Effects of Exchange Rate Movements on Stock Market Prices in South Africa

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Abstract: The exchange rate and stock market prices nexus can help investors to diversify their portfolio and choose a country for investment to increase the returns in their portfolios. Exchange rate as the rate of one country's currency in terms of another, play an important role in a country's level of trade. The paper investigated the relationship between stock market prices and the exchange rate in South Africa using monthly data for the period 2006 to 2016. The analysis began by conducting the unit root tests using both the Augmented Dickey Fuller and Phillips- Perron approaches to address stationarity in this time series model. The model applied the Johansen cointegration, Autoregressive Conditional Heteroskedasticity (ARCH) and the generalised ARCH (GARCH) models due to high volatility of the stock market prices. The ARCH test indicated presence of heteroscedasticity and that gave way to run the GARCH model. The GARCH model results confirmed that when the foreign exchange rate appreciates, the stock market will thus be negatively affected. The results from the Johansen cointegration test have proven that a long relationship between stock market prices and the exchange rate exist. A large portion of Johannesburg Stock Exchange investors are foreign and are influenced by variations in the exchange rate on share-price valuation. Hence, it is recommended that the South African Reserve Bank needs to stabilise and protect South Africa's currency.

Keywords: Exchange rate, Stock market prices, Volatility, GARCH

1. Introduction

Several studies have investigated the relationship between exchange rate and the stock market prices. Exchange rate is the rate of one currency in terms of another (Basher, Haug & Sardosky, 2016). Exchange rates play an important role in a country's level of trade, which is vital to most open market economies in the world including South Africa (Auer & Schoenle, 2016). This makes exchange rates to be one of the most watched, analysed and governmentally manipulated economic measure. Jain & Biswal (2016) add that amongst others, the relationship between stock market prices and exchange rate can also help determine economic performance and political stability of a country.

Foreign investors look for countries with strong economic performance to invest their capital (Menike, 2006). If a country has both a strong economic performance and stable politics, it attracts huge investments for itself. Political turmoil can, for example, cause a loss of confidence in a currency and a movement of capital to the countries of more stable currencies. Mahmudu & Gazi (2009) argues that the impacts of exchange rate on stock exchange provide important implications for monitory policy, risk management practices, financial securities valuation and government policy towards financial markets.

The stock market in South Africa is administered in the Johannesburg Stock Exchange (JSE) Limited where buyers and sellers of stock meet. The JSE is the oldest existing and largest stock exchange in Africa. Despite its relatively large size, historically, the turnover ratio has been relatively low (Serpil, 2016). As shown in the JSE, the All-Share index was 19.49% in 2012 and it decreased all the way to 4.53% in 2016. The year 2015 was one of the most difficult years for the South African stock market with the All-Share index of 2.37%. Ramey (1995) explains that exchange rate volatility is inversely related to economic growth. Aurelijus (2012) goes on confirming this by proving that a 50-percent increase in volatility translates into 0.4-percentage-point lower annual per capita growth. The openness of a country's economy is also recognised as a cause of volatility of its market (Enyaa, 2011). Hence, it was imperative to determine if the fluctuations are related to exchange rates. The study adopts exchange rate as the main macroeconomic variable that could influence the stock market prices. The volatility and fluctuations in both the stock market and the exchange rate are the challenges that led to an interest of investigating

a relationship between the stock market prices and exchange rate. High volatility is the unpredictability of the cost of capital, which undermines the efficient allocation of funds (Akdogu, 2016).

This research was motivated by the fact that, although the impact of exchange rate on stock markets has been investigated in both developed and developing economies, it is still of limitation in South Africa. Even the researchers that have documented this relationship, did so some decades back, Jammine & Hawkins (1974), Hadassin (1976) & Du Toit (1986), Affleck-Graves & Money (1975), Gilbertson & Roux (1977, 1978), Knight & Afflect-Graves (1983). Van Rensburg (1995, 1998, and 1999) conducted the most notable study of this nature in South Africa. However, the sample period of this study spanned the apartheid era in the history of South Africa. In this period, South Africa's economy was crippled by economic sanctions, international disinvestment and trading restrictions (Coovadia, 2014). Although Serpil (2016) stresses that exchange rates and stock prices play a major role both in fostering financial sector development and in aggravating financial crises, Hossein (2011) complains that the literature has rarely studied the potential impact that macroeconomic variables may have on developing stock market index.

