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The relationship between Sovereign Credit Ratings and the Stock Markets in Africa

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ABSTRACT

Stock markets in Africa are small, underdeveloped and generally undercapitalised by world standards. Until recently they have been perceived as too risky to invest in by external investors. The "old" perception of Africa as a "*single country/block*" is slowly receding and countries are starting to be viewed as individuals, while not necessarily overlooking the issue of the contagion effects of any regional business risks.

As has been observed, there has been generally improved market performance in stock markets on the African continent in terms of historical average annual returns represented by market capitalisation, market liquidity and number of domestic listed companies over the period 1997 to 2007. However, this could be due to many factors.

For countries to be attractive to external investors it is necessary to have investor-friendly policies that protect their investments while creating an environment that allows competition. In so doing, it is important to evaluate the macro-economic and micro-economic policies that the respective countries on the continent have. The sovereign credit ratings of countries are based on economic fundamentals whose rating affects the ratings of many companies or businesses in that particular country.

The purpose of this study was to gain insight into whether a relationship exists between sovereign credit ratings and the performance of stock markets on the African continent with respect to market capitalisation, market liquidity and the number of domestic listed companies. As it would appear that the information in this study has not been documented previously for the African continent it may be regarded as a formative evaluation and addition to the body of knowledge of the relationship between sovereign credit ratings and stock market performance in Africa. The statistical analysis methodology was undertaken using Spearman's rank correlation method, which uses a t-test statistic within a 95 % confidence interval to test the strength of this relationship and, based on this result, a conclusion could be made. The findings of the research are intended to

help countries in Africa evaluate their policies so that they become more attractive to investors.

A window period of five (5) years, (1999 to 2003), was used to analyse the data set for sovereign credit ratings. A similar, four (4)-year window period (2000 to 2003) was used for the comparison of the stock market indicators (market capitalisation, market liquidity and number of domestic listed companies). It was not possible to align the two window periods selected for the research as all the data sets published lack information for certain years. However, it was felt that as a trend – rather than an absolute correlation – was being sought, the validity of the research would not be unduly jeopardised.

The result of the findings in this research was that there exists no relationship between sovereign credit ratings and the performance of the stock markets on the African continent with respect to market capitalisation, market liquidity and number of domestic listed companies. It became clear that the performance of African stock markets was influenced by factors other than an improvement or worsening in the macro- and micro-economic fundamentals of a country.

The question remains: “What influences the performance of the stock markets on the African continent?” This is an important area for further research.

The World Bank, through its implementing partner, the United Nations Development Programme, needs to review its current programme to promote stock markets on the African continent to see what areas require additional focus for this project to receive the attention needed. Alternatively, it could be that it is still premature to do so, considering that in 2007 only 20 countries had stock markets.

DECLARATION

I, Killian Mwiinga, declare that this research report is my own unaided work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the University of the Witwatersrand, Johannesburg, South Africa. It has not been submitted before for any degree or examination in this or any other university.

_____

Killian Mwiinga

November 2009

To my son,

Mazuba Mwiinga,

who was born during my MBA studies...

"South Africa is seen by many investors as a 'proxy' for emerging markets in general. We are therefore in a position to send out a powerful message. And we did; namely, that votes settle our political differences, not violence"

Ramaphosa (2009:30)

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ABBREVIATIONS, ACRONYMS AND GLOSSARY

JSE	The JSE Limited (previously the JSE Securities Exchange and the Johannesburg Stock Exchange) is the largest stock exchange in Africa
NCSS	Number Cruncher Statistical System
NFPEs	Non-Financial Public sector Enterprises
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organisation

CHAPTER 1:

INTRODUCTION

1.1 Purpose of the Research

The purpose of the research is to investigate the relationship between changes in sovereign credit ratings and stock market performance on the African continent. Due to the increased reliance by investors worldwide on the credit ratings of the countries in whose securities they wish to invest, it is the aim of this research to identify the relationship between changes in these ratings and the influence they have in shaping investor opinions on the African continent. Knowing the relationship that changes in ratings have on the performance of stock markets can assist countries in Africa to develop policies that are investor friendly.

1.2 Context of the Research

Stock markets on the African continent present an exciting opportunity and challenge for international finance and foreign investment. The development of stock markets on the African continent is one of the most important aspects of foreign investment, finance, and economic progress. African stock markets generally have weak regulatory institutions, and macro-economic volatility, posing serious limitations on stock-market performances which have made many analysts doubt the importance of the system in promoting economic growth (Yartey and Adjasi 2007). Because of the risk to investment, countries the world over are encouraged to have their economies credit rated to present a positive outlook to investors.

Kräussl (2000,2005) asserts that a government's ability to pay its obligations within a specified period constitutes an economic risk which could be qualitative or quantitative.

Sovereign credit ratings draw remarkable attention from governments not only because some of the largest issuers on the international capital markets are national governments, but also because these assessments affect the ratings of a large number of other borrowers of the same nationality (Cantor and Packer 1995). The influence of the ratings extends to local municipalities, provincial governments, and private companies headquartered within the same country (Cantor and Packer 1995). In poorly regulated markets, there is limited ability to enforce contracts on a foreign government regulatory authority due to governments being sovereign in their territories and having few assets beyond their borders that can be seized by foreign court order and, therefore, regulation plays an important role in sovereign risk, as it contains critical information for investors (Cruces 2001,2006).

According to the United Nations Development Programme (UNDP) (UNDP 2007) report, the UNDP and Standard & Poor's have participated in the African Sovereign Credit Rating Initiative since 2002. This initiative is seen as a comprehensive strategy designed to assist Africa's drive toward poverty reduction; human, social, and economic development; and productive integration into the global economy. From the time this initiative was launched, seven sub-Saharan African countries have had sovereign credit ratings assigned to them (Benin, Burkina Faso, Cameroon, Ghana, Madagascar, Mali and Mozambique) and it is believed more are expected to follow suit. For the first few months of 2007, the trend in credit ratings among African sovereigns continued to be positive (UNDP 2007).

Macro-economic variables such as the size of the local market; the cost and skill of the labour market, and the quality of infrastructure are important (Kehl 2007). Kehl (2007), supporting research by the United Nations Industrial Development Organisation (UNIDO) (UNIDO 2003), also stresses that, among other things, governments that improve the political, economic and legal aspects of the investment climate are most likely to attract foreign investors.

In light of what has been said above, research in this topic will increase understanding of the relationship between changes in sovereign credit ratings and the behaviour of stock markets.

1.3 Problem Statement

1.3.1 Main problem

The main purpose of this research is to investigate the relationship between changes in sovereign credit ratings and the performance of stock markets in Africa.

1.3.2 Sub-problems

The three sub-problems probed in this research are to identify the relationship between:

- Changes in sovereign credit ratings and changes in market capitalisation.
- Changes in sovereign credit ratings and changes in market liquidity.
- Changes in sovereign credit ratings and changes in the number of domestic listed companies.

1.4 Significance of the Research

The research fills a gap in that understanding the relationship between changes in sovereign credit ratings and the performance of the stock markets on the African continent helps countries to develop policies that are investor friendly.

The study will provide guidance to governments of African states since the perceptions of investors and other market participants, and the influence of these opinions on the securities markets, are important if countries want to improve their business environment. Countries on the African continent will be able to develop investor-friendly policies that will reduce the cost of capital, increase issuers' access to capital and improve the structure of financial transactions (Gan 2004).

Governments seek credit ratings to ease their own access, and the access of other issuers domiciled within their borders, to international capital markets where many investors – particularly investors from the United States of America – prefer rated securities to unrated securities of apparently similar credit risk (Cantor and Packer 1996).

Economies in African countries holding sovereign credit ratings should benefit due to improved investor perceptions of their respective economies and subsequent investor willingness to invest there. This helps manage the perceived country risk on investment by various investors.

To the best of the researcher's knowledge, the information in this study has not been documented previously for the African continent and may be regarded as a formative evaluation of the relationship between sovereign credit ratings and stock market performance in Africa with respect to market capitalisation, market liquidity and number of domestic listed companies.

