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An Empirical Analysis of the Impact of Unemployment on Economic Growth in Zimbabwe

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Abstract

This study examined the impact of unemployment on economic growth in Zimbabwe for the period 1982 to 2013. In this study we use the ordinary least squares (OLS) to estimate the regression equation. The first step is to make the data stationary to avoid spurious regression. Based on the stationarity test results, cointegration tests were conducted to test for the existence of a long run relationship between economic growth and its determinants. The Error Correction Model (ECM) was also employed to establish the short run dynamics and speed of adjustment to the long run. The estimation results for both the long run and short run models revealed that unemployment has a significant influence on productivity growth. Also shown from the results is the negative relationship between unemployment and economic growth.

Key Words: unemployment, economic growth, cointegration, error correction, Zimbabwe

INTRODUCTION

The debate on unemployment and employment has been on for many years both for the developed and developing countries. Levinson (2008) says that unemployment is associated with social problems such as poverty, crime, violence, loss of morale and degradation. This predicament increases the cost of doing business in any country as aggregate demand falls while increasing country risk. The economic growth rate would therefore decline as the environment will not be conducive for investment.

Zimbabwe is one of the countries in Africa that has the highest formal unemployment rate hovering above 50% according to the Zimbabwe Agenda for Sustainable Transformation (Zim Asset) (2013). Other sources (CIA World fact book 2011) says formal unemployment rate at was at 95% in January 2011. This disposition is a reminiscent of the decade long economic quagmire that resulted in industrial incapacitation and closures, hence massive loss of jobs into the labour market which is already saturated.

Human capital plays a critical role in endogenous growth models, which hold that knowledge-driven growth can lead to a constant, or even increasing, rate of return. According to Romer (1990), human capital is the major input to research and development that innovates technologies. Therefore, countries with larger initial human capital stock are more likely to have new products and grow faster than other countries.

BACKGROUND OF THE STUDY

Zimbabwe's manufacturing industry is struggling, with most companies operating below full capacity. The Confederation of Zimbabwe Industries (CZI) (2014) says that industry's capacity utilisation was 18.9% in 2009, 57 % in 2011, 44.9 % in 2012 and 39.6 in 2013. The situation contagiously spread to other sectors of the economy through the interdependence cobweb system, thereby magnifying the unemployment rate.

PROBLEM STATEMENT

Saungweme etal (2014) say that although the causes of unemployment in Zimbabwe extent to pre-colonial period, they were so severe after independence. Unemployment rose sharply after the year 2000 when the country embarked on fast track land reform. Many farm labourers were displaced by new farmers as they were thought to be aligned to former white farmers. The country also failed to service its debt with multilateral lenders and in 1999 the IMF and World Bank suspended financial aid to Zimbabwe. Hence, unemployment has not been an issue of concern in Zimbabwe until the turn of the new millennium when the country entered into a decade of serious economic recession that lasted until February 2009. As a result, industrial capacity utilization declined dismally, companies closed, and thus giving birth to a striving informal sector. From 2000 to 2009, unemployment and inflation soared to unacceptably high levels. As if not enough, the introduction of the multicurrency regime system from February 2009 also brought with it some challenges that companies failed to cope. The liquidity crunch crippled companies from recapitalization and improving capacity utilization. This henceforth manifested into increased unemployment as the industry fails to absorb all job seekers.

RESEARCH OBJECTIVES AND HYPOTHESIS

The objective of this study is to examine the impact of unemployment on economic growth. It also seeks to make recommendations that would assist policy makers in creating formal employment and increasing national output. The hypothesis that pinned this study is that unemployment is negatively related to economic growth.

LITERATURE REVIEW

The Keynesian economists argue that the key determinant of employment is effective demand for labour and that unemployment occurs due to inadequate national income, which should be increased in order to increase effective demand until sufficient to reach full employment. Ernst and Berg (2009) say that high growth is associated with a high degree of employment intensity which is a necessary condition for the reduction of poverty.

