

BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF COMMERCE

DEPARTMENT OF ECONOMICS



EXCHANGE RATE VOLATILITY ON TRADE PERFORMANCE (1988-2022)

BY

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B201609B

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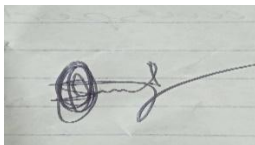
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DEDICATION

I dedicate this dissertation to my mother and siblings with whom I couldn't have made it this far without.

ABSTRACT

Zimbabwe has changed its currency more than twice in the past 2 decades from the Zimbabwe Dollar, to a multicurrency regime, RTGS and finally the current ZIG. This study sought to explore the effect of exchange rate volatility on trade performance. Estimation of results was conducted using Autoregressive distributed lag (ARDL) method with data samples spanning from 1988 to 2022 on E-views 10. The data was regressed using secondary data from World bank. The independent variables in this research were FDI, exchange rate, GDP, inflation and tariffs. After estimation. The study found a clear negative link between exchange rates and trade performance in the short term. In other words, higher exchange rates were associated with lower trade performance. The impact of inflation on trade was less clear. While the results suggested a possible negative relationship between inflation and long-term trade performance, the evidence wasn't statistically conclusive. The findings regarding GDP were more complex in the long run. Although the relationship between GDP and trade performance was negative, it was still statistically significant. This suggests a more intricate dynamic between economic growth and trade over extended periods. The research then proceeded to offer recommendations based on these findings discussing ways in which the objectives can be met and how policy makers can mitigate negative effects of exchange rate volatility.

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May the Lord bless them.

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LIST OF ACRONYMS

ADF	Augmented Dickey-Fuller
ARCH	Autoregressive Conditional Heteroskedasticity
ARDL	Autoregressive Distributed Lag
BG	Breusch Godfrey
CUSUM	Cumulative Sum
DW	Durbin Watson
ECF	Error Correction Form
ERV	Exchange Rate Volatility
FDI	Foreign Direct Investment

GDP	Gross Domestic Product
LM	Lagrange Multiplier
PPP	Purchasing Power Parity
REER	Real Effective Exchange rate
WB	World Bank

CHAPTER ONE

INTRODUCTION

1.0 INTRODUCTION

This study focuses on exchange rate volatility on trade performance. Its impact has long been recognized as one of the crucial ones when it comes to the success of trade performance.

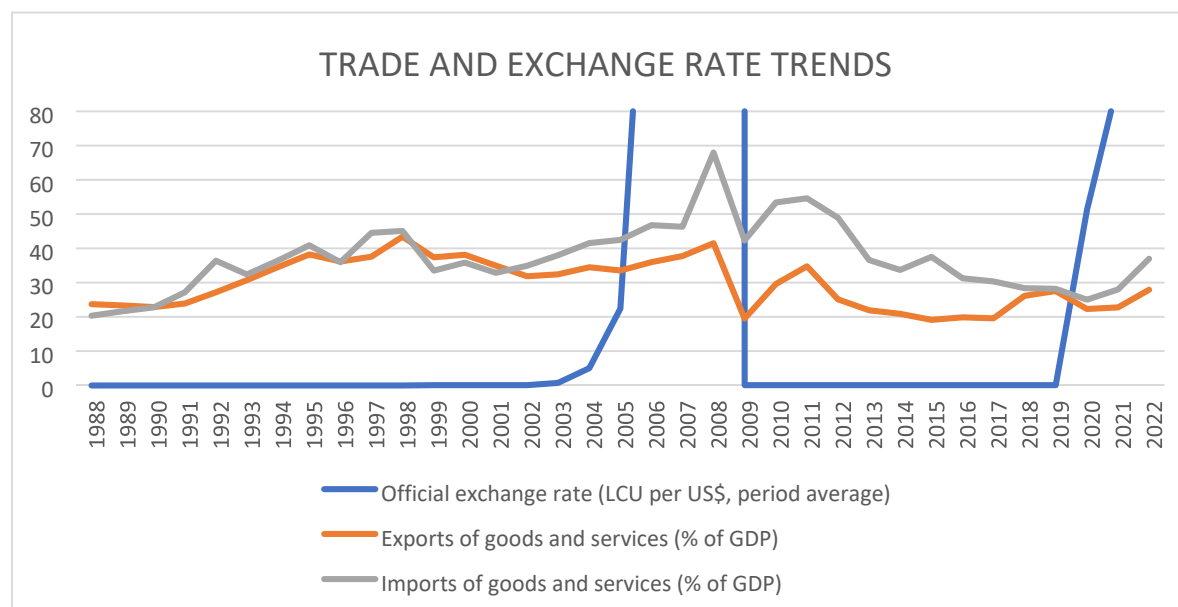
(Sakarombe & Makoni-Marimbe, 2020) said, “The spillover effects between exchange rates and stock prices in emerging markets are a critical focus in the financial economics policy fraternity.”

As international trade becomes increasingly intertwined, understanding the connection between fluctuating exchange rates and trade performance is crucial for policymakers, businesses, and economists. These fluctuations can significantly impact importers and exporters, affecting their competitiveness, pricing strategies, profit margins, and ultimately, the overall flow of goods across borders. "In the era of globalization, understanding the relationship between exchange rate volatility and trade performance is imperative for policymakers, firms, and economists. Exchange rate volatility can have substantial consequences for trade flows, economic growth, and international competitiveness. A comprehensive survey of the existing literature can help identify key patterns and insights that can inform policies and strategies aimed at managing ERV and promoting trade performance in a globalized world." It is of importance to have a clear understanding of the relationship between ERV and trade performance seeing as it has a large impact on various parts within the economy.

1.1 BACKGROUND OF THE STUDY

(Ndanga, 2019) said, “Zimbabwe has experienced considerable exchange rate fluctuations over the past decades, which have impacted its trade flows and economic growth. The volatility of the exchange rate can affect trade performance in Zimbabwe by creating uncertainty for traders and investors, and by affecting the competitiveness of Zimbabwean goods in the global market. Understanding the nature of this relationship is crucial for informing policies aimed at promoting trade and enhancing economic stability in Zimbabwe.” While exchange rate volatility and its impact on trade have undeniably caused economic instability and trade disruptions for Zimbabwe's

developing economy, they have also presented a complex situation with both drawbacks and potential benefits. Periods of hyperinflation and currency devaluation have directly influenced the country's trade landscape, affecting how it imports and exports goods. This impact can be seen in terms of market access, competitiveness of exports, and the dynamics of imports themselves. The following graphs show the official exchange rate (LCU per US\$, period average), exports of goods and services as a percentage of GDP and imports of goods and services as a percentage of GDP of Zimbabwe.



Source: World bank

Fig 1.0

Fig 1.1 is a depiction of the relation between imports, exports and the country's exchange rates over the years the research spans from 1988-2009. The gap on fig 1.1 between 2006 and 2009 is because inflation was at an all-time high spanning up to 6723052073.00%. Between 2009 and 2019 the country was using a multi-currency system whereby exchanges were done in either USD or Rand hence the constant 0%. The steep increase from 0% in 2019 was as a result of the introduction of the Zimdollar (ZWL) and a careful look at the graph shows that the increase in exchange rates led to a slight decrease in both exports and imports.

Zimbabwe's unique trade environment, with its mix of mineral resources, growing industries, and agricultural exports, offers a valuable case study in how exchange rates impact trade. The country's ongoing efforts to expand its export markets and practices highlight the need to understand the

complex relationship between volatile exchange rates and trade performance. This understanding is crucial for crafting targeted policies and interventions that can create a more robust and competitive trading environment for Zimbabwe. An additional layer of complexity comes from the interplay between exchange rates and Zimbabwe's specific socio-economic characteristics, including the influence of local knowledge systems on governance and trade practices. By examining these factors together, we can gain valuable insights to promote sustainable trade growth in Zimbabwe. (Moyo, 2020) highlighted how the economic landscape of Zimbabwe's economy presents challenges and opportunities that make it necessary to have a thorough understanding of the affiliation amongst exchange rate dynamics and trade performance also highlighting how an investigation of these factors is crucial for informing targeted policies and interventions that can foster a more resilient and competitive trade environment in the country. A complete understanding of ERV's impact on trade requires considering a country's cultural and historical background. Zimbabwe exemplifies this complexity. The study on exchange rate volatility and trade performance in Zimbabwe delves into the interplay between traditional knowledge systems and modern economic structures, along with how these systems influence economic activities. It also examines the deep connection between historical currency issues and current trade patterns, providing a richer picture of the situation.

1.2 PROBLEM STATEMENT

The Zimbabwean economy has experienced periods of high inflation and exchange rate fluctuations. Hyperinflation, fueled by economic uncertainty, volatile exchange rates, and rapid currency devaluation, has severely weakened the local currency. This has led to a surge in prices, a stagnant economy, and a public distrust of the government's monetary policies. Moreover, these exchange rate fluctuations have likely hampered international trade by creating risks and uncertainties for businesses. However, efforts have been undertaken to stabilize the situation. the implementation of a multi-currency system, which included the US dollar's acceptance as legal money in 2009, provided some relief from hyperinflation and helped restore some economic stability. While exchange rate fluctuations remain a challenge for businesses, various policy measures and structural reforms have been implemented to lessen their impact on trade. Furthermore, the lack of market confidence, which is considered a key factor driving currency volatility in Zimbabwe, has been linked to exchange rate fluctuations. This has resulted in

investment problems and a broader confidence deficit. The market's overall performance can be significantly impacted by this volatility, creating an atmosphere of risk and uncertainty for businesses and investors. Finally, due to the local currency's depreciation caused by exchange rate instability, prices have skyrocketed, particularly in formal retail settings. This has significantly reduced consumers' purchasing power, making it harder to afford basic necessities and worsening their financial struggles

1.3 RESEARCH OBJECTIVES

The general objective of this research is to find the effect of ERV on trade performance however some specific sub objectives can be derived such as:

- To analyze the impact of exchange rate volatility on trade flows.
- To identify the specific implications for trade performance, including the potential effects on trade diversification and competitiveness.
- To examine the effects of real effective exchange rate volatility on economic growth and trade dynamics and to explore how these effects vary across different sectors, industries, and regions within these economies.

1.4 RESEARCH QUESTIONS

- What is the effect of exchange rate volatility on the trade flows of Zimbabwe?
- What are the patterns and volume of international trade in Zimbabwe and how does exchange rate volatility contribute to the evolution of trade patterns?
- What are the effects of real effective exchange rate volatility on economic growth and trade dynamics in Zimbabwe?
- How can policy measures and strategic interventions effectively mitigate the adverse effects of exchange rate volatility on trade performance in Zimbabwe and what are the actionable insights and recommendations for promoting sustainable and resilient international trade within these economies?

1.5 RESEARCH HYPOTHESIS

Ho: There is a positive relationship between Exchange rate and trade performance.

H1: There is no positive relationship between Exchange rate and trade performance.

1.6 SIGNIFICANCE OF THE RESEARCH

The study is intended to be of great value to the following stakeholders;

To the government

The results of this study have the potential to guide the creation of trade policies, currency rate management plans, and other initiatives that support robust and sustainable foreign trade in Zimbabwe. They can also support the government in making decisions and formulating policies.

