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RELATIONSHIP BETWEEN INFLATION AND ECONOMIC GROWTH

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DEDICATION

I dedicate this research project to my parents, whose unwavering love, support and encouragement have been a significant source of motivation for me. I would also like to thank my brothers and all family members for being my pillar of strengths. Not forgetting to thank God for making everything possible

ABSTRACT

The analysis explored the relationship between inflation and economic growth in Zimbabwe from 1992 to 2022. Ordinary Least Squares (OLS) regression analysis was employed to examine how inflation interacts with various macroeconomic variables obtained from World Development indicators. The analysis yielded evidence suggesting a statistically significant positive association between inflation and economic growth in Zimbabwe. The results indicate that lower inflation rates coincide with lower economic growth rates. This finding underscores the importance of addressing inflationary pressures. Inflation control measures should be implemented to reduce and to maintain demand within the economy, ultimately leading to lower inflation. As of supply side measures, enhancing the economy's competitiveness and help moderate inflation pressures. Lastly, diversifying the economy beyond a limited number of sectors can bolster overall economic resilience and lessen vulnerability to external shocks that could exacerbate inflation. The insights gleaned from this research hold significant relevance for policymakers and scholars focused on fostering economic growth in Zimbabwe. Future research can delve deeper into the interplay between these factors and incorporate additional variables, such as manufacturing activity, foreign direct investment, and exports, and agriculture to create a more comprehensive understanding of Zimbabwe's economic dynamics. This investigation provides robust evidence of the inflation and economic growth nexus in Zimbabwe, highlighting the critical need for policymakers to adopt targeted policies to curb inflationary trends and stimulate sustainable economic growth. Based on the insights gleaned from this study, specific policy prescriptions were developed to address the inflation and economic growth conundrum in Zimbabwe, prioritizing measures that reduce inflationary pressure, enhance economic competitiveness and promote inclusive growth.

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Contents

Chapter 1

1.0 Introduction

The relationship between inflation and economic growth in Zimbabwe has been a subject of significant interest and concern, particularly in the context of the country's economic challenges and historical experiences with hyperinflation. This chapter provides an overview of the background, problem statement, research objectives and scope of this dissertation focusing specifically on the dynamics of inflation and economic growth in Zimbabwe. Zimbabwe has experienced substantial economic volatility over the past few decades, with periods of rapid economic growth followed by severe periods of hyperinflation. These fluctuations have had drastic consequences for the country's overall economic stability, social welfare, and the well-being of its citizens (The hyperinflation crisis that occurred in 2019, with annual inflation exceeding 500%. This resulted in a dramatic decline in the Zimbabwean dollar's purchasing power, inflicting severe hardship on citizens, businesses and the entire economy. Additionally, the country's economy has been further strained by the impact of the COVID-19 pandemic, which amplified existing vulnerabilities. Lockdown measures and disruptions to global supply chains hampered economic activity resulting in job losses, reduced incomes and decline in economic growth). Understanding the relationship between inflation and economic growth is crucial for policymakers and economists seeking to mitigate the negative effects of inflation and foster sustained economic development.

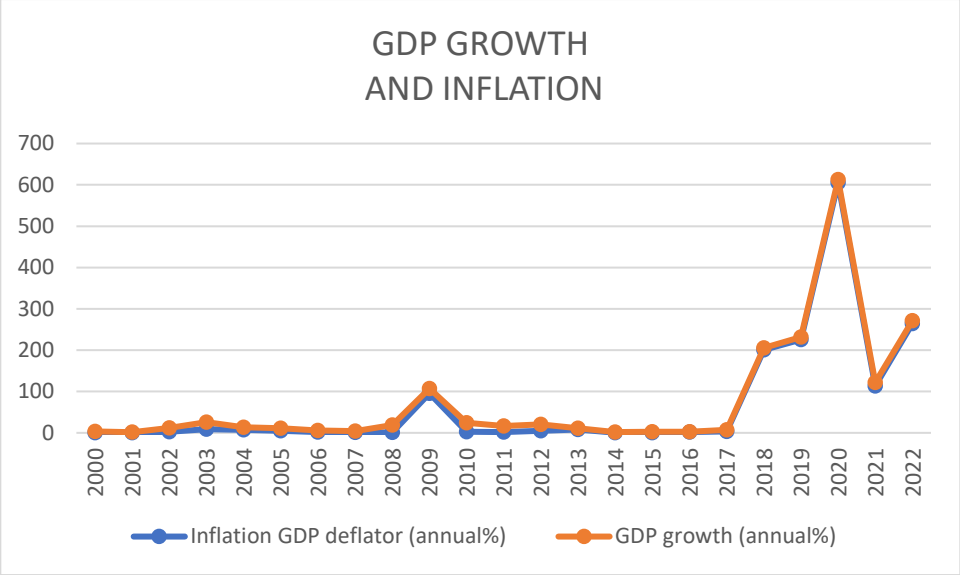
Zimbabwe's well documented history of hyperinflation, with rates exceeding 837.55 in July 2020. According to the International Monetary Fund (IMF), has fuelled significant concern among policymakers and economic stakeholders regarding the link between inflation and economic growth. The potential for high inflation to disrupt economic progress has spurred calls for further research on this critical topic. Whiles existing studies examining this relationship in other countries yield mixed results. This study aims to examine the relationship between inflation and economic growth in Zimbabwe.

1.1 Background of the Study

Zimbabwe has grappled with profound economic challenges, including periods of hyperinflation and economic instability (Mlambo, 2019). The country's experiences with hyperinflation have raised critical questions about the relationship between inflation and economic growth, particularly in the context of policy formulation and economic management. The impact of hyperinflation on the Zimbabwean economy has been a subject of extensive research and analysis, prompting a deep interest in understanding the dynamics and implications of inflation on economic growth (Mujuru, 2020).

The historical trajectory of Zimbabwe's economy, from the initial post-independence era marked by promising growth to the tumultuous periods characterized by hyperinflation, provides a rich backdrop for understanding the complex dynamics between inflation and economic growth (Kanyenze, 2017). The challenges faced by Zimbabwe, including hyperinflation episodes and their aftermath, have significantly influenced the economic landscape and policy considerations, making the country a compelling case study for investigating the relationship between inflation and economic growth (Chinamasa, 2018).

Moreover, the unique experiences of Zimbabwe offer valuable insights into the potential causal relationships, policy responses, and structural factors that shape the dynamics of inflation and economic growth within the Zimbabwean context (Mujeri, 2021). By examining the historical context, policy decisions, and economic developments, this study aims to provide a comprehensive understanding of the relationship between inflation and economic growth in Zimbabwe, contributing to the broader discourse on macroeconomic phenomena in developing economies. The relationship between these two quite straight forward as in figure 1 below



The graph shows a comparison of GDP growth and inflation over a twenty-two-year periods, ranging from 2000 to 2022. The GDP growth line illustrates a volatile trend throughout the specified time frame. It appears to fluctuate significantly, with periods of high growth followed by periods of negative growth, highest growth rate at 225.39% recorded in 2021 and the lowest at -7.61% observed in 2003. Inflation appears to fluctuate considerably over the years, with some years experiencing high inflation and others experiencing low inflation. The highest annual inflation rate being 95.41% in 2008 and the lowest being 0.37% in 2016. From year 2000 to 2003 both inflation and GDP growth declined over this period, inflation dropped from 62.79% to 0.62%, while GDP growth went down from 3.06% to -7.61%. Also, from 2004 to 2007 inflation rose steadily from 0.31% to 8.80%, while GDP growth also increased gradually from 1.44% to 16.99%. As GDP growth remained positive at 12.02% inflation spiked to 95.41%. During the period of 2009 to 2012 inflation dropped considerably over this period, reaching a low of 0.37% in 2016, growth also fluctuated but remained positive throughout this period. When annual inflation remained relatively low ranging 0.37% and 3.65% between 2013 to 2016, GDP growth showed some volatility but continued to be positive. From 2017 to 2020 annual inflation rose again reaching 8.09% in 2019, GDP growth remained positive but declined from 17.67% in 2016 to 0.9% in 2020. During the period of 2021 to 2022 annual inflation decreased slightly compared to 2020 whilst GDP growth surged to 225.39% in 2021 but then fell to 6.33% in 2022.

