

**EXPLORING THE INFLUENCE OF THE MACROECONOMIC
DETERMINANTS OF UNEMPLOYMENT IN THE EAST AFRICAN
COMMUNITY**

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DECLARATION

This research paper is my original work and has not been presented for a degree award in any other University

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DEDICATION

To my Mum, Mary Anyiga

To my wife, Caren Chemutai

To my Children: Sterling and Dorcas

You all inspire me.

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I acknowledge the Almighty God for giving me clarity of thought to undertake this study.

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LIST OF ABBREVIATIONS

CPI	Consumer Price Index
EAC	East Africa Community
ECOWAS	Economic Community of West Africa States
EU	European Union
FDI	Foreign Direct Investment
FE	Fixed Effects
FMOLS	Fully Modified Ordinary Least Squares
FRB	Federal Reserve Board
GDP	Gross Domestic Product
GET	Global Employment Trends
ILO	International Labour Organization
NAIRU	Non Accelerating Inflation Rate of Unemployment
OECD	Organization for Economic Co-Operation and Development
RE	Random Effects
SSA	Sub Saharan Africa
WDI	World Development Indicator
WESO	World Employment and Social Outlook

ABSTRACT

Unemployment as a macroeconomic indicator provides valuable insights into the economic health and general macroeconomic performance of an economy. This study is based on the Okun's law and Philips curve theoretical frameworks to provide a regional perspective of the relationship between macroeconomic variables and unemployment in the East Africa Community (EAC). In analysing the relationship, the Hausman test is employed and it favours the use of the Random Effects model. The panel data estimation techniques are used on annual aggregate EAC data over the period 2000 to 2018. The results show that Foreign Direct Investment (FDI), population and labour productivity are the significant macroeconomic variables that can be used to analyse unemployment in EAC. Population and labour productivity are found to have a positive relationship while FDI has a negative relationship with unemployment. This study, therefore, advocates for favourable macroeconomic environment that is conducive for employment creation in the EAC region.

1.0 CHAPTER ONE: INTRODUCTION

1.1 Introduction

Unemployment is the most pressing challenge that is facing policymakers of both developing and developed countries, today. It has been observed that unemployment narrows the economic prospects and welfare of the unemployed; increases crime rates, erodes human capital and perpetuates misery and social instability (Kyei & Gyekye, 2011). While it remains a matter of great concern, Eita and Ashipala (2010) have attributed unemployment to a range of aspects, among others, alcoholism, domestic tussles and other social evils that accentuate hopelessness, an argument that has been sustained by Bakare (2011).

According to Kühn (2019) the global unemployment rate maintained a steady rate of about 5.5 per cent between 2000 and 2011. During the 11 years, the number of unemployed persons increased from 152.1 million to 171.9 million, an equivalent of 11.5 per cent. By the end of 2011, the global disparity of 26.9 million of the unemployed between male and female had manifested with the number of an unemployed male standing at 99.4 million and female at 72.5 million. The ILO statistics reveal that in 2015, the estimates spiked to reach a total of 197 million unemployed persons, globally. The number of unemployed males increased by 13.8 per cent to reach 112.9 million and that of female increased by 16 per cent to reach 84.1 million. Regional unemployment projections are more worrying mainly in the East African Community (EAC) with 1.4 million youths locked out of meaningful employment and total unemployment projected to expand by one million, annually, a trend that is attributable to the expanding labour force (Kuhn, 2018).

These statistics are important to policymakers because employment is a major labour market outcome and a measure of the economic health of a nation. They explain the distribution of income and poverty across different groups and provide valuable insights into the overall macroeconomic performance of an economy (ILO, 2011). Various studies have demonstrated that a country's GDP is a crucial macroeconomic indicator of unemployment (Ericksson, 1997; Sodipe & Ogunrinola, 2011). Strong GDP growth is assumed to lead to high employment considering the major factors of production are labour and capital. Other important macroeconomic determinants of

employment include; inflation, Foreign Direct Investment (FDI) and labour productivity (Folawewo & Adeboje, 2017; Leeuw *et al.*, 2008).

Given the foreseeable challenges, the EAC purposed to harmonize its fiscal and monetary policies to enable stabilization of the region's business cycles, reduce unemployment and lower inflation. A monetary union formed in 2013 under the region's auspices seeks to promote and maintain monetary and financial stability to facilitate integration, robust growth and development (EAC, 2013).

1.1.1 History of the East African Community

Since its formation in 1967 as a regional body and with founding member-countries of Kenya, Tanzania and Uganda, the EAC has endured turbulence, despite progress. Notably, the EAC cooperation is older and dates back to 1917 when a range of bodies that sought to ease trade and create wealth and opportunities for the people were created. Some of these bodies, aimed at fostering information and communication, justice and commerce include the Court of Appeal for Eastern Africa (CAEA), the Customs Union (CU) of 1917, the East African Common Services Organisation (EACSO), the East African Community (EAC), the East African Co-operation (EACO) the East African Currency Board (EACB), the East African High Commission (EAHC) the East African Income Tax Board (EAIT), the Joint Economic Council (JEC) and the Postal Union (PU). The hallmark of their formation was to steer meaningful regional development agenda of the time (Ogola *et.*, al,2015). Back in the 1950s, the East African Airways (EAA) was established and operated across Africa and beyond. In education, the region enjoyed a single syllabus and a single examination body. The long-term motive was to achieve and sustain macroeconomic stability through the creation of wealth and opportunities by leveraging on the expanding labour force.

