

The effects of sentiments on the dollar rand (USD/ZAR) exchange rate

Kgomotso Euginia Mogotlane

772836

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DECLARATION

I, Kgomoitso Euginia Mogotlane, declare that this research article is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the Graduate School of Business Administration, University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Kgomotso Euginia Mogotlane

Signed at

On the day of 2017

DEDICATION

This research article is dedicated to the memory of my angels in heaven, may your souls continue to rest in eternal peace, love and light in the presence of our Almighty. I know you always shining down on me from heaven and this is the only way I can shine back. Hope you are all proud of me.

I did it for you!!!

Samuel Diswantsho Mogotlane.

Delia Shirley Mogotlane.

Moses Willy Seponana Mogotlane.

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I would like to thank God Almighty, for indeed He is faithful. *Jeremiah 29:11 "For I know the plans I have for you, declares the Lord. Plans to prosper you and not harm you, plans to give you hope and a future."*

I would also like to sincerely thank the following people for their assistance and support throughout my MBA journey:

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ABSTRACT

This journal paper seeks to review the effects of investor sentiments on the USD/ZAR currency pair. The paper will focus on major investor sentiments that had either a negative or positive impact on the exchange rate volatility of the USD/ZAR currency pair.

The literature is limited to the period between 2008 and 2017 quarter one. This period is based on the endeavour to understand how investor sentiment impacts the two currency pairs under investigation; post the financial crisis to date. The choice of the currency pair is based on: that USA is one of South Africa's significant trading partners, and that ZAR also trades heavily against the USD.

Both the ZAR and the USD follow a floating exchange rate regime. As a result, the short-run drivers of both currency exchange rates may be attributed to: economic fundamentals, investor sentiments, speculative attacks, as well as structural and liquidity shocks. The purpose of this paper is to focus purely on investor sentiment. Moreover, investor sentiments are random and unexpected news or events.

The study followed desktop research and engaged with documents sourced from public domain. The data set was drawn from Bloomberg terminal due to reliability. Academic literature was accessed from various publications, both in print and soft copy. Lastly, the discussion relating to evidence was sourced from Bloomberg terminal wired news series.

The research output is thus aimed at investors, hedgers, arbitrageurs, speculators and end-users in the foreign exchange market.

The outline of this paper is as follows: Section one is the introduction to the research. Section two is literature review. Methodology section follows on in chapter three.

Section four focuses on the data collection, while section five discusses the results. Lastly, section six concludes the research work.

Keywords: South Africa, The United States of America, exchange rate, USD/ZAR exchange rate, sentiments, volatility.

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Glossary of terms

1. Carry trade

Christiansen, Rinaldo and Soderlind (2009) defines carry trade as “borrowing a low yielding asset and buying a higher-yielding asset denominated in another currency.”

2. Currency crisis

Merrill Lynch & Co (as quoted on Bloomberg, 2008) defined a currency crisis as a decline of the currency of more than 25 percent since the beginning of the third quarter coupled with a pace of depreciation that would exceed the move in the 12 months to July 2008 by at least 10 percent.

3. Exchange rate

“Exchange rate is the price of one currency in terms of another currency. Exchange rates can be either be fixed or floating. Fixed exchange rates are decided by central banks of a country whereas floating exchange rates are decided by the mechanism of market demand and supply. (<https://www.economictimes.com>).

This paper looks at the USD/ZAR exchange rate, which is the price of USD in terms of ZAR. For the USD/ZAR currency pair, the exchange rate is decided by market forces.

4. Emerging markets index (Often referred to as EM)

MSCI EMERGING MARKETS INDEX ALLOCATION

MSCI EMERGING MARKETS INDEX				
EMERGING MARKETS				
Americas	Europe, Middle East & Africa		Asia	
Brazil Chile Colombia Mexico Peru	Czech Republic Egypt Greece Hungary Poland Qatar	Russia South Africa Turkey United Arab Emirates	China India Indonesia Korea Malaysia	Pakistan Philippines Taiwan Thailand

Source: (<https://www.msci.com/emerging-markets>)

South Africa forms part of the Emerging markets index whilst the United States of America is part of the developed markets.

5. Risk on, Risk off (RoRo)

Risk-on, Risk-off (often referred to as RoRo), is an investing practice which is described as a process where investors move to riskier potentially higher yielding investments or assets and then move back again to apparently lower yielding investments or assets which are perceived to have lower risk. Quite often RoRo behaviour follows what happens in global markets, where investors are encouraged to take risk in periods of supposed low financial risk, therefore creating a risk-on situation and take less risk in periods of supposed high financial risk, creating a risk-off situation (<http://lexicon.ft.com/Term?term=risk-on,-risk-off>).

6. Safe haven

Safe-haven can be defined as a currency, stock or commodity that is favoured by investors or market participants in times of market turbulences because of its stability and / or easy liquidation. (<http://lexicon.ft.com/Term?term=safe-haven>).

7. Volatility

“Volatility can be defined as the rate at which the price of a security increases or decreases for a given set of returns. Volatility is measured by calculating the standard deviation of the annualized returns over a given period of time. It shows the range to which the price of a security may increase or decrease. Volatility measures the risk of a security. Volatility indicates the pricing behaviour of the security and helps estimate the fluctuations that may happen in a short period of time. If the prices of a security fluctuate rapidly in a short time span, it is termed to have high volatility. If the prices of a security fluctuate slowly in a longer time span, it is termed to have low volatility” (<http://economictimes.indiatimes.com/definition/volatility>).

Purpose

The main focus of this paper is to examine non-fundamental factors that influence the dollar rand (USD/ZAR) exchange rate; that is the effects of sentiments on the USD/ZAR exchange rate for the period 2008 quarter one to the first quarter of 2017. I argue that sentiments should feature in the consideration of USD/ZAR exchange rate volatility.

Design / Methodology / Approach

Mixed methods approach research method will be followed. For qualitative research method, SARB monetary policy review publications, local and international business publications will be reviewed in detail. For quantitative research method, daily USD/ZAR exchange rate data will be sourced from the Bloomberg database for the period 2008 quarter 1 to the first quarter of 2017. Periods of extreme volatility within this period will be identified from the daily exchange rate data sourced and analysed in detail. Market sentiments indicators such as the VIX will also be used to identify the periods of volatility and gauge fear.

Expected findings

I expect to note the role non-economic market sentiments plays in determining the USD/ZAR currency volatility since beginning of 2008 to early 2017.

Limitations / Implications

The research is limited to a single currency pair, namely, USD/ZAR. This is largely due to USD being the major trading currency globally. The ZAR also trades heavily against the USD.

Originality / Value

This paper is not the first to analyse factors that influence the USD/ZAR exchange rate. Hsing (2016) indicates that there are several recent studies that have been conducted to examine elements of the USD/ZAR exchange rate. However upon literature review it has become evident that most studies focused mainly on

fundamental analysis and not necessarily on market sentiments when analysing determinants of the USD/ZAR exchange rate.

Paper type

Research article

1. Introduction

Economy overview: South Africa and the United States of America.

➤ Economy overview: South Africa

South Africa has a population of approximately 54 million people. The country operates an open economy with the policy choice of floating exchange rate, independent monetary policy and free capital mobility. According to Brand South Africa (2017), South Africa became part of the potentially high growth group of Brazil, Russia, India and China to form BRICs in 2011. South Africa's largest trading partners outside the African continent include China, United States of America, Europe Union and Japan (<https://www.brandsouthafrica.com/investments-immigration/business/economy/econoverview>).

The South African economy is estimated to grow by 1.2% in 2017, as measured by the Gross Domestic Product (GDP). GDP growth has seen some declining levels since the advent of the global financial crisis in 2008. South Africa recorded GDP growth of 3.6 in 2008 depicting the following trajectory thereafter: negative 1.5%: 2009, 3.1%: 2010, 3.6%: 2011, 2.5%: 2012, 1.9%:2013, 2.7%: 2014, 3.2%: 2015 and 0.3%: 2016. Factors leading to decline in GDP growth are cited as: high level of household debt, low commodity prices, drought, investor confidence and external macroeconomic economic shocks (SARB, 2017).

