Gordon Institute of Business Science
University of Pretoria

Effect of macroeconomic conditions on capital structure choice for listed South African firms

MK Magwai
98278615

A research project submitted to the Gordon Institute of Business Science, University of Pretoria, in partial fulfilment of the requirements for the degree of Master of Business Administration.

Date: 10 November 2014

Abstract
The objective of this study was to investigate the effect of macroeconomic conditions on capital structure choices of listed South African firms. Three variables were identified to be of interest, namely: real gross domestic product (GDP) growth rate, inflation rate, and unemployment rate. The sample consisted of 230 listed firms, and analysis was done through fixed-effect regression.

Macroeconomic variables were found to have an effect on capital structure choice of firms. Real GDP growth was found to have a positive influence on long term and overall leverage. Whilst inflation was found to have a negative effect on long term and overall leverage. Unemployment rate, on the other hand, was found to positively influence long term leverage, short term leverage and overall leverage.

The findings from this study on the influence of both real GDP growth and inflation on leverage suggest that firm management make decisions on issuance of short term debt in a different manner to long term debt. The same was not true with unemployment rate though, this variable influenced both types for leverage in a similar manner. These findings have some implications for how managers should think about macroeconomic changes when making decisions on their firm's capital structure.

Keywords
Capital structure, leverage, real GDP growth rate, inflation, unemployment rate.

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

MK Magwai	10 November 2014
	Date

Acknowledgements

I would like to thank my wife, Mokgadi, for her selfless sacrifice and unwavering support over the last two years. Your patience, understanding, encouragement and love were a source of strength. *Ke a leboga, Moratiwa*.

I would also like to express my gratitude to my supervisor, Mr Kuben Thaver, for his time, support and thoughtful guidance which were readily offered throughout the drafting of this research report.

To my friends and family, thank you for your support and understanding over the last two year.

To the management, faculty and staff at the Gordon Institute of Business Science, thank you for the great MBA experience that your institution afforded us.

TABLE OF CONTENTS

1. Introduction to Research Problem

1.1. Research Title

The study aims to investigate the following topic:

- *Effect of macroeconomic conditions on capital structure choice for listed South African firms.*

1.2. Research Problem

1.2.1. Context of the Study

It has been reported in the press that large corporations are hoarding more cash than ever in recent times (BusinessDay, 2012; Popelka, 2013). Corporate bank deposits have been reported to be at record highs (in South Africa) despite interest rates being at 30 year lows (Kamhunga, 2012). Weak domestic confidence and global uncertainty have been cited as primary reasons for these low levels of investment by companies (Kamhunga, 2012). That is macroeconomic conditions that have prevailed since the global financial crisis in 2008 are seemingly influencing how companies are making decisions on investment in future production capacity. High levels of risk aversion on the part of companies has resulted in accumulated cash being invested toward low yielding instruments and not into future production capacity (Kamhunga, 2012).

Some investors have argued that large cash balances reduce shareholder value due to reduced returns on capital (Popelka, 2013). Furthermore, these investors contend that getting the excess cash off companies' balance sheet and back to shareholders would increase the company value (Popelka, 2013). Whilst, on the other hand, some have argued that companies are waiting to see when the economy turns so that they can make large scale future capacity investment (Clark, 2013). When the economic climate improves companies can then employ their cash reserves to fund investment that enable them to capture opportunities in the market (Kamhunga, 2012). It has been further argued that firms that avoid debt and accumulate cash in order to preserve financial flexibility should be well positioned to meet financing needs and maintain investments in future, even under unfavourable economic conditions which are typically characterized by lack of credit (Dang, 2013). Furthermore, corporate loan growth driven by investment in future capacity was expected to rise as more macroeconomic certainty was expected (Kamhunga, 2012).

It is implied here that macroeconomic conditions are influencing how managers are making financing decisions for their companies.

It is apparent that there's an inherent conflict of interest between company management and external investors as highlighted by this issue; management would like the flexibility to use cash reserves to exploit future opportunities whilst shareholders would like get better returns from the "idle cash reserves". This will influence financing decisions of firms on whether to make use of internal retained earnings or external sources of funding, that is, debt or equity.

1.2.2. Significance of the Study

The question of how do firms fund their operations and growth aspirations is, therefore, a pertinent one; given the limited availability of funding resources during more certain macroeconomic conditions, and excessive cash stockpiles as observed after the recession due to the 2008 global financial crisis. A further consideration is the associated costs of obtaining external funding. Capital to fund a firm's activities can be accessed internally or externally (Bharath, Pasquariello, & Wu, 2009; Tsyplakov, 2008). Internally firms can make use of their retained earnings provided that they are profitable and their operating cash flow allows for this (Bokpin, 2009). External funding is normally a choice between debt and equity or a combination of both. A combination of these instruments determines the capital structure of a firm (Katagiri, 2014). Capital structure decisions have a bearing on the weighted average cost of capital (WACC) and, therefore, on amount of investment in future expansion and on the value of a firm (Firer, Ross, Westerfield, & Jordan, 2012). The goal in the decision making around capital structure is intended to maximize firm value or firm equity value.

According to Chen (2010) companies decide on quantity of debt to hold, timing of debt restructuring, and when to default based on their cash flows as well as macroeconomic conditions. The economy is made up of a cross-sectional mix of firms (Arnold, Wagner, & Westermann, 2012) in addition to government and households (Chen, 2010). Firms get the same macroeconomic shocks but experience different idiosyncratic shocks (Arnold et al., 2012). That is, capital structure of firms should be determined by idiosyncratic factors which are specific to the individual firm as well as macroeconomic factors which are similar

for firms in a particular economy.

Through knowing what macroeconomic factors and how they influence capital structure choices of firms, managers of companies can better position their firms to withstand macroeconomic shocks. This knowledge can assist firm management in their decision making around capital structure in order to maximize firm value in the context of changing macroeconomic conditions.

1.3. Research Motivation

The question of what factors determine capital structure of firms has been a matter of debate in the literature since the ground breaking work of Modigliani and Miller (1958). However the question of how macroeconomic conditions influence capital structure has only recently started to received attention (Bokpin, 2009; Chen, 2010; Hackbarth, Miao, & Morellec, 2006; Katagiri, 2014). Despite a large body of research on the question of what determines corporate capital structure, it remains one of the most hotly contested issues in financial economics (Rauh & Sufi, 2010). The current study aims to contribute to this debate by investigating the effect of macroeconomic conditions on capital structure of South African listed firms.

1.4. Research Objectives

The objectives of this research study are focused on the following aspects:

- Literature review on effect of macroeconomic conditions on capital structure. Including clarification on various measures for capital structure.
- Identify and isolate relevant macroeconomic variables that have an influence on capital structure based on current knowledge in the literature.
- Determine how the identified macroeconomic variables affect capital structure of firms.

1.5. Research Scope

The scope for the current study was to investigate the effect of macroeconomic conditions on capital structure choices of listed South African firms. The relevant macroeconomic variables were identified and their influence of capital structure was investigated.

The report is presented in seven chapters:

Chapter one (Introduction to Problem Statement) provides the context of the study, presents the problem statement and justifies the need for the study. The objectives for the research are also outlined here. The limitations of the study and assumptions made on the study are discussed.

Chapter two (Theory and Literature Review) explores the relevant theory and reviews existing literature on the subject of capital structure in the context of changing macroeconomic conditions. Gaps (areas that require further research) on the subject of macroeconomic conditions and capital structure were identified. Three macroeconomic variables were identified to be of interest in this study, namely: real gross domestic product (GDP) growth rate, inflation rate, and unemployment rate.

Chapter three (Research Hypotheses) presents the research hypotheses that have been formulated to achieve the objectives of this study. Gaps identified in the literature from chapter two are expressed in form of hypotheses to be test in the study. These hypotheses are related to how each of the identified macroeconomic variables influence capital structure. The precise purpose of the research is defined in terms of the research hypotheses.

Chapter four (Research Methodology) discusses the methodology selected for the study and the reasons for the selection. The selected research methodology and approach is further described in terms of the following aspects: data collection, data analysis, populations and sampling, and unit of analysis.

Chapter five (Results) gives the research findings for the study based on application of the research methodology. Both descriptive and analytic results are presented.

Chapter six (Discussion of Results) discusses the research findings in the context of the research hypotheses. Furthermore, the research findings are contrasted with findings from the literature review, and are discussed in light of the research objectives.

Chapter seven (Conclusion) highlights the main research findings from the study, and recommendations based on the research findings are made. Furthermore, recommendations on future research based on the study are made.

1.5.1. Limitations of the Study

The study was conducted on a sample of 230 listed firms from South Africa. The results from the study may not be applicable to other countries. Unlisted firms were not part of the sample used in the study; therefore, the results may not be applicable unlisted firms.

The study focuses on macroeconomic factors and does not include firm-specific factors and industry factors. The reason for excluding these factors from the study is that effect of these parameters on capital structure has been generally well established in the literature.

1.5.2. Assumptions

In conducting this research the following assumptions were made:

- Literature from developing and developed countries was used in the study; it was assumed that findings from research conducted in other parts of the world are applicable to the study.
- There is an implicit assumption made about the integrity of the financial data collected from the database used in the study.

2. Theory and Literature Review

2.1. Introduction

The literature review section first gives a brief overview on capital structure theory. Thereafter, various measures used in the literature to represent capital structure are explored. Determinants of capital structure for companies in the literature are then evaluated, with specific focus on the effect of macroeconomic variables identified in the literature. Three macroeconomic variables were identified to be of interest in this study based on the literature review, namely: real gross domestic product (GDP) growth rate, inflation rate, and unemployment rate. Other factors that could possibly be of interest in the current study that were excluded from the scope are also discussed, and reasons for their exclusion are given. Lastly, a summary of the literature review is presented highlighting key findings from the literature that are carried forward in this study.

2.2. Capital Structure Theory

There is currently no one universal theory that explains capital structure decisions of firms (Lemma & Negash, 2013). Instead there are conditional theories, namely: trade off theory (Dang, 2013; Modigliani & Miller, 1958; Ramjee & Gwatidzo, 2012; Titman & Wessels, 1988); agency theory (Jensen & Meckling, 1976; Kayo & Kimura, 2011); pecking order theory (Frank & Goyal, 2009; Leary & Roberts, 2010; Myers, 1984) and; market timing theory (Axelson, Jenkinson, Stromberg, & Weisbach, 2013; Baker & Wurgler, 2002).

2.2.1. Trade-Off Theory

Trade off theory states that there is an optimal capital structure, and capital structure is determined by a company's balancing of the benefit and cost associated with debt and equity financing (Dang, 2013; Lemma & Negash, 2013; Titman & Wessels, 1988). The benefit of debt is derived through the interest tax shield due to tax subsidies on interest payments, whilst cost of debt is mainly bankruptcy costs or cost of financial distress (Dang, 2013; Jensen & Meckling, 1976; Titman & Wessels, 1988). According to this theory companies employ their tangible assets as risk-reducing collateral to provide lenders with security in the event of financial distress (Delcoure, 2007). These financial distress concerns are said to be more relevant to firms that have had poor performance, and would have difficulties servicing debt (Dang, 2013). Firms with low debt tax shield and high non-

debt tax shields are said to have little incentive to incur debt (Dang, 2013).

Under the static trade-off model there is no difference between actual/observed leverage and targeted/optimal leverage; the observed debt ratio is used as proxy for a firm's optimal leverage (Ramjee & Gwatidzo, 2012). Companies may deviate from their target leverage for various reasons (DeAngelo, DeAngelo, & Whited, 2011; Ramjee & Gwatidzo, 2012). Firm management may deviate from the firm's optimal/target leverage when managers find it optimal to borrow in order to finance investments projects (DeAngelo et al., 2011; Dudley, 2012). Firms subsequently have incentives to return the firm to target by paying down the debt as circumstances permit (DeAngelo et al., 2011). Furthermore, shocks may move the optimal leverage in such a way that firms are forced to try to move towards a moving target/optimal leverage; this is referred to as the dynamic trade-off model (Ramjee & Gwatidzo, 2012). Optimal leverage is said to be chosen dynamically to maximize individual firm value (Bhamra, Kuehn, & Strebulaev, 2010).

2.2.2. Agency Theory

An agency relationship has been defined as "a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent" (Jensen & Meckling, 1976: p308). The manager of the firm is the agent, and outside equity and debt holders are principals (Jensen & Meckling, 1976). Jensen & Meckling (1976) argued that the agent (management) will not always act in the best interest of principals (outside equity and debt holders); therefore, principals have to limit divergence from their interest by establishing appropriate incentives for the agent and by incurring monitoring costs. These additional costs to prevent the agent from diverting from the interests of the principals are referred to as agency costs (Jensen & Meckling, 1976). The agency theory states that there is a conflict of interest between firm management, and outside equity and debt holders, and proposes that the capital structure of a firm is determined by the management's attempt to balance agency costs of debt against benefits of debt (Jensen & Meckling, 1976; Lemma & Negash, 2013). An assumption made in the agency theory is that managers behave in an opportunistic and rational manner in order to maximise their own utility at the expense of shareholders (Kayo & Kimura, 2011). According to this view, leverage would discipline management behaviour in such a way that firms with few

investment opportunities and high free cash flow would increase the use of debt (Kayo & Kimura, 2011). According to this theory, there is an optimal capital structure and it is said to be achieved when agency costs are minimized and firm value is maximized (Jensen & Meckling, 1976; Korteweg, 2010).

There are some studies that have contradicted the agency theory (Camara, 2012; Levy & Hennessy, 2007). According to Levy & Hennesy (2007) and Camara (2012) firm management engages in tactical managerial activism whereby financial managers actively replace equity with debt during economic expansions and replace debt with equity during economic contractions. This school of thought contradicts agency theory, as the opposite behaviour is predicted by the agency theory.

2.2.3. Pecking Order Theory

Although the pecking order theory has long roots in the descriptive literature (Frank & Goyal, 2009), it was first clearly articulated by Myers (1984). The Pecking order theory states that a firm will finance its activities in a specific order that sequentially starts with internal funding, followed by debt, and as a last resort equity (Bharath et al., 2009; Myers, 1984; Tsyplakov, 2008). The reason of this 'pecking order' is said to be the presence of information asymmetries and transactional cost that firms face when raising capital from external sources (Lemma & Negash, 2013; Myers, 1984). Others have argued that although the pecking order theory is mostly articulated in terms of asymmetric information, it can also be caused by tax, agency, or behavioural considerations (Frank & Goyal, 2009). It has been argued that managers of a firm know more than the rest of the market about their firm's value (information asymmetry), therefore, when a firm issues equity the market penalizes it (Bharath et al., 2009; Myers, 1984).

Managers tend to issue new shares when prices are overvalued to the benefit of old shareholders; consequently, new shareholder might demand a discount on the stock price in order to buy (Kayo & Kimura, 2011). Furthermore, from an outside investor's point of view, equity is more riskier than debt; therefore a rational investor will negatively revalue a firm's securities when it announces a security issue (Frank & Goyal, 2009). Accordingly, managers avoid issuing new shares even though this might be at the expense of potentially profitable investments at times (Kayo & Kimura, 2011). Those within the firm

view retained earnings as a better source of funds than outside financing (Frank & Goyal, 2009). As a result pecking order theory states that companies should issue equity for financing only as a last resort (Bharath et al., 2009; Myers, 1984). According to this theory, there is no optimal or targeted capital structure (Frank & Goyal, 2009; Myers, 1984). Pecking order theory implicitly assumes that managers behave rationally but not necessarily opportunistically unlike the agency theory (Kayo & Kimura, 2011).

2.2.4. Market Timing Theory

Market timing theory states that firms consider conditions in the securities market and time raising of funds in accordance with market conditions (Baker & Wurgler, 2002; Lemma & Negash, 2013; Tsyplakov, 2008). The basic idea is that when firm managers need to finance their companies they consider current prevailing conditions in both debt and equity markets; they then proceed to make use of whichever market is more favourable (Frank & Goyal, 2009). Firms take advantage of mispricing in equity markets when issuing equity, so that more equity is issued when markets are overpriced than when they are under-priced (Axelson et al., 2013; Tsyplakov, 2008). It has been further argued that firms should issue more debt when debt market is overvalued, and more favourable interest rates are on offer (Axelson et al., 2013).

If both debt and equity market are unfavourable firms may defer issuances (Frank & Goyal, 2009). However, if conditions are unusually favourable, firms may raise funds even if there is no current need for funds (Frank & Goyal, 2009). According to the market timing theory there is no optimal capital structure, instead “capital structure evolves as the cumulative outcome of past attempts to time the equity market” (Baker & Wurgler, 2002: p27). Market timing theory suggest that stock returns and debt market conditions will have an important role to play in capital structure decision, but has nothing to say about most factors traditionally considered in corporate leverage studies (Frank & Goyal, 2009).

2.3. Measures of Capital Structure

There is currently no universally accepted definition of capital structure in the literature (Lemma & Negash, 2013). It has been argued that the purpose of analysis or of the study should determine the measures of capital structure used (Lemma & Negash, 2013). Most

previous studies on capital structure have employed financial leverage/debt ratio as the dependent variable (Delcoure, 2007; Fosu, 2013; Frank & Goyal, 2009; Jõeveer, 2013; Katagiri, 2014; Lemma & Negash, 2013; Modigliani & Miller, 1958; Titman & Wessels, 1988). Table 1 gives various definitions of book leverage used in the literature.

Table 1: Book leverage measures of capital structure.

Measure	Definition	References	Equation
Short term leverage	Ratio of book value of short-term debt to total assets	(Delcoure, 2007)	$\frac{Book\ Value\ Short\ Term\ Debt}{Total\ Assets}$
	Ratio of short-term debt to equity	(Bokpin, 2009)	$\frac{Short\ Term\ Debt}{Equity}$
	Ratio of current liabilities to total book assets.	(Lemma & Negash, 2013)	$\frac{Current\ Liabilities}{Total\ Book\ Assets}$
Long term leverage	Ratio of book value of long-term debt to total assets	(Delcoure, 2007; Ramjee & Gwatidzo, 2012; Shivdasani & Stefanescu, 2010)	$\frac{Book\ Value\ Long\ Term\ Debt}{Total\ Assets}$
	Ratio of long-term debt to equity	(Bokpin, 2009)	$\frac{Long\ Term\ Debt}{Equity}$
	Ratio of non-current liabilities to total book assets.	(Lemma & Negash, 2013)	$\frac{Non\ Current\ Liabilities}{Total\ Assets}$
Overall Leverage	Ratio of total debt to total book assets	(Delcoure, 2007; Fosu, 2013; Frank & Goyal, 2009; Jõeveer, 2013; Leach, Moyen, & Yang, 2013; Leary & Roberts, 2010; Ogden & Wu, 2013; Ramjee & Gwatidzo, 2012)	$\frac{Total\ Debt}{Total\ Book\ Assets}$
	Ratio of total liabilities to total book assets	(Bokpin, 2009; Booth & Aivazian, 2001; Jõeveer, 2013; Lemma & Negash, 2013; Psillaki & Daskalakis, 2009; Weill, 2008)	$\frac{Total\ Liabilities}{Total\ Book\ Assets}$
	Ratio of total debt to earnings before interest, tax, depreciation & amortisation (EBITDA)	(Axelson et al., 2013)	$\frac{Total\ Debt}{EBITDA}$
	Ratio of total debt to enterprise value	(Axelson et al., 2013)	$\frac{Total\ Debt}{Enterprise\ Value}$
Interest Coverage	Earnings before interest and taxes over interest expenses	(Chen, 2010)	$\frac{Earnings\ before\ interest\ and\ taxes}{Interest\ Expenses}$

Defining leverage as total liabilities over total book assets has the advantage that it is more readily available for all firms in data sets, and the disadvantage that it is likely to overstate the level of leverage (Jõeveer, 2013). Total liabilities includes some short term items that are used for transactions only, and capital structure studies are concerned with part of liabilities that are used for financing (Jõeveer, 2013). According to Jõeveer (2013) a more relevant measure of leverage is the sum of long-term debt and short-term debt divided by the sum of long-term debt and short-term debt plus the book value of equity.

2.3.1. Book value vs Market value

A further disagreement in the literature is whether to use book leverage or market leverage (Kayo & Kimura, 2011; Lemma & Negash, 2013). There are arguments for use of both book-based and market-based leverage.

First, the argument for book leverage is addressed. According to Lemma & Negash (2013) most capital structure studies do not make use of market-based measures of capital structure for the following reasons:

- Most theoretical predictions on capital structure apply to book-based values;
- Book-based measures of capital structure better reflect management's target capital structures this is because market based values of equity are dependent on a number of factors outside the firm and management's control;
- Book measures are obtained from financial statements, and therefore have some credibility;
- Market-based values of debt are not always readily available.

Other researchers have also argued for use of book leverage due to market values data limitations (Delcoure, 2007; Titman & Wessels, 1988). It has been further argued that book leverage would be a better measure of capital structure because it captures the value of assets in place and not growth options reflected in market values (Barclay, Smith and Morellec (2006) cited in (Kayo & Kimura, 2011)).

The argument against the use of book leverage states that book values rely on distortions rooted in accounting rules; for example book equity may be negative and the correlation

between book and market value may be weak when firms are still small (Kayo & Kimura, 2011). It is argued that market leverage would be a more appropriate measure of capital structure in such cases (Kayo & Kimura, 2011). Kayo & Kimura (2011) further argue that market leverage more precisely reflect the potential for future leverage, as opposed to book leverage which only reflect debt used to finance assets already in place. Table 2 gives various market leverage measures of capital structure used in the literature.

There's a third school of thoughts that argue that the use of book leverage gives similar results to market values as the two are highly correlated (Bowman (1980) cited in (Lemma & Negash, 2013)).

Table 2: Market leverage measures of leverage.