Fetzgerald (1998) developed the Search Theory of Unemployment in which he believes that workers have different skills requirements, thus workers need to find well-paying, desirable jobs, while firms need to find the most productive workers. Terry (1998) says neither firms nor workers have all the information they need about the options available to them and as a result they must engage in search. However, since search is costly and time consuming both firms and workers must use some of their resources to find a good match.

Okun's law examines the statistical relationship between a country's unemployment rate and the growth rate of its economy. It shows how much of a country's gross domestic product (GDP) may be lost when the unemployment rate is above its natural rate. Output depends on the amount of labour used in the production process, so there is a positive relationship between output and employment and there is a negative relationship between output and unemployment.

Rigas etal (2011) examined whether the Okun's law is valid in Greece, France, and Spain. The results of the study conclude that the reaction of GDP to changes in unemployment and, more generally to Okun's coefficient differ substantially among the three countries. The study also concluded that a two-way causal relation between the GDP and rate of unemployment does not exist for any of the three countries.

Strauss and Wohar (2004) established that long run relationship exist between real wages and productivity at the industry level for a group of US manufacturing industries over the period of 1956 to 1996. They found out that the increase in productivity in an elastic form is associated with a less than unity increase in real wage in the U.S.

Meidani and Zabihi (2011) examined the dynamic effects of unemployment rate on per capita real GDP in Iran. The results of Autoregressive Distribution lag (ARD) long run coefficients reveal that unemployment rate is statistically significant in determining per capita real GDP in the long-run. Based on the results of short run and long run, unemployment rate is positively related with per capita real GDP.

MATERIALS AND METHOD

This section explores the econometric methodology applied in the study to establish the impact of unemployment on economic growth in Zimbabwe. The study employs secondary annual time series data set to examine the existence of relationship between unemployment and economic growth in Zimbabwe from 1982 to 2013. In this study we use the ordinary least squares (OLS) to estimate the equation. The estimation procedure was such that unit root test is first undertaken to determine the order of integration of the variables and that would be done using Augmented Dickey Fuller (ADF) tests. Given that all the variables are integrated of the same order, the second step is cointegration analysis which is applied for the estimation and determination of stable long run equilibrium relationship among variables and to check the integration of linear combination of variables through the Johansen cointegration technique. Lastly, for the determination of short run dynamics and speed of adjustment to the long run, the Error Correction Model is considered. Normality tests using the Jacque-Bera normality tests were carried out. Heteroscedasticity tests were carried out using the autoregressive conditional heteroscedasticity tests and the existence of high order serial correlation was tested using the LM test. Higher order serial correlation was tested using the Breusch-Godfrey test. Ordinary least squares estimation requires that the residuals be normally distributed, there be no autocorrelation and that the error term be homoscedastic.

The theoretical basis of the model is a linear relationship between economic growth as the dependent variable and the explanatory variables which include; unemployment rate, government expenditure, total investment and inflation. Drawing from Mosikari (2013), the relationship between economic growth and its variables in Zimbabwe can be specified as follows:

GDPCP = F (GVEXP, INFL, INVT, UNEMP, E)…… (1)
Where,
GDPCP - is gross domestic product;
GVEXP - is the government expenditure;
INVT - is total investment;
INFL - is inflation rate;
UNEMP - is the unemployment rate and
E - is the error term.

We then take the logarithms of the variables. This is because most economic time series are non-stationary. By the same token a log linear relationship is therefore given by;-

$$LNGDPCP_t = \beta_0 + \beta_1 LNGVEXP_t + \beta_2 LNINFL_t + \beta_3 LNINVT_t + \beta_4 LNUNEMP_t + \varepsilon_t$$

Natural logarithms smoothen the data as they allow for the management of high magnitudes of figures and give the direct estimation of economic growth sensitivity to explanatory variables.

The expected signs from the regression equation to be estimated are as follows,

$$\beta_1 > 0;\ \beta_2 < 0;\ \beta_3 > 0;\ \beta_4 < 0$$

DATA ANALYSIS AND INTERPRETATION OF RESULTS

This section focuses on the empirical estimation, presentation and economic interpretation of the regression results carried out using the methodology highlighted in the previous section.

