

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background to the Study

Unemployment rate since the aftermath of the Second World War in 1930s has been rising persistently and remains unstable in every economy, especially in the developing economies. Importantly, the increasing rate of poverty, homelessness, crime, frustration, social vices, economic retardness and other economic, social and political problems aroused the interest of unemployment as a macroeconomic issue in the literature.

According to World Bank (1998), unemployment is defined as the amount of economically active people who are unemployed but available for and seeking work, including those who have lost their jobs as well as those who are willingly to quit their occupations. Asoluka & Okezie (2011) defined unemployment in Nigeria as the percentage of labour force that was available for work but did not work during the week preceding the survey period for at least 39 hours.

The issue of unemployment has been a major problem all over the world, of which Nigeria as a developing country is not an exception. Indeed, Nigeria is one the high ranked poverty nation due to the problem of high rate of unemployment. Yusuf (2005) stated that unemployment is increasing at an alarming rate with up to 70% of young people unemployed. Adamu, Bashir & Hajara (2015) believed that the problem of unemployment became worse because of large numbers of graduates turn out from learning institutions without the ability to be absorbed in the labour market. These armies of unemployed youth are parading society, thus creating socio-economic issues for society. The authors stated further that in addition to representing a huge waste of the country's manpower resources, the rise in crime and criminality, social and political

tension such as cultism, armed robbery, prostitution, thuggery, drug addiction, among others, is mainly ascribed to the incidence of unemployment in almost every part of the nation.

According to the national bureau of statistics (NBS) (2020), Nigeria unemployment rate stands at 33.7%. Similarly, Feridum and Akindele (2016), George and Oseni(2012), Ezie(2012), Ede Ndubisi and Nwankwo (2013) in their studies consensually found unemployment as one of the major challenges confronting the Nigerian-economic development. The alarming unemployment rate in Nigeria in recent times has been a great concern to economists, policymakers, economic managers, individuals, government and many others (Bello,2003). Historically, the first two decades after independence of Nigeria as a country, unemployment was not an issue .This is because majority of citizens during that time resided in rural areas and engaged in farming and those in urban areas were gainfully employed .meaning at that time unemployment rate was very low. However, the country started her journey into unemployment when the oil sector took over the main sector of the economy (Nwankwo and Ifediofor 2014). Specifically, between 1960s and 1970s, the Nigerian economy provided jobs for the teeming population. The economy also considered imported labour in the science sectors. The wage rate is compared with international standards. There was also relative industrial peace in most industries and some groups. Regrettably, the Nigeria oil boom in the 1970s paved way for rapid migration, especially the youths movement from the rural areas to the urban areas in search of wage employment. But following the fall in the economy in the 1980s, the problem of unemployment started to manifest. The introduction of IMF-World Bank Structural Adjustment Programme (SAP) led to rapid depreciation of the naira exchange rate and the inability of most industries to import the raw materials required in supporting their output levels. A major consequence of the depreciation of the naira was the increase in the general price level. This development

subsequently led to a significant decrease in real wages. The low wage in turn resulted in a weak purchasing power of wage earners and decrease in aggregate demand. Consequently, firms started to accumulate unplanned inventories. As normal economic agents, the manufacturing firms started to reduce their workforce. In the public sector, embargo was placed on employment. More importantly with the sequential rapid expansion in the educational sector, new entrance into the labour market increased beyond the capacity of the economy, Central Bank of Nigeria (2003). These developments have eventually increased the unemployment situation in the country, Gbosi (2005).

Unfortunately, the tragedy trend in unemployment rate in Nigeria shows that unemployment in 1967 stood at a very low 1.7% and by 2014, it rose geometrically to 25.10% and recently, in 2021, the unemployment rate is at 33.7% (NBS 2021). According to Alanana (2003), unemployment is potentially dangerous as it sends alarming signal to all segments of the Nigerian society at the moment Nigeria is in recession and has unemployment rate of 33%. Due to this there has been an increase in social vices such as arm robbery, drug trafficking and kidnapping. It has also increased the migration of human capital to developed countries thereby worsening the development problem facing the country.

In line with the persistent unemployment issue vis-a vis the consequences to the economy, a number of empirical studies have focused more on the relationship between unemployment rate and economic growth produced mixed outcomes. Some of these works suggested that there is a negative / inverse relationship between unemployment and economic growth in Nigeria. (See Akeju & Olanipekun (2014)). While, some suggested that there is a positive relationship between unemployment and economic growth in Nigeria (See Arewa and Nwakanma (2012)).

Following the inconclusiveness in the literature on the relationship between unemployment rate and economic growth as well as invalidity of Okun's law in Nigeria, this study intends to fill the gap in the literature by examining the relationship between macroeconomic variables and unemployment rate within the study period 1970-2020 in Nigeria.

## **1.2 Statement of the Problem**

The changes in unemployment size and rate in Nigeria have been increasing in leaps and bound since shift from agricultural sector to oil sector and intensive practices of mono-economy. The fast rising unemployment rate has not only affected the youth but slow pace the macroeconomic variables performance in Nigeria.

In specific, the national bureau of statistics (NBS) showed that the national unemployment rate in the first quarter of 2007 was 14.6% respectively compared with 13.7% in 2006. Also, the urban and rural rates were 14.4% and 15.0% respectively compared with 10.2% and 14.8% in 2006. Further, the analysis showed that unemployment ranged from 14.1% for the age group of 25-44 to 23.5% for the age group of 65-70 disaggregation. According to geopolitical zones data, south-south zone accounts for the highest unemployment rate of 29.5% and south west with 8.8% between these extremes were the north-east with 18.5%, south-east 18.1%, north central 15.8% and north-west 14.2%.

Okun's law governs the relationship between unemployment and economic growth, Okun's law suggested that when an economy is developing at a particular percentage, the unemployment rate is expected to fall by a certain percentage due to expected increase in commerce (international trade), Economists also believe that international trade tends to encourage employment (Brecher 1974, Davis 1998, Helpman et al 2010) According to Alamara(2003),. According to Lipsey

(1963) unemployment brings about economic waste and causes human suffering. According to Fadayomi (1992) and Osinubi (2006), unemployment is as a result of the inability to develop and utilize the national manpower resources effectively especially in the rural sector.

The Philip curve shows a negative relationship between unemployment and inflation rate, despite the fact that a high rate of economic growth may reduce unemployment, inflation rate is another important factor that affects unemployment, the relationship between unemployment and inflation can be better explained with the Philip curve. In the short term Philip curve happens to be a declining curve. The Philip curve in the long term is separate from the Philip curve in the short term. It has been observed that in the long run the concepts of unemployment and inflation are not related.

In Nigeria, the existing empirical works on the relationship and unemployment rate and economic growth has produced mixed outcomes. Some of these works suggested that there is a negative / inverse relationship between unemployment and economic growth in Nigeria (Akeju & Olanipekun, 2014). While, some suggested that there is a positive relationship between unemployment and economic growth in Nigeria (Arewa and Nwakanma , 2012).

### **1.3 Research Questions**

In line with the statement of problem, the research questions to be answered in this study are;

1. To what extent does inflation rate affects unemployment in Nigeria?
2. To what extent does economic growth affects unemployment in Nigeria?
3. What is the causal direction among unemployment, economic growth and inflation rate?