To the public

It discusses how fluctuations in exchange rates may affect market access, economic growth, and trade dynamics. They can aid in a better comprehension of the intricacies of global commerce and its effects on different businesses and sectors within these economies. The results of the research might also influence public opinion on trade policies and how they might affect market possibilities and economic growth.

To the university

Enhances our knowledge and comprehension of the dynamics of commerce and exchange rates. It is in line with universities' primary goals of doing research and making discoveries in order to improve the institution's scholarly and academic accomplishments. Furthermore, the study might encourage cooperation between government organizations and academic institutions, facilitating the sharing of knowledge and skills in tackling practical economic issues.

To the researcher

In addition to advancing the researcher's professional development and level of skill in the field of trade and macroeconomic dynamics, the research gives the researcher the chance to delve into a complicated and relevant topic, possibly yielding insightful analysis and practical recommendations.

1.7 ASSUMPTIONS

- The data to be used in the study will be reliable

- There will be sufficient and appropriate resources for use
- The methodology will be plausible and ethically acceptable
- The research will be finished within the prescribed timeframe

1.8 DELIMITATIONS OF THE STUDY

The research is going to be carried out in Zimbabwe and will assess the impact of exchange rate volatility on trade performance.

1.9 LIMITATIONS OF THE STUDY

- The researcher might face time constraint, to counter this, the researcher will adjust timetable to better balance study schedule.
- The researcher will use secondary data. Only data from reliable sources will be used so as to ensure the quality of the outcome of the research, it will be retrieved from World Bank.
- The researcher might find some data unavailable, to counter this, the researcher will broaden the scope of their research for more accurate results.

1.10 DEFINITION OF TERMS

Exchange rate volatility: The rate at which one currency will be exchanged for another currency. It affects trade and movement of money between countries hence it is affected by both domestic currency value and foreign currency value (Chen, 2024)

Inflation: is an economy-wide, sustained trend of increasing prices from one year to the next. The rate of inflation represents how quickly investments lose their real value and how quickly prices increase over time. Inflation also tells investors exactly how much of a return (in percentage terms) their investments need to make for them to maintain their standard of living. (SEGAL, 2024)

Trade Balance: This measures the difference between a country's exports and imports. A positive trade balance indicates a surplus of exports, while a negative balance signifies a trade deficit. However, a simple surplus doesn't guarantee good performance (IMF, 2024)

Gross Domestic Product: According to (Fernando, 2024) it is the total monetary or market value of all the finished goods and services produced within a country's borders in a specific time period.

1.11 SUMMARY

The main research topic, the problem area, and the issue being investigated were all presented in this chapter. Additionally, it provided an overview and background information on the study's focus on the impact of exchange rate fluctuation on trade performance. This chapter discussed, the study's background; its relevance; its scope; its main goals; its research questions; and its underlying assumptions. The studied theoretical and empirical literature on the topic will be examined in the upcoming chapter.

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

This chapter lays the groundwork for the research by exploring relevant theories and past studies. To build this conceptual foundation, we'll examine a variety of sources, including academic journals, reports from leading economic and monetary institutions, scholarly research papers, and even online research articles. By reviewing this existing body of knowledge, we can justify the need for this current study and provide context for its findings.

2.1 THEORETICAL LITERATURE

Economists have proposed various theories to explain how fluctuating exchange rates impact trade. These theories include the traditional purchasing power parity (PPP) theory, the elasticity approach, the Mundell-Fleming model, and the Balassa-Samuelson effect.

2.1.1 TRADITIONAL PURCHASING POWER PARITY THEORY (PPP)

The PPP is an essential concept in international economics and exchange rate determination. (Vo & Vo, 2023) stated that, “The idea that an exchange rate equalizes prices of identical goods (or baskets of goods) in different countries is at the heart of the well-known theory of purchasing power parity (PPP), which is a fundamental concept in standard open-economy macroeconomic models. PPP is then defined by (Aroui & Jouini, 2019) as, “An economic theory that suggests that the exchange rate between two currencies should be equal to the ratio of the price levels in the two countries. In other words, PPP states that a unit of currency should buy the same amount of goods and services in each country.” It can be denoted as:

$$S = P1/P2$$

Where,

S = Exchange rate of currency 1 to currency 2

P1 = Cost of a good in currency 1

P2 = Cost of the same good in currency 2

In a perfect world, according to PPP, exchange rates would fluctuate to eventually make the buying power of different currencies equal, particularly in the short term. It means a currency's decline in purchasing power which is caused by a price increase should be offset by a decrease in its value on the foreign exchange market. However, PPP has limitations, it assumes perfect competition and free trade in all goods and services, which isn't realistic. Many goods are non-tradable or have high transport costs, making it difficult for exchange rates to truly equalize purchasing power across borders. Additionally, factors like tariffs, price discrimination, and time lags in price adjustments can create discrepancies. PPP can also be violated by market imperfections, such as price fixing or discrimination. Measuring PPP accurately is challenging due to difficulties in obtaining good price data, accounting for quality differences in goods, and choosing the right price index. While it has its shortcomings, it can still be a useful concept for Zimbabwean policymakers. By comparing prices and exchange rates through a PPP lens, they can gain valuable insights into how these factors influence the economy. This knowledge can then be used to develop policies that support long-term economic growth and improve the well-being of citizens.

2.1.2 THE ELASTICITY APPROACH

The approach is used to analyze how changes in price affect how much of a good or service is bought and sold. The Marshall-Lerner condition suggests that a weaker currency can benefit a country's trade balance, but only if the combined responsiveness of demand for both exports and imports is greater than one (Krugman, et al., 2018). This approach centers around the Marshall-Lerner condition, a key concept in international trade, (Krugman, et al., 2018) stated that the Marshall-Lerner condition implies that if both export and import demand are sufficiently elastic, increased trade balance will result from a fall in the value of the home currency. The J-curve effect indicates that because it takes time for changes in relative prices to have an impact on trade volumes, the trade balance may initially get worse after a currency depreciation, (Bahman Oskooee & Hegerty, 2010). The elasticity approach looks at how sensitive export and import quantities are to changes in their relative prices which is often driven by exchange rates. In theory, a country's trade balance depends on how responsive its exports and imports are to these exchange rate fluctuations. There are, however, limitations. When evaluating these elasticities, like the existence of substitutes, the type of goods being traded, and the timeframe considered. Despite these drawbacks, the elasticity technique is still beneficial. It clarifies the relationship between

trade performance and exchange rates and emphasizes the need of taking demand fluctuations into account when assessing the effects of exchange rate policies on a nation's trade balance.

2.1.3 THE MUNDELL-FLEMING MODEL

Developed in the 1960s this model helps analyze how exchange rates, interest rates, and economic output interact in the near future, especially under different currency regimes and capital mobility conditions. This model highlights how exchange rate fluctuations can impact a country's trade performance through their influence on exports. (Krugman, et al., 2018) stated that, "A change in the exchange rate, by altering the prices of exports and imports, will cause the aggregate demand curve to shift." Unstable exchange rates introduce uncertainty into international trade by affecting the prices of traded goods and services. As (Rodriguez & Reinhart, 2008) "Exchange rate volatility can decrease the level and quality of trade, especially when the level of volatility is substantial." Unstable exchange rates significantly impact a country's trade performance. They affect how competitive a country's exports and imports are in the global market, and they introduce uncertainty into international trade deals. (Lawrence, 2021)"A depreciation of the domestic currency may increase the competitiveness of the country's exports by lowering the price of its products in foreign markets." This volatility makes long-term trade agreements and investments in export-focused industries risky, because predicting future exchange rates is challenging. The same principle applies to imports, where fluctuating exchange rates can also cause price swings. The Mundell-Fleming model provides a valuable tool for policymakers to understand these dynamics and develop policies that promote both sustainable trade performance and exchange rate stability.

2.1.4 BALASSA-SAMUELSON EFFECT

Productivity and currency value are important for Zimbabwe's trade. The Balassa-Samuelson effect from the 1960s suggests that a country's exports getting more efficient can make its currency stronger. In Zimbabwe's case, constant swings in the exchange rate have significantly impacted trade and economic growth. These swings are caused by various issues like an unstable economy, government budget problems, and external events. This vagueness makes it difficult for Zimbabwean exporters to forecast and price their goods for foreign markets. It discourages international buyers and reduces Zimbabwe's export volume. Additionally, the extra costs of

protecting against these exchange rate fluctuations can burden exporters and make them less competitive. The theory also suggests that efficient export industries can raise wages without significantly affecting prices. However, with a volatile exchange rate, this effect gets complicated. If the Zimbabwean currency suddenly weakens, it can lead to inflation on imported goods, raising the costs of materials for export industries. This can erase the productivity gains and make Zimbabwean exports less competitive on the global market.

2.2 EMPIRICAL LITERATURE

Building on the existing theories, it's important to consider the diverse perspectives and findings from various researchers on this topic. The link between exchange rates and trade performance is a complex issue with ongoing debate, researchers have conducted numerous studies in various economies to understand this correlation. Interestingly, some studies have found an inverse relationship, where higher exchange rates lead to lower exports, while others report a constructive impact of exchange rates on exports.

2.2.1 THE IMPACT OF EXCHANGE RATE VOLATILITY ON TRADE FLOWS IN ZIMBABWE

Zimbabwe's situation is complicated by the presence of a large and growing black market in foreign currency. This market has led to a dual exchange rate system as stated by (Chipungu, et al., 2020), "the unified dual exchange rate system was introduced in June 2006 via the auction system." Since then, there have been transitions in and out of a managed float and more recently, into the adoption of a regime of a fixed peg against the US dollar. All of these transitions have been in response to attempts to control hyperinflation, or to rectify an overvalued exchange rate with the objective of improving the trade balance. (Mukwazhi, 2024), "Since January, the Zimbabwe dollar lost over 70% of its value on the official market, and was plunging even further on the thriving but illegal black market. Inflation increased from 26.5% in December last year to 34.8% this January before spiking to 55.3% in March, according to official figures." A real-world example can be seen in Zimbabwe's agricultural sector, where exchange rate fluctuations led to a shift in demand towards domestically produced maize, surpassing imports. In 2019, Zimbabwe experienced significant exchange rate volatility as the country transitioned from a multi-currency system to a local currency (ZWL). This volatility led to a rapid fall of the ZWL against the US

dollar, making imports more expensive for Zimbabwean consumers. As a result, the demand for locally produced maize increased as it became relatively cheaper compared to imported maize, (Chikoko & Tawodzera, 2021). Zimbabwe, with its significant tariff-protected manufacturing sector, is particularly vulnerable to exchange rate swings. High volatility can be seen as a sign of economic instability, leading to less FDI and portfolio investment. This, in turn, can indirectly impact trade flows by affecting overall economic activity. Analyzing how Harberger's framework applies to commodity trade in this context would be valuable. Zimbabwe's status as a small open economy with likely perfect capital mobility makes it an ideal case study. This characteristic strengthens the rationality of applying the Marshall-Lerner condition and the J-Curve concepts.