However, in 1977 the EAC collapsed due to non-commitment among the partner states. The states could not reach consensus on between socialism and capitalism, with members pulling apart on the economic pathway that they deemed appropriate for their countries. This disagreement saw the hitherto solid cooperation grow tepid and it was until 1999 that the old (EAC) cooperation was revived and a treaty signed in 2000. The revival saw the inclusion of Burundi and Rwanda in 2007 and South Sudan 2016. The EAC region covers an area of approximately 1.8 million square kilometres, which span

between latitude 1.9577° North and longitude 37.2972° East. Combined, the region has, roughly, 138 million people. It is estimated that the annual average population growth rate is 3 per cent, a pointer to an expanded market base (ILO,2017). According to the World Bank (2019) statistics, the total male population in EAC is 69,098,000 while the female population is 69,454,000. The youth (15-24 years) population is 27,140,000 and has an annual population growth rate of 2.8 per cent. The people within the community share a common history, culture, language and infrastructure. The shared aspects are important in developing a unique macroeconomic framework(s) to curb unemployment. In 2017, the GDP for the community was US\$168 billion while the GDP per capita was US\$ 1015.7 billion.

The objective of the EAC are not disparate from those of hitherto body formations only with a new sync of energy and purpose to advance trade, information, communication and technology sharing, movement of cargo and people, and the joint revoke to deepen justice, food security and security from adversaries (EAC, 2007). Already, the partner states enjoy a single customs union that was established in 2005 and led to an easier movement of goods within the region; creation of a common market in 2010 that has resulted in easier movement of labour and capital, good and services within the community; and, creation of the monetary union in 2013 that seeks to realize a single currency. Nonetheless, it is envisioned that the region will, soon, establish a political federation.

Despite the external shocks that are at play in the region and beyond the scope of this research, the performance of major macroeconomic indicators has been stable and impressive in the recent past. For instance, between 2000 and 2018, the average GDP growth rate and inflation rate for the community was a fair 6 per cent and 8.2 per cent, in that order. Worryingly, the statistics fall short of the expected improvement in employment in a region that is grabbling with a high unemployment rate.

1.1.2 The Micro and Macro Determinants of Unemployment

The microeconomic and the macroeconomic determinants of unemployment have been explored by a range of studies (e.g. Barnichon & Peiris, 2008; Esu & Atan, 2017; Malinov & Sommers, 1997). Whereas microeconomics concentrates on individual labour markets and how individuals make economic decisions, macroeconomics tries to forecast aggregate economic conditions to inform consumers, firms and

governments in making better decisions. Specifically, consumers are eager to know how easy it is to secure a job, access markets and ease in accessibility of finance and borrowing. Firms use macroeconomic analysis to determine the level of production equivalent to the market demand while governments turn to macro-economy when making both the fiscal and monetary policies.

In exploring the role of the trade-off Philip's curve as aforementioned, Friedman (1977) emphasizes the role of inflation in explaining unemployment. Insights drawn reveal the importance of inflations anticipations; short-run and long-run anticipations vis-à-vis the natural rate of unemployment, which reveals a direct link between unemployment and inflation. In this study, inflation was used to assess if this association with unemployment is just coincidental or not.

Labour productivity is an important indicator of economic growth but also unemployment as earlier indicated. Hansen (2001) observes that labour productivity in the manufacturing or durable sector(s) of the economy is an important macroeconomic indicator. But it is Oi (1962) that has weighed in on this aspect of labour as a quasi-fixed factor that is consistent with the pathway that the study pursued. This means, the role and contribution of labour (and capital) mobility in terms of foreign direct investments (FDI) were explored and its influence on unemployment determined.

According to the United Nation World Population Prospects Report (2018) Kenya, Uganda and Tanzania are among the selected Sub-Saharan Africa countries whose population trajectories are projected to spike over the coming decades. This shift in population certainly shifted unemployment. On whether the resultant shift in population had dividends on unemployment remains debatable. The World Bank report (2014) highlights that despite the grave consequences of demographic changes, the debate does not take centre stage in macroeconomic policy discussions.

Foreign Direct Investment (FDI) supports private investments, job creation, and transfer of knowledge and technological skills of the labour force. Most empirical evidence suggest that increased FDI injections reduce unemployment. Stamatiou and Dristsakis (2014) in their study found that an increase in FDI would increase growth and reduce unemployment both in the near-term and in the long-term. Another study (Shahidanet *al.*, 2012) indicated that FDI helped to reduce the unemployment rate and

increased GDP. Noor, Nor and Ghani (2007) who have placed particular focus in investigating output and unemployment articulate that as a consequence of shifts in aggregate demand, manufacturers change their output models. In turn, this affects the labour demand and eventually, unemployment rates. Ultimately, this implies that the real GDP growth is an important macroeconomic indicator of unemployment.

Therefore, this study concentrated on the macroeconomic variables to understand the behavior of the economy as a whole because it is easier to ascertain the health of an economy using macroeconomic variables to analyze the effect of aggregate economic policy.

1.2 Research Problem

Unemployment is a fundamental macroeconomic indicator that should be closely monitored. High unemployment rate indicates a worse economic situation whereas a low unemployment rate points to an economy that is healthy. Policymakers consider unemployment as a waste of resources since the unused labour could be employed to increase output in the production sector. Evidence suggests that unemployment is associated with various social problems like criminal activities, drug addiction, psychological disorders and even loss of self-confidence (e.g. Ashipala, 2010; Bakare, 2011). In addition, it is evident that societies flourish when there are opportunities that are created for the unemployed; opportunities are transformational, deepen integration and tame conflicts.

The three EAC countries of Kenya, Uganda and Tanzania experienced an average unemployment rate of over 5.5 per cent between the year 2000 and 2018. With the population growth rate of 2.9 per cent per annum, it is anticipated that future employment prospects in the community would worsen if the role of the macroeconomics determinants in creating additional opportunities are not understood and wedged on a viable policy framework to minimize unemployment in the community. This study decomposes the EAC into a unitary economic bloc to ascertain the aggregate macro-economic effect on unemployment. Previous interventions over the years to curb unemployment have not yielded the much-desired results. Therefore, the analysis of the macroeconomic determinants vis-à-vis unemployment can provide

new insights on how the growth rate of unemployment can be minimized and opportunities widened for the communities' growing population.