PRELIMINARY TESTS

Table 1: Descriptive Statistics

	LNGDPCP	LNGVEXP	LNINFL	LNINVT	LNUNEMP
Mean	0.008087	0.157684	0.807485	0.13828	0.058052
Median	0.018279	0.164836	0.202532	0.162117	0.056853
Maximum	0.112525	0.242868	7.886653	0.212932	0.102557
Minimum	-0.194435	0.020293	0.015873	0.015184	0.039221
Std. Dev	0.076082	0.048834	1.669689	0.057016	0.016227
Skewness	-0.998205	-1.297187	3.218520	-0.845106	0.923409
Kurtosis	3.812243	4.813896	12.89726	2.546840	3.420282
Jarque-Bera	6.193855	13.36133	185.8551	4.082894	4.783166
Probability	0.045188	0.001255	0.000000	0.129841	0.091485
Observations	32	32	32	32	32

Table 1 shows descriptive statistics of the dependent and explanatory variables used in the study for the period 1982 to 2013. The letters LN stands behind the variables indicates that the data was converted into logarithms to reduce its variability and enable direct estimation of parameters. Maximum and minimum statistics rule out the possibility of outliers in the data used.

Classical linear regression requires that the residuals be normally distributed and judging by the probability value of the Jarque-Bera all the variables residuals follows a normal distribution therefore, the test for correlation among the variables can be conducted.

CORRELATION TEST

The correlation matrix is used to test the linear relationships among the explanatory variables. It is also important in determining the strength of explanatory variables in explaining the dependent variable. Further, it helps in identifying which variables to include and those to drop from the model. The correlation matrix Table 2 below presents the outcome of the correlation tests.

Table 2: Correlation Matrix

	LNGDPCP	LNGVEXP	LNINFL	LNINVT	LNUNEMP
LNGDPCP	1.000000				
LNGVEXP	0.285121	1.000000			
LNINFL	-0.639670	-0.758688	1.000000		
LNINVT	0.657927	0.478995	-0.603721	1.000000	
LNUNEMP	0.141049	0.420936	-0.366465	0.368382	1.000000

In this study there is weak multicollinearity among variables as reflected by the coefficients of the value less than 0.8. The correlation test shows a positive relationship between GDP, government expenditure, investment and unemployment. More so it shows a negative relationship between GDP and inflation. Since there was no evidence of multicollinearity the study proceeds to test for stationarity.

STATIONARITY TEST RESULTS

The stationarity or unit root tests of the data used in this study were conducted using Augmented Dickey-Fuller test and the results are shown below.

Table 3: Augmented Dickey Fuller (ADF) Test Results after First Differencing.

Variable	t-ADF Statistic	Critical 1%	Critical 5%	Critical 10%	Conclusion
LNGDPCP	-5.654413	-4.3082*	-3.5731	-3.2203	1(1)
LNGVEXP	-3.435080	-4.3082	-3.5731	-3.2203**	1(1)
LNINFL	-5.009628	-4.3082*	-3.5731	-3.2203	1(1)
LNINVT	-3.294597	-4.3082	-3.5731	-3.2203**	1(1)
LNUNEMP	-4.576984	-4.3226*	-3.5796	-3.2239	1(2)

*, ** indicate significance at 1% and 10% respectively

The results from the ADF test after first differencing shows that only LNGDPCP, LNGVEXP, LNINFL and LNINVT became stationary. LNUNEMP became stationary after the second differencing at 1% significance level. Before testing for cointegration and analyzing the long run model results, statistical properties of the model were assessed. Diagnostic tests were carried out to test for serial correlation, heteroscedasticity, normality and specification. The results are presented in Table 4 on next page;

As shown in table 4, the diagnostic tests carried out show that the model is reasonably well specified and that residuals are homoscedastic and serially uncorrelated. The regression specification test (RESET) has a P value of 0.41 which shows that the model is correctly specified. The model passed the autoregressive test which suggests that there is no serial autocorrelation, the ARCH LM test gave a P value of 0.63 therefore the assumption of Homoscedasticity in the residuals is not rejected. This shows that there are no lagged forecast variances in the conditional variance equation. In other words, the errors are conditionally normally distributed, and can be used for inference. Overall, the model could be considered to be reasonably specified based on its statistical significance and fitness.

