
Population Growth and Unemployment in Zanzibar

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Abstract

The study aims to determine the effect of population growth and unemployment status in Zanzibar from 1990 to 2020. Descriptive analysis was used to investigate the normality of variables used and VECM estimation was used to estimate the results. In long run, the findings from this study revealed that, population growth contribute positively to increase the unemployment problem by 5.2 percent, however, the GDP per capita and inflation shown to reduce unemployment problem by 0.3 and 0.7 percent respectively. For the case of short run, population growth, Inflation and GDP per capita found to have positive contribution to increase the unemployment problem in Zanzibar by 0.55, 0.01, and 0.22 percent respectively. The findings also confirm the presence of unidirectional Granger causality from population growth to unemployment. Therefore, the study concludes that, population growth is among the factor that increase the unemployment rate in Zanzibar. Based on the study results, it is recommended that, Government should emphasize family planning and human capital investment, since it leads to generate the healthier and skilled labors who can compete in labour market and easily employed.

Keywords: Population growth; Unemployment and VECM.

1. Introduction

Unemployment and population growth are two solid indicators to a country's development and growth. According to the World Population Prospects data show that Zanzibar is growing at a very fast rate where by at the end of 2020 the country's population is estimated to be at 1,671,598 from 1,314,500 in 2012 the population of Zanzibar has increased with the annual percentage change of 3 percent.

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It was noted in [1] the unemployment rate in Zanzibar has declined from 16.5 percent in 2006 to 14.3 percent in 2014. This rate still is high when compared to Global expected rate of unemployment that is 5.4 percent in 2019 [2]. A higher unemployment rate reflects that people are not earning according to their desire and ability. In that aspect unemployment is not a healthy sign for a country from social and economic point of view. The [3] shows one of the major courses that poses serious problem in Zanzibar is that of unemployment especially among youth. Arthur Okun’s law of 1960’s explained that, if country grow well its economy lead to reduce the rate of unemployment and [4] results show that economic growth lead to increase the population growth. For that case, Zanzibar expected to reduce its unemployment rate to be achieved 4 percent in 2020 as targeted in MKUZA III since the overall economy achieved 7 percent annual growth rate in 2019 and population grow at a rate 3 percent annual but unemployment rate of 12 percent in 2019 is still higher for the nature of Zanzibar as shown in Figure 1. Therefore, this is necessary to address the effect of population growth on unemployment in Zanzibar. Specifically the study tends to examine if there is any causal linkage between population growth and unemployment in Zanzibar from 1990 to 2020.

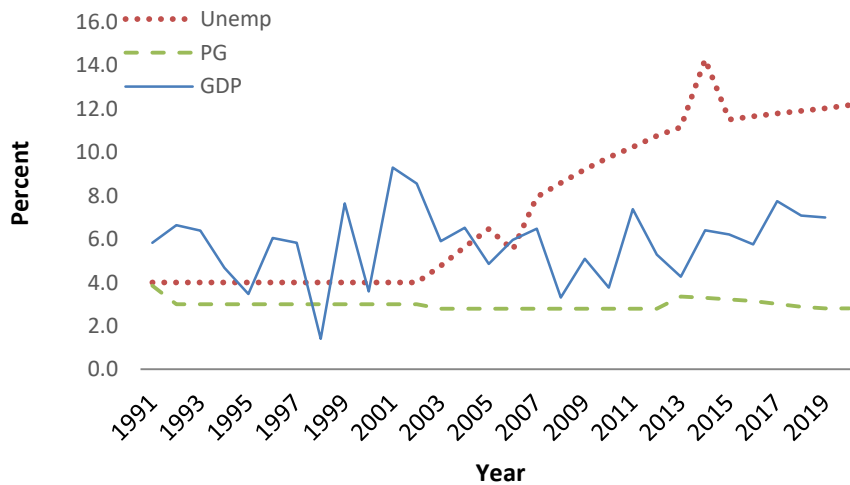


Figure 1: Unemployment rate and Population Growth in Zanzibar from 1990-2020

Source: Office of Chief Government Statistician Data, 2021

Therefore, the main objectives of this study can be achieved by testing two null hypotheses that there is no effects of population growth on unemployment in Zanzibar; and there is no causal linkage between population growth and unemployment in Zanzibar. The study will contribute the valuable awareness for the community to understand the impact of population in order to develop a positive attitude towards family planning to minimize the unemployment levels. The paper is presented as follows: Section 2 provides the details of theoretical and empirical literature reviews, section 3 describes the methodological part of the study. Section 4 will present findings and discussion, and finally in section 5 the authors present the conclusion and recommendation with respects to study findings.