Determining whether stock market prices can be explained using changes in exchange rate, analysing whether a long run and a short run relationship exist between exchange rate and the stock market prices and predicting whether exchange rate is useful in forecasting the volatility in South African stock market prices are the three objectives of this study. The sections of this paper are structured as follows; the second section examines the theoretical literature and empirical evidence, the third section examines the research methodology, the fourth section, empirical results and discussion and the last section concludes.

2. Literature Review

The literature review is divided into two sections which discuss the theoretical and empirical literature.

2.1 Theoretical Literature

Serpil & Ayse (2016) argue that there are two theoretical approaches that address the relationship between stock markets and exchange rate namely stock orientated models and flow orientated models. Flow orientated model, is a traditional approach initially developed for exchange rate determination (Serpil & Ayse, 2016). It suggests that the stock market reacts to changes in exchange rates, which are the result of the current account performance of the country.

Stock orientation model suggests the causality runs from stock market to exchange rates. This model focuses on the financial capital account as the main determinant of exchange rate dynamics. Akdogu (2016) emphasises that, "there is no reason to expect only one of these theories to be empirically valid; all of the mechanisms mentioned above may be simultaneously at work". Thus, the nature of the relation between stock prices and the exchange rate is likely to be dependent on the particulars of individual countries as well as the global conjuncture.

Bahmani-Oskooee & Saha (2015) theoretically justifies a positive link from stock prices to exchange rates. The author argues that an increase in stock prices causes an increase in output through an increase in wealth and investment. Then, the Mundell-Fleming model with J-curve effect was employed to trail out the impact of higher output on the exchange rate. Finally, theoretical support for the negative impact of exchange rates on stock prices was outlined.

2.2 Empirical Literature

This section discusses studies showing a relationship between the stock market, exchange rate, interest rate, inflation and money supply. The importance of how macroeconomic variables affect stock markets has been in the interest of many researchers as from the 1960s. Although some developing countries have also investigated the importance and usefulness of this relationship, research into the relationship between stock market returns and multiple macroeconomic variables for the South African economy has been limited. Ajayi (1996) investigated both the long run and short run relationship between stock prices and exchange rate of eight developed economies. It was found that an increase in stock prices causes the currency to depreciate for both the United Kingdom and the United States of America. This proved an existence of a negative relationship between exchange rates and stock prices.

Abdalla & Murinde (1997) observed the relationship for four emerging market economies; India, Pakistan, South Korea and Philippines. The error correction model was applied using monthly data from 1985 to 1994. The results indicated that causality runs from exchange rates to stock prices in India, Pakistan and South Korea while in Philippines, it runs in the opposite direction. Other studies such as Akdogu & Ayse (2016), at the same time, provided findings that there is no universal pattern for the causal relationship between stock prices and exchange rates in emerging market economies. These findings were based in the case of 21 emerging economies, included amongst others were Brazil, Egypt and Chile, for the period 2003 to 2013.

Interest rates had been the most used macroeconomic variable in investigating this relationship with stock prices (Alam & Uddin, 2009). When Cengiz & Başarir (2014) investigated the long run relationship between stock market capitalization rate and interest rate in Turkey for the period 1998 to 2012, it was figured out that there is long-run relationship between stock market capitalization rate and interest rates. Furthermore, interest rate and stock market performance were found to be negatively related. If interest rate increases, investors will avoid making high-risk stock market investment comparing to low risk interest.

On the other hand, Seyed, Zamri, & Yew (2011) discovered that in both long and short run, there is a linkage between the four chosen macroeconomics variables (crude oil prices, money supply, industrial production and inflation rate) and stock market indices in both China and India. In the long run, the impact of increases in crude oil price in China was positive but in India negative. In terms of money supply, for example, Lai discovered that the impact on Indian stock market was negative, but for China, there was positive impact. The effect of industrial production was negative only in China. From these findings, even though both China and India are developing economies, it was evident that the effects of macroeconomic variables on stock markets might differ for each country's economy.