1.5 Delimitations

The study focuses on countries in Africa that have readily available information on their stock markets. Specific information, such as "market capitalisation", "market liquidity", and "number of domestic listed companies", is used to analyse the corresponding relationships to upgrades or downgrades of sovereign credit ratings.

There are stock markets in Botswana, Côte d'Ivoire, Egypt, Ghana, Kenya, Malawi, Mauritius, Morocco, Mozambique, Namibia, Nigeria, South Africa, Swaziland, Tanzania, Tunisia, Uganda, Zambia and Zimbabwe (UNDP 2003).

1.6 Definition of Terms

According to Cantor and Packer (1996), "sovereign credit ratings" are assessments of the relative likelihood that a borrower country will default on its obligations. They also state that "government default" as defined by the credit rating agencies is either (i) a missed payment or (ii) a distressed debt exchange implying a diminished financial obligation by a government. Kräussl (2000,2005)

and Vilas (2007) opine agencies regard "sovereign credit ratings" as forward-looking indications of the likelihood that a sovereign debt issuer will have the ability and willingness to make full and timely payments of principal and interest over the life of a particular rated financial instrument.

The meanings of some terms according to World Bank (2004) definitions are:

- *Market capitalisation* – represents the aggregate value of a company or stock.
- *Market liquidity* – an asset's ability to be easily converted through an act of buying or selling without causing a significant movement in the price and with minimum loss of value.
- *Domestic listed companies* – are the domestically incorporated companies listed on a country's stock exchanges at the end of the year.
- *Institutional investors* – entities with large amounts to invest, such as investment companies, mutual funds, brokerages, insurance companies, pension funds, investment banks and endowment funds.
- *Institutional investor credit rating* – ranks, from 0 (highest risk) to 100 (lowest risk), represents the chances of a country's defaulting on a loan repayment and is the "sovereign credit rating".
- *Turnover ratio* – the total value of shares traded during the period divided by the average market capitalisation for the period.

1.7 Assumptions

The following assumptions were made for the research:

- Considering that few countries on the African continent have stock markets, it is assumed that the results of the study would be representative of the African continent.
- There are few or no contagion effects within a region.

1.8 Structure of the Research Report

Chapter 1 presented the background to the research. A literature survey is presented in Chapter 2. Chapter 3 contains a discussion of the research methodology used. The results of the research are presented and interpreted in Chapter 4. Chapter 5 contains the conclusions and recommendations for future research. A comprehensive list of References is provided immediately after Chapter 5, followed by the Appendices.

CHAPTER 2:

LITERATURE REVIEW

2.1 Introduction

Historically, credit rating agencies started in the United States of America as agencies that rated merchants' ability to pay their financial obligations after the financial crisis of 1837 (Cantor and Packer 1994). According to Cantor and Packer (1994), John Moody started rating US railroad bonds in 1909 and this was the beginning of the expansion of the rating business into securities. However, it was after World War I that Moody's started rating sovereigns (Cruces 2000 – citing "personal correspondence" with Christopher Mahoney in 2000, the then Group Managing Director of Moody's Financial Institutions and Sovereign Risk Group).

The influence of credit rating agencies has increased steadily over the years and the demand for "sovereign credit ratings", the credit ratings on the obligations of central governments, has increased dramatically (Gan 2004). This is due to a generally increased perception that sovereign credit ratings are shaping investor opinions on the creditworthiness of issuers of securities and their financial obligations in the markets of particular countries.

Africa has now caught the eye of global portfolio investors following record real returns on African securities since 2002. The diversification benefits the continent offers owing to the low contagion risk in African markets is another attraction (Databank 2008). There is a growing realisation by global portfolio investors that Africa is not *"one country*" and that there are numerous individual success stories from the continent (Databank 2008). In addition, gone are the days when an item of negative news from one country in Africa is used to taint the entire continent in an exaggerated way as a risky place for investors (Databank 2008). The growing use of credit ratings in Africa is part of the momentum of good policy implementation needs for long-term sustainability, as

demand increases for more transparency in emerging markets and as African governments seek to improve their governance practices and visibility (UNDP 2007).

Vilas (2007) notes that sovereign credit ratings are relied on by investors and have a substantial effect on the cost of borrowing by developing countries and this hinders their access to international capital markets.

The sub-problems consist of the stock market parameters whose relationships with the sovereign credit ratings the research wishes to test.

The research explores three sub-problems; namely, the relationship between sovereign credit ratings and market capitalisation, market liquidity and number of domestic listed companies on the African continent.

The definitions in Section 1.6 (World Bank 2004) form an important part of the study, as the first three definitions (on market capitalisation, market liquidity and domestic listed companies) form the sub-problems probed in this research. The "institutional investor credit ratings" are representative of the "sovereign credit ratings" of their respective countries.

2.1.1 Rating agencies

According to Fight (2001:29)

> "Moody's and Standard & Poor's are the dominant agents in the credit-rating industry. They both received the Nationally Recognised Statistical Rating Organisation designation in 1975. Both companies publish credit opinions, research and ratings on fixed income securities, issuers of securities and other credit obligations. In addition they provide a wide range of business and financial information."

2.1.1.1 Moody's ratings

Moody's sovereign long-term debt ratings (Moody's 2008) are opinions of the ability of entities to honour senior unsecured financial obligations and contracts denominated in foreign currency (foreign currency issuer ratings) or in their domestic currency (domestic currency issuer ratings) (World Bank 2004).

2.1.1.2 Standard & Poor's ratings

Standard & Poor's appraisal of each sovereign's overall creditworthiness is both quantitative and qualitative, with the quantitative analysis incorporating a number of measures of economic performance, while judging the integrity of the economic data is a qualitative matter. The analysis is also qualitative due to the importance of political and policy developments and because Standard & Poor's ratings indicate future debt-service capacity (Standard and Poor's 2006). A government can (and sometimes does) default selectively on its obligations, even when it possesses the financial capacity for timely debt service (Standard and Poor's 2006). A government that is unwilling to repay debt is usually pursuing economic policies that weaken its ability to attract foreign capital investment and because an investor may have limited legal redress. Willingness to pay, therefore, encompasses the range of economic and political factors influencing government policy, as shown in Table 2.1 (Standard and Poor's 2006).

Table 2.1 shows that the rating agencies rate the "riskiness" of a country through its macro-economic fundamentals under consideration. Therefore, ratings help shape the investment outlook with respect to external investors.

2.2 Definition of Topic and Background Discussion

The research intends to probe whether there is a relationship between changes in sovereign credit ratings and changes in stock market parameters, namely, market capitalisation, market liquidity and the number of domestic listed companies. The intention is to investigate whether changes in the credit ratings of sovereigns have an effect on the performance of the markets for the African continent.

Stock market indicators include measures of size (market capitalisation, number of domestic listed companies) and liquidity (value traded as a percentage of gross domestic product, value of shares traded as a percentage of market capitalisation) (World Bank 2004).

Table 2.1: Sovereign credit-rating methodology profile considerations

Sovereign credit-rating methodology profile
Political risk • Stability and legitimacy of political institutions • Popular participation in political processes • Orderliness of leadership succession • Transparency in economic policy decisions and objectives • Public security • Geopolitical risk
Income and economic structure • Prosperity, diversity, and degree to which economy is market oriented • Income disparities • Effectiveness of financial sector in intermediating funds; availability of credit • Competitiveness and profitability of non-financial private sector • Efficiency of public sector • Protectionism and other non-market influences • Labour flexibility
Economic growth prospects • Size and composition of savings and investments • Rate and pattern of economic growth
Fiscal flexibility • General government revenue, expenditure, and surplus/deficit trends • Revenue-raising flexibility and efficiency • Expenditure effectiveness and pressures • Timeliness, coverage, and transparency in reporting • Pension obligations
General government debt burden • General government gross and net (of assets) debt as a percentage of GDP • Share of revenue devoted to interest • Currency composition and maturity profile • Depth and breadth of local capital markets
Offshore and contingent liabilities • Size and health of NFPEs • Robustness of the financial sector
Monetary flexibility • Price behaviour in economic cycles • Money and credit expansion • Compatibility of exchange rate regime and monetary goals • Institutional factors, such as central bank independence • Range and efficiency of monetary policy tools
External liquidity • Impact of fiscal and monetary policies on external accounts • Structure of the current account • Composition of the capital flows • Reserve adequacy
External debt burden • Gross and net external debt, including deposits and structured debt • Maturity profile, currency composition, and sensitivity to interest rate changes • Access to concessional funding • Debt service burden
GDP = Gross Domestic Product **NFPEs** = Non Financial Public sector Enterprises
Source: Standard & Poors (2006:4)

2.3 Market Capitalisation

The purpose of this aspect of the research is to investigate the relationship between changes in sovereign credit ratings and changes in market capitalisation. “Market capitalisation” (also known as “market value”) is the share price multiplied by the number of shares in issue. Market capitalisation represents the size and “financial strength” of a company (World Bank 2004).

