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Macroeconomic determinants of corporate failures in South Africa (1994-2009)

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Macroeconomic determinants of corporate failures in South Africa. (1994-2009)

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Declaration

I, **Wellington Mtombwe Masekesa** declare that the research work reported in this dissertation is my own, except where otherwise indicated and acknowledged. It is submitted for the degree of Master of Management in Finance & Investment in the University of the Witwatersrand, Johannesburg. This thesis has not, either in whole or in part, been submitted for a degree or diploma to any other universities.

Signed:…… Date: 31 December 2010

ABSTRACT

The number of corporate failures in South Africa fluctuates greatly over time, and the characteristics of these fluctuations have not been investigated sufficiently. This paper examines the trends in corporate failures, specifically for small medium and micro enterprise (SMMEs) and private companies in South Africa, with a particular focus on identifying the dynamic features of the series and associated macroeconomic variables movements.

We examine the interactions between corporate failures and macroeconomic aggregates, and specifically the accounts of policy-induced changes in the macroeconomy for the observed fluctuations of South African business failures in the period 1994–2009. This research investigates both the short-run and long-run dynamic linkages between corporate failures in South Africa and selected macroeconomic variables by employing the Autoregressive Distributed Lag (ARDL) bound test. Time series Error Correction Model (ECM) estimates suggest that macroeconomic risk factors are related to firm failures in the same direction both in the short run and the long run, and that adjustment to steady state path is quite quick. A regression model is also estimated with a dummy variable included to decipher the corporate failure rates during the 2007-2009 global financial crisis. The results demonstrate that macroeconomic aggregates exert differential impacts on corporate failures both in the short run and in the long run. The study also reveals that corporate failure rates in South Africa are significantly and positively associated with the average lending rate, inflation rate, new corporation, exchange rate, 2007-2009 financial crisis, and inversely related to gross domestic product (GDP) and money supply both in the short run and long-run. In general, the results show expected and consistent relationships between shocks on economic variables and corporate failures.

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"*The thing that you really believe in always happens: and the belief in a thing makes it happen"*

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CHAPTER 1 - INTRODUCTION

1.1 PURPOSE OF THE STUDY

The recent turbulence in business landscapes of the world has called for a greater scrutiny to identify survival toolkit for many unlisted companies, particularly for small medium and micro enterprise (SMMEs) given that SMME are vulnerable to the dramatic economic changes. Some empirical studies concurred that a firm with smaller size was more likely to fail. For example, in the studies of Ohlson (1980) and Shumway (2001), when size was added as a predictor in logit analysis, the smaller firms were found to have a higher probability of failure than the larger firms.

The interest in the analysis and in the understanding of corporate failure can clearly be explained by the fact that a large number of stakeholders are concerned with a firm's activity and with its operations over time. Therefore a failure of firm may lead both to dramatic macroeconomic and to disastrous microeconomic consequences for the multiple partners of the firm.

Against this backdrop, understanding practices that may impede business success is deemed timely. An alternative approach to understanding practices that lead to business success is by examining the inverse of the best practices; that is, the behaviours associated with business failure. This is because factors cited as reasons for failure may appear as factors affecting success (Gaskill, et al, 1993). The number of corporate failures in South Africa fluctuates greatly over time, and the characteristics of these fluctuations have not been investigated sufficiently. The main purpose of this research is, therefore, to analyse and evaluate whether the corporate failures in South Africa could be explained by the movement of macroeconomic variables.

Secondary aims include:

- To analyse from the literature, macro economic factors that can cause corporate failures in South Africa, more particularly in SMMEs and unlisted companies.
- To determine or ascertain factors that explains corporate failures.

- To analyse the extent to which unexpected events and crisises may influence the rate of corporate failures. For instance did the global financial crisis in 2007 influence corporate failure rates?

1.2 CONTEXT OF THE STUDY

It is a well documented fact that besides the importance of micro level factors the likelihood of firms to prosper or to fail is largely influenced by aggregate or economy based risk, with estimates of its impact on the variation of business activities ranging from 25% to 75% (Sharpe, 1989; Sheinkerman, 2002). For example, a large empirical literature has highlighted that adverse macroeconomic conditions significantly affect companies's profitability and gearing and thus forcing financially fragile firms to fail (Ballantine et al 1993; Machin and Van Reenen, 1993; Geroski et al, 1997*).*

When any company fails, its stockholders, its investors, employees, suppliers and customers stand to lose out financially. Investors will usually lose the money they put into the business and unpaid creditors will often have to write off their debts. Therefore, the failure of a large company may well lead, indirectly, to financial problems or even insolvency for individuals and businesses that have a financial stake in the failed firm. At the same time, it is quite possible for the solvency of any company to be threatened by the collapse of other companies. (Causation effect: a failure of one company leads to the fall of another company). As result this kind of causation, loss of investor confidence in one country's financial markets becomes evident.

Although the failure of an individual small company may not attract media attention, the consequences of the failure of any company (whether a SMME, or a large public entity) are certainly a serious matter for those stakeholders who are directly involved. The collective consequences of a business failure are also a serious matter for national economies, for instance, unemployment, which will lead to decline in consumer spending resulting in reduction of economic growth. Above all the social impact of business failure is huge and thus not easily quantifiable.

It has been widely recognised that business growth and survival depends both on external and internal factors. While most of the challenges which a business will face may be foreseeable, some will be completely unpredictable. However, if a business is to succeed, its management must be alert to all matters which are likely to have a material

impact on its viability and must then demonstrate skills both in exploiting opportunities and mitigating threats.

The aim of this paper is to make a modest contribution to the corporate failure research by studying firms operating in different accounting, legal, and economic environment found in a developing economy: South Africa. Previous studies on the relationship between macroeconomic aggregates and business failures have been restricted to the description of the short-run relationships among these two variables. This paper employs a panel cointegration approach to estimate the relationship between business failures and macroeconomic conditions in South Africa over the period 1994 to 2009.

In the last years, the form and severity that this phenomenon can be explained by a set of events bound to the new conditions created by a more turbulent and complex macro environment. In this context, the survival and the efficiency of the enterprise depend on the efforts at adaptation to the moving environment. Deregulation, technological innovation, competition and globalization are the terms often used to characterize the new environment in which the enterprise must survive henceforth. A global financial crisis and the issue of how it has spread so rapidly into emerging markets and to already ailing developing countries cannot be overemphasized. All companies, from start–ups, ventures, SMMEs, BEEs–type companies, medium sized companies and even mature companies were not spared of the effect of the 2007 global crisis.

It is this backdrop that has prompted these questions: what are macroeconomic determinants of corporate failures? To what extend will such macroeconomic factors contribute to fall of companies? The value of investigating company failures derives from their effect on the economy as a whole. The most important effect is that company failure could indicate the fragility of the business sector and have far-reaching macroeconomic consequences.

Published studies on company failures abound, and are largely about firms in developed countries. There are few unpublished studies done by independent consulting and research companies in few developing economies and yet corporate failures has become a taunting issue both in developing and emerging economies. Business failures phenomena appears to be more complex in emerging capital markets (particularly South Africa) perhaps because of the relatively shorter history of firms and the greater potential for the demise of firms in low economic growth situations recorded in such economies.

Given these critical differences, it may be argued that the existing consensus found in the bankruptcy literature, based largely on developed economies may be indeed contestable.

Development of a verifiable prediction model may assist in identifying significant attributes of firms in less developed and emerging economies, which may be different from bankruptcy models in developed economies studied to date. Also, accounting and market information that can discriminate between failed and non-failed firms in less developed markets may indeed provide new insights about the failure process being different during what may well be different stages of economic growth in emerging capital markets. On the other hand, corporate failure studies may turn out to be inherently problematic in developing as well as emerging economies and yet no clear reasons for such causes has been established. Ultimately these issues can only be resolved through extending such research to emerging markets. Hence these are the additional justifications for this study.

1.3 PROBLEM STATEMENT

The number of corporate failures in South Africa and in most emerging economies has been increasing rapidly since 1990s (Statistics South Africa (Stats SA, 2009) and failure rate is higher for small and unlisted firms. The trend of more corporate failures continues to be evident and yet, no clear reasons or causes of the phenomena have been established. On the other hand, corporate failures may turn out to be inherently problematic in emerging countries which are economically fragile; yet few, if any of the previous studies have explored the reasons that explain this phenomenon.

1.4 SIGNIFICANCE OF THE STUDY

The aim of this paper is to make a modest contribution to the corporate failure research by studying firms operating in different accounting, legal, and economic environment found in emerging economies: main focus on South Africa. Previous studies on the relationship between macroeconomic aggregates and business failures have been restricted to the description of the short-run relationships among these variables. This paper employs a panel cointegration approach to estimate both the long run and long run relationship between business failures and macroeconomic conditions in South Africa over the period 1994 to 2009.

Previous studies concentrated on cross-sectional analysis; therefore they did not take into account the actual changes in these variables of interest over time. Furthermore, the construction of these models centered on microeconomic analysis, therefore, they disregard the important general macroeconomic framework in which the companies are operating, and that this may significantly influence the companies' financial health (Liu, 2004)

The research will be of interest to both financial academicians and investment practitioners. The paper will be of significance to portfolio managers in the private equity industry when assessing the potential failure of small companies (SMMEs) and when estimating the risk of default in a start-up type of investment. To some extent this paper will also be of benefit to both monetary and fiscal policy makers in South Africa.

Evaluating macroeconomic determinants of corporate failure is important for several other reasons.

- The finding of the study is expected to assist policymakers understand the short-run and long-run behaviors of corporate failure rates as far as the macroeconomic variables are concerned. For example, it will answer questions such as: "Do high interest-rate regimes consistently cause more corporate failures?" This, in turn, may shed some light on the effectiveness of our monetary policy.

- Second, when any company fails, its stockholders, its investors, employees, suppliers and customers stand to lose out financially. Investors will usually lose the money they put into the business and unpaid creditors will often have to write off their debts. Thus it is important for investment managers or professionals especially venture capitalist private equity investors to monitor developments in macroeconomic environment that may have a negative impact on their investments (analysis of early warning signals) and mitigate potential business failure.

- Third, a critical tenet of investment strategy (in case of individuals, Investors and Investment specialist) requires understanding of the relationship of macroeconomic variables with the performance of a company. This will assist in making more informed decisions in case of venture capitalists and debt lenders when making decisions to invest in start-up, and SMMEs type of businesses that are highly vulnerable to macroeconomic shocks.

- Fourth, by studying and analyzing the relationship between external factors of corporate failures, fund managers of investment companies, investment analyst particularly in private equity industry and company manager will be in a position to monitor closely such critical macroeconomic fundamentals timeously and perform appropriate stress testing and gauge the likelihood of companies to fall into bankruptcy given a shock in a macroeconomic variable. For this reason, investment practitioners will be able to devise appropriate survival strategies beforehand.

1.5 DELIMITATIONS OF THE STUDY

- The research will be conducted within the following parameters:
- Only South African companies will be analysed.
- Corporate failures will be measured by the rate of insolvencies and liquidations.
- The assumed accuracy of the published data from Department of Statistics South Africa (Stats SA) and South African Reserve Bank (SARB)
- The time period under study is limited to 15 years (1994 – 2009).

1.6 ASSUMPTIONS

All companies that declared insolvency voluntarily or involuntarily are assumed to have failed or collapsed.

Companies fall into liquidation or declare insolvency as a result of financial difficulties and or outright bankruptcy.

1.7 OUTLINE OF THE REPORT

The roadmap of the report is as follows:

I. Chapter 2 presents various definition and in-depth explanation of corporate failure and an insightful review of the literature on corporate failures determinants in different countries. The chapter introduces a theoretical framework suitable to being used in empirical work and briefly reviews the results from previous studies in this area.

II. Chapter 3 provides an overview of the research design and methodology utilized in this study to ascertain macroeconomic determinants of corporate failures in South Africa. The data used and econometric methodology is also discussed in this chapter.

III. Chapter 4 discusses the results of this study.

IV. Chapter 5 presents the conclusion and recommendations of the study.

2 CHAPTER TWO – LITERATURE REVIEW

2.1 INTRODUCTION

The purpose of this section is to review the previous works and studies on corporate failures. This section also considers theoretical links between the macroeconomic variables and insolvencies.

2.2 THE CORPORATE FAILURE CONCEPT

A broader definition of corporate failure is important in order to understand and explain why and how firms fail. A clear and generally accepted definition of the concept of corporate failure does not exist in the literature from previous studies. This implies that, in any study about corporate failure, it is necessary to consider the meaning of the corporate failure concept. The concept of corporate failure has thus been differently defined according to the context and specific interests of researchers (Dimitras et al., 1996).

Corporate failure is strongly related to financial distress and a failing firm is often defined as a firm that cannot meet its financial obligations (Malecot, 1981; Morris, 1997). Business failure is not a sudden event but it is a dynamic phenomenon. The reason why this narrow and financial definition is often used is that early stages of failure are difficult to identify.

Firms enter a failure process when they fail to anticipate, recognize, avoid, neutralize or adapt to external or internal pressures that threaten their long-term survival (Weitzel and Jonsson, 1989). Corporate failure relates to a misalignment between the firm (its resource set and its deployment) and its environment (Chowdhury and Lang, 2005): failure occurs when there is a misalignment of the firm to the environment's realities and when, under these circumstances, the firm cannot create or sustain a viable strategic position (Greenhalgh, 1983; Weitzel and Jonsson, 1989).