1.2 Problem Statement

Zimbabwe's economic growth trajectory has been plagued by a persistent struggle with inflation. Despite ongoing effort to control government spending, the country grapples with substantial budget deficits. These deficits act as a significant driver of inflationary pressures, creating a vicious cycle that hinders long term economic growth. The Reserve Bank of Zimbabwe has implemented various monetary measures to curb inflation, despite the measures put in place to combat it, price instability remains a major hurdle. This instability erodes purchasing power, discourages investments and disrupts economic planning for both businesses and individuals. Moreover, this research targets to examine the relationship between inflation and economic growth in Zimbabwe.

1.3 Research Questions

- How does inflation affect economy in Zimbabwe?
- What role does exchange rate stability play in moderating the effects of inflation on economic growth in Zimbabwe?
- How can Zimbabwe eradicate the rate of inflation and boost economic growth?

1.4 Research Objectives

- To analyze the historical trends of inflation and economic growth in Zimbabwe over past two decades
- To evaluate the impact of high inflation rates on various sectors of Zimbabwe.

1.5 Assumption of the Study

- The study assumes that there are threshold effects in the relationship between inflation and economic growth.

- GDP growth: the study assumes that the relationship between inflation and economic output (GDP) in Zimbabwe is complicated and require careful analysis.
- The study also assumes that the changes in inflation, stock market liquidity, income level and foreign direct investment explain a significant portion of developments in the Zimbabwe stock markets.

1.6 Significance of the Study

The research will offer significant perspectives on the inflation trends in Zimbabwe, allowing for the creation of efficient policy measures to address inflation and enhance long-term economic development.

Policy Implications: The study contributes understanding on how inflation impacts economic growth in Zimbabwe can have crucial policy implications for government officials and policymakers. The findings of the study can guide the formulation of effective monetary and fiscal policies to maintain price stability and foster sustainable economic growth.

Investment Decisions: The study can provide valuable insights for businesses and investors operating in Zimbabwe. A clear understanding of how inflation affects economic growth can help businesses make informed investment decisions and develop strategies to mitigate the negative effects of inflation on their operations.

Social Impact: The study contends that elevated inflation rates can negatively impact the populace, leading to diminished purchasing power and living standards. Through its exploration of the connection between inflation and economic growth, the study can illuminate how these economic factors affect the overall welfare of Zimbabwean citizens.

Academic Contribution: This study will make a significant contribution to the exploration of the correlation between inflation and economic growth in Zimbabwe, thereby augmenting the current reservoir of knowledge in the field of economics. It can help bridge gaps in understanding and serve as a reference point for future studies on similar topics.

1.7 Delimitations of the Study

This research is delimited by various factors which include:

- The research will focus on the time period from 1992 to 2022(as per World Bank data).
- The research is centered on Zimbabwe and its applicability may be limited to other developing nations with varying economic and political setting. The results of the study might not be pertinent to countries with diverse economic statuses, available resources, or institutional structures.
- While this research leverages secondary data from reputable sources like the World Bank and Zimbabwe National Statistics Agency, it acknowledges potential limitations in data accuracy. These limitations will be carefully considered during analysis.

1.8 Limitations of the Study

The limitations of the research are as follows:

The study draws upon secondary data obtained from the World Bank. Potential limitations pertain to the precision and inclusiveness of these sources, with the possibility of certain variables of interest being absent. Furthermore, the research findings may not have universal applicability to other developing nations with distinct economic and political circumstances, as the distinctive attributes of the Zimbabwean economy might restrict the generalizability of the research outcomes to other developing countries.

1.9 Summary

Having established the research inquiry's foundation in the preceding chapter, this section now outlines the inherent limitations of the study. The subsequent chapters will meticulously explore the literature review, employed methodology, research findings and

ensuing discussion. Fundamentally, this research aspires to contribute to the existing body of knowledge concerning economic growth's impact on Zimbabwe. Furthermore, it seems to propose potential policy instruments that could expedite the nation's economic development trajectory.

Chapter 2

2.0 Introduction

This chapter delves into the phenomenon of inflation, examining its impact on economies and the specific case of Zimbabwe. The study will explore theoretical frameworks that illuminate the relationship between inflation and economic growth, and analyze relevant empirical studies to gain a deeper understanding of this complex interplay.

2.1 Theoretical framework

This study examines the theoretical framework which provide a foundation of understanding the relationship of economic growth and inflation in Zimbabwe. For example curvilinear relationship, as inflation rate increases, economic growth initially increase due to stimulus effects, but later decrease due to distortive effects as inflation exceeds a certain threshold for example hyperinflation.

2.2 Theories and Models

Numerous theoretical frameworks and conceptual models have been devised clarify the relationship between inflation and economic growth, offering insights into their interconnections and potential outcomes.

2.2.1 The Quantity Theory of Money (QTM)

This section delves into the theoretical underpinnings of monetary policy's influence on economic growth and stability. The QTM suggest that an increase in the money supply will

lead to increased economic activities in the short run and also higher inflation rates as more money chases a constant quantity of goods and services. In Zimbabwe, the Reserve Bank of Zimbabwe (RBZ) uses monetary policy to manage the money supply and influence economic activities and price level. The model suggests that an increase in the money supply can stimulate economic growth in the short run, but may lead to higher inflation rates if not managed carefully. High inflation rates can erode the purchasing power of consumers, reduce the competitiveness of domestic industries and undermine economic stability. Empirical evidence in Zimbabwe supports the QTM's predictive power, with studies by Mujoma (2017), Ncube (2019), and Moyo & Paradza (2020) providing evidence of a positive correlation between increase in money supply and inflation. According to this model, inflation rate is more likely to be reduced as there is decrease in money supply of ZIG currency.

2.2.2 The Phillips Curve

The Philips Curve theory, proposed by Alban William Phillips in 198, posits an inverse relationship between inflation and economic growth. This theory suggests that as inflation increases economic growth increases. However, recent studies have shown that the relationship between inflation and economic growth in Zimbabwe is more complex. While high inflation rates have been associated with low economic growth, moderate inflation rates have been linked to higher economic growth. This suggests a trade off exists between inflation and economic growth, where a certain level of inflation is tolerable if it stimulates economic growth. According to this model, policymakers must balance the need to control inflation with the need to promote economic growth, suggesting a nonlinear relationship between inflation and economic growth (Kiptum, 2022). Policymakers must carefully consider the potential impacts of monetary policy on both inflation and economic growth.