Lastly, considering the country's current political and economic crisis, while an improvement in the trade balance is favorable, the regime in power would be against any measure which would be viewed as detrimental to the livelihood of the population. As a consequence, the examination of the exchange rate effect could help identify other relevant factors and policies which impact on the trade balance. (Mutodi, et al., 2020)

2.2.2 TO IDENTIFY THE SPECIFIC IMPLICATIONS FOR TRADE PERFORMANCE

When exchange rates are highly volatile, there's an uncertainty about future prices for exporters and importers, it can influence a country's ability to diversify its exports and imports and businesses can also be discouraged from exploring new markets or expanding their product lines, limiting trade diversification, (Cavallo, 2005). A stable exchange rate offers several advantages for businesses. It allows them to confidently invest in new products and enter new markets, leading to greater diversification in their trade activities. This stability also makes it easier for firms to make strategic decisions. (Krugman, et al., 2018), The corresponding prices of local versus foreign goods can be impacted by a fluctuating exchange rate, which can increase or decrease exports' competitiveness in global markets. Exchange rate fluctuations can affect production costs and profit margins for businesses engaged in international trade, potentially impacting their competitiveness. The uncertainty associated with volatile exchange rates may discourage (FDI), which can, in turn, hinder the development of export-oriented industries (Ito, et al., 2012).

A depreciating currency can increase the cost of imports, encouraging the manufacture of substitutes domestically, broadening the economy, and lowering dependency on imports. The

competitiveness of exports is directly impacted. Zimbabwean exports to other countries may be more expensive during an appreciation or a depreciation.

2.2.3 TO EXAMINE THE EFFECTS OF REAL EFFECTIVE EXCHANGE RATE (REER) VOLATILITY ON ECONOMIC GROWTH AND TRADE DYNAMICS IN ZIMBABWE

(Rapetti, 2020) stated that, In the past around 1950, mainstream economics didn't consider REER important for economic growth. This changed in the 1970s when East and Southeast Asian countries adopted export-driven growth strategies. It became clear that overvalued currencies could hinder exports and growth. As a result, the focus shifted to finding an equilibrium level for real exchange rates. Zimbabwe's economic growth and trade are impacted by fluctuations in REER, both positively and negatively. A weaker REER can make Zimbabwean exports cheaper overseas, potentially increasing export volume and revenue. This growth in export-oriented industries can stimulate overall economic activity. Research by Rodrik (2008) supports this, finding a positive link between undervalued currencies and economic growth, especially in developing countries. In the short term, a depreciated REER can improve export competitiveness, making Zimbabwean goods more attractive to foreign buyers. (Gluzmann, et al., 2012) found that currency undervaluation in developing countries has no influence on exportation; rather, it enhances saving, investment, and employment opportunities. A weaker Zimbabwean currency can have mixed effects. On the one hand, it makes imports more expensive, potentially incentivizing local businesses to produce substitutes. This diversification can reduce reliance on imports and strengthen the economy. A stable REER, as found by (Rapetti, 2020) to have a positive correlation with economic growth especially in developing countries, can encourage businesses to explore new export markets. This reduces dependence on a single market or currency and fosters diversification. Uncertainty discourages businesses from making long-term investments in expanding production or developing new products, potentially stifling overall economic activity. Additionally, rapid depreciation can lead to inflation on imported goods, further weakening economic performance.

2.2.4 TO PROVIDE ACTIONABLE INSIGHTS AND POLICY RECOMMENDATIONS AIMED AT MITIGATING THE ADVERSE EFFECTS OF EXCHANGE RATE VOLATILITY ON TRADE PERFORMANCE

To combat the challenges of ERV for businesses involved in international trade, central banks and policymakers have tools at their disposal, one strategy is to implement a managed float exchange rate system. As emphasized by (Kiguel & Ould-Aly, 2020), "central banks can manage exchange rate risk through a variety of tools" or peg the currency to a basket of stable currencies as (Kiguel & Ould-Aly, 2020) explains, "Pegs can be either to a single currency or a basket of currencies." By linking the domestic currency's value to a stable and diversified group of foreign currencies, policymakers can create a more predictable environment for businesses and reduce the risks associated with exchange rate volatility. This can help minimize sudden fluctuations and create a more predictable environment. Another approach is to improve communication between policymakers and businesses, by fostering understanding of exchange rate dynamics, governments can encourage businesses to utilize risk management tools like forward contracts or options to hedge against currency fluctuations. (Kose & Riezman, 2000) said, "Trade policy can be used to lessen the adverse impact of exchange rate volatility on trade flows," negotiating trade agreements with stable partners can provide stability to trade relations and lessen the effect of movements in ERV on a broader scale. Expanding regional economic cooperation creates larger and more varied markets, making trade less vulnerable to exchange rate swings. Additionally, a managed float exchange rate system, which allows some flexibility but maintains stability through interventions when needed, can significantly reduce the negative effects of volatile exchange rates on trade performance. This, in turn, can promote sustainable economic growth.

2.3 RESEARCH GAP

Most studies offer a general overview, neglecting how different sectors that is agriculture, manufacturing, services are uniquely affected. Analyzing these sectoral variations would provide valuable information for policymakers and businesses. Another gap exists in the focus on aggregate trade data. Little research explores the micro-level effects on individual firms or industries, understanding how small and medium-sized businesses (SMEs) cope with and manage exchange rate fluctuations is crucial. (Bahmani-Oskooee & Ratha, 2004) stress that "most studies

have focused on the experiences of developed countries,” leaving a knowledge gap regarding the experiences of developing countries and their unique vulnerabilities to exchange rate volatility. Furthermore, existing research often assumes a simple cause-and-effect relationship between volatility and trade. It's possible that non-linear or threshold effects exist, meaning volatility might have different impacts above or below certain levels. More research is needed to identify these thresholds and their influence on trade performance. National-level analyses often overlook regional variations within a country as noted by (Gros, 2012), "national-level analyses often overlook regional variations within a country". Studying how exchange rate volatility affects trade performance across different regions in Zimbabwe could reveal spatial disparities, informing targeted policy interventions. While some studies use cross-sectional data (looking at a single point in time), comprehensive time-series analysis (tracking changes over time) is lacking. Longitudinal studies examining how volatility and trade performance change together could provide valuable insights into dynamic trends. Finally, most research relies heavily on quantitative methods. Qualitative approaches, such as case studies or interviews with stakeholders, are needed to gain deeper understanding of how volatility influences trade dynamics and the real-world implications for businesses and policymakers.

2.4 CONCLUSION

After examining existing research on exchange rate volatility and trade performance, this chapter highlighted the importance of qualitative analysis alongside statistical methods. While statistical measurements are valuable, understanding the nuanced effects of exchange rate volatility on Zimbabwe's trade requires a deeper qualitative approach. The next chapter will delve into the specific methodology chosen to address the research question.

CHAPTER 3

METHODOLOGY

3.0 INTRODUCTION

This chapter outlines the research plan and explains the methods used to answer the study's questions. As (Kothari , 2004) points out, research methodology goes beyond just the chosen methods. It also involves justifying those choices and explaining the logic behind them. This section will detail the specific approach used to evaluate the impact of exchange rates on Zimbabwe's exports, utilizing data from the World Bank.

3.1 RESEARCH DESIGN

To investigate the connection between exchange rates and trade in Zimbabwe, this study uses a quantitative-descriptive approach. This means it'll analyze numerical data to uncover the relationship between these two factors. The data covers a period from 1988 to 2022, with a particular focus on how the shift to a multicurrency system in Zimbabwe impacted this relationship. An explanatory research design is employed to understand how exchange rates influence trade, considering potential external factors. To measure this influence, E-views software is used to conduct an ARDL regression analysis on data obtained from the WB. The design was adopted as according to (Tobias & Themba, 2011) and it offers several advantages. It helps control for variations between individual data points and reduces the influence of interrelated variables. This approach is well-suited for identifying trends within the data over time. To determine the extent to which exchange rates affect trade in Zimbabwe, the study employs a quantitative approach with ARDL regression analysis. This statistical technique analyzes time series data, where the chosen factors include exchange rates, export and import rates, along with other relevant independent variables.

3.2 RESEARCH INSTRUMENTS

3.2.1 MODEL SPECIFICATIONS

Model specification involves the process of selecting the independent variables that should be included or excluded from a regression equation (Gujarati & Porter, 2009). The primary aim of this empirical study was to examine the impact of exchange rate volatility on trade performance. To achieve this objective, a multiple linear regression model was employed. This model considered trade performance as the dependent variable, while exchange rate volatility, GDP, global trade

growth, FDI, domestic inflation, and other relevant independent factors were included as independent variables in the analysis. The following model was used:

$$tp = \beta_0 + \beta_1 ERV + \beta_2 GDP + \beta_3 INF + \beta_4 FDI + \beta_5 TARRIF + \epsilon$$

Where:

TP: Trade Performance (Trade Volume or Trade Value)	ERV: Exchange Rate Volatility
GDP: Gross Domestic Product	FDI : Foreign Direct Investment
INF: Inflation Rate	TARIFF: Export and Import Tariffs
$\beta_0, \beta_1, \dots, \beta_6$: Coefficients to be estimated	ϵ : Error term

In this analysis, a simple linear regression model is utilized to estimate the relationship between a dependent variable, TP and a set of explanatory variables, including ERV, GDP INF, FDI and TARRIF. The equation captures the linear function that describes how these explanatory variables collectively influence the trade performance variable. Linear regression has a long history, dating back to the late 1800s with Sir Francis Galton's initial ideas. He's considered the founding figure for this approach to analyzing data. The method continued to evolve in the early 1900s thanks to Karl Pearson and Francis Edgeworth. Their contributions included creating mathematical models to assess the strength and reliability of connections between variables. Finally, the 1950s saw the introduction of the least squares' method by Charles Ryberg and Moses Finkelstein, which remains the most common technique for estimating key aspects of linear regression models.

3.2.2 MODEL JUSTIFICATIONS

Exchange Rate Volatility: When the Zimbabwean currency depreciates, it can make Zimbabwean exports cheaper internationally, potentially boosting export volume and leading to a trade surplus, "Exchange rate depreciation can boost exports by making domestically produced goods cheaper in foreign markets" (Kiguel & Ould-Aly, 2020). However, this can also make imports more expensive, potentially reducing domestic consumption and negating some of the export gains.

Gross Domestic Product: A healthy GDP can be a double-edged sword for trade. On the one hand, as (Krugman, et al., 2018), "Growth in GDP can increase production capacity and boost the production of goods and services that can be exported". However, a booming economy can also

lead to people buying more domestically, potentially increasing imports and reducing the trade surplus. The final outcome depends on whether exports grow faster than imports.

Foreign Direct Investment: Foreign direct investment (FDI) refers to the act of establishing business entities or acquiring business assets in a foreign country. It can be undertaken by either companies or individuals from one country in another country. FDI plays a crucial role in facilitating technology transfer, which, in turn, enhances the export capabilities of the host country (Blanchard, 2010). Therefore, FDI is expected to have a positive impact on exports by enabling the transfer and adoption of technological advancements.

TARIFF (Export and Import Tariffs): Are essentially taxes on imports and sometimes exports, can significantly impact how well a country trades. In Zimbabwe, for instance, import tariffs make foreign goods more expensive for both businesses and consumers. This can lead to people buying less from abroad, potentially giving local producers a boost. To figure out the overall impact on trade, we need to see if the decrease in imports outweighs any potential increase in exports. Export tariffs, while less frequent, can be used to discourage the export of raw materials or control domestic prices. These tariffs typically reduce the volume of exports, ultimately hurting trade performance.