Measure	Definition	References	Equation
Short term leverage	Ratio of short-term debt to market value of assets (book value of debt plus market value of equity)	(Mittoo & Zhang, 2008)	$\frac{Short\ Term\ Debt}{Book\ Value\ Debt + Market\ Value\ Equity}$
Long term leverage	Ratio of long term debt to market value of assets (book value of debt plus market value of equity)	(Frank & Goyal, 2009; Mittoo & Zhang, 2008; Shivdasani & Stefanescu, 2010)	$\frac{Long\ Term\ Debt}{Book\ Value\ Debt + Market\ Value\ Equity}$
	Ratio of long term debt to market value of assets (book value of total debt less current liabilities plus market value of equity)	(Cook & Tang, 2010)	$\frac{Long\ Term\ Debt}{Book\ Value\ Total\ Debt - Current\ Liabilities + Market\ Value\ Equity}$
	Ratio of total long term debt to sum of total long term debt and firm equity market value.	(Kayo & Kimura, 2011)	$\frac{Total\ Long\ Term\ Debt}{Total\ Long\ Term\ Debt + Market\ Value\ Equity}$
Overall Leverage	Ratio of total debt to market value of assets (total debt plus market value of equity)	(Cook & Tang, 2010; Frank & Goyal, 2009; Leach et al., 2013; Mittoo & Zhang, 2008; Ogden & Wu, 2013)	$\frac{Total\ Debt}{Total\ Debt + Market\ Value\ Equity}$
	Ratio of total liabilities to market value of assets (total liabilities plus market value of equity)	(Cook & Tang, 2010)	$\frac{Total\ Liabilities}{Total\ Liabilities + Market\ Value\ Equity}$

In order to navigate around these differences of views on what measure of capital structure is most appropriate, a lot of the researchers employ more than one measure of capital structure (Bokpin, 2009; Cook & Tang, 2010; Delcoure, 2007; Frank & Goyal, 2009; Jõeveer, 2013; Mittoo & Zhang, 2008). Often the measures employed will include a combination of short-term, long-term and overall debt measures (Bokpin, 2009; Cook & Tang, 2010; Delcoure, 2007; Frank & Goyal, 2009; Jõeveer, 2013; Mittoo & Zhang, 2008), sometimes both book-based and market based leverage measures are used (Ogden & Wu, 2013).

Tables 1 and 2 above show that 22 studies used book leverage whilst only 12 used market leverage. The dominant view based on Tables 1 and 2 appears to be that book leverage is the more common measure of capital structure, and this parameter is typically represented as different forms of book leverage, namely: short term leverage; long-term leverage and overall leverage.

Some of the reasons why book leverage is commonly used, include:

- The results will be comparable to other studies on capital structure.
- Ease of data access from databases such as Thomson Reuters Datastream.
- Most theoretical predictions on capital structure apply to book-based values (Lemma & Negash, 2013);
- Book-based measures of capital structure better reflect management's target capital structures this is because market based values of equity are dependent on a number of factors outside the firm and management's control (Lemma & Negash, 2013).
- Book leverage captures the value of assets in place and not growth options reflected in current market values (Kayo & Kimura, 2011).

2.4. Capital structure decisions/determinants

Capital structure decisions have been described in the literature to be determined by firm characteristics, industry factors and country or macroeconomic factors (Axelson et al., 2013; Frank & Goyal, 2009; Kayo & Kimura, 2011; Psillaki & Daskalakis, 2009). In addition capital structures have also been reported to change with time (Kayo & Kimura, 2011).

There's some disagreement about how and the extent to which these three categories of factors (that is, firm characteristics, industry factors and country/macroeconomic factors) impact on capital structure of companies. There is a view that firm factors, and time are more significant determinant of capital structure, and country factors and industry factors play a role, but a less important one (Kayo & Kimura, 2011). Other research has found that country factors do not have an impact on capital structure at all (Psillaki & Daskalakis, 2009). This conclusion by Psillaki & Daskalakis (2009) was limited to the countries that were the focus of their study, namely: France, Greece, Italy and Portugal. The commonality in institutional and legal characteristics possibly contributed to the obtained results. This study by Psillaki & Daskalakis (2009) does not, however, rule out a possible effect of institutional factors on capital structure decision of firms. Psillaki & Daskalakis refer to institutional factors as those parameters that determine the institutional environment in which firms operate; examples of these factors include: legal system; judicial efficiency; corruption, extend of property rights, and contract enforcement. Some research, on the other hand, has reported industry factors (Fosu, 2013; Frank & Goyal, 2009) and country factors (Axelson et al., 2013; Cook & Tang, 2010; de Jong, Kabir, & Nguyen, 2008; Frank & Goyal, 2009; Weill, 2008) to have an influence on capital structure. Some of this research has found that industry (Kayo & Kimura, 2011) and country factors (de Jong et al., 2008) have both a direct and an indirect impact on capital structure. The indirect effect of country and industry factors in reinforcing firm specific factors impact on capital structure choices has received limited attention in the literature. This issue will not be pursued further in the current study, as previously stated the focus in the current study is on the direct impact of macroeconomic conditions on capital structure choices.

2.4.1. Business Cycle and Leverage (or Capital Structure)

Little attention has been given to the impact of macroeconomic conditions on capital structure choice within the literature (Hackbarth et al., 2006; Katagiri, 2014). The studies by Hackbarth et al. (2006), Korajczyk & Levy (2003) and Booth & Aivazian (2001) were some of the first papers to demonstrate that macroeconomic conditions influecne financing policies of firms (Chen, 2010). Furthermore, financing decisions, and therefore capital structure choice, within companies have been reported to reflect the state of the economy (Bokpin, 2009; Korajczyk & Levy, 2003).

Hackbarth et al. (2006) and Bokpin (2009) postulated that if optimal leverage is determined by balancing the tax benefit of debt and cost of debt, then both the benefit and cost of debt will be dependent on macroeconomic conditions. They argued that the tax benefit of debt depends on the level of company cash flows which in turn depends on whether the economy is in a recession or an expansion (Bokpin, 2009; Hackbarth et al., 2006). Hackbarth et al. (2006) and Bokpin (2009) further argued that costs of debt will depend on the probability of default and loss given default; both of which should be dependent on the current state of the economy. It has been reported that defaults are more likely during recessions, when they are more costly and harder to bear (Arnold et al., 2012). Firms tend to default at higher cash flow levels during recessions than when the economy is expanding (Chen, 2010). That is, when operating cash flows of companies are dependent on economic conditions, it would be expected that capital structure choices will be adjusted according to the economy's business cycle phase (Hackbarth et al., 2006). Evidence of this has been presented in the literature, where a survey of chief financial officers (CFO's) of firms revealed that they account for variations in macroeconomic conditions when making capital structure decisions (Graham & Harvey, 2001)

There's conflicting views in the literature on how macroeconomic conditions affect leverage. One view is that leverage varies counter-cyclically with macroeconomic conditions (Axelson et al., 2013; Chen, 2010; Cook & Tang, 2010; Korteweg, 2010; Lingenfelder, 2013); that is, leverage increases during contractions and decreases during expansions. Another view is that the variation of leverage with macroeconomic conditions is different for financially constraint and unconstraint companies (Korajczyk & Levy, 2003; Levy & Hennessy, 2007). Leverage has been reported to vary counter-cyclically with macroeconomic conditions for financially unconstrained firms (Korajczyk & Levy, 2003; Levy & Hennessy, 2007). Whilst for financially constrained firms, leverage was reported flat over the business cycle by some (Levy & Hennessy, 2007), and others have reported leverage to vary pro-cyclically with macroeconomic conditions (Korajczyk & Levy, 2003). A firm is defined as financially constraint if it does not have sufficient cash flow to take on investment opportunities and it faces severe agency costs when accessing financial markets (Korajczyk & Levy, 2003). Korajczyk & Levy (2003) used two criteria to determine if a firm is financially constraint:

- First criteria specified that a financially constraint firm does not have a net repurchase of debt or equity and does not pay dividends within a specified period.

- Second criteria specified that a financially constraint firm has a Tobin's Q greater than one at the end of the last quarter of the period under consideration. Tobin's Q was defined as the sum of market value of equity and book value of debt divided by the book value of assets; equation (1) gives this definition.

$$Tobin's\ Q = \frac{Market\ Value\ of\ Equity + Book\ Value\ of\ Debt}{Book\ Value\ of\ Assets} \quad (1)$$

A firm was labelled as financially unconstraint if it did not meet these two criteria (Korajczyk & Levy, 2003).

The discussion so far in this paper has focused on observed/actual leverage. Some researchers have distinguished between optimal/target leverage and observed/actual leverage in their studies (Chen, 2010; Korteweg, 2010). These studies have reported that optimal leverage is pro-cyclical, whilst actual/observed leverage is counter-cyclical (Chen, 2010; Korteweg, 2010). Chen (2010) explains this counter-cyclicality to be due the fact that when a recession arrives firms cannot adjust their leverage downward without incurring additional cost. When firms enter into a recession they are stuck with the debt issued in good times, as a result leverage is likely to increase because equity value falls more than debt during a recession (Arnold et al., 2012; Chen, 2010). As previously mentioned, under the static trade-off model there is no difference between actual/observed leverage and targeted/optimal leverage; the observed debt ratio is used as proxy for a firm's optimal leverage (Ramjee & Gwatidzo, 2012).

2.4.2. Macroeconomic Variables

Variables considered to define macroeconomic conditions in a particular country, in previous capital structure studies, include:

- Gross domestic product (Axelson et al., 2013; Bokpin, 2009; Booth & Aivazian, 2001; Cook & Tang, 2010; Dang, 2013; de Jong et al., 2008; Frank & Goyal, 2009; Jõeveer, 2013; Kayo & Kimura, 2011; Lemma & Negash, 2013; Lingenfelder, 2013)
- Taxation (Delcoure, 2007; Frank & Goyal, 2009; Jõeveer, 2013; Lemma & Negash, 2013)
- Inflation (Bokpin, 2009; Booth & Aivazian, 2001; Camara, 2012; Frank & Goyal,

2009; Jõeveer, 2013; Lemma & Negash, 2013)

- Interest rates (Axelson et al., 2013; Barry, Mann, Mihov, & Rodríguez, 2008; Bokpin, 2009; Chen, 2010; Graham & Harvey, 2001)

Other studies investigating the effect of country factors on capital structure decision have focused on institutional factors such: sophistication of equity and bond markets (de Jong et al., 2008; Delcoure, 2007; Kayo & Kimura, 2011); and efficiency of the legal system (de Jong et al., 2008; Weill, 2008).

2.4.2.1. Economic growth

There are varying views on how changes in economic growth influence capital structure choice. Economic growth has been represented in previous studies by gross domestic product (GDP) growth rate, which is defined as change in gross domestic product over a set period (Kayo & Kimura, 2011). One view is that leverage is negatively influenced by the GDP growth rate (Axelson et al., 2013; Kayo & Kimura, 2011). This view is supported by those who reported that leverage varies counter-cyclically with macroeconomic conditions (Axelson et al., 2013; Chen, 2010; Korteweg, 2010; Lingenfelder, 2013).

Another view is that real GDP growth rate has a positive effect on leverage (Booth & Aivazian, 2001; Dang, 2013; de Jong et al., 2008; Frank & Goyal, 2009). It is worth noting that in the studies reporting a negative relationship between leverage and GDP growth, there is no clear definition that this is real GDP growth as opposed to nominal growth. Whilst in the four studies reporting a positive relationship, GDP growth was clearly defined in real terms. The positive relationship between real GDP growth rate and leverage was explained to be due to firms in countries with higher real GDP growth rates willing to increase their leverage in order to finance future investments (de Jong et al., 2008). Dang (2013) argues that firms are more likely to avoid debt when the real GDP growth rate declines. That is, leverage is pro-cyclical (Dang, 2013).

An alternate view has been presented by Jõeveer (2013) who presented evidence that GDP growth rate negatively influences leverage for listed firms, and the relationship between leverage and GDP growth rate is positive for unlisted firms. It is not clear why GDP growth rate influences listed and unlisted firms in a different manner; no reason was

proposed in the study. Other research has evaluated growth rate of real GDP per capita; and leverage was found to be negatively influenced by the growth rate in real GDP per capita in this study (Lemma & Negash, 2013).

It is clear that there is no consensus in the literature on how economic growth influences capital structure of firms. One view is that real GDP growth rate negatively influences leverage (Axelson et al., 2013; Kayo & Kimura, 2011; Lemma & Negash, 2013), which is supported by the view that leverage varies counter-cyclically with macroeconomic conditions (Axelson et al., 2013; Chen, 2010; Korteweg, 2010; Lingenfelder, 2013). The other more dominant view is that real GDP growth influences leverage positively because of firms in countries with higher real GDP growth rates are willing to increase their leverage in order to finance future investments (Booth & Aivazian, 2001; Dang, 2013; de Jong et al., 2008; Frank & Goyal, 2009).

2.4.2.2. GDP per capita

Some researchers have evaluated whether GDP per capita is associated with capital structure choice (Bokpin, 2009; Lemma & Negash, 2013). GDP per capita has been reported to influence leverage negatively (Bokpin, 2009). It was argued that a higher GDP per capita may translate into growth for firms which would result in a rise in retained earnings for firms, and this explains the negative relationship between GDP per capita and leverage (Bokpin, 2009). Lemma & Negash (2013), on the other hand, reported that firms in richer countries tend to have more long-term debt and less short-term debt than those in poorer countries. GDP per capita was found to positively influence long term leverage ratio, but was reported to be negatively related to short-term and total leverage ratios (Lemma & Negash, 2013). That is, the impact of GDP per capita on capital structure is dependent on what measure of capital structure is used (Lemma & Negash, 2013) .

2.4.2.3. Inflation

Inflation represents an overall index for the cost of living for a particular country (Mokhova & Zinecker, 2014). According to Lemma & Negash (2013), inflation rate is ordinarily considered as a proxy for a government's ability to manage the economy and it is said to offer information about the stability of a given currency in long-term contracting. Lemma &

Negash, therefore, argue that inflationary situations affect financing patterns of firms. It has been shown empirically that inflation positively influences leverage (Frank & Goyal, 2009; Lemma & Negash, 2013). This effect of inflation was, however, reported to be relatively weak by Frank & Goyal (2009), but not by Lemma & Negash (2013). It has been argued that a firm is likely to issue more debt under inflationary environment because inflationary situations has the effect to both decrease the real value of debt and increase the real tax advantage of debt to firms (Frank & Goyal, 2009; Lemma & Negash, 2013). The positive effect of inflation on leverage is consistent with the trade-off theory (Frank & Goyal, 2009; Lemma & Negash, 2013).

Other research has reported a negative association between inflation and leverage (Booth & Aivazian, 2001; Camara, 2012; Jõeveer, 2013). This negative association has been explained to be due to firms resorting to internal sources of funding in periods of high inflationary pressures as inflation increases the cost of obtaining external sources of funding whether in the form of long-term or short-term debt (Bokpin, 2009; Camara, 2012). The expectation of changes in inflation rate are said to influence credit and reinvestment risks (Mokhova & Zinecker, 2014). Although inflation pushes up the monetary value of the firm's assets, the resultant higher interest rate and monetary risk caused by inflation are said to reduce firm leverage (Booth & Aivazian, 2001). In support of this view, Chen (2010) postulated that firms behave like market timers by issuing more debt when interest rates become lower. It has been shown empirically that interest rates negatively influence leverage (Axelson et al., 2013; Barry et al., 2008).

Based on these different views presented above it is clear that the effect of inflation on leverage is still a matter of debate in the literature. It is the author's opinion that the views put forward by Frank & Goyal (2009) and Lemma & Negash (2013), that financial managers of firms will take advantage of the decreased real value of debt and increase tax benefits of debt offered by higher inflation, is more plausible for financially unconstraint firms (as argued by Korajczyk & Levy (2003)). Bokpin (2009)'s view that high inflation increases the cost of external financing makes sense for firms that are financially constraint (as argued by Korajczyk & Levy (2003)). This raises the possibility that differences in reported results of the effect of inflation on capital structure are determined by whether firms under consideration are financially constraint or unconstraint.

The dependent variable used to measure inflation in the literature was the consumer price index (CPI) (Lemma & Negash, 2013). CPI is defined as "the annual percentage change in the cost to the average consumer of acquiring a fixed basket of goods and services that may be fixed or changed at specified intervals, such as yearly" (Lemma & Negash, 2013: p1097).

2.4.2.4. Unemployment Rate

According to the trade-off theory capital structure decisions are a consequence of a balance between benefit of debt and its cost – in the form of bankruptcy cost. It has been argued that the biggest bearer of bankruptcy cost is the employees of the firm because their employment contract would be terminated in the event of a firm filing for bankruptcy (Berk, Stanton, & Zechner, 2010). According to Berk et al. (2010), labour intensive firms have lower levels of debt; in fact extremely labour intensive firms are reported to have negative debt-to-equity and therefore, hold cash. This view is supported by findings in other studies which have shown leverage to increase with fixed assets-to-book value of firms (Frank & Goyal, 2009). The higher the fixed asset-to-book value the more capital intensive (and less labour intensive) the firm is (Berk et al., 2010). It has been postulated that firms might limit their use of debt due to human capital concerns (Berk et al., 2010).

Given that leverage has previously been reported to be counter-cyclical (Axelson et al., 2013; Kayo & Kimura, 2011; Lingenfelder, 2013), it would be expected that that leverage would increase with increasing unemployment rate. This is because unemployment rate increases during economic downturn (Chen, 2010), therefore leverage should increase with increasing unemployment rate; and unemployment rate decreases during economic expansion, therefore leverage should decrease with decreasing unemployment rate (Mokhova & Zinecker, 2014). To the author's knowledge the relationship between unemployment rate and capital structure has not been studied much in the literature; the only study that has explored this issue (to the author's knowledge) is that by Mokhova & Zinecker (2014).

2.4.2.5. Interest rates

Chen (2010) postulated that firms issue more debt when interest rates are lower; thus,

they behave like “market timers”. It has been shown empirically that interest rates negatively influence leverage (Axelson et al., 2013; Barry et al., 2008). This can be explained by the surveyed behaviour of managers who tend to time issuance of debt for periods when interest rates are at historical lows and debt is cheaper (Graham & Harvey, 2001). A different view on this issue was presented by Bokpin (2009) who presented empirical evidence that interest rate positively influences the choice of short term debt over equity, whilst the effect of interest rate was found to be insignificant in most of the other measures of capital structure choice. Other measures of capital structure choice used by Bokpin (2009) were long term debt to equity ratio and total debt to total book assets ratio. The effect of interest rates on capital structure is expected to be related to changes in inflation because changes in inflation determine interest rates (Booth & Aivazian, 2001).

2.4.2.6. Stock market development

Stock market development reduces company leverage (Kayo & Kimura, 2011). This is because of the availability of an alternative source of capital in the form of equity for firms. Stock market development has been reported to affect leverage indirectly by increasing the effect of growth opportunities to reduce leverage (Kato & Kimura).

2.4.2.7. Bond market development

Bond market development have been found to have a positive effect on leverage (de Jong et al., 2008). According to de Jong et al. (2008) this can explained by the fact that when a country’s bond market is more developed, firms have more choice for borrowing and, therefore, are willing to take on more debt. Other research, conversely, has found bond market development to reduce leverage (Kayo & Kimura, 2011). Bond market development has also been found to decrease the effect of asset tangibility on leverage (Kayo & Kimura, 2011). The reason for this effect is said to be that a more developed bond market negates the importance offered by fixed assets for companies.

2.4.3. Firm Specific Factors

There is generally some consensus regarding which firm specific factors determine capital structure choices, and how they affect the choices. The more prominent factors identified

in the literature are discussed below in no particular order. Four main firm factors are reported to influence capital structure: asset tangibility; profitability; firm size; and market-to-book ratio.

First, tangibility of a company's assets has been found to increase leverage (Axelson et al., 2013; Frank & Goyal, 2009; Kayo & Kimura, 2011). Asset tangibility is a reflection of collateral aspect of fixed assets to be an important leverage driver (Kayo & Kimura, 2011). Second, profitability reduces leverage (Axelson et al., 2013; Frank & Goyal, 2009; Psillaki & Daskalakis, 2009). Third, larger firms tend to have higher leverage (Frank & Goyal, 2009; Kayo & Kimura, 2011). Fourth, market-to-book ratio (used as proxy for growth opportunities) reduces leverage (Axelson et al., 2013; Frank & Goyal, 2009). As previously stated, firm specific factors are not part of the scope of the current study.

2.4.4. Industry Factors

The impact of industry factors on capital structure as previously reported in the literature has focused on the following variables as measure of industry characteristics: competition (Fosu, 2013; Graham & Harvey, 2001; Kayo & Kimura, 2011), munificence – availability of resources for a particular industry (Kayo & Kimura, 2011), dynamism – volatility of the industry environment (Kayo & Kimura, 2011); barriers to entry (Leach et al., 2013). Furthermore, industry median debt ratios have been reported to have an influence on capital structure of companies (Frank & Goyal, 2009). The idea of an industry debt ratio implies that firms operating in the same industry tend to converge toward a particular leverage value that is driven by industry specific factors (Frank & Goyal, 2009). The effect of industry factors on capital structure is beyond the scope of this study.

2.5. Literature Review Summary

2.5.1. Measure of Capital Structure

There is currently no universally accepted definition of capital structure in the literature (Lemma & Negash, 2013). It has been argued that the purpose of analysis or of the study should determine the measures of capital structure used (Lemma & Negash, 2013). In order to navigate around these differences of views on what measure of capital structure is most appropriate, a lot of the researchers employ more than one measure of capital

structure (Bokpin, 2009; Cook & Tang, 2010; Delcoure, 2007; Frank & Goyal, 2009; Jõeveer, 2013; Mittoo & Zhang, 2008). Often the measures employed will include a combination of short-term, long-term and overall debt measures (Bokpin, 2009; Cook & Tang, 2010; Delcoure, 2007; Frank & Goyal, 2009; Jõeveer, 2013; Mittoo & Zhang, 2008), sometimes both book-based and market based leverage measures are used (Ogden & Wu, 2013).

In line with normal practice in literature the current study employed book leverage as a measure of capital structure. The dependent variable adopted in this study was, therefore, book leverage, and the following measures of leverage were employed (consistent with Table 1):

- Short term leverage: defined as short-term debt over total book assets.
- Long-term leverage: defined as long-term debt over total book assets.
- Overall leverage: defined as overall debt over total book assets

The reason for choosing book leverage is that book value information is more readily available than market information (Delcoure, 2007; Lemma & Negash, 2013; Titman & Wessels, 1988). Numerous researchers have adopted book leverage for this reason; this makes this study more comparable to many others in the literature (See Table 1).