This study provides a region-wide approach, unlike previous studies that provide country-specific or issue-based unemployment studies on gender, youth, migration patterns and so on. For instance, studies on urban unemployment (Elkan, 1970 and Frank, 1968) concluded that unemployment can be solved by urban real income restraint and increasing agricultural real incomes from cash crops in the EAC region. Other studies in the region have majorly focussed on youth and women unemployment at the expense of total unemployment. An attempt to analyse macroeconomic variables impact on unemployment in the community have been remote. For example, OECD (2018) investigated the dynamics of growth, jobs and inequalities in East Africa while Dridi and Nguyen (2018) assessed inflation convergence in the region. Given the macroeconomic stability in the community, the study sought to understand why the observed stability has failed to translate to creating additional opportunities and reverse the observed trend in unemployment.

1.3 Research Questions

This study was guided by the following questions: -

- a) What are the macroeconomic determinants of unemployment in EAC?
- b) What policy implications can be derived for EAC?

1.4 Research Objectives

The general objective of the study was to understand the macroeconomic determinants of unemployment in the EAC region. The specific objectives of the study were to: -

- a) Analyze the macroeconomic determinants of unemployment in EAC.
- b) Derive employment policy recommendations for EAC.

1.5 Justification of the Study

Efforts to establish a viable regional body that can deepen economic, social and political aspirations among member countries is historical. Specifically, the co-operation of the three East African countries (of Kenya, Uganda and Tanzania) dates back to 1917 where a range of bodies were formed to facilitate the creation of jobs. The formalization

of the regional body in 1967 and eventual collapse in 1977 did not deter its revival in 1999 and an effective treaty for the same signed in 2000 with Kenya, Uganda and Tanzania as the initial partner states.

Although the EAC has other member countries (Rwanda, Burundi and South Sudan), this study has deliberately left them out because they joined the community later on after the signing of the EAC treaty in 2000. For instance, Burundi and Rwanda accented to the treaty in 2007 while South Sudan ratified her membership in 2016. The strong co-operation between Kenya, Uganda and Tanzania is attributed to similarities in economics in that all these countries emerged from a planned economic system at around the same time, and they are all in the same geographical location. Furthermore, the people of this community share a common history, culture, language and infrastructure that can be leveraged on to develop a unique macroeconomic framework to curb unemployment.

It is a deliberate intent of the member countries to transform into middle-income countries with a high-quality life for the people. An integrated labour supply human resource strategy to align labour demand alongside the implementation of policies that would help in the rapid development of the economy to create additional job opportunities is important. However, the creation of employment policies would require a clear understanding of the macroeconomic factors that determine unemployment in the EAC member states.

It is on this understanding that the study analysed the underlying macroeconomic drivers that can inform the formulation of future employment policies in the community. This study would, therefore, enable policymakers to evaluate the existing policies to come up with relevant macroeconomic policies geared towards reducing unemployment in the community.

Additionally, there are few studies in the EAC that have linked macroeconomic variables and unemployment and fronted impactful policy recommendations with a dearth of empiricisms that have decomposed the three countries of Kenya, Uganda and Tanzania into one economic bloc. This study, therefore, seeks to fill such a lacuna by carrying out a panel data estimations using annual data for the selected countries. The results obtained would inform policymakers in the EAC. Furthermore, the research is vital to scholars since it adds value to the existing literature on the determinants of

unemployment in the EAC. The findings would help scholars to further their research on unemployment in the community and use this study as a reference point.

1.6 Scope

The study covered the period 2000-2018 to analyze macroeconomic variables since the coming into force of the EAC treaty in 2000 with Kenya, Uganda and Tanzania as the initial Partner States. The analysis ran until 2018, which was the most recent data point.

1.7 Outline of Study

Subsequent chapters of the study are organized as follows: Chapter 2 provides the review of the theoretical and empirical literature on the thematic issues. Chapter 3 details the methodology while Chapter 4 presents a discussion of the study findings. Lastly in Chapter 5, the summary and the conclusion is provided.

2.0 CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The chapter provides the underlying theoretical and empirical literature. Under the theoretical literature deep insights into the Okun's law and the trade-offs, Philip's curve is presented. The frameworks provide critical insights into both unemployment and macroeconomic variates examined in this study. The empirical literature establishes basic connections between unemployment and macroeconomic variables like inflation, economic growth, FDI, total external debt stock, labour productivity and population growth is reviewed. An overview of the literature is then provided in the last section of the chapter.

2.2 Theoretical Literature

2.2.1 Okun's Law

The economic events of the post-war period gave rise to the "Okun's law", which explains an observed yet sustained argument that was first fronted by Arthur Okun. According to the law, the larger the output gap, the higher the rate of unemployment, implying, if countries can close their output gaps, then, unemployment would reduce. Okun's law provides a criterion for comparing the linkage between the two elements of the output gap and unemployment. It is observed through the law that a unit percentage reduction in unemployment is as a result of a 3 percentage point increase in productivity growth (Freeman, 2000).

It is this (3:1) ratio that explained the observed trade-off between the Gross National Product (GNP) and unemployment in the post-war era that resonated and accepted as Okun's law. The rationality of this ratio has been validated through a range of empirical investigations. Recent undertakings have established a 2:1 trade-off, an aspect that has been attributed to the estimation approach used (Daly *et al.*, 2014; Silvapulle, Moosa & Silvapulle, 2004).

Notwithstanding these important developments, the favourability of the Okun's law is that it is weighed against Philip's curve whose focus is on the association of inflation and unemployment. As aforementioned, Okun's law refers to the divergence of a country's GNP and unemployment from its equilibrium level. Often, time series or structured production function technique approaches are used. Under the latter technique, the expected output is predicted against the inputs used in production. It is

important to note that both approaches have been criticised on grounds that they are subject to measurement error.

2.2.2 Philip's Curve

Profoundly, Philip's curve relates to the trade-offs between inflation and unemployment. However, it has had to endure considerable evaluations, at least, since its conception in 1958. To validate the existence and stability of the inflation-unemployment relationship that is occasioned by Philip's curve, a range of empirical undertakings have been carried out (e.g. Yanbin, 2008; Zinai, 2001) whose focus was on China's economy; Barnichon and Peiris (2008) and Kii (2003) among other competing heuristic studies that have concentrated on the viability of Philip's curve around Africa.