Once a firm enters in a failure process and no corrective actions are taken quickly, the failing firm evolves in a downward spiral (Hambrick and D'Aveni, 1988; Chowdhury and Lang, 2005). The failing firm`s operational situation, and later its financial situation, deteriorates more and more. Typically, when the firm evolves in a failure process, its increasing deterioration gives rise to failure symptoms, which are mainly visible in the

financial indicators. Financial symptoms are thus only the translation in the financial accounts of more fundamental problems. This failure process eventually ends up with the bankruptcy of the firm.

2.3 FORMS OF CORPORATE FAILURES

Company failure can be defined in various forms:

1) discontinuation of the business,

2) the business does not earn an adequate return,

3) Insolvency declaration via the court.

The first definition is a proxy of a corporate failure, as discontinuation suggests that resources have been shifted to more profitable opportunities. This is a very broad definition of failure, because discontinuation may be caused by non-economic motives such as merger, acquisition, and even renaming. The advantage of the second definition is that it provides an economic criterion for failure. However, it is subjective in some instances because an adequate return is difficult to define. Companies which have stopped their payments and lost their creditworthiness may be declared bankrupt by the Court. A formal bankruptcy procedure will lead to the liquidation of the bankrupt firm. In this paper, we focus on compulsory liquidation and insovelvencies declared by companies, where the firm is declares insolvent voluntarily and or bankruptcy is determined by court. Compulsory liquidation is based on an economic criterion whereas insolvency arises from a debt that is not in dispute.

The failure rate of corporations is determined by three broad factors and these are:

1) **Firm risk,** i.e. the effectiveness of the management and adequacy of its capital. Young companies are more likely to fail than experienced companies (see Altman, 1993). Small companies are more prone to go bankrupt because their accessibility to the credit markets is more limited than that of large companies (Bernanke and Gertler, 1995).

2) **Industry risk**, i.e. a shock to a specific industry, such as its exposure to import reform, tariff reform, etc, and

3) **Macroeconomic risk**, i.e. risk deriving from macroeconomic or monetary factors.

In this paper, the focus is on the macroeconomic risks that may result in the failure of a company.

The aim of this paper is to explain the rate of liquidation and insolvencies of small and medium enterprises (SMMEs) and private companies due to shocks in macroeconomic variables such as the lending base rate, unexpected inflation, availability of credit, the economic growth, exchange rate and the birth rate of new companies.

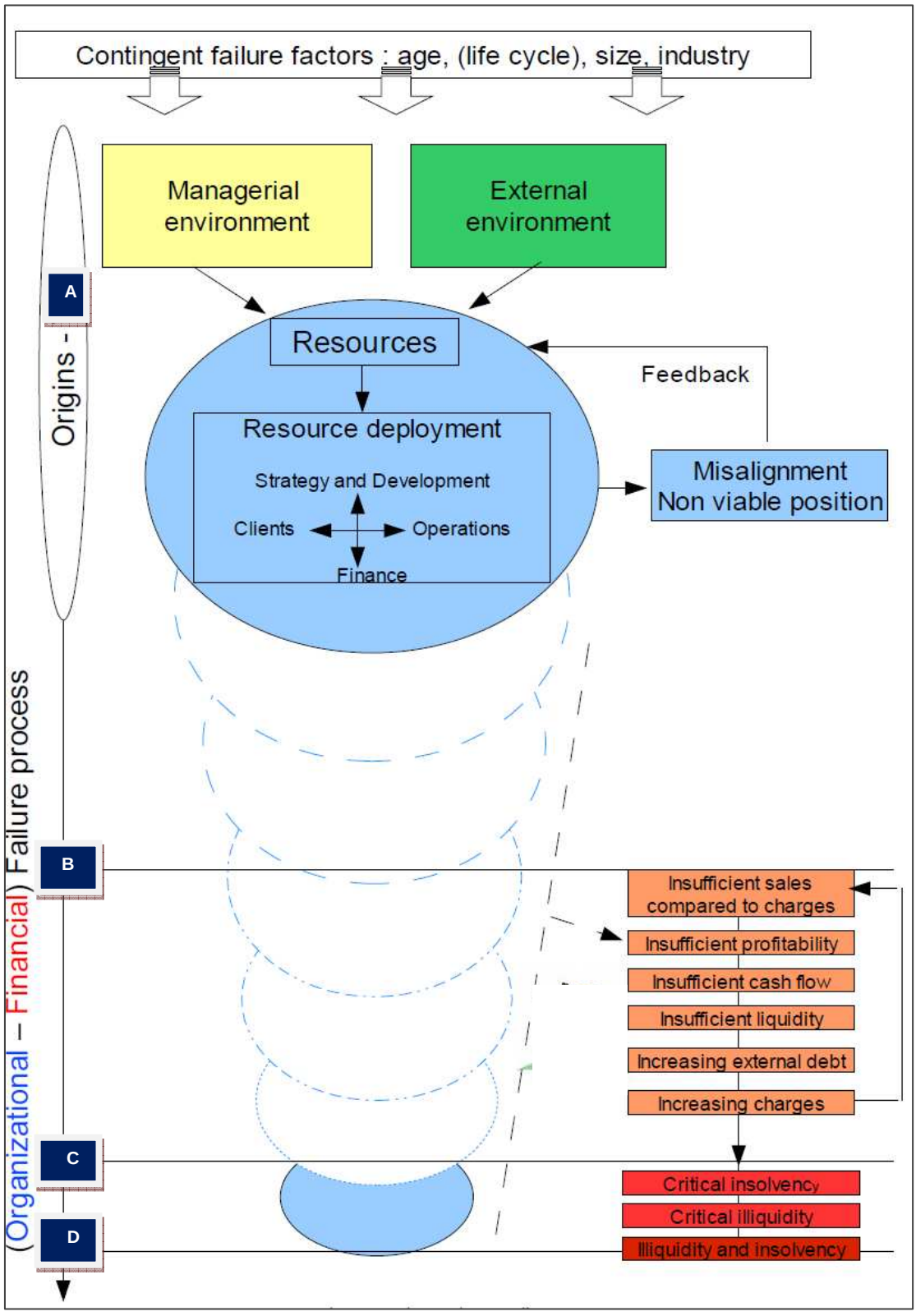
2.4 CORPORATE FAILURE PROCESS

Corporate failure process is organized into several chronological phases (or failure stages) through which all failing firms normally evolve if no corrective actions are taken to recover. Four phases are distinguished (see Figure 2.1): the entry and incubation phase (A to B), the distress phase (from B to C), the critical warning signal phase (from C to D) and finally, the bankruptcy of the firm (D).

The diagram represents the dynamics of the failure process in a deterministic perspective, so that bankruptcy is presented as the unique potential exit of the process. Nevertheless, firms have several opportunities to exit a failure process (at various stages of the process). The company may either recover if a timeous corrective action is taken or disappear (and of its juridical entity), voluntary disappearances (such as a voluntary liquidation, a merger, a scission or an absorption) and involuntary disappearances (such as the legal bankruptcy of the firm) (Balcaen and Ooghe, 2007). Bankruptcy is nevertheless the most famous exit of a failure process. It is declared on the basis of two legal criteria: serious illiquidity and insolvency.

The diagram below shows the corporate failure process.

Fig 2.1: The Corporate Failure Process



Source: Nathalie CRUTZEN (2009)

2.5 IMPACT OF MACROECONOMIC VARIABLES ON THE PROFITABILITY

A company becomes insolvent or bankrupt when the sum of its current year's earnings (denoted as Π) and the expected value of equity (E) is negative, so that Π + E < 0. This condition assumes that a firm has access to external capital and can borrow up to its net worth. If a firm is constrained at its current level of borrowing, the bankruptcy condition substitutes the liquidation value of the firm's assets for the expected value of equity. (Ran Sharabany, 2006)

The probability of bankruptcy of insolvent for firms that are able to borrow is given by: Prob [$\pi+\in < 0$] for a random variable π with mean μ_π and standard deviation δ_π . This implies that probability of bankruptcy is a negative function of profitability, but a positive function of the availability of debt.

To decompose the change in profitability, it can be rewritten as $\pi = pY - \omega L - qM - rD$. Where:

pY = is the output price (p) x the output, (Y)

$\omega L =$ Wage rate x the level of employment, (L)

$qM =$ Input price (q) x the raw material (M)

$rD =$ Interest rate (r) x the level of debt (D)

It is now important to understand how the macroeconomic variables (which define the aggregate profit of a company and may be determined by economic policy) influences the rate of liquidation. To fully determine and analyze the effect (variants) of the firm's profit components, it is important to consider that a firm normally fails as a result of a combination of different factors. If, for instance, a firm has incurred liabilities (fixed operating cost) in foreign currency and the market conditions changed, and thus the local currency depreciates, the company as a result will be unable to cover its liabilities and therefore goes bankrupt. In this instance, two factors determine this company failure; first a firm factor and secondly, a macroeconomic factor. The firm factor comes from the manager's decision to take a loan in foreign currency and a macroeconomic factor emanates from local currency depreciation.

Inflation, for instance, in general unexpected inflation would lead to an erroneous output level, resulting in the misallocation of resources. Unexpected inflation affects the firm's

profit. If actual inflation is lower than expected inflation at the time of entry into a nominal and fixed rate of debt or nominal wage contract, then it increases both the firm's real interest payments and the real wage (costs increases). As a result, the company`s earnings are reduced and the probability of bankruptcy increases. Expected inflation may also have a real effect on some companies' profit. Wadhwani (1986) notes that when expected inflation increases, a firm with a floating-interest nominal debt and no access to external capital, i.e. it cannot increase its nominal value of debt, experiences a negative cash-flow effect as its interest payments increase by more than the output price. This is because the nominal interest payments that the firm must pay include payment of principal. The nominal value of the firm's debt (without the current required payment of nominal interest) remains as it was before the price rise, while the real value of the debt is lower after it.

Higher nominal interest rates will have a greater effect on company real activity. For the credit-channel to be operative, banks have to play a special role in the private sector. The availability of credit can easily be measured by the money supply in the economy. The change in monetary policy that raises or lowers open-market interest rates tends to change the external finance premium in the same direction.

The credit-channel theory also postulates that the availability of credit is not comprehensible at a time of tightening monetary policy, especially for small firms (SMMEs) (Bernanke and Gertler, 1995) and (Bernanke, Gertler and Gilchrist, 1996). Commercial banks shift the supply of intermediated credit (loans by banks); this has been called the bank lending channel. This increases the external finance premium and reduces real economic. A rise in the real interest rate, which increases real interest payments, tends to reduce investment, spending and real economic activity, thereby increasing the probability of liquidation.

The number of new firms is relevant as a firm risk variable because new managers who are associated with new firms are less experienced and therefore tend to make more mistakes. Altman, 1983, noted that firms are most likely to fail within three years of formation. Those failures result from a variety of causes, including poor planning during the business development phase, a limited capital base, and inadequate managerial abilities. The number of new firms may also be seen as increasing competition to the existing established companies.

Increasing GDP, for instance, indicates the higher profitability of the firms in the economy which in turn lowers the rate of corporate failures. It is expected that the rate of companies being liquidated will decline in a period of prosperity.

Table below report the expected effect of each variable to the profitability, cashflow, costs and to the capital structure of the company that will ultimately result in a company facing financial squeeze and hence failure.

Table 2.1: Expected impact of changes in macroeconomic variables on a firm

	Revenue		Labour costs		Input costs		Leverage		Effect / Impact	
Macro-economic Variable	**Prices (P)**	**Output (Y)**	**Wage rate (w)**	Employ-ment rate (L)	**Input prices (q)**	**Materials needed**	Interest rate (r)	Debt Level (D)	Profits	**Cashflows**
Increase in Interest rates	Increase	Fall	Increase	constant	Increase	Decrease	high	high	Decline	Negative
Increase Inflation (unexpected)	Increase	Decrease	Increase	Constant	Increase	Decrease	high	high	Decline	Negative
Increase in Economic growth (GDP)	Increase	Increase	Increase	Increase	Decrease	Increases	Low	low	Improve	Positive
Depreciation Foreign exchange (R/US$)	Increase*	Decrease	Increase	constant	Increase	decrease* Increase*	Low* High*	Low* High*	Decline* Improve	Positive* Negative*
Increase in New Corporation births	Increase	Decrease	Increase	constant	Increase	decrease	high	high	Decline	Negative
Increase in Money Supply (Credit liquidity)	Increase	Decrease	Increase	constant	Increase	decrease	decrease	Low	Improve	Positive
Financial crisis	Increase	Decrease	Increase	Constant	Increase	Decrease	High	High	Decline	Negative

Source: wellington M Masekesa (2010) * depends on whether the business relies on imports or exports

2.6 PREVIOUS STUDIES ON CORPORATE FAILURES

The first works conducted on companies' failure go back to the 1960s. Beaver (1966) is the first researcher who was interested in the predictive power of the financial ratios in company failure prediction. Beaver (1966) showed that corporate failure could be reliably predicted through the combined use of sophisticated quantitative techniques using selected financial ratios. Using a sample of 79 failed/non-failed firms and 30 financial ratios averaged over five years prior to failures, he claimed that cash-flow-to-total-debt ratio was significant in predicting failure. This ratio misclassified only 13 per cent of the sample for one year before bankruptcy and 22 per cent of the sample for five years before bankruptcy. He suggests that the ratio analysis is a useful tool for predicting failures at least five years before the actual failures.