2.5.2. Macroeconomic Variables

2.5.2.1. Real GDP Growth Rate

A macroeconomic factor worth exploring further based on literature review is real GDP growth. It is uncertain whether an increase in real GDP growth causes an increase or decrease in leverage. It is clear that there is no consensus in the literature on how economic growth influences capital structure of firms. Although there is a viewpoint that real GDP growth rate negatively influences leverage (Axelson et al., 2013; Kayo & Kimura, 2011; Lemma & Negash, 2013), which is supported by the view that leverage varies counter-cyclically with macroeconomic conditions (Axelson et al., 2013; Chen, 2010; Korteweg, 2010; Lingenfelder, 2013). This was further supported by the argument that when firms enter into a recession they are stuck with the debt issued in good times, as a result leverage is likely to increase because equity value falls more than debt during a recession (Chen, 2010); hence the negative relationship between real GDP growth and

leverage. However, the counter argument, that real GDP growth influences leverage positively because of firms in countries with higher real GDP growth rates are willing to increase their leverage in order to finance future investments (de Jong et al., 2008), is plausible. These two different views raise the possibility that the effect of real GDP growth on leverage is conditional as proposed by some in the literature (Jõeveer, 2013; Korajczyk & Levy, 2003; Levy & Hennessy, 2007). This conditional effect on leverage has previously been reported some to be dependent on whether a firm is financially unconstraint or not (Korajczyk & Levy, 2003; Levy & Hennessy, 2007).

2.5.2.2. Inflation

Another macroeconomic factor identified in the literature review worth exploring further is inflation. Based on the different views presented in the literature it is clear that the effect of inflation on leverage is still a matter of debate. The foremost view was that reporting a negative association between inflation and leverage (Booth & Aivazian, 2001; Camara, 2012; Jõeveer, 2013). It is the author's opinion that the views put forward by Frank & Goyal (2009) and Lemma & Negash (2013), that financial managers of firms will take advantage of the decreased real value of debt and increase tax benefits of debt offered by higher inflation, is more plausible for financially unconstraint firms (as argued by Korajczyk & Levy (2003)). Bokpin (2009)'s view that high inflation increases the cost of external financing makes sense for firms that are financially constraint (as argued by Korajczyk & Levy (2003)). As with economic growth, it is possible that differences in the result on the effect of inflation on capital structure are determined by whether the firms under consideration are financially constraint or unconstraint.

2.5.2.3. Unemployment Rate

An additional macroeconomic factor identified in the literature review to deserve further consideration is unemployment rate. It has been postulated that firms might limit their use of debt due to human capital concerns because of the negative consequences of bankruptcy cost on employees (Berk et al., 2010). This raises the question for the consequence of a country's unemployment rate on capital structure choice of firms. In a country with a high unemployment rate, cheap labour should be more freely available; therefore, more firms in such a country would be expected to be more labour intensive.

Thus, firms operating in a country with higher unemployment rate would be expected to have lower levels of leverage.

It has been previously reported that leverage is counter-cyclical (Axelson et al., 2013; Chen, 2010; Cook & Tang, 2010; Kayo & Kimura, 2011; Lingenfelder, 2013). Accordingly, leverage should be higher during bad macroeconomic states than in good macroeconomic states. Unemployment rate increases during economic downturn (Chen, 2010), therefore leverage should increase with increasing unemployment rate. In support of this view, empirical evidence from Mokhova & Zinecker (2014) showed a positive and statistically significant relationship between leverage and unemployment rate. It must be noted that this finding was found only in one of the seven countries sampled in their study; in the other six countries the relationship was reported to be non-significant. To the author's knowledge the relationship between unemployment rate and capital structure has not been studied much in the literature; the only study that has explored this issue (to the author's knowledge) is that by Mokhova & Zinecker (2014).

2.5.2.4. Factors Excluded From Scope of Study

Other factors such as taxation, efficiency of legal system, bond market development and stock market development are not appropriate for a study that focuses on a single country such as the current study; in order to investigate the effect of these factors it is necessary have a comparison between countries. For this reason these factors were excluded from the scope of the current study.

There is not a lot of ambiguity and uncertainty with regard to how industry factors and firm-specific factors influence capital structure choices of firms; consequently, these factors were excluded from the scope of the current study. The effect of interest rates on capital structure is expected to be related to changes in inflation because changes in inflation determine interest rates (Booth & Aivazian, 2001). Due to the fact that inflation is one of the variables to be investigated further in the current study, it was decided that interest rates would be excluded from the scope of the current

3. Research Hypotheses

3.1. Central Hypotheses

Three central/primary hypotheses related to the effect of specific macroeconomic factors on capital structure were identified from the literature review; these three hypotheses are given below. These hypotheses are categorised as central because they directly address the objectives of this study which is to investigate the effect of macroeconomic conditions on capital structure choice for South African list-firms. Macroeconomic conditions are a function of some of the macroeconomic variables incorporated in these hypotheses.

Hypothesis 1: The null hypothesis states real GDP growth rate either does not affect or negatively affects leverage. The alternate hypothesis states that real GDP growth rate positively influences leverage.

$H1_0$: $Leverage_{(Low\ Real\ GDP\ Growth\ Rate)} \geq Leverage_{(High\ Real\ GDP\ Growth\ Rate)}$

$H1_A$: $Leverage_{(Low\ Real\ GDP\ Growth\ Rate)} < Leverage_{(High\ Real\ GDP\ Growth\ Rate)}$

Hypothesis 2: The null hypothesis states that inflation either does not influence or positively influences leverage. The alternate hypothesis therefore states that inflation negatively influences leverage.

$H2_0$: $Leverage_{(Low\ Inflation)} \leq Leverage_{(High\ Inflation)}$

$H2_A$: $Leverage_{(Low\ Inflation)} > Leverage_{(High\ Inflation)}$

Hypothesis 3: The null hypothesis states that the unemployment rate of a country either does not influence or negatively influences capital structure of firms in that particular country as measured through leverage. The alternate hypothesis states that the unemployment rate of a country positively influences leverage.

H_0: $Leverage_{(Low\ Unempl.)} \geq Leverage_{(High\ Unempl.)}$

H_A: $Leverage_{(Low\ Unempl.)} < Leverage_{(High\ Unempl.)}$

3.2. Secondary Hypotheses

Four secondary hypotheses related to the possibility that the effects of macroeconomic factors on capital structure are dependent on whether the firm is financially constraint or

not. The four hypotheses are stated below.

The hypotheses are categorised as secondary because they try to explain why there are differences in the manner in which macroeconomic factors influence capital structure choices. For instance real GDP growth rate is reported to influence capital structure in one direction by some literature (Booth & Aivazian, 2001; Dang, 2013; de Jong et al., 2008; Frank & Goyal, 2009), and then the opposite direction by others in literature (Axelson et al., 2013; Kayo & Kimura, 2011; Lemma & Negash, 2013). The same can be said of the reported influence of inflation on capital structure. These secondary hypotheses attempt to explain these differences on the basis of whether a firm is financial constraint or unconstraint as suggested by some in the literature (Korajczyk & Levy, 2003; Levy & Hennessy, 2007).

Hypothesis 4: The null hypothesis states that an increase in inflation either does not affect or brings about a decrease in leverage for financially unconstraint firms. The alternate hypothesis states that inflation positively influences leverage of financially unconstraint firms.

$H4_0$: $Leverage_{(Fin.\ unconstraint\ Firms\ in\ Low\ Inflation)} \geq Leverage_{(Fin.\ unconstraint\ Firms\ in\ Inflation)}$

$H4_A$: $Leverage_{(Fin.\ unconstraint\ Firms\ in\ Low\ Inflation)} < Leverage_{(Fin.\ unconstraint\ Firms\ in\ Inflation)}$

Hypothesis 5: The null hypothesis states that an increase in inflation either does not affect or brings about an increase in leverage for financially constraint firms. The alternate hypothesis states that inflation negatively influences leverage of financially constraint firms.

$H5_0$: $Leverage_{(Fin.\ constraint\ Firms,\ Low\ Inflation)} \leq Leverage_{(Fin.\ constraint\ Firms,\ High\ Inflation)}$

$H5_A$: $Leverage_{(Fin.\ constraint\ Firms,\ Low\ Inflation)} > Leverage_{(Fin.\ constraint\ Firms,\ High\ Inflation)}$

Hypothesis 6: The null hypothesis states that an increase in real GDP growth rate either does not affect or brings about an increase in leverage for financially unconstraint firms. The alternate hypothesis states that real GDP growth rate negatively influences leverage of financially unconstraint firms.

$H6_0$: $Leverage_{(Fin.\ unconstraint\ Firms\ in\ Low\ Real\ GDP\ Growth)} \leq Leverage_{(Fin.\ unconstraint\ Firms\ in\ Real\ GDP\ Growth)}$

$H6_A$: $Leverage_{(Fin.\ unconstraint\ Firms\ in\ Low\ Real\ GDP\ Growth)} > Leverage_{(Fin.\ unconstraint\ Firms\ in\ Real\ GDP\ Growth)}$

Hypothesis 7: The null hypothesis states that an increase in real GDP growth rate either does not affect or brings about a decrease in leverage for financially constraint firms. The alternate hypothesis states that real GDP growth rate positively influences leverage of financially constraint firms.

$H7_0$: $Leverage_{(Fin.\ constraint\ Firms,\ Low\ Real\ GDP\ Growth)} \geq Leverage_{(Fin.\ constraint\ Firms,\ High\ Real\ GDP\ Growth)}$

$H7_A$: $Leverage_{(Fin.\ constraint\ Firms,\ Low\ Real\ GDP\ Growth)} < Leverage_{(Fin.\ constraint\ Firms,\ High\ Real\ GDP\ Growth)}$

4. Research Methodology

This chapter discusses the methodology selected for the research study and the reasons for the selection. The selected research methodology and approach is further described in terms of the following aspects: data collection, data analysis, populations and sampling, and unit of analysis.

4.1. Research Design

Saunders & Lewis (2012) distinguishes between three types of research designs: Exploratory; Descriptive studies and Explanatory studies. Only one of these designs will be applicable to this research, namely: Explanatory studies. Explanatory studies is research that attempts to identify cause and effect relationships between variables. (Saunders & Lewis, 2012). This approach is appropriate for this study because it intends to determine if and how the various independent variables have a cause and effect relationship with capital structure as measured through leverage.

4.1.1. Deduction Approach

Deduction is defined by Saunders & Lewis (2012) as the research approach that that involves testing of theoretical proposition by using a research strategy designed for this purpose. This research is based on existing capital structure theories, namely: trade off theory, agency theory, pecking order theory and market timing theory. Empirical evidence presented in this study will be evaluated through the existing capital structure theory.

4.1.2. Research Strategy

A quasi-experiment approach was used, taking into account changes and differences in macroeconomic conditions. A combination of longitudinal and cross-sectional approaches was employed in this research to investigate relationship between the dependent and independent variables. More details are given on this later.

The dependent variable in this study as previously stated is book leverage, and the following measures of leverage were employed:

- Short term leverage (STL): defined as short-term debt (including the current portion of long term debt) over total book assets; as given in equation (2).

$$STL = \frac{Short\ Term\ Debt}{Total\ Book\ Assets} \quad (2)$$

- Long-term leverage (LTL): defined as long-term debt over total book assets; as given in equation (3).

$$LTL = \frac{Long\ Term\ Debt}{Total\ Book\ Assets} \quad (3)$$

- Overall leverage (OL): defined as overall debt (sum of long term debt and short term debt including the current portion of long term debt) over total book assets; as given in equation (4).

$$OL = \frac{Total\ Debt}{Total\ Book\ Assets} \quad (4)$$

The reasons for choosing these measures of leverage are as follows:

- The results will be comparable to other studies on capital structure.
- Ease of data access from databases such as Thomson Reuters Datastream.

4.2. Data Collection

Secondary data was utilized in this research. Macroeconomic data was obtained from the World Bank database and standardised financial statement data of companies was obtained from Thomson Reuters Datastream database.

Specific macroeconomic data of interest in this study was real GDP growth rate; inflation and unemployment rate for South Africa. A Microsoft Excel spreadsheet with data going back as far as 1990 for South Africa was downloaded from the World Bank's database.

Financial data of interest in this research was accessed on Thomson Reuters Datastream. A statement of financial position for each firm in the sample was collected from Datastream. Each statement of financial position collected gave historical data for each firm in the sample; and allowed tracking of changes over time for each firm. From the Excel spreadsheet collected, data required in order to determine book leverage was obtained. The specific information required in order to determine leverage was: short term debt, long term debt, total debt and total assets.

4.3. Data Analysis

Quantitative data analysis was utilized in this study; more specifically panel data regression was the chosen data analysis method. It is the most commonly used data analysis method in empirical studies on capital structure (as illustrated in Table 3). Panel data regression involves the pooling of observations on a cross section of units over several time periods and facilitate identification of effects that are otherwise not detectable in pure cross-section or time series regression (Bokpin, 2009). According to Delcoure (2007: p406): “Incorporating information relating to both cross-section and time-series variables diminishes the problems that arise when there is an omitted-variable problem because it is unlikely that the capital structure models are fully specified”.

Table 3. Common data analysis method in capital structure research.

Data Analysis Method	**Source**
Hierarchical Linear Modelling (Panel Data)	(Kayo & Kimura, 2011)
Panel Data Regression	(Axelson et al., 2013; Bokpin, 2009; Cook & Tang, 2010; de Jong et al., 2008; Fosu, 2013; Frank & Goyal, 2009; Jõeveer, 2013; Leach et al., 2013; Lemma & Negash, 2013; Psillaki & Daskalakis, 2009; Rauh & Sufi, 2010; Weill, 2008)

Literature indicates that panel data regression is superior to cross-sectional regression procedures (Lemma & Negash, 2013; Psillaki & Daskalakis, 2009). Panel data regression has a number of advantages over cross-section regression. First, the use of panel data reduces collinearity among the explanatory variables thus improving precision of model estimates (Psillaki & Daskalakis, 2009). Collinearity refers to an instance where independent variables are highly correlated with each other (Cramer & Howitt, 2004). Second, panel data models are able to account for a greater degree of heterogeneity that characterizes firms (Psillaki & Daskalakis, 2009). Heterogeneity refers to the state of variances being of incomparable magnitude (Cramer & Howitt, 2004). Third, panel data models are also said to allow for the presence of dynamic effects (Psillaki & Daskalakis, 2009). Fourth, the use of panel data provides a greater number of data points, and consequently additional degrees of freedom (Delcoure, 2007).

Literature identifies three basic panel data estimation procedures: pooled ordinary least

square, fixed effects and random effects (Bokpin, 2009; Delcoure, 2007; Lemma & Negash, 2013). These three procedures can be used separately from each other or in combination with each other. A choice was made to make use of regression with fixed effects through linear mixed modelling to test the hypotheses stated in chapter 3. A linear mixed model is able to account for random effects in addition to fixed effects. This type of analysis is commonly used in literature focusing on capital structure research (Booth & Aivazian, 2001; Cook & Tang, 2010; Delcoure, 2007; Fosu, 2013; Jõeveer, 2013; Kayo & Kimura, 2011; Korajczyk & Levy, 2003; Rauh & Sufi, 2010).

Regression with fixed effects is not necessarily better than one without it; it just answers a different question. The fixed effect regression analysis addresses within-individual changes or differences; whilst regression equation without fixed effects address questions tilted more toward differences between individuals (Petersen, 2004). Fixed effects analysis is appropriate for this study as it is concerned with changes in leverage within individual firms as macroeconomic conditions vary with time. This study is not concerned with differences in leverage between individual firms as macroeconomic conditions change. Advantages and drawbacks associated with fixed effects are discussed below.

4.3.1. Advantages of Fixed Effects

The fixed effects procedures‘ enormous strength is that it enables one to control for all unmeasured variables, and get consistent estimates for variables that change over time (Petersen, 2004). Making the transition from cross-sectional to panel data in a linear regression model allows one to estimate the effects of measured time-varying variables and at the same time to control for all measured and unmeasured time-constant variables (Petersen, 2004).

The fixed effects method reports how much the dependent variable on average changes when individual units within the sample change values on independent variable (Petersen, 2004). Fixed effects methods completely ignore the between-individual unit variation and focus only on the within-individual unit variations (Allison, 2009). This aspect makes it appropriate for capital structure research where individual firm variation in leverage is the object of interest. Furthermore, when the data set is unbalanced (such as is the case in the current study) fixed effects model permits use of all data, while the intercept is allowed to

vary across firms and/or time (Booth & Aivazian, 2001). The data set is said to be unbalanced when the number of observations on the dependent variable for each firm in the sample is different (Booth & Aivazian, 2001; Lemma & Negash, 2013).

4.3.2. Drawbacks of Fixed Effects

The main shortcoming of the fixed effects procedure is that one can only estimate the effects of variables that vary with time (Allison, 2009; Petersen, 2004). Another drawback is that individual units with no across-time variation in some of the variables do not contribute to the analysis and estimation, and this may considerably reduce the sample size (Petersen, 2004). These two possible drawbacks should not be of concern for the current study because all three independent variables are macroeconomic variables that vary with time. The variability of these variables with time is given in Chapter 5.

If independent variables vary substantially across individual units but have very little variation over time for each individual unit, then fixed effects estimates tend to be very imprecise (Allison, 2009). This should not be an issue in the current study because firms experience the same macroeconomic shocks, although idiosyncratic shocks would be different (Arnold et al., 2012). This means that the independent variables as defined in the current study do not vary across individual firms within the sample. In other words, capital structure of firms should be determined by idiosyncratic factors which are specific to the individual firm as well as macroeconomic factors which are similar for firms in a particular economy. Fixed effects model can produce more biased estimators than other methods if there is measurement error (Booth & Aivazian, 2001).

4.3.3. Data Requirements for Fixed Effects Method

There are two main data requirements for the application of fixed effects method (Allison, 2009); namely:

- Each individual unit in the sample must have at least two measurements on the same dependent variable;
- For a substantial portion of the individual units in the sample, the values of the independent variables of interest must be different on two or more occasions.

4.3.4. Model Selection Criteria

The Akaike information criterion (AIC) and Bayesian information criterion (BIC) are the two most commonly used model selection criteria (Frank & Goyal, 2009; Kayo & Kimura, 2011; Korajczyk & Levy, 2003); both of these were used in this study. The absolute value of BIC and AIC in itself has no meaning, instead the values are typically determined for two or more models, and then compared to decide on model selection (Seltman, 2014). A smaller value for both BIC and AIC is indicative of a better model (Frank & Goyal, 2009). A model with a BIC more than 2 lower than another is evidence that the model with the lower BIC is better balance between complexity and good fit (Seltman, 2014).

The BIC is defined as follows:

$$BIC = 2l + P \times \log(n) \tag{5}$$

where l is the log-likelihood, n represents the total number of observations minus the number of fixed effect parameters and P is the number of covariance parameters in the model.

The AIC, on the other hand, is defined as follows:

$$AIC = -2l + 2P \tag{6}$$

4.3.5. The Linear Mixed Model

Leverage is the dependent variable measured on a sample of 230 companies listed on the JSE over a period of 22 years. The dataset had 230 companies over a period of 22 years, and this is denoted as $L_{i,t}$ where i = 1,…230 companies and t = 1,…22 years. Accordingly, this data-set would be expected to have (230 x 22 =) 5060 observation if it was a balanced panel; instead 3377 observations were obtained (in the instance for long-term leverage) because this was an unbalanced panel that had missing data in some of the years for various firms. It is for this reason that a linear mixed model was used in this study because this type of model is asymptotically efficient (minimum variance) whether or not the data are balanced (Seltman, 2014).

Panel regression equation differs from a regular time-series or cross-section regression by the double subscript attached to each variable (Bokpin, 2009). The model is as follows:

$$L_{i,t} = \propto + \beta_1(Inflation_{i,t-1}) + \beta_2(GDP\ Growth_{i,t-1}) + \beta_3(Unemployment_{i,t-1}) + \varepsilon_{i,t} \quad (7)$$

with $L_{i,t}$ the leverage, α the constant and vector β the parameters estimates and $\varepsilon_{i,t}$ the error term or random error which represents the variance across time normally distributed with a mean of zero and given variance.

The results from the statistical analysis from this study will be presented in the following order in Chapter 5:

- Panel regression equation
- Significance testing and parameter estimates
- Random intercept variance
- Model fit statistics

4.3.5.1. Panel Regression Equation

In this section a table to describe form of equation used in the linear mixed model is given. The form of the regression equation is the same as equation 7 above.

4.3.5.2. Testing for Significance and Parameter Estimates

Results for testing for significance are given in this section; testing for significance is based on the F-statistic (ANOVA type test). Details for significance testing are given. Furthermore, parameter estimates for the coefficient of each of the independent variables are also provided in this section. In equation 7, the parameter estimate for inflation, real GDP growth, and unemployment are β_1, β_2, and β_3, respectively. The constant α is also given as the fixed intercept.

4.3.5.3. Random Intercept Variance

The random error term ($\varepsilon_{i,t}$) in equation 7 is given in this section. A significance test is performed in order to determine whether the random intercept should be included in the model or not.

The null hypothesis for the random intercept is a variance of zero, which would indicate

that a random effect is not needed in the model (Seltman, 2014). When the random intercept variance is not zero, and the associated p-value is below 0.05, then random intercept should be included in the model (equation 7). This means that there are important unmeasured explanatory variables for each individual company that increases or decreases their leverage in a manner that appears random because the values of these variables that are unaccounted for in the model are unknown. The random intercept parameter estimates give an indication of the extent of variability for individual company intercept from the mean fixed effects intercept for the model.

4.3.5.4. Model Fit Statistics

In this section the appropriate model fit statistics, namely AIC and BIC, are given and compared for two models. Based on the lowest AIC and BIC the best fit model is selected.

4.3.5.5. Reasons for lag

Lagged values of leverage are used to mitigate simultaneity bias. Leverage is lagged for a period of one year as has been done in similar capital structure studies (Cook & Tang, 2010; Fosu, 2013; Frank & Goyal, 2009; Leach et al., 2013; Psillaki & Daskalakis, 2009; Ramjee & Gwatidzo, 2012).

Other studies that did not use a one year lag had zero lag in their analysis. In all the literature investigated in this study no other lag was used.

4.3.6. Quality Controls

Model section was based on selection criteria that considers both BIC & AIC in order to ensure that the best model for the purposes of this study is selected.

Furthermore, the model used in the study was tested for the need of incorporating the random intercept variance. A model with and without the random intercept was tested, and the best model between the two was selected based in the above mentioned model selection criteria. The random intercept ensured that the model could control for important

unmeasured and unknown explanatory variables that are unaccounted for in the model.

