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The Impact of Political Instability on Exchange Rate in South Africa: An Econometric Modelling

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Abstract

The study examines the impact of political instability on exchange rates while adjusting for economic growth and real interest rates from 1989 to 2020. After applying the VECM model, the findings indicate a short-term correlation between exchange rates and political instability. The results of the Granger causality suggest that exchange rate fluctuations and inflation rates are not directly caused by political instability. Additionally, the ARIMA model results indicate that political instability in the long run should be anticipated to cause minor fluctuations in exchange rates. Political unrest is forecast to level off between 2021 and 2040, with a subsequent increase in the exchange rate expected. It is recommended that policymakers deal with macroeconomic conditions that affect exchange rates, such as interest rates, to stabilize the economy and avoid excessive currency appreciation or depreciation.

Keywords

Economic growth; Exchange rate; Political instability; Real interest rate; South Africa

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1. INTRODUCTION

The study's main purpose was to explore the impact of political instability on the exchange rate in South Africa. The history of political protests has been instrumental in positively changing government from colonial oppression to later strengthening democratic progress and ushering in a democratic government. While political conflict can be positive, it creates economic hardship until consistent stability exists. (Shonchoy & Tsubota, 2016) note that domestic disputes can turn a country into a fragile state with reduced investment status. In South Africa, the experience of political instability is reflected by internal political volatilities of corruption in government authorities and the weakness of state-owned institutions. (Gøtzsche-Astrup et al., 2020) It has also been cited as a problem that affects the country's sustained economic recovery. (Office, 2015)

Moreover, political instability has increased since the apartheid era with little change from 1994 to 2022 and has negatively impacted South Africa's economic growth and exchange rate. (Bank & Bank, 2018) An example among many is the "Nenegate" incident in December 2015, where former President

Jacob Zuma fired and hired three finance ministers, including former Finance Minister Nhlanhla Nene, in three days, plunging the rand to R16 to the dollar, a depreciation of 3%. (Nqabeni, 2016) (Fredriksson & Svensson, 2003) study demonstrated that corruption reduces investment and slows growth.

The study aims to analyze the impact of political instability on the exchange rate in South Africa's economy through the VECM model and the forecasting results of the ARIMA model. The following are the problematic questions answered in the research: (a) Is there any causal relationship between exchange rate and political instability? (b) What are the effects of political instability on the exchange rate? (c) What are the recommendations for the impact of political instability on the exchange rate in South Africa? This study used secondary data, which involves using relevant data collected from 1980 to 2020 and available in the public arena: Statistics South Africa, the South African Reserve Bank, International Country Risk Guide (ICRG), and Global World Economy.

Secondary quantitative research often helps to validate the data collected from primary quantitative research and aid in strengthening, proving, or disproving previously collected data. The researcher conducts this study with a delimitation on the availability of free secondary data on political instability and corruption; however, the data can be collected from the Global World Economy site at a cost.

2. METHODS

2.1 Methodological Design

This study adopts a predictive quantitative research design, integrating correlational analysis with predictive modeling to examine the relationship between political instability and exchange rate volatility. Time-series data from 1980 to 2020 is analyzed using the ARIMA model to forecast exchange rate fluctuations, while the VECM model is employed to assess both the short-run and long-run effects of political instability.

2.2 Estimated Model

The model for this analysis is formulated as follows:

XRf (PIS, GDP, CPR,ri, π, RL, CF)

Where:

- XR = Exchange rate
- PIS = Political instability/stability
- GDP = Gross Domestic Product
- CPR = Corruption control
- rir = Real interest rate
- π = Inflation rate

- RL = Rule of law
- CF = Corruption freedom
- μt = Error term

The linear form of the model is:

XR=β0+β1PIS+β2GDP+β3CPR+β4ri+β5π+β6RL+β7CF+μt

- Where β0\beta is the constant,
- β1\beta to β7 are the coefficients, and
- μt is the error term.

2.3 Estimation Techniques

Descriptive statistics and unit root tests are used to verify the normality of the data and the order of integration. The Johansen cointegration test is performed after determining the appropriate lag length using the Akaike Information Criterion (AIC). The VECM model is employed if cointegration exists, and Granger causality tests are conducted to determine the direction of the causal relationships. The ARIMA (p, d, q) model is applied for forecasting, following the Box-Jenkins method of model selection, estimation, and diagnostics. (Box, 2013)

3. FINDINGS AND DISCUSSION

3.1 Granger results.

Table 1: Granger Causality Between Political Stability and the Exchange Rate

H0	p-value	Chi
Political stability does not Granger-cause the exchange rate	0.488	0.447
Estimated at 10% level of significance		

Source: Author's compilation from Stata (2023)

Table 1 indicates that political stability does not Granger-cause the exchange rate, as a smaller p-value provides stronger evidence to reject the null hypothesis. Therefore, the null hypothesis that states that political stability does not Granger cause the exchange rate cannot be rejected. At the 10% significance level, the p-value is measured as an F-test of 0.488, and the critical value measured by chi-square is 0.447, greater than the 10% significance level. The results answer the study's objective of examining whether there is a causal relationship between exchange rates and political instability. The findings show no causal relationship between the exchange rate and political instability.