2.3.1 Market capitalisation

Most stock markets in Africa, with the exception of South Africa, more than doubled their market capitalisation between 1992 and 2002 (Appendix B), and the total market capitalisation for African markets increased from US$113,423 million to US$244,672 million in this period (Yartey and Adjasi 2007). However, African stock markets by world standards remain small with low market capitalisation and few domestic listed companies (Yartey and Adjasi 2007).

By the end of 2005, with a market capitalisation of $566,000 million, the JSE accounted for 94% of sub-Saharan Africa’s total market capitalisation and was more than 14 times larger than all the other markets combined (Moss, Ramachandran and Standley 2007). Nevertheless, stock markets in Africa have grown rapidly in recent years, and there have been large increases in capitalisation and turnover since 1999 (Jefferis and Smith 2005).

According to the Liquid Africa (2008) research report, as at the end of 2007 a total of 1,600 stocks – with a combined market capitalisation of US$1.2 trillion (excluding cross-listings) – was listed on the 20 stock exchanges on the African continent, representing an increase of US$250,000 million from the previous year. (During the window periods of this research – 1999 to 2003 for the sovereign credit ratings and 2000 to 2003 for the stock market indicators – there were only 18 stock exchanges.)

The JSE accounted for 76.6 % of the total continent’s market capitalisation in 2006, though this has declined quite significantly to 69.4 % in 2007 which, according to the Liquid Africa (2008) research, could be a “yellow flag” for SA-

orientated funds. The weighted average performance of all markets was about 32 % (Liquid Africa 2008).

However, in countries like Ghana, Mauritius, South Africa and Zimbabwe, domestic listed companies are relying less on external financing for asset growth than companies in other sub-Saharan markets (Yartey and Adjasi 2007). In these four countries, companies have been largely financed by the stock markets for long-term external finance. According to (Yartey and Adjasi 2007), about 12 % of total asset growth of the listed companies in Ghana between 1995 and 2002, was financed by the stock market. In contrast, in Mauritius, about 9 % of total asset growth was financed by the stock market, with retained earnings and external debt contributing 30 % and 61 %, respectively, between 1992 and 1999 (Yartey and Adjasi 2007).

2.3.2 Conclusion

In summary, the literature suggests that African markets are characterised by low market capitalisation by world standards. However, economic liberalisation and privatisation in some countries has led many companies to list on their local stock markets. In addition, stock markets on the African continent are considered to have high volatility, and are generally perceived to be too risky to investors and, consequently, continue to be underfinanced.

The literature review relating to this section has given rise to the following test hypothesis:

Hypothesis 1

H_O: There is no correlation between changes in sovereign credit ratings and changes in market capitalisation in Africa.

H_A: There is a correlation between changes in sovereign credit ratings and changes in market capitalisation in Africa.

2.4 Market Liquidity

The purpose is to investigate the relationship between changes in sovereign credit ratings and changes in market liquidity. “Market liquidity” is the total value traded. “Value traded” is the total value of shares traded during the period (World Bank 2004).

2.4.1 Market liquidity

A market is said to be “liquid” if the cost of buying or selling a large number of shares on demand is low, which implies that the cost of acquiring capital is lower for firms with more liquid securities (Sarin, Shastri and Shastri 2000).

Stock markets on the African continent suffer from the problem of low liquidity. Swaziland experienced the lowest liquidity ratio (as low as 0.02 % in 2004). This low level of liquidity means that it would be hard to support a local market with its own trading system as the business volume would simply be too low (Yartey and Adjasi 2007*).*

Mohanty (2002:49) states:

> “A market can be considered “liquid” if the following important characteristics are present: relative tightness, depth and resilience. “Tightness”, measured by the “bid-ask” spread, provides an idea about the costs incurred by market participants in executing transactions; the lower the spread, the higher the market liquidity. The “depth” of the market is the extent to which the market can handle large transactions without causing sharp changes in prices, while “resilience” determines the speed with which price fluctuations finally dissipate.”

In order to provide liquidity and vibrancy to the capital markets, investors and market makers rely heavily on the trustworthiness and accuracy of corporate information (Jain, Kim and Rezaee 2003). Therefore, financial exchange markets should be structured to maximise the satisfaction of participants and potential participants. To realise this level of satisfaction among participants, minimising transaction costs, establishing market prices that accurately reflect the underlying equilibrium prices, and reducing the uncertainty faced by traders in market interactions is important (Economides, Technological and Challenges 1993:1). For equity markets to function properly there is a need for quality, reliability, and transparent financial information to be disseminated to investors (Jain *et al* 2003).

According to Jain *et al* (2003) government regulations aimed at restoring investor confidence do improve market liquidity both in the short-term and long-term by reducing information asymmetry and improving the disclosure and transparency of corporate information.

Institutional investors play an important monitoring role and there may exist a relationship between the institutional ownership in a firm and the liquidity of the firm's stock (Sarin *et al* 2000). However, Mohanty (2002:57) goes on to state that institutional investors, such as pension and insurance funds, play a critical role in boosting liquidity in government bond markets by promoting a wholesale market for government bonds, increasing arbitrage activities through their diversified portfolio and boosting liquidity particularly in long-term securities.

In addition,

> "efficient stock market trading systems are characterised by low transaction costs, high transparency, high liquidity, and low volatility. There is often a trade-off between these characteristics and especially between high liquidity and low volatility on the one hand, and low transaction costs and high transparency on the other. .... The impact of institutional investors on trading and market liquidity depends on their investment policies and the extent to which they trade actively their portfolios. Newly established private pension funds tend to adopt a policy of 'buy and hold'" (Vittas 1998:12).

For effective and efficient securities' markets and the growth of institutional investors, countries require robust and effective regulation, and this robust regulatory framework is lacking in many developing countries (Vittas 1998:15).

Table 2.2 shows the historical annual average returns for stock markets in Africa across a 10-year period, from 1997 to 2007. The stock market returns for 2007 reflected an improvement over the previous year.

As can be observed from Table 2.2, the Lusaka Stock Exchange in Zambia was the top-performing market on the continent at the end of 2007, with a commendable 128% gain in US Dollar value mainly due to the firm copper price. This led to a rise in investment to resuscitate and also to open new copper mines (Liquid Africa 2008).