As this enduring debate continues, the major bone of contention remains to the health of the trade-off Philip's curve with a school of critics observing that Philip's curve is inept among the most productive countries. While others like Friedman (1977) observe that the trade-off Philip's curve was instrumentally occasional and inadvertent, it is not without proponents (e.g. Malinov & Summers, 1997) that have established the trade-off Philip's curve to be valid and reliable.

Recent empirical investigations (e.g. Tang & Lean, 2007) have argued that the trade-off Philip's curve is particularly critical as a monitoring tool for inflation and employment among developing countries. Insights drawn by utilizing these tools can be instrumental in assessing the supply-side economy and inculcating simultaneous macroeconomic policy injections that can contain inflation and unemployment. More recent works by Atkeson and Ohanian (2001) argue that there exists an array of Philip's curve like the one developed by the Federal Reserve Board (FRB) as well as the non-accelerating inflation rate of unemployment (NAIRU).

2.3 Empirical Literature

In Palestine, Abugamea (2018) utilized the OLS econometric analysis to establish the link between unemployment and variables of GDP, inflation, labour force, external trade and restrictions on the labour movement between 1994-2017. The empirical results reveal that all the variables have a significant impact on unemployment in Palestine. It is worth to note that high unemployment levels in Palestine were recorded

after the year 1994 when Israel changed her occupation policies which restricted the movement of Palestinian labour to Israel. The study recommends that to tame unemployment deliberate policy measures to strengthen the macroeconomic environment must be undertaken in addition to accessing the neighbouring Arab labour markets. In the EAC, citizens enjoy a single Customs Union that was established in 2005 and that that has led to efficiency in trade. Leveraging on the customs union protocol the EAC can now embark on the analysis of macroeconomic determinants of unemployment which is the core of this study.

Another study in Asia specifically in Malaysia, Tang and Lean (2007) provide a detailed analysis of whether Philip's curve is stable or not for the Asian country. On an annual time-series data of 1970-2005, their analysis reveals the validity of Philip's curve trade-off, over the short-run and in the long-run. Specifically, they reveal a valid linkage between inflation and unemployment in the country. These revelations imply that the country's economic framework is on the demand-side (as opposed to the supply or at the equilibrium) despite a set of rigorous industrialization interventions of the 1980s. As a consequence, human capital development that can ensure the efficiency and productivity in all sectors is not least important as a yardstick to strengthening the supply-side economy. If this can be done as probable policy injections, they have concluded that it would trigger a simultaneous possibility of containing inflation and unemployment.

Imran et al., (2015) sought to link economic growth and unemployment across 12 countries in Asia. Through the 30 years' period, they sought to calibrate new regression estimates by adopting the fixed effect and Pooled OLS approaches to simultaneously. The estimates showed significantly negative impact of unemployment on GDP per capita growth in the selected countries. Further, the study sought to investigate how economic growth is affected by variables like inflation, population growth, trade openness, Gross Capital Formation and so on and concluded that a substantial reduction in the unemployment rate can be realised through sustained economic growth.

In Central America, Caceres (2014) quantified the interdependence in labour markets using two (2) sets of aggregated panel data sets of El Salvador and Costa Rica as one and Nicaragua and Honduras as another, the VAR model was used with variables that include: unemployment rates, economic growth, investment, and change in export

ratios. The results suggested that there exist a strong cross border effects that can trigger unemployment rates to fall in response to external economic growth, investment and export ratios shocks in other countries. It was recommended that the creation of regional economic stabilization policies can address unemployment.

In Canada, Adanu (2005) analyzed variations of the Okun's coefficients across ten provinces. Data used (real GDP data and unemployment rate) was assembled from the provinces. A combination of two estimation techniques namely; the Hodrick-Prescott technique and the quadratic-detrending approach, with coefficients of -1.6 and 1.3, respectively were found. The conclusion reached reveals that more established provinces (in terms of industrialization) experienced higher unemployment-related losses (at -2.1) than the less established (or less industrialized) provinces (at -1.0).

Atkeson and Ohanian (2001) focused on the role of Philip's curves in predicting inflation in the United States of America. Having hypothesised that modern NAIRU models have utility in predicting inflation over the ordinary predictions than the naïve model, they tested their hypothesis over a 15 years' data set to confirm whether, at any test, inflation in the year after would be the same as the one before. The findings reveal that the possibility of forecasting a change in inflation rate is a game of chance, like flipping a coin. The implications of these findings, in their assessment, are that the debate on whether unemployment is a stable indicator of future inflation remains unsettled. This is despite having assessed a set of Philip's curves including textbook NAIRU and the one developed by the FRB. In their conclusion that contradicts proponents of Philip's curves, they posit that not an accurate Philip's curve that has been produced in 15 years to make credible inflation predictions but the naïve model that assumes inflation in the next four quarters would be indifferent to inflation in the last four quarters.

Soylu et al., (2018), monitored the Eastern European countries using historical data (1992-2014) on a panel framework to calibrate economic growth and unemployment with an ultimate aim of investigating the validity of the Okun's Law. The findings revealed feasibility of the Okun's Law in the Eastern European Countries with a 1% rise in GDP leading to a drop in the unemployment rate by 0.08%. Further, the findings revealed economic growth and unemployment were co-integrated.

Still in establishing the feasibility of the Okun's law in explaining unemployment across Spanish regions and using regional, 24-years, data spanning between 1980 and 2004, Villaverde and Maza (2009) illustrate the existence of an inverse nexus between unemployment and output for the majority of the regions but with regional variations on Okun's coefficients. The duo, restrict this observation to regional variations in productivity. As a result, they have concluded that these regional variations are not without policy implications and recommended the development of regional-specific policies that are in tandem with national demand and supply policies. At the same time, they have postulated that for these policies to be competitive enough as the European Union's (EU) labour market laws, the national and regional policies should aim at narrowing the unemployment rate while broadening productivity. They have observed that leveraging on a common language, deepening cultural convergences, institutional changes that can promote productivity, easing housing and inter-regional labour mobility laws are some of the workable policy interventions that can reduce unemployment. Lastly, they observe that although productivity growth-oriented policies may not yield the much-needed outcome within the short-run, it is productivity growth that will, over the long-run, reduce unemployment.