Table 2: Granger Causality Between the Exchange Rate and the Rule of Law

H0	*p*-value	Chi^2
The exchange rate does not Granger-cause the rule of law		
Estimated at 10% level of significance		

Source: Author's compilation from Stata (2023)

Table 2 indicates that the exchange rate does not Granger-cause the rule of law because the smaller the p-value, the stronger the evidence to reject the null hypothesis. Therefore, the study does not reject the null hypothesis that states that the exchange rate does not Granger-cause the rule of law. At the 10% significance level, the p-value, measured as an F-test of 0.863, and the critical value measured by chi-square as 0.851, are greater than the 10% significance level. The results answer the study's objective of examining whether there is a causal relationship between the exchange rate and the rule of law. The findings show a causal relationship between the exchange rate and the rule of law.

Table :3. Granger Causality Between the Exchange Rate and Political Stability

H0	*p*-value	Chi^2
The exchange rate does not Granger-cause political stability	0.031	0.012
Estimated at 5% level of significance.		

Source: Author's compilation from Stata (2023)

Table. 3 indicates that the exchange rate does Granger-cause political stability because the smaller the p-value, the stronger the evidence to reject the null hypothesis. Therefore, the study accepts the null hypothesis that the exchange rate Granger causes political stability. At the 5% significance level, the p-value, measured as an F-test of 0.031, and the critical value measured by chi-square as 0.012, are greater than the 5% significance level. Political instability could lead to vandalism, and criminal acts may devastate industries. Political stability becomes unstable when workers embark on a strike, leading to industries not yielding profits. Foreign countries are then less interested in buying ZAR because of the risk presented by political instability.

The results in Table 3 agree with (Oliver, 2019) findings, which state that political instability is one of the most significant factors that affect currency exchange rates, possibly having a major impact on the value of a currency in a matter of minutes depending on what type of events occur. As observed with the Brexit vote in 2016, the value of the British pound dropped quite dramatically in a matter of days, and then it quickly recovered. This type of currency shift is not the norm, but it is possible whenever there is an impactful event, such as political instability. No one can predict when such fluctuations will happen.

However, when they occur, a country may be able to save money on currency exchange. Elections

can also affect currency exchange rates. (Oliver, 2019) Unexpected election results and political instability affect exchange rates, which could result in a scandal that causes a leader's removal, resignation, a corruption investigation, or other types of unplanned election situations. This political instability may have some potential long-term benefits for a country. However, in the short term, many businesses and traders might perceive the instability as potentially harmful. (Oliver, 2019)

Table 4: Granger Causality Test Between Growth Rate and Exchange Rate

H0	*p*-value	Chi^2
The growth rate does not Granger cause the exchange rate.	0.961	0.949
Estimated at 10% level of significance		

Source: Author's compilation from Stata (2023)

Table 4 indicates that the growth rate does not Granger-cause the exchange rate because the smaller the p-value, the stronger the evidence to reject the null hypothesis. Therefore, the null hypothesis that states that growth rate does not Granger cause exchange rate cannot be rejected. At the 10% significance level, the p-value is measured as an F-test of 0.961, and the critical value measured by chi-square as 0.949 is greater than the 10% significance level.

Table 5: Lag Selection Criteria Results − Political Instability and Exchange Rate

Political instability and exchange rate					
Lag	Coef	Std. err	Z	P>lzl	95% Confi. interval
L1	-0.010	0.012	-0.91	0.363	-0.034
0.012					
L2	0.084	0.019	4.39	0.000	0.046
0.122					
L3	-0.031	0.016	-1.88	0.060	-0.064
0.001					
L4	-0.007	0.012	-0.64	0.523	-0.032
0.016					

Source: Author's compilation from Stata (2023)

Lag two of the exchange rate positively impacts political instability, and lag three negatively impacts political instability at the 5% level on average. Political instability also increased in the previous two years when exchange rates increased. The effect of political instability on the exchange rate for lags two and three is positive. In the previous three years, from 2020, political instability decreased when the exchange rate increased. These results resonate with Lothian and Taylor (1992), who investigated currency volatility and found high persistence in the exchange rate. Lothian and Taylor (1992) also found strong evidence that exchange rate volatility is impacted by past innovations unequally. Their

study supported the notion that currency volatilities have important economic implications for financial engineering and risk premium theories and that politico-economic dynamics impact exchange rates. (Taylor, 2022)

Table 6: Lag Selection Criteria Results − Political Instability on Political Instability.

Political instability on political instability					
Lag	Coef	Std.err	Z	P>lzl	95% confi.interval
L1	1.221	0.192	6.34	0.000	0.843
1.598					
L2	-0.452	0.201	-2.25	0.025	-0.847
-0.058					
L3	-0.493	0.140	-3.52	0.000	-0.768
-0.218					
L4	0.942	0.243	3.87	0.000	0.465
1.419					
cons	1.584	0.520	3.04	0.002	0.564
2.605					

Source: Author's compilation from Stata (2023)

All four lags of political instability positively impacted political instability (L1 and L4), and lag two and three negatively (L2 and L3) impacted political instability at a 5% level on average.