Table 2.2: Historical returns on African stock markets in USD as a percentage of the country's gross domestic product

Country	Year										
	1997 %	1998 %	1999 %	2000 %	2001 %	2002 %	2003 %	2004 %	2005 %	2006 %	2007 %
Botswana	93	14	42	-10	44	19	22	20	-5	51	41
Côte d'Ivoire	na*	na	na	na	na	-16	28	16	26	11	96
Egypt	25	-32	81	-46	-44	-5	81	117	155	3	66
Ghana	9	63	-43	-41	6	27	143	87	-26	3	27
Kenya	-13	-3	-34	-22	-30	-7	122	8	43	41	8
Malawi	-29	-23	9	-38	25	-17	-18	83	29	140	121
Mauritius	-1	7	-9	-19	-20	22	54	20	4	34	81
Morocco	35	24	-13	-21	-19	-7	52	25	8	79	53
Mozambique	na	na	na	na	na	na	na	na	na	na	na
Namibia	0	-36	59	-32	2	7	48	42	25	21	22
Nigeria	-6	-25	-16	37	22	5	51	31	0	36	102
South Africa	-10	-28	50	-21	-22	25	46	43	30	25	20
Swaziland	-49	-43	4	47	-6	-19	21	19	-11	-1	na
Tanzania	na	na	na	na	na	na	na	na	na	na	na
Tunisia	-29	5	53	59	-34	-12	12	20	8	47	17
Uganda	na	na	na	na	na	3	140	60	81	16	30
Zambia	95	-52	-8	1	13	24	38	77	116	26	125
Zimbabwe	na	na	na	na	na	na	na	na	na	na	na

na* = data not available

Source: Liquid Africa 2008

2.4.2 Conclusion

In summary, the literature suggests that for equity markets to function properly, there is a need for quality, reliable, and transparent financial information to be disseminated to the investment markets. This involves putting in place policies and financial market structures that are attractive to investors.

The literature review relating to this section has given rise to the following test hypothesis:

Hypothesis 2

H_O: There is no correlation between changes in sovereign credit ratings and changes in market liquidity in Africa.

H_A: There is a correlation between changes in sovereign credit ratings and changes in market liquidity in Africa.

2.5 Number of Domestic Listed Companies

The purpose is to investigate the relationship between changes in sovereign credit ratings and changes in the number of domestic listed companies in African countries. The number of domestic listed companies is the domestically incorporated companies listed on a country's stock exchange at the end of the year (World Bank 2004).

2.5.1 Number of domestic listed companies

The privatisation programmes in several African countries have involved the listing of shares in formerly nationalised firms, which are often large in relation to the size of national economies, thus providing a supply of new shares and a further boost to stock market development (Jefferis and Smith 2005).

Databank (2008) reported that in 2007 Egypt, Nigeria, South Africa and Zimbabwe were the exceptions with 435, 211, 346 and 79 domestic listed companies, respectively. The total number of domestic listed companies on

sub-Saharan African markets was 1,424 as at the end of 2007 with a market capitalisation of US$1.2 trillion. This number is expected to grow as countries carry out economic reforms towards easy financial transactions and transparency in the stock markets. (Interestingly, the number of domestic listed companies (1,424) given by Databank (2008) differs from the number of domestic listed companies (1,600) presented in Section 3.2.1 provided by Liquid Africa (2008). To probe the reason for these differences lies beyond the scope of the present research.)

2.5.2 Conclusion

In summary, the literature suggests that countries in Africa have relatively fewer domestic listed companies on their stock markets by world standards. Most companies do not list because they fail to meet the required standards set by the securities and exchanges, and because most companies in Africa are state-owned, and there are few policies in place to incentivise companies to list on the market.

The literature review relating to this section gives rise to the following test hypothesis:

Hypothesis 3

H_O: There is no correlation between changes in sovereign credit ratings and changes in number of domestic listed companies in Africa.

H_A: There is a relationship between changes in sovereign credit ratings and changes in number of domestic listed companies in Africa.

2.6 Conclusion of Literature Review

The influence of sovereign credit ratings on financial markets has drawn considerable interest in the African continent, considering that institutions like the World Bank (2004) and UNDP (2007) have in the recent past participated in helping African countries undertake sovereign credit ratings.

The market capitalisation and market liquidity of countries in Africa have been remarkably low by world standards.

The number of domestic listed companies – with the exception of Egypt and South Africa – has been very small. This has been due in part to unfriendly investor policies in most African countries.

However, to test if there is a relationship between changes in credit ratings and the stock markets, the following hypotheses are put forward:

2.6.1 Hypothesis 1

H_O: There is no correlation between changes in sovereign credit ratings and changes in market capitalisation in Africa.

H_A: There is a correlation between changes in sovereign credit ratings and changes in market capitalisation in Africa.

2.6.2 Hypothesis 2

H_O: There is no correlation between changes in sovereign credit ratings and changes in market liquidity in Africa.

H_A: There is a correlation between changes in sovereign credit ratings and changes in market liquidity in Africa.

2.6.3 Hypothesis 3

H_O: There is no correlation between changes in sovereign credit ratings and changes in number of domestic listed companies in Africa.

H_A: There is a correlation between changes in sovereign credit ratings and changes in number of domestic listed companies in Africa.

CHAPTER 3:

RESEARCH METHODOLOGY

3.1 Introduction

The methodology used covers the paradigm, research design, the population and sample, the procedure for data collection, data analysis and interpretation, validity and reliability, and limitations of the research.

3.2 Research Methodology/Paradigm

Quantitative methodology was selected as being the most suitable for this research since all data regarding stock market indicators (market capitalisation, market liquidity and number of domestic listed companies) and sovereign credit rating data for the sample countries is ordinal (Leedy and Ormrod 2004). These data were analysed statistically to undertake the correlation analysis.

In the context of this research, Spearman's rank correlation method (Borghers and Wessa n.d) was deemed appropriate to test whether there is a relationship between the two data sets, namely, changes in sovereign credit ratings and changes in stock market indicators. To test the strength of the relationship between changes in these two data sets, a correlation analysis of the changes in the data sets addressed the problem that this research embarked on (Appendix E): namely, whether there is a relationship between changes in credit ratings and the performance of stock markets in Africa.

Two assumptions were made prior to conducting the research. The first assumption was that there would be no contagion effects, and the second assumption was that the results would be representative of the continent of Africa.

3.3 Research Design and Time Frame

The research commenced with the collection of data from literature (Chapter 2). The data were then used to analyse whether there was a correlation between changes in sovereign credit ratings of the 18 selected African countries and the performance of their stock markets by looking at three selected stock market indicators: namely, how changes in sovereign credit ratings affect changes in market capitalisation, market liquidity and the number of domestic listed companies (Section 1.3.2) (Appendices B, C and D). A window period of five (5) years, (1999 to 2003), was used to analyse the data set for sovereign credit ratings. A similar, four (4)-year window period (2000 to 2003) was used for the comparison of the stock market indicators (market capitalisation, market liquidity and number of domestic listed companies). It was not possible to align the two window periods selected for the research as all the data sets published lack information for certain years. However, it was felt that as a trend – rather than an absolute correlation – was being sought, the validity of the research would not be unduly jeopardised. The interpretation of the correlation analysis data (Appendix E) was to prove whether a relationship exists if the correlation exists and whether the relationship does not exist if the correlation does not exist.

The advantage of this method is that the relationship is best analysed using the Spearman's rank correlation method (Appendix E) to see whether there is a relationship between the two data sets. Hence, this method is the most appropriate to resolve the problem statement for the research as it provides an understanding about the strength of the relationship between changes in ratings and changes in stock markets through the correlation coefficient and the t-test results.

3.4 Population and Sample

The population, sample and sampling method are described below.

3.4.1 Population

The population for the research was the 18 countries in Africa that had stock markets at the time the research was undertaken.

3.4.2 Sample and sampling method

Of the 18 African countries in the population (Botswana, Côte d'Ivoire, Egypt, Ghana, Kenya, Malawi, Mauritius, Morocco, Mozambique, Namibia, Nigeria, South Africa, Swaziland, Tanzania, Tunisia, Uganda, Zambia and Zimbabwe), 15 countries were selected for the sample. Malawi, Mozambique and Swaziland were omitted from the sample because there were no data for these countries for the selected window period (UNDP 2003).

South Africa was not included in the Spearman's rank correlation analysis (Appendix E) because of its huge market capitalisation and market liquidity relative to the rest of the African countries, but, rather, a plot of its stock market time series (Figure 4.1) was used to observe the trend. However, South Africa was included in the analysis of the number of domestic listed companies (Figure 4.2 and Appendix D).

3.5 Procedure for Data Collection

The data were collected from various literature (Appendix A – Consistency Matrix), namely: World Bank (2004) [*World Development Indicators 2004 Report*], UNDP (2003,2007), Databank (2008), Liquid Africa (2008), I-Net Bridge (through the JSE (n.d.)) and other rating agencies (for example, Standard & Poor's (2006) and Moody's (2008)). The data collected were institutional investors' ratings (measure of sovereign credit ratings), market capitalisation, market liquidity and number of domestic listed companies for the selected window periods (Section 3.3).

