Factors influencing unemployment An Economic Analysis of Unemployment in Zimbabwe

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Abstract- This study examines the factors influencing unemployment in Zimbabwe, focusing on the relationship between unemployment rate, GDP growth rate, and inflation rate from 2000 to 2022. Using various econometric techniques, including the Augmented Dickey-Fuller (ADF) test, Variance Inflation Factor (VIF), and Ordinary Least Squares (OLS) regression analysis, the research investigates the significance of these macroeconomic variables. The findings indicate that while the inflation rate significantly impacts unemployment, the GDP growth rate does not.

These results suggest that controlling inflation is crucial for managing unemployment in Zimbabwe. Further research is recommended to explore additional variables and refine the models used.

Index Terms- Unemployment, GDP Growth, Inflation, Zimbabwe, Econometric Analysis

I. Introduction

Zimbabwe, a landlocked country in Southern Africa, has a diverse economy that includes agriculture, mining, manufacturing, and tourism. Historically, Zimbabwe was considered the granary of Africa due to its robust agricultural sector. However, the country has faced significant economic challenges over the past few decades, including hyperinflation, political instability, and international sanctions[1].Zimbabwe's economy has faced significant challenges over the past few decades, including one of the worst hyperinflation crisis in history, peaking in 2008 and leading to the abandonment of the Zimbabwean dollar further persistent political instability during the late 1990s and 2000s, which has negatively impacted economic performance and investor confidence; development and poor infrastructure, particularly in energy and transport, that hampers economic activities . One of the many economic troubles is unemployment.Between 2000 and 2010, Zimbabwe saw its highest level of unemployment, which was accompanied by weak economic development, erratic hyperinflation, and stagflation Sitima, (2000).Zimbabwe has been grappling with persistently high unemployment rates for several decades. This issue has multifaceted implications, affecting economic growth, social stability, and the overall quality of life for its citizens Munangagwa, (2009). The unemployment rate has remained high due to a combination of economic mismanagement, political instability, and structural weaknesses in the economy. Additionally, the informal sector's dominance has masked the true extent of unemployment, as many people engage in precarious, low-income activities.In this study we intend to analyze persistent issue of high unemployment rates in Zimbabwe, since the economic is declining drastically the paper is motivated to investigate the relationship of unemployment rate with inflation and gdp.This paper aims to clarify the effect of GDP growth rate and inflation on unemployment rate in Zimbabwe.Economic growth is a crucial determinant of employment levels[2]. According to Okun's law positive GDP growth generally leads to job creation, reducing unemployment rates. Conversely, economic downturns can result in job losses and higher unemployment.Ball and Mankiw (2002) discuss how inflation can impact unemployment through its effects on purchasing power, wage demands, and business costs. They note that high inflation may lead to uncertainty and reduced investment, which can adversely affect employment.The scope of this study encompasses an economic analysis of the factors influencing unemployment in Zimbabwe. This involves examining macroeconomic variables such as GDP and Inflation from year 2000 to year 2022 to identify their impact on unemployment rates.Due to time and data limitations including gaps and inconsistencies in historical data, may have affected findings.

II. Literature Review

Economic activity has a significant impact on unemployment,in however, growth and unemployment are like two sides of the same coin. When economic activity is strong, more output occurs overall, requiring a greater number of workers to create the increased volume of goods and services[3].Basu, S. (2020) discusses the classical view of unemployment, emphasizing the role of wage flexibility and market self-correction mechanisms and Mankiw, (2021) this book provides an overview of classical economic theories, including the classical view of unemployment and the role of wage flexibility in achieving labor market equilibrium, these literature attest the classical view of unemployment.The Classical view of unemployment is rooted in the belief that labor markets function efficiently and that any unemployment is voluntary. According to this perspective, wages are flexible, and any excess supply of labor (unemployment) will be corrected by a decrease in wages, which will increase the demand for labor and return the market to equilibrium.Blinder, A. S. (2018) explores the Keynesian perspective on unemployment, emphasizing its core assertion that unemployment is often involuntary and primarily results from insufficient aggregate demand. This viewpoint stands in striking contrast to classical economic theories, which typically regard unemployment as a voluntary phenomenon corrected by wage flexibility.