Error Term (ϵ): Captures all the other unobserved factors that influence the trade balance, such as government policies, trade policies like quotas, and export subsidies can influence import and export volumes. Terms of Trade which refers to the relative prices of Zimbabwe's exports and imports.

Overall, this model provides a starting point to analyze the main factors influencing Zimbabwe's trade balance. By estimating the coefficients (β), you can quantify the intensity and direction of these variables' associations with one another.

3.3 DATA COLLECTION PROCEDURES

This research relied on secondary data to fuel both the literature review and the data analysis. Data sources included academic journals, websites of economic and standard-setting organizations, and professional organizations like the WB (World Bank). These sources provided reliable, countryspecific statistics crucial for the research. The study focused on variables like trade performance (exports and imports), exchange rate, GDP, inflation, and FDI. Data collection

happened online from the aforementioned professional organizations. The research period covered 1988 to 2022 to capture a broader timeframe for more robust data analysis. However, it's important to consider the multiple currency changes Zimbabwe has experienced over the past two decades when interpreting the results.

3.4 MODEL DIAGNOSTIC TESTS

3.4.1 UNIT ROOT TEST

This research uses a test to assess whether the time series data is stationary. Stationarity is a crucial characteristic that impacts how data can be analyzed and modeled. There are several common tests for stationarity, but this study will specifically use the Augmented Dickey-Fuller (ADF) test. These tests work by assuming the data has a unit root (non-stationary) as the null hypothesis. By comparing a calculated statistic from the data to established critical values or a p-value, we can either reject or fail to reject this assumption. Rejecting the null hypothesis means the data is considered stationary, while failing to reject it indicates non-stationary data.

H_0 : there is a unit root

H_1 : there is no unit root

3.4.2 AUTOCORRELATION TEST

Test assesses whether there is a systematic pattern of correlation among the residuals of a time series model at different lags. It occurs when the errors from one time period are related to the errors in other time periods. Common tests like the Durbin-Watson, Breusch-Godfrey, or LjungBox test can detect this issue. However, in this study Breush-Godfrey was used. If the test result is significant, it suggests the errors are not independent, violating an important assumption in time series analysis, "Serial correlation is often a serious problem in practice, since it implies that there is information which could be employed to improve the model that has not yet been used," (Brooks, 2019). This can result in misleading approximations of the model's coefficients and unreliable conclusions. To address autocorrelation, techniques like ARIMA modeling or including lagged dependent variables in the model can be employed. The test statistic spans between 0-4, variables close to 2 indicate little to no autocorrelation, variable below 2 suggest positive autocorrelation and those below 2 a negative autocorrelation.

H_0 : there is autocorrelation

H_1 : there is no autocorrelation

3.4.3 NORMALITY TEST

Ensuring normality of residuals is important for making valid statistical inferences and interpretations. These tests, such as the 1987 Jarque-Bera test, To evaluate whether the residuals of a regression model adhere to a normal distribution, various normality tests can be conducted. These tests include the Shapiro-Wilk test, Kolmogorov-Smirnov test, and Anderson-Darling test. By comparing the p-value obtained from the normality test to a chosen significance level (typically 0.05), one can determine whether to reject or fail to reject the null hypothesis of normality. If the p-value exceeds the significance level, it suggests that the residuals are approximately normally distributed. It is important to assess the normality of residuals since deviations from normality can impact the validity of t-tests, F-tests, and confidence intervals, potentially leading to erroneous conclusions. In this particular study, the researcher plans to employ the Jarque-Bera test to evaluate the normality of residuals. A significance level of 0.05 will be used to determine the results, wherein the null hypothesis will be rejected if the p-value is less than 0.05.

H_0 : There is no normality

H_1 : there is normality.

3.4.4 MULTICOLLINEARITY TEST

The degree of collinearity, or high correlation, between the independent variables in a regression model is evaluated using a multicollinearity test. occurs when there is a strong correlation between independent variables. To evaluate this, tests such as tolerance and the Variance Inflation Factor (VIF) are employed. Generally greater than 10, a high VIF indicates multicollinearity. As (Woolridge, 2016) states, "Multicollinearity can cause serious problems when trying to draw conclusions about how the dependent variable changes when one of the independent variables changes" This can make it tough to isolate the unique effect of each independent variable on the outcome because they're essentially measuring similar things. As a result, the precision of the estimates for each variable's influence, coefficient estimates suffers, making it harder to interpret how each factor truly affects the outcome of interest.

3.4.5 OPTIMAL LAG LENGTH

Finding the right lag length is crucial as all ARDL bounds are expected to be influenced by selected lags. Lag length refers to how many past values of your data you consider. Picking the right number is important because using too few can lead to inaccurate models, while using too many can make

your analysis statistically unreliable. The ideal lag length can be found via a variety of methods. Information criteria such as the Hannan-Quinn Information Criterion (HQIC), the Schwarz Bayesian Information Criterion (SBIC), and the Akaike Information Criterion (AIC) are used in one method. These techniques seek the simplest model that accurately represents the data by striking a balance between a model's complexity and how well it fits the data. Another approach involves tests like the Lagrange Multiplier (LM) or Wald test. Here, you start with a high number of lags and gradually reduce them until the test indicates there's no longer a relationship between past values and current errors in your model.

3.4.6 COINTEGRATION

Cointegration analysis plays a crucial role in ARDL as it helps determine the long-term relationship between variables within the model. The ARDL approach to cointegration, developed by Pesaran, Shin, and Smith, is a widely used method that can be applied even when the variables have different levels of integration, such as $I(0)$ and $I(1)$. It is essential to ensure that the model is appropriately specified and that the assumptions of the ARDL approach are met. These assumptions include the absence of serial correlation and heteroskedasticity in the residuals. To assess the significance of the cointegration relationship, the F statistic is calculated and compared to upper and lower bound critical values. If the calculated F statistic exceeds these bounds, the null hypothesis is rejected, suggesting the presence of a cointegrating relationship. Conversely, if the calculated F statistic falls within the bounds, the null hypothesis is not rejected, indicating the absence of a cointegrating relationship.

H_0 : there is co-integration.

H_1 : there is no co-integration.

3.4.7 ERROR CORRECTION FORM

The ARDL model's ECF tackles both short-term changes and long-term stability between variables. In ARDL cointegration analysis, this form is key for understanding short-term fluctuations, how fast variables adjust to equilibrium, and how these short-term movements connect to the long-term relationship. It strengthens the overall analysis by providing a more accurate picture of how the variables interact. Including this term also helps avoid misleading results (spurious regressions) that can arise from using data with trends (non-stationary). By incorporating the error correction form, the ARDL model captures both the dynamic adjustments

and the long-term equilibrium, leading to a more reliable analysis of the underlying economic relationships. H_0 is discarded if the p-value of the ECM term is above 0.05.

H_0 : the ECM term is significant.

H_1 : the ECM term is not significant.

3.4.8 HETEROSKEDASTICITY TEST

This research employs a test to check if the spread of errors (residuals) in the regression model is consistent across all values of the independent variables. This consistency is a vital assumption for linear regression models to hold true. (Gujarati & Porter, 2009) noted that, "One of the important assumptions of the classical linear regression model is that the variance of the disturbance term is constant, or homoscedastic". Tests like Breusch-Pagan or White's test can detect heteroskedasticity. If the test results in a low p-value (less than 0.05), it suggests the errors are not constant, potentially leading to inaccurate estimates of the model's parameters and unreliable test outcomes. In such cases, we would reject the assumption of homoskedasticity and acknowledge the presence of heteroskedasticity in the residuals. This can make the standard errors and test results misleading, as emphasized by (Stock & Watson, 2019), "The usual formula for the standard error [in the presence of heteroskedasticity] is incorrect, and t-statistics computed using this standard error do not have a standard normal distribution, even in large samples." Reject H_0 if the p-value of Chi-Square is greater than 0.05, if not do not reject.

H_0 : the generated residuals are equal.

H_1 : the generated residuals are unequal.

3.4.9 ARCH TEST

This test allows researchers to identify whether the regression residuals exhibit long memory which could compromise the validity of the estimated model. It also helps ensure that the residuals of the ARDL model are white noise, which is crucial for accurate forecasting and policy recommendations and it provides evidence of whether a model contains spurious relationships or not. Reject the null hypothesis if the P Value is less than 0.05 level of significance.

H_0 : There is no ARCH in the generated residuals. H_1 : there is ARCH in the generated residuals.

3.4.10 CUSUM TEST

The test can identify any sudden changes in the coefficients or intercept of the model. This can indicate a change in economic relationships over time, which can have important implications for forecasting and policy recommendations. It can also help identify significant changes in the behavior of the dependent variable, such as a shift in the mean or variance. If the cumulative sum of squares is not within the 5% crucial zone, reject the null hypothesis.

H_0 : There are no structural changes.

H_1 : there are structural changes.

3.4.11 CUSUM OF SQUARES

It serves a similar purpose to the CUSUM test, but with a few key differences like greater sensitivity, it is generally considered to be more sensitive to changes in parameter values, making it more likely to detect small structural breaks that might be missed by the CUSUM test. Reject the null hypothesis if it falls out of bounds.

H_0 : There are no structural changes.

H_1 : there are structural changes.

3.4.12 SPECIFICATION TEST

Econometric analysis relies heavily on specification tests which check how well a chosen model reflects the actual process that generated the data. Valid assumptions are vital for a model to produce reliable and interpretable results. There are various specification tests available, each suited to different model types and research questions. Some common examples include the Ramsey RESET test which checks for missing variables, the Chow test, checks for stability over time, and the Davidson-MacKinnon J test that checks for appropriate functional form. The results of these tests can reveal potential issues like missing variables or an incorrect model structure. Depending on the specific test outcome, researchers might need to refine the model. This could involve adding or removing variables, transforming existing variables, or even exploring different modeling techniques altogether. Typically, specification tests are conducted after the initial model is estimated. By interpreting these tests, researchers can determine if adjustments are necessary to ensure the model is accurate and valid. If the p-value is less than 0.05 level of significance null hypotheses will be rejected.

H_0 : The model is correctly specified.

H_1 : The model is incorrectly specified.

3.5 CONCLUSION

This chapter delved into the methods used to investigate the research questions and hypotheses established in the first chapter. It explained how the research tools were evaluated for reliability and validity. Additionally, it justifies the chosen variables used in the study and outlines the plan for analyzing and presenting the collected data in chapter four.

CHAPTER 4

DATA PRESENTATION AND DISCUSSION

4.0 INTRODUCTION

This chapter focuses on interpreting the findings related to how exchange rate volatility affects trade performance. The analysis utilizes the E-views 10 software to generate statistical results. This data will be presented in tables and charts, accompanied by clear explanations to enhance understanding. The ARDL diagnostic tests will be used to structure the presentation of the results in this chapter.