2. Theoretical and Empirical Reviews

The study significantly will increase the stock of knowledge on the effect of population growth on unemployment for developing countries. According to Malthusian theory of population (1798), the creation of sustainable livelihoods is an important factor in understanding growth of population especially in developing nations and particularly among the disadvantaged populations. Sustaining progress calls for an explicit consideration of future generations, thus Malthus, views increasing population as a danger leading to a disaster. On the other hand, the Keynesian Theory of unemployment (1930) broadly examines and explains the strong correlation between the population growth rate and unemployment. The theory states, for the society, population growth rate is major root-cause of raising unemployment levels, therefore, country should have a strong economy and proper and effective policies to reduce high population growth rates. Reference [5] in their study show that among the determining factors for rising unemployment in OECD are high and continuous unemployment benefits, high tax wedges, and stringent anti-competitive product market regulations are found to increase aggregate unemployment. Another study by [6] states that the major factor behind the youth unemployment problem in developing countries especially in Ethiopia are the rapidly growing size of the labour force, poor to modest macroeconomic performance, low level of job creation and low level of aggregate demand in the economy. Reference [7] study the characteristics and determinants of youth unemployment, underemployment and inadequate employment in Ethiopia, conclude that the youth is substantially affected by unemployment and significant differences exist within the youth group across location (urban-rural), gender and education. Reference [8] examined the role of inflation and unemployment on economic growth in Iran for the period of 1996 to 2012 by using Autoregressive Distributed Lag (ARDL) Model and the results showed the significant and negative effect of inflation and unemployment on economic growth in long - run, which indicated that inflation and unemployment decreased economic growth in long-run. Reference [9] at the study on impact of population growth on unemployment in Nigeria, it is hypothesized that population growth has a strong impact on unemployment in Nigeria. It is assumed that a positive relationship exists between population growth and unemployment. Reference [10] revealed that since 1970, the rate of unemployment in Nigeria and population has been on the increase amidst declining gross domestic product. The result also reveals that unemployment and population growth contribute com-measurably to gross domestic product. Furthermore, Reference [11] when they examine the impact of population growth on unemployment in Nigeria. The main results disclosed that population and exchange rate impacted positively with unemployment. Whereas consumer price index, GDP per capita and foreign direct investment impacted negatively thereby reducing the rate of unemployment in the long-run. However, it is observed that there has no study which purely concentrate on population with relation to employment and/ or unemployment in Zanzibar. Therefore, this study aimed to study in depth on impact of population growth and unemployment in Zanzibar.

3. Methodology

Different studies determined the impact of population growth on unemployment by using different variables. This study has used some of variables that look similar used by [12,13,14] in Nigeria, Ghana, India and Thailand.

3.1. Model Specification

To estimate the effect of population growth on unemployment in Zanzibar, the simple production function of Cobb-Douglas was applied and expressed as: -

$$Y_t = A_t L_t^{\beta_1} K_t^{\beta_2} \quad (1)$$

One important feature of this model is, it can be used and reformulated in slightly different ways using different productivity assumptions, or different measurement metrics. Therefore, the study borrows the framework and reformulating it into a model using some other variables. Thus, Y_t which is the total output is replaced with Unemployment ($Unemp_t$); K_t which is the produced capital is replaced with Gross domestic product per capital ($GDPpc_t$); L_t which is labour is replaced with Population Growth (PG_t) and A_t is that is used as Inflation (Inf_t). Econometrically the model shown as:

$$Unemp_t = A_t PG_t^{\beta_1} GDPpc_t^{\beta_2} \quad (2)$$

The logarithm was applied in the above equation and resulted to the following:

$$\log Unemp_t = \log A_t + \beta_1 \log PG_t + \beta_2 \log GDPpc_t \quad (3)$$

While the study assumed Inflation is among the factors that affect the unemployment, therefore, for this case the $\log A_t$ is represent the inflation and assumed to have a linear relationship with unemployment.

$$\log A_t = \log \beta_0 + \beta_3 \log Inf_t + \varepsilon_t \quad (4)$$

By replacing $\log A_t$ in the equation 3 the general model will be as:

$$\log Unemp_t = \log \beta_0 + \beta_1 \log PG_t + \beta_2 \log GDPpc_t + \beta_3 \log Inf_t + \varepsilon_t \quad (5)$$

Where by $\beta_0, \beta_1, \beta_2$ and β_3 are positive parameters which are greater than zero, $t = 1, 2, \dots$ is the time index for the time from 1990 to 2020 yearly basis and ε_t is the error term.