According to Keynesians, wages are sticky downwards, meaning they do not adjust quickly to changes in economic conditions, leading to prolonged periods of unemployment. Keynesians advocate for government intervention, such as fiscal and monetary policy, to boost demand and reduce unemployment.(Krugman, 2020) discusses various economic issues, including the Keynesian view of unemployment, and argues for active government policies to manage economic fluctuations and reduce unemployment.Kanyenze, (2004)provides an overview of historical trends in Zimbabwe's labor market, analyzing the impact of economic policies and external shocks on employment levels. The author highlights the significant rise in informal employment and the challenges faced by the formal sector. AlsoChitambara, P. (2010) examines the dynamics of the labor market in Zimbabwe, focusing on the structural and institutional factors contributing to high unemployment rates. The study also discusses the impact of economic policies on job creation.The empirical studies on unemployment in Zimbabwe focus on the unique economic challenges the country faces, including hyperinflation, political instability, and structural issues

$$DUR\mathrm{t} = \alpha + \beta 1 \quad D(GDP)\mathrm{t} + \beta 2 INFLATION\mathrm{t} + \epsilon$$

in the labor market. Therefore we get the motivation to assess the if GDP and inflation rate have an effect on Unemployment rate in Zimbabwe.Okun's Law is a foundational concept that links GDP growth to unemployment.

Where:

- DUR = Second differenced unemployment rate at time t
- D(GDP) = First differenced GDP growth rate at time t
- INFLATION = inflation rate at time t
- α = Intercept
- ϵ = Error term

Articulated by Arthur M. Okun in 1962, Okun's Law posits an inverse relationship between GDP growth and unemployment, suggesting that higher economic growth is associated with lower unemployment rates (Okun, 1962). This principle has been empirically validated across various countries and economic conditions. For instance, Ball, Leigh, and Loungani (2013) provide comprehensive empirical evidence supporting Okun's Law, confirming that GDP growth is a significant determinant of unemployment across different nations and economic environments.The relationship between inflation and unemployment is well illustrated by the Phillips Curve, introduced by A. W. Phillips in 1958. The Phillips Curve describes an inverse relationship between inflation and unemployment, indicating that higher inflation is associated with lower unemployment in the short run (Phillips, 1958). Blanchard and Summers (1986) explore various macroeconomic determinants of unemployment, including GDP growth and inflation, in the context of European unemployment issues. Their findings highlight the significant roles these variables play in influencing unemployment rates (Blanchard & Summers, 1986). Additionally, Nickell, Nunziata, and Ochel (2005) conduct a comprehensive cross-country analysis of unemployment determinants across OECD countries, emphasizing the importance of both GDP growth and inflation rates in understanding unemployment trends (Nickell, Nunziata, & Ochel, 2005).Hence we propose the following hypotheses;

A)
H0: GDP growth rate has no significant impact on unemployment rate
H1:GDP growth rate has a significant impact on unemployment rate.
B)
H0:Inflation rate has no significant impact on unemployment rate
H1:Inflation rate has no significant impact on unemployment rate

III. Methodology

The analysis involves several econometric techniques, including the Augmented Dickey- Fuller (ADF) test for stationarity, the Variance Inflation Factor (VIF) for multicollinearity, normality test, heteroscedasticity test and regression analysis. The model specification is also detailed to provide a clear framework for the empirical analysis.The data used in this study is sourced from reputable institutions, including the Zimbabwe National Statistics Agency (ZIMSTAT), International Monetary Fund (IMF), World Bank, and African Development Bank (AfDB). The dataset covers the period from 2000 to 2022 and includes variables such as unemployment rate,GDP growth rate, and inflation rate.The primary method used to examine the relationship between unemployment and its determinants is regression analysis. The Ordinary Least Squares (OLS) regression technique is applied to estimate the coefficients of the model.The general form of the regression model is as follows;

IV. Findings

I. *Descriptive statistics*

Table 1: Descriptive Statistics

	UR	D2_UR	GDP	D_GDP	INFLATION
Mean	0.058333	0.0018	0.009374	0.004355	0.705686
Median	0.05391	0	0.014621	-0.000477	0.039564
Maximum	0.0954	0.01281	0.214521	0.296885	6.049459
Minimum	0.0439	-0.00353	-0.176689	-0.140156	-0.020177
Std. Dev.	0.015441	0.004664	0.09989	0.100149	1.447072
Skewness	1.36038	0.778021	0.07434	1.065071	2.588784
Kurtosis	3.63644	2.612081	2.635746	4.604737	9.575212
Jarque-Bera	7.156956	2.357433	0.141888	6.519961	64.2039
Probability	0.027918	0.307673	0.931514	0.038389	0
Sum	1.28333	0.03959	0.206218	0.095816	15.5251
Sum Sq. Dev.	0.005007	0.000457	0.209539	0.210625	43.97438
Observations	22	22	22	22	22