The domestic headline consumer price index (CPIX) recorded 5.9% as at December 2016, and is expected to remain on the upper bound of the inflation target band, 3-6%. CPIX inflation has shown some improvements since 2008 in South Africa, reflecting the declining trend: 11.0%: 2008, 7.1%: 2009, 4.3%: 2010, 5.0%: 2011, 5.7%: 2012, 5.7%:2013, 6.2%: 2014, 5.9%: 2015 and 5.9%: 2016. CPIX is affected by exchange rate weakness and consumer goods prices (SARB, 2017 and du Toit, 2014)

The average mortgage or prime lending rate has been declining and closed 2016 at 10.5%. Prime interest rates declined as follows: 15.0%: 2008, 10.5%: 2009, 9.0%:

2010, 9.0: 2011, 8.5: 2012, 8.5%:2013, 8.5%: 2014, 10.0%: 2015 and 10.5%: 2016. Domestic interest rates follow future expectations of CPIX (SARB, 2017 and du Toit, 2014).

The USD/ZAR exchange rate currency pair shows a weakening ZAR to USD with a high of USD/ZAR 14.8. The USD/ZAR exchange rate short historical performance since 2008 is as follows: 8.25: 2008, 8.44: 2009, : 7.32: 2010, 7.25: 2011, 8.21: 2012, 9.65:2013, 11.73: 2014, 11.55: 2015 and 14.8: 2016 (SARB, 2017 and du Toit, 2014).

➤ **Economy overview: The United States of America**

The global share of the United States of America economy is 20.15% of world output. This makes the United States of America a key global economy. The economy is highly industrialised as reflected by 80% of total output generated from highly technological manufacturing and skilled services sector. The United States of America exports mainly to Canada, China, Mexico and Japan and imports mainly from China (<http://www.focus-economics.com/countries/united-states>).

The United States of America is considered one of the key contributors to the 2008 global financial crisis. This is due to “low interest rates, widespread mortgage lending, excessive risk taking in the financial sector, high consumer indebtedness and lax government regulation, led to a major recession that began in 2008.” The United States of America introduced the Dodd-Frank Act in 2010 to oversee and regulate financial markets and avoid another 2008 crisis (<http://www.focus-economics.com/countries/united-states>).

What is Market Sentiment and the VIX

Investor sentiment can be defined in numerous ways. Yang and Copeland (2014) defines it as the “feeling or tone of a market, or its crowd psychology, as revealed through the activity and price movement of the securities traded in that market. Market sentiment is also called “investor sentiment” and is not always based on “fundamentals”.

Baker and Wurgler (2006) explain it as the propensity to speculate or the overall optimism or pessimism about an asset. Baker and Wurgler (2007) further define investor sentiment broadly, as a belief, usually influenced by emotion, about future cash flows and investment risks that is not justified by the facts at hand.

There are various indicators that can be used to measure market sentiments such as the Chicago Board Options Exchange (CBOE) Volatility Index (often referred to as the VIX), 52 week high/low sentiment ratio, bullish percentages and moving averages. For the purposes of this paper, only the VIX and the USD/ZAR historical volatility will be examined.

The generalised formula used in the VIX calculation is as follows:

$$\sigma^2 = \frac{2}{T} \sum_i \frac{\Delta K_i}{K_i^2} e^{RT} Q(K_i) - \frac{1}{T} \left[\frac{F}{K_0} - 1 \right]^2$$

Where...

σ is	$VIX/100 \Rightarrow VIX = \sigma \times 100$
T	Time to expiration
F	Forward index level desired from index option prices
K_0	First strike below the forward index level, F
K_i	Strike price of the ith out-of-the-money option; a call if $K_i > K_0$; and a put if $K_i < K_0$; both put and call if $K_i = K_0$.
ΔK_i	Interval between strike prices - half the difference between the strike on either side of K_i
	$\Delta K_i = \frac{K_{i+1} - K_{i-1}}{2}$
	(Note: ΔK for the lowest strike is simply the difference between the lowest strike and the next higher strike. Likewise, ΔK for the highest strike is the difference between the highest strike and the next lower strike.)
R	Risk-free interest rate to expiration
$Q(K_i)$	The midpoint of the bid-ask spread for each option with strike K_i

Source: CBOE (2014)

Yang and Copeland (2014) offer this description for the VIX: “The Market Volatility Index (VIX), which measures the implied volatility of options on the Standard and Poor’s 100 stock index, is often referred as “investor fear gauge” by practitioners”.

Whale (2008) defines VIX as a measure of investor’s certainty (or uncertainty) regarding volatility. This index is about fear, investors or market participants fear of the unknown such that the higher the VIX is, the greater the fear.

This means that sentiments are driven by anything other than fundamentals and facts. The common fundamentals or facts that generally determine exchange rate volatility are explained by Janse van Rensburg, McConnell and Brue (2011) as, 1) change in consumer tastes or preferences, 2) country’s relative change in GDP or income, 3) relative change in purchasing power parity, 4) relative changes in interest rate parity, and 5) pure speculation.

Motivation for research

It is very important to understand factors that influence exchange rate instabilities as exchange rates have significant effects on production, trade, employment of a country and many other areas of both domestic and global economy (Mandalos, 2014). An exchange rate of a country, as an important macroeconomic variable, can also be used to assess the health of the economy.

An exchange rate is not just important for central banks to model policy scenarios and currency intervention tool by policy makers; but it is important for all participants in the economy. Participants in the economy can include multinational corporations, exporters, importers, and investors which are all concerned about exchange rate movements for different reasons as depicted on Table 1 (Hsing, 2016).

Table 1: Currency behaviour scenarios

Stronger domestic currency	Helps imports, hurts exports, and reduces overseas asset values measured in the domestic currency
Weaker domestic currency	Helps exports, hurts imports, and increases overseas asset values measured in the domestic currency.
Substantial depreciation of the domestic currency	Is expected to cause high inflation, increase international capital outflows, reduce foreign investments, and destabilize an economy

Source: Hsing, 2016

As mentioned in the economic overview, South Africa has an open economy. Mandalos (2014) actually recognises that foreign trade has played a critical role to the growth of the South African economy.

According to Mpofu and Peters (2016), it is also important to note that the South African rand is by far the most significantly traded African currency and it is an important emerging market currency. The rand has also been amongst the most volatile emerging currencies since 2000 to date.

The paper examined the USD/ZAR currency pair due to the facts stated below.

South Africa's traditionally bigger trading partners are the United States of America, Eurozone and Great Britain and as a result, the rand (ZAR) is usually paired against the USD, EUR and GBP. However, out of all these three pairs, the USD/ZAR is the most commonly traded pair (Mandalos, 2014).

South Africa follows the de facto free floating exchange rate regime. The exchange rate of a currency in a freely floating regime is purely determined by demand and supply forces.

Balcilar, Gupta and Jooste (2015) state that “the policy implications are clear: non-interventionist policy requires that the exchange rate be left to float freely along with changes to structural shocks – on the assumption that structural shocks are the core determinants of the exchange rate. This idea can be contested when exchange rate volatility is not a function of structural shocks. Speculative attacks, liquidity shocks such as the United States of America and the European Union quantitative easing and carry trade cause distortions that could lead to unwanted exchange rate outcomes.”

It is important to understand and be able to note differences between what causes long-term and short-term exchange rate volatility as different strategies need to be or can be adopted in those different scenarios.

Hassan (2015) states that “Long-term real exchange rate volatility raises the risks associated with investment in the tradable sector, and it is detrimental to long-term growth. Short-term volatility can however be hedged; reduces the currency’s attractiveness as a carry trade target; induces necessary caution against the build-up of liabilities denominated in foreign currency; helps maintain the scope for independent monetary policy; and, through rapid up and down movements, it can help reduce prolonged misalignment and long-run volatility.”

It is clear from the above excerpt of the importance of an exchange rate and also how important it is to understand what influences it. Misjudgement can lead to the wrong intervention by the respective authorities resulting in unwanted exchange rate outcomes and costs as was the case with South Africa after the 1998 crisis. Fluctuations of the exchange rate can impact the country’s trade flows, competitiveness, impact the country’s inflation, and hamper growth, just to list a few adverse consequences of having a high unstable exchange rates.