Ramin, Lee, & Mohamad (2004) investigated the relationship between interest rate, exchange rate, inflation rate, money supply, industrial production and stock market indices on the Singapore stock market. Singapore stock market and the Stock Exchange Singapore All-S Equities Property Index formed significant relationships with all macroeconomic variables identified, while the SES All-S Equities Finance Index and SES All-S Equities Hotel Index form significant relationships only with selected variables. This proves that not all macroeconomic variables relate positively with the stock market. Contrarily, some researchers discovered that the relationship exists between the stock market index and all four selected macroeconomic variables namely interest rate, exchange rate, inflation rate and money supply (Fama, 1981; Mhmoud, Sara & Khaled, 2016). This was found in the case of two emerging economies, Tunisia and Egypt. In this case, the researcher argued that the macroeconomic factors can be used in explaining stock market fluctuations.

A long run relationship between the New Zealand stock market indices and seven macroeconomic variables (inflation rate, exchange rate, gross domestic product, money supply, long term interest rate, short term interest rate and domestic retail oil price) was documented by Christopher, Minsoo, Hua, & Jun (2006). Although New Zealand is a developed economy, its stock market is relatively small compared to other developed economies. As a result, New Zealand stock exchange was found not to be a leading indicator for the investigated period 1990-2003. Strohe (2002) confirmed this positive relationship existed also in two large export countries Japan and Indonesia.

The Asian crisis of 1997-1998 has made a strong pitch for dynamic linkage between stock prices and exchange rates (Nath & Samantha, 2003). The study revealed that the crisis had been proved to have a negative effect on the exchange rate in the form of depreciation, and led to a fall in the stock prices. It was evident that a causal relationship between stock prices and exchange rate exists. While the study was based in India, for the period 1993 to 2003, generally returns in these two markets were not interrelated, though in recent years, the return in stock market had causal influence on return in exchange rate with possibility of mild influence in reverse direction.

The major impact exchange rate had on stock market returns has also been found in the study done in Pakistan (Jamil & Ullah, 2013). It was enlightened that, if there are fluctuations in rupee, the exchange rate will unfavourably affect the change in market returns. Thus, this tells us that for a stable

stock market, exchange rate must be maintained in a favourably territory. This attested to a study done, focusing in two countries, the United States of America and the United Kingdom. In the study, Dimitrova (2005) investigated whether there is a link between the stock market and exchange rates that might explain fluctuations in either market. Dimitrova (2005) made the case that, in the short run, an upward trend in the stock market may cause currency depreciation, whereas weak currency may cause decline in the stock market. Gavin (1989) showed that a booming stock market has a positive effect on aggregate demand.

Some contradictions are found from Suriani, Kumar, Jamil & Muneer (2005) that a relationship between exchange rate and stock market prices does not exist. The paper applied the Granger causality test which showed that both variables do not Granger cause each other. This means the variables do not affect each other and there is no interaction in between them. Furthermore, Bhattacharya & Mukherjee (2003) supported the findings of the study that there was no integration in stock price and exchange rate by conducting the research in India.

Odoyo, Muasya & Kipyego (2014) argued that the economic theory points to the relationship between stock price and exchange rates but does not properly define the direction of the relationship. In the investigation in Kenya, it was established that there was a robust, positive correlation between foreign exchange rates represented by the Kenyan shilling to the US Dollar and the stock price index as provided by the Nairobi securities exchange 20-share Index. Thus, when the exchange rate rises it infers an increase of the Kenya shilling or appreciation of the foreign currency. This means that when the foreign currencies appreciate or Kenya shilling depreciates, the stock prices fall. Also, when the stock prices rise, the foreign currencies depreciate or Kenya shilling appreciates.

3. Methods and Materials

This section outlines the methodology used in the paper. It integrates the model specification, data collection and estimation techniques.

3.1 Data

In order to achieve the stated objectives of how exchange rate influence stock market prices in South Africa, secondary time series data on monthly basis for the period 2006 to 2016 was chosen. Gay (2016) notes that the South African stock market recently witnessed a continuous drop in the All-Share Index and volume of traded securities in the period 2005 to 2015. Hackland (2015) also adds that during this period, the 2008/9 global crisis caused the drop in all sectors of the JSE. The stock market indices have moved far relative to their previous year's levels.

The data used was sourced from South African Reserve Bank (SARB), International Monetary Fund (IMF), Statistics SA and Quantec SA.