The descriptive statistics provide a summary of the data for unemployment rate (UR), differenced unemployment rate (D_UR), GDP growth rate (GDP), differenced GDP growth rate

(D_GDP), and inflation rate (INFLATION). The mean unemployment rate is 5.83% with a standard deviation of 1.54%. The Skewness of 1.36 indicates a rightward skew, and the kurtosis of 3.64 suggests a leptokurtic.The mean is 0.18% in differenced Unemployment Rate (D_UR) with a standard deviation of 0.46%. Skewness and kurtosis values suggest a nearly normal distribution, supported by the Jarque- Bera test (p-value = 0.3077). distribution. The Jarque-Bera test indicates non-normality (p- value = 0.0279).The mean inflation rate is 70.57% with high variability (standard deviation = 144.71%). The distribution is highly skewed and kurtoted, indicating significant deviations from normality (p-value = 0.0000).The GDP growth rate is high with a mean of 0.94%, while the differenced GDP growth rate is similar with a mean of 0.44%, indicating a deviation from normality.

II. Stationarity Test: Augmented Dickey- Fuller (ADF) Test

To ensure the reliability of the regression results, it is crucial to work with stationary time series data. The ADF test is employed to check for stationarity. The null hypothesis of the ADF test states that the series has a unit root (i.e., it is non-stationary). If the null hypothesis is rejected, the series is considered stationary[4].The Augmented Dickey Fuller (ADF) test was used to test for stationary and the results are shown in the table below.

Table 2: (ADF) Test

Variable	ADF Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value	P-Value	Conclusion
UR	1.342781	-3.769597	-3.004861	-2.642242	0.9980	Non-Stationary
1ST diff	-3.332854	-4.616209	-3.710482	-3.297799	0.0945	Borderline Stationary at 10%
2nd diff	-3.994718	-3.920350	-3.065585	-2.673459	0.0087	Stationary at 1%, 5%, and 10% levels
GDP	-2.575065	-3.769597	-3.004861	-2.642242	0.1129	Non-Stationary
1ST diff	-5.059777	-3.78803	-3.012363	-2.646119	0.0006	Stationary at 1%, 5%, and 10% levels
2nd diff	-4.663425	-3.886751	-3.052169	-2.666593	0.0022	Stationary at 1%, 5%, and 10% levels
INFL	-3.990632	-3.808546	-3.020686	-2.650413	0.0068	Stationary at 1%, 5%, and 10% levels
1ST Diff	-3.74038	-3.857386	-3.040391	-2.660551	0.0127	Stationary at 1%, 5%, and 10% levels
2nd diff	-13.0620	-3.808546	-3.020686	-2.650413	0.0000	Stationary at 1%, 5%, and 10% levels

The ADF test results show that the unemployment rate and GDP growth rate are non-stationary at level but become stationary after differencing. The inflation rate is stationary at level. Ensuring stationarity is crucial for reliable regression results.Unemployment Rate (UR) Non-stationary at level (p-value = 0.9980) but becomes stationary after second differencing (p-value = 0.0087).GDP Growth Rate (GDP) is non-stationary at level (p-value = 0.1129) but stationary at first difference (p-value = 0.0006) and second difference (p-value = 0.0022).Inflation Rate is Stationary at level (p- value = 0.0068) and at first difference (p-value = 0.0127) and second difference (p-value = 0.0000).

III. Multicollinearity Test: Variance Inflation Factor (VIF)

The results from the multi-collinearity test carried on explanatory variables are shown in the table below.

Table 3: Multi-collinearity test

Coefficient Variable	Uncentered Variance	Centered VIF	VIF
D_GDP	8.15E-05	1.001992	1.000011
INFLATION	3.90E-07	1.249155	1.000011
C	9.76E-07	1.250979	NA

The VIF values for D_GDP and INFLATION are both close to 1, indicating no multicollinearity. This suggests that the independent variables do not have high correlations with each other, allowing for reliable estimation of their individual effects on unemployment.

IV. Heteroscedasticity Test

The results from the Heteroscedasticity Test carried on explanatory variables are shown in the table below.

Table 4: Heteroscedasticity Test

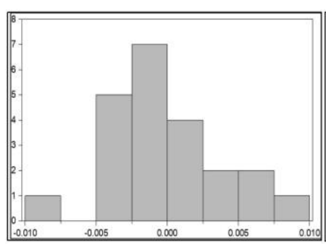
F-statistic	0.054956	Prob. F(2,19)	0.9467
Obs*R-squared	0.126535	Prob. Chi-Square(2)	0.9387
Scaled explained SS	0.078876	Prob. Chi-Square(2)	0.9613

The Breusch-Pagan test shows no evidence of heteroscedasticity (p-values: F-statistic = 0.9467, Obs*R-squared = 0.9387, Scaled explained SS = 0.9613). This means the variance of the errors is constant, validating the OLS regression results.