However, it is acknowledged that the first use of multivariat models and the discriminants analysis were first explored by Altman (1968), by way of the conception of the Z-score. These authors, as well as others [Elam, 1975; Collongues, 1977; Conan and holder, 1979] provide support for the predictive power of multivariate discriminant analysis. Altman (1968) extended this narrow interpretation by investigating a set of financial as well as economic ratios as possible determinants of corporate failures using multiple discriminants analysis.

Besides the exclusive use of financial ratios in failure prediction, academics define differently the corporate failure concept. For Beaver (1966), corporate failure is characterized by the recourse to the judicial procedure of bankruptcy or the default of payment of debts or the excessive use of the banking overdraft or finally the non payment of dividends on the preferred shares. However, for Colongues (1977), an enterprise becomes defaulter, when it is little profitable and / or little solvent. Whereas, Altman (1968); Deakin (1972); Edmister (1972); Blum (1974), Dambolena and Khoury (1980) use the declaration of bankruptcy as a restrictive definition of failure.

Since then, several studies [Dambolena and Khoury (1980); Ohlson (1980); Gentry et al. (1985); Zavgren (1985)] have been done, including a large variety of explanatory financial variables and using different statistical methodologies.

A second orientation has been noted since 1980's based on the fact that besides the financial ratios, there are other variables bound to the economic environment whose relevance is incontestable in the explanation of the failure phenomenon and the

termination of its reasons [Cumming and Saini (1981); rose, Andrew et al (1982); Altman (1983); Khoufi (1995); Tirapat and Nittayagasetwat (1999); Cumming and Saini (1981)] show that macroeconomic factors affect the cash-flow. A certain predictive power can be thus, clarified from some macroeconomic aggregates per the following for:

$$Y_t = a_0 + a_1.X_{1t} + a_2.X_{2t} + \ldots + a_k.X_{kt} + U_t$$

Where Y_t is the variation of the number of bankruptcies and $X_{1t,}$ X_{2t},..., X_{kt} the explanatory variables (macroeconomic aggregates).

Rose, ET al (1982) was interested in the features of the periods of recession and expansion and the possibility of their use for the explanation of the corporate failure phenomenon. A battery of economic indicators has been used and the selection process allowed the authors to keep the ten following variables, considered as statistically significant: the Dow Jones industrials, the unemployment rate, the profits after tax/income originating in corporations, the corporate AAA rate, free reserves, the gross savings/GNP, the gross private domestic investment/GNP, the change in total business investment, the output per hour and the retail sales/GNP.

Altman (1983) intends to examine first, the relationships between economic factors and bankruptcy and to construct then, a regression model for this phenomenon. Five categories of aggregate economic behavior are specified as potentially revealing indicators of corporate failure. The first concerns the economic growth. Altman affirms that corporate failure and low or negative economic growth are closely associated economic series. He also observes, increases in failure rates during recessionary periods. To reflect economic growth Altman chose real GNP and corporate profits.

Inspired from the previous works, Khoufi (1995) describes the link between the bankruptcy of the Tunisian small and medium size industries and some macroeconomic factors in the period 1975-1992. First, the author detects, through a graphic analysis, the possible lags to be considered for every explanatory variable. Second, he considers an econometric model translating at its best the link between the rate of bankruptcy (fail) and the macroeconomic factors.

Comparing four prediction models, Mossman et al. (1998) made important contribution to model efficiency. They tested four bankruptcy models: Altman's Z-score model based on financial ratios; Aziz et al.'s (1988) model based on cash flows; Clark and Weinstein's (1983) market return model; and Aharony's et al. (1980) market return variation model.

Tirapat and Nittayagasetwat (1999) use a logit model in which they introduce two types of variables: those of financial type relative to the firm and others to the sensitivity of the enterprise to its economic environment. Two specifications have been considered. The first uses the output of the firm's share estimated from the changes in some macroeconomic variables (growth rate of the industrial production, rate of inflation, interest rate and growth rate of the money supply) as being a proxy of the economic health. The literature on bankruptcy modelling is well known, and so this paper does not attempt to summaries this vast literature.

2.7 THE RESEARCH GAP

The majority of the previous studies concentrated on cross-sectional analysis; therefore they did not take into account the actual changes in the variables of interest over time. Furthermore, the construction of these models centered on microeconomic analysis, therefore they disregard the important general macroeconomic framework in which the companies are operating, and that this may significantly influence the companies' financial health (Liu, 2004). Many studies have incorporated macroeconomic variables such as interest rate (Hudson, 1986; Liu & Wilson, 2002), profit (Hudson, 1986; Cuthbertson & Hudson, 1996), growth of money stock, inflation (Wadhwani, 1986), exchange rate, income gearing (Cuthbertson & Hudson, 1996) and legislation (Liu & Wilson, 2002). Although these studies utilized dynamic models to investigate the causes of corporate failures, they are restricted to the description of the short-run relationships among the variables. Therefore, it is quite difficult to separately interpret the long-run and short-run behaviors of corporate failures in relations to macroeconomic activities (Liu, 2004).

To understand the reason behind this tremendous change, this paper examines the macroeconomic factors that may influence and cointegrate with the variability of corporate failure rates in South Africa from 1994 to 2009.

2.8 CONCLUSION

Based on previous studies, there is an abundant amount of literature which has attempted to determine the factors that may influence corporate failures. However, most of the studies focused only on the micro point of view or firm level analysis. To the best of my knowledge, there are very few studies which presents the macroeconomic explanations of corporate failures were carried out in emerging countries, for instance in South Africa, yet these are economies with fragile economic growth and are experiencing rampant company failures. The preceding chapter will explain the research methodology used.

3 CHAPTER THREE - RESEARCH METHODOLOGY

3.1 INTRODUCTION

This section introduces the research methodology used in this study. The hypothesis of this study, the research design and development of the econometric model is explained. In addition, the data sources and methodology is also discussed in this section.

3.2 THE HYPOTHESIS

Recall that the aim of this study is to test whether corporate failures in South Africa could be explained by the movement of macroeconomic variables that consist of credit, liquidity condition, inflation, interest rates, economic growth, financial crisis, industry effect and competition. In other words, the study seeks to determine both the short run and long relationship of the mentioned macroeconomic variables with corporate failures. In this paper, corporate failure is hypothesized to be a function of macroeconomic variables.

3.2.1 Identification of relevant variables and setting prior expectations

Taking previous studies as a basis, this study will consider that macroeconomic determinants of corporate failure are closely bound to the economic health, new business incorporations, the monetary and credit policies, inflation, stock market performance, uncertainties (financial crisis) and to the level of economic openness.

- **Economic health measured by GDP**

The survival of the enterprise depends, in part, on the economic health of the country in which the firm operates. Vulnerable entities disappear in recessionary periods. The enterprises that survive are often those that could identify future macroeconomic changes that need to be taken handled. During the periods of economic stress, sales and earnings decrease. In this study we expect a negative correlation between this measure (GDP) and the firms' failure rate.

- **New incorporations**

As observed by several authors (e.g. Altman, 1983; Malecot, 1981; Koenig, 1985) new incorporations are associated with firms' to failure. Chauveau and MadjaouI (1988) observe an association between the change in firm's failures and the change in firm's population, and that the frequency distribution of failures, with respect to age of the firm, show that one-half of all failure occurs within a firm's five years and almost one-third within three years. The increased fragility of some young firms is mainly due to the insufficiency of their equity capital, commercial constraints and to the required time to constitute its part of market. In this study we expect failure rate to increase as new business incorporation increases.

- **Money market and credit conditions (Money supply and interest rates)**

In this study we expect firm's propensity to fail to increase during periods of relatively tight credit conditions. In fact, vulnerable firms declare their bankruptcy when the access to credits becomes difficult or impossible. Small firms are more prone to bankruptcy because their access to the credit markets is more limited than that of large firms (Bernanke and Gertler 1995). The two series chosen to reflect the money market and credit conditions are money supply and interest rate.

- **Economic openness (measured by foreign exchange rates)**

The rise of the economic openness rate is, entirely attributable to the development of the international trade. For some countries, the exchanges with foreign markets have the tendency to encourage the growth of the enterprises while allowing them to increase the outlets of the national productions and hence economy of scales. Otherwise, for other countries, the opening of the market increases the degree of the competition in the exposed sectors. The dominant impact of the openness of the market on the growth is expected to be positive. The exchange rate is used to measure the exchange rate environment.

- **Uncertainty measured by Inflation**

Higher expected inflation will increase the probability of default for firms that are credit-constrained, through the negative cash-flow effect due to higher nominal interest rates - often referred to as the frontend loading effect of inflation on debt. A change to a higher

level of expected inflation and therefore a higher level of nominal interest rates will then have real effects. Inflation hurts companies on the way up, as a result of cash-flow problems associated with high nominal interest rates. In an environment of sticky wages and prices, unanticipated volatility of inflation will impose real costs on firms and their workers. In this context, we consider a volatility measure derived from changes in the consumer price index (CPI) as a proxy for the macrolevel uncertainty that firms face in their financial and production decisions. Inflation has a negative impact on most business and it is expected that a positive relationship between inflation levels and corporate failure rate should exists.

- **Financial crisis**

The 2007 to 2009 global financial crisis has hampered most business across the world and in that course several businesses suffered serious financial distress and insolvency. In this study we expect corporate failure rate to increase as a result of global financial crisis experienced between 2007 and 2009.

- **Industry-specific factors**

Companies' profitability is a function of the market in which they are operating. Basically, a concentrated market will confer higher profits for companies as they are able to tap a higher market share relative to companies capturing only a small portion of the market. On the other hand, in case of a well-diversified market structure, companies in such industries are expected to enjoy low profits level on the back of a highly competitive market structure.

According to Berger (1995), under Relative Market Power hypothesis, only firms with large market shares and well-differentiated products are able to exercise market power and earn non-competitive profits. Industry specific factors have indeed impact on the likelihood of a company to fall into bankruptcy. A shock to a specific industry, such as its exposure to import reform, tariff reform will also push the company to fall into a bankruptcy.

Although an industry breakdown is available, it was not possible to analyze the effect of the macroeconomic variables on the different industries. To control for this in the model, we have set this variable as a dummy.

- **Corporate Failure Rate**

This is the rate at which companies fail Company failure may be defined in various ways; (a) discontinuation of the business, (b) the business does not earn an adequate return, (c) insolvency via the court. In this study, the focus will be on voluntary and compulsory liquidation, where the firm is declared insolvent by a court or voluntarily declare insolvency. Compulsory liquidation is based on an economic criterion because insolvency arises from a debt that is not in dispute.

The tables below illustrate the expected relationship of each hypothesized macroeconomic variable with the rate of corporate failures in South Africa.

Table 3.1: Expected/hypothesized relationship between corporate failures and macroeconomic determinants.

Macroeconomic Variable	Expected Relationship (sign)
GDP Increase	Negative
Exchange rate depreciation	Negative
Money supply increase	negative
Increase in inflation	Positive
Financial crisis	Positive
New corporations	Positive
Industry/ sector falling	Positive

Source: WM Masekesa (2010)

3.3 RESEARCH DESIGN AND MODELLING

In this study, a linear function model is estimated by employing explanatory variables to determine the short run and long-run dynamic linkages between corporate failure rate and hypothesized macroeconomic determinants of corporate failure. Thus

Corporate failure =f (Credit liquidity, interest rates, Uncertainty, Economic growth, Competition, Global Financial Crisis). This is expressed in the following regression equation

$$Ln\ CFR =, \alpha_{0,} + \beta_1 Ln\ (Ms) + \beta_2\ Ln(\ ARL) + \beta_3\ Ln\ (CPI) + \beta_4\ Ln\ (GDP) + \beta_5\ Ln\ (CBR) + (\beta_6\ Ln(\ FER) + \beta_7\ (dummy_1) + \beta_8\ (dummy_2) + e_t,$$

where *Ln* CFR is the natural log of corporate failure rate; *Ln Ms* is the natural log of money supply; *Ln ARL* is the natural log of average repo rate; *Ln* CPI is the natural log of consumer pricing index; *Ln* GDP is the natural log of real gross domestic product; *Ln* CBR is the natural log of corporate birth rate (competition); *Ln FER is* the natural log of foreign exchange rates and *Ln* Dummy represents the Global Financial Crisis, which started in 2007:Q3 and continued until 2009:Q2 when the recovery process is suggested to have begun. It is still questionable when the financial crisis was over, or even whether it really has ended. *Ln* $(dummy_2)$ *is* the control factor that captures the industry effect.

The parameter of α_0 is the intercept and β_1 , β_2, β_3 , β_4 , β_5 , β_6, β_7, β_8, are coefficients of the independent variables and e_t is the error term.