Esu and Atan (2017) sought to assess the viability of Philip's curve hypothesis in the SSA using 24 years of panel data from 1991 to 2015. Bringing together 29 countries across SSA and using the Consumer Price Index (CPI) and national total unemployment estimates as proxies for unemployment, they established an insignificant relationship between the two indicators. They have thus concluded that the common Philip's curve cannot explain unemployment in SAA. However, due to suspected inherent heterogeneous rationalities of the panel data used, they have advised caution in using their findings for policy purposes.

In a regional study across the Economic Community of West Africa States (ECOWAS), a study sought to weigh the viability of both the Okun's law and Philip's curve to bring into focus how GDP affects unemployment. The study employed annual time-series data spanning from 1991-2014. Three (3) models: the fully modified ordinary least squares (FMOLS), random effects and fixed effects models were used and the findings compared. The findings reveal that macroeconomic aggregates have the potential to reduce unemployment rate although the effect was found to be insignificant, suggesting

reduced employment elasticity of growth among ECOWAS member countries. Besides, the findings revealed that Philip's curve does not hold because inflation was estimated to have a positive impact on unemployment. Further, a positive relationship between labour productivity and the unemployment rate was established, implying a direct trade-off between the two factors. In an even further analysis, external debt and FDI were found to weakly influence unemployment but population growth had a strong influence. It is on this finding that Folawewo and Adeboje (2017) concluded that the macroeconomic aggregates of GDP growth; FDI and labour productivity are important factors of unemployment rate in the ECOWAS.

In analyzing the various determinants of unemployment in Namibia, the Engle-Granger two-step approach was used to estimate the variates from 1971 through 2007. Upon analysis, the results established that unemployment and inflation were a negatively related. Further results show a positive relationship between unemployment and output if wage increases. To curb unemployment, the output must be raised up to potential level with minimal wage demands from workers. Also, an increase in investment will reduce unemployment significantly (Eita & Ashipala, 2010).

Kiio (2003) estimated a time-varying NAIRU against the output gap in Kenya to determine appropriate macroeconomics policies towards a non-inflationary growth trajectory. In the estimation, NAIRU was captured by Philip's curve while Okun's law was employed to assess the nexus between the output gap and the labour market gap. The findings established a negative nexus between the two gaps. It was concluded that a combination of macroeconomics policies was necessary for increasing employment, mainly through expansionary fiscal and monetary policies.

Sheila Kaminchia (2012) analyzed economic factors affecting wage employment in Kenya using annual data over the period 1972-2010. An Error Correction Model is estimated for the entire economy and for each economic sector with the Augmented Dickey-Fuller (ADF) test used to determine the stationarity of the variates under analysis. The results show that an increase in economic output does not guarantee high wages. To control high wage employment in Kenya, all levels of socio-economic development should be improved with a focus on increasing the volume of Kenya's exports while maintaining a low level of domestic inflation.

2.4 Overview of Literature

The debate on the relevance of the macroeconomics determinants of unemployment remains a dominant issue in the labour economics circles. It has been observed that as population growth continues to explode, it is inevitable that the growing population needs added opportunities to create wealth, earn income and lead a decent life. This is particularly important at a time when nearly 80 million youths worldwide cannot find meaningful engagements to generate income as per the ILO-GET (2017) statistics. Policymakers, as indicated under literature, are interested in understanding these dynamics and forthwith, drawing appropriate policy interventions that if injected by the member countries, then the macroeconomics factors of economic growth, external debt and FDI, inflation, labour productivity and population growth will have a positive effect, thereby reduce, unemployment.

Literature suggests a theoretical linkage between various macroeconomic variates and unemployment. The Okun's Law has been established in certain countries and the Phillips curve connection of inflation and unemployment in others. Literature also suggest that there are other macroeconomic variables that mainly relate to unemployment. Some empirical studies did not confirm the anticipated linkage, an aspect that is attributable to data type and estimation procedure used.

The review of literature of various studies on determinants of unemployment has revealed that there is a lack of breadth of studies that touch on macroeconomic determinants of unemployment from a regional wide perspective. Additionally, most studies have not considered some fundamental macroeconomic variables that might currently determine the unemployment rate in the EAC. This study aims to fill this gaps by incorporating in macroeconomic variables like GDP growth rate, Inflation Rate, FDI, External Debt, Population and Labour Productivity growth as determinants of unemployment in the EAC in the current period (2000-2018).

3.0 CHAPTER THREE: METHODOLOGY

3.1 Introduction

Chapter three (3) presents the methodology. Essentially, both the theoretical and the empirical approaches are detailed. Subsequent sections detail empirical specification, variable definition, data – type and source, and the estimation procedure

3.2 Theoretical Approach

The literature review has suggested relationship between unemployment and macroeconomic variates. Whereas the study limits itself to the theoretical of the Okun's law and the Philip's curve, it is instrumental noting that unemployment and macroeconomic indicators can be estimated on varied theoretical groundings (Dornbusch et al., 2011). However, for purposes of the present study, Okun's law forms the main argument of the theoretical technique adopted. The Okun's law is given as:

$$-\varphi(u - u^*) = \left[\frac{Y - Y^*}{Y^*} \right] \quad (a)$$

Where;

φ denotes the link between the unemployment gap and economic growth, while;

Y , which is a proxy for economic growth is the real GDP, and;

Y^* denotes the potential GDP.

It is noteworthy that the negative sign ($-\varphi$) implies a trade-off on either side of the equation.