During the 1998 financial crisis, the South African rand and the United States of America currency pairs depreciated by 28% while during the 2001 financial crisis the aforementioned currency pairs depreciated by 26%. The South African rand to the United States of America dollar currency pair’s depreciations are measured in nominal

terms. In both the 1998 and 2001 financial crises, South African policy responses were different. In 1998, South African policy response was direct intervention leading to slow economic recovery; yet in 2001, South Africa's policy response was that of non-interventionist and the economic recovery was quicker. The learning outcomes of the two-financial crisis are: Intervention in the foreign exchange market can be costly and ineffective. As such, the South African government refrained from participating in the foreign exchange rate market in 2001, avoiding the 1998 experience (Bhundia and Ricci, 2001).

2. Literature review

This paper is not the first to analyse factors that influence the USD/ZAR exchange rate but we have identified the gap that most literature has focused on fundamental shocks rather than sentiments. The focus of this paper will be to understand the behaviour of the USD/ ZAR exchange rate from the sentiments driven perspective.

Balcilar, Gupta and Jooste (2015) state that an increase in exchange rate volatility relative to price and output suggests that news and non-fundamental shocks have become important drivers of the rand exchange rate. They further state that impact of interest rate shocks on the exchange rate has weakened since the 2008/2009 financial crisis as shown by important results.

Balcilar et al (2015) argue that fundamental shocks will only cause temporary deviations from the structural level if a fundamental exchange rate exists. They further state that productivity differentials, interest rate differentials and price differentials are often the variables that characterise this fundamental relationship.

Mumtaz and Plassmann, as cited in Balcilar et al (2015), believe there is an indication of a disconnect between the exchange rate and fundamentals as evidenced by an increase in exchange rate volatility to output volatility.

The South African exchange rate volatility to the United States of America dollar since the 2008 financial crisis is attributed to the South Africa local politics, global commodity prices and global markets shocks. Further economic shocks emanating from the United States of America are more influential to the USD/ZAR volatility than economic shock resulting in Europe, China and South Africa (Maveé, Perrelli, and Schimmelpfennig, 2016).

Under the independently floating exchange rate regime, it is key to leave exchange rate volatility to the market determinants, because structural shocks are primary determinants of the exchange rate and independent from the domestic monetary economy policy choice (Balcilar, Gupta and Jooste, 2015).

Mavee, Perrelli and Schimmelpfennig (2016) conclude that a flexible exchange rate regime is an adjusting mechanism to absorb financial crisis. Even though it causes investor uncertainty, it is often short lived. Further, the South African economy and currency is commodity dependent, thus the ZAR is exposed to global commodity volatility. One key mitigant to shocks is an increase in financial reserves. Also, politicians can to some extent manage their actions and proclamations to minimise currency volatility.

Bandopadhyaya and Jones (2006) add that investor sentiments tend to drive the short run compared to fundamentals which determine the long run asset prices. They further state that in recent times, the focus of many studies has become investor investment on asset pricing and also recognises that “traditional research on asset pricing has focused on fundamental, firm-specific and economy-wide factors that affect asset prices.”

Research has found that changes in asset prices may be triggered by changes in investor sentiment, which indicates that investor sentiment may be an important element of the market pricing process. And as a result, in order to explain asset-price behaviour, researchers have recently turned to investor psychology for answers (Bandopadhyaya and Jones, 2006).

A fundamental feature of any crisis episode and a major driver of behaviour during periods of market turmoil, has been found to be heightened uncertainty prevailing in the markets. As such because of this extreme volatility, a crisis is expected to be associated with major spikes in the short-term volatility of the market (Duncan and Liu, 2009).

3. Methodology

Research methodology is the process used to extract meaning from data, in an attempt to bridge the gap between the researcher's inquiry mind and the truth (Leedy and Ormrod, 2001).

The following sections of the paper will outline the proposed research paradigm and design and research instruments to be used. The population and sample will also be discussed.

3.1 Research methodology / paradigm

There are two basic approaches to research: quantitative and qualitative. In the past, these were seen as competing approaches, but today, they are seen as the opposite ends of a continuum and various mixed methods fall in-between (Creswell 2003).

Mixed methods approach: pragmatic knowledge claims, collection of both quantitative and qualitative data sequentially. The researcher bases the inquiry on the assumption that collecting diverse types of data best provides an understanding of a research problem. Pragmatists do not see the world as an absolute unity. In a similar way, mixed methods researchers look to many approaches to collecting and analysing data rather than subscribing to only one approach (e.g., quantitative or qualitative).

It is thus based on the above analysis that this paper will follow mixed methods approach research method. As the nature of this research is exploratory, it will be interesting to see what using both qualitative and quantitative approaches will yield.

3.2 Research design

A post-positivism world view was used as it reflects the need to identify and assess the causes that influence outcomes. The knowledge developed through a post-positivist lens is based on careful measurement of the objective reality that exists (Creswell 2009:7).

Creswell (2003) suggests a framework for research design, consisting of three steps:

- The researcher needs to state which of the alternative knowledge claims or epistemology schools he subscribes to (i.e positivism, constructivism, advocacy, participatory or pragmatism).
- Next, the researcher needs to decide on a strategy of enquiry, from the numerous strategies associated with qualitative and mixed method research approaches.
- Thirdly, the researcher needs to decide on the methods of data collection and data analysis to be used.

3.3 Population and sample

3.3.1 Population

The population is all the USD/ZAR exchange rates over the defined research period 2008 – 2017.

3.3.2 Sample and Sampling Method

The analysis is based upon a sample of either the daily, monthly, quarterly or annual data from the Bloomberg database. The period which the paper cover ranges from beginning of 2008 to the first quarter of 2017.

3.4 The research instrument

I will analyse the periods of stable volatility and extreme volatility as figure 1 below.

The paper will also examine and analyse the VIX index as there seems to be correlation between the VIX and ZAR.

Figure 1: USDZAR Currency (USD-ZAR X-CHG Rate)



Source: Bloomberg (2008 – 2017).

Figure 2: VIX Index (Chicago Board Options exchange SPX Volatility Index)



Source: Bloomberg (2008 – 2017).

The data will be organised in Microsoft excel; thereafter, build graphs from the data pulled to have a pictorial picture of the data as per figure 1 above, and then identify and note periods of extreme volatility on the graphs, then investigate the reasons behind those moves; this could be either fundamentals or non-fundamentals but the interest of this paper will be on sentiments that are non-fundamentals. As a start, the SARB monetary policy review publications and local and international business publications will be reviewed in detail. Bloomberg and Reuters databases will be interrogated for news that might have impacted on the extreme moves.

The aim of this paper is not to quantify the sentiments but merely investigate the possible reasons (whether fundamentals/ non-fundamentals) behind the fluctuations. Below is an example of a few important events that occurred and saw the rand plummet against the dollar, mainly driven by sentiments (fear/emotions/concerns).

9 December 2015: SA Minister of Finance Nene sacked

9 October 2015: SA Minister of Finance Gordhan charged by NPA

24 June 2015: UK votes to leave the European Union

11 November 2016: Donald Trump wins US election

February 2017: SA Cabinet reshuffle rumour

31 March 2017: SA Minister of Finance Gordhan sacked

This paper will follow the same logic, examining periods of extreme volatility between 2008 and 2017 quarter one and investigate the events behind the moves. Interest will only be on non-fundamental events.

According to the SARB (2017) monetary policy review, the following are some sentiments that affects foreign currency to rand exchange rate: Capital inflows to emerging markets, the United States of America election results, cabinet reshuffle, Brexit referendum, commodity prices, GDP growth, business confidence, other domestic, sovereign credit rating, political developments and foreign factors.

3.5 Procedure for Data Collection

I will export daily USD/ZAR exchange rates from the Bloomberg database to Microsoft Office Excel for analysis. I will customise dates to pull data for the period 2008 to 2017 first quarter.

3.6 Data Analysis and interpretation

Data analysis involves preparation of the data for analysis, conducting analyses, moving to deeper understanding, decisions regarding representation of the data, and making interpretation of the larger meaning of the data (Creswell, 2003).