3.4 DATA DESCRIPTION AND SOURCES

The choice of variables used in the model is dictated by the availability of information. The data on the first five explanatory variables (growth rate of the GDP, interest rate of the banking credits, inflation, growth rate of the money supply and foreign exchange rates come from Stats SA and South African Reserve Bank (SARB). The rate of company liquidations (CFR) is computed as the rate of change of the sum of compulsory and voluntary liquidations registered by local courts (Source: Ministry of Justice and Statistics South Africa)

In this study, monthly time series data of all variables except for GDP figures (which is reported on quarterly basis) are collected over the period 1994 -2009. All the data observed is interpretated on a quarterly basis.

Table 3.2: Summary of key data description and their sources.

Data Description	Source (s)
Corporate failures	Department of Statistics South Africa (StatSA), Inet Bridge, Ministry of Trade & Industry, Quantec
CPI figures	Department of Statistics South Africa (StatSA), Inet Bridge, Quantec
Bond Yields	Inet Bridge, South African Reserve Bank (SARB), Public Investment Corporation's Economic Department
Interest rates	Inet Bridge, South African Reserve Bank (SARB), Public Investment Corporation's Economic Department
Money supply figures	Inet Bridge, Bloomberg, South African Reserve Bank (SARB), Public Investment Corporation's Economic Department

New incorporations	Department of Statistics South Africa (StatSA), Ministry of Trade & Industry, Quantec, Competition Commissioner (CC)
Foreign Exchange Rates	Inet Bridge, Bloomberg, South African Reserve Bank (SARB), Public Investment Corporation's Economic Department
Other data (for comparison check)	Inet Bridge, Bloomberg, South African Reserve Bank (SARB), Public Investment Corporation's Economic Department, Department of Finance, National Treasury

3.5 METHODOLOGY

To examine both the long-run and short run relationship between South Africa's corporate failure rate and its macroeconomic determinants, we employ the autoregressive distributed lag (ARDL) cointegration procedure introduced Engle and Granger (1987). We used Microsoft 2007 excel to run the *Engle–Granger test.*

The Engle–Granger test based on the regression of Ln (CFR) on explanatory variables (i.e. macroeconomic determinants) is applied. Remember that, if cointegration occurs, then the errors from this regression will be stationary. Conversely, if cointegration does not occur, then the errors will have a unit root. Given the close relationship between the errors and the residuals, it is therefore appropriate to examine the properties of the residuals in order to investigate the presence of cointegration and thus we run the unit root test in the residuals. It is worthwhile to stress that the Engle–Granger test is based on a unit root test.

To begin with, we test for a unit root in the residuals. The first step involves running the regression of *Ln (CFR) on explanatory variables lagged two periods (i.e. macroeconomic determinants)* and save the residuals. Second, was to carry out a unit root test on the residuals (without including a deterministic trend).

We then test for the null of no cointegration against the existence of a long-run relationship. Unlike other cointegration techniques (e.g., Johansen's procedure) which require certain pre-testing for unit roots and that the underlying variables to be integrated are of order one, the ARDL model provides an alternative test for examining a long-run relationship regardless of whether the underlying variables are stationary or non stationary (I(0), I(1)), or fractionally integrated.

Accordingly, the null hypothesis of no cointegration is tested against the alternative by means of the F-test. Note that the asymptotic distributions of the F-statistic are non-standard irrespective of whether the variables are stationary or non stationary (I (0), I (1)).

Engle and Granger (1987) provide two sets of asymptotic critical values. One set assumes that all variables are stationary (I (0)) and the other assumes they are all non stationary (I(1)). If the computed F-statistic falls above the upper bound of the critical value, then the null of no cointegration is rejected. If it falls below the lower bound, then the null cannot be rejected. Finally, if it falls inside the critical value band, the result would be inconclusive. Once cointegration is confirmed, we move to the second stage and estimate the long-run coefficients of the corporate failure rate function and the associated ARDL error correction models.

The study adopts a two stage procedure. First we will determine the lags to consider for each explanatory variable. A distributed-lag model (ARDL) could provide a more effective structure specification. In the second stage, we will try to find the best specification that allows for identifying the macroeconomic determinant of the failure of the South African small micro and medium size firms and private companies.

The ARDL cointegration test assumes that only one long-run relationship exists between the dependent variable and the exogenous variables (Engle and Granger (1987)).

The second stage of ARDL approach is to estimate the coefficients of the long-run cointegrating relationship and the corresponding Error Correction Model (ECM). Since the data are quarterly, we choose two (six months effect) for the maximum order of the lags in ARDL model. If cointegration is present, then not only do we avoid the spurious regression problem, but we also have important financial information (e.g., that an equilibrium relationship exists or that two series are trending together).

3.6 ECONOMETRIC MODELLING

3.6.1 *Econometric Modelling*

Financial time series are often highly correlated with their lags. This implies that the original form of the ARDL model frequently runs into multicollinearity problems. This problem is also addressed by running ARDL bound test. The ARDL cointegration test assumed that only one long-run relationship exists between the dependent variable and

the exogenous variables (Engle and Granger (1987). The model can be written as follows:

$$\emptyset(L,p)y\gamma_t = \sum_{i=1}^{k} \beta_i\ (L,q_i)x_{it} + \delta w_t + \mu_t \ldots.$$

Were $\emptyset(L,p) = 1 - \emptyset_1 \mathrm{L} - \emptyset_2 \mathrm{L}^2 - \cdots - \emptyset_\mathrm{p} \mathrm{L}^\mathrm{p}$

$\beta_\mathrm{i}\ (L,q_i) = 1 - \beta_{\mathrm{i}1}\mathrm{L} - \beta_{\mathrm{i}2}\mathrm{L}^2 - \cdots - \beta_{\mathrm{iq}}\mathrm{L}^{\mathrm{qi}}$, $\mathrm{i} = 1,2,3 \ldots \ldots \mathrm{k}$

L is a lag operator of $L\gamma_t = \gamma_{t-1}$. and $w_{t.}$ is a S x 1 vector of deterministic variables, such as the intercept terms, dummies, time trends or exogenous variable with fixed lags. All possible values of p = 0,1,2,3…..m, where as i= 1,2,3,….k with a total of $(m+1)^{k+1}$.

ARDL can now be estimated by using the Ordinary least squares (OLS). The long run coefficients of the dependent variable γ_t to a unit change in x_t can be estimated by the following equation:

$$\hat{\theta_i} = \frac{\hat{\beta_i}\ (,\hat{q_i})}{\hat{\emptyset}(1,\hat{p})} \quad \text{Where i=1, 2, 3……..k,}$$

and where $\hat{p}$ and $\hat{q_i}$, i=1,2,3,4….k , are the estimated values of p and q

The error correction model (ECM) is given by:

$$\Delta y_t = -\phi(1,\hat{p})EC_{t-1} + \sum_{i=1}^{k} \beta_{i0}\Delta x_{it} + \delta'\Delta w_t - \sum_{j=1}^{\hat{p}-1} \phi_j^*\Delta y_{t-j} - \sum_{i=1}^{k}\sum_{j=1}^{\hat{q}_i-1} \beta_{ij}^*\Delta x_{i,t-j} + \mu_t \text{ where}$$

$$EC_t = y_t - \sum_{i=1}^{k} \hat{\theta}_i x_{it} - \hat{\Psi}' w_t \ .$$

Basically, the bound test developed by Engle and Granger (1987) is the (F-statistic version of the bound testing approaches) for the lagged level variables in the right-hand side of unrestricted error correction models. That is, we test the null hypothesis of non-cointegrating relation by performing a joint significance test on the lagged level variables. The asymptotic distribution of the F-statistic is non-standard under the null hypothesis of no cointegrating relation between the examined variables, irrespective of whether the explanatory variables are purely I(0) or I(1).

Under the conventionally used level of significance such as 5 percent, if the statistic from the Wald test falls outside the critical bounds value (lower and upper values); a

conclusive inference can be made without considering the order of integration of the explanatory variables. If the F-statistic exceeds the upper critical bound, then the null hypothesis of no cointegrating relation can be rejected. If the test statistic (F-statistic) falls below the lower critical bound, we cannot reject the null of non- cointegration. In the case of the F-statistic falling between the upper and lower bounds, a conclusive inference cannot be made. Here, the order of integration for the explanatory variables must be known before any conclusion can be drawn (Pesaran et al., 2005).

3.6.2 *The Error Correction Modelling (ECM)*

The second stage of ARDL approach is to estimate the coefficients of the long-run cointegrating relationship and the corresponding Error Correction Model (ECM). To capture both the long term and the short term dynamics of company failure in South Africa, we created an error correction model using the Engle-Granger (1987) methodology. This involved the inclusion of the lagged residuals from the regression in ARDL model into a new model, with all the involved variables taken in the first difference.

A specification of unrestricted error correction version of the ARDL is given by:

$$\text{Log (CFR)}_t = \alpha_0 + \sum_{i=1}^{2} \omega_1 \left(\Delta Ln(CFR)\right)_{t-i} + \sum_{i=1}^{2} \omega_2 \left(\Delta Ln(Ms)\right)_{t-i} + \sum_{i=1}^{2} \omega_3 \left(\Delta Ln(ALR)\right)_{t-i} + \sum_{i=1}^{2} \omega_4 \left(\Delta Ln(FER)\right)_{t-i} + \sum_{i=1}^{2} \omega_5 \left(\Delta Ln(CBR)\right)_{t-i} + \sum_{i=1}^{2} \omega_6 \left(\Delta Ln(CPI)\right)_{t-1} + \delta_1 \left(Ln(CFR)\right)_{t-1} + \delta_2 \left(Ln(MS)\right)_{t-1} + \delta_3 \left(Ln(ALR)\right)_{t-1} + \delta_4 \left(Ln(FER)\right)_{t-1} + \delta_5 \left(Ln(MCAP)\right)_{t-1} + \delta_6 \left(\Delta Ln(CBR)\right)_{t-1} + \alpha(Dummy)_{t-1} + \varepsilon_{t-1}$$

This expression is still in the form of a regression model and can be estimated using the two-step procedure. The adjustment to equilibrium intuition also holds for this model.

Since we did not have access to these sophisticated software packages, we used the Microsoft 2007 excel to run panel cointegration test.

The ECM also has some nice statistical properties which mean that we do not have to worry about the spurious regression problem. Dependent variable and explanatory variables both have unit roots; hence change in explanatory variables and change in dependent variables are stationary.

Furthermore, since dependent variable and explanatory variables are cointegrated, the equilibrium error is stationary. Hence, the dependent variable and all explanatory variables in the ECM are stationary. This property means that we can use OLS estimation and carry out testing using t-statistics and P-values in the standard way.

The only new statistical issue in the ECM arises due to the inclusion of e_{t-1} as an explanatory variable. Of course, the errors in a model are not directly observed. This raises the issue of how they can be used as an explanatory variable in a regression. Some sophisticated statistical techniques have been developed to estimate the ECM, but the simplest thing to do is merely to replace the unknown errors by the residuals from the regression (i.e. replace e_t-1 by u_{t-1}).

3.7 CONCLUSION

The research methodology has been presented in this chapter. The ARDL, Unit root test and ECM model were developed to ascertain the long run and short relationship between macroeconomic determinants of corporate failures and corporate failure rate in South Africa. Quarterly data was collected from various sources for a long period of fifteen years (1994 to 2009). We further defined all the inputs into these models. The next chapter presents and discusses the results obtained from these models.

4 CHAPTER FOUR – RESULTS AND DISCUSSION

4.1 INTRODUCTION

In this section, we present the most important results of the research. First, ARDL was developed using the Ordinary Least Squares (OLS) method with all included variables. This regression equation represents the long term relationship between corporate failure rate in South Africa and the included independent variables (macroeconomic determinants). After testing for their stationarity, the residuals from this model (ARDL) are then used in the ECM model to capture the long term and the short term dynamics of business failures and macroenomic variables shocks in South Africa. We present the results obtained from the ARDL, Unit root test and ECM model. We further discuss the findings of these results relating them to theoretical aspects.

4.2 ESTIMATION AND TESTING FOR COINTEGRATION - RESULTS

As mentioned in chapter three, we employ the autoregressive distributed lag (ARDL) cointegration procedure introduced by Engle and Granger (1987). We employed, *Engle–Granger test (1987)* and followed the steps using Microsoft 2007 excel to run the model. The results obtained from the excel model are purely the same as the ones that are likely to come from sophisticated computer software packages, however the main difference is that it is tedious.

If dependent variable and explanatory variables are cointegrated, then the spurious regression problem does not apply; consequently, we can run an OLS regression of Dependent variable (CFR) on explanatory variables (macroeconomic variables) and obtain valid results. Furthermore, the coefficient from this regression is the long run multiplier. Thus, insofar as interest centers on the long run multiplier, then estimation with cointegrated variables is very easy. Before using results from this so-called cointegrating regression, it is important to verify that dependent variable and explanatory variables are in fact cointegrated. If they are not cointegrated, then the spurious regression problem holds and the results we obtain can be completely meaningless.

Again it is important to emphasize that when testing for a unit root in the residuals, it is rare to include a deterministic trend. If such a trend were included it could mean the errors could be growing steadily over time. This would violate the idea of cointegration

(the idea that the system always returns to equilibrium and, hence, that errors never grow too big).