In order to test for robustness of the models used in this study, alternate models incorporating random slopes in addition to random intercepts were employed to test the relevant hypotheses. These robustness tests ensured that the models used in the study could be tested under different conditions; and the associated conclusion could be tested under various conditions for consistency and robustness.

4.3.7. Hypothesis Testing

The procedure of hypothesis testing is sketched as follows: First, the null hypothesis and alternate hypothesis were defined (as was done in chapter 3). Second, the significance level was defined. The significance level determines the probability that is considered too low to offer support to the null hypothesis. Third and last, the appropriate statistical technique was chosen to determine whether the null hypothesis could be rejected in favour of the alternate hypothesis based on empirical data (as done in chapter 5).

The significance level of 0.1 was used for purposes of rejecting (or failing to reject) the null hypothesis. Similar studies on capital structure have also used the significance level of 0.1 for hypothesis testing (Fosu, 2013; Lemma & Negash, 2013; Mittoo & Zhang, 2008; Weill, 2008). The null hypothesis was rejected (or failed to be rejected) on the basis of the p-value associated with the relevant explanatory variable. The null hypothesis was rejected when the p-value was below the significance level of 0.1, and failed to be rejected when the p-value was equal to or above the significance level of 0.1.

4.3.8. Statistical Software Package

IBM SPSS was used for data analysis in this study.

4.4. Population and sampling

4.4.1. Population

The population for the current study was defined to be companies that are operating in South Africa and are listed on the Johannesburg stock exchange.

4.4.2. Sampling

The sample employed in this study consists only of listed South African firms. Unlisted firms were excluded from this study due to data availability. Financial sector companies were removed from the sample data because capital structure choice for firms in the financial sector is influenced by regulatory factors that are not relevant for other sectors and therefore make it difficult to compare results (Fosu, 2013; Frank & Goyal, 2009; Lingenfelder, 2013; Mittoo & Zhang, 2008; Psillaki & Daskalakis, 2009; Ramjee & Gwatidzo, 2012; Shivdasani & Stefanescu, 2010). Banks, for instance, are in certain instances incentivised to maximise leverage up to the regulatory minimum (Gropp & Heider, 2009). Firms from the following sectors were excluded from the sample: banking, insurance, equity investment, real estate and investment trusts. Exclusion of financial sector firms is common amongst capital structure studies (Fosu, 2013). Furthermore, firms with data available for less than six years were also excluded from the sample. This condition ensure that firms included in sample have at least five years of data which enables establishment of a material trend for individual firms, and therefore support fixed effects regression requirements mentioned above in section 4.3.3.

A possible exclusion criterion considered in this study was firm rejection from the sample on the basis of market capitalisation; with this approach only companies that represent the top 99% of the total market capitalisation of the Johannesburg stock exchange (JSE) would have been considered (Muller & Ward, 2013). A total of 160 firms would have made up the sample with this exclusion criterion. This approach was, however, not adopted because it is not in line with the objective of this study to evaluate the effect of macroeconomic conditions on capital structure choice of companies. The subject matter is equally relevant whether a firm has the largest market capitalisation or the smallest. Moreover, firm size is not normally used to decide on sample size in capital structure research (Frank & Goyal, 2009).

Consequently, out of the possible 333 listed firms, only 230 firms comprised the final sample used in this study. Of the 103 firms excluded, 79 were from the financial sector; 15 had financial data available for less than six years and nine had no data available on Datastream.

4.5. Unit of Analysis

The unit of analysis was a single listed company on the Johannesburg stock exchange.

4.6. Research Limitations

The study was conducted on a sample of 230 listed firms from South Africa. The results from the study may not be applicable to other countries. Unlisted firms were not part of the sample used in the study; therefore, the results may not be applicable unlisted firms.

The findings from this research are not applicable to financial firms as they are excluded from the sample. Results cannot be generalised to all RSA firms (listed and unlisted) as only listed non-financial firms were considered.

The study focuses on macroeconomic factors and does not include firm-specific factors and industry factors. The reason for excluding these factors from the study is that effect of these parameters on capital structure has been generally well established in the literature.

As mentioned above, the model used in the current study does not incorporate firm specific factors and industry factor. Therefore, the possible interaction and reported indirect impact of industry and macroeconomic factors on how firm specific factors influence capital structure are not accounted for in the results from this study.

Measures used to quantify properties (such as capital structure) are neither perfect nor absolute. Specific measures of leverage have been chosen in this research that will not necessarily be comparable to all studies in the literature. Different measures of leverage are used in the literature due to difference in research objective, researcher preference, data limitations etc. The current study used book leverage to represent capital structure and not market leverage as done by some in the literature. Therefore, caution should be applied in comparing the results from this study with those where different measures of leverage were used. It should, however, be clarified that there are different views in the literature on whether this is an issue or not.

There is an implicit assumption made about the integrity of the financial data collected from the database used in the study. The same goes for the comparability of firm accounting data from the various companies that constitute the study sample.

5. Results

The results from the analysis of the data based on the sample are given in this chapter. First the descriptive statistics on the dependent and independent variables are presented and discussed. Leverage is analysed on the basis of the three measures of leverage, namely: long term leverage, short term leverage and overall leverage. Second, the fixed effects regression of leverage and the associated significance test are presented. Robustness tests on the presented regression model are given. Third and lastly, the results are summarised in terms of the hypotheses for this study.

5.1. Data Cleaning and Manupilation

Data from Thomson Reuters Datastream was filtered to remove inconsistencies and anomalies. Where duplicate companies were found in the dataset the double counting was removed from the data. Missing data was differentiated from zero values in the analysis.

Financial data from Thomson Reuters Datastream was downloaded on an Excel spreadsheet for each the companies within the sample. The statement of financial position data was arranged in a standardized manner in the spreadsheet. The various items of interest such as long term debt, short term debt, and total assets could easily be access from each of the spreadsheet for the individual firms. Each of these spreadsheets were put together into a single Excel workbook where a table for all the firms in all the year could be compiled showing the calculated long term leverage, short term leverage and overall leverage. The calculations of the three leverage measures were according to equations 2, 3 and 4 previously given in chapter 4.

The macroeconomic data downloaded from the World Bank was also in the form of an Excel spreadsheet. This data could easily be aligned with the leverage data according to the date of the data (which was on an annual basis).

Once the two datasets were combined and aligned into one Excel workbook, this data could be uploaded into the statistical software, SPSS. This data could then be prepared with the statistical software for statistical analysis.

5.2. Descriptive Statistics

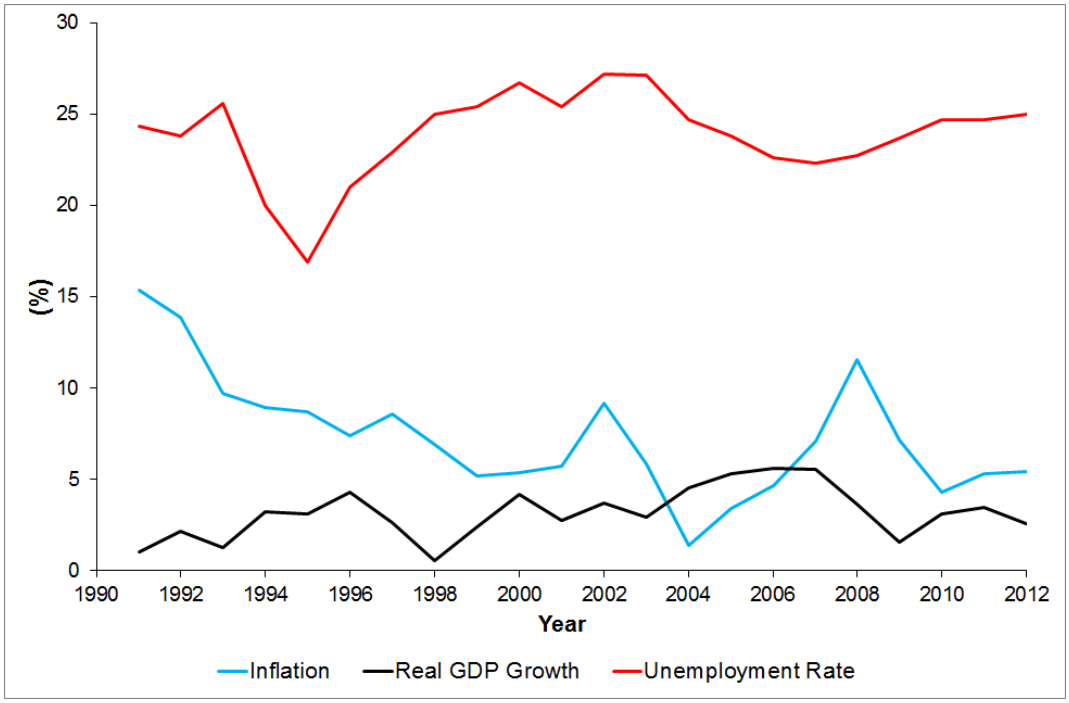
The distribution of companies included in the sample across various economic sectors is shown in Table 4 below. As shown in Table 4 firms included in the sample were from diverse economic sectors. The top four economic sectors in the sample, in decreasing order of quantities, were basic materials, industrials, consumer cyclicals and consumer non-cyclicals. As previously stated firms from the financial sector were excluded from the sample.

Table 4: Sample breakdown by economic sector (Source: Thomson Reuters Datastream)

Economic Sector	Number of Firms	% of Firms
Basic Materials	66	29%
Consumer Cyclicals	42	18%
Consumer Non-Cyclicals	29	13%
Energy	13	6%
Healthcare	5	2%
Industrials	51	22%
Technology	18	8%
Telecommunications Services	6	3%
Grand Total	**230**	**100%**

Annual data on the three leverage types and macroeconomic variables were used in the statistical analysis. The annual variation of the three macroeconomic factors of interest (namely: inflation, real GDP growth and unemployment rate) are shown in Fig. 1. The unemployment rate represents the total number of unemployed as a percentage of total labour force. Note that the figures from the World Bank for the years 1991, 1992 and 1993 are based on modelled International Labour Organization (ILO) estimate.

Figure 1: Changes in inflation, real GDP growth and unemployment rate over the study period for South Africa.



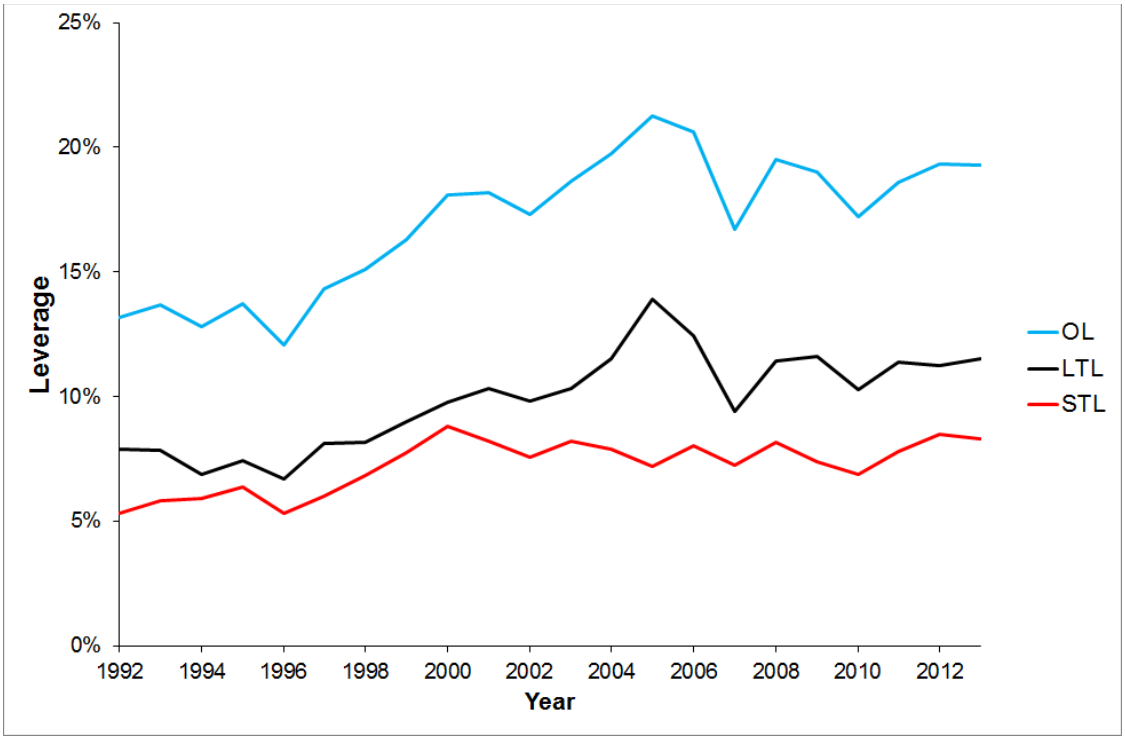
The mean, median and standard deviations of inflation, real GDP growth and unemployment rate during the study period are given in Table 5. The median for each of the three leverage measures were less than mean. Furthermore, the 5th percentile and 95th percentile for each of the three independent variables are also given.

Table 5: Descriptive statistics on macroeconomic parameters.

		Inflation (%)	GDP Growth (%)	Unemployment Rate (%)
Mean		7.31	3.15	23.89
Std. Deviation		3.30	1.41	2.39
Variance		10.89	1.98	5.73
Range		13.95	5.09	10.30
Minimum		1.39	0.52	16.90
Maximum		15.33	5.60	27.20
Percentiles	5	1.69	0.59	17.36
	25	5.26	2.30	22.68
	50	6.99	3.10	24.50
	75	8.99	4.19	25.40
	95	15.12	5.60	27.19

The mean values per year for each of the three leverage measures used in this study are shown in Fig. 2. All three measures of capital structure were changing with time. There's a consistently upward trend for all three measures of capital structure from around 1996 until around 2005 followed by a generally volatile period from 2006 until 2010. This volatility in the period from 2006 until 2010 is most likely a consequence of the global financial crisis. A more stable but upward trend seems to emerge again from 2010 to 2013.

Figure 2: Changes in the three measures of leverage during the study period.



The overall mean of leverage during the study period for the three measures of capital structure, short-term, long-term and overall leverage were 7.33%, 10.44% and 17.78%, respectively. The median for each of the three leverage measures were less than mean. Furthermore, the 5th percentile and 95th percentile for each of the leverage measures are also given. The majority of the data is clearly in a defined and relatively narrow range.

Figure 3: Annual median of the ratio of short term leverage to long term leverage.

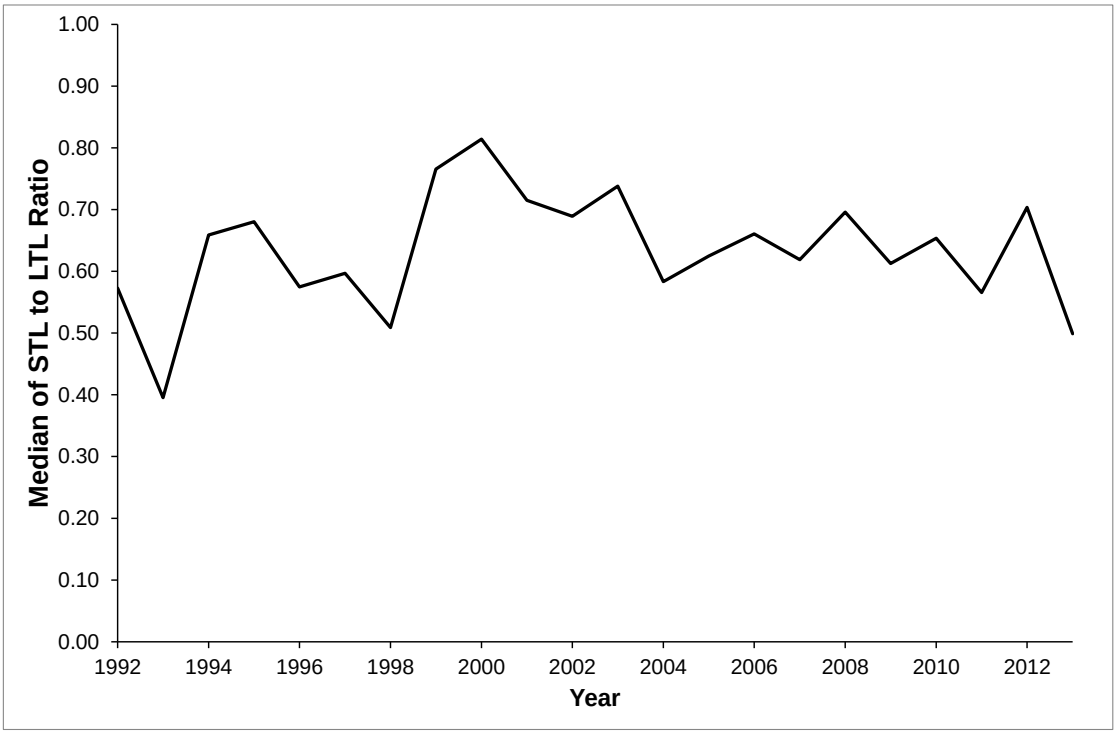


Fig. 3 shows the annual median for the ratio of short term leverage to long term leverage. A distinction is made between the two types of leverages because short term leverage consists largely of trade credit which is under influence of different determinants as compared to long-term leverage (de Jong et al., 2008). The annual median for the ratio of short term leverage to long term leverage ranged from 0.40 to 0.81 during the study period. This illustrate that the utilisation of short term debt as compared to term debt was variable during the study period.

Table 6: Descriptive statistics on three measures of book leverage.

		Long Term Leverage (LTL)	Short Term Leverage (STL)	Overall Leverage(OL)
N		3433	3428	3428
Mean (%)		10.44	7.33	17.78
Std. Deviation (%)		16.93	9.62	19.78
Variance		286.56	92.58	391.43
Minimum (%)		0.00	0.00	0.00
Maximum (%)		371.96	147.14	372.04
Percentiles (%)	5	0.00	0.00	0.00
	25	0.37	0.54	3.58
	50	5.40	4.40	13.74
	75	14.24	10.35	26.02
	95	37.76	25.01	51.11

N –the number of observations.

The data for firms in the sample satisfy requirements for fixed effects technique that:

- Each firm in the sample must have at least two measurements on the same dependent variable (Allison, 2009);
- For a substantial portion of the individual units in the sample, the values of the independent variables of interest must be different on two or more occasions (Allison, 2009).

The first requirement was ensured by including only companies that have data for at least six years; companies with five years or less data were excluded from the sample. The second requirement was ensured by having a sample with firm data ranging from 6 to 22 years, and the variability in the data is reflected in Table 6 and Fig. 2.

5.3. Effect of Macroeconomic Factors on Leverage

5.3.1. Long Term Leverage

5.3.1.1. Panel Regression Equation

The model dimension table in Table 7 shows details of the fitted model for long-term leverage. It further illustrates the choices made when fitting the linear mixed model. The specified fixed effects components of the model were: (fixed) intercept, inflation, real GDP

growth and unemployment rate. There was a single random effect incorporated into the model, namely the intercept for each level of each of the individual companies in the sample. Companies are considered subjects in this study (as shown under the column “Subject Variables” in Table 7). The total number of parameters is a measure of overall complexity of the fitted model. The column labelled “number of levels” in Table 7 shows how many lines are dedicated to a particular independent variable in the fixed effects table (Table 9); there is only one level for each quantitative independent variable.

Table 7: Model dimension for long-term leverage (Model L1).

		Number of Levels	Covariance Structure	Number of Parameters	Subject Variables
Fixed Effects	Intercept	1		1	
	Inflation	1		1	
	GDP Growth	1		1	
	Unemployment	1		1	
Random Effects	Intercept	1	Variance Components	1	Companies
Residual				1	
Total		5		6	

5.3.1.2. Test for Significance and Parameter Estimates

Table 8 shows the results of the tests for fixed effects regressions which have an ANOVA-type test for each fixed effect parameter in the model. The statistical significance of each of the independent variables is given in Table 8 in addition to the relevant test statistic. Note that the abbreviation DF in Tables 8 and 9 stands for degrees of freedom.

Table 8: Tests of fixed effects for long term leverage.

Source	Numerator DF	Denominator DF	F-Statistic	P-value
Intercept	1	3344	0.293	0.588
Inflation	1	3214	3.031	0.082*
GDP Growth	1	3211	5.069	0.024**
Unemployment	1	3227	4.945	0.026**

*Significance at 0.1 level
**Significance at 0.05 level
***Significance at 0.01 level

The fixed effects define a mean intercept and mean slope for the total sample, and this gives a mean fitted regression line for the group (Seltman, 2014). Table 9 shows the fixed effect estimation results from the linear mixed modelling with random intercepts for long-term leverage. The parameter estimates in fixed effects table (Table 9) represent the estimated regression line in the form of equation 7. Whilst Table 8 shows the significance of each of the explanatory variables, Table 9 gives the coefficient estimate of for each of the independent variables (and associated significance).

A parameter estimate for the coefficient of an independent variable gives an indication of how strong or weak the influence of that particular independent variable is on the dependent variable. That is, the higher the value of the parameter estimate is the stronger the influence of the independent variable, and the lower the value of the estimate is the weaker is its influence on the dependent variable. The sign of the parameter estimate gives the direction of influence: a positive sign means a positive influence and a negative sign means a negative influence.

Table 9: Parameter estimates of fixed effects for long-term leverage.

Parameter	Parameter Estimate	Std. Error	DF	t-Statistic	P-value.
Intercept	2.31	4.26	3344	0.541	0.588
Inflation	-0.18	0.10	3214	-1.741	0.082*
GDP Growth	0.47	0.21	3211	2.251	0.024**
Unemployment	0.33	0.15	3227	2.224	0.026**

*Significance at 0.1 level
**Significance at 0.05 level
***Significance at 0.01 level

The parameter estimate for the real GDP growth coefficient of 0.47 in Table 9 means that a one percentage increase in real GDP growth increases long-term leverage by 0.47%. The coefficient of real GDP growth is positive and statistically significant at the 0.05 significance level. According to these results long-term leverage increases with increasing real GDP growth. These results lend support to hypothesis H1 which states that real GDP growth rate positively influences leverage.

The parameter estimate for the inflation coefficient of -0.18 in Table 9 means that a one percentage increase in inflation will decrease the mean long-term leverage of listed non-financial South African firms by 0.18%. The coefficient of inflation is negative and statistically significant at the 0.1 significance level. These results show that long-term leverage decreases with increasing inflation. This finding supports hypothesis H2 which states that inflation negatively influences leverage.