Creswell's Data Analysis Spiral (Leedy and Ormrod 2001) consists of four steps between the raw data and the final report which was employed in this assignment:

- **Organisation** – First the data was exported from the Bloomberg database for the period under review. Then the data is organised (in this case, using a computer spreadsheet and inserting graphs to have a pictorial view of the data)
- **Perusal** – The entire data set was examined a number of times to get a sense of the whole. In this case, notes were made of spikes and periods of extreme volatilities noted.
- **Classification** – Notes were made of spikes and periods of extreme volatilities noted to be investigated further.
- **Synthesis** – This step involves integrating the data and summarising it for the analysis and final reporting.

3.7 Limitations of the study

The study will only focus on the USD/ZAR currency volatility and limit the period under investigation to 2008 and 2017 quarter one.

3.8 Validity and Reliability

It is essential that the research measures that are used are both valid and reliable (Leedy and Ormrod 2001; Riley, Wood, Clark, Wilkie and Szivas 2000).

3.8.1 Validity

Validity can be divided into internal and external validity. Internal validity is where the research instrument measures what it is supposed to, while external validity concerns the generalisability of the findings (Leedy 1980).

3.8.2 Reliability

Reliability refers to the accuracy of the research and the consistency with which it yields the same results, if the conditions remain the same (Leedy and Ormrod 2001).

3.9 The Role of the Researcher

Creswell (2003) advocates that a researcher should acknowledge his role and biases. He should also disclose his relevant past experience, as well as any connections he may have with participants.

The researcher is an Accountant by training and has in total 12 years working experience. Of the 12 years, 9 years has been in the banking and financial services sector. Since the beginning of 2017, the researcher has moved from finance to be a sales specialist in foreign exchange sales dealing.

The researcher understands that biases can influence the analysis; therefore, it is important to have an open mind when approaching an analysis.

Authors Leedy and Omrod 2001 and Creswell (2003) propose that these biases and preconceived notions should be suspended during the research process; a step called “bracketing”.

The rest of this paper will follow the following sequence: section four offers the description of the data used in this paper and how it was analysed. Section five is a discussion of the results. The last section, section six concludes the paper.

4. Data

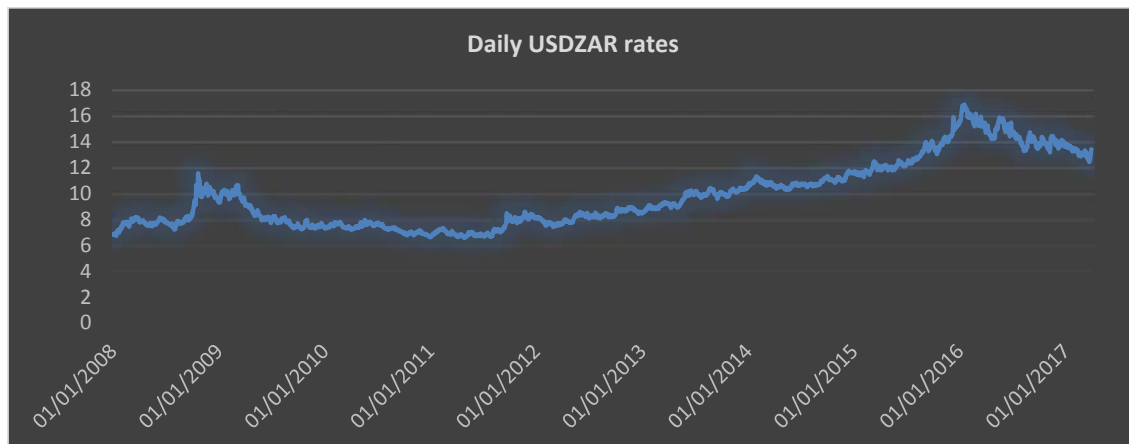
The analysis is carried out based on the USD/ZAR daily exchange rates and the daily CBOE volatility index (the VIX). The period covered in this paper ranges from the beginning of 2008 to the first quarter of 2017 (01/01/2008 to 31/03/2017), corresponding to 2415 daily observations and the time frame is approximately eight years.

To assess the causal relationship between USD/ZAR currency pair and sentiments since 2008, I have employed the use of daily foreign exchange data. The reason is supported by Gupta and Reid (2012) who state that the use of daily data is important as it avoids loss of information between discrete events of macroeconomic news

releases, it allows for surprises, observation and sentiments to slowly find their way into exchange rate volatility.

The data analysis starts with quantitative collection of daily USD/ZAR currency pairs for the period under review. The data source is the Bloomberg terminal; the Bloomberg terminal is considered reliable in the banking sector. Data is further sorted by the earliest date to the latest, using Microsoft excel. Once sorting is completed, the results are then graphed in Figure 3 below; this is referred to as daily USD/ZAR exchange rates. The USD/ZAR historical volatility was also calculated from the same data sourced from Bloomberg, refer figure 5 below. This seeks to show medium term trend as regards to the depreciation or appreciation of the two currencies under investigation.

Figure 3: Daily USDZAR exchange rates - Last price (2008 quarter one to 2017 quarter one)



Source: Bloomberg and own calculations.

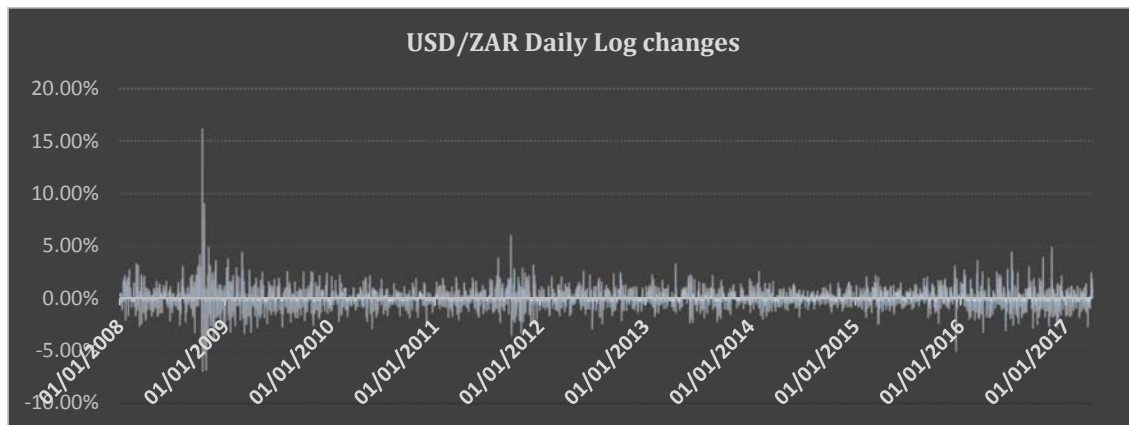
Figure 3 above has limitations in that it is focused on daily percentages. Daily percentage changes can move up or down to a finite large number. Such large percentage changes may not be beneficial for analysis of large values. In order to have reliable measures of changes in pattern over a period of time, logarithms are better proxies. Figures 4 and 5 below are an extension of work done for Figure 3, the

extension is the introduction of a log function and the volatility graphs. As such, Figure 4 smooths out daily changes for the period under consideration.

In addition to using the VIX as an instrument to measure investor sentiment, the USD/ZAR historical volatility will be used as well to identify periods of extreme volatility.

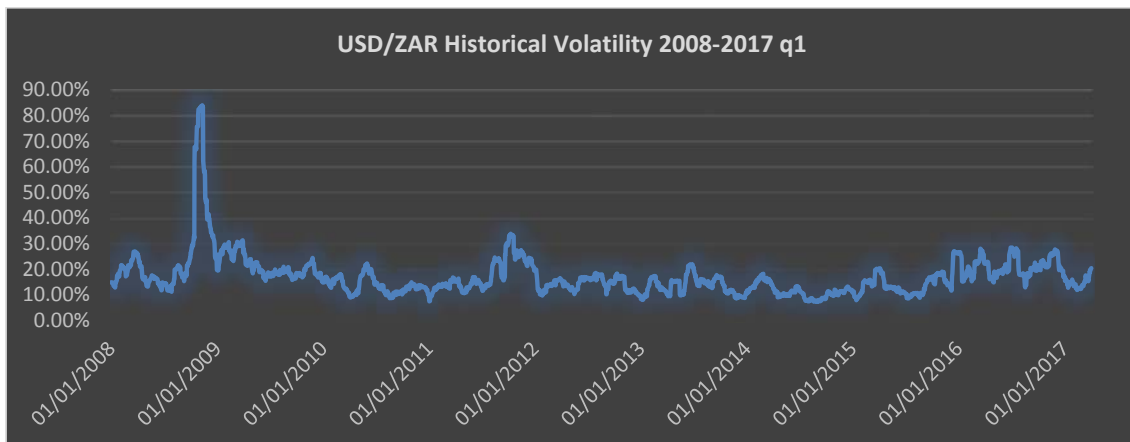
As mentioned previously, there are numerous models that can be used as a measure of volatility, but Duncan and Liu (2009) state that regardless of the model chosen, there are fundamental challenges in measuring volatility. They state that the problem in measuring volatility is that volatility is a latent and unobservable variable. So, they suggest that typically, applied measures such as the standard deviation of returns, like we used for the USD/ZAR historical volatility calculation (Figure 6), may at best be considered proxies of true volatility measure.