3.2. Variables Description

All key variables used in this study were based on the past studies that were done by different scholars are obtained from Zanzibar Statistical Abstracts. Each of the variables was found to be significant in examining the effect of population growth and unemployment status of any country. Table 1 show the summary of all variables used in this study, their measures and expected sign.

Table 1: Summary for Variables, Measure and their Expected sign

Variable	Measure	Expected sign
Unemployment	Unemployment rate	Positive
Population Growth	Percentage growth of population	Positive
Income per Capita	GDP per capita	Positive
Inflation	General annual inflation rate	Positive

Source: Constructed by Authors (2021)

3.3. Data Analysis Techniques

The data processed and analyzed quantitatively. In general, aggregate analysis and measures of dispersion are highly used to check whether the data series follow the normal distribution or not. The unit root test will be done to ensure the variables were stationary to avoid uncorrelated results. The famous test used is Augmented Dickey Fuller (ADF) test as given in [15]. ADF test will be suitable for the model that include the term dependent variables as independent variables. ADF test always assumes of rejecting the null hypothesis of a unit root. The co-integration between variables will be tested, since it this test was similar to testing the linear regression residuals for stationarity. Following the study of [16], if one series co-integrates this means that error in the regression model is stationary although the dependent and independents variables are non stationary it is concluded the existence of long run relationship. Finally, model can be estimated by using Vector Error Correction Mechanism (VECM) which allow for the separation out of long run and short run impacts of population growth and unemployment. Since the VECM is the first difference of VAR, the maximum lag length should be reduced by one at the estimation process. VECM also allow the Error Correction Term (ECT) while the coefficient term of ECT_{t-i} concludes the long run causality in the model and show the speed of adjustment of the variables used to return to the equilibrium position. While the F-test of the coefficients of the first difference independent variables shows short run causality. The causality can be derived through the Wald test of the joint significance of the lags of the independent variables.

$$\Delta Unemp_t = \eta_1 \sum_{i=1}^{k-1} w_{1,i} \Delta Unemp_{t-i} + \sum_{i=1}^{k-1} \varphi_{1,i} \Delta PG_{t-i} + \sum_{i=1}^{k-1} \delta_{1,i} \Delta GDPpc_{t-i} + \sum_{i=1}^{k-1} \gamma_{1,i} \Delta Inf_{t-i} + \mu_1 ECT_{t-i} + \varepsilon_t \dots \dots \dots (8)$$

$$\Delta PG_t = \eta_2 \sum_{i=1}^{k-1} w_{2,i} \Delta Unemp_{t-i} + \sum_{i=1}^{k-1} \varphi_{2,i} \Delta PG_{t-i} + \sum_{i=1}^{k-1} \delta_{2,i} \Delta GDPpc_{t-i} + \sum_{i=1}^{k-1} \gamma_{2,i} \Delta Inf_{t-i} + \mu_2 ECT_{t-i} + \varepsilon_t \dots \dots \dots (9)$$

$$\Delta GDPpc_t = \eta_3 \sum_{i=1}^{k-1} w_{3,i} \Delta Unemp_{t-i} + \sum_{i=1}^{k-1} \varphi_{3,i} \Delta PG_{t-i} + \sum_{i=1}^{k-1} \delta_{3,i} \Delta GDPpc_{t-i} + \sum_{i=1}^{k-1} \gamma_{3,i} \Delta Inf_{t-i} + \mu_3 ECT_{t-i} + \varepsilon_t \dots \dots \dots (10)$$

$$\Delta Inf_t = \eta_4 \sum_{i=1}^{k-1} w_{4,i} \Delta Unemp_{t-i} + \sum_{i=1}^{k-1} \varphi_{4,i} \Delta PG_{t-i} + \sum_{i=1}^{k-1} \delta_{4,i} \Delta GDPpc_{t-i} + \sum_{i=1}^{k-1} \gamma_{4,i} \Delta Inf_{t-i} + \mu_4 ECT_{t-i} + \varepsilon_t \dots \dots \dots (11)$$