The parameter estimate for the unemployment rate coefficient of 0.33 in Table 9 means that a one percentage increase in unemployment rate increases long-term leverage by 0.33%. The coefficient of unemployment is positive and statistically significant at the 0.05 significance level. Thus, the results indicate that long-term leverage increases with increasing unemployment rate. This finding supports hypothesis H3 which states that the unemployment rate of a country positively influences leverage.

5.3.1.3. Random Intercept Variance

Parameter estimates in Table 10 are estimate of variance; random effect parameter estimates give an indication of the extent of variability for individual company coefficients from the mean fixed effects coefficients given in Table 9. The tests for covariance parameters (given in Table 10) assist in determining which random effects are essential for the fitted model. A random intercept has been incorporated into the model and the variance of the random intercept has been estimated (as shown in Table 10). The estimated variance of the random intercept is 85.77, thus, the standard deviation of the random intercept is 9.26% (square root of variance), which implies that individual companies in the sample have different intercepts. This means for any individual company within the sample (which has the mean intercept of 2.31 as given in Table 9), the individual company will have its own intercept that is up to 9.26 higher or lower than the group

average 68% of the time. In other words, the random intercept gives an indication of the variance of the mean fixed effect intercept.

Table 10: Estimates of covariance parameters for long-term leverage.

Parameter	Estimate	Std. Error	Wald Z	P-value.
Residual	204.55	5.12	39.97	<0.001
Random Intercept	85.77	9.51	9.02	<0.001

The null hypothesis for the random intercept is a variance of zero, which would indicate that a random effect is not needed in the model (Seltman, 2014). The applicable test statistic here is the so-called Wald Z statistic. It is clear from the results in Table 10 that the null hypothesis has to be rejected (Wald Z = 9.02, $p<0.001$), and the random intercept is essential in this model. This means that there are important unmeasured explanatory variables for each individual company that increases or decreases their long term leverage in a manner that appears random because the values of these variables that are unaccounted for in the model are unknown. Such a finding is expected given that industry factors and firm specific factors that have been shown in the literature to have a significant influence on long term leverage were not included in the current study. As previously mentioned in chapter 2, these factors were not part of the scope of this study.

The estimate of the residual variance is 204.55 in Table 10, with a standard deviation of 14.30, represents the variability of each year's mean long-term leverage around the individual regression lines for each company within the sample. This implies that once a best-fit line has been determined for each company, their actual measurements will randomly vary around the line with about 68% of the values falling within 14.30 higher or lower of the line.

5.3.1.4. Model Fit Statistics

Model-fit statistics for long-term leverage are given in Table 11. Model L1 is the chosen model whose details are presented in Table 7 to Table 10. An alternate model (name model L2) in which there was no random intercept was considered, but this model had inferior model fit statistics to model L1 as shown in Table 11. Details of model L2 are given in Appendix 9.1. As previously mentioned, the model selection criteria was based on both

the Akaike information criterion (AIC) and Bayesian information criterion (BIC). A smaller value for both BIC and AIC is indicative of a better model (Frank & Goyal, 2009). Both the BIC and AIC for model L1 were much smaller than that for model L2. It is for this reason that model L1 was the chosen model for long term leverage. Note that model L2 does not contradict the key conclusions reached in this section regarding hypotheses H1, H2 and H3.

Table 11: Model-fit statistics for long-term leverage.

Model	Random Slope	Random Intercept	BIC	AIC
L1	No	Yes	28473	28461
L2	No	No	29165	29159

Random slope was excluded in models L1 and L2. Other configurations in which this parameter is included in the model are discussed later in this document. Inclusion or exclusion of this parameter in the model does not change the conclusions reached with regard to the effect of the macroeconomic factors on long term leverage.

5.3.2. Short Term Leverage

5.3.2.1. Panel Regression Equation

The model dimension table in Table 12 shows details of the fitted model for short-term leverage. The details of this model are the same as those for long-term leverage.

Table 12: Model dimension for short-term leverage (Model S1).

		Number of Levels	Covariance Structure	Number of Parameters	Subject Variables
Fixed Effects	Intercept	1		1	
	Inflation	1		1	
	GDP Growth	1		1	
	Unemployment	1		1	
Random Effects	Intercept	1	Variance Components	1	Companies
Residual				1	
Total		5		6	

5.3.2.2. Test for Significance and Parameter Estimates

The results of the tests for fixed effects for short term leverage are given in Table 13. Only one of the three explanatory variables is found to be significant for short-term leverage, namely: unemployment rate. This independent variable was found to be significant at the 0.01 significance level. Note that the abbreviation DF in Tables 13 and 14 stands for degrees of freedom.

Table 13: Tests of fixed effects for short term leverage.

Source	Numerator DF	Denominator DF	F-statistic	P-value
Intercept	1	3340	0.201	0.654
Inflation	1	3205	0.076	0.783
GDP Growth	1	3203	1.091	0.296
Unemployment	1	3218	9.209	0.002***

*Significance at 0.1 level
**Significance at 0.05 level
***Significance at 0.01 level

The parameter estimate for the coefficient of real GDP growth is positive but not statistically significant. According to these results short-term leverage is not dependent on real GDP growth. This result is not in support of hypothesis H1 that states that real GDP growth rate positively influences leverage.

The parameter estimate for the coefficient of inflation is negative and not statistically significant. The results show that short-term leverage is not influenced by changes in inflation. This finding is in contradiction with hypothesis H2 which states that inflation negatively influences leverage.

The parameter estimate for the coefficient of unemployment is positive and statistically significant at the 0.01 significance level. Thus, the results indicate that short-term leverage increases with increasing unemployment rate. This finding further support hypothesis H3 which states that unemployment rate of a country influences leverage. It is interesting to note the magnitude of the coefficient for unemployment rate for short term leverage (0.26) as opposed to that of long term leverage (0.33). The effect of unemployment rate is slightly less pronounced for short term leverage as compared to long term leverage.

Table 14: Parameter estimates of fixed effects for short-term leverage.

Parameter	Parameter Estimate	Std. Error	DF	t-statistic	P-value
Intercept	1.09	2.45	3340	0.448	0.654
Inflation	-0.02	0.06	3205	-0.275	0.783
GDP Growth	0.12	0.12	3203	1.045	0.296
Unemployment	0.26	0.08	3218	3.035	0.002***

*Significance at 0.1 level
**Significance at 0.05 level
***Significance at 0.01 level

5.3.2.3. Random Intercept Variance

Table 15 gives the estimates of covariance parameters for short term leverage. A random intercept has been incorporated into the model. The random intercept is essential in the model given the associated p-value. This means that there are important unmeasured explanatory variables for each individual company that increases or decreases their short term leverage in a manner that appears random because the values of these variables that are unaccounted for in the model are unknown.

The variance of the random intercept has been estimated at 28.92, thus, the standard deviation of the random intercept is 5.38% (square root of variance). This implies that individual companies within the sample have different intercepts. Meaning that for any individual company within the sample (which has the mean intercept of 1.09 as given in Table 14), the individual company will have its own intercept that is up to 5.38 higher or lower than the mean intercept 68% of the time.

Table 15: Estimates of Covariance Parameters for short term leverage.

Parameter	Estimate	Std. Error	Wald Z	P-value
Residual	66.46	1.66	39.92	<0.001
Intercept	28.92	3.21	9.00	<0.001

5.3.2.4. Model Fit Statistics

Model-fit statistics for short term leverage are given in Table 16. Model S1 is the chosen model whose details are presented in Table 12 to Table 15. An alternate model (namely model S2) in which there was no random intercept was considered, but this model had inferior model fit statistics as compared to model S1 (Table 16). As with the long term leverage models; the alternate model S2 does not contradict the key conclusions reached with regard to hypotheses H1, H2 and H3.

Table 16: Model-fit statistics for short-term leverage.

Model	Random Slope	Random Intercept	BIC	AIC
S1	No	Yes	24590	24578
S2	No	No	25260	25254

5.3.3. Overall Leverage

5.3.3.1. Panel Regression Equation

Model dimensions for overall leverage are given in Table 17. The structure of the model used was the same as that used for both long term leverage and short term leverage.

Table 17: Model dimensions for overall leverage (Model O1).

		Number of Levels	Covariance Structure	Number of Parameters	Subject Variables
Fixed Effects	Intercept	1		1	
	Inflation	1		1	
	GDP Growth	1		1	
	Unemployment	1		1	
Random Effects	Intercept	1	Variance Components	1	Companies
Residual				1	
Total		5		6	

5.3.3.2. Test for Significance and Parameter Estimates

The results of the tests for fixed effects for overall leverage are shown in Table 18. All three explanatory variables are found to be significant for overall leverage. Inflation was found to be significant at the 0.1 significance level. Whilst real GDP growth rate and unemployment rate were found to be significant at the 0.05 significance level and 0.01 significance level, respectively.

Table 18: Tests of fixed effects for overall leverage.

Source	Numerator DF	Denominator DF	F-Statistic	P-value.
Intercept	1	3358	0.465	0.496
Inflation	1	3205	2.785	0.095*
GDP Growth	1	3203	6.333	0.012**
Unemployment	1	3216	12.471	<0.001***

*Significance at 0.1 level
**Significance at 0.05 level
***Significance at 0.01 level

The parameter estimate for the coefficient of real GDP growth is positive and statistically significant at the 0.05 significance level. According to these results overall leverage increases with increasing real GDP growth. This lends support to hypothesis H1 which states that real GDP growth rate positively influences leverage.

The parameter estimate for the coefficient of inflation is negative and statistically significant at the 0.1 significance level. The results show that overall leverage decreases with increasing inflation. This finding supports hypothesis H2 which states that inflation negatively influences leverage.

The parameter estimate for the coefficient of unemployment is positive and statistically significant at the 0.01 significance level. Thus, the results indicate that overall leverage increases with increasing unemployment rate. This finding supports hypothesis H3 which states that the unemployment rate of a country influences leverage.

Table 19: Parameter estimates of fixed effects for overall leverage.

Parameter	Parameter Estimate	Std. Error	DF	t-Statistic	P-value
Intercept	3.30	4.84	3 358	0.682	0.496
Inflation	-0.19	0.12	3 205	-1.669	0.095*
GDP Growth	0.59	0.23	3 203	2.516	0.012**
Unemployment	0.59	0.17	3 216	3.531	<0.001***

*Significance at 0.1 level
**Significance at 0.05 level
***Significance at 0.01 level

5.3.3.3. Random Intercept Variance

Table 20 gives the estimates of covariance parameters for overall leverage. A random intercept has been incorporated into the model as with long term leverage and short term leverage. The random intercept is necessary in the model as indicated by the associated p-value. This implies that there are important unmeasured explanatory variables for each individual company that increases or decreases their overall leverage in a manner that appears random because the values of these variables that are unaccounted for in the model are unknown.

The variance of the random intercept has been estimated at 139.99, thus, the standard deviation of the random intercept is 11.83% (square root of variance). This implies that individual companies within the sample have different intercepts. Meaning that for any individual company within the sample (which has the mean intercept of 3.30 as given in Table 14), the individual company will have its own intercept that is up to 11.83 higher or lower than the mean intercept 68% of the time.

Table 20: Estimates of covariance parameters for overall leverage.

Parameter	Estimate	Std. Error	Wald Z	P-value.
Residual	259.87	6.51	39.94	<0.001
Intercept	139.99	15.01	9.33	<0.001

5.3.3.4. Model Fit Statistics

Model-fit statistics for short term leverage are given in Table 21. Model O1 is the chosen model whose details are presented in Table 17 to Table 20. An alternate model (model O2) in which there was no random intercept was considered, but this model had inferior model fit statistics as compared to model O1 (Table 20). As with the long term leverage and short term leverage models; the alternate model O2 does not contradict the key conclusions reached with regard to hypotheses H1, H2 and H3.

Table 21: Model-fit statistics for overall leverage.

Model	Random Slope	Random Intercept	BIC	AIC
O1	No	Yes	29302	29289
O2	No	No	30185	30179

5.3.4. Robustness Test

In order to test for robustness of the models used in this study, alternate models incorporating random slopes in addition to random intercepts were employed to test the relevant hypotheses. Two models incorporating random slopes were evaluated for each of the three measures of leverage (long term leverage, short term leverage and overall leverage). Model-fit statistics for these six models are given Table 22, and fixed effects coefficients with the associated p-values are given in Table 23. Full details of each of these models are presented in Appendix 9.1.

Table 22: Model-fit statistics for alternate model configurations

Model	Random Slope	Random Intercept	BIC	AIC
L3[a]	Yes	Yes	28429	28398
L4	Yes	No	28421	28396
S3	Yes	Yes	24596	24565
S4	Yes	No	24587	24563
O3[a]	Yes	Yes	29258	29227
O4	Yes	No	29250	29225

[a]Warning from SPSS that validity of subsequent results cannot be ascertained. The results for models L3 and O3 should be interpreted with caution.

Although AIC and BIC are lower for the models given in Table 22 and 23 with random slope included and random intercept excluded, these models do not appropriately account for the effect of other factors not specified in the model because of the absence of random intercept. It is known as previously mentioned that firm-specific factors and industry factors also influence leverage; but these factors are not part of the scope of this study, and therefore, are not accounted for in the model. The random intercept more reasonably accounts for this phenomenon whereby the capital structure models are fully specified (Seltman, 2014). The models adopted in this document, therefore, do not include random slope because the three macroeconomic variables do not account for all the variables that influence leverage. Thus, model selection was determined not only by the model-fit statistics, but also by consideration of the effect of unspecified variables that are accounted for by the random intercept.

According to the results in Table 23, the parameter estimate for the coefficient of real GDP growth is positive and statistically significant at the 0.05 significance level for long term leverage and overall leverage. For short term leverage the coefficient is positive but not statistically significant. These results do not contradict the conclusions reached based on the models adopted in this document (models L1, S1 and O1).

The results in Table 23 show the parameter estimate for the coefficient of inflation to be negative and statistically significant at the 0.1 significance level for long term leverage. The coefficient for inflation was not statistically significant for short term leverage and overall leverage. The findings are not in contradiction with the conclusions reached based on models L1, S1 and O1.

The results for unemployment rate are also consistent with those attained with models L1, S1 and O1. The parameter estimate for the coefficient for unemployment rate was positive and statistically significant at the 0.05 significance level and the 0.01 significance level for long term leverage and short term & overall leverage, respectively.

Table 23: Fixed effects coefficient for alternate models. P-values for each coefficient are given in parenthesis.

Model	Inflation	GDP Growth	Unemployment
L3[a]	-0.188* (0.070)	0.515** (0.035)	0.331** (0.024)
L4	-0.188* (0.070)	0.515** (0.035)	0.331** (0.024)
S3	-0.008 (0.893)	0.153 (0.232)	0.286*** (0.001)
S4	-0.009 (0.876)	0.151 (0.237)	0.282*** (0.001)
O3[a]	-0.192 (0.120)	0.667** (0.015)	0.627*** (<0.001)
O4	-0.192 (0.120)	0.667** (0.015)	0.627*** (<0.001)

*Significance at 0.1 level
**Significance at 0.05 level
***Significance at 0.01 level

5.4. Financially Constraint vs Unconstraint Firms

As previously explained in chapter 3, hypotheses H4, H5, H6 and H7 are related to whether a firm is financial constraint or unconstraint. In order to test these four hypotheses, the status of firms in the sample as to whether they are financially constraint or unconstraint had to be determined.

As previously mentioned, a firm is defined as financially constraint if it does not have sufficient cash flow to take on investment opportunities and it faces severe agency costs when accessing financial markets (Korajczyk & Levy, 2003). Korajczyk & Levy (2003) used two criteria to determine if a firm is financially constraint:

- First criteria specified that a financially constraint firm does not have a net repurchase of debt or equity and does not pay dividends within a specified period.
- Second criteria specified that a financially constraint firm has a Tobin's Q greater than one at the end of the last quarter of the period under consideration. Tobin's Q was defined as the sum of market value of equity and book value of debt divided by the book value of assets.

Determination of the Tobin's Q for firms in the sample revealed the results given in Table 24. Only 14 of the 230 firms in the sample had a Tobin's Q greater than one. Tobin's Q could not be determined for eight of the firms in the sample due to insufficient data.

Table 24: Tobin's Q for firms in the sample.

	Tobin's Q at end of 2013		
	>1	**<1**	**Not Computed**
No. of Firms	14	208	8

A sample consisting of only 14 firms was insufficient for purposes of testing hypotheses H5 and H7. Furthermore, results for H4 and H6 would be expected to be indistinguishable from those for H1 and H2 because the financially unconstraint sample is effectively the same as the total combined sample. However, testing for hypotheses H5 and H7 was still performed on this small and inadequate sample to get an indication of the results (see Table 25). The same applies to hypotheses H4 and H6 for financially unconstraint firms. Table 25 below gives the results on analysis of this small sample. Note that incorporation of the other criterion on dividend payment reduces the 14 firms to one. However, for the purposes of getting an indication of the results the 14 firms sample based on the Tobin's Q was retained.

Table 25: Fixed effects parameter estimate for the coefficient of independent variable for models based on 14 firms with Tobin's Q greater than one. P-values for each coefficient are given in parenthesis.

	Financially Unconstraint		**Financially Constraint**	
Model	**Inflation**	**GDP Growth**	**Inflation**	**GDP Growth**
LFC1	-0.152 (0.158)	0.525** (0.014)	-1.243** (0.012)	-0.398 (0.702)
SFC1	-0.024 (0.686)	0.079 (0.498)	0.120 (0.720)	0.820 (0.247)
OFC1	-0.129 (0.278)	0.592** (0.012)	-1.121** (0.048)	0.441 (0.712)

*Significance at 0.1 level
**Significance at 0.05 level
***Significance at 0.01 level

The results presented in Table 25 should be interpreted with much caution because the sample was insufficient and not representative. Although one cannot attach any

significance to these results, they do give an indication and provide reasons for future research.

5.4.1. Financially Unconstraint Firms

The parameter estimate for the coefficient for inflation was negative and not statistically significant for all three measures of leverage for financially unconstraint firms. These results do not seem to lend support to hypothesis H4 which states that inflation positively influences leverage of financially unconstraint firms.

The parameter estimate for the coefficient for real GDP growth was positive and statistically significant at the significance level of 0.05 for long term and overall leverage for financially unconstraint firms. For short term leverage, on the other hand, the coefficient of real GDP growth was positive and not statistically significant for financially unconstraint firms. These findings also do not seem to lend support to hypothesis H6 which states that GDP growth rate negatively influences leverage of financially unconstraint firms.

5.4.2. Financially Constraint Firms

The parameter estimate for the coefficient for inflation was negative and statistically significant at the significance level of 0.05 for long term and overall leverage for financially constraint firms. For short term leverage, on the other hand, the coefficient of inflation was positive and not statistically significant for financially constraint firms. These findings on long term and overall leverage do seem to lend support to hypothesis H5 which states that inflation negatively influences leverage of financially constraint firms. Whilst the result on short term leverage do not seem to lend support to hypothesis H5.

The parameter estimate for the coefficient for real GDP growth was not statistically significant for all three measures of leverage for financially constraint firms. However, long term leverage appears to be negatively related to real GDP growth, whilst short term and overall leverage appear to be positively influenced by real GDP growth for financially constraint firms. These findings do not seem to lend support to hypothesis H7 which states that GDP growth rate positively influences leverage of financially constraint firms. It should

be noted that the direction of the signs for the parameter estimate of the coefficient for short term and overall leverage were in the same direction as that in hypothesis H7.

5.5. Summary of Results

As previously stated the procedure of hypothesis testing is as follows: First, the null hypothesis and alternate hypothesis were defined (as was done in chapter 3). Second, the significance level was defined. The significance level determines the probability that is considered too low to offer support to the null hypothesis. Third and last, the appropriate statistical technique was chosen to determine whether the null hypothesis could be rejected in favour of the alternate hypothesis based on empirical data (as was done in chapter 5).

The significance level of 0.1 was used for purposes of rejecting (or failing to reject) the null hypothesis. Similar studies on capital structure have also used the significance level of 0.1 for hypothesis testing (Fosu, 2013; Lemma & Negash, 2013; Mittoo & Zhang, 2008; Weill, 2008). The null hypothesis was rejected (or failed to be rejected) on the basis of the p-value associated with the relevant explanatory variable. The null hypothesis was rejected when the p-value was below the significance level of 0.1, and failed to be rejected when the p-value was equal to or above the significance level of 0.1.

5.5.1. Central Hypotheses

Hypothesis 1: The null hypothesis states real GDP growth rate either does not affect or negatively affects leverage. The alternate hypothesis states that real GDP growth rate positively influences leverage.

$H1_0$: $Leverage_{(Low\ Real\ GDP\ Growth\ Rate)} \geq Leverage_{(High\ Real\ GDP\ Growth\ Rate)}$

$H1_A$: $Leverage_{(Low\ Real\ GDP\ Growth\ Rate)} < Leverage_{(High\ Real\ GDP\ Growth\ Rate)}$

Table 26: Summary of statistical findings on hypothesis H1.

Capital Structure Measure	**Conclusion**
Long term leverage	Reject $H1_0$
Short term leverage	Failed to reject $H1_0$
Overall leverage	Reject $H1_0$

Hypothesis 2: The null hypothesis states that inflation either does not influence or positively influences leverage. The alternate hypothesis therefore states that inflation negatively influences leverage.

$H2_0$: $Leverage_{(Low\ Inflation)} \leq Leverage_{(High\ Inflation)}$

$H2_A$: $Leverage_{(Low\ Inflation)} > Leverage_{(High\ Inflation)}$

Table 27: Summary of statistical findings on hypothesis H2.

Capital Structure Measure	**Conclusion**
Long term leverage	Reject $H2_0$
Short term leverage	Failed to reject $H2_0$
Overall leverage	Reject $H2_0$

Hypothesis 3: The null hypothesis states that the unemployment rate of a country either does not influence or negatively influences capital structure of firms in that particular country as measured through leverage. The alternate hypothesis states that the unemployment rate of a country positively influences leverage.

H_0: $Leverage_{(Low\ Unempl.)} \geq Leverage_{(High\ Unempl.)}$

H_A: $Leverage_{(Low\ Unempl.)} < Leverage_{(High\ Unempl.)}$

Table 28: Summary of statistical findings on hypothesis H3.