## **1.4 Research Objectives**

### **Aim and Objectives**

The aim of this study is to investigate the macroeconomic determinants of unemployment in Nigeria between 1970-2020. In specific the three objectives to be investigated are;

1. Impact of inflation rate on unemployment rate in Nigeria.
2. Impact of economic growth on unemployment in Nigeria.
3. The causal direction among unemployment, economic growth and inflation in Nigeria.

## **1.5 Research Hypothesis**

In line with the specific objectives, the three hypothesis are formulated

**H01:** Inflation rate has no impact on unemployment in Nigeria.

**H02:** Economic growth has no impact on unemployment in Nigeria.

**H03:** There is no causal direction among unemployment, inflation and economic growth.

## **1.6 Significance of the Study**

The worrisome rate of crisis; boko haram, kidnapping, and the recent 'End-SAR' indicated the consciousness and the interest of unemployment issue not only academics but for policy makers in the country. Unlike the previous studies that has drawn more attention on macroeconomic determinants of unemployment putting more pressure on the government with little or no remarkable success to eliminate the high state of unemployment in the country. To this end this

study will benefit the government, In specific this study will be beneficiary to academics to revalidate Okun's law and also a references to Philip curve theory, on their prepositions.

In addition the study extends Okun's law and Philip curve to benefit contemporary scholars on other macroeconomic determinants of unemployment. On the other hand this study benefits the government on which of the macroeconomic policy of variables will be effective to detect on outdated unemployment crisis.

### **1.7 Scope of the Study**

The scope of the study is centred on the impact of macroeconomic determinants of unemployment in Nigeria and its effect on the economic growth in Nigeria. The research work is centred on fifty years of duration from 1970-2020.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Conceptual Review**

##### **2.1.1 Concept of Unemployment**

Unemployment according to Udu and Agu (2005), unemployment is a situation in which persons able to work and willing to work are unable to get a well-paid job. As defined by International Labour Organization (2007), unemployed workers are those who are currently not working but are willingly and able to work and have actively search for work (Homby, 2010) defines unemployment as the facts of the amount of people not having a job, the amount of people without job, the amount of people without a job, the state of not having job.

The national bureau of statistics of Nigeria stated that Nigeria youths are among the most important resources the country need is to be able to achieve prosperity and progress (Maigwa and Kipesha, 2013). In addition, the population of every economy is of two categories, the economically active and the economically inactive (Muhdin, 2016).

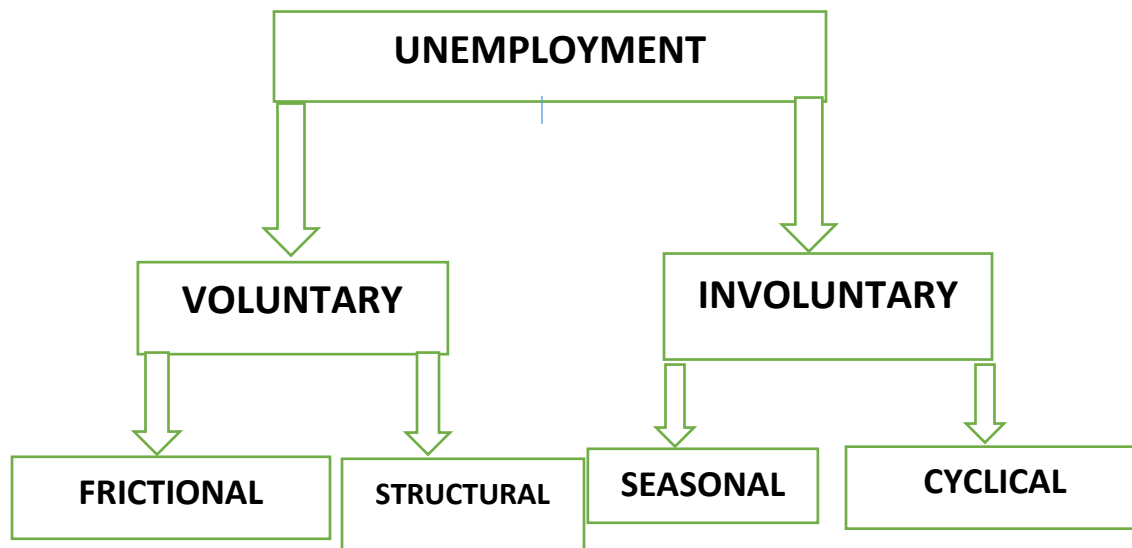
The resultant effects of unemployment are extensive crises in psychological, social-economic perspective, some of them are increasing crime rates and violence in the society, low-self-confidence by the victim, poor social life, and unhappiness (Bulus, 2011). Nasir et al (2009) in explained that unemployment affects the socio-economic status of the family and also leads to poor emotional health, dependency and increase the rate of corruption, immorality, drug addiction, suicide and other crimes in the society.



The International Labour Organisation in their contribution has it that the unemployed are numbers of the economically active population who are without job but available for and seeking for work. They also include people who voluntarily left their job and lost their job (world bank 1999). On the other part of Bassey and Atan(2012), Nigerian has the potential for fast economic growth, with her rich natural resources, yet the country's economic performance has been defined as being damaged ,disarranged and unimpressive(Ajayi 2002,Iyaha and oriakhi 2002,kayode 2004, Ekpo,2008). The poor growth of performance of the economy is depicted in the rising incidence of poverty, massive unemployment, skyrocketing inflation, balance of payment, excessive external debt burden, widen income inequalities and growing fiscal imbalances which takes into consideration the Nigerian crisis of unemployment. This is why Ekpo(1987) In Bassey and Atan(2012), confirmed that all these problems are rooted in the excessive distortions existing within the economy.

Unemployment in Nigeria developed after her first independence. Akintoye (2008) in Bassey and Atan (2012) suggested that the rate of unemployment rise from 4.3% to 6.4% and further rose to 7.1% in 1987. Bassey and Atan, (2012) suggested that structural adjustment (SAP) had a salutary effect on job creation leading to a sharp fall in unemployment figure from 7.1% in 1987 to 3% in 1994. However the rate of unemployment in Nigeria keeps on increasing.

### 2.1.1.1 Types of Unemployment



#### **Voluntary Unemployment**

This refers to the situation when workers deliberately chooses not to work because of a low wage scale or not able to find out the suitable employment. In other word, the voluntary unemployment is when the person decides not to participate in the labour market, not because of the unavailability of jobs, but because of not finding the jobs of his/her choice or is not satisfied with the wage system. The voluntary unemployment also gets created when the worker is neither willing to work nor searches for a job, as he is satisfied with the amount given by the government in the form of unemployment benefits. High-income tax rates could also be one of the reasons behind a worker not choosing to work.

#### **Involuntary Unemployment**

This refers to a situation in which workers are prepared to labor at the market wage or just below it, but are unable to do so due to circumstances beyond their control. A lack of aggregate

demand, labor market inflexibilities, implicit wage bargaining, and efficiency wage theory are all possible reasons. In Keynesian theory, involuntary unemployment is linked to a lack of aggregate demand, and as a result, is closely related to demand deficient unemployment.