4. Findings and Discussions

4.1. Descriptive Statistics

Table 2: Descriptive Statistics of the Key Variables

Descriptive	UNEMP	PG	GDPPC	INF
Mean	0.07	0.03	843118.20	9.05
Median	0.06	0.03	835673.30	8.88
Maximum	0.14	0.04	2549000.00	29.40
Minimum	0.04	0.03	55375.39	0.70
Std. Dev.	0.04	0.00	772140.00	8.11
Skewness	0.16	0.03	0.28	0.07
Kurtosis	2.65	2.83	2.52	2.80
Jarque-Bera	3.57	35.40	4.36	3.52
Probability	0.17	0.06	0.11	0.17
Observations	31	31	31	31

Considering the descriptive results shown in Table 2, the standard deviation of each variable found to be low when compared to its mean, this indicates a small coefficient of variation of the variables. Furthermore, the of skewness of each variable used seen to be close to zero and kurtosis close to 3 which indicate the presence of normal distribution. All the variables were found to be normally distributed since the p-value for Jarque Bera test were greater than 0.05 (P > 0.05). Therefore, the study has been confirmed the normality of distribution and the implication of this is data are ready for analysis.

4.2. Multicollinearity Test

According to [17] say that, if the pairwise correlation coefficient between the two regressor is more than 0.8, then multicollinearity is a serious problem. Table 3 shows there is a negative linear association between population growth and unemployment rate. This reflects the negative correlation between population growth and unemployment in Zanzibar. In the case of control variables that used in this study, GDPpc found to have strong positive association with unemployment while inflation has weak negative correlation.

Table 3: Multicollinearity Result

Variable	Unemp	PG	GDPpc	INF
Unemp	1			
PG	-0.65	1		
GDPpc	0.72	-0.70	1	
Inf	-0.45	0.30	-0.54	1

4.3. Selection of Maximum Lag length for the Model

To ensure the model used is stable, the appropriate maximum lag length for the model used was selected by choosing the lowest information criterion value. Therefore, considering the result in Table 4, the study selected 2 maximum lag length under the Akaike Information Criterion that found to have the smallest criterion value at 5% level of confidence.

Table 4: Criteria of Maximum Lag Length

Model	Lag	Akaike Information Criterion	Schwarz Information Criterion
<i>logUnemp_t</i>	1	7.790797	8.733760
	2	7.757202*	9.470036

Note: * Indicates Maximum Lag Length

4.4. Serial Correlation Test

The serial correlation was test by using the Ljung-Box Q statistic. This was done since it is suitable to check the serial correlation problem of the model. Table 5 show the p-value of Q-statistic in various lags be greater than 0.05 which implies the model is statistically significant. Hence, the study failed to reject the null hypothesis that is no existence of the serial correlation problem in the models and confirm the model used is correct.

Table 5: Serial Correlation Results

Lags	Auto Correlation	Partial Auto Correlation	Q-Stat	Prob*
1	-0.020	-0.020	0.0122	0.912
2	-0.222	-0.223	1.6568	0.437
3	-0.286	-0.311	4.4833	0.214
4	0.292	0.242	7.5416	0.110
5	0.001	-0.127	7.5417	0.183
6	-0.069	-0.057	7.7263	0.259
7	-0.032	0.127	7.7672	0.354
8	0.006	-0.158	7.7689	0.456
9	-0.011	0.005	7.7743	0.557
10	-0.128	-0.118	8.5536	0.575

Note: * Indicates the probability values are not valid for this model

4.5. Stationarity Tests

The empirical results of ADF stationarity test show that all series were stationary at first difference at intercept with trend at 1% level of significant except Unemployment is stationary at 5% level of significant which is well corresponded to their p-values of 0.05. Therefore, the study rejects the null hypothesis means that the series are strongly stationary.