Sources of data were:

- Sovereign credit ratings variables for 1999 to 2003 which were obtained from World Bank (2004) [*World Development Indicators 2004 Report*] and Senbet and Otchere (2008).

- Market capitalisation variables (Appendix B) for 2000 to 2003 which were obtained from the investment climate of the World Bank (2004) [*World Development Indicators 2004 Report*], UNDP (2003,2007) and Senbet and Otchere (2008).

- Market liquidity variables (Appendic C) for 2000 to 2003 which were obtained from the investment climate of World Bank (2004) [*World Development Indicators 2004 Report*], UNDP (2003,2007) and Senbet and Otchere (2008).

- The number of domestic listed companies' variables (Appendix D) for 2000 to 2003 which were obtained from the investment climate of World Bank (2004) [*World Development Indicators 2004 Report*], Databank 2008, Liquid Africa 2008, UNDP (2003,2007) and Senbet and Otchere (2008).

- South African time-series stock market data variables which were obtained from I-Net Bridge (through the JSE (n.d.)) and JSE Limited (www.sharenet.co.za; www.jse.co.za).

Table 3.1 shows the data used in the analysis for the research.

3.6 Data Analysis and Interpretation

Spearman's rank correlation method, using Number Cruncher Statistical Systems (NCSS) 2004 software (Hintze 2007a,b) was used to analyse and establish whether there is a correlation. If the results showed a correlation, then the deduction would be that there exists a relationship between changes in sovereign credit ratings and the stock market performance indicators, and vice versa. The correlation analysis was applied across the 15 selected African countries to test whether there is a relationship between changes in sovereign credit rating data and changes in their corresponding country stock market indicators as shown in Table 3.1.

Table 3.1: Sovereign credit rating, market capitalisation, market liquidity and number of domestic listed companies of stock markets in Africa for the selected window periods

Country	Sovereign Credit Rating		Market Capitalisation as % of GDP		Market Liquidity as % of GDP		Number of Domestic Listed Companies	
	Year		Year		Year		Year	
	1999	2003	2000	2003	2000	2003	2000	2003
Botswana	36.5	62.2	15.83	25.73	0.77	1.05	16	19
Côte d'Ivoire	25.5	15.7	11.37	12.01	0.32	0.18	41	38
Egypt	45.4	41.1	28.79	32.65	11.14	3.95	1076	967
Ghana	30.7	25.8	10.10	18.70	0.20	0.60	22	25
Kenya	24.8	24.6	10.10	28.54	0.37	1.43	57	51
Malawi	–	–	–	–	–	–	–	–
Mauritius	53.9	53.9	29.79	37.26	1.69	1.89	40	40
Morocco	44.3	49.4	32.70	30.02	3.28	1.58	53	53
Mozambique	–	–	–	–	–	–	–	–
Namibia	38	39.8	9.12	6.88	0.65	0.04	13	13
Nigeria	17.9	20.2	9.21	16.29	0.57	1.47	195	200
South Africa	45.6	54.6	154.24	160.66	58.32	61.69	616	426
Swaziland	–	30.7	5.26	9.02	0.02	0	6	5
Tanzania	19.5	21.8	2.57	6.41	0.44	0.19	4	6
Tunisia	50.3	52.6	14.54	9.86	3.22	0.66	44	46
Uganda	21.7	20.1	–	0.76	–	0	–	3
Zambia	14.9	15.3	7.28	6.63	0.25	0.25	9	11
Zimbabwe	25.1	11	32.87	67.26	3.77	18.18	69	81

– = data not available

Source: Senbet and Otchere (2008:2,3,11,20)

South Africa was not included in the correlation analysis, however, a time-series analysis for South African stock market data and ratings (Figures 4.1 and 4.2) is shown since there is a long history of data available on the JSE stock market to observe trends in sovereign credit rating changes and changes in market performance indicators.

The format for the data layout which was analysed is given in Table 3.2.

Table 3.2: Format for the data layout which was analysed

Country	Sovereign Credit Rating 1999 to 2003	Stock Market Indicators 2000 to 2003		
	Δ Rating	Δ Market Capitalisation	Δ Market Liquidity	Δ Domestic Listed Companies
Botswana	x	y	v	w
Côte d'Ivoire	x	y	v	w
Egypt	x	y	v	w
Ghana	x	y	v	w
Kenya	x	y	v	w
Malawi	X	Y	V	w
Mauritius	x	y	v	w
Morocco	x	y	v	w
Mozambique	x	y	v	w
Namibia	x	y	v	w
Nigeria	x	y	v	w
South Africa	x	y	v	w
Swaziland	x	y	v	w
Tanzania	x	y	v	w
Tunisia	x	y	v	w
Uganda	x	y	v	w
Zambia	x	y	v	w
Zimbabwe	x	y	v	w

3.6.1 Spearman's rank correlation coefficient

Spearman's rank correlation coefficient measures the extent of the association between two sets of variables measured on an ordinal scale. In the present research, the data consists of two sets of rankings on the same subject. The statistic ranges from –1 (a perfect negative correlation) to +1 (a perfect positive correlation). The importance of this method is that it uses a t-test of significance which is used to test a hypothesis.

The procedure for calculating the Spearman's rank correlation coefficient was to compare the rankings for the objects under study. The difference between each pair of ranks is denoted d. These differences were squared and added and then used to calculate the correlation coefficient as follows:

$$r_s = 1 - 6\Sigma d^2 / (n^3 - n)$$

Where,

r_s = Spearman's rank correlation coefficient (theoretical)
d^2 = Squared differences between the two ranks
n = Number of objects being compared
ρ = Spearman's rank correlation coefficient (Observed)

The significance of the Spearman's rank correlation coefficient is tested through the t-test statistic, which has a t-test distribution based on (n – 2) degrees of freedom.

For the test of significance, the null and alternative hypotheses are:

H_O: $\rho_y \leq 0$

H_A: $\rho_s > 0$

If the t-statistic is greater than the critical t-value, the null hypothesis is rejected.

The standard error, s_r, of r is computed using the equation:

$$s_r = \sqrt{((1 - r^2) / (n - 2))}$$

The t-statistic, t, is computed using the equation:

$$t = (r_s - \rho_s) / s_r$$

3.7 Validity and Reliability

"Validity" refers to the degree in which a test or other measuring device is truly measuring what it is intended to measure. "Reliability" is synonymous with the consistency of a test, survey, observation, or other measuring device (Golafshani 2003). Both validity and reliability have been adhered to in the research in the ways described in the sections below.

3.7.1 External validity

"External validity" is the ability of the research to be generalised across persons, settings and times (Golafshani 2003). The research focuses on the stock markets of the African continent. African stock markets are perceived negatively by the outside world (Liquid Africa 2008). Few African countries have stock markets and this may affect the external validity of the research. Nevertheless, the analysis on African stock markets is not expected to affect the external validity of the research as it may be generalised to other regions that have similar economies, such as Malaysia and Mexico (Senbet and Otchere 2008). The assumption that there is no contagion effect within a region may also affect the validity of the research. However, a correlation analysis with a t-test statistic across all sample data may improve the validity.

3.7.2 Internal validity

"Internal validity" shows the extent to which the measuring instrument provides adequate coverage of the topic under study (Golafshani 2003). The use of data such as market capitalisation, market liquidity and the number of domestic listed companies renders the data internally valid as these data are generally good indicators of potential stock market performance.

The measure of the relationship between changes in sovereign credit ratings and changes in stock market data within a similar window period, through the method of Spearman's rank correlation analysis (Borghers and Wessa n.d.) for all the African countries in the sample is consistent with what the research sought to measure.

The use of the data from the literature of World Bank development indicators (World Bank 2004) and African stock markets (Senbet and Otchere 2008; Liquid Africa 2008; UNDP 2003 and 2007; World Bank 2004) renders validity of the information/ data used for the research.

