distinguish firms that efficiently and inefficiently manage their working capital. Further research could be conducted on the ability of stock markets to penalise (reward) firms that poorly (efficiently) manage their working capital.

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Appendix A1: Working capital management and profitability studies

Study	Description of the data used	Dependent variable (profitability measure)	Main independent variable Working capital efficiency measure	Results obtained
Shin and Soenen (1998)	58 985 American listed firms (1975-1994)	Operating income	Net trade cycle	Negative
			Current ratio	Negative
Deloof (2003)	1009 Belgian firms	Gross operating income	Cash conversion cycle	Negative
			Days accounts receivable	Negative
			Days inventories	Negative
			Days accounts payable	Negative
Lyroudi and Lazaridis (2000)	131 firms listed on the Athens Stock Exchange	Return on assets	Cash conversion cycle	Positive
		Net operating margin	Cash conversion cycle	Negative
García-Teruel and Martínez-Solano (2007)	Spain 8,872 SMEs (1996-2002)	Return on assets	Cash conversion cycle	Negative
			Days accounts receivable	Negative
			Days inventories	Negative
			Days accounts payable	Negative
Raheman and Nasr (2007)	94 firms listed on Karachi Stock Exchange period 1999-2004	Net operating profitability	Cash conversion cycle	Negative
			Days accounts receivable	Negative
			Days inventories	Negative
			Days accounts payable	Negative
Gill et al. (2010)	88 companies listed on the New York Stock Exchange for the period	Gross operating profit	Cash conversion cycle	Positive
			Accounts receivables period	Negative
			Inventories conversion period	Positive

	2005 -2007.		Accounts payable period	Positive
Padachi(2006)	58 SMEs in Mauritius (1998 - 2003)	Return on Total Assets	Cash conversion cycle	Negative
Mathuva (2009)	30 companies listed on the Nairobi Stock Exchange (1993-2008)	Net operating income	Cash conversion cycle	Negative
			Accounts receivables period	Negative
			Inventories conversion period	Positive
			Accounts payable period	Positive
Ganesan (2007)	349 telecommunications equipment companies (2001-2007)	Income total assets	Days' working capital	Negative
Samiloglu and Demirgunes (2008)	25 companies listed on the Istanbul Stock Exchange (1997-1998 and 2007-2008)	Return on Total Assets	Cash conversion cycle	Negative
Narware (2004)	National Fertilizer Limited (NFL)	Return on Investment (ROI)	Current assets to total assets ratio	Positive
			Inventory turnover ratio	Positive
			Debtors turnover ratio	Negative
Singh and Pandey (2008)	Hindalco Industries, India (1990 – 2007)	Return on Total Assets	Current ratio	Negative
			Liquid ratio	Positive
			Inventory turnover	Negative
Eljelly (2004)	Saudi Arabia 29 joint listed companies (1996 - 2000)	Net operating income	Current ratio	Negative
Falope and Ajilore (2009)	50 Nigerian quoted non-financial firms (1996-2005)	Return on Total Assets	Cash conversion cycle	Negative
Shah and Sana (2005)	Oil and Gas sector in Pakistani (2001-2005)	Gross profit margin	Cash conversion cycle	Negative

Appendix A2: Empirical studies on the determinants of working capital management

Researchers	Dependent variable	Independent variables	Hypothesis: coefficient signal	Results :coefficient signal
Chiou et al. (2006)	Working capital requirements / Total assets	Leverage	–	– significant
		Operating cash flow	–	– significant
		Growth opportunity	–	– insignificant
		Age	+	+ significant
		Firm performance	–	+ significant
		Size	+	+ significant
		Industry effect	Significant differences	No evidence found
		Business indicator measured by business cycle during recession	+	– significant
		Business indicator measured by business cycle	-	– significant
Kieschnick et al. (2006)	Cash conversion cycle	Industry practices	+	+ significant

		Size	+	+ significant
		Sales growth	+	+ significant
		Fixed assets ratio	+	– insignificant
		Market power	–	– insignificant
		Board size	–	– insignificant
		Number of independent directors	–	– significant
		CEO compensation measured by total current compensation (stock options excluded)	–	– significant
		CEO compensation measured by CEO total unexercised stock options	–	– insignificant
		Ratio of CEO-held stock	–	+ significant
		Governance index (provisions)	–	+ insignificant
Narener et al. (2008)	Working capital requirements / Total assets	Firm size	+	+ significant
		Leverage	–	+insignificant
		Operating cashflow	–	+insignificant
		Growth	–	– significant