4.1 DIAGNOSTIC RESULTS

4.1.1 UNIT ROOTS RESULTS

Table 1: ADF Unit Root test results

Variable	ADF Stat	Critical Value		Intercept	Trend	P-value	Integration order
EXRT	-4.68448	1%	-4.25288	YES	YES	0.0034	I(0)
		5%	-3.54849				
		10%	-3.20709				
FDI	-4.44376	1%	-4.25288	YES	YES	0.0063	I(0)
		5%	-3.54849				
		10%	-3.20709				
INFL	-5.33854	1%	-4.27328	YES	YES	0.0007	I(0)
		5%	-3.55776				
		10%	-3.21236				
GDP	-6.86278	1%	-4.26274	YES	YES	0	I(1)

		5%	-3.55297				
		10%	-3.20964				
		1%	-4.26274				
		5%	-3.55297				
		10%	-3.20964				
TARRIF	-6.72561			YES	YES	0	I(1)

Source: Authors computations in E-views 10

Based on the findings presented in Table 1, it was observed that the variables Exchange rate (EXRT), Foreign Direct Investment (FDI), and Inflation (INFL) exhibited stationary behavior at the I(0) level of integration. In contrast, Gross Domestic Product (GDP) and Tariffs demonstrated stationarity at the I(1) level of integration. The results were supported by the ADF statistic, which displayed more negative values compared to the critical values at various significance levels. This suggests that the null hypothesis of a unit root can be rejected for all variables. In simpler terms, the results indicate that all five variables are likely to be stationary. This conclusion is further supported by the p-values, which were found to be lower than 0.05.

4.1.2 OPTIMAL LAG LENGTH RESULTS

Table 2: Optimal Lag length results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1116.685	NA	1.20e+23	70.16783	70.44265*	70.25892
1	-1063.392	83.26992	4.25e+22	69.08703	71.01081	69.72471
2	-1029.346	40.43062	6.19e+22	69.20910	72.78183	70.39336

3	-942.4655	70.59010*	5.61e+21*	66.02909*	71.25078	67.75994*
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The optimal lag length for this study is 3 which means that the researcher will maintain that lag length throughout the regression analysis. The highest value of LogL IS -942.4655 and the lowest is 67.75994 and they are both found in the third lag. Maintaining the lag length is crucial as it ensures reliable estimates of the model coefficients and also it assists in avoiding spurious regression which is a phenomenon that can occur when 2 stationary variables are regressed on each other.

4.1.3 COINTEGRATION RESULTS

Table 3: Cointegration results

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	14.88344	10%	2.75	3.79
k	5	5%	3.12	4.25
		2.5%	3.49	4.67
		1%	3.93	5.23

The bound test cointegration results indicate that the F-statistic value is 14.88344 which is more than all the critical values at significance levels of 1%. Since the F-stat exceeds the upper bound

critical values it generally indicates that the null hypothesis of no relationship between the independent variables and the dependent variable can be rejected with a high level of confidence. In other words, the F-test shows that the overall model is statistically significant, indicating that at least one of the independent variables has a non-zero coefficient and that the explanatory variables can predict the dependent variable together.

4.1.4 ERROR CORRECTION FORM

Table 4: Error Correction Form Results

ECM Regression				
Case 5: Unrestricted Constant and Unrestricted Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.881609	0.540900	3.478664	0.0017
CointEq(-1)*	-0.823854	0.167698	-4.912716	0.0000

The findings from the error correction form (ECF) indicate a strong long-run relationship between government spending and economic growth. The statistically significant coefficient of CointEq(1) with a value of -0.823854 suggests that any imbalances between these factors will be corrected over time. The very low probability value (prob. 0.0000) reinforces the reliability of this finding. Specifically, the speed of adjustment towards long-run equilibrium can be estimated by multiplying this coefficient by 100. In this case, it's about 82.38%. This means that for every 1% deviation from the long-run balance, government spending adjusts back towards equilibrium by roughly 0.82% in the short run, assuming other factors remain constant. This adjustment process helps ensure that government spending and economic growth eventually return to their long-run equilibrium state

4.1.5 MULTICOLLINEARITY TEST

Table 5: Multicollinearity results

	EXRT1	FDI	GDP	INFL	TAR1
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EXRT1	1	-0.002574	-0.324631	-0.0481327	-0.002438
FDI	-0.002574	1	0.156634	-0.0536354	-0.338485
GDP	-0.324631	0.156634	1	-0.111343	0.021238
INFL	-0.048132	-0.053635	-0.111343	1	-0.250279
TAR1	-0.002438	-0.338485	0.021238	-0.250279	1

Source:E-views10

The correlation values between each variable in the model are displayed in Table 3. There are inverse relationships between some of the variables in the correlation matrix. Since there is no correlation between the independent variables—all values in the preceding table are less than 0.8, with 0.156634, representing the greatest value—the model is not multicollinear. It is advantageous because it enables a more precise understanding of the distinct impacts of every variable on the dependent variable.

4.1.6 AUTOCORRELATION RESULTS

Table 6: Autocorrelation results

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.337258	Prob. F(2,7)	0.3222
Obs*R-squared	8.846385	Prob. Chi-Square(2)	0.0120

The analysis suggests the model is statistically sound and accurately captures the data's dynamics. The F-statistic 1.337258 is lower than critical values at different significance levels, indicating no serial correlation (autocorrelation) in the residuals. This is further supported by the high ObsRsquared value 8.846385, suggesting a good model fit. Additionally, p-values from both the F-test 0.3222 and chi-square test 0.0120 are greater than the common 5% significance level, again confirming the absence of serial correlation. Serial correlation is a concern because it can lead to unreliable results and predictions. By demonstrating its absence, we can be more confident in the model's validity and the accuracy of any policy recommendations or forecasts derived from it.

Essentially, these tests provide evidence that the model accurately captures the data's underlying trends, making it a more reliable tool for analysis and decision-making.

4.1.7 HETEROSCEDASTICITY RESULTS

Table 7: Heteroscedasticity Results

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.763010	Prob. F(22,9)	0.7131
Obs*R-squared	20.83125	Prob. Chi-Square(22)	0.5312
Scaled explained SS	1.663755	Prob. Chi-Square(22)	1.0000

The F-statistic obtained in this analysis is 0.763010, which exceeds the upper bound critical value at various significance levels. This suggests that there is evidence to support the presence of a significant relationship between the explanatory variables in the model. Moreover, the ObsRsquared value of 20.83125 indicates that a substantial portion of the variation in the residuals can be explained by the explanatory variables included in the model. The p-value associated with the F-statistic is calculated as 0.7131, which is higher than the conventional significance level of 0.05. As a result, we fail to reject the null hypothesis of homoscedasticity, indicating the absence of heteroskedasticity in the regression model. This conclusion is based on comparing the p-value to the significance level of 0.05 and finding that it is higher, providing evidence in favor of no heteroskedasticity.

4.1.8 ARCH RESULTS

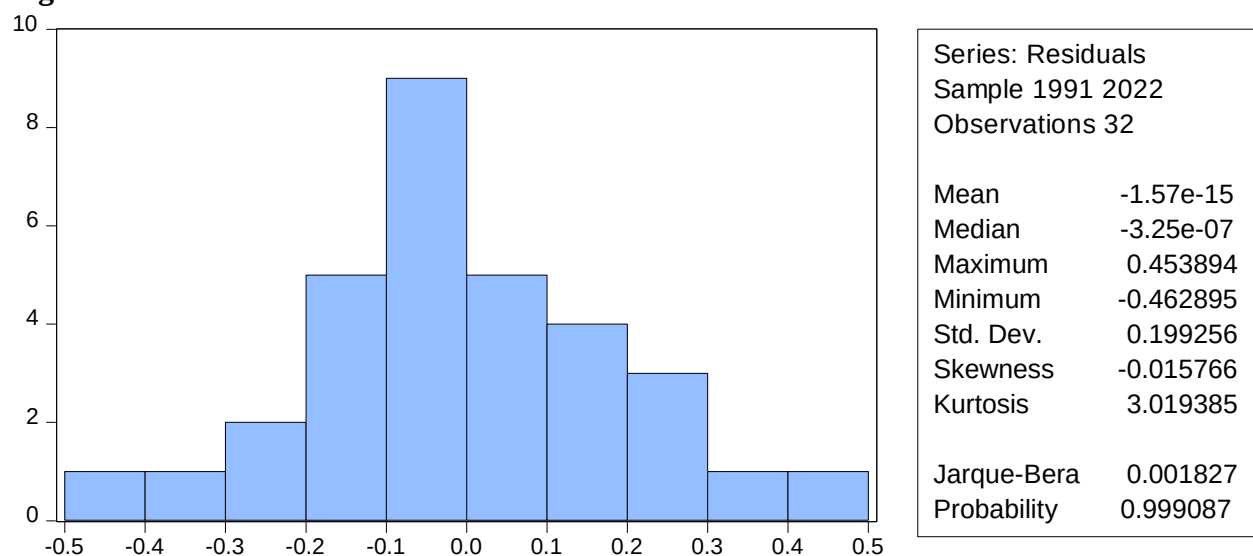
Table 8: ARCH Results

Heteroskedasticity Test: ARCH			
F-statistic	3.919869	Prob. F(1,29)	0.0573
Obs*R-squared	3.691264	Prob. Chi-Square(1)	0.0547

The test results indicate that the spread of errors in the model is likely homoskedastic. This conclusion is based on the F-statistic's p-value (0.0573), which is slightly above the commonly used significance level of 0.05. Since we fail to reject the null hypothesis of homoskedasticity, we can be confident that the Breusch-Pagan-Godfrey and ARCH tests support the validity of the regression model. In other words, the variance of the errors seems constant and doesn't show any patterns related to past errors. This strengthens the reliability of the model's results.

4.1.9 NORMALITY TEST

Figure 4.1: Normal results

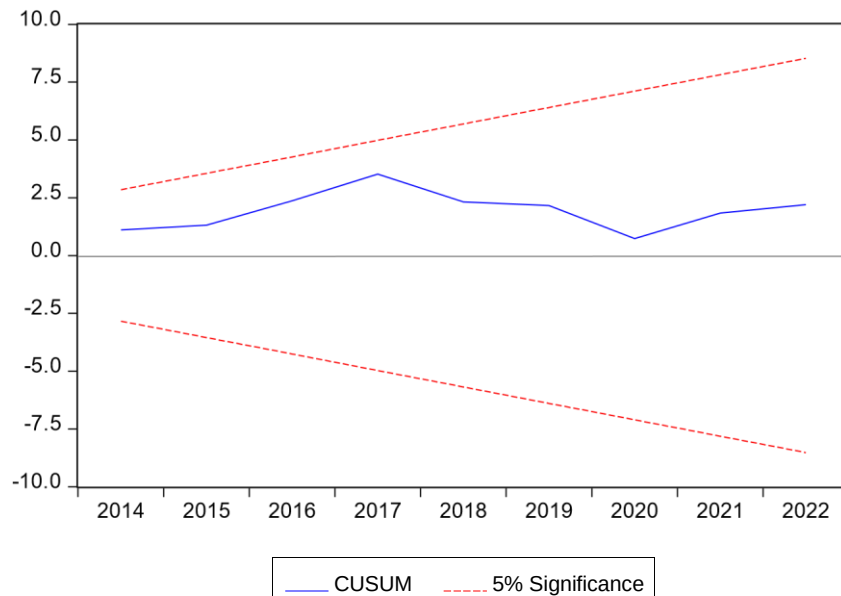


The provided graph and statistics suggest the data most likely follows a normal distribution. The test's p-value 0.999087 is significantly more than the standard significance level of 0.05. This means that unless the null hypothesis is rejected, we are unable to reject the theory that the data is normally distributed. Additionally, the skewness value -0.015766 is slightly negative, indicating a possible minor skew to the left side of the distribution. However, the high p-value and small magnitude of the skew value suggest this deviation from perfect symmetry is likely not significant. In simpler terms, we compare the test result p-value to a chosen threshold significance level to see if the data deviates significantly from normality. Here, the p-value 0.999087 is well above the threshold 0.05, signifying that the data likely follows a normal distribution. This is further supported by the Jarque-Bera test, which reinforces the idea that the data pattern aligns with a

normal distribution. Overall, the evidence suggests the data in this study can be considered normally distributed.