We use −2.89 as a critical value against which to compare the t-statistic. If the *t*-statistic on t - values in the unit root regression involving the residuals is more negative than −2.89, we conclude that the errors do not have a unit root and hence that *the dependent variable (CFR)* and *explanatory variables (Macroeconomic variables)* are indeed cointegrated. Recall that in the Dickey–Fuller test, we test the hypothesis that $\delta = 0$ (i.e. the null hypothesis is the unit root). In the cointegration test, we use the Dickey–Fuller methodology but cointegration is found if we reject the unit root hypothesis for the residuals. In other words, the null hypothesis in the Engle–Granger test is "no cointegration" and we conclude "cointegration is present" only if we reject this hypothesis.

The table below shows that the computed F -statistics run for the unit root test to test for the existence of cointegration.

Table 4.1 : Results - Unit Root Test

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-0.00766	0.023074	-0.3321	0.740969	-0.05382	0.038493
**U_{t-1}	-0.52944	0.114543	-4.62223	2.07E-05	-0.75856	-0.30032

** Statistically significant at 5% significance level

Regression Statistics	
Multiple R	0.512427721
R Square	0.262582169
Adjusted R Square	0.250291872
Standard Error	0.181618701
Observations	62

By carrying out unit root test, we find that t -stat value of -4.622 exceeds the critical bound of -2.89 (Dickey–Fuller test) at 5 percent significance level. The lag order of 2 (six months) is applied to all the explanatory variables. This implies that the null hypothesis of no cointegrating long-run relationship can be rejected. Thus, these results reveal the existence of a long-run relationship between macroeconomic determinants of corporate failures and rate of corporate failures in South Africa. The model passed the unit root test.

4.3 ESTIMATION OF (ARDL) LONG RUNG COEFFICIENT - RESULTS

If dependent variable and explanatory variables are cointegrated, then the spurious regression problem does not apply, consequently, we can run an OLS regression of Ln (CFR) on explanatory variables (macroeconomic determinants) and obtain valid results. Furthermore, the coefficient from this regression is the long run multiplier. Thus, insofar as interest centers on the long run multiplier, then estimation with cointegrated variables is very easy. Table 4.2 provides the estimates of the ARDL long-run coefficient for the model; and results of the estimated optimal.

Table 4.2: Results - Estimation of Long run coefficient

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
**Intercept	3.724773172	0.59201153	6.291724	5.07636E-08	2.538831577	4.910714767
**Ln(ALR)$_{2\ periods}$	1.344707259	0.169037924	7.955063	9.16679E-11	1.00608361	1.683330909
**Ln (GDP)$_{2\ periods}$	-0.020554843	0.009830932	-2.09083	0.041093254	-0.04024857	-0.00086112
**Ln (FER)$_{2\ periods}$	0.301478102	0.101635132	2.966278	0.004424971	0.097878469	0.505077735
**Ln MS $_{2\ periods}$	-0.503997911	0.10147907	-4.96652	6.75225E-06	-0.70728492	-0.30071091
Ln(CPI)$_{2\ periods}$	0.021141527	0.05433839	0.389072	0.698698689	-0.08771135	0.129994401
Ln(CBR)$_{2\ periods}$	0.46796873	0.314204185	1.489378	0.170571108	-0.24281052	1.178747977
**Dummy$_{2\ periods}$	0.486281016	0.094538852	5.143716	3.57166E-06	0.296896939	0.675665093

** Statistically significant at 5% significance level

Table 4.3 - SUMMARY ARDL MODEL OUTPUT

Regression Statistics	
Multiple R	0.862541954
R Square	0.743978623
Adjusted R Square	0.716547761
Standard Error	0.216925012
Observations	63 Quarters

Average Lending Rate (ALR), Gross Domestic Product (GDP), Exchange rate (FER), Money Supply (MS), and the dummy variable long run coefficients were found to be statistically significant at 5% significance level, while the inflation (CPI) and corporate

birth rate (CBR) variables were not significant at 5% significance level. The explanatory variables (Macroeconomic determinants of corporate failures) were found to have correct estimated signs.

R^2 of 74.3% implies the robustness of model and confirms that the model passed the diagnostic tests against the serial correlation and non-normality errors.

4.4 ERROR CORRECTION MODEL - RESULTS

The second stage of the Engle-Granger methodology suggests the calculation of an error correction model. This has been done by including the lagged residuals from ARDL model. This has been done by including the lagged residuals from model (ARDL) in ECM model. ECM states that the first difference of the dependent variable depends on the first differences of the other independent and lagged dependent variables and also on the equilibrium error term u_{t-1}. If the latter differs from zero, then the model is out of equilibrium.

Important theorem, known as the Granger Representation Theorem (Engle and Granger, 1987), says that if the dependent variable and explanatory variables are cointegrated, then the relationship between them can be expressed as an ECM. The table below shows the results from ECM.

Table 4.5 – Error correction Model results

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.008986	0.02258	0.39798331	0.692183119	-0.036264836	0.054237746
**U_{t-1}	0.274064	0.118507	2.312639048	0.024510405	0.036570583	0.511557262
**ΔLn (ALR)	0.514992	0.411745	1.250754412	0.016318875	-0.310163524	1.34014723
ΔLn (CPI)	-0.01914	0.07076	-0.27049347	0.787793124	-0.160945212	0.122665241
ΔL n(GDP)	-0.03692	0.052556	-0.702476032	0.485344943	-0.142245201	0.068405869
Δ Ln (FER)	-0.11506	0.33202	-0.346542729	0.730257217	-0.780441775	0.550323626
Δ Ln (MS)	-0.02799	0.129505	-0.216113771	0.829698602	-0.287521415	0.231545829
Δ Ln (CBR)	0.00021	0.498234	0.923426799	0.328765383	0.093116282	0.875276906

** Statistically significant at 5% significance level

The error correction term estimated at 0.274 is statistically significant at 95% confidence level and has the correct sign, making certain that the long-run equilibrium is attainable. Thus, coefficient α in model of 0.008986 suggests that corporate failure rate is adjusting rapidly to the changes in the explanatory variables before reaching its equilibrium. Average lending rate (interest rates) short run properties were found not be significant at 5% significant level, while the rest of other macroeconomic variables was not significant at 5% significance level. However the other explanatory variables (Macroeconomic determinants variables (ΔLn (ARL), ΔLn (CPI), ΔLn (GDP), ΔLn (FER), ΔLn (Ms)) were found to have correct estimated signs using ECM though found not to be statistically significant at 5% significance level. The coefficient obtained for explanatory variables represents the short run effect of the chosen macroenomic determinants of corporate failures.

4.5 DISCUSSION OF THE FINDINGS

It has been reviewed that indeed the long run relationship between macroeconomic variables movement and corporate failure rate do exists in South Africa for the period 1994 to 2009.

The following findings were obtained:

The result entails that any movement in the average lending rate, gross domestic product and the rate of inflation are found to be cointegrated or co-moving with the changes in corporate failure rates.

The intercept α_0 was found to be statistically significant at 5 percent critical levels with a positive sign. This means that holding other factors constant (ceteris paribus), corporate failures in South Africa naturally increase over time. This natural increase in corporate failure is rife in most countries as other factors and natural circumstances may push companies to fall. Other variables not captured in this model such as change in regulations, political risks, and natural disasters may negatively affect companies over time, and hence we expect the rate of corporate failures to be a an increasing function over time.

Strong evidence emerges that a long run relationship exist between interest rates and corporate failures movements in South Africa, ceteris paribus. Average lending rate Ln (ARL) (measured in the form of prime rate) was found to be statistically significant at 5

percent significance level. As expected, an increase in the average lending rate increased the numbers of corporate failure since it contributed to the higher cost of borrowing which indirectly affected the company's profitability (Liu, 2004). Higher cost of borrowing may lower the degree of profitability of the company and thus put it under financial pressure which consequently may increase the possibility of the company going into bankruptcy.

The results estimates that an increase in interest rate (Prime rate) will result in an increase in corporate failures by approximately 1.34% in the long run, after a period of six months (2 lags) assuming other factors constant. These results are consistent with theory which suggests that interest rates represent the cost of borrowing, or the cost of obtaining money. Though central banks can influence interest rates by adjusting their benchmark interbank overnight lending rate, the most important interest rates are set in open markets, such as the South African Treasury market. Other important rates, like the London Interbank Offered Rate (LIBOR), Johannesburg Interbank Rate (JIBAR), Prime rate, and Repo rate as determined by the Central bank, reflect an average of actual rates paid by large institutional borrowers. From such benchmarks, the actual rates paid by most businesses and consumers are determined. High interest rates affect business because they influence both their own direct costs and the ability of their customers to borrow and spend.

Companies, that are already highly geared or leveraged, that is, their capital structure is heavily reliant on debt finance, suffer from cashflow problems, in cases where the company`s debt instruments are prime rate linked, (interest rate volatility risk).Changes in interest rates have a gradual effect on the economy over time. The types of businesses most immediately impacted are those that require frequent borrowing. Businesses are forced to renegotiate the terms of their loans as interest rates fluctuate, their fixed costs increase in that course. The ultimate effect on the business will be determined by its pricing power, whether it can pass these costs on to consumers or is forced to absorb them. Unfortunately, many of these capital-intensive businesses and SMMEs have the least price elasticity and are least able to offset increased borrowing costs with higher prices. Change in Average lending rate (ΔLn (ARL was also found to possess short run relationship (statistically significant at 5%) with corporate failures.

We find variable economic growth as measured by gross domestic product ($\mathrm{Ln}\ (\mathrm{GDP})$) to be statistically significant at 5 percent significance level, with a long run coefficient of -0.02. Gross domestic product (GDP) significantly influenced the corporate failure rates in a negative direction. The inverse relationship between GDP and corporate failures implies

that an increasing GDP lowers the rate of corporate failures in South Africa. As the economy grows, consumer consumption is also expected to grow, and in turn companies are expected to post strong profits and cashflows during the expansionary period.

Furthermore, money supply (variable Ln (MS)), was found to be statistically significant at 5 percent significance level with a long run coefficient of -0.50 percent. This entails that money supply (MS) significantly influenced the corporate failure rates in a negative direction. We used money supply as proxy to measure the availability of credit in South Africa. We find strong evidence of the relationship between money supply and corporate failures. The findings, suggest that as money supply increases in an economy, the availability of credit and accessibility is presumed to be easy, such that companies can have access to less expensive funding at anytime. As expected, an increase in money supply results in a sharp decline in corporate failures in the long run. However the short run effect (using ECM), money supply was found to be not significant at 5 percent significance level, but showed the expected negative sign.

We also find evidence demonstrating that an increase in the rate of inflation (Ln (CPI) will cause a rise in the corporate failures ceteris paribus. One plausible explanation for this relationship is that, as the inflation rate is increasing, we expect purchasing power to decrease. Therefore, the ability of the consumers to buy goods or services that are supplied by the company will decline and thus negatively impact company's revenue and its cashflows position.

The variable Ln (CBR) was found to be statistically insignificant at 5 percent significance level; however the results showed the expected sign. The number of new firms is relevant as a firm risk variable because new managers who are associated with new firms are less experienced and therefore tend to make more mistakes. Altman, 1983, noted that firms are most likely to fail within three years of formation. Those failures result from a variety of causes, including poor planning during the business development phase, a limited capital base, and inadequate managerial abilities. The increase in the number of new firms may also be seen as increasing competition to the existing established companies, hence contributes to increase in corporate failures.

Most importantly, we again find strong evidence that the financial crisis experienced in 2007 to 2009, contributed to more corporate failures. The variable Ln (Dummy), which represented financial crisis, in our model was found to be statistically significant at 5% significance level with a long run coefficient of 0.48. The positive relationship, illustrates

that corporate failures is an increasing function of financial crisis, ceteris paribus. The results indeed coincide with what was actually experienced during the financial crisis period. The global financial crisis that began in the United States Of America (USA) has created a ripple effect that had devastating effect on the economies of other countries in the world. The financial crisis began with the bursting of the housing bubbles in the US. The financial crisis, later on led to global recession and South Africa and most economies across the world were adversely affected. Most companies were not spared, and liquidated during this period. Businesses around the globe were hit so hard by the economic crisis that several businesses had to seek monetary assistance from the government in order to survive. Several industries were in jeopardy and the others were facing the threat of bankruptcy.

Furthermore, our results also revealed that, variable Ln (FER) (Foreign exchange rate) is statistically significant at 5 percent significance level with a long run coefficient of 0.30. The results presented a positive relationship. We conclude that changes in exchange rates affect a business in different ways depending on the nature of the business and industry. Exchange rates changes can increase or lower the price of a product sold abroad, the price of imported raw materials may change and the price of competitors' products may change in the home market for example an increase in the exchange rate (a strong rand) will mean that price abroad goes up, lowering sales; price of imported raw materials falls, either leading to a fall in price and more sales, or an increase in profits; competitors' prices fall, meaning lower sales.