The unemployment, economic growth and inflation nexus is collectively explained by the application of both the Okun's law and Philip's curve to give a composite Okun's law – Philip's curve aggregate supply (AS) curve expression within and in the anticipated period as: -

$$P_{t+1} = P_{t+1}^e + P_t \frac{\vartheta}{\varphi} \left[\frac{Y - Y^*}{Y^*} \right] \quad (b)$$

By re-ordering expression (b), we have: -

$$P_{t+1} = P_{t+1}^e [1 + \sigma(Y - Y^*)] \quad (c)$$

The unemployment, economic growth and inflation link is realized by infusing equation (a) in (c). When the infusion is done, it can be theoretically demonstrated that there is a reverse association of unemployment with both output and inflation, which as explained is as a result of the combination of the Okun's law and Philip's curve as: -

$$-(u - u^*) = \left[\frac{P_{t+1} - P_{t+1}^e}{P_{t+1}} \right] \cdot \left(\frac{1}{\vartheta Y^* \varphi} \right) \quad (d)$$

3.3 Empirical Specification

As made explicit under the theoretical model, the combination of Philip's curve and the Okun's law is inevitably reliable in explaining the unemployment-output-inflation relationship in an economy or region. The empiricism of this model is anchored on the labour market structure as explained by Lorenz and Valeyre (2005) and is given as: -

$$y_{it} = \beta \lambda X_{it} + \varepsilon_{it} \quad (e)$$

Where;

y denotes unemployment; X denotes the macroeconomics determinants of unemployment; λ denotes the coefficient matrix of the macroeconomic determinants of unemployment; ε denotes the disturbance term; i denotes the panel identification for the selected EAC countries of Kenya, Uganda and Tanzania; and t denotes the periods covering the study. However, the model specification is given as: -

$$unmp_{it} = \beta_{1i} + \beta_1 gdp_{it} + \beta_2 infln_{it} + \beta_3 fdi_{it} + \beta_4 exdbt_{it} + \beta_5 popt_{it} + \beta_6 laprd_{it} + v_{it} \quad (f)$$

Where;

$unmp$, which is the dependent variable denotes unemployment rate; gdp denotes the GDP growth; $infln$ denotes the rate of inflation; fdi denotes the foreign direct investment; $exdbt$ denotes the external debt; $popgt$ denotes population growth and $laprd$ denotes the labour productivity, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ denote the variable coefficients of the outlined factors; v is the (composite) error term i.e. $[v_{it} = \mu_{it} + \varepsilon_i]$ where; μ_{it} represents both the cross-section and the time-series composite error while ε_i represents the cross-section error.

3.4 Variable Definition, Measurement and Data Source

Table 3.1: Variable Definition and Data Source

Variable	Description	Source
Unemployment Rate	The annual proportion (as a %) of the total labour force (total labour force measures both the employed and unemployed individuals) that is without meaningful work but available for and actively seeking employment.	World Bank (2019)
GDP Growth	The annual proportion (as a %) of GDP at market prices based on constant local currency.	World Bank (2019)
Inflation Rate	The annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed based on the Consumer Price Index	World Bank (2019)
Foreign Direct Investment	Net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, divided by GDP.	World Bank (2019)
External Debt	Total external debt stocks to gross national income. It is the sum of public, publicly guaranteed, and private nonguaranteed long-	World Bank (2019)

Variable	Description	Source
	term debt, use of IMF credit, and short-term debt.	
Population	The number of all residents regardless of legal status or citizenship. The values shown are midyear estimates.	World Bank (2019)
Labour Productivity Growth	The annual total volume of output (measured in terms of GDP at constant prices) produced per unit of labour (measured in terms of employed persons).	ILO (2019)

3.5 Estimation Procedure

The empirical model is specified in equation (f) where the macroeconomic variables under this study are related to unemployment. The model comprises of a composite error term (V_{it}) that consists of both the individual specific error component. The model also consists of the dual time-series and cross-section error component.

Panel unit tests will be performed on the data using the Levin Lin Chu (LLC) test. Execution of this procedure will be to ascertain the stationarity of the variables. Non-stationary variables result in spurious regression results (Baumohl and Lyocsa, 2009). As such, their inclusion in estimation leads to potentially biased estimates.

After getting the order of integration, the study applied Pedroni's co-integration test to confirm stable long-run equilibrium relationships between the variables. Pedroni's co-integration test is suitable because it performs several tests for co-integration that permits heterogeneous intercepts and trend coefficients across cross-sections.

The study will use the Hausman test to determine which model between fixed and random effect will be adopted for estimation. It is hypothesized in the fixed-effects model that a particular set of data has different intercept in the regression. In the random effects model, it is hypothesized that a particular set of datasets have variant error terms.

For this purpose, the Hausman test is important in ensuring that incidences of model misspecification and inefficient estimators are minimised

3.6 Data Type

The study uses panel data covering the period of 2000-2018 for the EAC countries. The data is measured annually in the same way for the countries under consideration of this study. In essence, we have 19 different time points and 3 entities to give a sample size of 57 observations. The choice of the period (2000-2018) is pegged on the revival of the EAC in 2000 and the eventual signing of the EAC treaty to make policies and programmes intended to deepen mutual co-operation. The period is sufficient to help us analyse the level of macroeconomic factors of unemployment in the EAC.

4.0 CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

Chapter four (4) presents data analysis, results and discussion (of the results). As arranged, the first section provides descriptive statistics. The next, estimation(s) and estimation tests. The last section provides the discussion.

4.2 Descriptive statistics

The descriptive statistics provides summary for particular variates under analysis. Key measures of tendency as shown on Table 4.1 are provided. The study had 57 observations under review, across all variates. The average unemployment rate throughout this study (2000-2018) stood at 5 per cent with the highest unemployment rate of 10 per cent while the lowest rate is 1.7 per cent. FDI recorded the lowest mean of 2.8 per cent while the average total population was the highest at 39 million.