### **Frictional Unemployment**

This is the unemployment which occurs as a result of incompleteness of information of both workers who are constantly on the lookout of better jobs and employers who are also on the look out for better workers, the amount information available about job opportunities that one worker possess is incomplete, so is the amount of information to the employer about labour opportunities. As a result, we define frictional unemployment as the fraction of unemployment caused by the regular operation of the labor market, and it is used to assess the presence of short-run job/skill mismatches. As a result, frictional unemployment is a form of transitory unemployment. (S.A.Oyefusi)- and others

### **Structural Unemployment**

This occurs when there is technological advancement when production structure changes from labour intensive to capital intensive method. This can occur due to change in demand, this unemployment is caused by changes in the country's industrial structure through the switching of production from one kind of work to another, such a change produces unemployment only because of the immobility of factor of production.

### **Seasonal Unemployment**

This is the type of unemployment which comes and goes with the season of the year. The demand for Labour is high during the relevant seasons and low when out of season. Hence, seasonal variations. E.g. construction, workers are often unemployment during the rainy season

or winter. Farmers in Nigeria are fully employed during the planting and harvesting seasons, outside these seasons, they are unemployed. Again the demand for rainy season product such as rain coats, umbrella, and rubber shoes are usually high during season and more workers are required for their production and packaging. Outside this season, some of these workers are laid off and become jobless or unemployed.

### **Cyclical Unemployment**

This type of unemployment is associated with deficient demand; that is an unemployment that occurs because aggregate demand is not enough to purchase available output. Put differently, cyclical unemployment refers to that form of unemployment which would not exist if the economy were operating at its full employment output level. Cyclical conditions are associated with recessions and depressions. During cyclical down turns, that are during recessions, fewer goods and services are purchased on the aggregate and employers reduce production and the number of employees. There, many people find themselves without jobs. Several workers in basic industrial employment such as steel, automobile and farm equipment production are usually unemployed for some time during depression or recession and can only return to their job when the economy bounces back.

#### **2.1.1.2 Concept of Macroeconomic Variables**

- **Inflation**

Inflation is described as an increase in the price of goods and services over a certain period of time, usually over a lengthy time (Balami,2006). Economists have argued over how to distinguish inflation from an economic occurrence that causes a price increase in products and services at a certain period or when there is an upward tendency in the prices of economic goods

and services in a specific area. The relationship between inflation and unemployment has gone through some phases since the conclusion of world war (II), the first phase was the ascent of Philip hypothesis (Friedman, 1978). Philip discussed that there was a consistent negative relationship between the level of unemployment and the rate of changes in wages. Wage reductions are linked to high levels of unemployment, whereas wage increases are linked to low levels of unemployment.

- **Economic Growth**

Economic growth is an increase in general output of a nation, it may be measured in terms of its GDP, GNP, or GDP per capital (Michael. P. Todaro). Economic growth is what leads to economic development but not always is usually. There can be economic growth without development but no economic development without economic growth. Meaning that economic growth is necessary for economic development.

According to Balami (2006), economic growth which is usually regulated by GDP is often conceptualized as an increase in total output of an economy's capacity to produce goods and services needed to improve the welfare of the country's citizen. Growth is viewed as a strategy that entails increasing the amount of products and services produced in the economy. When the pace of growth is significantly higher than population increase, it is relevant since it must lead to an improvement in human wellbeing. Therefore, growth is seen as a steady process of increasing the productive capacity of the economy and hence, of increasing national income, As an economy's output increases, it is expected that the purchasing power of the country increases as well. However this is not always the case because of the possibility of rising inflation alongside the economic growth.

Growth is an important objective of economic policy particularly in Nigeria because it is the key to high standards of living; it brings about more revenue which means more and better schools, hospitals, and social services (Olutola, 2013) as well as increased employment.

The economic growth rate in Nigeria has been quite remarkable recently with a GDP of 262.6 billion dollars (World Bank data) and a growth rate of 6.75%, the nation is surely making progress. Although, the economic growth of Nigeria is yet to accumulate into development as the nation is still experiencing gross poverty, high unemployment, etc. and with the rising rate of population of the country. Nigeria as nation is tasked with duty of ensuring the proper wellbeing of its citizens in terms of health, education, and provision of other basic social amenities.

## **2.2 Theoretical Review**

### **2.2.1 The Classical Theory of Unemployment**

The classical were the school of thought that emphasized the role of money in explaining the short term changes in national income. Their view was that involving unemployment was a short term phenomena resulting from a discrepancy between the price level and the wage level unemployment was the result of two high wages. At times the wage level in the classical view would be reduced and there will be no unemployment except for fictional search unemployment caused by time delays between quitting one job and starting another. The school viewed that the problem of urban unemployment is traceable to the fault of workers and the various trade union power. They believe strongly in the theory of supply and demand. Therefore it insists that urban unemployment is caused by supply of labour of more than capacity of the economy.

Consequently the school argued that the demand for two high wages by worker without a corresponding increase in productivity, vendors product costly therefore discourage competitiveness among local industries and foreign industries. The implication of this trend is

the reduction of sales, which further leads to mass retrenchment of workers, resulting to unemployment.

The cyclical unemployment is the disequilibrium level of involuntary unemployment caused by the combination of low aggregate demand and sluggish wage adjustment. The classical case of unemployment is based on the inflexibility of wages. Unemployment result because labour, due to organize activities do not allow wage to decline for the accommodation of excess labour when there is incidence of unemployment.

Given- wage-price flexibility, there are automatic forces in the economic system that tends to draw the economy into the equilibrium state. (Jhingan 200). Unemployment from the classical view cannot really be situated in most sub- Sahara Africa economics. Although, price flexibility is not actually feasible due to trade union activities, but its existence wouldn't have efficiently addressed the problem of unemployment. This is because for instance, in Nigeria, most sector if not all especially the public sector enterprise have the problem of labour redundancy due to over staffing (Bello, 2003).

### **2.2.2 The Keynesian Theory of Unemployment**

John Maynard Keynes in 1930's revolutionized thinking in several areas of macroeconomic, including unemployment, money supply and inflation.

Keynesian unemployment also known as demand deficient unemployment occurs when there is no aggregate demand in the economy. It gets its name because it varies with the business cycle, though can be persistent as it was during the great depression of the 1930's. Keynesian unemployment rises during economic depression and falls when the economy improves. His type of unemployment exists due to ineffective demand.

In the Keynesian theory, employment depends upon effective demand which results in increased output, output creates income and income provides employment. He regards unemployment as a function of income. effective demand is determined by aggregate supply and demand function. The aggregate supply function relies on physical or technical conditions which do not change in the short run, thus it remains stable. Keynes focused on aggregate demand function, to reduce depression and unemployment, thus employment depends on aggregate demand which in turn is determined by consumption demand and investment demand. Consumption depends on income, and when income rises savings also rises, and also consumption can multiply by raising the propensity to consume, which could lead to a rise in income and employment, but it is believed that the psychology of people ( taste,habits,trends etc) are constant in the short run, therefore propensity to consume is stable. Employment thus depends on investment.