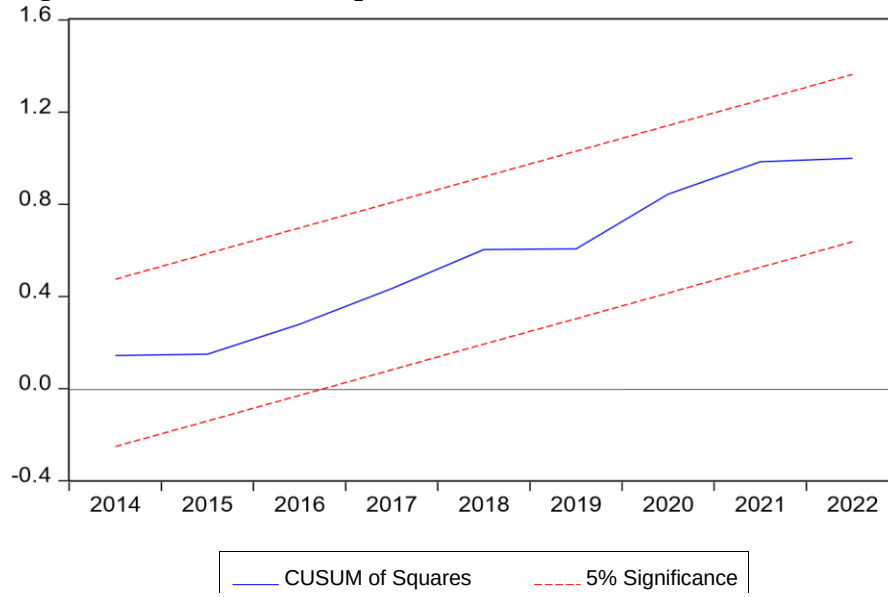
4.1.10 CUSUM TEST

Figure 4.2: CUSUM Results



The CUSUM (Cumulative Sum) is used to test the stability of regression coefficients or other model parameters, it computes the cumulative sum of weighted squared deviations of estimated parameters from their initial values and further assesses whether these cumulative sums are significantly different from zero. If significant e.g at the 0.05 level it proposes there is unsteadiness in the model parameters and it can be used to detect structural breaks or regime shifts in time series data. In overall, the CUSUM test is a useful tool for detecting changes or instability in model parameters over time and since the residuals fall within the critical range, it suggests that the estimated model sufficiently captures the underlying relationship between the variables and that the model's parameters remain relatively stable over time.

Figure 4.3: CUSUM of Squares Results



Tests for instability in the variance of residuals over time, similar to the CUSUM test adds up the squares of the residuals' standard deviations, which are weighted to represent the chance of changes becoming more likely over time, it is able to identify heteroskedasticity or other variations in the data's variance that might be brought on by missing variables or other causes used in time series regression models to evaluate the stability of residual variance. In the event that the CUSUMSQ test statistic is significant at 0.05 level, it implies that the data's variance may have changed, which could result in estimates that are biased. It is crucial to identify and rectify these alterations to guarantee that the fitted model is suitable and dependable. CUSUMSQ examination. In this case however, it is within bounds of the significance levels supporting the notion that the relationship between the study variables remain relatively stable throughout the study period.

4.1.11 MODEL SPECIFICATION RESULTS

Table 9: Model Specification Results

	Value	df	Probability
F-statistic	0.885962	(1, 27)	0.3549

The obtained F-statistic value of 0.885962 is relatively small and significantly below the upper bound critical value at a significance level of 0.05. This indicates that there is insufficient evidence to reject the null hypothesis, which states that there are no omitted variables in the model.

Consequently, it can be concluded that the model is adequately specified and does not suffer from omitted variable bias. Furthermore, the p-value associated with the F-statistic is calculated as 0.3549, which is well above the conventional 5% significance level. This provides additional evidence in support of the null hypothesis, suggesting that important explanatory variables have not been omitted from the model. Taken together, these results indicate that the model is appropriately specified, and there is no strong indication of the omission of significant explanatory variables. It is worth emphasizing that conducting model specification testing is a crucial step in the model selection process. By examining the presence of omitted variables, researchers can ensure that their models are unbiased and accurately capture the most important relationships between the dependent and independent variables.

4.2 REGRESSION RESULTS

4.2.1 ESTIMATED SHORT RUN RESULTS

Table 10: Estimated short run results

ECM Regression				
Case 5: Unrestricted Constant and Unrestricted Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.735086	0.764463	11.42643	0.0000
@TREND	-0.213995	0.019723	-10.84981	0.0000
D(TP(-1))	-0.361375	0.107873	-3.350002	0.0085
D(EXRT1)	3.25E-11	4.74E-11	0.686208	0.5099
D(EXRT1(-1))	2.32E-11	6.00E-11	0.386115	0.7084
D(EXRT1(-2))	-4.01E-10	6.92E-11	-5.787371	0.0003
D(FDI)	0.171817	0.047409	3.624116	0.0055
D(FDI(-1))	-0.142074	0.044862	-3.166901	0.0114

D(GDP)	0.032334	0.008909	3.629268	0.0055
D(GDP(-1))	0.072822	0.011413	6.380652	0.0001
D(GDP(-2))	0.028581	0.009005	3.173850	0.0113
D(INFL)	-0.001863	0.000732	-2.545598	0.0314
D(INFL(-1))	0.010589	0.001032	10.25916	0.0000
D(INFL(-2))	0.015869	0.001986	7.991409	0.0000
D(TAR1)	1.494009	0.707816	2.110730	0.0640
D(TAR1(-1))	6.382286	0.707835	9.016624	0.0000
D(TAR1(-2))	4.819823	0.787259	6.122284	0.0002
CointEq(-1)*	-0.639160	0.054230	-11.78610	0.0000

4.2.2 ESTIMATED LONG RUN RESULTS

Table 11: Estimated long run results

Levels Equation				
Case 5: Unrestricted Constant and Unrestricted Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXRT1	-4.63E-10	2.77E-10	-1.672695	0.1287
FDI	0.995619	0.328305	3.032600	0.0142
GDP	-0.093006	0.026261	-3.541559	0.0063
INFL	-0.010571	0.009701	-1.089742	0.3041
TAR1	-9.770795	4.178699	-2.338239	0.0441

		Durbin-
R-squared 0.968022	F-statistic 24.92945	Watson stat 2.406749
Adjusted		Prob(F-
R-squared 0.929192	statistic)	0.000000

Initial findings from this study provide insights into the goodness of fit of the regression model and the strength of relationships between variables. The R-squared value of 0.968022 indicates that approximately 96.80% of the variation in trade performance, the dependent variable, can be explained by the independent variables included in the model. This signifies a substantial explanatory power, indicating that the selected variables significantly influence trade performance. However, it is important to consider the adjusted R-squared value of 0.929192, which considers the number of independent variables and the sample size. The lower adjusted R-squared value compared to the R-squared suggests that some independent variables may not contribute significantly to explaining economic growth. Hence, cautious interpretation is necessary to avoid overestimating the model's predictive ability for future outcomes. The F-statistic of 24.92945 and its associated very low p-value of 0.0000 indicate that the overall model is statistically significant. This implies that the inclusion of the independent variables in the model is not a result of chance but reflects a meaningful relationship between government spending and economic growth in Zimbabwe. The low p-value strongly supports rejecting the null hypothesis of no relationship. Additionally, the Durbin-Watson statistic of 2.406749 is used to measure autocorrelation and examine serial correlation within the residual errors of the model. The value of 2.406749 suggests a moderate positive autocorrelation, indicating that the errors might be related across observations. Addressing this autocorrelation is crucial to ensure the reliability of the regression results since the ideal value of the Durbin-Watson statistic is closer to 0 or 4, indicating no correlation.

4.3 Interpretation of Regression Results

The ARDL outcomes in Tables 4.10 and 4.11 provide results into the effect of the independent variables chosen for this study on trade performance.

4.3.1 EXCHANGE RATE (EXRT1)

In the short run, the coefficient for ER is reported as $-4.01E-10$, and the associated probability value, or p-value, is 0.0003. This indicates a statistically significant negative relationship between exchange rate and trade performance in the short run. The negative coefficient suggests that an increase in exchange rate is associated with a decrease in trade performance in the short term. Several factors could explain this relationship. Firstly, in the short run, an increased exchange rate might lead to a decrease in competitiveness of Zimbabwe's exports, making them more expensive for foreign buyers which in turn reduces demand, leading to a decrease in overall trade performance. Additionally, exchange rate movements can lead to increased uncertainties for businesses which can slow down operations and trade. In the long run, the coefficient for the exchange rate is reported as $-4.63E-10$, and the associated probability value is 0.1287. The coefficient is negative, indicating a potential inverse relationship between exchange rate and trade performance and the p-value is not statistically significant at the conventional significance level of 0.05. This suggests that the relationship between exchange rate and trade performance in the long run is not statistically strong.

4.3.2 FOREIGN DIRECT INVESTMENT (FDI)

The results in tables 4.10 and 4.11 reveal the impact of FDI on trade performance in both the short run and the long run. In the short run, the coefficient for FDI is reported as 0.171817, and the associated probability value is 0.0055. This indicates a highly statistically significant positive relationship between FDI and trade performance in the short term. The positive coefficient suggests that an increase in FDI is associated with an increase in trade performance in the short run. FDI often leads to the establishment of new production facilities or the expansion of existing ones. This increase in production capacity can boost a country's export capabilities, as the additional output can be directed towards international markets, leading to improved trade performance in the short run. Multinational companies that invest in a country through FDI tend to bring with them advanced technologies, management practices, and production techniques which can lead to efficiency gains and improved competitiveness of the host country's exports, driving up trade performance in the short term. FDI can also help integrate the host country's firms into global supply chains, providing them with better access to international markets, distribution networks, and inputs. In the long run, the coefficient for FDI is reported as 0.995619, and the

associated probability value is 0.0142. The positive coefficient indicates a potential positive relationship between FDI and trade performance. The positive relationship between FDI and trade performance in the long run could be explained by various factors. As foreign firms bring in new technologies, managerial expertise, and production techniques, these can spill over to domestic firms through labor mobility, imitation, and competition. This can lead to productivity gains and increased competitiveness of the host country's exports in the long run. Integration into Global Value Chains by providing them with access to larger international markets and better distribution networks which can lead to an expansion of trade flows and improved trade performance over the long term and improved product quality and diversification can enhance the competitiveness of the host country's exports in the long run. Therefore, an increase in FDI by 1 unit, it will result in GDP increase by 0.995619

4.3.3 INFLATION (INFL)

The study finds a statistically significant positive relationship between inflation and trade performance in the short run with the coefficient for inflation is reported as 0.010589, and the associated probability value, or p-value, is 0.0000. This means that when inflation rises, trade performance also tends to increase. There are a few reasons why this might happen. First, during inflation, domestic producers may be able to raise their prices to keep up with the overall price increase. This can make their exports more competitive in the international market, as their prices might still be lower than those of foreign competitors. Second, firms might be able to adjust their costs such as, wages and materials relatively quickly to maintain their profit margins and production levels, allowing them to export more and improve short-term trade performance. Finally, inflation might prompt exporters to use tools like currency swaps or forward contracts to hedge against exchange rate fluctuations. This can help them lock in favorable prices and manage risks, leading to better short-term trade performance. In the long run the coefficient for the inflation is reported as -0.010571, and the associated probability value is 0.3041. The coefficient is negative, suggesting a possible negative relationship between inflation and long-term trade performance, but the p-value is not statistically significant at the usual 5% level. This means the evidence for a long-term connection is weak. The long-term effects of inflation on trade might be more complex. While there might be some initial benefits, the negative consequences of inflation, such as reduced

purchasing power, competitiveness, and economic stability, may eventually outweigh the shortterm gains.