Table 4.1: Descriptive Statistics

Variable	N	Mean	S.D.	Mean/ S.D.	Min	Max
Unemployment	57	5.027	3.340	1.505	1.698	10.099
Gross Domestic Product	57	5.765	1.998	2.885	.232	10.785
Inflation rate	57	7.623	4.395	1.734	-.288	26.24
Foreign Direct Investment	57	2.774	1.715	1.617	.041	6.48
External Debt	57	35.326	14.587	2.422	13.475	73.772
Population	57	3.90e+07	8090000	4.821	2.37e+07	5.63e+07
Labour Productivity	57	5066.691	1112.281	4.556	3104.51	7043.495

Source: Author's computations

The ratio of the mean and standard deviation as an indicator for variance shows that the highest variation per unit of standard deviation is for the population at 4.8 while the lowest variance of 1.5 is for unemployment. The contribution of those employed to the GDP growth was captured through labour productivity, with the least contribution of US\$ 3104 and the highest contribution recorded at US\$7043 per annum.

4.3 Correlation Analysis

The correlation matrix analysis is undertaken to determine the degree of association between variables and secondly is to detect the degree of multi-collinearity among the variables as indicated in Table 4.2. As shown, most of the variables are positively

correlated to unemployment apart from Foreign Direct Investment and labour productivity. To be specific, GDP, FDI and inflation rate, external debt, population and labour productivity have correlation coefficients of 0.127,0.217, -0.028,0.032, 0.322 and -0.180, respectively. As can be observed from the results, weak correlations exist among the explanatory variables and therefore all the variables can be used independently to explain unemployment.

Table 4.2 Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Unemployment	1.000						
(2) Gross Domestic Product	0.127	1.000					
(3) Inflation Rate	0.217	-0.166	1.000				
(4) Foreign Direct Investment	-0.028	0.483	-0.041	1.000			
(5) External Debt	0.032	-0.188	-0.465	-0.161	1.000		
(6) Log Population	0.322	-0.031	0.093	-0.192	-0.417	1.000	
(7) Log Labour Productivity	-0.180	-0.278	0.259	-0.607	-0.412	0.621	1.000

Source: Author's computations

4.4 Panel Unit Root Test

It is important to establish the stationarity of variables to avoid spurious regression problems and otherwise avoidable biasness in estimates. This is done by establishing the number of lags and order of integration. Using the LLC panel unit root test for the strongly balanced panel data with a few panels and relatively more periods ($N < T$), the results show that the null hypothesis of the presence of unit root at the level is rejected for all the variables under review, except for external debt and labour productivity as detailed in Table 4.3. This means that our variables of unemployment, GDP, inflation, FDI and population are all stationary at level; it is only external debt and labour productivity that are stationary at first difference.

Table 4.3: Panel Unit Root Test Results

variable	LLC t-statistic	P-Value	Number of Lags	Order of Integration
Unemployment	-1.8805*	0.0300	0	0
Gross Domestic Product	-2.2313*	0.0128	0	0
Inflation rate	-7.1019*	0.0000	0	1
Foreign Direct Investment	-1.9088*	0.0281	0	0
External debt	-1.3434*	0.0896	0	1
Log Population	-2.2275*	0.0130	0	0
Log Labour productivity	-3.0940*	0.0010	0	1

*P < 0.10

Source: Author's computations

4.5 Panel Co-Integration Test

Since not all variables were integrated of order zero, a co-integration test was carried out to establish the existence of a long-run relationship among the variables. This study executed the Pedroni co-integration test because of its capability to handle a combination of both the $I(0)$ and $I(1)$ series. The results of the test are presented in Table 4.4.

Table 4.4: Pedroni Cointegration Test Results

Test Statistic	Statistic
v-Statistic	-0.4037
rho-Statistic	1.7600
PP-Statistic	0.7873
ADF-Statistic	0.5929

Source: Author's computations

The co-integration results from Table 4.4 indicates that first panel statistics are negative (Panel v-Statistic = -0.4037), while the rest of the three panel statistics are positive (Panel rho-Statistic = 1.7600, Panel PP-Statistic = 0.7873, and Panel ADF-

Statistic = 0.5929). All the test statistics are distributed $N(0, 1)$, under a null of no cointegration, and diverge to positive infinity (save for panel v- Statistic). Based on Pedroni (1999) co-integration test we conclude that the series are co-integrated and have a long-run relationship.

4.6 Hausman Test Results

The decision between the use of either fixed effect or random effect model is determined by the results of the Hausman test presented in Table 4.5. The Hausman test is important in ensuring that incidences of model misspecification and inefficient estimators are minimized and it is used to test;

H_0 : Random effects would be consistent and efficient.

H_1 : Random effects would be inconsistent.

Table 4.5 Hausman Test Results

	Co-efficient.
Chi-square test value	2.85
P-value	0.8275

Source: Author's computations

Since the p-value = 0.8275 is greater than 0.10 significance level, the null hypothesis is not rejected and conclude that the random effects estimators would be consistent and efficient. Consequently, this study interprets the results based on the random effect model.

4.7 Estimated Results for Random Effects

The macroeconomic variables of GDP, inflation, FDI, external debt, population and labour productivity are estimated by running both the fixed effect and random effect model. The output of the model is presented in Table 4.5. The choice of the model to be interpreted between FE and RE is determined by the Hausman Test Results discussed under item 4.6.

Table 4.5: Estimated Results for Random Effects Model

Variables	Coefficient
Gross Domestic Product	0.0679 (0.103)
Inflation rate	0.0719 (0.0464)
Foreign Direct Investment	-0.524*** (0.163)
External Debt	0.0193 (0.0178)
log Population	6.920*** (1.095)
Log Labour Productivity	10.21*** (1.095)
Constant	38.73** (16.84)
Observations	57
Number of countries	3

Standard errors in parentheses *** p<0.01, ** p<0.05

Source: Author's computations

The estimated results reveal a negative yet statistically significant relationship between FDI and unemployment. Specifically, whenever FDI increases by one unit, unemployment will reduce by 0.524, holding all other variables constant. The effect of FDI on unemployment depends on the type of FDI, the characteristic feature of the sector receiving the FDI and the level of production technology in that sector. The relevance of FDI in employment generation is significantly higher in Greenfield investments-that is, capital injection by a foreign entity to pitch a new business or expand an existing foreign owned business as compared to Brownfield investments that occurs when a government buys or leases existing production facilities to launch a new production operation which might even limit employment opportunities (Strat et al., 2015).