Capital Structure Measure	**Conclusion**
Long term leverage	Reject $H3_0$
Short term leverage	Reject $H3_0$
Overall leverage	Reject $H3_0$

5.5.2. Secondary Hypotheses

Testing for hypotheses H4, H5, H6 and H7 could not be reliably performed in this research due to insufficient data in the final sample. However, testing for hypotheses H4, H5, H6 and H7 was still performed on this unreliable sample to get an indication of the results.

Hypothesis 4: The null hypothesis states that an increase in inflation either does not affect or brings about a decrease in leverage for financially unconstraint firms. The alternate hypothesis states that inflation positively influences leverage of financially unconstraint firms.

$H4_0$: $Leverage_{(Fin.\ unconstraint\ Firms\ in\ Low\ Inflation)} \geq Leverage_{(Fin.\ unconstraint\ Firms\ in\ Inflation)}$

$H4_A$: $Leverage_{(Fin.\ unconstraint\ Firms\ in\ Low\ Inflation)} < Leverage_{(Fin.\ unconstraint\ Firms\ in\ Inflation)}$

The results on all three measures of leverage do not seem to lend support to hypothesis H4 which states that inflation positively influences leverage of financially unconstraint firms.

Hypothesis 5: The null hypothesis states that an increase in inflation either does not affect or brings about an increase in leverage for financially constraint firms. The alternate hypothesis states that inflation negatively influences leverage of financially constraint firms.

$H5_0$: $Leverage_{(Fin.\ constraint\ Firms,\ Low\ Inflation)} \leq Leverage_{(Fin.\ constraint\ Firms,\ High\ Inflation)}$

$H5_A$: $Leverage_{(Fin.\ constraint\ Firms,\ Low\ Inflation)} > Leverage_{(Fin.\ constraint\ Firms,\ High\ Inflation)}$

The findings on long term and overall leverage do seem to lend support to hypothesis H5 which states that inflation negatively influences leverage of financially constraint firms. Whilst the result on short term leverage do not seem to lend support to hypothesis H5.

Hypothesis 6: The null hypothesis states that an increase in real GDP growth rate either does not affect or brings about an increase in leverage for financially unconstraint firms. The alternate hypothesis states that GDP growth rate negatively influences leverage of

financially unconstraint firms.

$H6_0$: $Leverage_{(Fin.\ unconstraint\ Firms\ in\ Low\ Real\ GDP\ Growth)} \leq Leverage_{(Fin.\ unconstraint\ Firms\ in\ Real\ GDP\ Growth)}$

$H6_A$: $Leverage_{(Fin.\ unconstraint\ Firms\ in\ Low\ Real\ GDP\ Growth)} > Leverage_{(Fin.\ unconstraint\ Firms\ in\ Real\ GDP\ Growth)}$

The findings on all three measures of leverage also do not seem to lend support to hypothesis H6 which states that GDP growth rate negatively influences leverage of financially unconstraint firms.

Hypothesis 7: The null hypothesis states that an increase in real GDP growth rate either does not affect or brings about a decrease in leverage for financially constraint firms. The alternate hypothesis states that GDP growth rate positively influences leverage of financially constraint firms.

$H7_0$: $Leverage_{(Fin.\ constraint\ Firms,\ Low\ Real\ GDP\ Growth)} \geq Leverage_{(Fin.\ constraint\ Firms,\ High\ Real\ GDP\ Growth)}$

$H7_A$: $Leverage_{(Fin.\ constraint\ Firms,\ Low\ Real\ GDP\ Growth)} < Leverage_{(Fin.\ constraint\ Firms,\ High\ Real\ GDP\ Growth)}$

The findings on all three measures of leverage do not seem to lend support to hypothesis H7 which states that GDP growth rate positively influences leverage of financially constraint firms.

The results presented on hypotheses H4, H5, H6 and H7 should be interpreted with much caution because the sample was insufficient and not representative. At best these results give an indication for future research, and should not be interpreted as reliable conclusions from this research. Although one cannot attach any significance to these results, they do give an indication and provide reasons for future research.

6. Discussion of Results

The results presented in chapter five are discussed further in this chapter in the context of previous literature findings as well as the research objectives for this current study. The sub-sections are divided according to the hypotheses previously discussed in chapters three and five.

6.1. Hypothesis 1: Real GDP Growth Rate and Leverage

Real GDP growth rate was found to positively influence long term leverage and overall leverage at the significance level of 0.1. The relationship with short term leverage was found to be positive but not significant. That is, the null hypothesis $H1_0$ was rejected in favour of the alternate hypothesis $H1_A$ for long term leverage and overall leverage. The null hypothesis $H1_0$ could not be rejected for short term leverage though.

It is interesting to note that the effect of real GDP growth on long term leverage was not the same as on short term leverage. Overall leverage is excluded from this discussion because it is the sum of long term and short term leverage. First, real GDP growth had a statistically significant effect on long term leverage, whilst the relationship with short term leverage was not statistically significant. Second, the parameter estimates of the coefficient for the independent variable were different for the two leverage types. As previously shown (in Fig. 3) the annual median for the ratio of short term leverage to long term leverage ranged from 0.40 to 0.81 (equivalent to 29% to 45% of total debt) during the study period. That is short term leverage contributes significantly to the total debt mix of firms in the study sample, yet this leverage type is not influenced by real GDP growth rate.

This seems to suggest that firm management make decisions on issuance of short term debt in a completely different manner to long term debt. In other words, changes in real GDP growth rate do not influence firm management's decision to increase or decrease short term debt.

According to the static trade off theory firms take on debt, increase it up to an optimal leverage point, and increasing debt beyond this point will eventual result in the firm being at risk of financial distress and then defaulting. This explains why firms limit their use of debt. However, if some of the firms have overall leverage as high as 51% (95^{th} percentile

in Table 6) with short term debt contributing up to 45% of the overall leverage, it would be a concern that short term leverage is not adjusted according to changing macroeconomic conditions. This is so because the point at which default occurs is not just a function of the debt levels, but also macroeconomic conditions. That is, a firm that is not at risk of default during economic expansion can be a higher risk of default purely because the economy has shifted into a recession (Chen, 2010). If that particular firm does not adjust its short term leverage accordingly as suggested by the results from the current study, this could place the business at risk of defaulting.

6.1.1. Comparison with Literature

The study's results on long term leverage and overall leverage are in agreement with previous finding that real GDP growth rate has a positive effect on leverage (Booth & Aivazian, 2001; Dang, 2013; de Jong et al., 2008; Frank & Goyal, 2009). In these studies reporting a positive relationship between GDP growth and leverage, GDP growth was clearly defined in real terms.

Table 29. Comparison of parameter estimates for this study with literature for real GDP growth. Note this table shows only studies in which a positive relationship between real GDP growth and leverage was reported.

Parameter Estimates		
Overall Leverage	**Long-term Leverage**	**Source**
0.29***	–	(Frank & Goyal, 2009)
1.18	1.2	(Booth & Aivazian, 2001)
0.24**	–	(Dang, 2013)
0.02***	–	(de Jong et al., 2008)
0.59**	0.47**	This study

*Significance at 0.1 level
**Significance at 0.05 level
***Significance at 0.01 level

Parameter estimates for the coefficient of real GDP growth rate obtained in this study were compared with that from the literature as shown in Table 29 above. Note Table 29 only show the figures where a positive relationship was reported between leverage and real GDP growth. The parameter estimate for the coefficient of real GDP growth obtained in this study of 0.59 is comparable to those obtained in similar previous studies which ranged

between 0.02 and 0.29 (for overall leverage where the relationship was statistically significant). The parameter estimate from this study is higher from than those reported in the literature, which implies that the effect of real GDP growth rate on leverage ranged from twice as strong to thirty times stronger as that previously reported in the literature.

6.1.2. Explanation for Positive Influence of GDP Growth on Leverage

The reported positive influence of real GDP growth on leverage can be explained in terms of the following:

- Trade-off theory – Balancing of the benefit and cost of debt
- GDP Growth act as proxy for growth opportunities
- Tactical managerial activism

6.1.2.1. Trade-off Theory

The positive relationship between leverage and real GDP growth rate obtained in the current study can be explained in terms of the static trade-off theory. The trade-off theory states that capital structure is determined by a company's balancing of the benefit and cost associated with debt and equity financing (Dang, 2013; Lemma & Negash, 2013; Titman & Wessels, 1988). Both the benefit and cost of debt are dependent on macroeconomic conditions (Hackbarth et al., 2006).

The tax benefit of debt depends on the level of cash flows, which in turn is dependent on whether the economy is in an expansion or in a contraction (Hackbarth et al., 2006). Furthermore, the expected bankruptcy costs depend on the probability of default and the loss when default occurs, both of these are dependent on the current state of the economy (Hackbarth et al., 2006). The probability of default is higher during periods of economic contraction (Chen, 2010; Hackbarth et al., 2006) and so is the cost of default (Chen, 2010). According to Chen (2010) firms are reluctant to take on leverage not because the default losses are high on average, but because the losses are particularly high in those states in which defaults are more likely and losses are harder to bear. Consequently, leverage tends to decrease with decreasing real GDP growth rate, and increase with increasing real GDP growth rate in line with the findings from the current study.

6.1.2.2. GDP Growth act as Proxy for Growth Opportunities

The positive relationship between real GDP growth rate and leverage can be explained to be due to firms in countries with higher real GDP growth rates increasing their leverage in order to finance future investments (de Jong et al., 2008). That is, when real GDP growth is high this brings about growth opportunities for firms in the economy, which in response utilise debt to capitalize on investment in future growth opportunities. In support of these results, Dang (2013) argued that firms are more likely to avoid debt when the real GDP growth rate declines. According to Booth & Aivazian (2001), firms borrow against real but not inflationary growth prospects.

According to Hackbarth et al. (2006), changes in macroeconomic conditions impacts on the firm's debt capacity. Debt capacity is defined as the maximum amount of debt that can be sold against the firm's assets (Hackbarth et al., 2006). The debt capacity of a firm is said to be greater when the economy is in an expansion (Hackbarth et al., 2006). That is, firms are more likely to take on debt in healthier economic conditions (de Jong et al., 2008). It has been further argued that a firm's capital structure decisions are impacted by the rate at which a country's economy grows; it is postulated that firm growth is correlated with economic growth of the country in which the firm operates (Lemma & Negash, 2013). Firm growth is viewed as proxy for firm's investment opportunity set and, therefore, its financing needs (Lemma & Negash, 2013). In support of this view, it has been argued that macroeconomic conditions may affect leverage through the fact that they proxy growth opportunities in the overall economy (Jõeveer, 2013). Lemma & Negash further argue that at the core of the argument is the view that economic development reflects wealth disparity between countries and therefore access to finance.

Chen (2010) argues that if a firm's cash flows are more correlated with the market, changes in the aggregate expected growth rate and volatility will have a larger impact on its cash flows. That is, Chen (2010) argues that when the expected growth rate is high and economic uncertainty is low, the firm is more aggressive in taking on debt and thereby increasing leverage. There is an underlying assumption in this argument that there is correlation between the growth rates of firm cash flows and aggregate output (real GDP growth rate). At the core of the argument that economic development of a given country is associated with the financing patterns of firms in that country, is the view that economic development reflects wealth disparity between countries, and therefore, access to finance

(Lemma & Negash, 2013).

6.1.2.3. Tactical Managerial Activism

An alternate explanation for the positive relationship between (long term and overall) leverage and real GDP growth has been offered by Levy & Hennesy (2007) and Camara (2012). According to Levy & Hennesy (2007) and Camara (2012) firm management engages in tactical managerial activism whereby financial managers actively replace equity with debt during economic expansions and replace debt with equity during economic contractions. Economic contraction is said to have occurred when real GDP has declined for two or more quarters; meaning negative real GDP growth for two or more quarters.

According to Camara (2012) such tactical rebalancing of debt and equity in different macroeconomic states serves a signalling function, whereby managers deliberately increase their share of total equity holdings during periods of economic contraction in order to send a confidence signal to market participants. Managers are said to signal positive private information by replacing debt with equity and holding large shares of their own firm equity (Levy & Hennessy, 2007). This view that management engages in tactical managerial activism through signal has found support in another study that has reported that adverse macroeconomic conditions increase the inclination of firms to avoid debt (Dang, 2013); that is, leverage decreases during economic contractions and increases during economic expansions.

This type of management behaviour is in contradiction with the agency theory, which states that there is a conflict of interest between firm management, and outside equity and debt holders. According to this view, leverage would discipline management behaviour in such a way that firms with few investment opportunities and high free cash flow would increase the use of debt (Kayo & Kimura, 2011). The opposite behaviour is suggested by the results obtained from the current study.

Table 30: Theories supported and contradicted by the positive relationship between real GDP growth and leverage.

Capital Structure Measure	Conclusion	Theory Supported	Theory Contradicted
Long term leverage	Reject $H1_0$	Trade-off Theory	Pecking Order Theory Agency Theory
Short term leverage	Failed to reject $H1_0$	None	None
Overall leverage	Reject $H1_0$	Trade-off Theory	Pecking order Theory Agency Theory

6.1.3. Alternative Views

Parameter estimates for the coefficient of real GDP growth rate obtained in this study were compared with that from the literature as shown in Table 31 where different results were obtained. Note Table 31 only shows the figures where a negative relationship was reported between leverage and real GDP growth. The magnitude of the parameter estimate for the coefficient of real GDP growth obtained in this study of 0.59 is larger than those obtained in previous studies which ranged between 0.012 and 0.18 (for overall leverage where the relationship was statistically significant). Note that caution should be taken in comparing the figure from Axelson et al. (2013) because they defined their dependent variable as logarithm of debt divided by EBITDA.

Table 31: Comparison of parameter estimates for this study with literature for real GDP growth. Note this table shows only studies in which a negative relationship between real GDP growth and leverage was reported.

Parameter Estimate		
Overall Leverage	**Long-term Leverage**	**Source**
-0.024***	–	(Lemma & Negash, 2013)
-0.176***	–	(Kayo & Kimura, 2011)
-0.012**	–	(Axelson et al., 2013)
0.59**	0.47**	This study

*Significance at 0.1 level
**Significance at 0.05 level
***Significance at 0.01 level

The results from this study does not support findings from studies that report that leverage is negatively influenced by the GDP growth rate (Axelson et al., 2013; Kayo & Kimura,

2011; Lemma & Negash, 2013). The negative relationship between leverage and real GDP growth rate is supported by those who reported that leverage varies counter-cyclically with macroeconomic conditions (Axelson et al., 2013; Chen, 2010; Korteweg, 2010; Lingenfelder, 2013). Chen (2010) explains this counter-cyclicality to be due the fact that when a recession arrives firms cannot adjust their leverage downward without incurring additional cost. When firms enter into a recession they are stuck with the debt issued in good times, as a result leverage is likely to increase because equity value falls more than debt during a recession (Arnold et al., 2012; Chen, 2010).

According to Bokpin (2009), improvement in the general economy drives firms to resort to internal sources of financing rather than external sources. A boost in the economy and consequently growth in GDP leads to increased firm profits; and according to the pecking order theory firms prefer the use of internal sources of funding over external sources such as debt (Lemma & Negash, 2013; Mokhova & Zinecker, 2014).

The results on the relationship between leverage and real GDP growth are clearly in contradiction with the pecking order theory. The pecking order theory states that that a firm will finance its activities in a specific order that sequentially starts with internal funding, followed by debt, and as a last resort equity (Bharath et al., 2009; Myers, 1984). The reason of this 'pecking order' is said to be the presence of information asymmetries and transactional cost that firms face when raising capital from external sources (Lemma & Negash, 2013; Myers, 1984). According to the pecking order theory firms prefer the use of internal sources of funding over external sources such as debt, therefore, it would be expected that when real GDP growth increases leverage should decrease. This decrease in leverage would be due to increased firm profits, and therefore higher retained earnings, that accompany increase in real GDP growth.

6.2. Hypothesis 2: Inflation and Leverage

Inflation represents an overall index for the cost of living for a particular country (Mokhova & Zinecker, 2014). According to Lemma & Negash (2013), inflation rate is ordinarily considered as a proxy for a government's ability to manage the economy and it is said to offer information about the stability of a given currency in long-term contracting. Lemma & Negash, therefore, argue that inflationary situations affect financing patterns of firms.

Inflation was found in this study to negatively influence long term leverage and overall leverage at the significance level of 0.1. The relationship between short term leverage and inflation was found not to be statistically significant. Therefore, the null hypothesis $H2_0$ was rejected for both long term leverage and overall leverage in favour of the alternate hypothesis $H2_A$. The null hypothesis $H2_0$ could not be rejected for short term leverage. The results from this study on long term leverage and overall leverage is in support of research studies that have reported a negative relationship between inflation and leverage (Booth & Aivazian, 2001; Camara, 2012; Jõeveer, 2013).

Just as with real GDP growth, it is interesting to note that the effect of inflation on long term leverage was not the same as on short term leverage. First, inflation had a statistically significant effect on long term leverage, whilst the relationship with short term leverage was not statistically significant. Second, the parameter estimates of the coefficient for the independent variable were different for the two leverage types. As previously shown (in Fig. 3) the annual median for the ratio of short term leverage to long term leverage ranged from 0.40 to 0.81 during the study period. That is short term leverage contributes significantly to the total debt mix of firms in the study sample, yet this leverage type is not influenced by inflation.

Again this finding appears to suggest that firm management make decisions on issuance of short term debt in a completely different manner to long term debt. In other words, changes in inflation rate do not influence firm management's decision to increase or decrease short term debt. The same risk highlighted previously for real GDP growth of the risk of financial distress and default is applicable for inflation.

6.2.1. Comparison with Literature

Table 32: Comparison of parameter estimates for this study with literature for inflation. Note this table shows only studies in which a negative relationship between inflation and leverage was reported.

Parameter Estimate		
Overall Leverage	**Long-term Leverage**	**Source**
-0.1	-0.1	(Booth & Aivazian, 2001)
-0.0002***	–	(Camara, 2012)
-0.00006***	–	(Jõeveer, 2013)
-0.19*	-0.18*	This study

*Significance at 0.1 level
**Significance at 0.05 level
***Significance at 0.01 level

Parameter estimates for the coefficient of inflation obtained in this study were compared with that from the literature as shown in Table 32 above. Note that Table 32 only shows the figures where a negative relationship was reported between leverage and inflation. The parameter estimate for the coefficient of inflation obtained in this study of 0.19 is much higher than those obtained in similar previous studies which ranged between 0.00006 and 0.0002 (for overall leverage where the relationship was statistically significant).

6.2.2. Explanation for Negative Effect of Inflation on Leverage: Market Timing Theory

This negative association has been explained to be due to firms resorting to internal sources of funding in periods of high inflationary pressures as inflation increases the cost of obtaining external sources of funding whether in the form of long-term or short-term debt (Bokpin, 2009; Camara, 2012). The expectation of changes in inflation rate are said to influence credit and reinvestment risks (Mokhova & Zinecker, 2014). Although inflation pushes up the monetary value of the firm's assets, the resultant higher interest rate and monetary risk caused by inflation are said to reduce firm leverage (Booth & Aivazian, 2001). In support of this view, Chen (2010) postulated that firms behave like market timers by issuing more debt when interest rates become lower. It has been shown empirically that interest rates negatively influence leverage (Axelson et al., 2013; Barry et al., 2008). This can be explained by the surveyed behaviour of managers who tend to time issuance of debt for periods when interest rates are at historical lows and debt is cheaper (Graham & Harvey, 2001).

Table 33: Theories supported and contradicted by the negative relationship between inflation and leverage.

Capital Structure Measure	Conclusion	Theory Supported	Theory Contradicted
Long term leverage	Reject $H1_0$	Market Timing Theory	Trade-off Theory
Short term leverage	Failed to reject $H1_0$	None	None
Overall leverage	Reject $H1_0$	Market Timing Theory	Trade-off Theory

These results lend support to the market timing theory which states that firms consider conditions in the securities market, and time raising of funds in accordance with market conditions (Baker & Wurgler, 2002; Lemma & Negash, 2013). The basic idea is that when firm managers need to finance their companies they consider current prevailing conditions in both debt and equity markets; they then proceed to make use of whichever market is more favourable (Frank & Goyal, 2009).

6.2.3. Alternative View

Some studies on the other hand have found inflation not to be significant in determining firm leverage (Axelson et al., 2013). This view was supported by the results found in this study on short term leverage, but not on long term leverage and overall leverage.

Table 34: Comparison of parameter estimates for this study with literature for inflation.

Parameter Estimate		
Overall Leverage	**Long-term Leverage**	**Source**
0.025***	0.035***	(Frank & Goyal, 2009)
0.013***	–	(Lemma & Negash, 2013)
-0.19*	-0.18*	This study

*Significance at 0.1 level
**Significance at 0.05 level
***Significance at 0.01 level

It has been shown empirically that inflation positively influences leverage (Frank & Goyal, 2009; Lemma & Negash, 2013). The strength of this effect of inflation was reported to be relatively weak by Frank & Goyal (2009), but not by Lemma & Negash (2013). It has been argued that a firm is likely to issue more debt under inflationary environment because

inflationary situations has the effect to both decrease the real value of debt and increase the real tax advantage of debt to firms (Frank & Goyal, 2009; Lemma & Negash, 2013).. The results from this study, however, do not support this view that inflation positively influences leverage.

The positive effect of inflation on leverage is consistent with the trade-off theory (Frank & Goyal, 2009; Lemma & Negash, 2013). The findings on the relationship between inflation and leverage from the current study are, therefore, not in support of the trade-off theory. If the trade-off theory was supported by the results, the argument put forward by Frank & Goyal (2009) and Lemma & Negash (2013) that financial managers of firms will take advantage of the decreased real value of debt and increase tax benefits of debt offered by higher inflation would have been corroborated. In that case, higher inflation would have resulted in increased leverage.

6.3. Hypothesis 3: Unemployment Rate and Leverage

Unemployment rate was found to positively influence long term leverage, short term leverage and overall leverage at the significance level of 0.1. That is, the null hypothesis $H3_0$ was rejected in favour of the alternate hypothesis $H3_A$ for long term leverage, short term leverage and overall leverage. This relationship was found to be particularly robust; the null hypothesis could have been rejected at 0.01 significance level for this explanatory variable.

There was more congruency in terms of how unemployment rate influenced long term and short term leverage as compared to the other two independent variables, namely: real GDP growth and inflation. First, both long term and short term leverage had a statistically significant relationship with the independent variable. Second, the parameter estimates of the coefficient for the independent variable were in close proximity for the two leverage types.