Figure 4: USDZAR Daily log changes (2008 quarter one to 2017 quarter one)



Source: Bloomberg and own calculations.

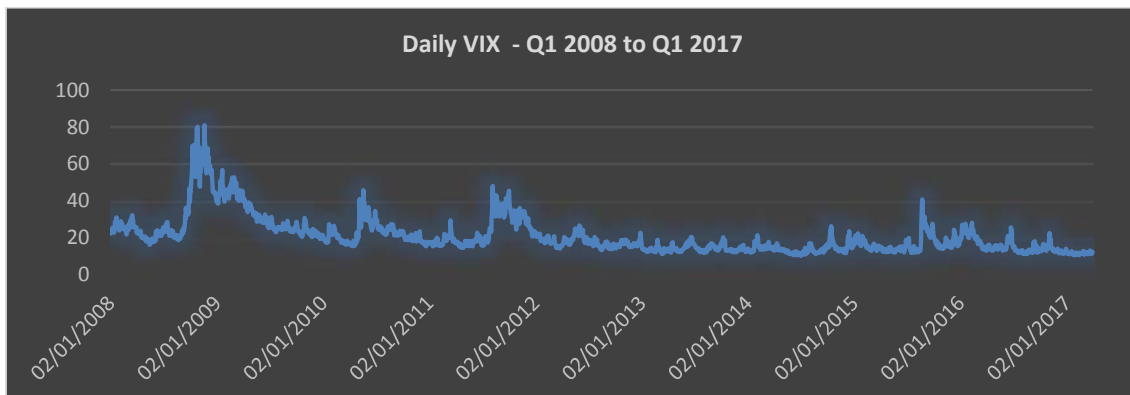
Figure 5: USDZAR Historical volatility 2008 to 2017 quarter one



Source: Bloomberg and own calculations.

For the VIX, the daily data was pulled for the same period and ordered in excel to create a trend chart. This was done so as to highlight periods of extreme volatility as well and examine the correlation between the daily exchange rates movements, the daily log changes and the USD/ZAR volatility, (refer figure 6 below).

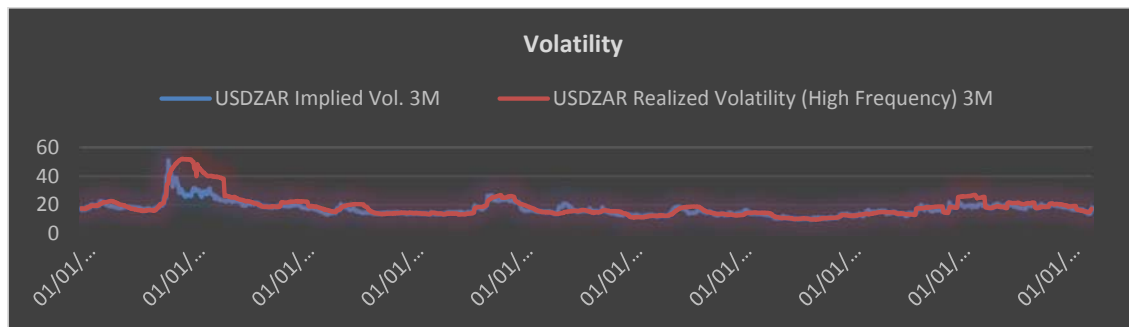
Figure 6: VIX index (2008 quarter one to 2017 quarter one)



Source: Bloomberg and own calculations.

Interesting to observe as well and as expected is that, data pulled for the implied and realised volatility, figure 7 below follows the same trend. This will be discussed in more detail under section five.

Figure 7: 3M Implied and realised volatility (2008 quarter one to 2017 quarter one)



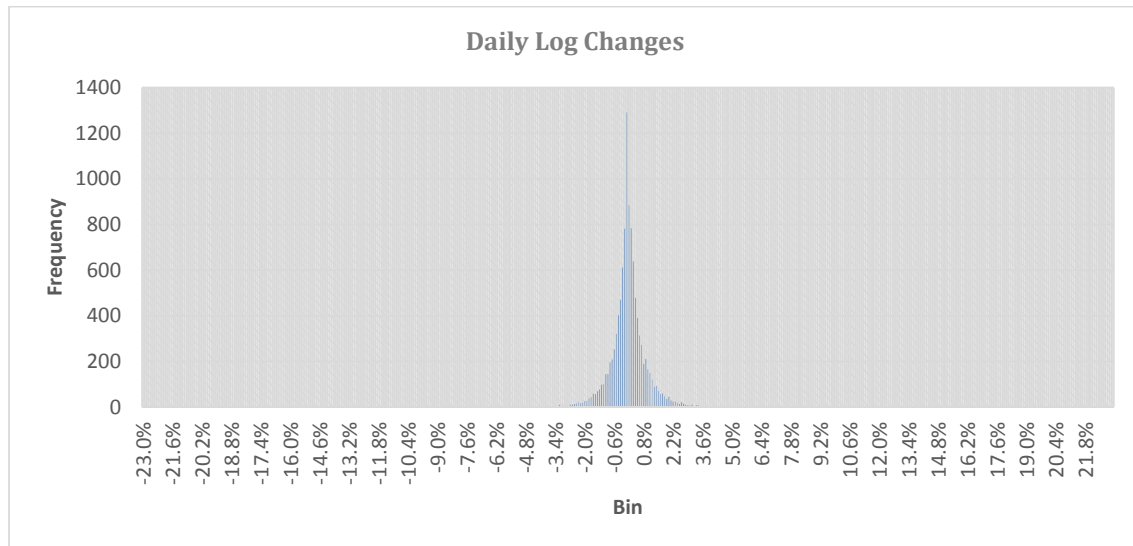
Source: Bloomberg and own calculations.

5. Results

This section of the paper will discuss the results of the research work. The period of interest for this research is based on the spikes as per the daily VIX chart below and the USD/ZAR historical volatility chart, ranging from 2008 quarter one to the first quarter of 2017. The results on table 2 below, will further highlight corresponding VIX spikes, log changes, historical volatility and the USD/ZAR exchange rate behaviour.

To identify periods of extreme volatility, the research examined the bin and frequency of the log changes, volatility and the VIX. From figure 8 below, it can be observed that most of the daily log changes are centred between the -3% and +3% bracket, so stable volatility would be this bracket. Therefore, for my selection, only log changes outside of this bracket were considered; that is, changes lower than -3% and changes above 3%.

Figure 8: Daily log changes (Bin and frequency)



Source: Bloomberg and own calculations.

Table 2 below draws positive and negative logs with changes as per the above criteria. The highest daily change for the period under review was on the 15th of October 2008, with a daily log change of 16.21% and the VIX level of 69.25.

Table 2 summarises the results of the investigation for the period under review. It highlights the log changes as per the above criteria as indicated already and the corresponding: volatility, VIX levels, USD/ZAR exchange rates movements and the events or news headlines associated with the moves.

The table lists 44 days which had periods of extreme volatility as per the criteria above. The years 2008 and 2009 were characterised by periods of heightened uncertainty with the VIX levels of mostly above 40 and high volatility of above 80% on some days in 2008. From 2010 to the first quarter of 2017, the VIX level and volatility has been coming down, and in fact both the numbers have not been higher than those observed in 2008 and 2009. The 2008/2009 period was also characterised by some phenomena

of switching between low risk and high risk investments as investors sought safe haven assets.