However, the limited sample of 15 African countries may affect the validity of the research. The small number of countries used in the research is considered a limitation of the research due to the constraints of the lack of data and little can be done to overcome this problem since few African countries have stock markets and sovereign credit ratings.

3.7.3 Reliability

"Reliability", as stated earlier, means consistency of a test, survey, observation, or other measuring device (Golafshani 2003). The literature from which the data were obtained provides reliable stock market information for analysis of the performance of the securities variables. Spearman's rank correlation method described earlier is consistent with the desired measurement of correlation and will render the analysis of the research reliable. A Spearman's rank correlation analysis will help meet the reliability criteria of measuring the strength of the relationship.

3.8 Limitations of the Research

The first limitation of the research was the small number of African countries with stock markets and sovereign credit ratings, reducing the sample available for statistical analysis and the generalisability of the research to all countries on the African continent.

A second limitation was the limited period of stock market data available as most African countries developed their stock markets relatively recently, which limits the window period of published data available for analysis.

The third limitation encountered was not being able to align the window periods of the sovereign credit ratings and the stock market indicators perfectly. However, as the research was looking for trends, rather than an absolute correlation, it was felt that the validity of the research would not be unduly jeopardised.

CHAPTER 4:

PRESENTATION AND INTERPRETATION

OF RESULTS

4.1 Test Undertaken

The Spearman's rank correlation test (Borghers and Wessa n.d.), using the NCSS Software (Hintze 2007a,b), was used to establish whether there is a relationship between the sovereign credit ratings and the stock market variables, namely, the market capitalisation, market liquidity and the number of domestic listed companies. The strength of the results was shown using the t-test results (Appendix E).

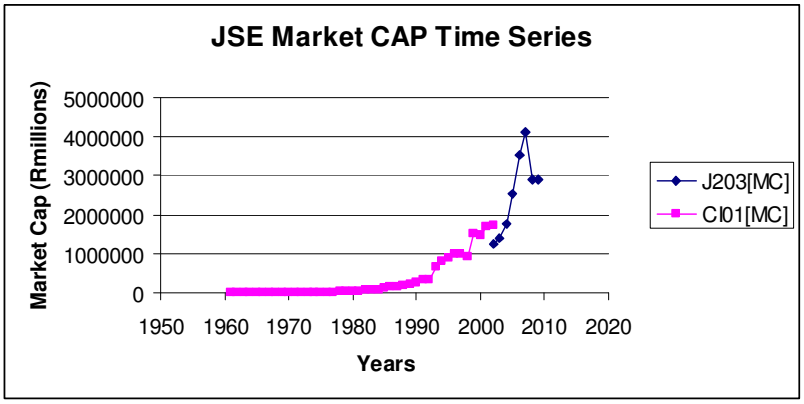
The correlation between the results of sovereign credit rating and stock market variables is presented in Table 4.1.

Table 4.1: Correlation results between sovereign credit rating and stock market variables

	Market Capitalisation	**Market Liquidity**	**Domestic Listed Companies**
Sovereign credit rating	-0.40	-0.31	0.17
t-test			
Null hypothesis (H_O)	Accept	Accept	Accept
Alternative hypothesis(H_A)	–	–	–
Decision	No relationship	No relationship	No relationship

The results of the analysis in Table 4.1 show that there exists no conclusive evidence that there is a relationship between sovereign credit ratings and stock market performance indicators in Africa. This means that the macro-economic policy of a given country has no direct effect on the stock market performance on the African continent. However, this is contrary to the findings in other regions or developed countries (Vilas 2007; Senbet and Otchere 2008).

Figure 4.1 shows the historical time-series data of the market capitalisation of the South African JSE. It is evident that there has been a general increase in the market capitalisation over 48 years, showing a general confidence in the economy of the country and the JSE. From 1961 to 2002, it was trading as code C101 (MC) (the "old" All Share Index) and, from 2002, it has been trading as J203 (MC) (the "new" All Share Index).

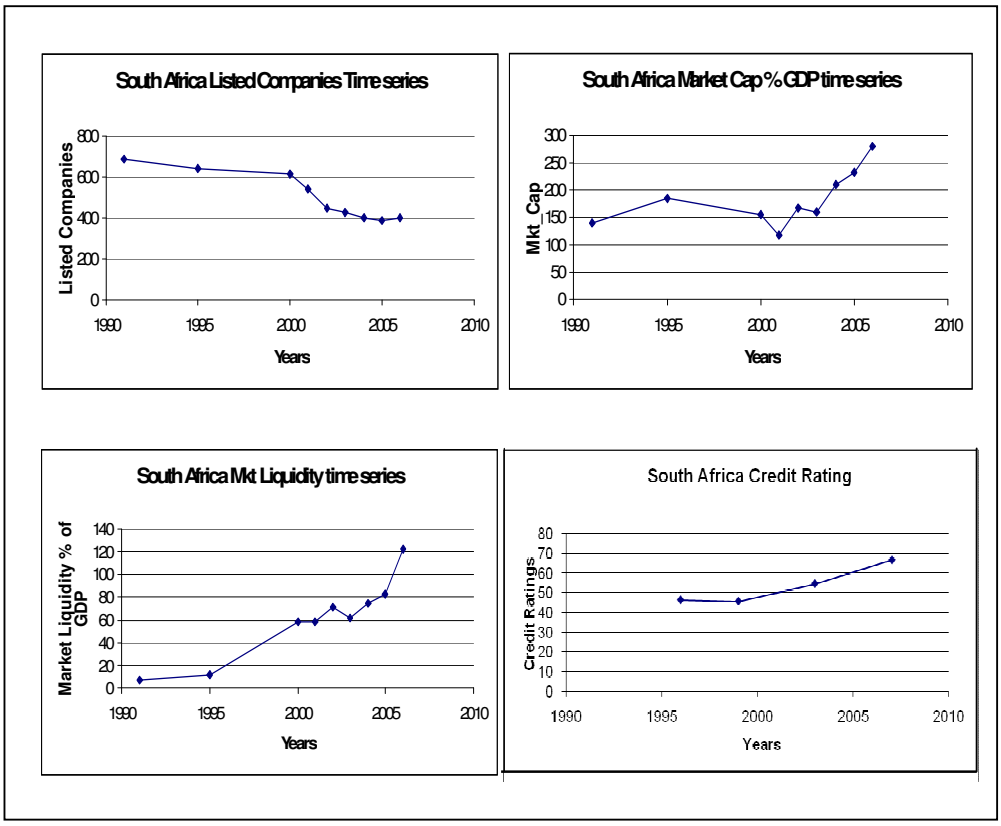


Source: JSE (n.d.)

Figure 4.1: Historical time-series data of JSE market capitalisation for the South African stock market

The sovereign credit rating for South Africa has shown an improvement since 1999 (Figure 4.2). Interestingly, although the market capitalisation and market liquidity have risen between 1991 and 2007, the number of South African domestic listed companies has decreased by 300 during the same period (Figure 4.2). The most marked changes in market capitalisation, market liquidity and number of South African domestic listed companies have taken place since 2000. The reasons for the delistings lie beyond the scope of this research.

In addition, South Africa's sovereign credit rating has shown a consistent and gradual improvement since 1999 (Figure 4.2).



Source: Senbet and Otchere (2008:3,4,11,17)

Figure 4.2: A comparison of credit ratings and stock market data for South Africa for the period 1991 to 2007

4.2 Interpretation and Analysis of Results

This chapter presents an interpretation and analysis of the correlation results for the various hypotheses in determining whether there exists a relationship between sovereign credit ratings and performance of stock market indicators on the African continent. The Number Cruncher Statistical System (NCSS) 2004 software (Hintze 2007a,b) was used to undertake the correlation analysis of whether a relationship exists between the considered variables.