6.3.1. Comparison with Literature

Comparison of the parameter estimates for coefficients of the independent variable for the current study with literature could not be performed because of the fact that there is no

other study that has done a similar study making use of panel regression techniques. The only other study that has investigated the relationship between unemployment rate and capital structure was that by Mokhova & Zinecker (2014).

Mokhova & Zinecker used Pearson correlation analysis in order to investigate the influence macroeconomic factors on capital structure. They reported a correlation of 0.895 which was statistically significant at the 0.05 significance level. Whilst the findings from the current study gave parameter estimates of 0.33, 0.26 and 0.59 for long term, shot term and overall leverages respectively. The significance levels for long term, shot term and overall leverages were 0.05, 0.01, and 0.01 levels, respectively. The results from both studies imply a robust relationship between unemployment rate and leverage.

6.3.2. Explanation for Positive Influence of Unemployment Rate on Leverage

The results from the current study on unemployment rate support the view that has previously been reported that leverage is counter-cyclical (Axelson et al., 2013; Chen, 2010; Cook & Tang, 2010; Kayo & Kimura, 2011; Lingenfelder, 2013). Accordingly, leverage should be higher during bad macroeconomic states than in good macroeconomic states. Unemployment rate increases during economic downturn (Chen, 2010), therefore leverage should increase with increasing unemployment rate; and unemployment rate decreases during economic expansion, therefore leverage should decrease with decreasing unemployment rate. In support of this view, Mokhova & Zinecker (2014) empirically provided evidence of a positive and statistically significant relationship between leverage and unemployment rate. It must be noted that this finding was found only in one of the seven countries sampled in their study; in the other six countries the relationship was reported to be non-significant. To the author's knowledge the relationship between unemployment rate and capital structure has not been studied much in the literature; the only study that has explored this issue (to the author's knowledge) is that by Mokhova & Zinecker (2014).

Table 35: Theories supported and contradicted by the positive relationship between unemployment rate and leverage.

Capital Structure Measure	Conclusion	Theory Supported	Theory Contradicted
Long term leverage	Reject $H1_0$	None	Trade-off theory
Short term leverage	Reject $H1_0$	None	Trade-off theory
Overall leverage	Reject $H1_0$	None	Trade-off theory

6.3.3. Alternative Views

There are alternative views on this issue. According to the trade-off theory capital structure decisions are a consequence of a balance between benefit of debt and its cost – in the form of bankruptcy cost. It has been argued that the biggest bearer of bankruptcy cost is the employees of the firm because their employment contract would be terminated in the event of a firm filing for bankruptcy (Berk et al., 2010). Chen (2010) also identified loss of human capital as an indirect cost of a firm going through financial distress. In a country with a high unemployment rate, cheap labour is more freely available; therefore, firms in such a country would be expected to be more labour intensive. According to Berk et al. (2010), labour intensive firms have lower levels of debt; in fact extremely labour intensive firms are reported to have negative debt-to-equity and therefore, hold cash.

This view is supported by findings in other studies which have shown leverage to increase with fixed assets-to-book value of firms (Frank & Goyal, 2009). The higher the fixed asset-to-book value the more capital intensive (and less labour intensive) the firm is (Berk et al., 2010). It has been postulated that firms might limit their use of debt due to human capital concerns (Berk et al., 2010). If this argument holds, it would be expected that firms in a country with high unemployment will tend to make more conservative use of leverage in order to minimize possible impact of bankruptcy costs on their employees. The findings from this study on the relationship between unemployment rate and leverage do not support this view; as leverage was found to increase with increasing unemployment rate. Thus, the findings on the relationship between unemployment rate and capital structure, as measured through long term leverage and overall leverage, are in contradiction with the trade-off theory.

6.4. Shortcomings

6.4.1. Model not Comprehensive

The linear mixed model used to establish the effect of selected macroeconomic variables on capital structure choice was not inclusive of all macroeconomic variables that influence capital structure. Furthermore, firm specific factors and industry factors not included – this may hide some of the indirect effect that some of the factors have on the established relationships.

6.4.2. Market vs Book Leverage

The results obtained in this study were obtained making use of three measures of book leverage, namely: long term leverage, short term leverage and overall leverage. There are conflicting views in the literature on whether the use of book leverage and market leverage to measure capital structure give the same results or not.

de Jong et al. (2008) reported the use of market leverage or book leverage did not yield contradictory results. Whilst Booth & Aivazian (2001) and Frank & Goyal (2009) got different results depending on whether market leverage or book leverage was used. According to Frank & Goyal (2009) book leverage is backward looking while market leverage is forward looking. That is, in interpreting the results caution must be taken in assuming that they are necessarily applicable to capital structure as measured through market leverage.

The implication for the current study is that the research findings obtained are not necessarily comparable with other research studies in which capital structure is defined differently. For instance those studies that use market leverage and not book leverage.

6.4.3. Developing vs Developed Economy

Whether the country is developing or developed has been reported to have an impact on the association between capital structure and macroeconomic factors (Mokhova & Zinecker, 2014). This implies that macroeconomic factors with influence capital structure in a different manner in a developing country as opposed to a developed country.

On the other hand, Booth & Aivazian (2001) reported that leverage in developing countries seem to be affected in the same way and by the same type of macroeconomic variables that are significant in developed countries. However, it has been reported that there are systematic difference in the way leverage is affected by macroeconomic factors (Booth & Aivazian, 2001).

The results from the current study are in some agreement with Booth & Aivazian (2001)'s assertion that leverage in developing countries seem to be affected in the same way and by the same type of macroeconomic variables that are significant in developed countries. This is because some of the findings from this study are in agreement with other research that was done in cross section of countries, some from developed economies and others from developing economies.

Although there's agreement with other research from other countries, there's equally conflicting results compared to research from other countries. This implies that the results from this study are not necessarily transferable to other countries, although there is some agreement with literature from various other countries.

6.4.4. Financial Constraint vs Unconstraint Firms

The results presented the impact of whether a firm is financially constraint or unconstraint on how real GDP growth and inflation influence leverage should be interpreted with much caution because the sample was insufficient and not representative. At best these results give an indication for future research, and should not be interpreted as reliable conclusions from this research. Although one cannot attach any significance to these results, they do give an indication and provide reasons for future research.

6.5. Summary on Discussion of Results

6.5.1. Hypothesis 1: Real GDP Growth Rate

The current study's results on long term leverage and overall leverage are in agreement with previous finding that real GDP growth rate has a positive effect on leverage (Booth & Aivazian, 2001; Dang, 2013; de Jong et al., 2008; Frank & Goyal, 2009). The reported

positive influence of real GDP growth on leverage can be explained in terms of the following:

- Static trade-off theory: The trade-off theory states that capital structure is determined by a company's balancing of the benefit and cost associated with debt and equity financing (Dang, 2013; Lemma & Negash, 2013; Titman & Wessels, 1988). Both the benefit and cost of debt are dependent on macroeconomic conditions (Hackbarth et al., 2006), such a way an increase in real GDP growth rate results in rising benefits of cost and reduced cost of debt.
- GDP Growth act as Proxy for Growth Opportunities: When real GDP growth rate rises, this brings about growth opportunities for firms in the economy, which in response utilise more debt to capitalize on investment in future growth opportunities.
- Tactical managerial activism: Firm management engages in tactical managerial activism whereby financial managers actively replace equity with debt during economic expansions and replace debt with equity during economic contractions (Camara, 2012; Levy & Hennessy, 2007). Managers are said to signal positive private information in order to send a confidence signal to market participants.

The findings from this study on the relationship between real GDP growth and leverage suggest that firm management make decisions on issuance of short term debt in a completely different manner to long term debt. In other words, changes in real GDP growth do not influence firm management's decisions with regard to changes in short term debt.

6.5.2. Hypothesis 2: Inflation

The results from this study on long term leverage and overall leverage are in support of research studies that have reported a negative relationship between inflation and leverage (Booth & Aivazian, 2001; Camara, 2012; Jõeveer, 2013).

These results lend support to the market timing theory which states that firms consider conditions in the securities market, and time raising of funds in accordance with market conditions (Baker & Wurgler, 2002; Lemma & Negash, 2013).

The findings from this study suggest that firm management make decisions on issuance of

short term debt in a completely different manner to long term debt. In other words, changes in inflation do not influence firm management's decisions with regard to changes in short term debt.

6.5.3. Hypothesis 3: Unemployment Rate

Unemployment rate was found to positively influence long term leverage, short term leverage and overall leverage. The results from the current study on unemployment rate support the view that has previously been reported that leverage is counter-cyclical (Axelson et al., 2013; Chen, 2010; Cook & Tang, 2010; Kayo & Kimura, 2011; Lingenfelder, 2013). In support of this view, Mokhova & Zinecker (2014) empirically provided evidence of a positive and statistically significant relationship between leverage and unemployment rate. To the author's knowledge the relationship between unemployment rate and capital structure has not been studied much in the literature; the only study that has explored this issue (to the author's knowledge) is that by Mokhova & Zinecker (2014).

There was more congruency in terms of how unemployment rate influenced long term and short term leverage as compared to the other two independent variables, namely: real GDP growth and inflation. First, both long term and short term leverage had a statistically significant relationship with the independent variable. Second, the parameter estimates of the coefficient for the independent variable were in close proximity for the two leverage types.

6.5.4. Other Observations

No single universal theory was able to explain the research finding from the current study. The observed effect of real GDP growth rate on long term and overall leverage was in line with static trade off theory but contradicted the pecking order theory as well as agency theory. The relationship between inflation, and long term and overall leverages, on the other hand, supported the market timing theory but contradicted the static trade off theory. Meanwhile the effect of unemployment rate did not support any particular capital structure theory yet contradicted the static trade off theory.

7. Conclusion

7.1. Main Findings

The objective of this research study was to investigate the effect of macroeconomic conditions on capital structure choices of listed South African firms. This was done by first performing a literature review on effect of macroeconomic conditions on capital structure in order to assess the current knowledge on the issue. This review included clarification on various measures for capital structure used in the literature. Second, relevant macroeconomic variables that have an influence on capital structure were identified and isolated based on current knowledge in the literature. Third, the study proceeded to determine how the identified macroeconomic variables affect and influence capital structure of firms.

7.1.1. Measure of capital structure

There is currently no universally accepted definition of capital structure in the literature (Lemma & Negash, 2013). It has been argued that the purpose of analysis or of the study should determine the measures of capital structure used (Lemma & Negash, 2013). Most previous studies on capital structure have employed financial leverage/debt ratio as a measure of capital structure (Delcoure, 2007; Fosu, 2013; Frank & Goyal, 2009; Jõeveer, 2013; Katagiri, 2014; Lemma & Negash, 2013; Modigliani & Miller, 1958; Titman & Wessels, 1988). In order to navigate around these differences of views on what measure of capital structure is most appropriate, a lot of the researchers employ more than one measure of capital structure (Bokpin, 2009; Cook & Tang, 2010; Delcoure, 2007; Frank & Goyal, 2009; Jõeveer, 2013; Mittoo & Zhang, 2008). Often the measures employed will include a combination of short-term, long-term and overall debt measures (Bokpin, 2009; Cook & Tang, 2010; Delcoure, 2007; Frank & Goyal, 2009; Jõeveer, 2013; Mittoo & Zhang, 2008), sometimes both book-based and market based leverage measures are used (Ogden & Wu, 2013).

In line with normal practice in literature the current study employed book leverage as a measure of capital structure. The dependent variable adopted in this study was, therefore, book leverage, and the following measures of leverage were employed: short term leverage; long-term leverage and overall leverage.

7.1.2. Macroeconomic Conditions and Different Measures of Leverage

Three macroeconomic variables were identified to be of interest in this study, namely: real gross domestic product (GDP) growth rate, inflation rate, and unemployment rate. The effect of real GDP growth and inflation on long term leverage was not the same as on short term leverage. First, real GDP growth rate and inflation rate had a statistically significant effect on long term leverage (and overall leverage), whilst the relationship with short term leverage was not statistically significant. Second, the parameter estimates of the coefficient for the independent variable were different for the two leverage types. In other words, the effect of both independent variables on long term leverage was stronger than on short term leverage.

The findings from this study on the influence of both real GDP growth and inflation on leverage suggest that firm management make decisions on issuance of short term debt in a completely different manner to long term debt. In other words, changes in real GDP growth and inflation do not influence firm management's decisions with regard to changes in short term debt.

There was more congruency in terms of how unemployment rate influenced long term and short term leverage as compared to the other two independent variables, namely: real GDP growth and inflation. First, both long term and short term leverage had a statistically significant relationship with the independent variable. Second, the parameter estimates of the coefficient for the independent variable were in close proximity for the two leverage types.

7.1.3. Effect of Macroeconomic Conditions on Capital Structure

The current study's findings on long term leverage and overall leverage are in agreement with previous finding that real GDP growth rate has a positive effect on leverage (Booth & Aivazian, 2001; Dang, 2013; de Jong et al., 2008; Frank & Goyal, 2009). The results from this study on long term leverage and overall leverage are in support of research studies that have reported a negative relationship between inflation and leverage (Booth & Aivazian, 2001; Camara, 2012; Jõeveer, 2013).

Unemployment rate was found to positively influence long term leverage, short term leverage and overall leverage. In support of these results, Mokhova & Zinecker (2014) empirically provided evidence of a positive and statistically significant relationship between leverage and unemployment rate. To the author's knowledge the relationship between unemployment rate and capital structure has not been studied much in the literature; the only study that has explored this issue (to the author's knowledge) is that by Mokhova & Zinecker (2014).

The effect of macroeconomic conditions on capital structure choices is illustrated in Fig. 4 to Fig. 7. The manner in which the combination of the two independent variables, real GDP growth and inflation, influence leverage based on the findings form this study is illustrated in Fig. 4.

Figure 4: How real GDP growth and inflation influence leverage. Applicable to long term and overall leverages only.

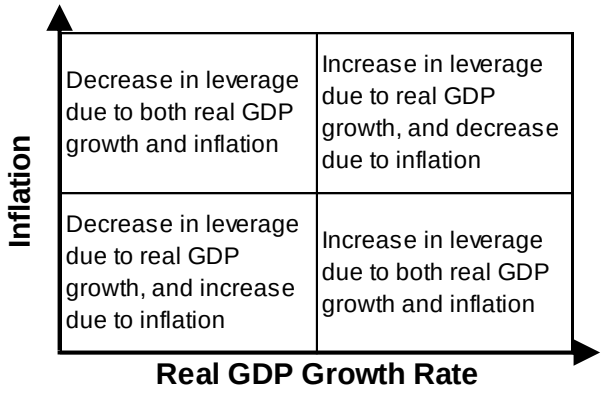
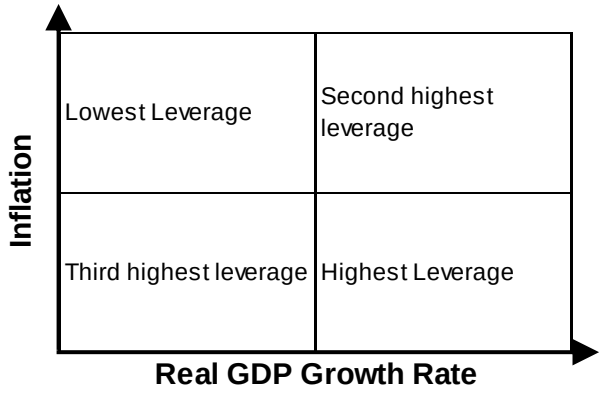


Fig. 5 shows that the highest leverage should be obtained under conditions whereby real GDP growth increases and inflation decreases. Based on the results obtained in the current study, real GDP growth rate was found to have a stronger influence on leverage than inflation. Consequently, the macroeconomic conditions under which the second highest leverage would be obtained would be when real GDP growth increases and inflation decreases.

Figure 5: Effect of real GDP growth and inflation on leverage. Assuming that everything else remains constant. Graph applicable to long term and overall leverages only.



The manner in which the combination of the two independent variables, real GDP growth and unemployment rate, influence leverage based on the findings form this study is illustrated in Fig. 6.

Figure 6: How real GDP growth and unemployment rate influence leverage. Applicable to long term and overall leverages only.

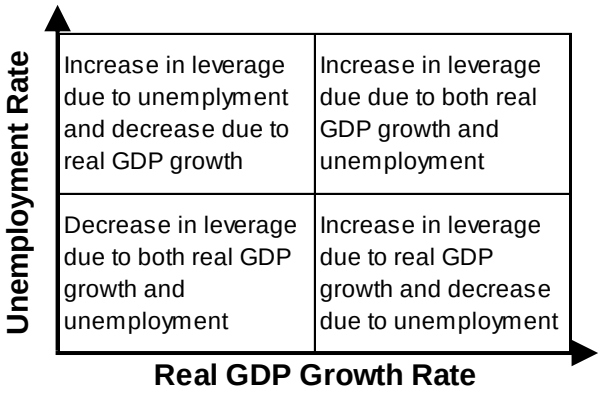
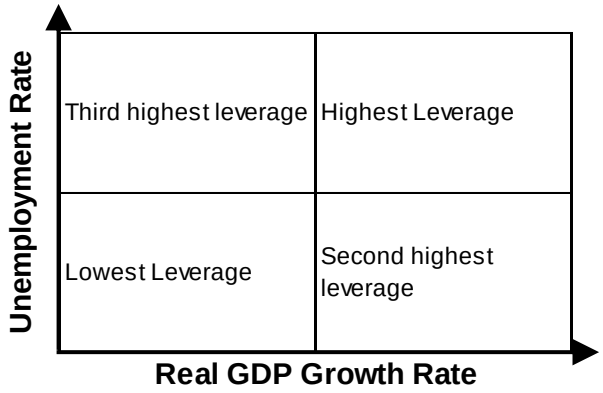


Fig. 7 illustrate that the highest leverage should be obtained under conditions whereby both real GDP growth and unemployment rate increase. Based on the results obtained in the current study, real GDP growth rate was found to have a stronger influence on leverage than unemployment rate for long term leverage. However, as far as overall leverage is concerned real GDP growth rate and unemployment rate were found to have an effect that was of equal strength. Consequently, the macroeconomic conditions under which the second highest leverage would be obtained would be when real GDP growth increases and unemployment decreases, and vice versa.

Figure 7: Effect of real GDP growth and unemployment rate on leverage. Assuming that everything else remains constant. Graph applicable to long term leverage only. For overall leverage the second and third highest leverages would be replace by only second highest leverage for both conditions.



No single universal theory was able to explain the research finding from the current study. The observed effect of real GDP growth rate on long term and overall leverage was in line with static trade off theory but contradicted the pecking order theory as well as agency theory. The relationship between inflation, and long term and overall leverages, on the other hand, supported the market timing theory but contradicted the static trade off theory. Meanwhile the effect of unemployment rate did not support any particular capital structure theory yet contradicted the static trade off theory.

7.1.4. Management Implications of Research Findings

Industry factors and firm specific factors may drive capital structure choices of firms into a specific direction in the course of the business cycle. Furthermore, the findings from this study illustrate that manager do not consider short term leverage when adjusting utilisation of debt under changing macroeconomic conditions. These two scenarios may bring a particular firm closer to the risk of financial distress and default. Managers of firms need ensure that they have sufficient flexibility in structuring their firm's capital in order to account for variations in macroeconomic shocks which can also significantly dictate capital structure choice and limit financing options for the firm.

In periods of low growth managers are conservative and leverage levels are low – which implies lower levels of investment given that profits are not expected to be higher when

real GDP growth is low.

7.2. Research Limitations

The study was conducted on a sample of 230 listed firms from South Africa. The results from the study may not be applicable to other countries. Unlisted firms were not part of the sample used in the study; therefore, the results may not be applicable unlisted firms.

The findings from this research are not applicable to financial firms as they are excluded from the sample. Results cannot be generalised to all RSA firms (listed and unlisted) as only listed non-financial firms were considered.

The study focuses on macroeconomic factors and does not include firm-specific factors and industry factors. The reason for excluding these factors from the study is that effect of these parameters on capital structure has been generally well established in the literature.

As mentioned above, the model used in the current study does not incorporate firm specific factors and industry factor. Therefore, the possible interaction and reported indirect impact of industry and macroeconomic factors on how firm specific factors influence capital structure are not accounted for in the results from this study.

Measures used to quantify properties (such as capital structure) are neither perfect nor absolute. Specific measures of leverage have been chosen in this research that will not necessarily be comparable to all studies in the literature. Different measures of leverage are used in the literature due to difference in research objective, researcher preference, data limitations etc. The current study used book leverage to represent capital structure and not market leverage as done by some in the literature. Therefore, caution should be applied in comparing the results from this study with those where different measures of leverage were used. It should, however, be clarified that there are different views in the literature on whether this is an issue or not.

There is an implicit assumption made about the integrity of the financial data collected from the database used in the study. The same goes for the comparability of firm accounting data from the various companies that constitute the study sample.

7.3. Recommendations for Future Studies

7.3.1. Financial Constraint or Unconstraint

The variation of leverage with macroeconomic conditions is different for financially constraint and unconstraint companies (Korajczyk & Levy, 2003; Levy & Hennessy, 2007). Leverage has been reported to vary counter-cyclically with macroeconomic conditions for financially unconstrained firms (Korajczyk & Levy, 2003; Levy & Hennessy, 2007). Whilst for financially constrained firms, leverage was reported flat over the business cycle by some (Levy & Hennessy, 2007), and others have reported leverage to vary pro-cyclically with macroeconomic conditions (Korajczyk & Levy, 2003).

Testing the impact of whether a firm is financially constraint or unconstraint on how real GDP growth and inflation influence leverage could not be reliably performed in this research due to insufficient data in the final sample. However, the analysis was still performed on this unreliable sample in order to get an indication of the results. Mixed results were obtained from this analysis, necessitating future research with a more reliable sample.

The results presented the impact of whether a firm is financially constraint or unconstraint on how real GDP growth and inflation influence leverage should be interpreted with much caution because the sample was insufficient and not representative. At best these results give an indication for future research, and should not be interpreted as reliable conclusions from this research. Although one cannot attach any significance to these results, they do give an indication and provide reasons for future research.

7.3.2. Indirect Effect of Country and Industry Factors on Determinant of Capital Structure

An issue that came up in the literature review that was not pursued in the current study was the indirect effect of country and industry factors in reinforcing firm specific factors impact on capital structure choices. This has received limited attention in the literature.