What is interesting to note is that, of the 44 days, for the 35 days that is about 80% of the results, drivers behind the big movements were attributed to non-fundamental events or news. That is moves on those days were driven by fear, emotions or concerns. The concerns or fears which mostly dampened investor sentiments and resulted in emerging markets currencies seen as risky.

It was also observed that negative sentiments proved to have more impact on the USD/ZAR currency pair than positive sentiments as supported by the log changes. And global events emanating mostly from the United States of America or the European Union also proved to have more harmful effects to emerging markets. The RoRo practise still happens till today but it became more common in the fallout to the 2008/2009 global financial crisis.

Refer to table 2: Results table (next page)

Period of interest (date)	ZAR moves	Log Changes	Volatility	VIX level	Non-Fundamental	Event / News headlines
2/29/2008	7.8075	3.38%	21.42%	26.54	✓	"Rising concerns about a faltering United States economy restricted demand for higher-yielding assets, EM"
3/6/2008	8.0335	3.21%	21.43%	27.55	✓	"After a fall in stocks around the world and concern credit-market losses are widening damped demand for higher-yielding assets, EM currencies."
8/8/2008	7.7125	3.15%	19.79%	20.66	✗	"A rampant USD is heightening the commodity downturn, which is not good for the ZAR"
9/19/2008	7.895	-3.24%	21.47%	32.07	✓	"News that central banks have indicated they are ready to bail out troubled financial institutions results in improvement in EM sentiment."
9/29/2008	8.31	3.05%	24.31%	46.72	✓	"Investors to avoid higher-yielding, EM assets on signs that the financial turmoil is spreading."
10/2/2008	8.484	3.20%	26.46%	45.26	✗	"ZAR, SA's Stocks Slide, led by BHP, as Commodities Tumble."
10/6/2008	8.83	4.22%	28.94%	52.05	✓	"ZAR drops amid deepening concern the credit turmoil is spreading, sapping demand for higher-yielding, EM assets."
10/8/2008	9.165	3.05%	29.53%	57.53	✓	"Increasing concerns the credit-market turmoil will curb growth, sapping demand for higher-yielding EM asset."
10/13/2008	9.0751	-4.04%	32.90%	54.99	✓	"All the higher-yielding currencies are strengthening including ZAR, government bank-support plans boost confidence"
10/15/2008	10.69	16.21%	61.81%	69.25	✓	"ZAR Drops Versus Dollar on Recession Concern"
10/16/2008	9.975	-6.92%	67.77%	67.61	✓	"ZAR Reversed the losses after plummeting on the 15th amid recession concern"
10/21/2008	10.61	4.63%	66.82%	53.11	✓	"ZAR Weakened on comments by the then Minister of finance Trevor Manuel "ZAR volatility overdone"..."
10/22/2008	11.62	9.09%	71.77%	69.65	✓	"ZAR joins Ukraine `Currency Crisis`"
10/23/2008	11.02	-5.30%	75.52%	67.8	✓	"ZAR has rebounded along with all EM currencies"
10/28/2008	10.22	-6.81%	80.58%	66.96	✓	"Cheapest valuations in over 2 decades lured investors back to EM assets as sentiment starts to improve"
10/29/2008	9.77	-4.50%	82.40%	69.96	✗	"SA Bonds rallies along with the rand, Stocks Rally, as inflation softened"
11/4/2008	9.67	-3.26%	83.19%	47.73	✓	"ZAR rises as nation's stocks advanced along with stocks around the world, boosting investor appetite for higher-yielding, EM assets."
11/6/2008	10.248	4.93%	83.60%	63.68	✓	"ZAR drops amid concern the global economy is headed towards a recession"
11/11/2008	10.293	3.24%	84.01%	61.44	✓	"Investors continue to cut their positions in riskier assets because of fear that the financial-market crisis will have a further negative contagion effect on EM,"
11/24/2008	10.02	-4.06%	46.07%	64.7	✗	"ZAR rebounds on speculation the central bank will cut its key interest rate"

11/25/2008	9.698	-3.27%	46.64%	60.9	✓	"ZAR Rises to Highest Level in Three Weeks on Stimulus Plans by the Fed, increasing demand for high yielding currencies"
12/1/2008	10.495	3.69%	41.12%	68.51	✓	"ZAR dropped to a one-week low against USD as stocks and commodity prices drop, following record declines in manufacturing around the world that curbed demand for higher-yielding assets."
1/7/2009	9.61	3.01%	22.48%	43.39	✓	"EM Stocks Sink in 2008, May Rebound on BRICs Rally."
1/12/2009	10.119	3.88%	26.09%	45.84	✓	"ZAR to 3-Week Low on Ruling SA President Zuma Can Face Graft Charges"
1/21/2009	9.95	-3.24%	28.19%	46.42	✗	"ZAR rose against USD on speculation exporters purchased the currency after it reached a six-week low, and as weaker retail sales boosted prospects the reserve bank will cut its main interest rate."
2/10/2009	9.875	3.00%	30.58%	46.67	✓	"ZAR May Benefit From 'Carry Trade' on Yield Gap"
3/2/2009	10.517	4.50%	27.70%	52.65	✓	"ZAR depreciated after a rejection of aid for eastern Europe raised concern that currencies of other current-account-deficit countries may weaken, and a national manufacturing index fell to a record low."
3/10/2009	10.24	-3.34%	29.62%	44.37	✗	"ZAR strengthened the most since November against USD as higher copper prices helped boost stocks in the region, reviving demand for the currency."
4/2/2009	9.04	-3.21%	27.88%	42.04	✓	"ZAR Climbs to Six-Month High on Signs Global Recession Is Easing"
8/8/2011	7.199	3.94%	20.97%	48	✓	"ZAR Falls to 10-Week Low on Continued Global Growth Concern; Bonds Drop"
9/21/2011	8.22	6.08%	25.58%	37.32	✗	"USD Climbs on Stimulus by the Fed to Fuel Economic Concern"
9/23/2011	8.1	-3.52%	29.18%	41.25	✓	"Improved sentiment on EM see Mexico Peso Gains on Bets Policy Makers Will Support Currency"
10/27/2011	7.68	-3.30%	25.33%	25.46	✓	"Full risk on EM Stocks Rise 20% From Oct. 4 Low on EU Debt Plan..."
12/8/2011	8.265	3.28%	23.24%	30.59	✓	"EM Stocks Decline to Week Low on EU Jitters"
4/15/2013	9.1986	3.37%	14.90%	17.27	✓	"ZAR weakened against USD, on IMF world outlook release"
12/10/2015	15.4615	3.20%	17.20%	19.34	✓	"SA Markets Rattled as President Zuma Fires His Finance Minister"
12/14/2015	15.0937	-5.06%	26.16%	22.73	✓	"SA Minister U-Turn Doesn't Remove Policy Uncertainty, Pravin appointed damage control"
2/26/2016	16.1488	3.67%	22.82%	19.81	✓	"ZAR Slumps Amid Concern Over the National Treasury Dispute"
3/17/2016	15.1625	-3.22%	27.97%	14.44	✗	"SA Raises the Lending Rate to 7% as Political Crisis Hits Rand"
6/3/2016	15.088	-3.08%	19.97%	13.47	✗	"ZAR Extends Gains vs USD After S&P Affirms Rating"
6/24/2016	15.06	4.48%	25.58%	25.76	✓	"ZAR slumps to record versus JPY, most since 2008 to USD, along with other African Assets Slump as Brexit Vote Triggers Commodity Decline"
8/23/2016	13.995	3.09%	17.67%	12.38	✓	"ZAR Plunges After Finance Minister Gordhan Summoned by Police in SA"

10/11/2016	14.3609	3.95%	22.99%	15.36	✓	"ZAR plunges on SA local political turmoil"
11/10/2016	14.12	4.94%	24.91%	14.74	✓	"ZAR dropped the most in five years, leading global currency declines against USD as a global bond selloff worsened amid concern that spending by the US Pres Donald Trump administration will fuel inflation"

Source: Bloomberg and own calculations

Figure 9: VIX index



Source: Bloomberg and own calculations

Figure 10: USD/ZAR Foreign Exchange Behaviour (2008 to 2017)



Source: Bloomberg and own calculations

The gap I sought to address in my research was to highlight that sentiments should not be ignored when considering exchange rate determinants. The USD/ZAR currency pair is one of the most traded emerging markets currencies. As such, the pair is very liquid and tradable. For this reason, South Africa's importers and exporters have the ability to enter international trade easily. For instance, African countries like Zimbabwe, Angola, Nigeria, and Sudan are suffering due to currency liquidity as regards to international trade payments. In the case of South Africa, the liquidity of USD/ZAR provides both positives and negatives. The positives are the currencies' ability to trade freely with the disadvantage of over valuation or under valuation. This may be a result non-fundamental issues as evidenced in Table 2 above.