DIAGNOSTICS TESTS

Table 4: Diagnostics Summary

	F Statistics	Probability
Specification Error: Ramsey reset test	1.035990	0.410066
Serial Correlation: Breusch-Godfrey Serial Correlation LM test	0.607334	0.552644
AR Conditional Heteroscedasticity: ARCH LM Test	0.462858	0.634385
Normality: Jarque- Bera	5.228383	0.073227

LONG RUN MODEL RESULTS

Using the aggregate data for regression, the results of the estimated long run equation are reported in Table 5 below.

TABLE 5: OLS RESULTS

Dependent Variable: LNGDPCP

Variable	Coefficient	Std. Error	T –Statistics	Prob
LNGVEXP	*-0.712186*	*0.284762*	*-2.500983*	*0.0188*
LNINFL	*-0.033930*	*0.008920*	*-3.803963*	*0.0007*
LNINVT	*0.625308*	*0.197616*	*3.164255*	*0.0038*
LNUNEMP	*-0.525323*	*0.611697*	*-0.858796*	*0.3980*
C	*0.091815*	*0.060249*	*1.523912*	*0.1392*

R-squared 0.638492
Adjusted R-squared 0.584935
F-statistic 11.92178 Probability (F-Statistic) 0.000010
Durbin-Watson stat 1.602625

Table 5 shows the estimated results showing the coefficient values of the explanatory variables as well as indicating through the probability value whether each respective variable is significant. Following on the results the estimated model would be as follows,

〖LNGDPCP〗_t = 0.09 - 0.71〖LNGVEXP〗_t- 0.03〖LNINFL〗_t + 0.63〖LNINVT〗_t- 0.53〖LNUNEMP〗_t

[0.060249] [0.284762] [0.008920] [0.197616] [0.611697]
1.523912 -2.500983 -3.803963 3.164255 -0.858796

According to the estimated model above, there is long run relationship between gross domestic product and the explanatory variables as depicted by significant parameters of the equation. The value of the adjusted R-squared is 0.58 meaning that about 58% variation in gross domestic product is explained by the variation in the independent variables. The fitness of the model is tested by the F-statistic (11.92178) which is well above the probability value

(0.000010), meaning the model is significant. The DW of 1.6 means that there is no serial correlation in the variables and also residual is significant.

Whilst some of the signs of the parameters dove-tailed to expectations according to literature reviews, government expenditure showed otherwise. The parameter shows a negative relationship between economic growth and government expenditure. This is because the government expenditure in Zimbabwe is more of recurrent than capital expenditure. For example in the Zimbabwe National Budget of 2015, 92% of national budget goes to salaries for civil servants.

The OLS results shows that unemployment have a significant impact on economic growth as shown by the parameter -0.53. This entails that a unit increase in unemployment will result in a decrease of 0.53 on economic growth in Zimbabwe. Thus, high unemployment shows that companies are closing shop or incapacitated to absorb job seekers. Henceforth, the skilled manpower end up lying idle despite the human capital investment which could have contributed positively to the economy through improved national output. The next stage involves testing for the existence of cointegrating relationships among the variables.

COINTEGRATION TEST RESULTS

The results using the Johansen procedure are presented in the table 6 below.