8. Reference List

Allison, P. D. (2009). *Fixed Effects Regression Models*. Thousand Oaks, CA: SAGE Publications, Inc. doi:http://0-dx.doi.org.innopac.up.ac.za/10.4135/9781412993869

Arnold, M., Wagner, A. F., & Westermann, R. (2012). Growth options, macroeconomic conditions, and the cross section of credit risk. *Journal of Financial Economics*, *107*(2), 350–385.

Axelson, U., Jenkinson, T., Stromberg, P., & Weisbach, M. S. (2013). Borrow Cheap , Buy High? The Determinants of Leverage and Pricing in Buyouts. *The Journal of Finance*, *68*(6), 2223–2267.

Baker, M., & Wurgler, J. (2002). Market timing and capital structure. *The Journal of Finance*, *57*(1), 1–32.

Barry, C. B., Mann, S. C., Mihov, V. T., & Rodríguez, M. (2008). Corporate Debt Issuance and the Historical Level of Interest Rates. *Financial Management*, *37*(3), 413–430.

Berk, J. B., Stanton, R., & Zechner, J. (2010). Human Capital , Bankruptcy , and Capital Structure Source. *The Journal of Finance*, *65*(3), 891–926.

Bhamra, H. S., Kuehn, L., & Strebulaev, I. (2010). The Levered Equity Risk Premium and Credit Spreads: A Unified Framework. *Review of Financial Studies*, *23*(2), 645–703. doi:10.1093/rfs/hhp082

Bharath, S. T., Pasquariello, P., & Wu, G. (2009). Does Asymmetric Information Drive Capital Structure Decisions? *Review of Financial Studies*, *22*(8), 3211–3243.

Bokpin, G. A. (2009). Macroeconomic development and capital structure decisions of firms: Evidence from emerging market economies. *Studies in Economics and Finance*, *26*(2), 129–142.

Booth, L., & Aivazian, V. (2001). Capital Structures in Developing Countries. *The Journal of Finance*, *56*(1), 87–130.

BusinessDay. (2012). EDITORIAL: Big cash stockpiles in SA no surprise. *Business Day Live*. Retrieved May 03, 2014, from http://www.bdlive.co.za/articles/2012/04/11/editorial-big-cash-stockpiles-in-sa-no-surprise;jsessionid=546C3AC94C534518444144CEEE4613EA.present2.bdfm

Camara, O. (2012). Capital Structure Adjustment Speed and Macroeconomic Conditions : U . S MNCs and DCs, *84*(84).

Chen, H. (2010). Macroeconomic Conditions and the Puzzles of Credit Spreads and Capital Structure. *The Journal of Finance*, *65*(6), 2171–2212.

Clark, J. (2013). Are SA companies sitting on piles of cash? *Moneyweb*. Retrieved May 03, 2014, from http://www.moneyweb.co.za/moneyweb-economic-trends/are-sa-companies-sitting-on-piles-of-cash

Cook, D. O., & Tang, T. (2010). Macroeconomic conditions and capital structure adjustment speed. *Journal of Corporate Finance*, *16*(1), 73–87.

Cramer, C. D., & Howitt, D. (2004). *The SAGE Dictionary of Statistics heterogeneity*. London: SAGE Publications, Inc. doi:http://dx.doi.org/10.4135/9780857020123

Dang, V. A. (2013). An empirical analysis of zero-leverage firms: New evidence from the UK. *International Review of Financial Analysis*, *30*, 189–202. doi:10.1016/j.irfa.2013.08.007

De Jong, A., Kabir, R., & Nguyen, T. T. (2008). Capital structure around the world: The roles of firm- and country-specific determinants. *Journal of Banking & Finance*, *32*(9), 1954–1969.

DeAngelo, H., DeAngelo, L., & Whited, T. M. (2011). Capital structure dynamics and transitory debt. *Journal of Financial Economics*, *99*(2), 235–261. doi:10.1016/j.jfineco.2010.09.005

Delcoure, N. (2007). The determinants of capital structure in transitional economies. *International Review of Economics and Finance*, *16*(3), 400–415.

Dudley, E. (2012). Capital structure and large investment projects. *Journal of Corporate Finance*, *18*(5), 1168–1192. doi:10.1016/j.jcorpfin.2012.07.007

Firer, C., Ross, A. S., Westerfield, R. W., & Jordan, B. D. (2012). *Fundamentals of Corporate Finance - South African Edition* (5th ed.). Berkshire: McGraw-Hill Education.

Fosu, S. (2013). Capital structure, product market competition and firm performance: Evidence from South Africa. *The Quarterly Review of Economics and Finance*, *53*(2), 140–151.

Frank, M. Z., & Goyal, V. K. (2009). Capital Structure Decisions : Which Factors Are Reliably Important? *Financial Management*, *38*(1), 1–37.

Graham, J. R., & Harvey, C. R. (2001). The theory and practice of corporate finance : evidence from the field. *Journal of Financial Economics*, *60*(2), 187–243.

Gropp, R., & Heider, F. (2009). *The determinants of bank capital structure* (No. 1096. European Central Bank Working Paper Series). Retrieved from http://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1096.pdf

Hackbarth, D., Miao, J., & Morellec, E. (2006). Capital structure, credit risk, and macroeconomic conditions. *Journal of Financial Economics*, *82*(3), 519–550.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305–360.

Jõeveer, K. (2013). Firm, country and macroeconomic determinants of capital structure: Evidence from transition economies. *Journal of Comparative Economics*, *41*(1), 294–308.

Kamhunga, S. (2012). Corporate cash pile balloons on uncertainty. *Business Day Live*. Retrieved May 03, 2014, from http://www.bdlive.co.za/articles/2012/04/10/corporate-cash-pile-balloons-on-uncertainty

Katagiri, M. (2014). Author ' s Accepted Manuscript A Macroeconomic Approach to Corporate Capital Structure. *Journal of Monetary Economics*.

Kayo, E. K., & Kimura, H. (2011). Hierarchical determinants of capital structure. *Journal of Banking and Finance*, *35*(2), 358–371.

Korajczyk, R., & Levy, A. (2003). Capital structure choice: macroeconomic conditions and financial constraints. *Journal of Financial Economics*, *68*(1), 75–109.

Korteweg, A. (2010). The Net Benefits to Leverage. *The Journal of Finance*, *65*(6), 2137–2170.

Leach, J. C., Moyen, N., & Yang, J. (2013). On the strategic use of debt and capacity in rapidly expanding markets. *Journal of Corporate Finance*, *23*, 332–344.

Leary, M. T., & Roberts, M. R. (2010). The pecking order , debt capacity , and information asymmetry. *Journal of Financial Economics*, *95*(3), 332–355.

Lemma, T. T., & Negash, M. (2013). Institutional, macroeconomic and firm-specific determinants of capital structure: The African evidence. *Management Research Review*, *36*(11), 1081–1122.

Levy, A., & Hennessy, C. (2007). Why does capital structure choice vary with macroeconomic conditions? *Journal of Monetary Economics*, *54*(6), 1545–1564.

Lingenfelder, J. M. (2013). *The effect of significant macroeconomic fluctuations on the capital structures of firms in emerging markets*. Gordon Institute of Business Science. University of Pretoria.

Mittoo, U. R., & Zhang, Z. (2008). The capital structure of multinational corporations: Canadian versus U.S. evidence. *Journal of Corporate Finance*, *14*(5), 706–720.

Modigliani, F., & Miller, M. H. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *The American Economic Review*, *48*(3), 261–297.

Mokhova, N., & Zinecker, M. (2014). Macroeconomic Conditions and Corporate Capital Structure. *Procedia - Social and Behavioral Sciences*, *110*, 530–540. doi:10.1016/j.sbspro.2013.12.897

Muller, C., & Ward, M. (2013). Style-based effects on the Johannesburg Stock Exchange : A graphical time-series approach. *Investment Analysts Journal*, (77), 1–16.

Myers, S. C. (1984). The Capital Structure Puzzle. *The Journal of Finance*, *39*(3), 574–592.

Ogden, J. P., & Wu, S. (2013). Reassessing the effect of growth options on leverage. *Journal of Corporate Finance*, *23*, 182–195.

Petersen, T. (2004). *Handbook of Data Analysis*. (M. Hardy & A. Bryman, Eds.) (pp. 332–346). London: SAGE Publications, Ltd.

Popelka, L. (2013). Too Much Cash Isn't Good for Apple - Businessweek. *Bloomberg Businessweek*. Retrieved May 02, 2014, from http://www.businessweek.com/articles/2013-02-26/too-much-cash-isnt-good-for-apple

Psillaki, M., & Daskalakis, N. (2009). Are the determinants of capital structure or firm country specific? *Small Business Economics*, *33*(3), 319–333.

Ramjee, A., & Gwatidzo, T. (2012). Dynamics in capital structure determinants in South Africa. *Meditari Accountancy Research*, *20*(1), 52–67. doi:10.1108/10222521211234228

Rauh, J. D., & Sufi, a. (2010). Capital Structure and Debt Structure. *Review of Financial Studies*, *23*(12), 4242–4280. doi:10.1093/rfs/hhq095

Saunders, M. N. K., & Lewis, P. (2012). *Doing Research in Business and Management: An Essential Guide to Planning Your Project*. Edingburgh Gate: Pearson.

Seltman, H. J. (2014). *Experimental Design and Analysis*. Retrieved from http://www.stat.cmu.edu/~hseltman/309/Book/Book.pdf and

Shivdasani, A., & Stefanescu, I. (2010). How Do Pensions Affect Corporate Capital Structure Decisions ? How Do Pensions Affect Corporate Capital Decisions? *The Review of Financial Studies*, *23*(3), 1287–1323.

Titman, S., & Wessels, R. (1988). The Determinants of Capital Structure Choice. *Journal of Finance*, *43*(1), 1–19.

Tsyplakov, Ã. S. (2008). Investment frictions and leverage dynamics. *Journal of Financial Economics*, *89*, 423–443. doi:10.1016/j.jfineco.2007.09.004

Weill, L. (2008). Leverage and Corporate Performance : Does Institutional Environment Matter? *Small Business Economics*, *30*(3), 251–265.

9. Appendix

9.1. Models

Model L2 : Long-Term Leverage without Random Slope and Random Intercept

Table A1: Model dimensions for model L2.

		Number of Levels	Number of Parameters
Fixed Effects	Intercept	1	1
	Inflation	1	1
	GDP_Growth	1	1
	Unemployment	1	1
Residual			1
Total		4	5

Table A2: Tests of fixed effects for model L2.

Source	Numerator DF	Denominator DF	F-Statistic	P-value
Intercept	1	3429	0.384	0.536
Inflation	1	3429	2.464	0.117
GDP_Growth	1	3429	4.103	0.043
Unemployment	1	3429	2.726	0.099

Table A3: Estimates of fixed effects for model L2.

Parameter	Estimate	Std. Error	DF	t-Statistic	P-value.
Intercept	3.057	4.934	3429	0.620	0.536
Inflation	-0.190	0.121	3429	-1.570	0.117
GDP_Growth	0.492	0.243	3429	2.026	0.043
Unemployment	0.285	0.173	3429	1.651	0.099

Table A4: Estimates of covariance parameters for model L2.

Parameter	Estimate	Std. Error	Wald Z	P-value
Residual	285.646	6.899	41.407	<0.001

Model L3 : Long-Term Leverage without Random Slope and with Random Intercept

Table A5: Model dimensions for model L3.

		Number of Levels	Covariance Structure	Number of Parameters	Subject Variables
Fixed Effects	Intercept	1		1	
	Inflation	1		1	
	GDP_Growth	1		1	
	Unemployment	1		1	
Random Effects	Inflation + GDP_Growth + Unemployment	3	Variance Components	3	Companies
Residual				1	
Total		7		8	

Table A6: Tests of fixed effects for model L3.

Source	Numerator df	Denominator df	F-statistic	P-value
Intercept	1	2 885	0.269	0.604
Inflation	1	492	3.301	0.070
GDP_Growth	1	633	4.474	0.035
Unemployment	1	2 963	5.115	0.024

Table A7: Estimates of fixed effects for model L3.

Parameter	Estimate	Std. Error	df	t-statistic	P-value
Intercept	2.148	4.139	2 885	0.519	0.604
Inflation	-0.188	0.104	492	-1.817	0.070
GDP_Growth	0.515	0.244	633	2.115	0.035
Unemployment	0.331	0.146	2 963	2.262	0.024

Table A8: Estimates of covariance parameters for model L3.

Parameter	Estimate	Std. Error	Wald Z	P-value
Residual	195.817	5.325	36.772	0.000
Inflation	0.074	0.123	0.600	0.549
GDP_Growth	4.167	0.749	5.564	0.000
Unemployment	0.054	0.015	3.688	0.000

Model L4 : Long-Term Leverage with Random Slope and Random Intercept

Table A9: Model dimensions for model L4.

		Number of Levels	Covariance Structure	Number of Parameters	Subject Variables
Fixed Effects	Intercept	1		1	
	Inflation	1		1	
	GDP_Growth	1		1	
	Unemployment	1		1	
Random Effects	Intercept + Inflation + GDP_Growth + Unemployment[b]	4	Variance Components	4	Comp
Residual				1	
Total		8		9	

Table A10: Tests of fixed effects for model L4.

Source	Numerator df	Denominator df	F-statistic	P-value
Intercept	1	2 885	0.269	0.604
Inflation	1	492	3.301	0.070
GDP_Growth	1	633	4.474	0.035
Unemployment	1	2 963	5.115	0.024

Table A11: Estimates of fixed effects for model L4.

Parameter	Estimate	Std. Error	df	t-statistic	P-value
Intercept	2.148	4.139	2 885	0.519	0.604
Inflation	-0.188	0.104	492	-1.817	0.070
GDP_Growth	0.515	0.244	633	2.115	0.035
Unemployment	0.331	0.146	2 963	2.262	0.024

Table A12: Estimates of covariance parameters for model L4.

Parameter	Estimate	Std. Error	Wald Z	P-value
Residual	195.817	5.325	36.772	0.000
Intercept	.000000[b]	0.000		
Inflation	0.074	0.123	0.600	0.549
GDP_Growth	4.167	0.749	5.564	0.000
Unemployment	0.054	0.015	3.688	0.000

[b]. This covariance parameter is redundant. The test statistic and confidence interval cannot be computed.

Model S2 : Short-Term Leverage without Random Slope and Random Intercept

Table A13: Model dimensions for model S2.

		Number of Levels	Number of Parameters
Fixed Effects	Intercept	1	1
	Inflation	1	1
	GDP_Growth	1	1
	Unemployment	1	1
Residual			1
Total		4	5

Table A14: Tests of fixed effects for model S2.

Source	Numerator DF	Denominator DF	F-statistic	P-value
Intercept	1	3424	0.565	0.453
Inflation	1	3424	0.692	0.405
GDP_Growth	1	3424	1.572	0.210
Unemployment	1	3424	4.354	0.037

Table A15: Estimates of fixed effects for model S2.

Parameter	Estimate	Std. Error	DF	t-Statistic	P-value.
Intercept	2.115	2.815	3424	0.751	0.453
Inflation	-0.057	0.069	3424	-0.832	0.405
GDP_Growth	0.173	0.138	3424	1.254	0.210
Unemployment	0.206	0.099	3424	2.087	0.037

Table A16: Estimates of covariance parameters for model S2.

Parameter	Estimate	Std. Error	Wald Z	P-value.
Residual	92.438881	2.234101	41.376	0.000

Model S3 : Long-Term Leverage without Random Slope and with Random Intercept

Table A17: Model dimensions for model S3.

		Number of Levels	Covariance Structure	Number of Parameters	Subject Variables
Fixed Effects	Intercept	1		1	
	Inflation	1		1	
	GDP_Growth	1		1	
	Unemployment	1		1	
Random Effects	Inflation + GDP_Growth + Unemployment	3	Variance Components	3	Companies
Residual				1	
Total		7		8	

Table A18: Tests of fixed effects for model S3.

Source	Numerator df	Denominator df	F-statistic	P-value
Intercept	1	3050	0.011	0.918
Inflation	1	618	0.018	0.893
GDP_Growth	1	831	1.429	0.232
Unemployment	1	3181	11.391	0.001

Table A19: Estimates of fixed effects for model S3.

Parameter	Estimate	Std. Error	df	t-statistic	P-value
Intercept	0.247	2.382	3050	0.103	0.918
Inflation	-0.008	0.059	618	-0.134	0.893
GDP_Growth	0.153	0.128	831	1.195	0.232
Unemployment	0.286	0.085	3181	3.375	0.001

Table A20: Estimates of covariance parameters for model S3.

Parameter	Estimate	Std. Error	Wald Z	P-value
Residual	64.558	1.691	38.186	0.000
Inflation	0.021	0.035	0.614	0.539
GDP_Growth	0.628	0.174	3.615	0.000
Unemployment	0.039	0.006	6.350	0.000

Model S4 : Long-Term Leverage with Random Slope and Random Intercept

Table A21: Model dimensions for model S4.

		Number of Levels	Covariance Structure	Number of Parameters	Subject Variables
Fixed Effects	Intercept	1		1	
	Inflation	1		1	
	GDP_Growth	1		1	
	Unemployment	1		1	
Random Effects	Intercept + Inflation + GDP_Growth + Unemployment[b]	4	Variance Components	4	Companies
Residual				1	
Total		8		9	

Table A22: Tests of fixed effects for model S4.

Source	Numerator df	Denominator df	F-statistic	P-value
Intercept	1	2191	0.021	0.884
Inflation	1	457	0.025	0.876
GDP_Growth	1	813	1.399	0.237
Unemployment	1	2954	11.122	0.001

Table A23: Estimates of fixed effects for model S4.

Parameter	Estimate	Std. Error	df	t-statistic	P-value
Intercept	0.348	2.388	2191	0.146	0.884
Inflation	-0.009	0.059	457	-0.157	0.876
GDP_Growth	0.151	0.128	813	1.183	0.237
Unemployment	0.282	0.085	2954	3.335	0.001

Table A24: Estimates of covariance parameters for model S4.

Parameter	Estimate	Std. Error	Wald Z	P-value
Residual	64.615	1.704	37.924	0.000
Intercept	3.879	12.907	0.301	0.764
Inflation	0.015	0.040	0.365	0.715
GDP_Growth	0.617	0.178	3.467	0.001
Unemployment	0.034	0.020	1.661	0.097

Model O2 : Short-Term Leverage without Random Slope and Random Intercept

Table A5: Model dimensions for model L3.

		Number of Levels	Number of Parameters
Fixed Effects	Intercept	1	1
	Inflation	1	1
	GDP_Growth	1	1
	Unemployment	1	1
Residual			1
Total		4	5

Table A6: Tests of fixed effects for model L3.

Source	Numerator df	Denominator df	F-statistic	P-value
Intercept	1	3424	0.851	0.356
Inflation	1	3424	2.908	0.088
GDP_Growth	1	3424	5.384	0.020
Unemployment	1	3424	5.723	0.017

Table A7: Estimates of fixed effects for model L3.

Parameter	Estimate	Std. Error	df	t-statistic	P-value
Intercept	5.333	5.779	3424	0.923	0.356
Inflation	-0.242	0.142	3424	-1.705	0.088
GDP_Growth	0.658	0.284	3424	2.320	0.020
Unemployment	0.484	0.202	3424	2.392	0.017

Table A4: Estimates of covariance parameters for model L3.

Parameter	Estimate	Std. Error	Wald Z	P-value
Residual	389.511	9.414	41.376	0.000

Model O3 : Long-Term Leverage with Random Slope and Random Intercept

Table A5: Model dimensions for model O3.

		Number of Levels	Covariance Structure	Number of Parameters	Subject Variables
Fixed Effects	Intercept	1		1	
	Inflation	1		1	
	GDP_Growth	1		1	
	Unemployment	1		1	
Random Effects	Intercept + Inflation + GDP_Growth + Unemployment	4	Variance Components	4	Companies
Residual				1	
Total		8		9	

Table A6: Tests of fixed effects for model O3.

Source	Numerator df	Denominator df	F-statistic	P-value
Intercept	1	2845	0.215	0.643
Inflation	1	486	2.431	0.120
GDP_Growth	1	580	5.935	0.015
Unemployment	1	2986	14.451	0.000

Table A7: Estimates of fixed effects for model O3.

Parameter	Estimate	Std. Error	df	t-statistic	P-value.
Intercept	2.150	4.639	2845	0.463	0.643
Inflation	-0.192	0.123	486	-1.559	0.120
GDP_Growth	0.667	0.274	580	2.436	0.015
Unemployment	0.627	0.165	2986	3.801	0.000

Table A4: Estimates of covariance parameters for model O3.

Parameter	Estimate	Std. Error	Wald Z	P-value.
Residual	243.261	6.647	36.600	0.000
Inflation	0.423	0.199	2.128	0.033
GDP_Growth	5.369	0.990	5.424	0.000
Unemployment	0.131	0.026	5.088	0.000

Model O4 : Long-Term Leverage without Random Slope and with Random Intercept

Table A5: Model dimensions for model O4.

		Number of Levels	Covariance Structure	Number of Parameters	Subject Variables
Fixed Effects	Intercept	1		1	
	Inflation	1		1	
	GDP_Growth	1		1	
	Unemployment	1		1	
Random Effects	Inflation + GDP_Growth + Unemployment	3	Variance Components	3	Companies
Residual				1	
Total		7		8	

Table A6: Tests of fixed effects for model O4.

Source	Numerator df	Denominator df	F	P-value
Intercept	1	2845	0.215	0.643
Inflation	1	486	2.431	0.120
GDP_Growth	1	580	5.935	0.015
Unemployment	1	2986	14.451	0.000

Table A7: Estimates of fixed effects for model O4.

Parameter	Estimate	Std. Error	df	t	P-value
Intercept	2.150	4.639	2845	0.463	0.643
Inflation	-0.192	0.123	486	-1.559	0.120
GDP_Growth	0.667	0.274	580	2.436	0.015
Unemployment	0.627	0.165	2986	3.801	<0.001

Table A4: Estimates of covariance parameters for model O4.

Parameter	Estimate	Std. Error	Wald Z	P-value.
Residual	243.261	6.647	36.600	0.000
Inflation	0.423	0.199	2.128	0.033
GDP_Growth	5.369	0.990	5.424	0.000
Unemployment	0.131	0.026	5.088	0.000