Table 7: Johansen Normalisation Restriction Imposed

Beta	Coef	Std. err	Z	P>lzl	95% confi.interval
_cel					
	1	_	_	_	_
gross domestic product	3.885	1.025	3.79	1.876	5.894
inflation	5.324	0.560	9.50	4.226	6.423
rule of law	-33.359	25.371	-1.31	-83.087	16.368
corruption control	-1.392	0.485	-2.87	-2.345	-0.440
real interest rate	-1.013	0.389	-2.60	-1.777	-0.250
political instability	13.367	8.470	1.58	-3.233	29.969
cons	20.493	_	_	_	_

Source: Author's compilation from Stata (2023)

Normalizing the cointegrating vectors concerning the variables of interest is standard practice for

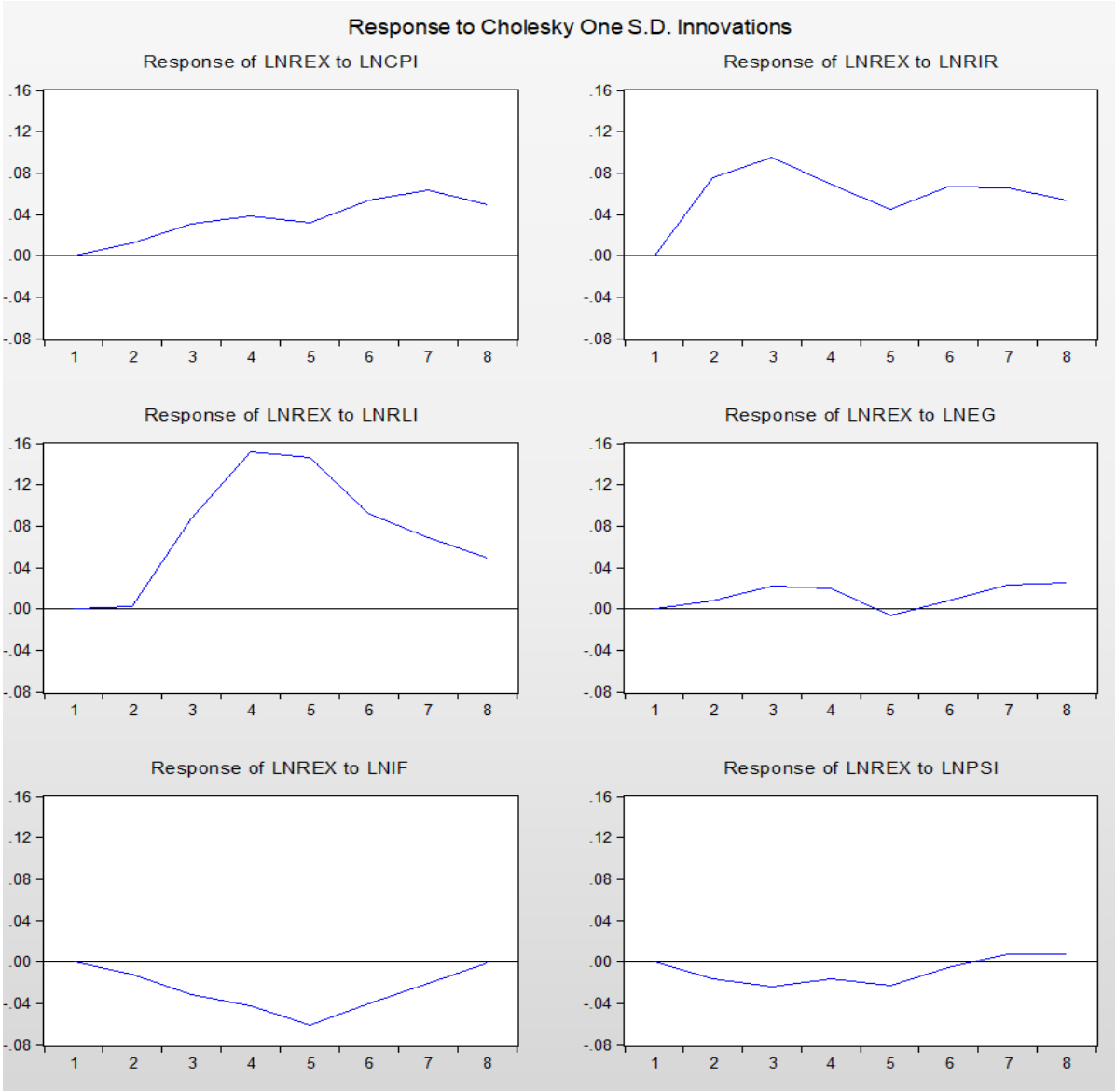
better interpretation. (Mahadea & Kabange, 2022) Hence, the Johansen normalization restriction was imposed on the exchange rate, gross domestic product, inflation, rule of law, corruption control, real interest rate, and political instability. Furthermore, the signs of the normalized cointegrating coefficients were reversed in the long run to enable proper interpretation. Since there is a single cointegrating relationship in the long run, rendering the model as related to the dependent variable is important.