4.3.3 GROSS DOMESTIC PRODUCT (GDP)

In the short run, the coefficient for GDP is reported as 0.072822, and the associated probability value, or p-value, is 0.0001 therefore, the study finds a statistically significant positive relationship between GDP and trade performance in the short run. In other words, when GDP increases, trade performance tends to improve as well. This can be explained by a few factors. As an economy grows, domestic demand for goods and services typically rises. This can lead to both increased imports and exports. Additionally, positive GDP growth can boost business and consumer confidence, leading to more investment and spending, which further stimulates trade activity. In the long run, the coefficient for GDP is reported as -0.093006, and the associated probability value is 0.0063, the results for the long run are more nuanced. The coefficient is negative, but indicates a statistically significant relationship between GDP and trade performance. This might seem counterintuitive, but it can be explained by considering the maturity of the economy. As an economy develops, its domestic market becomes saturated, and firms may need to look outward to export their products. This can weaken the direct link between domestic economic growth and trade performance. Additionally, increased competition in the global market, driven by factors like technological advancements, can make it harder for firms to remain competitive in the export market, potentially hindering long-term trade performance.

4.3.5 TARIFFS (TAR1)

The coefficient for tariffs is 6.382286 with a highly significant p-value of 0.0000, it suggests a positive short-term relationship between tariffs and trade performance. An increase in tariffs is associated with an increase in trade performance in the short run. This can be explained by a few factors such as how higher import tariffs can make domestic products more attractive to consumers, leading to a rise in demand for locally produced goods which can shift results in a short-term boost in domestic production and exports as firms capitalize on new market opportunities. Revenue from tariffs can also be used by the government to fund infrastructure projects, export promotion initiatives, or other measures that facilitate trade, these investments can enhance the country's export capacity and competitiveness in the short term. If trading partners retaliate with tariffs, it

can divert trade flows away from targeted products, potentially creating new opportunities for domestic firms to expand exports to alternative markets. This trade diversion effect can contribute to a short-term increase in overall trade performance. On the other hand, the coefficient for tariffs is -9.770795 with a significant p-value of 0.0441 which indicates a negative long-term relationship between tariffs and trade performance. Tariffs can incentivize domestic firms to invest in technologies, processes, and innovations that improve productivity which can lead to increased efficiency, cost reductions, and enhanced competitiveness, ultimately boosting long-term trade performance. Tariffs can provide temporary protection for emerging industries, allowing them to develop their capabilities. Once mature and competitive, these industries can expand their presence in international markets, contributing to better long-term trade performance. Overall, the analysis suggests a complex relationship between tariffs and trade performance. While tariffs might offer some short-term benefits, they can have negative consequences in the long run.

4.4 CONCLUSION

In conclusion, this chapter has presented results on several diagnostic tests. This was done to avoid the generation of spurious regression results. The diagnostic tests conducted on the model showed the absence of issues such as multicollinearity, heteroscedasticity, autocorrelation and specification errors, enhancing the reliability of the results. The next chapter will wrap up the study by proffering on the conclusion, summary, recommendation and suggestions for future study.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 INTRODUCTION

This chapter provides an overview of the study, along with a conclusion, recommendations, and ideas for more research based on the findings.

5.1 SUMMARIES

5.1.1 TO ANALYZE THE IMPACT OF EXCHANGE RATE VOLATILITY ON TRADE FLOWS.

The first objective was to analyze the impact that exchange rate volatility has on trade flows. This was achieved by means of analyzing and regressing data for the span of 1988-2022 using autoregressive distributed lag(ARDL) model on E-views 10. The outcomes from the analyses were presented in the fourth chapter of this study in form of graphs, tables and written interpretations. The study looked at the significance of short and long run effects of fluctuating exchange rates whilst putting into consideration other variables that can also affect trade like FDI and GDP. It revealed that exchange rate volatility has a discernible influence on the country's trade dynamics through its short-term trends and long-term trends.

5.1.2 TO IDENTIFY THE SPECIFIC IMPLICATIONS FOR TRADE PERFORMANCE, INCLUDING THE POTENTIAL EFFECTS ON TRADE DIVERSIFICATION AND COMPETITIVENESS.

While economic growth initially benefits Zimbabwe's trade, exchange rate fluctuations pose challenges. Currency movements can affect the flow of money in and out of the country, impacting trade. A weaker Zimbabwean dollar makes exports cheaper but hurts profits if companies have foreign currency expenses. On the other hand, a stronger dollar benefits consumers with cheaper imports but harms exporters. Businesses can navigate this volatility by diversifying exports and managing currency risks. Policymakers can also help by stabilizing the exchange rate or providing tools for exporters to hedge against fluctuations. Understanding how much price changes affect demand for Zimbabwe's exports and imports is crucial for designing effective trade policies.

Ultimately, Zimbabwe's trade strategy needs to consider exchange rate volatility to create a more competitive and diverse trading environment. Additionally, the impact of these fluctuations can vary depending on the industry and its market dynamics. Companies in highly competitive markets or those reliant on imports may be more vulnerable.

5.1.3 TO EXAMINE THE EFFECTS OF REAL EFFECTIVE EXCHANGE RATE VOLATILITY ON ECONOMIC GROWTH AND TRADE DYNAMICS AND TO EXPLORE HOW THESE EFFECTS VARY ACROSS DIFFERENT SECTORS, INDUSTRIES, AND REGIONS WITHIN THESE ECONOMIES.

Studies on real exchange rate volatility in Zimbabwe show it hinders economic growth and trade. The main reason is uncertainty caused by erratic exchange rates. Businesses and investors are hesitant to commit resources due to the high risks. Rapid currency fluctuations, especially depreciation, make imports expensive, leading to inflation. This reduces purchasing power and hurts economic growth. The impact of REER volatility differs across sectors. Export-oriented industries like agriculture and manufacturing are more vulnerable. They struggle to adapt quickly to changing exchange rates, losing competitiveness and export earnings. This can create a negative cycle as lower export earnings limit access to foreign currency needed for imports. The service sector, being more domestic, is less directly affected. However, it can still experience slowdowns due to reduced consumer confidence and business uncertainty caused by REER volatility. Furthermore, the effects of REER volatility vary by region. Areas with stronger global economic ties, like cities and border areas, feel the exchange rate swings more intensely compared to isolated rural regions.

5.2 CONCLUSIONS

5.2.1 TO ANALYZE THE IMPACT OF EXCHANGE RATE VOLATILITY ON TRADE FLOWS.

The conclusions drawn from the analyses underscore the critical importance of exchange rate stability for sustainable trade growth in Zimbabwe. the short run p-value of ER was found as 0.0003 which indicated a statistically significant negative relationship between ER and trade performance in the short run because the coefficient was negative meaning that an increase in exchange rate is associated with a decrease in trade performance. Probability value in the long term was 0.1287 which is not statistically significant at the conventional significance level of 0.05. This concluded that the relationship between exchange rate and trade performance in the long run is not statistically strong. The findings suggest that targeted policy interventions targeted at mitigating the adverse effects of ERV could yield substantial benefits for the country's economic resilience

and global trade competitiveness moreover the conclusions emphasize the need for a nuanced approach to exchange rate management that considers both short- and long-term strategic objectives

5.2.2 TO IDENTIFY THE SPECIFIC IMPLICATIONS FOR TRADE PERFORMANCE, INCLUDING THE POTENTIAL EFFECTS ON TRADE DIVERSIFICATION AND COMPETITIVENESS

Extreme levels of ERV can negatively impact trade performance by eroding competitiveness and reducing export earnings, particularly in export-oriented sectors such as agriculture and manufacturing. It can hinder trade diversification efforts as sectors facing difficulties in adjusting to rapid exchange rate changes may struggle to explore new markets and products. Lastly although relatively insulated from direct ERV, the services sector can still experience indirect effects through reduced consumer and business confidence, which can impact trade in services.

5.2.3 TO EXAMINE THE EFFECTS OF REAL EFFECTIVE EXCHANGE RATE VOLATILITY ON ECONOMIC GROWTH AND TRADE DYNAMICS AND TO EXPLORE HOW THESE EFFECTS VARY ACROSS DIFFERENT SECTORS, INDUSTRIES, AND REGIONS WITHIN THESE ECONOMIES

The study reveals that erratic exchange rates (REER volatility) act as a major obstacle to Zimbabwe's economic growth and trade. This volatility creates uncertainty, making businesses and investors hesitant to commit resources which in turn hinders economic expansion. Reduced purchasing power due to inflation further weakens economic growth. The impact of REER volatility is not uniform across all sectors. Export-oriented industries like agriculture and manufacturing are particularly vulnerable. These sectors struggle to adjust quickly to changing exchange rates, losing competitiveness and export earnings. This can create a vicious cycle as lower export earnings limit access to foreign currency needed for imports. The service sector, while less directly affected, can still experience slowdowns. Reduced consumer confidence and business uncertainty caused by REER volatility can lead to a decline in service sector activity. For instance, people might cut back on spending due to anticipated price increases, impacting service providers. Businesses might also delay investments due to uncertainty, affecting the demand for services. Furthermore, the effects of REER volatility vary depending on a region's economic ties to the global market. Regions with stronger global connections, like cities and border areas, feel the exchange rate swings more intensely compared to isolated rural regions. This highlights the need

for targeted policies that address the specific challenges faced by different areas within Zimbabwe. Maintaining a stable and predictable exchange rate is crucial for fostering sustained economic growth and a thriving trade environment in Zimbabwe.

5.3 RECOMMENDATIONS

5.3.1 TO ANALYZE THE IMPACT OF EXCHANGE RATE VOLATILITY ON TRADE FLOWS.

Based on the analyses it is recommended that Zimbabwe's policy makers prioritize measures to stabilize the exchange rate. This could involve careful monetary policies and proactive interventions, such as linking the Zimbabwean currency to a basket of stable foreign currencies. Additionally, establishing a foreign exchange trading platform would increase transparency and predictability in the market. Foster an environment that encourages businesses to export a wider range of goods and services. This includes promoting non-traditional exports like manufactured goods and services, alongside exploring new agricultural products. Diversification helps reduce vulnerability to price swings in any single commodity. Continued research is crucial to understand how exchange rate movements specifically affect Zimbabwe's trade, given its unique economic situation. This knowledge can be used to refine future policies and promote long-term trade growth.