1. The 2008 October and November – VIX spikes

According to Theunissen (2008a) the South African rand experienced one of its highest depreciations against the United States of America dollar and other major currencies during the month of October 2008. This was the largest depreciation since 2002. The depreciations were a result of: the global financial turmoil, fear of imminent global recession, slow capital flows to emerging markets, and declining emerging market investment confidence. This situation was not unique to South Africa, as it has also affected other emerging markets countries such as, Brazil, Indonesia, Ukraine and Iceland. The effects of South African currency depreciation are that, South Africa generates over 50% of revenue from exports. As such, a weaker rand leads to low export revenue for business and the country. The fear of potential global recession and its implication was behind this depreciation.

During the months of November and December 2008, the demand for high yield emerging markets continued to decline, including that of South Africa, further reducing export or foreign currency earnings. The USD/ZAR currency pair depreciated from 7.83 on the 29th of February 2008 to 10.50 on the 1st of December 2008, (see table 2 above). Further, Theunissen (2008b) comments that global equities lost \$32 trillion during 2008 as a result of the reduced global growth and investor move to safe haven i.e. emerging markets asset sell off. Estimated global asset write off including credit losses, amounted \$966 billion, making 2008 the worst financial depression since the great depression of the 1970s.

2. The year 2009 Sentiments add more

Negative sentiments due to the fear of global recession on the back of the global financial crisis continued to be a key driver in 2009 as well.

During the beginning of 2009, Theunissen (2009a) reports that the domestic currency depreciated as the country's president elect faced the courts. The ANC had elected Mr Jacob Zuma to be the next head of state. However, in January

2009, the Supreme Court of Appeal decided that Mr Zuma, should face the courts for accusations relating to corruption, racketeering, fraud, bribery and tax evasion.

The domestic currency improved by 1.4% against the USD as the South African president Jacob Zuma announces on the 20th of July that Ms Gill Marcus will succeed Mr Tito Mboweni as the governor of the central bank. Ms Marcus will join the South African Reserve Bank from her role as chairwoman of Barclays Plc's Absa Group Ltd. Markets sentiments are positive and supported the appointment (Theunissen, 2009b).

The South African rand lost 1.6% amid pronouncements in October 2009 by Mr Pravin Gordhan who announced that domestic currency is too strong. As such, National Treasury may massage the domestic without direct market intervention. Market did not take this nicely as the market prefer no direct or indirect currency manipulation by the government (Theunissen, 2009c).

3. The 2010 mergers and acquisitions

The failure of MTN Group Ltd. to conclude an acquisition of Algeria's Orascom Telecom. The domestic currency strengthened by 2% on 29th of April (Theunissen, 2010a). On May 12, the rand gained 0.5% amid talks that Standard Chartered Bank may purchase Nedbank Limited (Theunissen, 2010b).

4. 2011 dynamics post the world cup

The imminent elections in Italy lead the rand to a 1.1% decline on October 22 during 2011, with Italy in debt crisis, and the need for austerity measures. Whoever, wins the presidential elections may be in support or decide not to implement the austerity measures (Theunissen, 2012)

5. 2012 currency activities

2012 did not have periods of extreme volatilities as per the criteria defined above, but it had interesting events which had an impact on sentiments and will be important to note.

The events included: change of South Africa's credit rating outlook by Fitch and Moody's investor services; talks about the country's assets nationalisation; Central bank announcement and Greece economy concerns.

Fitch cut South Africa's credit rating outlook to negative from stable early in January 2012. This saw the rand falling by 2.2%, erasing all the gains it made since the beginning of the year. Moody's had also reduced South Africa's outlook the previous year in November 2011 as well from negative to stable, citing heightened political risk as the concern (Martinez, 2012).

Talks about nationalising South Africa's assets by the ruling African National Congress youth wing (mining to be exact), took centre stage as well which upset investor confidence. Fitch warned that any steps to try nationalise mining assets would have immediate and negative consequences to the country's rating (Ibid: 2012)

On February 10th, the rand was under pressure, headed for its first weekly drop in five days as markets were concerned about the Central bank announcement. The bank was set to make an announcement of "national importance" the following day. This saw the rand declining 2.7% and becoming the worst performer out of the twenty emerging markets currencies as monitored by Bloomberg (Brand, 2012).

The above just highlights what fear and uncertainty can do to the markets. Any first sign of fear, results in immediate risk to emerging markets assets.

2009 also saw Greece experiencing some drama which had an impact on the markets.

On February 13, the rand strengthened along with other emerging market currencies as the Greek Parliament approved austerity measures, boosting demand for riskier assets. The positive sentiments was welcomed by market participants and certainly promised to be positive for the rand (ibid: 2012)

6. 2013 events

During the end of May 2013, the domestic currency lost 2.4% intraday due to speculations that South African central bank could act outside its mandate to mute currency volatility. The concern in the forex market was that the SARB would intervene a freely floating exchange rate. Governor Gill Marcus dismissed the reports; however, the markets were still unsettled (Brand and Visser, 2013).

7. 2015 events

When you think the rand has seen it all, our own local developments or happenings in South Africa, sent the market into an immediate panic and saw the rand plummet. The year 2015 was seen as fairly stable, with absent or minimal episodes of extreme volatility until later in the year when the then Finance Minister, Nhlahla Nene was recalled, apparently to be deployed to another “strategic position”. This move was seen as a big negative by market participants and as expected, the rand was hit hard.

The unexpected cabinet reshuffle by President Jacob Zuma which saw the Minister of Finance, Nhlanhla Nene fired on 9th of December 2015 rattled the markets. Moreover, the appointment of Mr David van Rooyen as Mr Nene’s successor, raised even more concerns. The forex market response emanated into a domestic currency depreciating, posting a biggest decline in more than four years. The rand hit a new record low of 15.3857, posting its biggest decline since September 2011 of about 5.4% (Cohen and Vollgraaff, 2015).

8. 2016 events

The local unit lost 3.6% against the dollar amid news of dispute between The Minister of Finance, Mr Pravin Gordhan, and the head of the South African Revenue Services (SARS) Mr Tom Moyane. This was the biggest decline since September 2011; the rand traded at 16.1801 on the day at 16h10 in South Africa. The cited reason was that there is a power struggle between the two. The head of the National Treasury is not happy with the conduct of the SARS Commissioner. Yet, the President of the country supports the SARS Commissioner. The forex markets are not taking this kindly (Khanyile, 2016).

6. Conclusion and recommendation

Even though there continues to be volatility in the market, the periods of extreme volatility as evidenced by high VIX numbers and log changes were mostly in 2008 when the global financial crisis hit the world. High VIX numbers of between 50 to 100 were last seen between the periods of 2008 and 2009.

The fear and uncertainty prevailing in the markets at that time was high. The fear was largely driven by concerns of the global economy recession on the back of the global financial crisis. That period was characterised by severe deterioration in risk appetite and this resulted in emerging markets' currencies suffering hard, including the rand. Investors were cutting most of their exposures if not all, to emerging markets. It was a complete risk off season as investors were fleeing to safe-haven assets.

Developments in the local political arena in South Africa also contributed to the weakening of the rand against the dollar. Fears of the local political unrest saw the rand decline against the dollar, as this resulted in immediate loss of confidence in the local markets and investors shun of South Africa's assets. Some of the developments included, change in government leadership, evidenced by changes of Presidential leadership, the South African Reserve Bank Governor, as well as Ministry of the National Treasury. Any sign of uncertainty in our local markets sends investors to an immediate panic.