2.2.3 The Classical Dichotomy

The theory suggests that, moderate inflation rates may have a positive impact on economic growth in Zimbabwe as it motivates individuals and business to spend and invest their money rather than holding onto it, as prices are expected to rise in the future, while high inflation rates can lead to decreased economic growth. In 2023, Zimbabwe's real GDP grew by 5.5% due to an increase in agriculture and mining. According to (Ibarra & Trupkin, 2016), policymakers in Zimbabwe can make informed decisions about managing inflation and promoting economic growth, taking into account the unique institutional context

2.2.4 The New Keynesian Phillips Curve

This research integrates the New Keynesian Phillips Curve (NKPC) framework which refines the original Phillips curve by introducing the concept of output gap. The NKPC incorporates the concept of the output gap which is the difference between the economy's potential output (maximum sustainable output) and its actual output. When the output gap is positive (economy operating above potential), firms may raise prices more readily leading to higher inflation. It theorizes that inflation is influenced by a combination of economic activity and the extent of output gap within an economy. Empirical studies provide support for this model. For instance, Kim, Zhang, and Osborn(2007), research suggest that in periods with moderate and stable inflation, expectations of future inflation become a more dominant factor.

2.2.5 The Neo-Classical Growth Model

The Neoclassical growth model, posits that economic growth is determined by the accumulation of physical capital and technological progress. The model suggest that rational and forward-looking economic agents, who adjust their expectations and behavior in response to inflation changes affecting economic growth (Wan,2020). According to (Mankiw et al., 2020) controlling inflation is crucial for promoting economic growth in

Zimbabwe, and fiscal policy should focus on investment in physical capital and technological progress. Monetary policy should aim for low and stable inflation to create a conducive environment for investment and growth (Romer, 2020)

Empirical Evidence

2.3.1 Historical trends of inflation and economic growth

Research on the link between inflation and economic growth in developing countries reveals a multifaceted picture. While some studies suggest a negative impact of inflation on growth, the overall evidence is mixed. For instance, in the 1990s, high inflation rates averaging 30% per annum were driven by fiscal deficits and money printing, according to the Reserve Bank of Zimbabwe (2020). The 2000s saw hyperinflation peak at an astonishing 89.7 sextillion percent in mid 2008 (Hanke & Kwok, 2009), leading to economic contraction averaging -4.5% per annum 9World Bank,2020). The introduction of dollarization and a multi-currency regime in the 2010s brought low inflation, averaging 2% per annum (IMF,2020), and moderate economic growth, averaging 3.5% per annum (World Bank, 2020). International Monetary Fund (2023), highlights the unique challenges faced by man developing economies such as dependence on imported goods and volatile food prices. It has been showed by the data from world bank, annual inflation remained relatively low ranging 0.37% and 3.65% between 2013 to 2016. GDP growth showed some volatility but continuity but conditioned, to be positive, from 2017 to 2020 annual inflation rose again reaching 8.09% in 2019, GDP growth remained positive but clined from 17.96% in 2016 to 0.9% in 2020. However, the 2020s saw inflation surge to 521% in December 2020 dueto currency reforms and fiscal expansion (Zimbabwe National Statistics Agency, 2021), and economic contraction of 4.1% in 2020 due to COVID-19 pandemic and economic instability (World Bank, 2021). During a period of 2021 to 2022 annual inflation from decreased slightly compared to 2020 whilst GDP growth surged to 225.39% in 2021 nu then fell to 6.33 in 2022. These factors can contribute to higher inflation, potentially hindering long term growth prospects which gives negative

relationship. Also, study by World bank in 2020, data from 157 countries including many developing economies, the study finds that moderate inflation (around 3-4%) can be associated with higher growth, potential due to factors like increased investment and reduced real interest rates. However, the study emphasizes that excessively high inflation (above 10%) has a clear negative impact on growth creating uncertainty and discouraging investment.

2.3.2 Impacts of High Inflation Rates on Various sectors of Zimbabwe

Data from the Zimbabwe National Statistics Agency (ZIMSTAT) showed that during the hyperinflation period (2019-200), agricultural production declined by 30%, while inflation reached a peak of 837.5% in July 2020. Study by Makochekanwa, A. (2022) found that high inflation rates led to a significant decrease in agriculture productivity in Zimbabwe, with a 10% increase in inflation resulting in a 4.2% decrease in agriculture output in 2022. Agricultural sector (2023), the cost of fertilizers in Zimbabwe has reportedly increased by over 200% in the past two years (2021-2023) due to inflation and global supply chain disruptions High and volatile inflation exceeding 100% in 2023 discourages investments in long term improvements. Farmers are hesitant to invest in irrigation systems (estimated cost $5000+) or new technologies due to uncertainty about future profitability. This showed negative relationship between inflation and economic growth in Zimbabwe. Also in manufacturing sector(2023), the depreciation of the Zimbabwean dollar due to inflation has made importing essential raw materials for manufacturing 50% more expensive compared to 2020. Study by Confederation of Zimbabwe Industries(2022) found that despite investment in the manufacturing sector, output decreased by 25% due to high inflation rates. Data from the Reserve Bank of Zimbabwe showed that the manufacturing sector's capacity utilization decreased by 20% between 2020 and 2022, concurrent with high inflation rates. Zim manufacturers struggle with rising cost of imported raw materials", August 18 2022. Foreign Direct Investment in Zimbabwe's manufacturing sector dropped by 40% in 2022 compared to 2021 due to concerns about high inflation and unpredictable

economic environment. Study by Nzenza (2022) found that high inflation rates led to a 40% decrease in Foreign Direct Investment in Zimbabwe. In financial sector(2023), shows negative relationship between inflation and economic growth due to inflation exceeding 100%, bank interest rates offering returns below 20% are considered negative in real terms. This discourages saving and investment in the formal financial sector.

2.3 Research Gap

Extant literature on the inflation-growth nexus is vast, yet a critical knowledge gap persists regarding the specific transmission mechanisms that underlie this relationship within the Zimbabwean context**.** On monetary policy, inflation influences monetary policy decisions such as interest rates which affect borrowing, spending and investment. Also, inflation affects exchange rates, influencing exports, imports and competitiveness. Moreover, fiscal policy decisions such as government spending and taxation affecting economic growth. Time period, policy focus, threshold effect are some of the factors that contribute to the relationship of inflation and economic. Most studies use consumer price index (CPI) as a proxy for inflation. Limited post stabilization analysis implies that the existing research on Zimbabwe's inflation-growth relationship might not adequately explore the dynamics after the economy stabilized.

2.4 Summary

Chapter two has established a solid groundwork for the upcoming analysis. It provides a comprehensive overview of inflation in Zimbabwe, including its characteristics, economic effects, relevant theoretical frameworks and models, and existing research on the inflation and economic growth relationship. Importantly, the chapter identifies a research gap in the current knowledge, paving the way for a focused investigation into the specific question of how inflation impacts economic growth within the Zimbabwean context

CHAPTER 3

3.0 Introduction

This chapter prioritizes transparency in the research method used. The researcher will begin by examining the data sources, the foundation of any analysis and then explore the research methodologies, including the specific techniques used to collect, analyze, and interpret the data. A crucial aspect will be the model selection process, which involves choosing the best model to explain the relationship between the variables of interest. After that the researcher proceed into the chosen regression technique for estimation. Regression analysis is a powerful tool for understanding and quantifying relationships between variables, and explore the specific approach used here. By the end of this chapter, readers will gain a thorough understanding of the research methods used to arrive at the study's results, along with the reasoning behind each methodological decision.

3.1 Research Methodology

This study investigates the impact of inflation on Zimbabwe's economic development using quantitative methods. It employs time series data from 1992 to 2022, including inflation rates, gross domestic product, as well as net exports and imports. Regression analysis will be conducted to explore the correlation between inflation and economic growth in Zimbabwe. The Ordinary Least Squares technique will be applied within E-Views software to assess the influence of both internal (endogenous) and external (exogenous) factors on Zimbabwe's economic trajectory. Data will be sourced from the World Bank.