Table 6: ADF Stationary Test Results

Variable	At Level		At the First Difference					
	Intercept		Intercept with Trend		Intercept		Intercept with Trend	
	Test	Critical	Test	Critical	Test	Critical	Test	Critical
	Statistics	Value	Statistics	Value	Statistics	Value	Statistics	Value
Unemp	-0.372	-2.964	-5.990	-4.416*	-3.182	-3.405	-4.922	-4.235**
PG	-3.724	-3.670*	-3.429	-3.568	-5.309	-3.679*	-5.487	-4.309*
GDPpc	2.559	-2.964	-1.085	-3.568	-4.231	-3.679*	-4.416	-3.622*
Inf	-1.948	-2.964	-2.288	-3.568	-4.564	-3.689*	-4.339	-3.587*

Note: * and ** Indicates significance at the 1% level and 5% level respectively

4.6. Johansen Co-integration Test

Testing for co-integration implies testing for the existence of such a long-run relationship between economic variables [18]. Since the ADF test results shows that all series were stationary at first difference, the Johansen-Juselius co-integration test was done to test the existence of long run equilibrium relationship between the variables used in the study [19]. At intercept and intercept with trend, the results in Table 7 of the computed trace statistics and their corresponding critical values indicated that the null hypothesis of no co-integration rejected under trace test and maximum Eigen value at 5 percent levels of significance. These imply a long-run relationship is associated between unemployment, population growth, GDPpc and inflation in Zanzibar. Therefore, it is concluded that the series are co-integrated and a long run equilibrium relationship exist.

Table 7: Unrestricted Co-Integration Rank Test

Intercept		Maximum Eigen value							
Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Value	Critical	Prob	Trace Statistic	0.05 Value	Critical	Prob
None *	0.723	57.901	47.856		0.004**	37.200	27.584		0.002**
At most 1	0.358	20.701	29.797		0.377	12.861	21.132		0.465
At most 2	0.217	7.840	15.495		0.483	7.099	14.265		0.478
At most 3	0.025	0.741	3.841		0.389	0.741	3.841		0.389
Intercept and Trend									
None *	0.751	76.195	63.876		0.003**	40.298	32.118		0.004**
At most 1	0.483	35.897	42.915		0.210	19.130	25.823		0.297
At most 2	0.355	16.767	25.872		0.433	12.696	19.387		0.353
At most 3	0.131	4.071	12.518		0.732	4.071	12.518		0.732

Note: ** denote rejection of the null hypothesis (series are non-co-integrated) at 5% level of significant

4.7. Vector Error Correction Model

Since the results in Table 7 show the evidence of the existence of long-run relationship, the study continued to perform the VECM for estimating the effect of population growth over unemployment status in Zanzibar from 1990 to 2020. Therefore, the long run and short run estimation results are presented in Table 8 and 9.

Table 8: Long run Regression Model

Variables	Coefficient	Std. Error	t-statistics
log Unemp_{t-1}	1.00		
log PG_{t-1}	5.231	-1.049	-4.988
log GDPpc_{t-1}	-0.273	-0.072	-3.812
log Inf_{t-1}	-0.685	-0.094	-7.245

All variables used in long run regression model shown to be statistically significant at 5 percent significant level. The population growth shown to have positive significant effect on unemployment status in Zanzibar. The findings indicate when population growth increased by one percent caused the unemployment rate to raise by 5.2 percent which is higher compared to the ILO benchmark. Based on the ILO, unemployment is understandably quite low at a recorded rate of 2.4 percent nationally, because without state-provided unemployment benefit most workers cannot afford to remain idle while looking for work. These results are similar with the results found by [20,11,9,21] who study the impact of population growth on unemployment in Nigeria and realized in long run the population growth has a strong positive impact on unemployment in Nigeria. Since the findings of this study support the Keynesian Theory of unemployment (1930) which states the population growth rate is the major root cause of raising unemployment levels, therefore, the study confirms the positive impact of population growth on unemployment in Zanzibar. Empirically, the results in Table 8 show an increasing one percent in GDPpc lead to decrease unemployment by 0.3 percent. The findings support the results of [22,23,24,25] who realized the economic growth (GDP) have a negative relationship with unemployment. With regards to empirical findings of this study, the negative coefficient of log GDPpc implies the Government allocated fund in high productive areas that generate more employment and resulting the individual income to increase. Such productive areas are providing loans and capital to small scale industries and entrepreneurs who employ more workers; improvement of physical infrastructures including roads, electricity, water and communication that influence more investors to invest in various areas that demanded skilled and unskilled labours. Therefore, this situation could be possibly due to the fact that a high growth rate of Zanzibar economy resulting the generation of employment opportunities from various sectors as well as increasing the value of domestic products. The result in Table 8 indicates one percent rise in Inflation cause to decrease the unemployment by 0.7 percent. This result is holding the theory of [26] who argues the relation of inflation and unemployment rate is inverse, means that, inflation is negatively affecting unemployment. The findings also support the study of [11,27] confirm the strong negative relationship between inflation and unemployment. The negative coefficient of log Inf is probably due to the fact that Inflation increases the cost of production that led to increase the price of goods and services. This situation resulting economic agents to take this opportunity of increasing price to increase production that resulting to hired more labours. The findings of this study, provide an insight to the policy maker in making strong strategies in making sure the economy of Zanzibar is growing up well so as to reduce the unemployment rate in Zanzibar.