3.2 Model Specification

This study used quantitative research design. The variables under investigation are as follows; market index as proxy for stock market prices, South African Rand (ZAR) per U.S dollar as a proxy for exchange rate; deposit rate to represent interest rates; consumer price index as proxy for inflation and M2 for money supply. Most studies that investigated about the effects of macroeconomic variables on stock prices have used interest rate as the most important factor, thus it should be noted that this study uses exchange rate.

$$SM_t = f(ER_t + IR_t + CPI_t + MS_t) \quad (1)$$

Equation 1 indicates that Stock Market prices (SM) as a dependant variable is a function (f) of exchange rate (ER), interest rate (IR), consumer price index (CPI) and money supply (MS).

Linearizing the model, we obtain Equation 2,

$$SM_T = \alpha + \beta_1 ER_t + \beta_2 IR_t + \beta_3 CPI_t + \beta_4 MS_t + \varepsilon_t \quad (2)$$

Where, α is the constant, β's are the coefficients of the explanatory variables and ε is the error term.

3.3 Estimation Techniques

To test the hypotheses that exchange rate affects stock market prices, an econometric analysis was employed. Unit root tests, Johansen cointegration and general autoregressive conditional heteroscedasticity models are discussed in the sections below.

3.3.1 Unit Root Tests

Phillips-Perron (PP) and Augmented Dicky Fuller (ADF) were used to test whether each of the time

Table 1: Augmented Dickey Fuller and Phillips-Perron Test Results

		ADF			Phillips-Perron		
Order of Integration	**Variable**	**Intercept**	**Trend**	**None**	**Intercept**	**Trend**	**None**
Level	1.Lstock Prices	-7.511485*	-9.765588*	-1.049271	-6.961320*	-9.002097*	-1.498470
1st Difference				-18.01722*			-21.96977*
Level	2.Lexchange Rate	-0.934338	-2.051050	1.400940	-0.774434	-1.834369	1.659323
1st Difference		-8.557046*	-8.526196*	-8.400879*	-8.507479*	-8.475758*	-8.301802*
Level	3.Interest Rate	-1.767221	-2.216878	0.115123	-1.441405	-1.750244	0.223534
S1st Difference		-3.849526*	-3.847274*	-3.836360*	-10.84339*	-10.82908*	-10.83883*
Level	4.Inflation Rate	-3.879472*	-3.715640*	0.103819	-2.709047	-2.428191	0.064821
1st Difference				-5.038009*	-9.469989*	-9.638768*	-9.375863*
Level	5.Lmoney Supply	-5.641990*	-5.257174*	2.966357	-4.247233*	-4.621635*	5.836568
1st Difference				-2.270124*			-6.991817*
Notes: * denotes rejection of the null hypothesis at 0.05 level							

Source: Author

series variables used in the study is non-stationary or not, and therefore possesses a unit root (Dickey & Fuller, 1979). The researcher chose Phillips Perron for confirmation of the ADF based on Brooks (2008) argues Phillips and Perron's theory of unit root to be more comprehensive. If variables are found non-stationary they will be differenced make them stationary (Brooks. 2008).

3.3.2 Johansen Cointegration Test

The Johansen cointegration test was used to test if a cointegration relationship between exchange rate and the stock market prices exists. Both the trace and maximum Eigen values have been used to indicate 1 cointegration relationship. The presence of cointegration is an indicator of a long-run relationship in the series.

3.3.3 General Autoregressive Conditional Heteroscedasticity Model

The autoregressive conditional heteroscedasticity (ARCH) model was used to provide a framework for the analysis and development of time series models of volatility. The ARCH model was introduced by Engle (1982). Through following two decades, this basic model was significantly extended, leading to many different types of models, which created an extensive ARCH family framework (Engle, 2001). The most important extension of the ARCH model was the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model introduced by Bollerslev, Chou & Kroner (1992). Before running any GARCH model, it is important to ensure that an ARCH effect exists in the model. A simple ARCH specification would not definitely be sufficient to capture all dynamics of the process. This can be understood as a confirmation that variance processes of stock market returns are highly persistent (Engle, Lillien & Robbins, 1987; Ryan, 2004; Reboredo & Rivera-Castro, 2014).

4. Results and Discussion

This section presents the results found in the study and discussions thereof.

4.1 Unit Root Test Results

Most of the series data is non stationary at level, therefore before making any estimation of the GARCH model, all our variables need to be tested for stationarity. The reason is that regressing two trending variables can lead to a spurious regression, where we have a high coefficient of determination and high significance of independent variables, although these variables are completely unrelated.