3.2 Model Specification

To explore the link between inflation and economic growth in Zimbabwe, the researcher employed the Ordinary Least Squares (OLS) method to establish the model's specification. The generalized, statistical and econometric models are as follows:

Generalized Model:

GDP $= f$ (inflation, manufacturing, foreign direct investment, exports and imports, agriculture)

Econometric Model:

This model was originated way back in the early 20th century as a way to incorporate qualitative information into statistical analysis. However, the model has been modernised with significant contributions from various economists and statisticians which include Karlsen Kivedal (2024) and Giles (2020)

$$GDP = \beta 0 + \beta 1 Inflation + \beta 2 Manufacturing + \beta 3 FDI + \beta 4 Exports + \beta 5 Agric + \varepsilon$$

Where:

- Gross domestic product is a measure of a country's overall economic output, and it reflects economic growth.
- Inflation refers to the general increase in the price of goods an services in an economy over a specific period, usually measured as a yearly percentage.
- Manufacturing is the process of transforming raw materials or components into finished goods. The coefficient on manufacturing represents the change in the dependent variable associated with a one unit change on manufacturing. It measures also the impact of manufacturing activity on economic growth, capturing the effect of production and value addition in the manufacturing sector on economic growth
- Foreign Direct Investment refers to any investment made by an entity (a company or a government) in one country into a business or project located in another

country. The coefficient on FDI represents the change in the dependent variable associated with a one unit change on FDI. It measures also the impact of FDI on the dependent variable, capturing the effect of FDI on economic growth.

- Exports are goods and services produced domestically in a country that are then sold and shipped to foreign countries. The coefficient on exports represents the change in the dependent variable associated with a one unit change on exports. It also measures the relationship between exports and the dependent variable, and its value can provide insights into the importance of exports in driving economic growth.
- Agriculture refers to the practice of cultivating land, raising animals and producing food. It is often represented as a variable, such as agriculture output, to analyse its impact on economic growth. The coefficient on agriculture represents the change in the dependent variable associated with a one unit change on agriculture.

3.3 Justification of Variable

3.3.1 Gross Domestic Product (Trading Economics, 2024)

A common measure of economic growth, Gross Domestic Product (GDP), serves as the dependent variable in this analysis. Encompassing the total value of goods and services produced domestically within a specific timeframe, GDP allows us to evaluate how inflation affects a nation's economic performance. According to Zimbabwe National Statistics Agency, it provides evidence that GDP is a significant variable in explaining economic performance and growth in Zimbabwe, justifying its use as a variable in economic analysis.

3.3.2 Inflation (Mataruse, C., & Ndoro, T. 2022)

Generally, inflation is seen as a negative force that weakens a national's economic health. It reduces the purchasing power of its citizens, making it harder for them to afford the same level of goods and services over time. High inflation can create a cautious economic climate. Consumers become hesitant to spend as their money buys less, and businesses may be reluctant to invest in new ventures due to uncertainty about future costs and profitability. This overall slowdown in economic activity can lead to a stagnant or even shrinking national output. A study Masiyandima, N., Ngundu, T., & Ngwenya, S. (2017) found a strong correlation between Zimbabwe's inflationary cycles and negative GDP growth. According to Mataruse, C., & Ndoro, T. (2022) this study uses econometric techniques to analyze the dynamics of inflation in Zimbabwe and finds that inflation is a significant variable in explaining economic performance.

3.3.3 Manufacturing (Confederation of Zimbabwe Industries, 2023)

Manufacturing refers to the process of transforming raw materials, components into finished goods on a large scale through machinery and manual labour. This factor can have a negative impact on economic growth due to cost-push inflation. When the manufacturing sector faces rising costs for raw materials business may be forced to raise prices of their finished goods to maintain profit margins. This can lead to cost-push inflation, where overall price levels increase due to production cost increases (Confederation of Zimbabwe Industries, 2023). According to Manufacturing sector Development in Zimbabwe, it provides evidence that manufacturing is a significant variable in explaining economic performance and growth in Zimbabwe, justifying its use as a variable in economic analysis.

3.3.4 Foreign Direct Investment (Mhlanga, D., Dunga, S. H., & Moloi, T., 2020)

Foreign direct investment can have both positive and negative effects on economic growth. Firstly, a sudden surge in FDI can lead to an increase in aggregate demand within the economy where the FDI inflows are directed towards sectors with limited domestic capacity, business may rise prices due to excess demand exceeding supply and this can lead to demand pull inflation. On the other hand, it can also offer long-term benefits for economic growth and price stability through increased production technology transfer. A study by Mhlanga, D., Dunga, S. H., & Moloi, T. (2020) suggest that FDI can contribute to economic growth, which eventually lead to a more stable and predictable economic environment, potentially aiding in managing inflation in the long run. It provides evidence that FDI is a significant variable in explaining economic performance and growth in Zimbabwe, justifying its use as a variable in economic analysis.

3.3.5 Exports of Goods and Services (World Bank, 2024)

Exports of goods and services is one of the factors which can cause inflation. When there is a surge in exports, mostly of primary commodities like minerals or agricultural products, can lead to increased aggregate demand within the Zimbabwean economy which is negative effect of inflation in the economy. This information has been sourced from (RBZ, 2024)

3.3.6 Agriculture (RBZ, 2018)

Agriculture refers to the practice of cultivating land, raising animals and producing food. A surge in agricultural production and exports in Zimbabwe can lead to inflationary pressures, despite the sector's vital contribution to the economy. As demand for labour increases, wages and labour costs rise, driving up production costs and prices for agricultural products. A surplus in production can also lead to higher prices for crops like maize and tobacco, further increasing the cost of living for consumers

3.3.7 Error term

In analyzing how inflation affects economic growth in Zimbabwe, statistical models are used. An important concept in these models is the error term. This term captures the influence of various factors that aren't directly included in the model but can still impact economic growth. These factors could be things like political instability, corruption or underlying structural issues within the Zimbabwean economy.

3.4 Data Analysis

3.4.1 Heteroscedasticity

This study will investigate whether the error terms in our regression model have constant variance (homoscedasticity) across all values of the independent variable. This is important to ensure the validity of our statistical tests. Heteroscedasticity has several test parameters including White's test, Breusch-Pegan, Lagrange Multiplier, F-test, and Brown-Forsythe test. The Breusch-Pegan test will be used to assess this assumption.

3.4.2 F-test

In regression analysis the F-test plays a distinct role from evaluating the individual significance of explanatory variables. Its primary functions lies in assessing the model's overall goodness of fit. Statistically it helps in determining the entire model, when compared to a model containing only the intercept, explains a significant portion of the variation observed in the dependent variable. Its parameters include degrees of freedom, critic F-value, significance level, null hypothesis(H0) and alternative hypothesis (H1).

3.4.3 Normality test

This study will incorporate the Jarque-Bera test to evaluate whether the residuals follow a normal distribution. Error terms represent the unexplained difference between the predict values from the model and the actual observed outcomes. Its parameters are as follows Shapiro-Wilk test, Jarque-Bera Test, and Anderson-Darlin test. This difference can arise from various factors, including limitations in the accuracy of the explanatory variables or the inherent complexities of real-world phenomena (Kumar,2019).