There is a need to normalize the long-run part of the VECM in terms of the variable, which is entered first in the estimated level VAR model, to get a meaningful economic interpretation of the estimated coefficients. This is also done to allow for forecasting abilities. The restriction is placed on the exchange rate indicated as the target variable. Ce1 indicates the cointegrated equation of the VECM interpretation of the Johansen normalization restriction imposed. In the long run, gross domestic product and inflation negatively impact the exchange rate.

The coefficients are significant at a 1% level. In the long run, corruption control and real interest rates positively impact the exchange rate, and the coefficients are statistically significant at a 1% level. In the long run, the rule of law has a positive impact, while political instability negatively impacts the exchange rate. However, both coefficients were not statistically significant in the long run.

The results in Table 7 show that the exchange rate has many positive reactions from periods one to four in the early stages since it is above the zero lines. This indicates a positive reaction of exchange rates to shocks in corruption control in South Africa. However, from period four to period five, the reaction of the exchange rate to corruption control declines but is still positive. From period five to period seven, there was a relatively steep reaction of the exchange rate, followed by a gradual decline in period eight. Subsequently, the exchange rate response to a one standard deviation shock to the real interest rate portrays an interesting reaction. In the earlier stage, from periods one to four, there is a gradual increase in the real exchange rate as a reaction to shocks from the real interest rate.

Figure 1. Impulse Response Function



Source: Author's compilation from Stata (2023)

The increase decreases marginally but is still positive from periods two to three. There is a noticeable drop in the reaction of exchange rates from periods three to five.

3.2. Impulse response function

From periods five to six, the reaction of the exchange rate to shocks in the real interest rate becomes positive and gradually becomes stable in period seven and decreases again in period eight. This shows that exchange rates' reaction to changes in real interest rates fluctuates in the short run before becoming relatively stable in the long run. In terms of the exchange rate and the rule of law, it is noted that the reaction is stable and close to zero from periods one to two. However, the exchange rate reaction from periods two to four increases gradually and is positive; and decreases significantly from periods five to

eight.

This reaction signifies a quick response of the exchange rate to shock in the rule of law index in South Africa. The results further reveal an interesting exchange rate reaction to shocks from the gross domestic product from periods one to eight. In periods one to three, the exchange rate reaction to shocks from economic growth is relatively positive and increasing. However, from periods three to four, the reaction is relatively stable and eventually decreases and becomes negative in periods four and five. Eventually, the reaction gradually changes from negative to positive and increases from periods five to seven. However, from periods seven to eight, the reaction is relatively stable; this shows that the reaction of exchange rates to shocks in economic growth fluctuates in the short run and gradually becomes stable in the long run.

The results in Figure 1 revealed that the exchange rate reaction to one SD innovation to inflation is negative from periods one to eight. Thus, it is noticed that from periods one to five, the reaction of the real exchange rate to shocks in inflation is negative and decreasing. However, the reaction increases from five to eight but remains in the negative zone. Similar results are noted for the exchange rate reaction to political stability index shocks that fluctuate in the negative zone from periods one to six. From periods one to three, the reaction decreases and becomes relatively stable in periods three to five. Eventually, the reaction gradually increases in periods five to six and becomes positive and stable in periods seven to eight. This shows that the exchange rate reacts negatively to shocks in the political stability index in South Africa but becomes stable and positive in the long run. Figure 1 is the graphical representation of the impulse response function results from Stata software.

Response of Political Instability to Political Instability

This indicates the impact on political instability to a one standard deviation shock on political instability. Figure 1 shows the responses of political instability (response variable) to a shock of political instability (impulse variable). Response of political instability to a one SD shock (innovation) on political instability is stable; this suggests that shocks to political instability will not affect political instability in the short and long run. The IRF is orthogonalized for all variables.

Response of Political Instability to Exchange Rate

This indicates the impact of political instability of a one SD shock on the exchange rate. Figure 1 shows the responses of political instability (response variable) to a shock in the exchange rate (impulse variable). The response of political instability to one SD shock (innovation) on the exchange rate increases the exchange rate. This positive response gradually increases until the seventh period. Beyond period eight, political instability declines and stabilizes; this suggests that shocks to political instability will positively impact exchange rates in the short and long run. The IRF is within the 95% confidence

interval for all the variables. The implication of the findings concludes that political instability has contingent effects on the exchange rate policy decisions, which are not related to economic emergencies but to political priorities.

Response of Exchange Rate to Political Instability

This indicates the impact on the exchange rate of a one SD shock to political instability. Figure 1 shows the exchange rate responses (response variable) to a shock on political instability (impulse variable). The response of the exchange rate to a one standard deviation shock (innovation) on political instability is stable; this suggests that shocks to the exchange rate will not affect political instability in the short run and long run. The IRF is orthogonalized for all variables.