### **BASIC ASSUMPTIONS**

1. Keynesian economics assumes that price and wages responds weakly to changes in demands and supply, resulting in shortages and surpluses of labour. And that may increase in real wages (money wages remaining constant or rising) will lead to an increase in the number of labour available.
2. Government interference is beneficial to an economy; through the fiscal policy, the government use spending of goods and services to reduce business cycle. Government spending reduces the price of goods and services, making it more affordable. This increases the demand and consumer's spending. With the increase in demand, companies need to produce more so they will have to hire more employees.
3. Keynesians sees unemployment as both too high on average and variable, although they know that theoretical justification for these positions is hard. Keynesians also feel that



numerous periods of recession or depression are economic disturbance. Income in terms of money wage units corresponds substantially in its variations with the variation in level of employment, it is concluded that income, consumption and level of employment are related to each other in a simple pattern.

4. Finally and even less unanimously, Keynesians are more concerned about reducing unemployment than about reducing inflation. They concluded from the evidence that the costs of low inflation are small. However there are plenty of anti-inflation Keynesians.

### **2.2.3 Okun's Law**

Okun's law instigated the presence of a particular empirical relationship between economic growth and unemployment rate change. Several cross country have been undertaken on the Okun Law Coefficient (OLC). The significance of Okun's law for public policy was reviewed by Perman and Tareva in this declaration; The relationship between Okun's law has a significant consequences for macro policy since the size of OLC is a significant indicator of the degree of interdependence between output and labour movements on their long-term routes and is considered a benchmark for policy makers to assess the price of greater unemployment (Sodipe and Oluwatobi 2014).

- **The difference version of Okun's Law**

Okun's first relationship captured how changes in the unemployment rate shifted from one quarter to the next with real output quarterly development. Thus; change in the rate of unemployment = a+b ( real increase in production). It depicts the contemporary relationship between output growth and unemployment movements meaning output growth differs at the same time as unemployment rate changes. Parameter b is often referred to as Okun's coefficient. The coefficient is expected to be negative, resulting in

fast production development related with reduced unemployment rate, and slow or negative output development connected with increasing unemployment rate. The  $-a/b$  ratio provides production growth rate consistent with a stable rate of unemployment, or how fast the economy would typically need to develop to keep a desired amount of unemployment (Javeid ,2012).

- **The Gap Version of Okun's Law**

Javeid (2012) stated that while Okun's first connection was based on easily available macroeconomic statistics, his second connection linked the unemployment rate to the gap between potential output and real production. Okun attempted to define in potential output how much the economy would generate 'under full employment circumstances'. Okun regarded what he thought was a low level of unemployment to generate as much as possible without creating too much inflationary stress in full employment. Typically, Okun reasoned, an elevated unemployment rate would be connected with idle resources. In such a case, the real production rate would be expected to be below its capacity. The inverse scenario would be combined with a very low unemployment rate. Thus the second connection of Okun's Law or the gap version of the law of Okun took the form of  $\text{unemployment rate} = c+d$  (gap between potential output and real production). It is important to interpret variable  $c$  as the unemployment rate connected with full employment. To adhere to the above intuition, the ratio  $d$  would be positive. The issue with both potential output and full employment is that neither is a macroeconomic statistic which can be immediately observable. As such, they allow the investigator to make a significant interpretation. For example, when Okun wrote he thought complete employment happened when unemployment was 4% Okun was able to build a series for

potential output based on this premise and the gap equation. But altering the hypothesis of what level of unemployment constituted full employment would generate a distinct measure of prospective output. Okun noticed that apart from this problem, the equation might be difficult. This has resulted economists to suggest a number of variation on the initial relationships of Okun. These connections are also often referred to as the law of Okun even though they vary significantly from the previous equations (Javeid, 2012).

- **The dynamic version of Okun's Law**

Another of Okun's findings proposed that past and present production could affect the present rate of unemployment. This means that some appropriate factors were exempted from the correct side of the equation in the difference version of Okun's law. Many economists make use of the dynamic version of Okun's law, based on proposal. A popular form for the dynamic version of Okun's law would have actual real output development, past real output growth and previous unemployment rate shifts as factors on the correct side of the equation. The present shift in unemployment rate on the left hand would then be explained by these factors. This dynamic version is similar to the Okun's law of difference. It is actually different, however as it no longer captures only the contemporary correlation between changes in the unemployment rate and development in real output. In terms of the timing of the link between production development and changes in unemployment, the dynamic relationship is not restrictive. But the disadvantage is that this connection does not have the same easy interpretation as the initial version of Okun's law of difference (Javeid, 2012).

- **The production function version of Okun's Law**

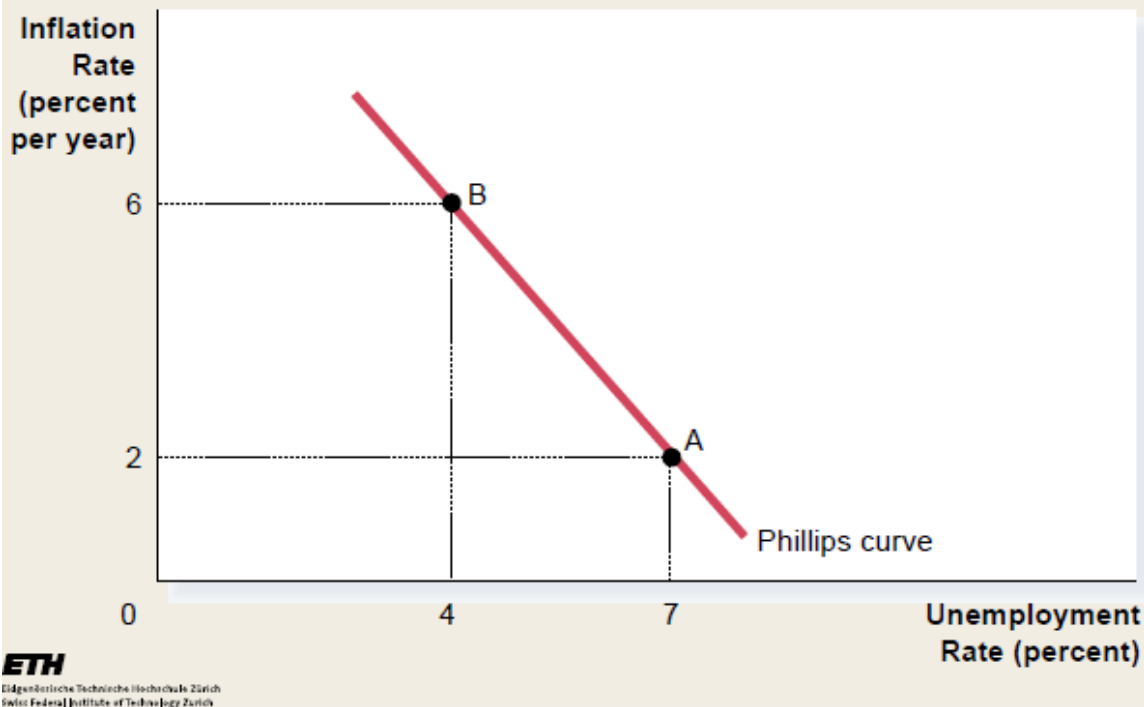
Okun noticed in his proposed relationships, the unemployment rate is a t best 'a measureable variable for all the ways in which output is affected by idle resources'. Idle resources can form an amount of sources. Economic theory indicates that a country needs mixture of labour, capital, and technology to produce goods and services. The unemployment rate is one factor in determining the complete quantity of labour used as an input, other considerations include the population, the percentage of the labour force population and the number of hours employees used. By accounting for all these components along with the components of capital and technology, economists have a more complete view of what affects output. This method has led to production-function versions of okun's law. This enables economists to evaluate all the idle resources of the economy. Okun's law vary on the production function has the advantage of an underlying theoretical structure. This contrasts with prior equations, mainly motivated empirically. But this strategy also has disadvantages as evaluating inputs such as capital and technology factor is a challenging and imprecise job (Javeid, 2012)

#### **2.2.4 The Modified Philip Curve**

The Philip curve is used to analyse the relationship between inflation and unemployment. In 1958, A.W Phillips of the London school of economics published a paper in the economics journal *economica*; 'The Relation Between Unemployment and the Rate of Changes of Money Wages in the United Kingdom'(1961-1957).