International political uncertainties were also noted to be important factors that may positively or negative affect the currency pair under consideration. The Brexit event and the Trump era in the US. Markets participants are watching events in these particular markets closely and any sign of uncertainty, investors run to safe haven assets which this is always negative for emerging markets.

The aforementioned, are in line with at least one contributor to the forex volatility as mentioned by Maveé, Perrelli, and Schimmelpfennig, (2016) that of local politics.

Large mergers and acquisition involving domestic entities with off shore companies seem to create potential inflow or outflows of forex are also present with respect to investor sentiments.

Recommendation for future research

This research article focused on the effects of sentiments in general on the USD/ZAR exchange rate, however the results revealed a few aspects that still need to be researched and explained. I would recommend the following areas for consideration:

- Why is it the case that negative sentiments have more impact on the USD/ZAR currency pair than positive sentiments?
- Why is it the case that global events emanating mostly from the U.S or the EU prove to have more harmful effects to emerging markets, especially South Africa?
- In recent years, we have seen the rise in geopolitical risks being the major driver of markets. It would be interesting for this area to be researched more and highlight the impact this have on exchange rates.

REFERENCES

- Baker, M., and J., Wurgler. (2006). Investor sentiment and the cross-section of stock returns. *Journal of Finance*, 61, 1645-1680.
- Baker, M., and J., Wurgler, (2007). Investor Sentiment in the Stock Market. *Journal of Economics Perspectives*, 21(2), 129–151.
- Balcilar, M. Cyprus. N. Gupta, R. and Jooste, C. (2015). The dynamic response of the rand real exchange rate to fundamental shocks.
- Bandopadhyaya, A, and Jones A.L. (2006). Measuring investor sentiment in equity markets.
- Bleaney, M., and Francisco, M., (2003). Exchange rate regimes and inflation-only hard pegs make a difference. *University of Nottingham Discussion Paper No. 03/15. p.p. 1-36.*
- Bloomberg.(2008,2009,2010,2011,2012,2013,2014,2015,2016,2017)
- Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)
- Bloomberg. (2008) "South African Rand Drops as Stock Losses Curb Demand for Yield" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)
- Bloomberg. (2008) "South African Rand Falls Versus Dollar as Stock Market Decline" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)
- Bloomberg. (2008) "Rand Slumps, Heads Toward Biggest Weekly Decline in Two Years" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)
- Bloomberg. (2008) "South African Rand Rises Most in Four Years as Credit Woes Ease" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)
- Bloomberg. (2008) "South African Rand Drops Versus Dollar as Credit Crisis Spreads" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2008) "South African Rand Drops Versus Dollar as Credit Crisis Spreads" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2008) "South African Stocks Slide, led by BHP, as Commodities Tumble" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2008) "Amid deepening concern the credit crisis is spreading, sapping demand for higher-yielding, emerging-market assets" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2008) "Concern the credit-market crisis will curb growth, sapping demand for higher-yielding emerging-market asset" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2008) " All the higher-yielding currencies are strengthening, which is all down to government bank-support plans" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2008) " South Africa's Rand Drops Versus Dollar on Recession Concern" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2008) " Reversed the losses after plummeting on the 15th amid recession concern" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2008) "South African Minister Says Rand Volatility Overdone" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2008) "South Africa, Ukraine Are in Currency `Crisis" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2008) "South Africa's Rand Rebounds After Slumping to 6 ½ Year low" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2008) "South African Bonds Rise as Rand, Stocks Rally" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2008) "South Africa's Rand Rises Against Dollar, Euro as Stocks Rally" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2008) "South African Rand falls Against Dollar as Stock Markets Tumble" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2008) "Rand Snaps Two-Day Advance as Stocks Drop, Credit Outlook Cut" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2008) "Rand Rises to Highest Level in Three Weeks on Fed Stimulus Plan" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2008) "Rand Drops to One-Week Low as Stocks Drop, Manufacturing Slumps" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2009) "Emerging-Market Stocks Sink in 2008, May Rebound on BRICs Rally" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2009) "Rand Drops to 3-Week Low on Ruling Zuma Can Face Graft Charges" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2009) "Rand Rebounds as Exporters Buy South African Currency, On rates" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2009) "Rand Climbs to Six-Month High on Signs Global Recession Easing" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017)

Bloomberg. (2011) " Rand Falls to 10-Week Low on Global Growth Concern; Bonds Drop" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017

Bloomberg. (2011) " Mexico Peso Gains on Bets Policy Makers Will Support Currency" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017

Bloomberg. (2011) "Emerging-Market Stocks Decline to Week Low on Europe Jitters" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017

Bloomberg. (2013) "South Africa Rand weakened against the dollar, IMF world outlook" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017

Bloomberg. (2015) "South African Markets Rattled as Zuma Fires His Finance Minister" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017

Bloomberg. (2016) " South African Rand Slumps Amid Concern Over Treasury Dispute" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017

Bloomberg. (2016) " South African Rand Plunges After Gordhan Summoned by Police" Bloomberg Professional. [Online]. Available at: Subscription Service (Accessed: 24 August 2017

Bhundia, A., and Ricci, L., (2001). The Rand crisis of 1998 and 2001: What have we learned?

Bubula, A. and Otker-Robe, I., (2003) Are Pegged and Intermediate Exchange Rate Regimes More Prone? *International Monetary Fund Working Paper No. 03/223. P.p 1-34.*

Caruana, J., (2007). Review of Exchange Arrangements, Restrictions, and Controls. International Monetary Fund. P.p. 1-38.

Christiansen, C., Ranalda, A., and Soderlind, P. (2009). The Time-Varying Systematic Risk of Carry Trade Strategies.

Chicago Board of Options Exchange (CBOE), 2014. The powerful and flexible trading and risk management tool from the Chicago Board of Options Exchange.

Creswell, J.W. (2003) Research Design, Second Edition, Sage Publications, California.

du Toit, J., (2014). Housing Review First Quarter 2014. ABSA.

Duncan, A.S., and Liu, G.D., (2009). Modelling South African Currency Crises as Structural Changes in the Volatility of the Rand. University of Johannesburg

Gupta, R., and Reid, M. (2012). Macroeconomic Surprises and Stock Returns in South Africa. University of Pretoria, Working Paper 12.

Haque, T., (2016). Risk-On Risk-Off: How does Risk-On Risk-Off affect returns to the Australian stock market?

Hassan, S. (2015). Speculative Flows, Exchange Rate Volatility and Monetary Policy: The South African Experience. South African Reserve Bank Working Paper 2.

Hsing, Y. (2016). Determinants of the ZAR/USD exchange rate and policy implications: A simultaneous-equation Model International Monetary Fund

(2004). Classification of Exchange Rate Arrangements and Monetary Policy Framework.

Leedy, P.D. and Ormrod, J.E. (2001) Practical research: Planning and Design, Seventh Edition, Prentice-Hall Inc., Upper Saddle River, New Jersey.

Odhiambo, M., (2015). Exchange rate dynamics in South Africa: A review of past and present regimes.

Rensburg, R., McConnell, C., and Brue, S (2011). *Economics Southern African* Edition. The McGraw-Hill Companies, Inc.

Ilzetzki, E., Reinhart, C., and Rogoff, K. (2010). Exchange Rate Arrangements Entering the 21st Century: Which Anchor Will Hold? Mimeo University of Maryland and Harvard University

Mandolos, A. (2014). A time series analysis of the ZAR/USD exchange rate.

Maveé, N., Perrelli, R., and Schimmelpfennig, A. (2016) ,Surprise, Surprise: What Drives the Rand / U.S. Dollar Exchange Rate Volatility?. IMF Working paper Working Paper No 16/205. P.p. 1 – 36.

Mpofu,T,. and Peters, C. (2016). The impact of monetary policy announcements and political events on the exchange rate: The case of South Africa

South African Reserve Bank (SARB), (2017). Monetary Policy Review April 2017. *South African Reserve Bank*.

Whaley, R.E. 2008. Understanding VIX. Working Paper, Vanderbilt University.

Yang, Y., and Copeland, L. (2014). The Effects of Sentiment on Market Return and Volatility and The Cross-Sectional Risk Premium of Sentiment-affected Volatility. Cardiff Economics Working Papers