Exporters loose price competitiveness, market share and as a result profits declines. Exporting companies such as gold producers and manufacturing firms are forced to downsize their operation and cut down jobs, hence unemployment increases. If exports fall, this has a negative impact on economic growth which will in turn have an impact on consumer spending patens. A depreciation of the Rand against USD should work in the opposite direction, improving the exports. However continuous depreciation of the Rand will result in droop in investor confidence scaring away the much needed foreign direct investments from abroad. Currency crisis have also a sweeping impact on income distribution and thus may result in decline in consumer spending, hence fall in demand for goods and services.

4.6 SUMMARY

The results demonstrate that macroeconomic aggregates exert differential impact on corporate failures both in the short run and in the long run in South Africa. The findings also revealed that corporate failure rates in South Africa are significantly and positively associated with the average lending rate, inflation rate, new corporation, exchange rate, 2007-2009 financial crisis and inversely related to gross domestic product (GDP) and money supply both in the short run and long-run. In general, the results show expected and consistent relationships between shocks on macroeconomic variables and corporate failures. The following chapter concludes and recommend.

5 CHAPTER FIVE – CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

Our principle objective was to examine the short run and long run relationship between corporate failures and instability associated with the macroeconomic cycles (macroeconomic determinants), focussing on south African companies, over a long period (15 years). The relationship between corporate failures and macroeconomic risk factors has been an issue of concern for academics, financial expects especially private equity and SMME investment specialist, practitioners and policy makers for long time. South Africa has been heavily been hampered by high rate of corporate failures since 1994 (Stats SA, 2009), and this trend is also prevalent in most emerging market economies. In this section we conclude and give our recommendation.

5.2 CONCLUDING REMARKS

This study has attempted to shed some light on the influence of macroeconomic variables on the failure of companies more particularly SMMEs and private companies in South Africa during the period 1994-2009 using quarterly data. Cointegration analysis using ARDL model and error correction methodology (ECM) were applied in order to ascertain the short run and long run relationship between corporate failures and macroeconomic variables.

Previous research on financial distress and failures of companies focused predominantly on listed companies and developed countries. Yet in emerging economies, private companies and SMMEs make up the majority of firms, both in terms of numbers and contribution to economic activity. The failure rate is also high for small and private companies in most emerging economies. This paper is believed to be among the few studies on corporate failure in South Africa.

An important point emerges from the empirical analysis. Our estimates corroborate the hypothesis that both short run and long run relationship exists between corporate failure rate in South Africa and the selected macroeconomic determinants. Corporate failure rates are significantly and positively associated with the average lending rate, inflation rate, new corporation, exchange rate, 2007-2009 financial crisis and inversely related to gross domestic product (GDP) and money supply both in the short run and long-run.

5.3 RECOMMENDATIONS

From a policy point of view, our results suggest that fiscal and monetary policy strategies affect business bankruptcies differently over the short and the long run. In the short run for example, macroeconomic stability as measured by cyclical fluctuations of real GDP, (demand side policies) is likely to be less effective than policies aimed at helping firms to mitigate their variable e.g. labor and interest payments costs. However, in the long run these demand side polices are more effective in ensuring continuity of businesses.

The findings from this study have important implications for the efficient conduct of monetary policy management with regard to the survival of the firms. As one of the monetary policy's tools, interest rate is used by the South African Reserve bank (SARB) to control the fluctuation in the economy. Base lending rate (BLR), which is usually set by the Central Bank, is used in most instances as a benchmark by commercial banks and financial institutions to determine their lending and saving rates, after taking into account their profit margin.

It is reviewed that any movement in the lending rate is associated with corporate failure; it is therefore recommended that the Central Bank should take into consideration this positive relationship before deciding to increase the base interest rate. Furthermore we suggest that commercial banks and financial institutions should also be cautious when fixing their margin. In cases where the margin is too high, it tends to increase the lending rate and thus as a result may increase the likelihood of a company falling into a bankruptcy, especially those companies with unsustainable leverage levels. In case of companies in need of funding, this may result in incurring higher cost of borrowing, and it will increase the probability of the company defaulting on its debt repayment. The effect may also spread to banks themselves, since loan repayment defaults will eventually increase the Non Performing Loan (NPL) held by the banks

From an Investor perspective our results suggest that, when making investment decisions, it is important to measure and analyse fully the macroeconomic fundamentals and its impact on the targeted investment. New entrepreneurs should from time to time evaluate shocks in an economy and adjust their business models beforehand, so as to avoid a situation of unexpected financial difficulties.

From a fund manager point of view, our results suggest that, when making investment decisions, it is important to note that, uncertainty measured in the form of sharp increases

in inflation and sharp depreciation of the rand, affect small firms adversely. Small companies are more likely to go bankrupt during unstable years. Acquisition activity is also subdued in these years. Evaluation of the financial health of companies; testing the practical applicability of models is essential and thus an adequate understanding of each macroeconomic factors and their impact on the operations and financial positions of a company should be carefully scrutinized. Improper application of corporate failure models may lead into mistaken managerial judgments and misunderstanding of actual facts that may lead to wrong investments decisions.

Understanding of the relationship between macroeconomic fundamentals and corporate failures is of utmost important to portifolio managers, investments analyst and fund manager in identifying timeously early warning signal of financial distress. By performing adequate stress test analysis of the impact of external environment on various business models, corporate financiers are able to come up with appropriate financial restructuring plans and rescue strategies before the company evolve in the failure process Fund managers in private equity and venture capital industry will also be in a position to monitor closely and timeously developments in the external environment and be in a position to perform appropriate stress testing to gauge beforehand the likelihood of companies to fall into financial difficulties. For this reason, investment practitioners are well positioned to devise appropriate survival strategies beforehand.

It is also of utmost importance for the business society such as creditors, customers, suppliers, employees, and government in general to know the financial well being of companies and the effect of each macro environment. When any company fails, its stockholders, its investors, employees, suppliers and customers stand to lose out financially. Investors will usually lose the money they put into the business and unpaid creditors will often have to write off their debts. Early awareness of potential financial distress in companies may easy finding immediate solutions to the problems. Failing to predict the likelihood of a company to fall into financial distress causes damage not only for the company failing but also affects all other businesses associated with that company. The major reason why corporate failure has such a major impact on the economy of a country is the costs associated with going bankrupt.

5.4 FURTHER STUDY

A large part of the previous researches on firms` failure concentrated on the predictive perspective. Nevertheless, the predictive literature has strong limitations and it provides few explanations as to why and how business failure takes place. To date, few studies focused on identification of explanatory factors of corporate failure patterns and few of the previous studies proposes several failure patterns dedicated to small firms while their failure is significant and specific. It is important to note that in this study, the focus was on finding the short run and long run relationship between macroeconomic variables with corporate failures in South Africa. An opportunity exists to extent this study to evaluate the relationship between micro and macro factors (combined together) on corporate failures for small businesses. The study may further be extended to other emerging economies such as Brazil. China, Russia and Korea.

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7 APPENDIX

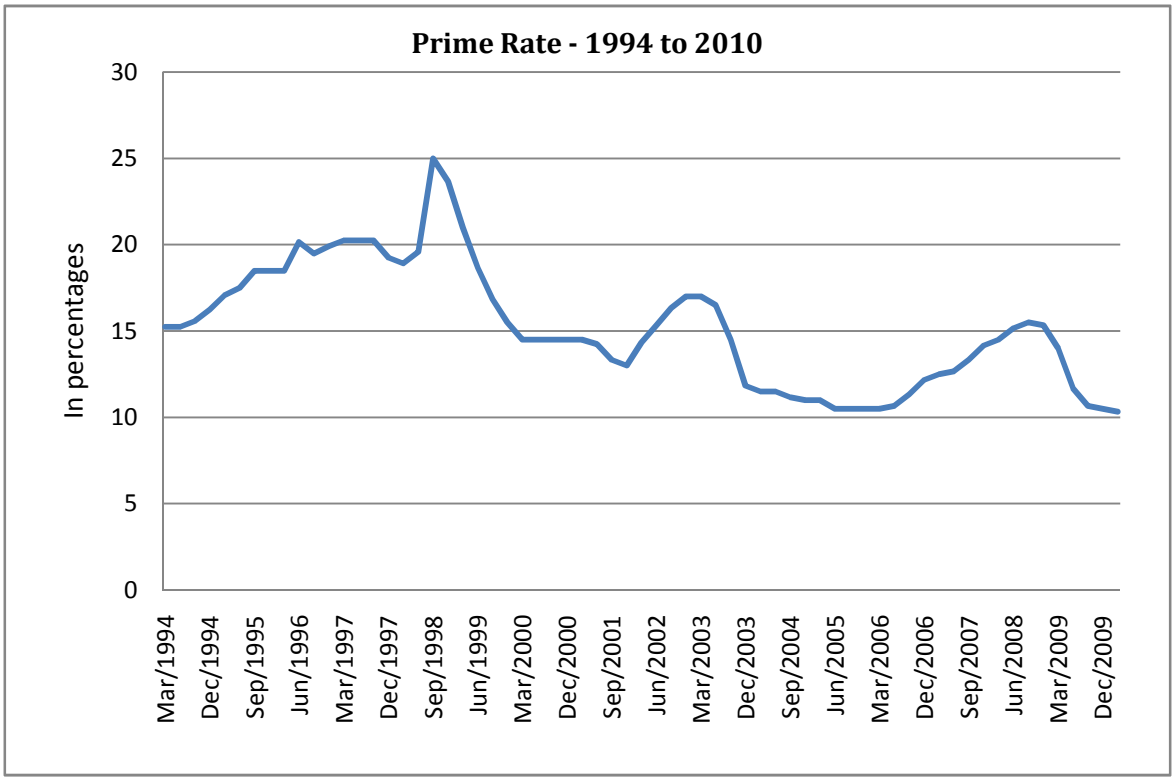
Annexure 1 – Model Inputs – Sources (Stat SA, SARB, Competition Commission, Ministry of Trade and Industry, Ministry of Finance)