Table 9: Short Run Regression Model

Variables	Coefficient	Std. Error	t-statistics
log Unemp_t	1.00		
β₀	0.024	-0.009	2.489
ECT_{t-1}	0.012	-0.003	3.353
Dlog Unemp_{t-1}	-0.220	-0.111	-1.981
Dlog PG_{t-1}	0.546	0.217	2.516
Dlog GDPpc_{t-1}	0.221	-0.083	2.655
Dlog Inf_{t-1}	0.012	-0.003	4.380

The short run regression model indicates the coefficient of ECT for population growth on unemployment is 0.012. It implies that if everything else is kept constant, the model identified the sizable speed of adjustment by 1.2% of disequilibrium correction yearly for population growth reaching long run equilibrium steady state position. The result also indicates increasing one percent value of population growth associated with the increase of 0.55 percent value unemployment. This positive relation is similar as in long run. In the case of coefficients of GDPpc and Inflation, have signs which are incompatible with the theoretical argument as presented in section 2. When everything else is kept constant, increasing in GDPpc resulting to increase the rate of unemployment by 0.22 percent. While increasing in inflation cause the unemployment to increase by 0.01 percent. The result found the coefficient of constant term is 0.024 which imply that at zero population growth rates in Zanzibar the unemployment rate remained at 2.4 percent. Following the results in Table 9, the model seen not to be good for the purpose of reducing unemployment in Zanzibar. The Granger Causality results in Table 10 show that at 5 percent significant level, the study confirm the presence of unidirectional causality between population growth and unemployment in Zanzibar. This implies that, presence of unemployment does not influence the growth of population in Zanzibar while the vice versa is true.

Table 10: Pairwise Granger Causality Tests

Null Hypothesis	Obs	F-Statistic	Prob.
LPG does not Granger Cause LUnemp	29	3.963	0.03
LUnemp does not Granger Cause LPG		0.313	0.73
LGDPpc does not Granger Cause LUnemp	29	1.804	0.19
LUnemp does not Granger Cause LGDPpc		2.801	0.08
LInf does not Granger Cause LUnemp	29	0.032	0.97
LUnemp does not Granger Cause LInf		0.312	0.73
LGDPpc does not Granger Cause LPG	29	2.256	0.13
LPG does not Granger Cause LGDPpc		1.032	0.37
LInf does not Granger Cause LPG	29	0.334	0.72
LPG does not Granger Cause LInf		0.061	0.94
LInf does not Granger Cause LGDPpc	29	2.710	0.09
LGDPpc does not Granger Cause LInf		0.615	0.55

5. Conclusions and Recommendations

The study was carried out to examine the effects of population growth on unemployment in Zanzibar. It was found that population growth leads to increase the unemployment. The results are robust and strongly significant at the 5 percent level. With regards to the effect of per capita economic growth and inflation, the results also indicate GDPpc and Inflation have significant negative effect on unemployment. This means that, the higher economic growth or inflation in long run leads the reduction of unemployment gap in Zanzibar. However, in short run all variables used in the study shown to have positive significant effect on unemployment in Zanzibar. Despite the reliable sources of data for Zanzibar do not have much time series data relating to macroeconomics indicators, the study still concludes that, population growth has a significant impact on the unemployment rate in Zanzibar. Based on findings, the study then recommends that Government should introduce and strictly implement the population policy as well as promotes the tourism and agricultural sector since these sectors believed to generate high employment opportunities as well as foreign currencies. Further studies are suggested to look on the dynamic interaction between economic growth, unemployment, income distribution and population growth.