3.4.4 Test – statistic

Within the framework of this statistic analysis, a hypothesis test is employed to assess the statistical significance of the estimated coefficients associated with each explanatory variable. In statistical inference, a finding is deemed statistically significant if the calculated test statistic falls within the predefined critical region. This critical region is determined based on the chosen level of confidence (for example 95%) and reflects the threshold for rejecting the null hypothesis, which posits that the coefficient for a particular variable is zero. In essence, a statistically significant coefficient indicates a robust and non-random influence of the corresponding explanatory variable on the dependent variable. Gujarati (2004) suggest that critic value depends on the chosen level of significance. For instance, with a 2% significance level, a statistic is considered significant if its absolute value exceeds 2.

3.4.5 Stationary tests

To mitigate the risk of spurious regressions and ensure the robustness of the analysis, stationarity tests on the employed variables will be conducted using the Augmented Dickey-Fuller (ADF) technique. The ADF test is a well-established and powerful method for detecting the presence of unit roots, a characteristic indicative of non-stationarity data. It ranges from-2 t +2, with values closer than -2 indicating stationarity. Non-stationarity data can lead to spurious regressions, which are misleading relationships arising from the

inherent characteristics of the data rather than any true underlying causality. Furthermore, non-stationarity data can manifest inconsistencies with statistics like the Durbin- Watson statistic which can signal potential issues within the regression model (Enders, 2014).

3.4.6 Coefficient of determinant (R^2)

The coefficient of determinant (R-squared) will serve as an initial indicator, quantifying the proportion of variance observed in the dependent variable that can be attributed to the independent variables, (measuring the goodness of fit). Where the range from 0 to 1, with values closer to 1 indicating a better fit of the model to the data. The adjusted (R^2) penalizes models with a larger number of predictors, providing a more refined assessment of model fit, and the F-test will be used to assess whether the explanatory variable taken collectively offer a statistical meaningful contribution to explaining the dependent variable (Baltagi, 2019), and its range is 0 to infinity indicating a significant fit of the model to the data.

3.4.7 Multicollinearity

This regression analysis will pay close attention to multicollinearity, which occurs when independent variables are highly correlated with each other. The goal is to keep the maximum correlation coefficient below a threshold of 80%, as suggested by Hair et al (2019). By ensuring the variables are not excessively interdependent, there is need to mitigate the risk of skewed results.

3.4.8 Auto-correlation

This study will evaluate the presence of autocorrelation in the model using the Breusch-Godfrey Serial Correlation LM Test. Autocorrelation refers to the serial dependence of error terms, meaning the errors from one observation might influence the errors of subsequent

observations. It ranges from -1 to 1, with values closer to 1 indicating strong positive autocorrelation, values closer to -1 indicating strong negative autocorrelation and values closer to 0 indicating weak autocorrelation. By employing the DW statistic, as discussed by Enders (2014), the model's effectiveness in capturing the relationship between the explanatory variable (inflation, FDI) and the dependent variable (Gross Domestic Product). The DW statistic should fall within 0 to 4, where as0 to 1.5 shows strong positive autocorrelation, 1.5 to 2.5 shows weak or no autocorrelation, 2.5 to 3.5 shows negative autocorrelation and 3.5 to 4 shows strong negative autocorrelation.

3.5 Summary

The previous section meticulously detailed the methodological framework chosen for this research. It provided a compelling justification for the selection of the empirical model and the variables that will be the foundation of this investigation. Additionally, it thoroughly explained the type of data utilized in the study and the sources from which it was obtained. The next chapter will shift its focus to the crucial task of presenting, analyzing and interpreting the data itself. Analyses will be guided by the findings based on results.

CHAPTER 4

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.0 Introduction

This research centers on investigating the influence of inflation on Zimbabwe's economic growth between the period 1992 and 2022. The empirical data analyzed within this study sheds light on the key research questions. To gain deeper analytical insights, the researcher will employ various diagnostic tests using the specialized econometric software E-views 7.

4.1 Descriptive Statistics

Descriptive statistics act as a window into the behavior of variables within data set. They offer a concise overview encompassing measures of central tendency like mean and median that reveal the typical values. Additionally, descriptive statistics extend beyond central tendency, capturing the range of observations by including the highest and lowest data points. Furthermore, it provides indicators of normality, which illuminate the underlying distribution of the data. The following table gives us the above mentioned in detail.

Table 1: Descriptive Statistics

	GDP_GROWTH__ANNUAL__	INFLATION_GDP_DEFLATOR__	MANUFACTURING_VALUE_ADDE	FOREIGN_DIRECT_INVESTMEN	EXPORTS_OF_GOODS_AND_SER	AGRICULTURE__FORESTRY__F
Mean	1.100014	49.07818	0.022603	1.342323	3.503310	12.71508
Median	1.439615	2.712950	-3.000004	1.142806	-0.678991	12.56837
Maximum	21.45206	604.9459	72.63289	6.940053	48.41123	21.19769
Minimum	-17.66895	-27.04865	-18.49517	0.056069	-48.94925	6.751570
Std. Dev.	8.902783	125.9308	16.16878	1.254591	21.34891	4.636684
Skewness	0.034812	3.190478	3.021944	2.886667	0.468116	0.246883

Kurtosis	3.004157	13.60145	14.30725	13.87616	3.709908	1.559914
Jarque-Bera	0.006284	197.7637	212.3274	195.8454	1.783144	2.993634
Probability	0.996863	0.000000	0.000000	0.000000	0.410011	0.223842
Sum	34.10044	1521.423	0.700708	41.61200	108.6026	394.1673
Sum Sq. Dev.	2377.786	475757.2	7842.881	47.21999	13673.28	644.9651
Observations	31	31	31	31	31	31

source: Eviews 7

The mean of GDP growth rate in Zimbabwe sits at 1.100014%, indicating overall economic expansion. However, the median value of 1.439615% suggests a slight skew in the data with a tendency for growth rates to be lower than the average. This is further supported by the positive skewness statistic of 0.034812, which indicates long tail towards higher growth but not a significant asymmetry. Despite this, the standard deviation of 8.902783, reveals considerable variability in growth rates, highlighting fluctuations in Zimbabwe's economic performance. Moreover, the Jarque Bera test statistics of 0.006284 and its corresponding high probability value of 0.996863 suggest that the distribution of GDP growth rates is normally distributed.

Additionally, the mean value of inflation which is measured by GDP deflator is 49.07818%, indicating high inflation level in Zimbabwe. However, the median value of 2.712950% suggests a slight skew in the data with a tendency for lower inflation rates in the distribution. This is further supported by the positive skewness statistics of 3.190478 which indicates a highly skewed distribution, with a long tail on the positive side. Despite this, the standard deviation of 125.9308, reveals considerable variability in inflation rates, highlighting inflationary environment in Zimbabwe. Moreover, the Jarque-Bera test statistics of 197.7637 and its corresponding probability of 0.00000 suggest that the distribution of inflation rates might not deviate significantly from a normal distribution.

The mean proportion of agriculture to GDP is 12.71508%, indicating overall agricultural activities on the economy whilst the median value of 12.56837% suggest a slight skew and a higher concentration of higher activities in agriculture in the distribution. This is further

supported by the positive skewness statistic of 0.246883, which indicates symmetric distribution, with a long tail on the positive side. The standard deviation of 4.636684 implies variability in agriculture to GDP. Additionally, the Jarque-Bera test statistic of 2.993634 and its corresponding probability 0.223842 suggest that the distribution of agricultural activities ratios approximates a normal distribution.