Response of Exchange Rate to Exchange Rate

This indicates the impact of one SD shock on the exchange rate. Figure 1 shows the exchange rate responses (response variable) to a shock in the exchange rate (impulse variable). The response of the exchange rate to a one SD shock (innovation) in the exchange rate increases the exchange rate. This positive response gradually increases through period ten, indicating that shocks to the exchange rate will positively impact the exchange rate in the short and long run. The IRF is within the 95% confidence interval for all the variables. The study's findings resonate with Nor et al. (2020), who established that shocks and macroeconomic factors significantly influenced Somalia's unregulated exchange rate volatility. (Nor et al., 2020)

Table 8. IRF Exchange Rate Changes Due to Shock on Exchange Rate and Shock on Political Instability

Year	Exchange rate	Political instability
1	1	0
2	0.9237	0.0012
3	0.8954	0.0081
4	0.8904	0.0091
5	0.8891	0.0092
6	0.8886	0.0092
7	0.8884	0.0093
8	0.8884	0.0093
9	0.8884	0.0093
10	0.8884	0.0093

Source: Author's compilation from Stata (2023)

Table 8 indicates that after two periods, 92% of the variability in the exchange rate is due to a shock on the exchange rate (shock on itself) in South Africa, and only 0.12% of the shock is explained by political instability.

Table 9. IRF: Political Instability Changes Due to Shock on Political Instability and Shock on Exchange Rate

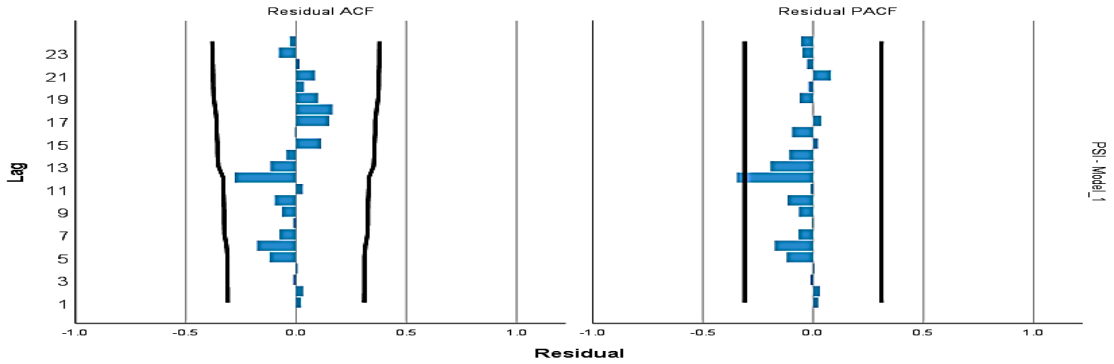
Year	Exchange rate	Political instability
0	0	0
1	0.033	0.747
2	0.071	0.620
3	0.083	0.594
4	0.084	0.588
5	0.084	0.588
6	0.084	0.588
7	0.084	0.588
8	0.084	0.588
9	0.084	0.588
10	0.084	0.588

Source: Author's compilation from Stata (2023)

Table 9 indicates that after one period, 74.7% of the variability in political instability is due to a shock on political instability (shock on itself) in South Africa. Similarly, after one period, only 3.38% of the change in political instability is explained by exchange rates.

Figure 2a. Forecasting the exchange rate and political instability Residual: Forecasting Model (ARIMA 3.1.1.)

Residual: Forecasting Model (ARIMA 3.1.1.)

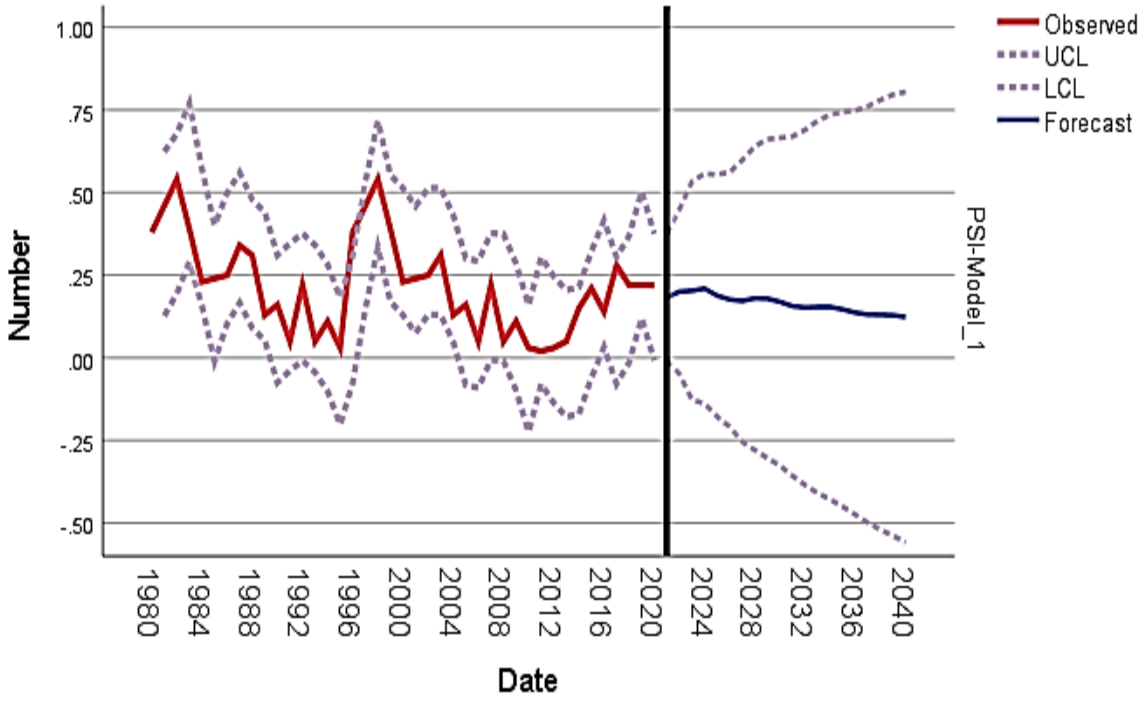


Source: Author's compilation from Stata (2023)