Phillips gathered data about the rate of change in money wages, sometimes referred to as wage inflation, and about unemployment rates in the United Kingdom over almost a century.

## The Phillips Curve



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Source; *ETH*

*Eidgenössische Technische Hochschule Zurich.*

*Swiss Federal Institute of Technology Zurich.*

The Philip curve shows the short –run combinations of unemployment and inflation that arises as shifts in the aggregate demand curve move the economy along the short-run aggregate supply curve.

The greater the aggregate demand for goods and services, the greater is the economy's output and the higher is the overall price level.

A higher level of output results in a lower level of unemployment.

The curve, is a downward slopping one suggested that the rate of change of money wage rates (wage inflation) and unemployment rates are inversely related.

Policy makers concluded from the Philip curve that lowering both wage inflation and unemployment was impossible; they could do only one or the other. So the combination of low wage inflation and low unemployment was unlikely.

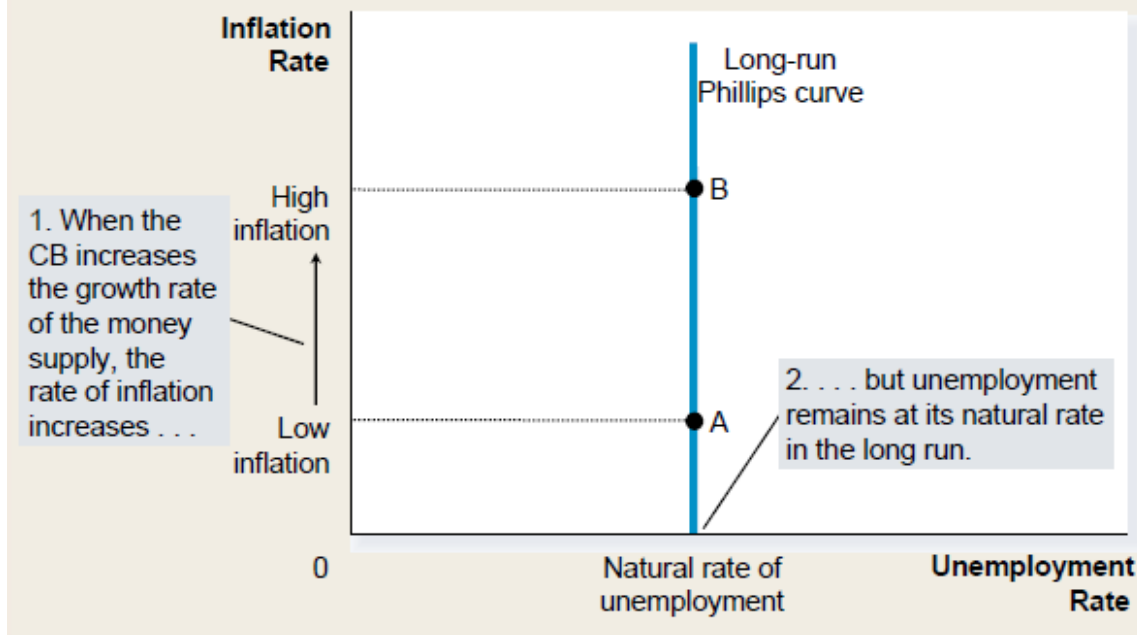
- **The long run Philip curve**

In 1960, Friedman and Phelps concluded that inflation and unemployment are unrelated in the long run. As a result, the long-run Philip curve is vertical at the natural rate of unemployment.

Monetary policy could be effective in the short run but in the long run. Monetarist argued that if there is an increase in aggregate demand, then workers demand higher nominal wages, they work longer hours because they feel real wages have increased.

However, this increase in AD causes inflation, and therefore, real wages are the same as last year, they change their price expectations, and no longer supply extra labour and the real output returns to its original level. Therefore unemployment remains unchanged, but a higher inflation rate.

## The Long-Run Phillips Curve



Source; *ETH*

*Eidgenössische Technische Hochschule Zurich.*

*Swiss Federal Institute of Technology Zurich*

### 2.3 EMPIRICAL REVIEW

Numerous studies examined the determinants of unemployment, a short review of authors will be carried out.

Tabuina (2000) found empirical support by raising a hypothesis that unemployment has a negative effect on economic growth while Layard and Nickell (1999) cannot find the labour market institution that increases unemployment also lower economic growth. It is quite possible that some institute that affect unemployment also affect economic growth and the level of output in Nigeria.

Stephen (2011), investigate the impact of unemployment on economic growth for a case of Nigeria, for the period 1980-2008. He used cobb-Douglas production function to develop his model and estimated his results by using simple OLS method, he found out that unemployment changes significantly and inversely to the economic growth in Nigeria.

Silvapulle et al., (2004), examined the relationship between unemployment and economic growth, they explore the impact of cyclical unemployment for a case of U.S, by applying dynamic model for post war period data set, they found two conclusions from the study, first was that the positive impact of cyclical output on unemployment differs from negative impact of cyclical output on unemployment in the short run, the second was that, the negative impact of cyclical output on cyclical unemployment is more significant than that of the positive impact of cyclical output on cyclical unemployment.

Tunch (2010) examined the macroeconomic variables of real GDP consumer price index, previous unemployment and real effective exchange rate which impacted unemployment for turkey over the period 2000-2008 by using a quarterly data set. The study employed Johansen's cointegration econometric procedures. The results showed a significant impact of real GDP, consumer price index and previous unemployment rate on the unemployment rate whereas real effective exchange rate did not impact the unemployment. The study also found that a negative relationship exists between economic growth and unemployment.

Auer Bach and Gorodnichenko (2012) also studies the relationship between government expenditure and unemployment in Nigeria. By applying error correction modelling technique, they found a significant relationship which means an increase in government expenditure leads to a fall in unemployment.



Folawewo and Adeboje (2017) analysed the relationship between macroeconomic variables and unemployment in the Economic Community of West African States (ECOWAS). The selected variables: inflation rate, GDP growth, labour productivity, foreign direct investment and external debt. The study employed fixed-random effects and fully modified ordinary least squares (FMOLS) panel data estimation procedures on annual data for the period 1991 to 2014. Results shows that GDP growth has a reducing but insignificants effect on unemployment rate and inflation has a positive impact on unemployment, indicating invalidity of the Philips curve hypothesis. Also, it is found a positive impact of labour productivity on unemployment rate, meanwhile FDI and external debt exhibit a low negative impact on unemployment rate.