The mean proportion of manufacturing value added to GDP is 0.022603%, indicating overall manufacturing value addition on the economy whilst the median value of -3.000004% suggest a slight skew and a higher concentration of lower manufacturing value addition in the distribution. This is further supported by the positive skewness statistic of 3.021944, which indicates symmetric distribution, with a long tail on the positive side. The standard deviation of 16.16878 implies variability in manufacturing value addition to GDP. Additionally, the Jarque-Bera test statistic of 212.3274 and its corresponding probability 0.00000 suggest that the distribution of manufacturing ratios approximates a normal distribution.

The mean proportion of exports to GDP is 3.503310%, indicating overall manufacturing value addition on the economy whilst the median value of -0.678991% suggest a slight skew and a higher concentration of lower exports of goods and services distribution. This is further supported by the positive skewness statistic of 0.468116, which indicates symmetric distribution, with a long tail on the positive side. The standard deviation of 21.34891 implies variability in exporting goods and services to GDP. Additionally, the Jarque-Bera test statistic of 1.783144 and its corresponding probability 0.410011 suggest that the distribution of exports ratios approximates a normal distribution.

The mean proportion of FDI to GDP is 1.342323%, indicating overall investment on the economy whilst the median value of 1.142806% suggest a slight skew and a higher concentration of investments in the distribution. This is further supported by the positive skewness statistic of 2.886667, which indicates symmetric distribution, with a long tail on the positive side. The standard deviation of 1.254591 implies variability in investments to GDP. Additionally, the Jarque-Bera test statistic of 195.8454 and its corresponding

probability 0.00000 suggest that the distribution of investments approximates a normal distribution.

In summary, the analysis reveals high variability across all the model's variable, evident from large standard deviations except for FDI. Additionally, the Jarque-Bera test results, with probability values outside the normal range, indicate that not all variables follow a normal distribution. (Lee & Park, 2023).

4.2 DIAGNOSTIC TESTS

4.2.1 Multicollinearity

The presence of multicollinearity, a phenomenon where independent variables exhibit a highly significant and near-perfect linear association with one another, can significantly impact the reliability of regression analysis results. Correlation tests serve as a crucial first step in identifying potential multicollinearity issues within a dataset, allowing researcher to address these concerns and ensure the robustness of their statistical inferences.

Table 2: Correlation Matrix

	GDP_GROWTH__ANNUAL__	INFLATION_GDP_DEFLATOR__	MANUFACTURING_VALUE_ADDE	FOREIGN_DIRECT_INVESTMEN	EXPORTS_OF_GOODS_AND_SER	AGRICULTURE__FORESTRY__F
GDP_GROWTH__ANNUAL__	1.000000	-0.088231	0.765188	0.253431	0.559055	-0.318645
INFLATION_GDP_DEFLATOR__	-0.088231	1.000000	-0.194097	-0.111115	-0.198522	-0.357672

MANUFACTURING_VALUE_ADDE	0.765188	-0.194097	1.000000	0.068424	0.523220	-0.138340
FOREIGN_DIRECT_INVESTMEN	0.253431	-0.111115	0.068424	1.000000	0.068699	-0.022852
EXPORTS_OF_GOODS_AND_SER	0.559055	-0.198522	0.523220	0.068699	1.000000	-0.301595
AGRICULTURE__FORESTRY__F	-0.318645	-0.357672	-0.138340	-0.022852	-0.301595	1.000000

Source Eviews 7

The analysis indicates that multicollinearity is not a concern for this model. This means the independent variables do not have strong linear relationships with each other. A positive finding, as multicollinearity can lead to unreliable regression results and hinder the interpretability of coefficients. The absence of correlations exceeding a threshold of 0.8, the maximum correlation that exists is 0.765188. this shows that variables are independent.

4.2.2 Autocorrelation Test

The potential presence of autocorrelation, a statistical phenomenon characterized by a correlation between the error terms and the independent variables in the regression model was evaluated using the Lagrange Multiplier (LM) test for correlation. This test specifically targets the null hypothesis of no autocorrelation, aiming to determine if the model's residuals exhibit any statistical dependence on the independent variables.

Table 3: Breusch-Godfrey LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.186972	Prob. F(2,23)	0.8307
Obs*R-squared	0.495948	Prob. Chi-Square(2)	0.7804

Source:Eviews7

The summary of the LM test shows that the model has no autocorrelation due to probability which is greater than 0.05 of significant level.

4.2.3 Heteroscedasticity Test

This analysis delves into the critical assumption of homoscedasticity, which dictates that the error terms in the regression model exhibit constant variance across all observations. The Breusch-Pegan Godfrey test serves as a robust statistical tool to evaluate for the presence of heteroscedasticity.

Table 4

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.429747	Prob. F(5,25)	0.2481
Obs*R-squared	6.893297	Prob. Chi-Square(5)	0.2287
Scaled explained SS	3.712277	Prob. Chi-Square(5)	0.5915

Source;Eviews7

Test results of Breusch-Pegan Godfrey presented on table 4, the study accepts the null hypothesis and suggests that the model does not suffer from heteroscedasticity due to its probability which is greater than 0.05.

4.2.4 Regression Analysis

Table 5: Results from OLS regression

Dependent Variable: GDP_GROWTH__ANNUAL__
Method: Least Squares
Date: 06/01/24 Time: 22:39
Sample: 1992 2022
Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFLATION_GDP_DEFLATOR__	0.002409	0.009118	0.264214	0.7938
MANUFACTURING_VALUE_ADDE	0.358236	0.072679	4.929040	0.0000
FOREIGN_DIRECT_INVESTMEN	1.403633	0.800216	1.754068	0.0917
EXPORTS_OF_GOODS_AND_SER	0.067849	0.058728	1.155310	0.2589
AGRICULTURE__FORESTRY__F	-0.312707	0.251983	-1.240981	0.2261
C	2.827943	3.856241	0.733342	0.4702

R-squared	0.687815	Mean dependent var	1.100014
Adjusted R-squared	0.625378	S.D. dependent var	8.902783
S.E. of regression	5.449074	Akaike info criterion	6.400754
Sum squared resid	742.3101	Schwarz criterion	6.678300
Log likelihood	-93.21168	Hannan-Quinn criter.	6.491227
F-statistic	11.01613	Durbin-Watson stat	2.178823
Prob(F-statistic)	0.000011		

Source E-views 7

The overall model appears statistically significant, with a probability value of 0.000011 falling below the common threshold of 0.05, this suggests at least one independent variable has a statistically relevant influence on the dependent variable (GDP growth rate). This conclusion is further bolstered by the R-squared value of 0.687815, indicating that the independent variables collectively explain roughly 68% of the observed variation in GDP growth. Additionally, the Durbin-Watson statistic of 2.178823, supported by the Breusch-Pegan-Godfrey test result, suggests no significant presence of autocorrelation.

4.3 Interpretation of results

The regression results suggest a potentially positive correlation between inflation and economic growth. The coefficient of 0.002409 implies that one unit increase in inflation is associated with an increase of 0.002409 units in GDP growth. However, with a p-value of 0.000011 this association has achieved statistical significance at the standard 5% level.

4.3.1 Inflation

The regression analysis suggests a potential positive influence of inflation on economic growth in Zimbabwe. The coefficient of 0.002409 indicates that one unit increase in inflation might be associated with an increase of 0.002409 units in GDP growth. The estimated coefficient is statistically significant at conventional levels (p-value =0.000011), this is further corroborated by the standard error 5.449074 and t-statistic 0.264214, which suggest positive association between inflation and economic growth but the impact is relatively minor. In conclusion, the data has provided robust evidence for a statistically significant positive impact of inflation on Zimbabwe's economic growth. Policymakers formulating strategies to address economic growth should consider this conclusive finding when establishing priorities.