V. Normality Test

Ensuring normality of residuals is crucial for reliable hypothesis testing and confidence interval estimation in regression analysis.

Table 4: Normality Test



Mean	2.37e-19
Median	-0.000837
Maximum	0.008580
Minimum	-0.007807
Std. Dev.	0.003940
Skewness	0.355681
Kurtosis	2.671486
Jarque-Bera	0.562794
Probability	0.754729

The residuals' mean is close to zero, indicating a normal distribution. The skewness is slight but not significant. The kurtosis value is close to the normal distribution value of 3.Since the p-value is greater than the common significance levels (0.05, 0.01), we fail to reject the null hypothesis of the Jarque-Bera test. This means we do not have sufficient evidence to say that the residuals are not normally distributed.The histogram and descriptive statistics of the residuals, along with the Jarque-Bera test (p-value = 0.754729), indicate that the residuals are normally distributed. This supports the reliability of the regression estimates.

VI. Regression

Table 5: Regression Results

Dependent Variable:Unemployment rate (d_ur)

Variable	Coefficient	Std error	t statistcs	P value
C	0.000585	0.000988	0.592123	0.5607
D_GDP	0.004813	0.009026	0.533305	0.6
INFLATION	0.001692	0.000625	2.708093	0.0139
R-squared	0.286461	F-statistic	3.813916	Durbin-Watson stat
Adjusted R-squared	0.211351	Prob(F-statistic)	0.040501	1.739437
D means differenced Method: Least Squares				

The regression analysis estimates the relationship between the differenced unemployment rate (D_UR) and the independent variables (differenced GDP growth rate and inflation rate).The coefficient for INFLATION is positive and statistically significant (p-value < 0.05), suggesting that inflation positively impacts the differenced unemployment rate.This low p-value indicates that we reject the null hypothesis (H0). Therefore, we have sufficient evidence to conclude that the inflation rate has a significant impact on the unemployment rate in Zimbabwe.The coefficient for D_GDP is not statistically significant (p-value > 0.05), indicating that GDP growth R-squared: 0.286461, indicating that about 28.65% of the variance in D_UR is explained by the model.This high p-value indicates that we fail to reject the null hypothesis (H0). Therefore, we do not have sufficient evidence to conclude that the GDP growth rate has a significant impact on the unemployment rate in Zimbabwe.F-statistic: 3.813916, p-value = 0.040501, indicating overall model significance at 5% level ,Durbin-Watson stat: 1.739437, suggesting no serious autocorrelation issues.rate does not significantly affect the differenced unemployment rate in this model.These findings suggest that inflation control should be a priority in policy-making to manage unemployment in Zimbabwe, while GDP growth alone may not be sufficient to address the unemployment issue. Further research is necessary to explore additional factors and refine the analytical models for more comprehensive insights.

V. Conclusion

Understanding the factors influencing unemployment in Zimbabwe is crucial for developing effective policies to address the issue. While this study provides valuable insights, it also highlights the need for further research to explore additional variables and refine the models used. Addressing the limitations and considering the broader economic context will be crucial for developing comprehensive strategies to combat unemployment in Zimbabwe.The analysis indicates that changes in GDP growth rate do not significantly influence the unemployment rate in Zimbabwe. This implies that policies aimed at stimulating GDP growth alone may not be effective in reducing unemployment. Additional variables and underlying structural problems could also influence the estimate of the unemployment rate.However the analysis shows that inflation rate significantly impacts the unemployment rate. Specifically, an increase in inflation is associated with an increase in the unemployment rate. This suggests that controlling inflation could be crucial in managing unemployment.

Policymakers should consider measures to stabilize prices as part of their strategies to reduce unemployment.

VI. Recommendation

a) Policymakers should prioritize measures to control inflation, as it significantly impacts unemployment. This could include implementing monetary policies aimed at stabilizing prices.

b) Since GDP growth alone does not significantly reduce unemployment, policies should also address structural issues in the economy, such as improving infrastructure, enhancing workforce skills, and promoting sectors that have high employment potential.

VII. Further study

Further research is necessary to explore additional variables and refine the models used to develop comprehensive strategies to combat unemployment in Zimbabwe.

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