Figure 2a shows that the model cannot be used for this study since some lags fall slightly outside

the boundary. This is because the ACF and the PACF do not tail off and have values that stay close to one over many lags; therefore, the series is considered non-stationary, requiring differencing. The MA coefficient is significant, which does not indicate that the model is the right fit. The AIC and BIC statistics are higher for MA than for AR; therefore, this model cannot be considered for forecasting.

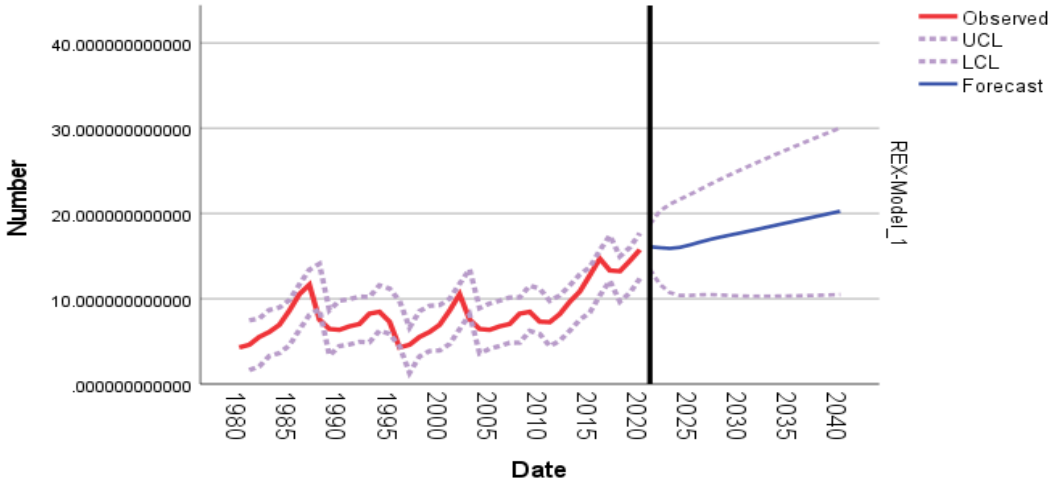
Figure 2b. Forecasting Model (ARIMA 3.1.1.) Stationary



Source: Author's compilation from Stata (2023)

Figure 2b represents the ARIMA 3.1.1 model used to forecast the exchange rate from 2021 to 2040. The results of the forecast show that political instability, in the long run, decreases at a steadily decreasing rate. The observed variable fluctuates within the confidence interval until the year 2021. The results in this forecast model further indicate that when political instability decreases in the long run, the exchange rate also increases in the long run. Therefore, the null hypothesis that there is a negative relationship between exchange rates and political instability is rejected. Instead, it is accepted that there is a negative relationship between political instability and exchange rates. The results answer the study's objective of forecasting the exchange rate and political instability. The findings show that the exchange rate will increase from 2021 to 2040 in the long run when political instability decreases.

Figure 2c. Forecasting Model of Exchange Rate (ARIMA 3.1.1.)