4.2.1 Hypothesis 1

Hypothesis 1: *Addresses the question of whether there is a relationship between changes in sovereign credit ratings and changes in market capitalisation in Africa.*

The results of the Spearman's rank correlation have a correlation value of -0.40, implying that there is a negative relationship between sovereign credit ratings and market capitalisation in African countries. However, tested against the t-test statistic, a measure of the strength of the relationship, it is revealed that this relationship is weak and is rejected. Hence, the null hypothesis ($\mathbf{H_o}$) is accepted.

4.2.2 Hypothesis 2

Hypothesis 2: *Addresses the question of whether there is a relationship between changes in sovereign credit ratings and changes in market liquidity in Africa.*

The results of the Spearman's rank correlation have a correlation value of -0.31, implying that there is a small but negative relationship between sovereign credit ratings and market liquidity in African countries. However, tested against the t-test statistic, a measure of the strength of the relationship, it is revealed that this relationship is weak and is rejected. Hence, the null hypothesis ($\mathbf{H_o}$) is accepted.

4.2.3 Hypothesis 3

Hypothesis 3: *Addresses the question of whether there is a relationship between changes in sovereign credit ratings and changes in number of domestic listed companies in Africa.*

The results of the Spearman's rank correlation have a correlation value of 0.17, implying that there is a small but positive relationship between sovereign credit ratings and number of domestic listed companies in African countries. However, tested against the t-test statistic, a measure of the strength of the relationship, it is revealed that this relationship is weak and is rejected. Hence, the null hypothesis ($\mathbf{H_o}$) is accepted.

CHAPTER 5:

CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

From the results of the statistical analysis of the tested hypotheses (Appendix E), there is no conclusive evidence that there is a relationship between sovereign credit ratings and the performance of stock markets on the African continent. That this relationship is not strong in African markets may be due to the poor regulatory systems existing in many African countries. The sizes of the market due to fewer listings suggest that the capital markets do not play a significant role in the respective economies in Africa. Senbet and Otchere (2008) support this assertion.

It is clear from the t-test statistics (Appendix E) that there exists no relationship between sovereign credit ratings and the macro-economic fundamentals of the stock markets of the African countries under consideration. The t-test accepted the null hypothesis of the test statistics, indicating the null hypothesis ($\mathbf{H_O}$) is true.

There is a general conclusion that the there is no relationship between sovereign credit ratings and the macro-economic policies of a given country on the African continent.

The results show that other factors drive the performance of stock markets on the African continent, but these factors need to be established and lie beyond the scope of the present research.

However, as more African countries come forward to have their sovereigns rated voluntarily, many of the negative perceptions and structural problems of individual markets in Africa may be resolved to project an efficient, transparent and well-regulated market.

5.2 Recommendations

The following recommendations are supported by Senbet and Otchere (2008) for an improvement in stock market performance.

- Improved macro- and micro-economic policies in most African countries to attract foreign and local investors.
- It is recommended that African countries should opt for a solicited credit rating so that there is transparency and disclosure available about a country's economic fundamentals, since most sovereign credit ratings are unsolicited and there could be doubt about the actual disclosure or data made public.
- There is a need for stricter regulatory framework governing African stock markets, though this sometimes works against smaller emerging companies in some countries.
- There is a need for increased liberalisation of state-owned companies so that they stop relying on government subsidies and raise their capital from investors on their stock markets.
- There is a need for increased transparency and efficiency on the operations of African stock markets.
- There is a need for sensitising the public on the importance and benefits of investing on the stock markets.
- There is a need for increased promotion and development of capital markets in more African countries.
- There is a need for the removal of credit ceilings.
- There is a need for the development of incentives for listing on stock exchanges (for example, tax incentives for domestic listed companies) as a means to achieve greater market depth and trading activity.

- There is a need to foster public confidence and improve information flow with regard to disclosure rules, accounting standards, and enforceability of contracts.
- There is a need to adopt best global practices for disclosure and accounting standards.
- There is a need to develop a well-functioning stock market regulatory scheme, including a strong securities and exchange commission capable of enforcing securities laws and developing appropriate rules, consistent with best international practices (self-regulatory, oversight, investor protection and rule of law).
- There is a need to strengthen institutions for corporate governance.
- There is a need to adopt best international practices in terms of measures for the effectiveness of the corporate board of directors and increased protection of shareholder rights against controlling shareholders/management.

5.3 Generalisability of the Research

There are few countries on the African continent with stock markets. Those with stock markets have been in existence for relatively few years. Therefore, to carry out an analysis that is representative of the entire continent may pose some challenges.

As it would appear that the information in this study has not been documented previously for the African continent it may be regarded as a formative evaluation of the relationship between sovereign credit ratings and stock market performance in Africa and used as a basis from which to conduct a broader or even a longitudinal study.

5.4 Suggestions for Further Research

The following are some areas that need further research to understand the factors that influence the performance of stock markets in Africa:

- What factors drive the equity market in Africa?
- What is the influence of regulatory policies on stock markets in Africa?
- What influence do shareholders have on stock markets in Africa?
- Are foreign investors still worried about investing in stock markets in Africa?
- What is the quality of entrepreneurship activity in countries on the African continent?

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APPENDIX A:

CONSISTENCY MATRIX

The table on the following page is a consistency matrix to show that the research followed the research design.

TO IDENTIFY THE RELATIONSHIP BETWEEN CHANGES IN SOVEREIGN CREDIT RATINGS AND THE STOCK MARKETS ON THE AFRICAN CONTINENT					
Sub-problem	**Literature Review**	**Hypotheses or Propositions or Research Questions**	**Source of Data**	**Type of Data**	**Analysis**
Identify the relationship between changes in sovereign credit ratings and changes in **market capitalisation**	• World Bank 2004 • Yartey and Adjasi 2007 • Moss *et al* 2007 • Databank 2008 • Jefferis and Smith 2005 • Kräussl 2000 • Cantor and Packer 1995	• **Ho:** There is no correlation between changes in sovereign ratings and changes in market capitalisation in Africa • **H_A:** There is a correlation between changes in sovereign credit ratings and changes in market capitalisation in Africa	• World Bank 2004 • UNDP 2003 and 2007 • Databank 2008 • Liquid Africa 2008 • I-Net Bridge (through JSE n.d.)	Ordinal	Spearman's rank correlation method
Identify the relationship between changes in sovereign credit ratings and changes in **market liquidity**	• Databank 2008 • Sarin *et al* 2000 • Mohanty 2002 • Economides *et al* 1993 • Jain *et al* 2003 • Vittas 1998	• **Ho:** There is no correlation between changes in sovereign ratings and changes in market liquidity in Africa • **H_A:** There is a correlation between changes in sovereign credit ratings and changes in market liquidity in Africa	• World Bank 2004 • UNDP 2003 and 2007 • Databank 2008 • Liquid Africa 2008 • I-Net Bridge (through JSE n.d.)	Ordinal	Spearman's rank correlation method
Identify the relationship between changes in sovereign credit ratings and changes in **number of domestic listed companies**	• Jefferis and Smith 2005 • Yartey and Adjasi 2007 • Databank 2008 • Liquid Africa 2008	• **Ho:** There is no correlation between changes in sovereign ratings and changes in number of domestic listed companies in Africa • **H_A:** There is a correlation between changes in sovereign credit ratings and changes in number of domestic listed companies in Africa	• World Bank 2004 • UNDP 2003 and 2007 • Databank 2008 • Liquid Africa 2008 • I-Net Bridge (through JSE n.d.)	Ordinal	Spearman's rank correlation method

APPENDIX B:

MARKET CAPITALISATION

The market capitalisation in the stock markets in Africa is relatively small compared to other emerging economies in the world. African stock markets are generally undercapitalised (due to various reasons) as can be seen from table on the following page. As can be observed from this table, the total market capitalisation for the whole of Africa as a percentage of gross domestic product has seen an increase since 1991.