Period	CFR	Ln CFR	ΔLn CFR	ALR	Ln(ALR)	ΔLn (ALR)	CPI	Ln(CPI)	ΔLn (CPI)	GDP	Ln (GDP)	Δ ln(GDP)	FER	Ln (FER)	Δ Ln FER)	FER	FER	MS	Ln MS	Δ MS
Mar/1994	1033	6.940222469		15.25	2.724579503		9.59667	2.261415816		3.16	1.150572028		3.45847	1.240825331				11.0967	2.406644762	
Jun/1994	763	6.637258031	-0.3029644378	15.25	2.724579503	0.0000	7.13	1.964311234	-0.297104582	3.15	1.147402453	-0.003169575	3.6033	1.281850092	0.04102476			14.43	2.669309372	0.262665
Sep/1994	979	6.886531643	0.2492736112	15.5833	2.746201967	0.0216	9.23667	2.22318107	0.258869836	2.83	1.040276712	-0.107125741	3.6094	1.283541554	0.00169146			15.3	2.72785282840	0.058543
Dec/1994	698	6.548219103	-0.3383125398	16.25	2.788092909	0.0419	9.87333	2.28983752	0.06665645	3.78	1.32972401	0.289447298	3.53303	1.262156803	-0.02138475			15.0467	2.71115648272	-0.016696
Mar/1995	734	6.598509029	0.0502899259	17.0833	2.838103329	0.0500	9.99	2.301584593	0.011747072	4.3	1.458615023	0.128891013	3.57453	1.273834631	0.01167783			11.83	2.47063867799	-0.240518
Jun/1995	632	6.448889394	-0.1496196345	17.5	2.862200881	0.0241	10.7167	2.371800162	0.070215569	3.64	1.291983682	-0.166631341	3.64447	1.293210036	0.01937540			15.7867	2.75916570191	0.288527
Sep/1995	741	6.608000625	0.1591112311	18.5	2.917770732	0.0556	7.68667	2.039487226	-0.332312936	2.93	1.075002423	-0.216981259	3.642	1.292532981	-0.00067705			15.7667	2.75789800683	-0.001268
Dec/1995	663	6.496774990	-0.1112256351	18.5	2.917770732	0.0000	6.53	1.876406943	-0.163080283	1.64	0.494696242	-0.580306181	3.6521	1.295302345	0.00276936			14.36	2.66444656362	-0.093451
Mar/1996	704	6.556778356	0.0600033660	18.5	2.917770732	0.0000	6.46	1.865629318	-0.010777625	2.7	0.993251773	0.498555531	3.83123	1.343186771	0.04788443			18.7333	2.93030446823	0.265858
Jun/1996	656	6.486160789	-0.0706175672	20.1667	3.004031076	0.0863	6.08333	1.805552791	-0.060076526	4.16	1.425515074	0.432263301	4.3385	1.467528666	0.12434190			17.42	2.85761897142	-0.072685
Sep/1996	745	6.613384218	0.1272234294	19.5	2.970414466	-0.0336	7.56333	2.02331201	0.217759219	4.89	1.587192303	0.161677229	4.50883	1.506038436	0.03850977			19.1033	2.94986283990	0.092244
Dec/1996	698	6.548219103	-0.0651651156	19.9167	2.991556902	0.0211	9.22667	2.222097842	0.198785832	5.47	1.699278616	0.112086313	4.66133	1.53930153	0.03326309			19.1033	2.94986283990	-
Mar/1997	669	6.505784060	-0.0424350426	20.25	3.008154794	0.0166	9.59	2.260720889	0.038623047	4.31	1.460937904	-0.238340712	4.48833	1.501481438	-0.03782009			17.4867	2.86143868577	-0.088424
Jun/1997	819	6.708084084	0.2023000237	20.25	3.008154794	0.0000	9.4	2.240709689	-0.0200112	3.01	1.101940079	-0.358997825	4.4815	1.499957812	-0.00152363			15.69	2.75302356674	-0.108415
Sep/1997	953	6.859614904	0.1515308198	20.25	3.008154794	0.0000	8.72333	2.166001428	-0.074708261	2.07	0.727548607	-0.374391471	4.65333	1.537583809	0.03762600			15.8967	2.76610944364	0.013086
Dec/1997	842	6.735780014	-0.1238348894	19.25	2.957511061	-0.0506	6.80333	1.917412688	-0.24858874	1.26	0.231111721	-0.496436886	4.8455	1.578050439	0.04046663			17.75	2.87638551592	0.110276
Mar/1998	880	6.779921907	0.0441418932	18.9167	2.940043368	-0.0175	5.60333	1.723361659	-0.194051029	1.1	0.09531018	-0.135801541	4.97027	1.603473494	0.02542305			17.1033	2.83927337629	-0.037112
Jun/1998	962	6.869014451	0.0890925432	19.5833	2.974678864	0.0346	5.11333	1.631851507	-0.091510151	0.63	-0.46203546	-0.557345639	5.37783	1.682285567	0.07881207			16.57	2.80759383144	-0.031680
Sep/1998	1071	6.976348070	0.1073336198	25	3.218875825	0.2442	7.70667	2.042085755	0.410234248	0.2	-1.609437912	-1.147402453	6.14	1.81482472	0.13253918			14.6767	2.68625893110	-0.121335
Dec/1998	1376	7.226936018	0.2505879480	23.6667	3.164067588	-0.0548	9.20667	2.219927859	0.177842104	0.14	-1.966112856	-0.356674944	5.73417	1.746442433	-0.06838231			12.26	2.50634193051	-0.179917
Mar/1999	1371	7.223295680	-0.0036403389	21	3.044522438	-0.1195	8.41333	2.129817749	-0.09011011	0.94	-0.061875404	1.904237453	6.13333	1.813738376	0.06729594			8.83333	2.17853244432	-0.327809
Jun/1999	1725	7.452982329	0.2296866499	18.6667	2.926739402	-0.1178	7.27333	1.984214692	-0.145603057	1.6	0.470003629	0.531879033	6.119	1.811398684	-0.00233969			7.66333	2.03644705011	-0.142085
Sep/1999	1555	7.349230825	-0.1037515049	16.8333	2.823361048	-0.1034	3.30667	1.195940633	-0.788274059	2.93	1.075002423	0.604998794	6.07817	1.804703115	-0.00669557			7.75	2.04769284337	0.011246
Dec/1999	1364	7.218176838	-0.1310539862	15.5	2.740840024	-0.0825	1.92667	0.655791394	-0.540149239	3.96	1.376244025	0.301241602	6.146	1.815801464	0.01109835			10.1267	2.31517220850	0.267479
Mar/2000	1129	7.029087564	-0.1890892743	14.5	2.674148649	-0.0667	2.81	1.033184483	0.377393089	4.18	1.430311247	0.054067221	6.3925	1.855125428	0.03932396			10.6767	2.36806067495	0.052888
Jun/2000	1230	7.114769448	0.0856818842	14.5	2.674148649	0.0000	4.93	1.595338988	0.562154505	4.3	1.458615023	0.028303776	6.836	1.922202765	0.06707734			8.88333	2.18417686194	-0.183884
Sep/2000	1200	7.090076836	-0.0246926126	14.5	2.674148649	0.0000	6.65333	1.895117982	0.299778994	4.2	1.435084525	-0.023530497	7.054	1.953594832	0.03139207			7.62	2.03077636970	-0.153400
Dec/2000	1135	7.034387930	-0.0556889059	14.5	2.674148649	0.0000	6.99667	1.945433845	0.050315863	3.94	1.371180723	-0.063903802	7.61457	2.030063079	0.07646825			6.82667	1.92083651150	-0.109940
Mar/2001	918	6.822197391	-0.2121905393	14.5	2.674148649	0.0000	7.38	1.998773639	0.053339793	3.45	1.238374231	-0.132806492	7.819	2.056556669	0.02649359			10.7367	2.37366467468	0.452828
Jun/2001	1038	6.945051064	0.1228536731	14.25	2.656756907	-0.0174	6.35333	1.84897961	-0.149794029	3.02	1.105256831	-0.1331174	8.03283	2.083537309	0.02698064			13.5133	2.60367685236	0.230012
Sep/2001	1085	6.989335266	0.0442842022	13.3333	2.590267165	-0.0665	4.71667	1.551102335	-0.297877274	2.28	0.824175443	-0.281081388	8.5396	2.144714168	0.06117686			17.28	2.84954976338	0.245873
Dec/2001	895	6.796823718	-0.1925115477	13	2.564949357	-0.0253	4.25333	1.447702989	-0.103399346	2.2	0.78845736	-0.035718083	10.5734	2.358344566	0.21363040			16.35	2.79422789734	-0.055322
Mar/2002	763	6.637258031	-0.1596556870	14.3333	2.662587827	0.0976	5.7	1.740466175	0.292763186	2.86	1.050821625	0.262364264	11.4227	2.435599685	0.07725512			20.3733	3.01422685619	0.219999
Jun/2002	827	6.717804695	0.0805466637	15.3333	2.730029108	0.0674	7.68	2.038619547	0.298153372	3.59	1.278152203	0.227330578	10.2375	2.326057449	-0.10954224			21.1233	3.05037827467	0.036151
Sep/2002	789	6.670766321	-0.0470383742	16.3333	2.793208009	0.0632	10.46	2.347558459	0.308938911	4.16	1.425515074	0.147362872	10.4052	2.342302478	0.01624503			18.3367	2.90890269822	-0.141476
Dec/2002	679	6.520621128	-0.1501451933	17	2.833213344	0.0400	12.7933	2.548924202	0.201365743	4.06	1.401182974	-0.024332101	9.28117	2.227987257	-0.11431522			19.4967	2.97024351079	0.061341
Mar/2003	491	6.196444128	-0.3241769998	17	2.833213344	0.0000	10.6967	2.369932166	-0.178992035	3.67	1.300191662	-0.100991312	8.18833	2.102710377	-0.12527688			14.02	2.64048488161	-0.329759
Jun/2003	677	6.517671273	0.3212271451	16.5	2.803360381	-0.0299	7.83667	2.058813574	-0.311118593	2.93	1.075002423	-0.225189239	7.5196	2.017512945	-0.08519743			14.6833	2.68671306371	0.046228
Sep/2003	775	6.652863029	0.1351917564	14.5	2.674148649	-0.1292	4.67333	1.541872593	-0.516940981	2.65	0.97455964	-0.100442783	7.20257	1.974437444	-0.04307550			14.2633	2.65769214176	-0.029021
Dec/2003	709	6.563855527	-0.0890075028	11.8333	2.470920408	-0.2032	0.70667	-0.3471962	-1.889068793	2.56	0.940007258	-0.034552382	6.63457	1.892293355	-0.08214409			12.9867	2.56392319011	-0.093769
Mar/2004	535	6.282266747	-0.2815887796	11.5	2.442347035	-0.0286	0.43667	-0.828585151	-0.481388951	3.15	1.147402453	0.207395194	6.6621	1.89643475	0.00414139			14.1	2.64617479738	0.082252
Jun/2004	551	6.311734809	0.0294680623	11.5	2.442347035	0.0000	0.69333	-0.366244395	0.462340757	4.09	1.40854497	0.261142517	6.55687	1.880512847	-0.01592190			11.7	2.45958884180	-0.186586
Sep/2004	501	6.216606101	-0.0951287081	11.1667	2.41293315	-0.0294	1.34333	0.295154087	0.661398482	5.22	1.652497402	0.243952432	6.46227	1.865980133	-0.01453271			13.11	2.57337529778	0.113786
Dec/2004	388	5.961005340	-0.2556007615	11	2.397895273	-0.0150	3.20333	1.164191934	0.869037847	5.73	1.745715531	0.093218129	5.8569	1.767620453	-0.09835968			14.24	2.65605490598	0.082680
Mar/2005	372	5.918893854	-0.0421114854	11	2.397895273	0.0000	2.86	1.050821625	-0.113370309	5.21	1.650579856	-0.095135675	5.9922	1.790458623	0.02283817			12.61	2.53449014998	-0.121565
Jun/2005	396	5.981414211	0.0625203570	10.5	2.351375257	-0.0465	3.13333	1.142097401	0.091275776	5.63	1.728109442	0.077529586	6.4956	1.871125025	0.08066640			16.1133	2.77964708661	0.245157
Sep/2005	441	6.089044875	0.1076306642	10.5	2.351375257	0.0000	3.80333	1.335877875	0.193780475	5.34	1.675225653	-0.052883789	6.42343	1.859952762	-0.01117226			18.74	2.93066027681	0.151013
Dec/2005	431	6.066180090	-0.0229367853	10.5	2.351375257	0.0000	3.61	1.283707772	-0.052170103	4.93	1.595338988	-0.079886665	6.48813	1.869974867	0.01002211			17.97	2.88870370080	-0.041957
Mar/2006	395	5.978885765	-0.0872223252	10.5	2.351375257	0.0000	3.75	1.32175584	0.038048068	5.45	1.695615609	0.100276621	6.12513	1.812400525	-0.05757434			23.0167	3.13621859119	0.247515
Jun/2006	392	5.971261840	-0.0076239251	10.6667	2.367123614	0.0157	4.08	1.406096988	0.084341148	5.3	1.667706821	-0.027908788	6.62037	1.890150756	0.07775023			23.7667	3.16828403875	0.032065
Sep/2006	443	6.093569770	0.1223079303	11.3333	2.427748236	0.0606	5.22667	1.653773726	0.247676738	5.36	1.678963975	0.011257155	7.28107	1.985277372	0.09512662			21.6733	3.07608262621	-0.092201
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Mar/2007	421	6.042632834	-0.0464120418	12.5	2.525728644	0.0270	5.92667	1.779461941	0.061468622	6.26	1.834180185	-0.004780886	7.25447	1.981617371	0.01149789			21.6933	3.07700499368	-0.098406
Jun/2007	514	6.242223265	0.1995904318	12.6667	2.538973871	0.0132	6.99667	1.945433845	0.165971904	5.4	1.686398954	-0.147781232	7.06227	1.954766058	-0.02685131			22.7833	3.12602927450	0.049024
Sep/2007	592	6.383506635	0.1412833694	13.3333	2.590267165	0.0513	6.99667	1.945433845	0	5.24	1.656321498	-0.030077455	7.03547	1.950964023	-0.00380203			25.0667	3.22153894229	0.095510
Dec/2007	754	6.625392368	0.2418857331	14.1667	2.650891787	0.0606	8.46333	2.135743107	0.190309262	5.07	1.623340818	-0.032980681	6.71043	1.903663529	-0.04730049			23.3533	3.15073972910	-0.070799
Mar/2008	681	6.523562306	-0.1018300619	14.5	2.674148649	0.0233	10.6933	2.369620494	0.233877387	4.18	1.430311247	-0.193029571	7.77577	2.05101206	0.14734853			21.8167	3.08267420369	-0.068066
Jun/2008	1135	7.034387930	0.5108256238	15.1667	2.719100037	0.0450	10.95	2.393339456	0.023718962	4.71	1.549687908	0.119376661	7.65727	2.035655088	-0.01535697			20.39	3.01504458459	-0.067630
Sep/2008	1371	7.223295680	0.1889077496	15.5	2.740840024	0.0217	11.84	2.471483629	0.078144173	3.75	1.32175584	-0.227932068	7.75023	2.04772295	0.01206786			17.2167	2.84587790690	-0.169167
Dec/2008	1384	7.232733136	0.0094374566	15.3333	2.730029108	-0.0108	10.3867	2.340522932	-0.130960697	2.13	0.75612198	-0.56563386	9.78117	2.280458768	0.23273582			16.3833	2.79626455793	-0.049613
Mar/2009	974	6.881411304	-0.3513218325	14	2.63905733	-0.0910	8.41333	2.129817749	-0.210705183	-0.45	-0.56563386	-1.32175584	9.94147	2.296714562	0.01625579			12.5633	2.53078251861	-0.265482
Jun/2009	1521	7.327123292	0.4457119886	11.6667	2.456735773	-0.1823	7.75333	2.048122858	-0.081694891	-2.47	-1.32175584	-0.75612198	8.02677	2.08278179	-0.21393277			7.45333	2.00866139962	-0.522121
Sep/2009	1321	7.186144305	-0.1409789877	10.6667	2.367123614	-0.0896	6.40667	1.857339115	-0.190783744	-2.56	-0.75612198	0.56563386	7.68517	2.039292064	-0.04348973			5.06333	1.62202502794	-0.386636
Dec/2009	1228	7.113142109	-0.0730021958	10.5	2.351375257	-0.0157	6.03	1.796747011	-0.060592104	-1.62	0.56563386	1.32175584	7.53743	2.019882717	-0.01941035			1.61667	0.48036641628	-1.141659
Mar/2010	836	6.728628613	-0.3845134956	10.3333	2.335374916	-0.0160	5.66	1.733423892	-0.063323119	1.43	0.357674444	-0.207959416	7.53277	2.019262394	-0.00061932			0.76	-0.27443684570	-0.754803