		Business indicator	–	– significant
		Profitability	–	+insignificant
Appuhami (2008)	Working capital requirements	Capital expenditure	–	– significant
		Operating expenditure	–	+ significant
		Financial expenditure	–	+ significant
		Operating cash flow		– significant
		Growth		+ insignificant
		Profitability		+ insignificant
		Leverage		+ insignificant
Nazir and Afza (2009a)	Working capital requirements / Total assets	Operating cycle	+	+ significant
		Operating cash flow	-	significant
		Sales growth		+ insignificant
		Profitability	+	+ significant
		Tobin's Q	+	+ significant
		Leverage	–	– significant
		Level of economic activity	–	+insignificant

		Size		– insignificant
Hill et al. (2010)	Working capital requirements / Total assets	Operating cashflow	+	+significant
		Sales growth	–	– significant
		Contribution margin	+	+insignificant
		Capital market access	+	+ significant
		Market to book ratio	–	–insignificant
		Market power	–	– insignificant
Baños-Caballero et al. (2010)	Cash conversion cycle	Operating cash flow	+/–	– significant
		Leverage	–	– significant
		Sales growth	+/–	+ insignificant
		Size	+	+ significant
		Age	+	+ significant
		Tangible fixed assets	+/–	– significant
		Return	–	+ significant
Palombini and Nakamura (2012)	Working capital requirements / Total assets	Presence of annual compensation connected to profit	–	– insignificant
		Presence of ownership concentration	–	+ insignificant

		Participation of outside directors in the board	–	+ significant
		Leverage	–	– significant
		Free cashflow	–	– insignificant
		Profitability		+ insignificant
		Leverage		+ insignificant
Akinlo (2012b)	Working capital requirements	Leverage		– significant
		Operating cycle		+ significant
		Fixed financial assets to total assets		+ insignificant
		Size		+ significant
		Growth		+ insignificant
		Business indicator		+ significant

Appendix A3: Empirical studies on determinants of trade credit

Researchers	Independent variables	Hypothesis: coefficient signal	Results :coefficient signal
Petersen and Rajan (1997)	Natural log of Total assets		+ significant
	Natural log (1 + age)		+ insignificant
	Natural log $(1 + age)^2$		– insignificant
	Net profit/sales		+ significant
	Positive sales growth		+ significant
	Negative sales growth		– significant
	Relationship with the bank		– insignificant
Deloof and Jegers (1999)	Financial assets	–	– insignificant
	Operating cash flow	–	– significant
	Inventories	+	+ insignificant
	Trade debtors	+	+ significant
	Cash holdings	+	+ significant
	Other short term investments	–	– insignificant
	Other current assets	–	– insignificant
	Supply of trade credit	+	+ significant
Delannay and Weill (2004)	Firm size	+/–	– significant (except in 2countries)
	Profitability	+/–	+ significant
	Positive Growth	+	+insignificant

	Negative Growth	–	Mixed results
	Leverage	+/–	– significant
Niskanen and Niskanen (2006)	Natural log of Total assets	+	+significant
	Natural log (1 + age)	–	– significant
	Natural log $(1 + age)^2$	–	– significant
	Net profit/sales	+	+ insignificant
	Positive sales growth	+	+ significant
	Negative sales growth	+	+ insignificant
	Contribution margin	+	+insignificant
	Contribution margin^2	–	– insignificant
	Macroeconomic conditions	–	–insignificant
	Market interest rate	–	– insignificant
	Terms of trade	–	– insignificant
García-Teruel and Martínez-Solano (2010)	Lagged account payable	+	+ significant
	Operating cash flow	–	– significant
	Long term debt	–	– significant
	Cost of alternative finance	+	+ significant
	Sales growth	+	+ insignificant
	Size	–	– significant
	Age	+	+ insignificant
	Age^2	+	–insignificant
	Assets maturity	+	– significant

	GDP	+	+ significant
Akinlo (2012a)	Profits	–	– insignificant
	Size	+	+ significant
	Inventories	+	+ significant
	Collaterals	+	+ significant
	Liquid assets		+ significant
	Loans		+ insignificant
Khan et al. (2012)	Supply of Trade Credit	+	+ significant
	Creditworthiness and Access to Capital Markets	+	+ significant
	Growth	+	– significant
	Internal Financing	+	+ significant
	Asset maturity	+	+ significant
	Cost of Alternative Capital	+	+ significant