Country	Annual market capitalisation as a percentage of gross domestic product								
	1991	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Botswana	6.65	8.34	15.83	21.03	29.04	25.73	25.94	23.33	38.22
Côte d'Ivoire	5.16	7.87	11.37	11.04	11.57	12.01	13.46	14.50	23.70
Egypt	7.17	13.44	28.79	24.93	29.70	32.65	48.85	88.83	86.97
Ghana	1.15	25.54	10.10	9.93	12.02	18.70	29.80	12.82	13.40
Kenya	5.56	20.85	10.10	8.09	11.02	28.54	24.10	33.26	53.71
Malawi	–	–	–	–	–	–	–	–	–
Mauritius	11.05	34.84	29.79	23.42	29.19	37.26	39.23	41.61	55.80
Morocco	5.50	18.04	32.70	26.80	23.80	30.02	50.10	52.73	86.13
Mozambique	–	–	–	–	–	–	–	–	–
Namibia	–	5.40	9.12	4.68	5.47	6.88	7.74	6.70	8.50
Nigeria	6.88	7.23	9.21	11.26	12.29	16.29	20.01	19.95	28.62
South Africa	139.74	185.64	154.24	117.95	166.50	160.66	210.46	233.58	280.41
Swaziland	2.97	24.85	5.26	10.12	12.05	9.02	9.43	7.53	–
Tanzania	–	–	2.57	4.22	7.25	6.41	5.90	4.67	–
Tunisia	5.44	21.78	14.54	11.52	10.13	9.86	9.39	10.03	14.68
Uganda	–	–	–	0.62	0.83	0.76	1.40	1.19	–
Zambia	–	0.55	7.28	6.97	6.31	6.63	7.93	13.60	–
Zimbabwe	16.02	28.66	32.87	77.73	71.39	67.26	41.20	70.26	530.02
Africa: mean	**17.78**	**28.79**	**24.92**	**23.14**	**27.41**	**29.29**	**34.06**	**39.66**	**101.68**
– = data not available					**Source:** Senbet and Otchere (2008:2)				

APPENDIX C:

MARKET LIQUIDITY

The market liquidity in the stock markets in Africa is relatively small compared to other emerging economies in the world. African stock markets have a generally low liquidity as a percentage of the gross domestic product (due to various reasons) as can be seen from the table on the following page. Since 2004 there has been a remarkable improvement in the market liquidity in stock markets on the African continent. This could be due to improvements in corporate governance in some countries and improved political stability.

Country	Annual market liquidity as a percentage of gross domestic product								
	1991	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Botswana	0.20	0.80	0.77	1.08	0.93	1.05	0.51	0.43	0.71
Côte d'Ivoire	0.07	0.13	0.32	0.08	0.14	0.18	0.30	0.19	0.64
Egypt	0.38	1.13	11.14	3.99	2.91	3.95	7.11	28.31	44.16
Ghana	–	0.34	0.20	0.25	0.18	0.60	0.74	0.42	0.41
Kenya	0.13	0.72	0.37	0.31	0.28	1.43	2.13	2.63	6.40
Malawi	–	–	–	–	–	–	–	–	–
Mauritius	0.18	1.83	1.69	2.46	1.25	1.89	1.57	2.40	2.64
Morocco	0.18	7.35	3.28	2.87	1.63	1.58	3.35	8.03	23.56
Mozambique	–	–	–	–	–	–	–	–	–
Namibia	–	0.09	0.65	0.24	0.05	0.04	0.31	0.10	0.33
Nigeria	0.03	0.05	0.57	1.03	1.02	1.47	2.31	3.00	3.10
South Africa	6.70	11.28	58.32	58.51	71.09	61.69	75.23	82.92	122.53
Swaziland	–	0.03	0.02	0.79	0.02	0	0	0	–
Tanzania	–	–	0.44	0.08	0.19	0.19	0.15	0.11	–
Tunisia	0.23	3.68	3.22	1.58	1.05	0.66	0.80	1.59	1.81
Uganda	–	–	–	0	0.01	0	0	0.04	–
Zambia	–	–	0.25	1.46	0.05	0.25	0.12	0.19	–
Zimbabwe	0.89	2.11	3.77	14.91	11.35	18.18	2.88	9.70	17.90
Africa: mean	**0.90**	**2.27**	**5.80**	**4.98**	**5.39**	**5.00**	**6.31**	**8.69**	**18.60**
– = data not available					**Source:** Senbet and Otchere (2008:11)				

APPENDIX D:

DOMESTIC LISTED COMPANIES

The number of domestic listed companies in the stock markets on the African continent is relatively small compared to other emerging economies. African stock markets are generally under-listed as can be seen from the table on the following page.

Country	Annual number of domestic listed companies								
	1991	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Botswana	9	12	16	16	18	19	18	18	18
Côte d'Ivoire	25	31	41	38	38	38	39	39	40
Egypt	627	746	1076	1110	1148	967	792	744	603
Ghana	13	19	22	22	24	25	29	30	32
Kenya	53	56	57	57	57	51	47	47	51
Malawi	–	–	–	–	–	–	–	–	–
Mauritius	20	28	40	40	40	40	41	42	41
Morocco	67	44	53	55	55	53	52	56	65
Mozambique	–	–	–	–	–	–	–	–	–
Namibia	–	10	13	13	13	13	13	13	9
Nigeria	142	181	195	194	195	200	207	241	202
South Africa	688	640	616	542	450	426	403	388	401
Swaziland	2	4	6	5	5	5	6	6	–
Tanzania	–	–	4	5	5	6	6	6	–
Tunisia	15	26	44	46	47	46	44	46	48
Uganda	–	–	–	2	3	3	5	5	–
Zambia	–	2	9	9	11	11	11	12	–
Zimbabwe	60	64	69	72	76	81	79	79	80
Africa: mean	**143**	**133**	**151**	**139**	**137**	**124**	**112**	**111**	**133**
– = data not available					Source: Senbet and Otchere (2008:3)				

APPENDIX E:

SPEARMAN'S RANK CORRELATION RESULTS

The Spearman's rank correlation results are presented with their t-test results. The correlation results were generally small contrary to expectation, and the associated t-test results confirmed the Null ($\mathbf{H_o}$) hypothesis. This implied that the strength of the relationship was not strong enough to reject the hypothesis.

E.1 Market Capitalisation

Spearman Correlations Section (Pair-Wise Deletion)

	C1	C2
C1	1.000000	-0.403321
	0.000000	0.171759
	13.000000	13.000000
C2	-0.403321	1.000000
	0.171759	0.000000
	13.000000	13.000000

Equal-Variance t-Test Section

Alternative Hypothesis	t-Value	Probability Level	Decision (5 %)	Power (Alpha = 0.05)
Difference <> 0	-1.5293	0.139262	Accept $\mathbf{H_o}$	0.311791
Difference < 0	-1.5293	0.069631	Accept $\mathbf{H_o}$	0.436917
Difference > 0	-1.5293	0.930369	Accept $\mathbf{H_o}$	0.000867

Difference: (C1)-(C2)

E.2 Market Liquidity

Spearman Correlations Section (Pair-Wise Deletion)

	C1	C2
C1	1.000000	-0.309397
	0.000000	0.303636
	13.000000	13.000000
C2	-0.309397	1.000000
	0.303636	0.000000
	13.000000	13.000000

Equal-Variance t-Test Section

Alternative Hypothesis	t-Value	Probability Level	Decision (5 %)	Power (Alpha = 0.05)
Difference <> 0	0.0478	0.962279	Accept H_o	0.050241
Difference < 0	0.0478	0.518861	Accept H_o	0.045388
Difference > 0	0.0478	0.481139	Accept H_o	0.054978

Difference: (C1)-(C2)

E.3 Domestic Listed Companies

Spearman Correlations Section (Pair-Wise Deletion)

	C1	C2
C1	1.000000	0.167836
	0.000000	0.583636
	13.000000	13.000000
C2	0.167836	1.000000
	0.583636	0.000000
	13.000000	13.000000

Equal-Variance t-Test Section

Alternative Hypothesis	t-Value	Probability Level	Decision (5 %)	Power (Alpha = 0.05)
Difference <> 0	0.8197	0.420448	Accept H_o	0.123469
Difference < 0	0.8197	0.789776	Accept H_o	0.007303
Difference > 0	0.8197	0.210224	Accept H_o	0.198180

Difference: (C1)-(C2)