There are also studies on the effect of government expenditure on unemployment. Nwosa (2014) examined the impact of government purchases on unemployment and poverty rates in Nigeria from 1981 to 2011. By using the OLS methods, he found that government expenditure has a positive and significant impacts on unemployment rate while it has a negative and significant impacts on poverty rate.

Khemraj, Madrick and Semmlar (2006) research was the first extensive but concise study on the Okun's law and development of joblessness. They updated the outcomes of the Okun's law with a latest information collection (1961-2000) and in a panel model analysis acquired GDP and work elasticities. Khemraj et al., (2006) in their article viewed the phenomenon of unemployment development in the United States of America as Okun's hypothesis and showed that a decreasing work development reaction arises from a decrease in the Okun coefficient. They also showed that this ratio was not dropping but increasing in other nations, for instance, Germany and France. They found, thus reversing the prior greater work development reaction to US financial development.

Villaverde and Maza (2009) check the validity of Okun's law for the Spanish regions between 1980 and 2004. In support of adverse connection between unemployment and production, the research offers proof for most areas and for the entire nation. However, the research further shows various estimates of the coefficients of Okun across areas that could be ascribed to regional productivity disparities.

Loria and De Jesús (2007) check the robustness of Mexico's Okun's law using quarterly information from the first quarter of 1985 to the fourth quarter of 2006. The research estimates the coefficient of Okun to fluctuate in the range 2.3-2.5 using three structural time series models (Kalman Filter). The research also finds solid proof that production and unemployment are bilateral causal.

Kreishan (2011) investigates the relationship between unemployment and economic growth in Jordan by implementing Okun's law. Using annual data covering the period 1970-2008, empirical results reveal that Jordan cannot confirm Okun's law. It can therefore be suggested that the absence of economic growth does not explain the issue of unemployment in Jordan.

Zaglar (2003) analyses an economic growth and unemployment vector error correction model in four main European nations, Germany, France, Italy, and the United Kingdom. The research discovers that there is a beneficial long-term connection between economic growth and unemployment, a finding that goes against the law of Okun. The short-run dynamics of the two interest factors, however, indicate agreement with the Okun's law. The research further shows that with the exception of United Kingdom, the coefficient of Okun is in agreement with prior estimates for the nations in the sample.

Valadkhani (2003) examined the major causes of unemployment in Iran. The study used time series data covering the period of 1968-2000. The study employed annual rate of unemployment (U) as the dependent variable and consumer's price index (P), output gap (G); actual real output (Y); potential output ( $Y^p$ ); economic uncertainty proxy with black market premium (Bp); total investment (I) and dummy variables taking the value of 1 for the Iraqi war (1980-1988) as the independent variable. The data obtained were analysed using ADF test and two stage least square technique. The study found that the rate of unemployment responds positively to output gap and increasing economic uncertainty and negatively to the higher growth rates of real investment and inflation, supporting the view that there exists a degree of trade-off between inflation and unemployment in Iran.

Eital et al (2010) investigated the determinants of unemployment in Namibia. The study used time series data spanning from 1971-2007. The study employed unemployment rate (UN) as the dependent variable and consumer price index (P); output gap ( $Y_a - Y_p$ ); Real wage (RW); and productivity (PROD) as the independent variables. The data obtained were analysed using ADF test, Error correction Mechanism, Engel-Granger co-integration test, and ordinary least square techniques. The study found that there is evidence of a negative relationship between unemployment and inflation. And, it shows that the Philips curve holds for Namibia.

Kabaklarli et al (2011) analysed economic determinants of unemployment problem in Turkey. The study used monthly data spanning from 2005-2010. the study employed log of youth unemployment rate (UN) as the dependent variable and log of the real GDP which is deflated with consumer price index (I); log of productivity as a total output/total employment (PROD) as the independent variables. The data obtained were analysed using ADF test, PP test, Vector Autoregression model, Johansen Cointegration test, and ordinary least square techniques. The

study found that inflation and productivity have positive effects on unemployment rate, despite the fact that GDP and investment have negative effects in the long-run.

Aurangzeb et al (2012) investigated macroeconomic determinants of the unemployment for India, China and Pakistan. The study used time series data covering the period 1980-2009. The study employed unemployment of the total labour force of a country (UE) as the dependent variable and annual growth in the gross domestic product of a country (GDP), effective exchange rate of local currency against US dollar (ER), inflation (INF), and annual growth in total production (POP) as the independent variables. The data obtained were analysed using regression analysis, cointegration and granger causality test. The study found that GDP, exchange rate, inflation and population growth have a significant impact on unemployment in India, China and Pakistan.

Chigbu (2013) analysed the causes, effects and remedies of poverty and unemployment in Nigeria. The study utilized a time series data covering 1991-2010. The study employed GDP as the dependent variable and recurrent expenditure on education (EDU); unemployment rate (UNEMPL); recurrent expenditure on agriculture (AGRIC); recurrent expenditure on health (HETH); and population growth (POP) as independent variables. The data obtained were analysed using a descriptive statistics, ADF test, co-integration test and ordinary least square technique. The study found that unemployment is on the increasing side in Nigeria and it has a significant relationship with poverty.

Amezaga (2014) examined the impact of economic growth on unemployment rate in Peru. The study used a time series data covering the period of (2001-2012). The study employed unemployment rate (UE) as the dependent variables and economic growth (EG) as the independent variable. The data obtained was analysed using descriptive statistic and ordinary

least square estimation technique. The study found a negative relationship between economic growth and unemployment rate.

Nwosa (2014) examined the impact of government expenditure, unemployment and poverty rate on Nigerian economy. The study used time series data covering the period of (1981-2011). The study employed unemployment rate (UNE) as the dependent variable and poverty rate (POV), government expenditure (GEX), public debt (DBT), and economic growth (EG) as the independent variables. The data obtained were analysed using descriptive and inferential statistics, ordinary least square method. The study found the unemployment rate has a positive and significant impact on economic growth of Nigeria.

Cheema et al (2014) examined the economic determinants of unemployment in Pakistan. The study used time series data covering the period of (1973-2010). The study indicated unemployment rate (UNR) as the dependent variable and output gap(OG); Economic uncertainty EU); Gross fixed investment (GFI); productivity (PRD); and Openness of trade (OT) as the independent variables. The data obtained were analysed using ADF test, PP test, Engel- Granger test, ARDL, ECM and ordinary least square technique. The study found that output gap have a positive relationship with unemployment in both the long run and short run. Also, that Economic uncertainty and Gross fixed investment are important determinants of unemployment in Pakistan.

The connection between production and unemployment in Scotland was researched by Revoredo-Giha Leat and Renwick (2012). A decrease in Scottish labour market circumstances affected their research. Their research findings show that the variations in rural and urban economic structure lead to a powerful connection between development and jobs in urban regions.