Appendix A4: Growth in Gross Domestic Product quarter on quarter

Year	Quarter1	Quarter 2	Quarter 3	Quarter 4
2002	4.4	5.2	4.6	3.4
2003	2.6	2.0	2.2	2.3
2004	2.6	5.7	6.7	4.3
2005	4.1	7.4	5.6	2.7
2006	6.2	6.7	5.8	6.4
2007	6.1	3.4	5.1	5.7
2008	2.5	5.5	1.3	-0.7
2009	-7.4	-2.8	0.9	3.2

Source StatsSA

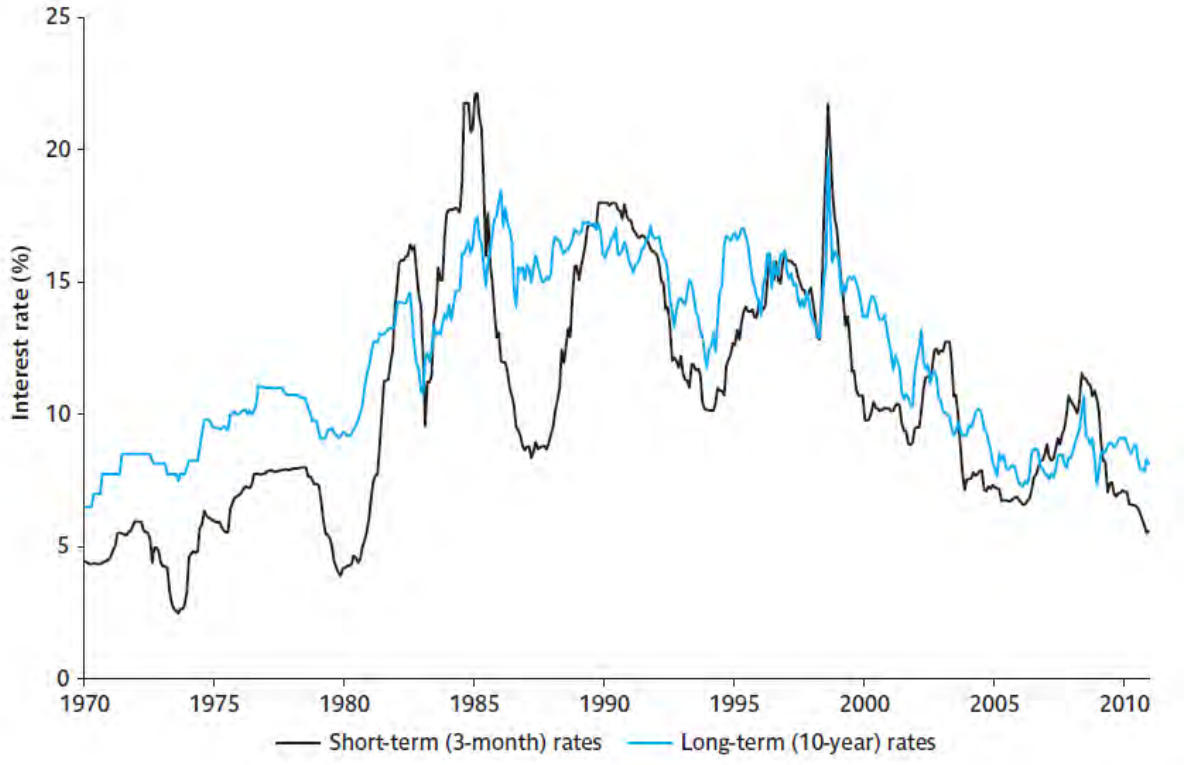
Appendix A5: Lending and Treasury Bills rates

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Prime rate	13.77	15.75	14.96	11.29	10.63	11.17	13.17	15.13	11.71	9.83
Repo rate	10.92	12.25	11.46	7.79	7.125	7.67	9.67	11.625	8.21	6.33
10 year yield	11.63	10.44	9.15	8.38	7.57	7.81	8.29	7.82	9.03	8.38
91 day yield	9.66	11.19	10.63	7.54	6.89	7.37	9.13	10.8	7.84	6.46

Source: South African Reserve Bank

http://www.resbank.co.za/Research/Rates/Pages/CurrentMarketRates.aspx

Appendix A6: **South African Interest rates 1970-2010**



Source: (Firer et al., 2012): Fundamentals of Corporate Finance 5th South African Edition McGraw-Hill Berkshire (page :205)