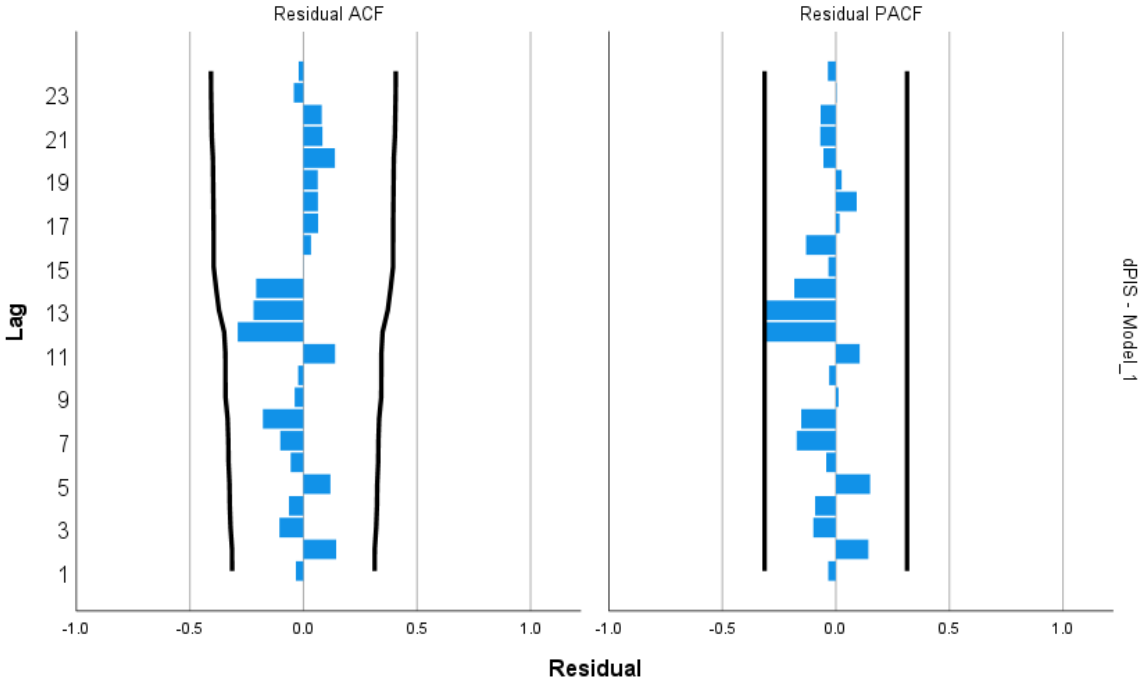


Source: Author's compilation from Stata (2023)

Non-Stationary

Figure 2c shows an exchange rate that is not stationary but increasing steadily in the long run. The observed data from 1982 to 2020 show the exchange rate fluctuating at an increasing rate.

Figure 2d: Forecasting Model for PSI (ARIMA 3.1.2.)

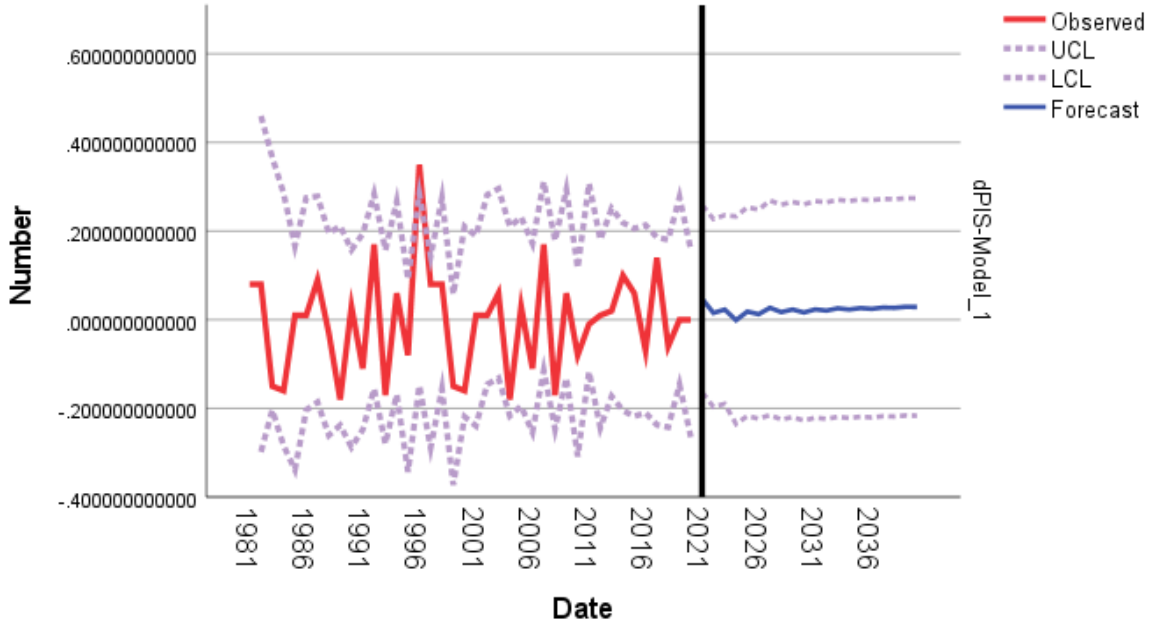


Source: Author's compilation from Stata (2023)

Figure 2d presents a perfect model for this study since all the lags fall inside the confidence boundary. This is because the ACF and the PACF do not tail off and have values that stay close to zero. Therefore, the series is stationary, not requiring differencing. Furthermore, the MA coefficient is not

significant, which is a good sign for this model.

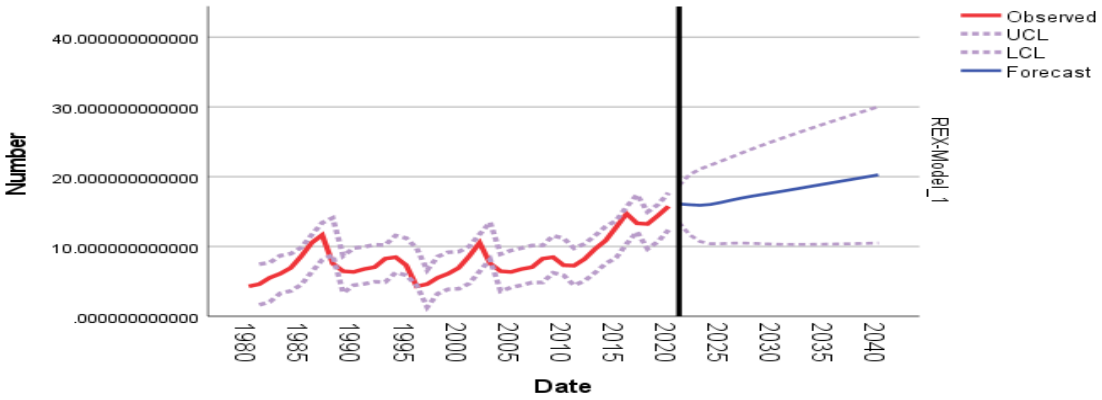
Figure 2e: Forecasting Model for PSI (ARIMA 3.1.2)