Unit root testing was conducted using both Augmented Dicky Fuller and Philips-Perron. The test was conducted under all assumptions, that is, with intercept; without intercept but trend; and without intercept and trend. The results for all the five variables are presented in Table 1 above.

Table 1 indicated five variables that were tested for stationarity namely stock market prices (SMP), exchange rate (ER), interest rate (IR), inflation rate (CPI) and money supply (MS). Exchange rate, interest rate and inflation were found to be non-stationary at levels and stationary at first difference which is the common phenomenon in most of the economic

Table 2: Johansen Cointegration Test Results

Hypothesized No. of CE(s)	Trace statistics	Critical value (0.05)	Probability
None*	70.16153	69.81889	0.0469
At most 1	43.47198	47.85613	0.1215
At most 2	25.07370	29.79707	0.1588
At most 3	13.24427	15.49471	0.1061
At most 4	3.232234	3.841466	0.0722
Notes: * denotes rejection of the null hypothesis at 0.05 level			

Source: Author (2019)

time series (Dimitrova, 2005). Further, ADF statistics and PP test rejects null hypotheses of unit root at level of the other two variables, stock market and money supply at five percent in case of trend and trend & intercept. Without trend and intercept, the data was differenced once to make it stationary. Therefore, it can be concluded that generally variables are of first order integration and became stationary after first differencing.

4.2 The Johansen Cointegration Test Results

After indicating the order of integration, the Johansen cointegration test was run using both the trace and the max Eigen values. The trace results are presented in Table 2.

Table 2 indicates the presence of one cointegrating relationship. This is shown by the trace statistic of 70.16153, which is greater than the critical values of 69.811889 at 5% level. This means that a long-term relationship exists between the stock market prices and exchange rate, proven by the p-value of less than 0.05 at none. We thus reject the null hypothesis because it is significant.

Hancocks (2010) supports these findings by claiming that a large portion of JSE investors are foreign and are influenced by variations in the exchange rate on share-price valuation. Thus, foreigners benefit from a weaker rand position when investing in the South African stock market (Hamrita & Trifi, 2011). This also affects domestic investors because factors such as inflation and market growth affect them directly. In the long run, an unfavourable outlook in either of these factors will cause a marked swing in price performance on stock market performance with depreciation in exchange rate, an increase in money supply or a decrease in inflation having a positive effect on the stock market.

4.3 The ARCH Model Test Results

Before the application of any GARCH model, it is convenient to ensure the presence of ARCH effects. Engle (1982) proposed a procedure for testing the presence of ARCH effects. Table 3 on the following page presents results of the ARCH test.

From Table 3 test results, it can be seen that the probability of the F-version statistic is significant, suggesting that there is heteroscedasticity in the stock market prices and exchange rate relationship. This is a go ahead to run the GARCH model.

4.4 The GARCH Model Test Results

Stephan (2014) argued that the main advantage of the GARCH model is allowing for a longer memory of process, but at the same time, getting along with a much more flexible lag structure. Table 4 on the following page indicates results of the GARCH model.

Table 4 showed that there is a negative statistically significant relationship between exchange rate and stock market prices. The negative relationship was also found in literature from studied of Jamil & Ullah (2013), Dimotrova (2005) and Nath & Samantha (2003). This indicates that a depreciating exchange rate could increase stock market prices. Furthermore, this implies that a 1% decrease in exchange rate would increase stock market prices by 3%. This suggests a relatively large degree of persistency in the variance equation. It will thus take a relatively long time for the impact of past shocks to disappear (Robert, Sinclair, & Robert, 1997). Interest rates and money supply also indicated a negative strong relationship with stock market prices. However, inflation is the only variable in the model to show a positive relationship.