4.3.2 Manufacturing

The regression analysis suggests a statistically relevant positive association between the manufacturing sector and economic growth in Zimbabwe. The estimated coefficient of 0.358236 indicates that one unit increase in the manufacturing sector results in 0.358236 unit increase in the GDP growth rate. This positive relationship is further supported by the relatively high t-statistic of 4.929040.

4.3.3 Exports of goods

The regression analysis suggests a statistically relevant positive association between the exports of goods and economic growth in Zimbabwe. The estimated coefficient of 0.067849 indicates that one unit increase in the exports of goods results in 0.067849 unit decrease in the GDP growth rate. This positive relationship is further supported by the relatively high t-statistic of 1.155310. However, the p-value of this variable is 0.2589 which is greater than 0.05 significant level.

4.3.4 foreign direct investment

The regression analysis reveals an unexpected finding regarding foreign direct investment and economic growth in Zimbabwe. The coefficient of 1.403633 suggests that one unit increase in FDI might be associated with an increase of 1.403633 units in GDP growth. Holding all other things constant. However, the t-statistic of 1.754068 is relatively high, and p-value of 0.0917 is higher than the standard significance level of 0.05. This indicates that there is estimated positive relationship between FDI and GDP.

4.3.5 Agriculture

The regression analysis suggests a negative statistically association between the agricultural sector and economic growth in Zimbabwe. The estimated coefficient of -0.312707 indicates that one unit increase in the agricultural sector results in -0.312707 unit increase in the GDP growth rate. This negative relationship is further supported by the relatively low t-statistic of -1.240981.

4.4 Summary

The analysis suggests a potentially positive relationship between inflation and economic growth, although with a possible negative influence from agriculture on GDP growth. Conversely, the findings indicate a positive association between both manufacturing activity and foreign direct investment with economic growth in Zimbabwe for the studied period. It's important to note that we reject the null hypothesis regarding inflation's impact on economic growth based solely on this analysis. The next chapter will delve into the overall study summary, conclusions, and potential recommendations.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter delves into a comprehensive summary of the key findings presented in chapter 4. It leverages these empirical results to formulate policy recommendations aimed at strengthening the relationship between inflation and economic growth in Zimbabwe. The chapter will synthesize conclusions derived from the statistical analysis in chapter 4 and propose areas for further research endeavors.

5.1 Summary of findings

This study aimed to shed light on the nature of the relationship between inflation and economic growth in Zimbabwe over the period 1992-2022. To achieve this, Ordinary Least Squares (OLS) regression analysis was employed to examine how inflation interacts with various macroeconomic variables which include manufacturing, agriculture, exports of goods and services, inflation, gross domestic product and foreign direct investments. The findings suggest a potentially positive impact of inflation on Zimbabwe's economic growth, when inflation rises, the GDP growth rate tends to rise. However, all the variables of have a positive influence on GDP except for agriculture and this suggest that bolstering to this sector could potentially stimulate economic growth more in Zimbabwe.

5.2 Conclusion

The study suggests a potential positive association between inflation and economic growth in Zimbabwe whilst further research is warranted to increase the statistical significance of this relationship, it underscores the importance of eradicating inflationary pressures

through implementing targeted policies such as reducing money supply. The positive correlation between foreign direct investment and GDP growth highlights the strategic value of this sector indicating the importance of allowing investors to investing in the country as they upgrade transportation networks could significantly reduce production cost, improve efficiency for manufacturers and employment creation. This in turn, can stimulate economic growth and potentially bolster Zimbabwe's export competitiveness. However, currency exchange rate instability can make Zimbabwean exports more expensive on the international market. The government should prioritize addressing inflationary pressure to make exports more competitive. Moreover, exploring negotiable trade agreements with regional and internation partners could be crucial in reducing export barriers and opening new markets for Zimbabwean goods and services.

Overall, the study should emphasize the importance of establishing a fair and transparence business environment to reduce export barriers and accessing new markets for Zimbabwean goods and services. Government also, should implementing strong anti-corruption measures so as to attract much needed investment and foster long term economic growth.

5.3 Recommendations

In light of the key insights gleaned from this study, the following recommendations are put forward:

1. **Combating Inflation**: The Zimbabwean government should prioritize implementing effective monetary policies to ensure price stability. Tools such as managing the money supply and closely monitoring exchange rates can be crucial in mitigating in pressure on the economy.
2. **Attracting Investment and Fostering Growth**: Strong anti-corruption measures are essential for creating a fair and transparent business environment. This fosters long term economic growth by attracting much needed investment. Additionally, strategic investments in sectors like

manufacturing and energy, coupled with efforts to promote exports, can further stimulate economic activity.

3. **Fiscal Responsibility:** Maintaining prudent fiscal management remains critical. Striking a balance between government spending and revenue generations is essential for ensuring sustainable economic growth over time.
4. **Economic diversification:** Encouraging diversification across different sectors can enhance Zimbabwe's resilience to inflationary pressures. Reducing reliance on a single economic sector can mitigate the negative impacts of external shocks.
5. **Expanding Market Access:** Negotiating favourable trade agreements with regional and international partners can provide significant benefits. By reducing export barriers and opening new markets for Zimbabwean goods and services, these agreements can promote economic growth and development.

To gain a more nuanced understanding of Zimbabwe's economic dynamics, future research endeavors could delve into a broader range of influential factors the likes of interplay between exchange rates and economic growth, investing in human capital, the role of political stability and improving the well-being of its citizens overall.

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Appendix1: Data

Year	Inflation GDP deflator (annual%)	GDP growth (annual%)	Manufacturing Value added (annual %growth)	Foreign direct investment	Exports of goods and services	Agriculture, forestry, fishing, value added(% of GDP)
1992	-14.12965834	-9.015570075	-8.476818765	0.221431698	-5.322551354	6.75157042
1993	-3.791122192	1.051458647	-7.742402958	0.425897783	22.77273177	13.73790751
1994	-3.895672562	9.235198825	20.94117304	0.502837235	9.389929799	17.08007706
1995	3.038538256	0.158025687	-7.220054647	1.655119106	0.487132225	13.46596889
1996	8.984383328	10.36069677	14.67846834	0.945850735	8.137958808	19.34262298
1997	-2.879048138	2.680594179	-0.792361755	1.583901352	5.517720222	16.69573065
1998	-27.04864927	2.885211796	-3.358587263	6.940053217	-0.678990861	18.89032032
1999	-8.006813297	0.817821033	-4.609421581	0.860307485	-3.662836319	15.48126672
2000	-0.627900021	3.059189749	-10.9999961	0.346788445	-7.732307438	15.66706342
2001	-0.130890212	1.439615396	-5.000003015	0.056068824	3.276213473	15.62707072
2002	-2.712950295	8.894023631	-13.00000362	0.408381024	-16.964817	12.56836756
2003	-8.801275607	16.99507473	-12.99999655	0.066345508	-20.43725466	14.79335521
2004	-7.611524316	5.807538023	-9.9999978	0.149855352	-2.05635567	18.06379683
2005	-5.136601107	5.711083707	4.00000053	1.786206014	-7.34172667	17.14823974
2006	-2.017678707	-3.461495188	-3.000003897	0.734767827	-8.942446937	19.23011578
2007	-0.894886823	3.653326835	-4.999999899	1.301977507	-9.786355989	21.19768854
2008	-1.349222529	17.66894633	-17.1000014	1.168556906	-21.08434436	19.02107406
2009	95.40865967	12.01955997	7.540002049	1.086305042	-3.824146813	10.74255023
2010	2.57553602	21.45206092	72.6328866	1.018021731	45.77855178	9.609863269
2011	2.171761032	14.62020726	13.82616266	2.441511459	5.104660055	8.665865173
2012	4.855945519	15.74487708	5.325054897	2.044131278	-3.274345234	8.044517527
2013	8.09114025	3.196730887	-0.760518896	1.954060076	-11.87653348	7.144479446
2014	0.624974485	1.484542622	-5.110914999	2.425172602	3.879176129	8.745304229
2015	0.367419653	2.023649996	0.146424575	1.999687364	48.41122639	8.284246903