5.3.2 TO IDENTIFY THE SPECIFIC IMPLICATIONS FOR TRADE PERFORMANCE, INCLUDING THE POTENTIAL EFFECTS ON TRADE DIVERSIFICATION AND COMPETITIVENESS

Based on the findings of the research, policymakers can develop trade policies and strategies that aim to mitigate the negative effects of exchange rate volatility and promote trade diversification and competitiveness. They can do so through regular monitoring and evaluation of trade performance can help policymakers to adjust and improve trade policies and strategies in response to changing economic conditions and exchange rate volatility.

5.3.3 TO EXAMINE THE EFFECTS OF REAL EFFECTIVE EXCHANGE RATE VOLATILITY ON ECONOMIC GROWTH AND TRADE DYNAMICS AND TO EXPLORE HOW THESE EFFECTS VARY ACROSS DIFFERENT SECTORS, INDUSTRIES, AND REGIONS WITHIN THESE ECONOMIES

Zimbabwe's policymakers need to acknowledge the uneven impact of fluctuating exchange rates on different parts of the country, both industries and regions. To ensure economic well-being, several strategies are crucial. First, prioritizing exchange rate stability will foster growth in trade and the overall economy. Second, programs that enhance the flexibility and adaptability of export-oriented industries, such as training, technology advancements, and trade facilitation initiatives, can be implemented. Finally, developing targeted policies for various regions is essential, considering their differing vulnerabilities to exchange rate fluctuations. By taking these steps, Zimbabwe can build a more resilient and competitive economy despite the challenges posed by a volatile exchange rate.

5.4 CONCLUSION

The objective of this study was to examine the relationship between trade and fluctuations in the exchange rate of Zimbabwe's currency. The analysis covered the period from 1988 to 2022, utilizing time series analysis and employing the ARDL model. In addition to investigating the impact of exchange rate on trade performance, the study also considered other variables that could potentially influence trade performance. The aim was to gain a comprehensive understanding of the extent to which exchange rate affects trade performance. By reviewing existing research conducted by other scholars, which was referenced in this study, and conducting quantitative research on the topic, it was concluded that exchange rate volatility does indeed have an impact on trade performance. The findings suggest that future approaches should take a nuanced perspective in order to mitigate the effects of exchange rate volatility on trade performance.

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LIST OF APPENDICES

Appendix 1: Data Set

A	B	C	D	E	F	G
	TP	EXRT1	FDI	GDP	INFL	TAR1
1988	0.26	0.001807734	-0.2307629	7.552374	7.785117	1.21421237...
1989	0.13	0.00212134	-0.1228622...	5.19976663...	0.7929329	1.22519292...
1990	0.01	0.002454518	-0.1389583...	6.988553	-0.920431	1.23605420...
1991	-0.28	0.003625489	0.03229175	5.531782	-6.7773	1.24679878...
1992	-0.63	0.005104267	0.2214317	-9.01557	-14.129658...	1.25742913...
1993	-0.11	0.006490494	0.4258978	1.05145859...	-3.791122	1.26794768...
1994	-0.13	0.008160799	0.50283724...	9.235199	-3.8956725...	1.27835673...
1995	0.19	0.008675219	1.655119	0.15802568...	3.03853821...	1.28865855...
1996	0.02	0.01001371...	0.9458507	10.3606967...	8.984384	1.29885532...
1997	-0.6	0.01212504...	1.58390140...	2.68059420...	-2.879048	1.04368541...
1998	-0.11	0.02370601...	6.940053	2.88521170...	-27.04865	1.05673026...
1999	0.27	0.03834471	0.8603075	-0.817821	8.006813	1.05338147...
2000	0.15	0.04446837...	0.34678843...	-3.0591897...	0.6279	0.89544109...
2001	0.14	0.05511466	0.05606882	1.43961536...	-0.1308902	0.85701868...
2002	-0.2	0.05509829	0.408381	-8.894024	2.71295022...	1.05119126...
2003	-0.32	0.6982161	0.06634550...	-16.995075...	8.801275	1.04817445...
2004	0.41	5.07441949...	0.14985534...	-5.807538	7.611524	1.01897769...
2005	-0.51	22.38904	1.786206	-5.711084	5.136601	0.98890278...
2006	-0.59	164.547363...	0.73476785...	-3.461495	-2.0176787...	0.95789525...
2007	-0.46	9686.771	1.30197751...	-3.6533267...	0.8948869	0.92589540...
2008	-1.17	6723052000	1.16855692...	-17.668947...	1.34922254...	0.96287623...
2009	-2.21	141622690...	1.086305	12.01956	95.40866	0.99853811...
2010	-2.87	298331568...	1.01802170...	21.45206	2.575536	1.03297189...
2011	-0.28	62844255.0...	2.44151139...	14.6202068...	2.171761	0.56605232...
2012	-4.08	13238291.9...	2.04413127...	15.7448768...	4.85594558...	0.99025499...
2013	-2.8	2788677.7045	1.95406	3.196731	8.09114	0.86539180...
2014	-2.5	587441.596...	2.42517256...	1.48454260...	0.6249745	0.72268307...
2015	-3.68	123745.970...	1.99968731...	2.02365	0.36741966...	0.55616343...
2016	-2.33	26067.3832...	1.66927433...	0.9009554	2.01409482...	0.47464030...
2017	-1.88	5491.15632...	1.74688458...	4.080264	3.056905	0.57219033...
2018	-0.76	1156.72515...	2.101721	5.009867	200.769577...	0.66106442...
2019	-0.15	243.666906...	1.14280557...	-6.3324465...	225.39465332	0.74268056...
2020	-0.59	51.3290138...	0.6990335	-7.816951	604.945861...	0.81813523...
2021	-0.15	88.55244	0.8811741	8.468017	113.29498291	0.88829377...
2022	-2.48	374.954376...	1.24787020...	6.522375	264.5806	0.91882429...

Appendix 2: Test for Heteroskedasticity, ARCH

Heteroskedasticity Test: ARCH			
F-statistic	3.919869	Prob. F(1,29)	0.0573
Obs*R-squared	3.691264	Prob. Chi-Square(1)	0.0547

Appendix 3: Test for Heteroskedasticity, Breusch-Pagan

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.763010	Prob. F(22,9)	0.7131
Obs*R-squared	20.83125	Prob. Chi-Square(22)	0.5312
Scaled explained SS	1.663755	Prob. Chi-Square(22)	1.0000

Appendix 4: Unit Root test for Exchange rate

Null Hypothesis: EXRT1 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.684483	0.0034
Test critical values: 1% level	-4.252879	
5% level	-3.548490	
10% level	-3.207094	

*Mackinnon (1996) one-sided p-values.

Appendix 5: Unit Root test for FDI

Null Hypothesis: FDI has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.443757	0.0063
Test critical values: 1% level	-4.252879	
5% level	-3.548490	
10% level	-3.207094	

*Mackinnon (1996) one-sided p-values.

Appendix 6: Unit Root test for GDP

Null Hypothesis: D(GDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.862478	0.0000
Test critical values: 1% level	-4.262735	
5% level	-3.552973	
10% level	-3.209642	

*Mackinnon (1996) one-sided p-values.

Appendix 7 : Unit Root test for Inflation

Null Hypothesis: INFL has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 2 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.338542	0.0007
Test critical values: 1% level	-4.273277	
5% level	-3.557759	
10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Appendix 8 : Unit Root test for Tariffs

Null Hypothesis: D(TAR1) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.581793	0.0000
Test critical values: 1% level	-4.262735	
5% level	-3.552973	
10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Appendix 9 : LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.337258	Prob. F(2,7)	0.3222
Obs*R-squared	8.846385	Prob. Chi-Square(2)	0.0120

Appendix 10: Lag Order Selection

VAR Lag Order Selection Criteria

Endogenous variables: TP EXRT1 FDI INFL GDP TAR1

Exogenous variables: C

Date: 06/02/24 Time: 10:45

Sample: 1988 2022

Included observations: 32

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1116.685	NA	1.20e+23	70.16783	70.44265*	70.25892
1	-1063.392	83.26992	4.25e+22	69.08703	71.01081	69.72471
2	-1029.346	40.43062	6.19e+22	69.20910	72.78183	70.39336
3	-942.4655	70.59010*	5.61e+21*	66.02909*	71.25078	67.75994*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Appendix 11: Levels Equation

Levels Equation					
Case 5: Unrestricted Constant and Unrestricted Trend					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
EXRT1	-4.63E-10	2.77E-10	-1.672695	0.1287	
FDI	0.995619	0.328305	3.032600	0.0142	
INFL	-0.010571	0.009701	-1.089742	0.3041	
GDP	-0.093006	0.026261	-3.541559	0.0063	
TAR1	-9.770795	4.178699	-2.338239	0.0441	

EC = TP - (-0.0000*EXRT1 + 0.9956*FDI -0.0106*INFL -0.0930*GDP -9.7708

Appendix 12 : ECM Regression

ARDL Error Correction Regression

Dependent Variable: D(TP)

Selected Model: ARDL(2, 3, 2, 3, 3, 3)

Case 5: Unrestricted Constant and Unrestricted Trend

Date: 06/02/24 Time: 10:56

Sample: 1988 2022

Included observations: 32

ECM Regression				
Case 5: Unrestricted Constant and Unrestricted Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.735086	0.764463	11.42643	0.0000
@TREND	-0.213995	0.019723	-10.84981	0.0000
D(TP(-1))	-0.361375	0.107873	-3.350002	0.0085
D(EXRT1)	3.25E-11	4.74E-11	0.686208	0.5099
D(EXRT1(-1))	2.32E-11	6.00E-11	0.386115	0.7084
D(EXRT1(-2))	-4.01E-10	6.92E-11	-5.787371	0.0003
D(FDI)	0.171817	0.047409	3.624116	0.0055
D(FDI(-1))	-0.142074	0.044862	-3.166901	0.0114
D(INFL)	-0.001863	0.000732	-2.545598	0.0314
D(INFL(-1))	0.010589	0.001032	10.25916	0.0000
D(INFL(-2))	0.015869	0.001986	7.991409	0.0000
D(GDP)	0.032334	0.008909	3.629268	0.0055
D(GDP(-1))	0.072822	0.011413	6.380652	0.0001
D(GDP(-2))	0.028581	0.009005	3.173850	0.0113
D(TAR1)	1.494009	0.707816	2.110730	0.0640
D(TAR1(-1))	6.382286	0.707835	9.016624	0.0000
D(TAR1(-2))	4.819823	0.787259	6.122284	0.0002
CointEq(-1)*	-0.639160	0.054230	-11.78610	0.0000
R-squared	0.968022	Mean dependent var	-0.077813	
Adjusted R-squared	0.929192	S.D. dependent var	1.114259	
S.E. of regression	0.296503	Akaike info criterion	0.704801	
Sum squared resid	1.230794	Schwarz criterion	1.529277	
Log likelihood	6.723189	Hannan-Quinn criter.	0.978091	
F-statistic	24.92945	Durbin-Watson stat	2.406749	
Prob(F-statistic)	0.000000			