Asoluka and Okezie (2011) evaluated Nigeria's unemployment growth relationship (1985-2009). One of the study's main results is that between 1991 and 2006 the economy grew by 55.5% and the population increased by 36.4%. All things been equal, this should have led to a drop in the unemployment rate, but unemployment rose by 74.8%. The research also discovered that the oil sector's average contribution to GDP between 1991 and 2006 was 30.5% to just a 6.1% difference from oil, which uses less than 10% of the labour force. The research suggested that the agricultural sector be used as a means of decreasing unemployment in Nigeria and recommends that the government and all appropriate stakeholders continue their quest to reduce unemployment, as well as providing their assistance to ensure that the agricultural sector is not downtrodden but accepted in this assignment.

#### **2.4 GAPS IN THE LITERATURE**

Numerous studies has focused mostly on one of macroeconomic determinants of unemployment and others also focused on the individual-socio-economic determinants of unemployment, although this study is not too different from existing studies but extended the frontier of knowledge in the literature by considering more than one of the macroeconomic variables or determinants of unemployment in Nigeria. In specific, the following gaps in the literature reviewed are under listed as follows:

- The number of studies on Macro-economic Determinants of Unemployment in Nigeria.
- Little or no studies on Philips curve and Okun's Law.
- Methodological, most studies have not considered the short-run and long-run impact on macroeconomic variables on unemployment.

- In addition few or no studies have considered the causal direction amongst unemployment rate, inflation rate, and economic growth in Nigeria.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Introduction**

This chapter reveals the theoretical framework of the study to delineate the determinants of unemployment in Nigeria and the methodological approach employed to establish the empirical determinants of unemployment in Nigeria. Also, explained here are the model specified, a priori specification, and technique of estimation, data sources and description as well as other methodological issues.

#### **3.2 Sources of Data**

This study used secondary data. The data was obtained World Development Index (WDI), Central Bank of Nigeria (CBN) and the National Bureau of Statistics(NBS).

#### **3.3 Definition and Measurement of Variables**

The variables used in this study were drawn from the theoretical framework and the existing empirical studies. The definition and measurement of these variables are classified into dependent and independent variables. Where unemployment is the dependent variable. It is measured by the Macroeconomic determinants. Independent variables include macroeconomic determinants, which is measured by; (Economic growth, Foreign Direct Investment, Gross Domestic Product, and Inflation.



### 3.4 Theoretical Framework

In search of the determinants of unemployment several theories have been developed which includes the Keynesian model, Okun's model and the Philip curve model. However, the model that best captures the main objective of this study is the Philip curve model which is a type of an endogenous growth theory.

The Philip curve model which was developed by Professor A.W Philips (1914-1975) is based on the inverse relationship between the rate of Unemployment and the rate of nominal wages, a lower rate of unemployment is associated with a higher wage rate or inflation, and vice versa. In other words there is a tradeoff between wage inflation and unemployment. Thus decrease in unemployment leads to increase in the wage, but when wage increases, the firm cost of production increases which leads to increase in price. Therefore it is also called wage inflation that is decrease in unemployment leads to wage inflation.

To explain the tradeoff between growth rate of wages and unemployment:

Let  $W_t$ .....Wage in the last period

$W_{t+1}$ .....Wage in this current period

Then growth rate of wage inflation( $g_w$ ) will be :

$$g_w = \frac{W_{t+1} - W_t}{W_t} \dots\dots\dots 1$$

With  $U^*$  representing NRU, the equation of Philip curve can be written as

$$g_w = -\epsilon(U - U^*) \dots\dots\dots 2$$

Where  $\epsilon$  = Response of wage change to unemployment rate

$U - U^* =$  Unemployment gap

$U =$  Actual unemployment

$U^* =$  NRU

or  $W_{t+1} = W_t [1 - \epsilon(U - U^*)] \dots \dots 3$

Equation 2 shows:

If  $U > U^*$  wages are falling because  $g_w$  is negative ( $g_w < 0$ ),  $U < U^*$  wages are rising because  $g_w$  is positive ( $g_w > 0$ )

This shows that there exists inverse relationship between the rate of unemployment and growth rate of money wages. The Philips curve shows that wages and prices adjust slowly to changes in AD due to imperfections in the labour market e.g. Assume, initially the economy is in equilibrium with stable prices and unemployment at NRU (NAIRU) ( $U^*$ )

### **3.5 Methodological Approach**

This subsection will reveal the methodological approach employed by the study as it pertains to the model specified and the estimation techniques and procedures employed in this research to evaluate the determinants of unemployment in Nigeria.

#### **3.5.1 Model Specification**

This study will use a time series data model to investigate the determinants of unemployment in Nigeria, Hence this model showed the mathematical relationship between the dependent and independent variable, In, specific order to achieve the first two objectives, the two model specialization are as follows:

**3.5.1.1 Model specification for objective (1)**

UNEMP=F (INF, POPG, GFCE, FDI, GDPPCI)

$$UNEMP = \beta_0 + \beta_1 INF_t + \beta_2 POP.G_t + \beta_3 GFCE_t + \beta_4 FDI + \beta_5 GDPPCI + e_t \dots \dots \dots 3.1$$

Where,

UNEMP= Unemployment

INF=Inflation

POP.G=Population growth

GFCE= Government fixed capital formation

GDPPCI= Gross domestic product per capital income

**3.5.1.2 Model specification for objective (2)**

UNEMP =F (EG, INF, INFR, HC, CEXP)

$$UNEMP = \beta_0 + \beta_1 EG_t + \beta_2 INF_t + \beta_3 INFR + \beta_4 HC_t + \beta_5 CEXP_t + e_t \dots \dots \dots 3.2$$

Where,

UNEMP= Unemployment

EG= Economic Growth

INF= Inflation

INFR= Infrastructure

HC=Human capital

CEXP= Capital expenditure

### 3.5.2 A PRIORI SPECIFICATION

#### A priori specification for objective (1)

Coefficient	Variable	A priori expected sign
$\beta_0$	Intercept	positive
$\beta_1$	INF	Negative
$\beta_2$	POPG	positive
$\beta_3$	GFCF	Negative
$\beta_4$	FDI	Negative
$\beta_5$	GDPPCI	Positive

Source: Author's compilation, 2021.

#### A priori specification for objective (2)

Coefficient	variable	A priori expected sign
$\beta_0$	Intercept	positive
$\beta_1$	EG	Negative
$\beta_2$	INF	positive
$\beta_3$	INFR	Negative
$\beta_4$	HC	Negative
$\beta_5$	CEXP	Negative

Source : Author's compilation, 2021.

### 3.5.3 Estimation Technique

The techniques employed in this study are descriptive statistics and econometric. First, the descriptive statistics employed mean standard deviation, skewness and kurtosis to describe the data from univariate analysis. Further, the econometric technique, used the time series econometric properties such as Unit root and Augmented Dickey- Fuller (ADF) to test the unit root problem for each data as well as determine the cointegration of joint variable in the long run. Lastly the OLS regression and Granger causality test are used to estimate the causal relationship of the two research objectives and the Granger causality is used to estimate the causal direction between the main variable.