From the estimated results, the population has a positive and statistically significant effect on the unemployment level. That is, if the population increases by one per cent, the unemployment rate will increase by 6.920 per cent, holding other variables constant. This finding is consistent with Meier (1995) who stated that population growth obscures savings, that way, limiting investment and invariably curbs employment generation. According to Furuoka (2010), population growth increases the dependency burden from those that are economically unproductive. Fundamentally, larger population growth leads to tremendous growth in the labour force. This, as it has been observed,

shifts the labour supply curve upwards. It has also been observed that spiked population growth results to widened labour force, adversely affecting unemployment, a typical phenomenon in the SSA region (Herrin & Pernia, 2014). In the EAC region where working-age population is responsible for more than 50 percent total population, there are lesser dividends that the pool has provided (World Bank, 2019).

Lastly, the impact of labour productivity on unemployment is positive and statistically significant, with a one per cent increase in labour productivity leading to an increase of 10.21 per cent in the unemployment rate. The significant positive impact is an indicator that an increase in labour productivity unnecessarily reduces unemployment. Numerous reasons have been brought forth to justify this relationship. For instance, a large technological shock and an increase in real wages will not permit an improved output per worker that will lead to a rise in employment since fewer workers will be needed in the production sector (Barnichon, 2008; Fanti & Manfredi, 2003; Krugman, 1994; Landmann, 2004; Levine, 2013).

5.0 CHAPTER FIVE: SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

5.1 Introduction

Chapter five (5) provides the summary of the study, conclusion and areas for policy recommendation. The last bit of the chapter provides areas for future research.

5.2 Summary

The purpose of this study is to examine the macroeconomic determinants of unemployment in EAC. This is supplemented by two specific objectives. First, to analyse the macroeconomic variables of unemployment in the region and secondly, to suggest policy measures that can be applied to lower unemployment level in the EAC.

Data analysis is done using panel data techniques over the period 2000-2018 with unemployment rate used as the dependent variable and GDP growth, inflation rate, FDI, external debt, population growth and labour productivity growth as independent variables. Selection of model between Fixed Effect Model and Random Effect Model was done using the Hausman test that favoured the use of the random-effects regression model which yielded several pertinent insights into to the study's focus.

Upon analysis, it emerged that macroeconomic variables have different degrees of impact on unemployment. Importantly, the study identified that FDI, population and labour productivity as variables that are significant in determining the unemployment level in the EAC. The study established an inverse association between FDI and unemployment, indicative of increases in FDI lowers unemployment. Additionally, labour productivity is found to have a positive and statistically significant impact on unemployment. Lastly, population growth is found to have a positive and statistically significant impact on unemployment with an increase in population worsening the unemployment situation in the region.

5.3 Conclusions

The unemployment rate in the EAC has been persistent and increasing over the years despite a fairly stable macroeconomic environment. Given this situation, GDP growth, inflation rate and external debt were found to have little or no significance in determining the unemployment rate in the region. However, given that FDI leads to creative job destruction in the labour market through competitive pressure, it increases creation of jobs. The EAC can utilise increases in FDI to generate more job

opportunities. Secondly, since labour productivity was found to have positive and statistically significant impact on unemployment, an increase in labour productivity should be pursued alongside sufficient output growth that will trigger an improvement in employment.

The study, therefore, concludes that the region must vigorously pursue measures to generate enough job opportunities given the increasing population. Some of these measures to combat unemployment includes; giving incentives to manufacturers, mechanisation of agriculture and creating a conducive environment to attract FDI. Additionally, the region should embark on prudent management of macroeconomic variables that would spur employment creation and reverse the high unemployment rates. Apart from that, other factors that influence unemployment like education and competitive wages should be pursued.

5.4 Policy Recommendations

Based on the significant negative relationship between FDI and unemployment. This study suggests the region should attract FDI inflows into labour-intensive sectors with more preference given to Greenfield investments rather than Brownfield investments. Therefore, it is important to diversify the EAC economy into more Greenfield investments for purposes of attracting more foreign investors into the sectors. Several policies should be pursued especially those concerned with; investment incentives, improvement of domestic infrastructure, control of corruption, political stability, development of local skills and setting up a conducive regulatory environment. The community should deliberately also pursue policies that will attract FDI that will be directed towards the productive sectors, which have high labour absorptive capacity.

The creation of sufficient output growth to generate more employment opportunities will mitigate the effects of increased labour productivity on unemployment, an option policy-makers should put to test. Whereas it is desired that an increase in labour productivity should be pursued by policymakers alongside sufficient output growth, it is recommended that governments should focus on regulations on industries and trade, government investment programmes in infrastructure, institutional innovations, human capital and technology to generate more employment opportunities.

Since population growth has a positive and significant impact on unemployment, respective countries should embark on policies to stimulate productive activities for the

ever-increasing workforce as a means of creating employment opportunities. Some of the sectors to be targeted include the agricultural sector that not only has the potential to guarantee food security at household level but also lead to the establishment of Agro-industries that can create more job opportunities.

More importantly, to improve on the efficiency of monitoring and coordination of macroeconomic policies, the region must come up with a mechanism that can enforce policy implementation. Through a joint mechanism, country-specific recommendations on national economic policies and their compatibility to the regional objectives can be deliberated. This will enable the seamless implementation of policies that are geared towards the reduction of unemployment in the region.

5.5 Areas for Further Research

The scope of this study was to investigate the macroeconomic determinants of unemployment in the EAC region for the period 2000 to 2018. The study focussed on macroeconomic determinants of unemployment due to limitations of data on other determinants of unemployment in the region. The study can therefore be extended by considering other determinants at microeconomic level as data become more available. This could be important in identifying holistically the determinants of unemployment in the region and therefore give appropriate recommendations on how to curb unemployment.

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