2016	2.014094734	0.900955396	0.541750657	1.669274353	21.00079094	7.873985821
2017	3.056905062	4.080263903	1.332564598	1.746884527	4.80668452	8.340968872
2018	200.7695776	5.009866783	1.387913391	2.101721082	-2.912872614	7.319375146
2019	225.3946482	6.332446426	-10.80114622	1.142805585	13.88998489	9.819261595
2020	604.9458642	7.816950618	-18.49516739	0.699033511	-48.9492549	8.772858753
2021	113.2949806	8.468016909	1.198732768	0.881174075	47.0479455	8.849899249
2022	264.580608	6.522375287	1.616971021	1.247870255	43.94903618	7.191922166

Appendix 2: Descriptive Statistics

	GDP_GROWTH__ANNUAL__	INFLATION_GDP_DEFLATOR__	MANUFACTURING_VALUE_ADDE	FOREIGN_DIRECT_INVESTMEN	EXPORTS_OF_GOODS_AND_SER	AGRICULTURE__FORESTRY__F
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Skewness	0.034812	3.190478	3.021944	2.886667	0.468116	0.246883
Kurtosis	3.004157	13.60145	14.30725	13.87616	3.709908	1.559914
Jarque-Bera	0.006284	197.7637	212.3274	195.8454	1.783144	2.993634
Probability	0.996863	0.000000	0.000000	0.000000	0.410011	0.223842
Sum	34.10044	1521.423	0.700708	41.61200	108.6026	394.1673
Sum Sq. Dev.	2377.786	475757.2	7842.881	47.21999	13673.28	644.9651
Observations	31	31	31	31	31	31

Appendix 3: Multicollinearity

	GDP_GROWTH__ANNUAL__	INFLATION_GDP_DEFLATOR__	MANUFACTURING_VALUE_ADDE	FOREIGN_DIRECT_INVESTMEN	EXPORTS_OF_GOODS_AND_SER	AGRICULTURE__FORESTRY__F
GDP_GROWTH__ANNUAL__	1.000000	-0.088231	0.765188	0.253431	0.559055	-0.318645
INFLATION_GDP_DEFLATOR__	-0.088231	1.000000	-0.194097	-0.111115	-0.198522	-0.357672
MANUFACTURING_VALUE_ADDE	0.765188	-0.194097	1.000000	0.068424	0.523220	-0.138340
FOREIGN_DIRECT_INVESTMEN	0.253431	-0.111115	0.068424	1.000000	0.068699	-0.022852
EXPORTS_OF_GOODS_AND_SER	0.559055	-0.198522	0.523220	0.068699	1.000000	-0.301595
AGRICULTURE__FORESTRY__F	-0.318645	-0.357672	-0.138340	-0.022852	-0.301595	1.000000

Appendix 4: Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.186972	Prob. F(2,23)	0.8307
Obs*R-squared	0.495948	Prob. Chi-Square(2)	0.7804

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 06/02/24 Time: 01:13
Sample: 1992 2022
Included observations: 31
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFLATION_GDP_DEFLATOR__	-0.000756	0.009679	-0.078138	0.9384
MANUFACTURING_VALUE_ADDE	0.010509	0.081743	0.128561	0.8988
FOREIGN_DIRECT_INVESTMEN	0.078527	0.880076	0.089227	0.9297
EXPORTS_OF_GOODS_AND_SER	-0.002105	0.061246	-0.034367	0.9729
AGRICULTURE__FORESTRY__F	-0.014227	0.267222	-0.053239	0.9580
C	0.119338	4.014499	0.029727	0.9765
RESID(-1)	-0.134884	0.221193	-0.609801	0.5480
RESID(-2)	-0.004070	0.242936	-0.016754	0.9868

R-squared	0.015998	Mean dependent var	6.10E-16
Adjusted R-squared	-0.283480	S.D. dependent var	4.974301
S.E. of regression	5.635425	Akaike info criterion	6.513658
Sum squared resid	730.4344	Schwarz criterion	6.883720
Log likelihood	-92.96170	Hannan-Quinn criter.	6.634289
F-statistic	0.053421	Durbin-Watson stat	1.955368
Prob(F-statistic)	0.999714		

Appendix 5: Heteroscedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.429747	Prob. F(5,25)	0.2481
Obs*R-squared	6.893297	Prob. Chi-Square(5)	0.2287
Scaled explained SS	3.712277	Prob. Chi-Square(5)	0.5915

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 06/02/24 Time: 01:13
Sample: 1992 2022
Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	50.45176	21.41448	2.355965	0.0266
INFLATION_GDP_DEFLATOR__	-0.061151	0.050635	-1.207667	0.2385
MANUFACTURING_VALUE_ADDE	0.862910	0.403599	2.138039	0.0425
FOREIGN_DIRECT_INVESTMEN	-3.347105	4.443760	-0.753215	0.4584
EXPORTS_OF_GOODS_AND_SER	-0.539954	0.326126	-1.655660	0.1103
AGRICULTURE__FORESTRY__F	-1.348014	1.399314	-0.963339	0.3446

R-squared	0.222364	Mean dependent var	23.94549
Adjusted R-squared	0.066837	S.D. dependent var	31.32473
S.E. of regression	30.25979	Akaike info criterion	9.829502
Sum squared resid	22891.38	Schwarz criterion	10.10705
Log likelihood	-146.3573	Hannan-Quinn criter.	9.919975
F-statistic	1.429747	Durbin-Watson stat	2.341447
Prob(F-statistic)	0.248124		

Appendix 6: Regression OLS

Dependent Variable: GDP_GROWTH__ANNUAL__
Method: Least Squares
Date: 06/01/24 Time: 22:39
Sample: 1992 2022
Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFLATION_GDP_DEFLATOR__	0.002409	0.009118	0.264214	0.7938
MANUFACTURING_VALUE_ADDE	0.358236	0.072679	4.929040	0.0000
FOREIGN_DIRECT_INVESTMEN	1.403633	0.800216	1.754068	0.0917
EXPORTS_OF_GOODS_AND_SER	0.067849	0.058728	1.155310	0.2589
AGRICULTURE__FORESTRY__F	-0.312707	0.251983	-1.240981	0.2261
C	2.827943	3.856241	0.733342	0.4702

R-squared	0.687815	Mean dependent var	1.100014
Adjusted R-squared	0.625378	S.D. dependent var	8.902783
S.E. of regression	5.449074	Akaike info criterion	6.400754
Sum squared resid	742.3101	Schwarz criterion	6.678300
Log likelihood	-93.21168	Hannan-Quinn criter.	6.491227
F-statistic	11.01613	Durbin-Watson stat	2.178823
Prob(F-statistic)	0.000011		