Table 6: Johansen Technique Results (Likelihood Ratio Statistic)

Hypothesized No. of CE(s)	Eigenvalue	Likelihood Ratio	5 %Critical Value	1 % Critical Value
None **	0.740396	103.6391	87.31	96.58
At most 1*	0.647697	63.18121	62.99	70.05
At most 2	0.400276	31.88327	42.44	48.45
At most 3	0.323299	16.54468	25.32	30.45
At most 4	0.148678	4.828929	12.25	16.26

L.R. test indicates 2 cointegrating equation(s) at 5% significance level
*(**) denotes rejection of the hypothesis at the 5 %(1%) significance level

Using LR, the hypothesis of no cointegration is rejected suggesting that there exist a long run relationship amongst gross domestic product and its determinants. This is because the statistical values of these tests were greater than their critical values. When the cointegration is present, it means GDPCP, GVEXP, INFL, INVT and UNEMP share a common trend and long run equilibrium as suggested. However, the null hypothesis of no co-integration could not be rejected by the likelihood statistics for CEs at most 2 up to 4 because their statistical values were less than their critical values.

THE ERROR CORRECTION MODEL

The error correction model relates the short run changes in the dependent variable (gross domestic product) to the short run changes to the explanatory variables linking these with the changes to the long run effect through the feedback mechanism (Gujarati, 2004). Error correction model also measures the speed of adjustment at which the dependent variable adjust to changes in the explanatory variables before converging to equilibrium. The results of the error correction model estimation are shown in Table 7 below

Table 7: Error Correction Model Results
Dependent Variable: D (LNGDPCP)

Variable	Coefficient	Std. Error	t- Statistics
DLNGVEXP	-0.605107	0.40867	-1.48069
DLNINFL	-0.037065	0.01185	-3.12768
DLNINVT	0.489535	0.37329	1.31140
DLNUNEMP	-1.070135	1.07595	-0.99459
EC	-0.524237	0.32381	-1.61896
C	0.120336	0.09871	1.21912

R-squared 0.595827
Adjusted R-squared 0.467226
F-statistic 4.633162 (0.000000)
Log likelihood 45.31176
D denotes the first difference operator

The table above shows that the exogenous variables are still significant to the model as indicated by the magnitude of their parameters follows and the expected signs which still conform to the earlier OLS results. The coefficient of the error correction term (EC) in the model is negatively signed and highly significant which is a feature for model stability. The speed of adjustment back to equilibrium annually is -0.52 which implies a very rapid adjustment and suggests the convergence to equilibrium aftershocks. The estimated coefficient value of 0.52 for the error correction term suggests that the system corrects its previous period's disequilibrium from long run volatility by 52% a year. Explicitly, the coefficient of the error correction term shows the speed of adjustment at which gross domestic product adjust to changes in the independent variables. The significance of the error correction term confirms the earlier conclusion that a long run relationship exist between gross domestic product and its explanatory variables. It should noted from the results is that unemployment has the higher impact in the short run than in the long run.

CONCLUSION AND POLICY RECOMMENDATIONS

With reference to the above findings, the high level of formal unemployment has proved to be a cause of concern to the government due to its negative impact to national output. Henceforth the government must come up with policies that curtail the escalating unemployment in the economy.

The first stage in attempting to reduce unemployment is to identify the cause of the unemployment, as this will ultimately influence the policy tool that you use to cure the unemployment. For example if unemployment is demand deficient then this would require government to increase aggregate demand. Equally if it is due to real-wage effects, then policies are needed to allow wages to be more flexible. If the unemployment is voluntary, then policies are needed to reduce the gap between the labor force and the supply of labor. In reality in the long term, effective policies are required for both the demand and the supply side of the economy so that enough new jobs are created and that people possess the skills and incentives to take those jobs.

In Zimbabwe case of unemployment is could be due to demand deficient driven. The government should implement policies that boost demand for labor in the market. For

example, the government implements policies that reduce import duties on capital and raw materials. This will facilitate recapitalization process and also lower cost of productions, thus promoting companies to recruit more labor. Another way of boosting productivity is to introduce productivity based salaries. If industry productivity is increased significantly more labour will be hired. The government of Zimbabwe should restore investor confidence by guaranteeing property rights of investors. Indigenous laws should also be harmonized so that there are not in conflict with the country's constitution. Harmonizing laws will promote foreign direct investment and the government can also go into joint venture irrigation agriculture with multinational companies to boost agricultural output. If agricultural, mining and manufacturing sectors are full capitalized, many people will get employment and thus boosting economic growth of Zimbabwean economy.

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