Bibliography

- [1]. Office of Chief Government Statistician Zanzibar (OCGS), 2015. 2014 Integrated Labour Force Survey Report
- [2]. ILO (2020). World Employment and Social Outlook: Trends 2020 International Labour Office Geneva
- [3]. Office of the Chief Government Statistician. (2021). HBS (2019/2020). Main Report.
- [4]. Davoud, M., Kondelaji, H. and Jafari, S. (2020).The Causality Relationship between Population Growth, Economic Growth and Capital Stock in OIC Countries and Its Policy Aspects. *International Journal of Economics and Politics* 1(2): 117-132
- [5]. Bassanini, A. and R. Duval (2006a). “The Determinants of Unemployment Across OECD Countries: Reassessing the Role of Policies and Institutions”, *OECD Economic Studies*, 42, 7-86.
- [6]. Haile, G. A. (2003). The incidence of youth unemployment in urban Ethiopia. Paper Presented at the 2nd EAF International Symposium on Contemporary Development Issues in Ethiopia, Addis Ababa, Ethiopia
- [7]. Abebe, O. A. (2012). Effect of Population on Economic Development in Nigeria: A Quantitative Assessment, *International Journal of Physical and Social Sciences*.
- [8]. Mohsenia, M. and Jouzaryan, F. (2016). Examining the Effects of Inflation and Unemployment on Economic Growth in Iran. *Procedia Economics and Finance*, Vol. 36, pp. 381-389.
- [9]. Gideon, E. H. (2017). Population Growth in Nigeria, Economic Development, Yola, Adamawa State of Nigeria.
- [10]. Orumie and Ukamaka (2016). The Effect of Unemployment Rate and Population Growth Rate on Gross Domestic Product in Nigeria.

- [11]. Maijamaa, Musa and Bauchi (2017), Impact of Population Growth on Unemployment Population Growth on Unemployment in Nigeria: Dynamic OLS Approach. *Journal of Economics and Sustainable Development*, Vol.10, No.22
- [12]. Emmanuel Y. Anudjo (2015) The Population growth - Economic growth nexus: New evidence from Ghana.
- [13]. Musa A. Mahmud (2015). "Econometric Model on Population Growth and Economic.
- [14]. Fumitaka, F. (2009). "Population Growth and Economic Development: New Empirical Evidence from Thailand", *Economics Bulletin*.
- [15]. Dickey, D. & Fuller, W. (1988). Likelihood ratio statistics for autoregressive time series with a unit. *Econometrica*. 49(4): 1057-1072.
- [16]. Johansen, S. & Juselius, K. (1990). Maximum likelihood estimation and inference on co-integration with applications to the demand for money. *Oxf Bull Econ Stat*. 52:159-210
- [17]. Gujarati, D. N. (2013). *Basic Econometrics*, 5th edition, New York: McGraw Hill
- [18]. Ssekuma, R. (2011) *A study of Co-integration Models with Applications*, University of South Africa, South Africa.
- [19]. Datta, K. and Kumar, C. (2011) 'Relationship between Inflation and Economic Growth in Malaysia'. *International Conference on Economics and Finance Research IPEDR* Vol. 4, No. 2, pp. 415-16.
- [20]. Afolabi, B., & Awopetu, O. B. (2020). Population Growth and Unemployment in Nigeria. *Journal of Economics and Sustainable Development*, Vol.11, No.2
- [21]. Ikechukwu (2006). Concludes the study on Relationship between population growth and unemployment in Nigeria.
- [22]. Malley J. and Molana H. (2001) "The Relationship between Output and Unemployment with Efficiency Wages" Department of Economics, University of Dundee, Dundee DD1 4HN, UK
- [23]. Fanati, L. & Manfredi, P. (2003). Population, Unemployment and Economic Growth Cycles: A Further Explanatory Perspective, *Metroeconomica*, *International Review of Economics*, Vol. 54, Issue2-3, Pp 179-207.
- [24]. Noor, Z., Nor N. and Ghani J. (2007) "The Relationship between Output and Unemployment in Malaysia", Does Okun's Law exist? *International Journal of Economics and Management* 1(3): 337 – 344
- [25]. Kalim, R. (2003). Population and Unemployment: A Dilemma to Resolve, *IUP Journal of Applied Economics*, Vol. 0(3), Pp. 7-15
- [26]. Phillips, A.W. (1958). The relationship between unemployment and the rate of change of money wage rates in the United Kingdom, 1861-1957. *Economica* 25, 258-299.
- [27]. Adamu, M. (2011). *Inflation and Unemployment in a Developing Economy: A Case of Nigeria*, Bayero University Kano.