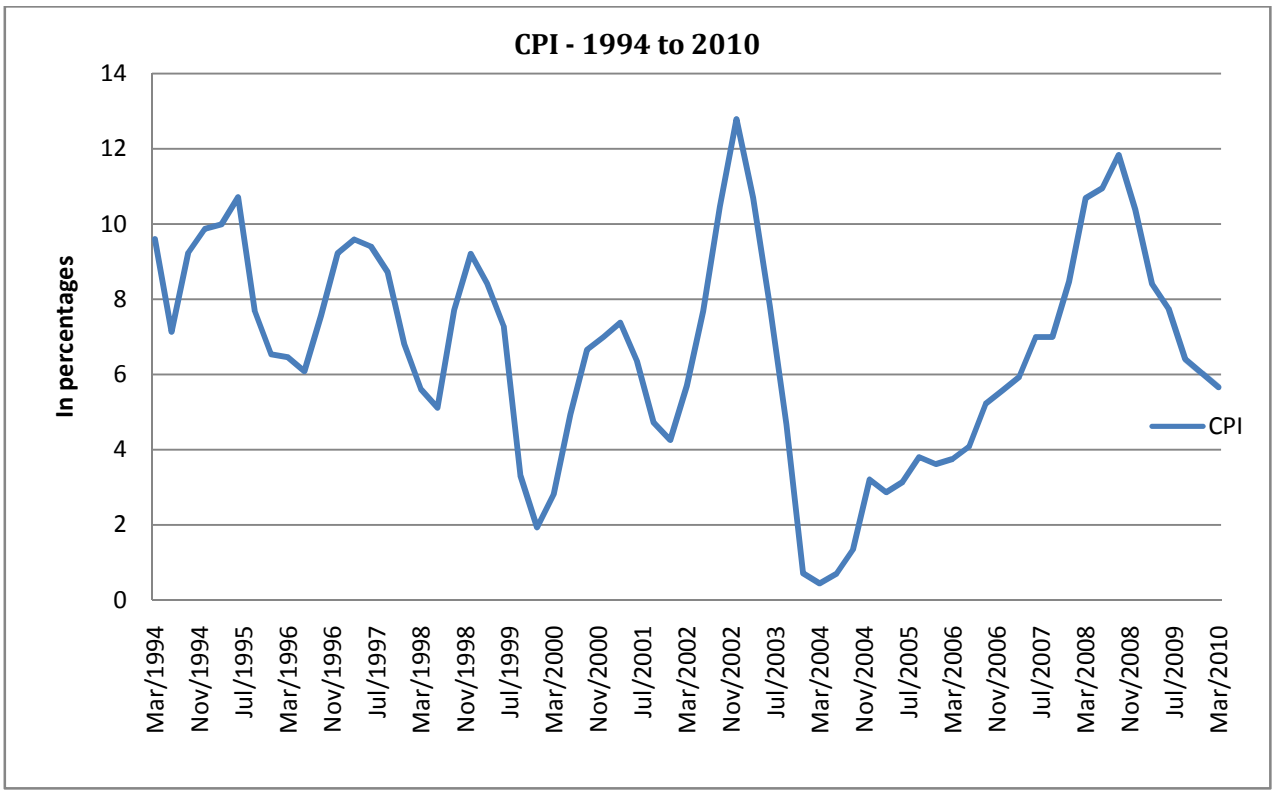
Annexure 2 – Corporate Failures in South Africa for the period 1994-2009



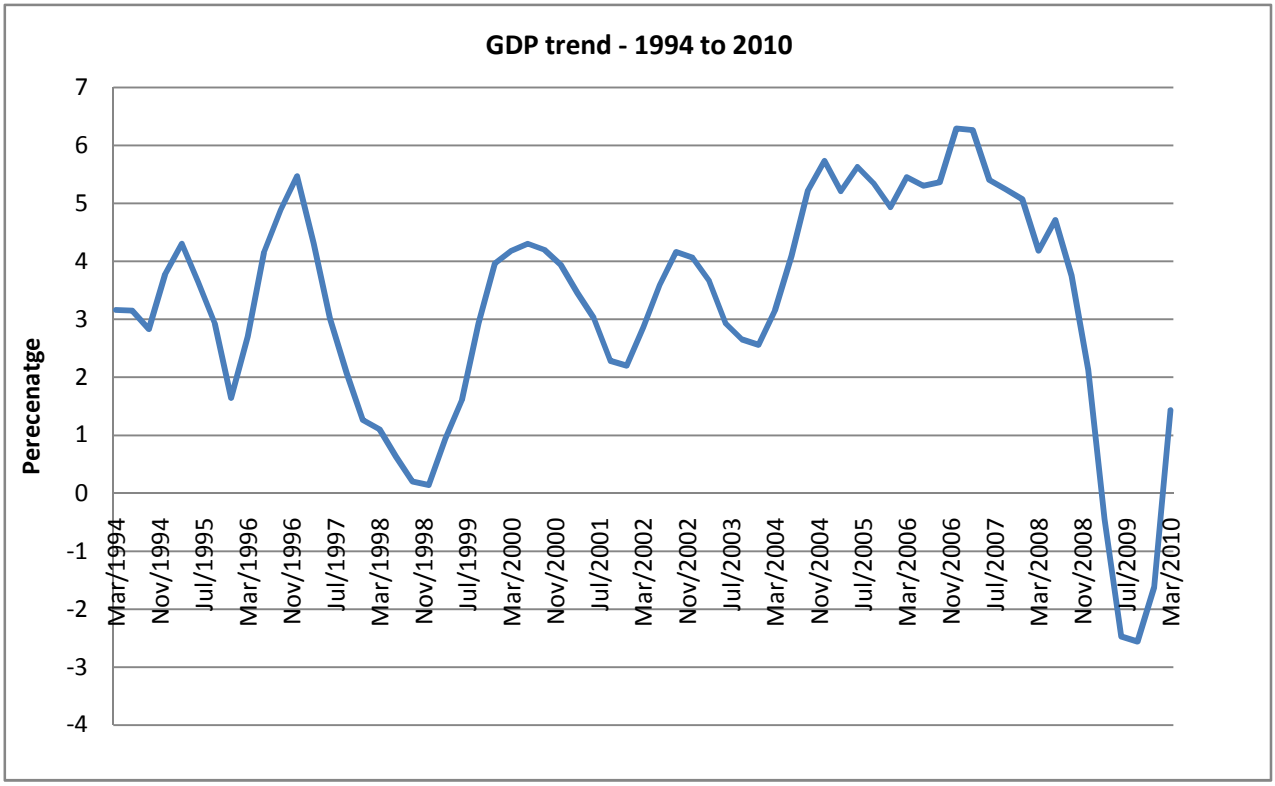
Annexure 3 – Interest Rates Trends for the period 1994-2009



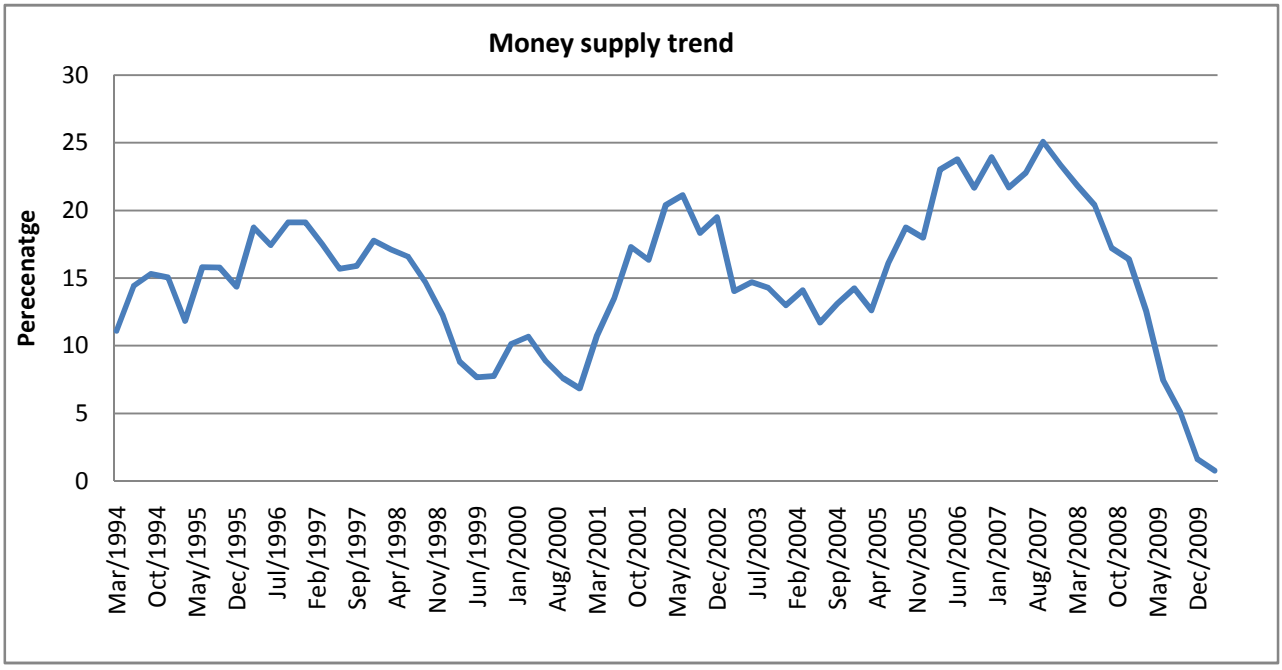
Annexure 4 – CPI trends in South Africa for the period 1994-2009



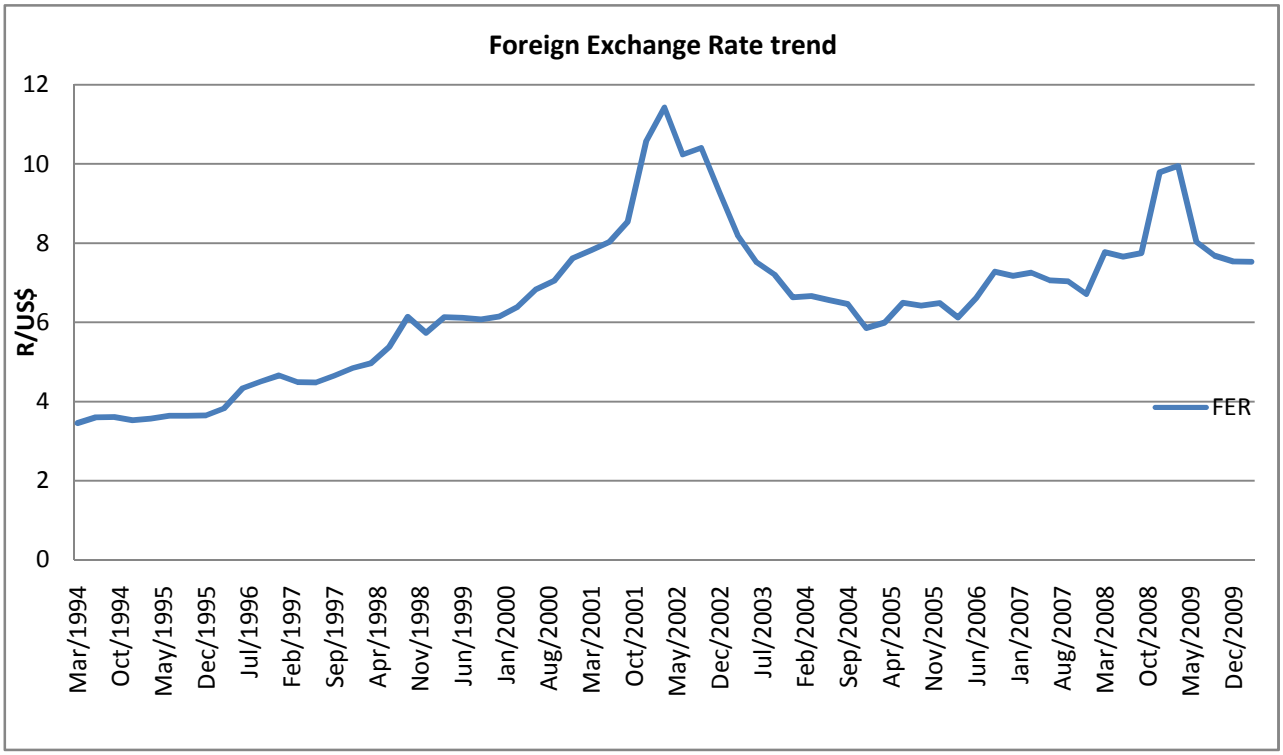
Annexure 5 – GDP tend in South Africa for the period 1994-2009



Annexure 6 – Money Supply trend for the period 1994-2009



Annexure 6 – Foreign Exchange rate (R/USD) trend for the period 1994-2009



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