Table 3: The ARCH Model Test Results

Heteroskedasticity Test: ARCH				
F-statistic	0.000309	Prob. F(1,129)		0.0005
Obs*R-squared	0.000590	Prob. Chi-Square(1)		0.0027
Test Equation: Dependent Variable: WGT_RESID^2 Method: Least Squares Sample (adjusted): 2006M02 2016M12 Included observations: 131 after adjustments				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	1.009466	0.155610	6.487150	0.0000
WGT_RESID^2(-1)	-0.059113	0.085476	-0.691570	0.4905
R-squared	0.003694	Mean dependent var		0.951597
Adjusted R-squared	-0.004029	S.D. dependent var		1.498601
S.E. of regression	1.501618	Akaike info criterion		3.666112
Sum squared resid	290.8764	Schwarz criterion		3.710009
Log likelihood	-238.1304	Hannan-Quinn criter.		3.683949
F-statistic	0.478269	Durbin-Watson stat		1.971969
Prob(F-statistic)	0.490450			

Source: Author (2019)

Table 4: The GARCH Test Results

Dependent Variable: LSMP Method: ML ARCH - Normal distribution (BFGS / Marquardt steps) Sample: 2006M01 2016M12 Included observations: 132 Failure to improve likelihood (non-zero gradients) after 38 iterations Coefficient covariance computed using outer product of gradients Presample variance: backcast (parameter = 0.7) GARCH = C(6) + C(7)*RESID(-1)^2 + C(8)*GARCH(-1)				
Variable	**Coefficient**	**Std. Error**	**z-Statistic**	**Prob.**
LEX_RATE	-0.030103	0.013645	-2.206104	0.0274
CPI	0.002946	0.000732	4.025578	0.0001
IR	-0.008729	0.000823	-10.60693	0.0000
LMS	-0.214047	0.010729	-19.95091	0.0000
C	5.418507	0.033154	163.4350	0.0000
Variance Equation				
C	6.11E-05	1.29E-05	4.735157	0.0000
RESID(-1)^2	0.641192	0.193762	3.309170	0.0009
GARCH(-1)	-0.007132	0.003272	-2.179678	0.0293
R-squared	0.692309	Mean dependent var		3.926366
Adjusted R-squared	0.682618	S.D. dependent var		0.028247
S.E. of regression	0.015913	Akaike info criterion		-6.159112
Sum squared resid	0.032161	Schwarz criterion		-5.984396
Log likelihood	414.5014	Hannan-Quinn criter.		-6.088115
Durbin-Watson stat	0.746301			

Source**:** Author (2019)

Table 5: Summary of Diagnostic Tests Results

Test	Probability	Conclusion
Jarque- Bera (JB)	0.546 > 0.05	We do not reject the H0, terms are normally distributed
Breusch- Godfrey Serial Correlation LM test	0.4022 > 0.05	We do not reject H0, there is no serial correlation
ARCH test	0.4904 > 0.05	We do not reject H0, there is heteroscedasticity

Source: Author (2019)

4.5 Diagnostic Tests

Three diagnostic tests have been run to test for normality, heteroscedasticity and serial correlation. Table 5 presents the diagnostic test results.

To test for normal distribution, the Jarque-Bera test was conducted. The kurtosis of 3.456 was found which implies that the series is normally distributed. Theory states that the kurtosis must be equal or greater than three for the data to be normally distributed (Brooks, 2008). The Breusch-Godfrey serial correlation Lagrange Multiplier test indicated a p-value 0.4 which is greater than 0.05 implying no serial correlation in this time series model. Lastly, the ARCH test for heteroscedasticity also indicated a p-value of 0.4 (which exceeds 0.05), thereby concluding that there is no heteroscedasticity in the model.

5. Conclusion and Recommendations

This aim of the study was to analyse the relationship between the stock market prices and exchange rate in South Africa for the period 2006 to 2016. The key macroeconomic factors examined in this study are exchange rates, inflation, interest rates and money supply. The study made use of the Johansen cointegration and general autoregressive conditional heteroscedasticity methodology to analyse the relationship.

The Johansen cointegration indicated a long run relationship between the exchange rate stock market price series. The conclusion of this study is that long-run relationships between macroeconomic factors and share prices on the JSE exist. This finding corresponds with international studies which found that both developing and developed markets are all influenced by various macroeconomic factors. These factors are shown to have a shaping effect exogenous to the stock market itself on prices within the market. The implications of this are that changes in the selected macroeconomic factors can be used to predict future moves in stock prices.

In the long run, an unfavourable outlook in exchange rate fluctuations can cause a marked swing in price performance on stock market prices. Money supply negatively influence stock market prices while inflation having a positive effect on the stock market. From the GARCH test, it is evident that the volatility of exchange rate does have an impact in stock market prices, thus it can be used to determine the state of the stock market. This shows that it is important for the South African Reserve Bank to stabilise and protect South Africa's currency.

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