Source: Author's compilation from Stata (2023)

Figure 2e presents ARIMA 3.1.2, the perfect forecast model for this study. In this ARIMA model, when a value is forecasted past the end of the series, values from the observed series on the right side of the equation are needed and not yet observed. For a stationary model, the forecast of future values will eventually unite with the mean and remain there. The forecast results indicate that from 2021 to 2040, political instability will stabilize in the long run and remain within the confidence interval.

Figure 2f. Forecasting Model for Exchange Rate (ARIMA 3.1.2.)



Source: Author's compilation from Stata (2023)

In Figure 2f, the exchange rate increases steadily in the long run under the ARIMA (3.1.2) model, while political instability stabilizes over the same period. Political instability can erode confidence in a currency, leading to capital outflows towards stable countries (Central Bank of RSA, 2021). Since, in this

forecasting model, the exchange rate increases and political instability stabilizes in the long run, the null hypothesis of a negative relationship between political instability and the exchange rate can be rejected.

In the same spirit, Onour and Sergi (2020) found that sustainable unification of exchange rates cannot be attained under political instability. The psi increases at a decreasing rate while the exchange rate increases steadily over the long run. The implications of a lower-valued currency make a country's imports more expensive and its exports less expensive in foreign markets. This currency depreciation can be maintained through SARB intervention, as depreciation can cause macroeconomic problems, such as increased unemployment and decreased real wages. (Onour & Sergi, 2021)

3.3. Discussion

The ARIMA 3.1.2 model was found to be the ideal model to be used to forecast the variables. The analysis was based on the idea that PACF and AFC should be within the confidence limit for all lags in the model. The results suggest that the exchange rates in South Africa should be a combination of stable political instability in the long run. The results also imply that South Africa would experience exchange rate increases in the short run because of political instability, boosting the country's economy. This also means that the government could achieve economic growth in the short run at a minimum cost of political instability and a high exchange rate.

The forecasting approach in this study can also be applied to other countries to identify their political instability and exchange rate trade-offs that can assist in achieving economic growth. The results also helped clarify that political instability in the short run is bad for the domestic economy. The analysis shows that an increase in the exchange rate (depreciation) is preferred to a decrease in the exchange rate (appreciation) to achieve a healthy and stable economy. The policy implication from the forecasting results in this chapter is that the country's exchange rate policymakers should consider political instability as increasing exchange rates.

The results presented in this chapter are the outcome of assumptions made in constructing the ARIMA model. The results illustrated the trade-off between political instability and the exchange rate. The limitation of the ARIMA model approach discussed in this chapter is that it can be limited in forecasting extreme values. The model is proficient at modeling seasonality and trends. However, it is difficult to forecast the outliers for ARIMA since they lie outside the general trend captured by the model.

Table 1. Table format

No	Description	Explanation
1	Granger causality between political instability and the exchange rate	Political instability does not Granger cause political instability
2	Granger causality between the exchange rate and the rule of law	The exchange rate does not Granger cause rule of law
3	Granger causality between exchange rates and political instability	The exchange rate does not Granger cause political instability
4	Granger causality between growth rate and the exchange rate	Growth rate does not Granger cause exchange rate.
5	Lag selection criteria results: political instability and exchange rate.	The effect of political instability on the exchange rate of Lag two and three is positive
6	Lag selection criteria results: political instability and political instability.	Political instability positively impacted political instability on Lag two and three
7	Johansen Normalisation Restriction Imposed	There is a positive reaction of the exchange rate to shocks in corruption control in South Africa.
8	IRF exchange rate changes due to the shock on exchange rate and shock on political instability.	92% of the variability in the exchange rate is due to a shock in the exchange rate.
9	IRF political instability changes due to the shock of political instability.	74.7% of the variability in political instability is due to a shock on political instability.

4. CONCLUSION

The results can also illustrate the short-run and long-run trends under which future exchange rate strategies can lead to a rise in economic growth. Exchange rates are among the most watched, analyzed, and manipulated economic measures. The study examined the impact of political instability on exchange rates by observing data collected from 1982 to 2020.

The results indicate that political instability hurts exchange rates. Descriptive statistics show that the computed probabilities of variables are above the 5% significance level. The vector error correction model (VECM) with specification was estimated for the time series period between 1982 and 2020, and the results confirm that political instability negatively impacted South Africa and that there is a short-run and long-run relationship between political instability and exchange rates.

If political instability is excluded from the exchange rate function, this exchange rate function will be mispecified. Although political instability is a non-economic variable, it is significant since it impacts

the exchange rate's operation. The findings of this study are expected to inform policymakers to acknowledge the effect of politics as a contributor to fluctuations in exchange rates, changes in the inflation rate, interest rates, and economic growth.

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