## DESCRIPTION OF VARIABLES AND DATA SOURCES

**Tables 3.2: Description and sources of Data**

Identifier	Variable	Description	Sources of Data
H.C	Human capital proxied as secondary enrolment rate(SER)	This refers to the education trend and an overview of the structure of the education system. The more people are educated with the right skills for the right jobs, the lesser the unemployment rate in the economy as people are able to get job that matches their skills.	World Development Index (WDI)
INFR	Infrastructure is proxied as percentage population access to electricity	This refers to an electronic apparatus that provides appropriate voltages for the rest of the electronics from the connected source, it invest power and transmission lines to ensure a stable power supply. The higher the power supply rate in the country the lesser the unemployment rate as people are able to venture into businesses like laundry, cyber café e.t.c	World Development index
POPG	Population Growth	This is the increase in the number rate of the people in an Economy.	World development index
EG	Economic Growth is measured as change in GDP over a required ratio.	This refers to an increase in a country's productive capacity, as measured by comparing Gross National Product (GNP) in a year with the GNP in the previous year, increase in the capital stock, advances in technology and improvement in the quality and level of literacy are considered to be the basic causes of economic growth.	World development index
FDI	Foreign Direct Investment	This refers to the form of long-term international capital amount which is carried out for productive activity, which is supplemented by the intention of managerial control or the impact in the management of a foreign business.	World Development Indicators
GDPPCI	Gross Domestic Product per capita	Monetary value of goods and services produced in the economy over a period of time irrespective of the nationalities of the persons producing	World development index

		the goods and services divided the population size.	
INF	Inflation	This represent an economic situation, where there is a constant general increase in the prices of goods and services. As calculated by an index such as the consumer price index (CPI) or by implicit price deflator for Gross National Product(GNP). It could be characterized as a continuous price increase. Its also the condition where too much money purchases too few goods.	Central Bank of Nigeria
GOV.EXP	Government Expenditure is measured as the total government expenditure in closing capital and recurrent government expenditure	This refers to the expenses which government incurs the performance of its operation, it covers things such as spending on health, education and social-services sector and it is funded by tax revenue.	World development index

Source: *Researcher's compilation, 2021.*

## CHAPTER FOUR

### DATA PRESENTATION AND ANALYSIS OF RESULTS

#### 4.1 Introduction

This chapter reveals the descriptive summary of the variables of interest, correlation matrix, unit root test result and cointegration relationship of the variables, empirical testing and integration of findings from the model put forward as well as testing of the research hypothesis. The method of analysis employed the Johansen cointegration test and the Ordinary Least Square method of analysis.

#### 4.2 Data Presentation

This section presents the data used to evaluate impact of macroeconomic variables on unemployment in Nigeria in this study.

Table 4.1 Data Presentation for this study

YEAR	inf(cpi)	POPG	GFCF	FDI	GDPPCI	E.G	inf(gdp deflator)	INFR	HC	CEXP	U
1970	0.115051	55982144	79.38105	3.114868	181.0811	14.23753	1.348034	8.3	-0.3669	-4.43	
1971	0.119029	57296983	80.38105	2.484843	188.0942	3.364262	2.892868	9.3	0.6331	-3.43	
1972	0.125459	58665808	81.38105	2.459956	203.804	5.39276	5.346837	10.3	0.65999	-2.43	
1973	0.141361	60114625	82.38105	1.034345	317.8485	11.16067	43.94637	11.3	-2.27797	-1.43	
1974	0.189373	61677177	83.38105	1.692362	362.0616	-5.22775	23.50079	12.3	-1.27797	-0.43	
1975	0.23539	63374298	84.38105	0.933656	438.6813	9.042352	14.35319	13.3	-0.27797	0.57	
1976	0.270905	65221378	85.38105	1.222448	499.7535	6.024118	10.71375	14.3	0.72203	1.57	
1977	0.329717	67203128	86.38105	0.577459	520.4562	-5.76416	13.91475	15.3	0.75333	2.57	
1978	0.368326	69271917	87.38105	0.655098	601.3358	6.759431	11.48876	16.3	0.74564	3.57	
1979	0.405056	71361131	88.38105	-1.15086	684.6569	4.204831	12.41966	17.3	0.74349	4.57	
1980	0.48936	73423633	89.38105	0.329732	1846.627	-13.1279	219.0028	18.3	0.75174	5.57	
1981	0.52703	75440502	85.9339	0.301613	1925.041	-6.80339	14.80255	19.3	0.74734	6.57	
1982	0.649365	77427546	75.75313	0.375338	1998.999	-10.9241	19.56895	20.3	0.7013	6.42	
1983	0.765086	79414840	58.94738	0.257422	2036.301	-1.11562	5.653664	21.3	0.67649	4.89	

1984	0.821973	81448755	46.39088	0.658453	2247.778	5.913027	6.927769	22.3	1.67649	4.10
1985	0.868966	83562785	54.95059	0.352544	2310.032	0.060945	5.415453	23.3	0.79799	5.46
1986	0.967075	85766399	49.98771	1.15907	2778.94	3.200125	19.66948	24.3	0.81294	8.53
1987	1.49424	88048032	43.64422	0.762696	3491.503	7.334025	20.17713	25.3	1.81294	6.37
1988	2.248333	90395271	52.48869	4.282088	4471.06	1.919381	28.96967	26.3	0.83242	8.34
1989	2.413909	92788027	53.18669	1.087951	5195.157	11.77689	6.668942	27.3	0.78217	15.03
1990	2.727885	95212450	48.40572	1.450318	6041.508	0.358353	18.86391	34.79286	-7.17665	24.05
1991	3.944218	97667632	43.77939	1.876018	9045.665	4.631193	46.75236	35.68333	-6.17665	28.34
1992	6.19894	100161710	44.48886	4.84779	12241.15	-2.03512	41.63906	36.57439	-5.17665	39.76
1993	9.734302	102700753	42.08362	5.790847	16798.65	-1.81492	43.29646	37.46665	-4.17665	54.50
1994	16.82433	105293700	37.23967	0.762196	28719.62	-0.07266	75.40165	38.36071	-3.17665	70.92
1995	21.74852	107948335	36.62556	0.977521	36921.57	4.195924	26.49109	39.25716	-2.17665	121.14
1996	23.60365	110668794	38.47746	0.862276	38945.88	2.937099	5.055346	40.1566	-1.17665	212.93
1997	25.96315	113457663	40.61495	0.548616	41309.89	2.581254	6.009344	41.0588	-0.17665	269.65
1998	27.68149	116319759	38.34181	1.692558	45969.74	0.584127	13.43057	44.9	0.82335	309.02
1999	29.60073	119260063	34.10954	1.641739	57757.02	5.015935	22.67374	42.85609	0.81514	498.03
2000	35.18747	122283850	30.92589	1.608284	65668.94	5.917685	10.07648	43.74224	0.82727	239.45
2001	39.71841	125394046	27.58251	1.964727	89438.58	15.32916	21.10905	44.61411	0.81157	438.70
2002	45.29161	128596076	29.3868	1.911463	102781.7	7.347195	9.804324	52.2	-0.17196	321.38
2003	52.08447	131900631	27.11797	1.374086	133934.4	9.250558	22.36834	46.29712	0.82804	241.69
2004	61.38857	135320422	26.18959	2.82883	166506.1	6.438517	19.85849	47.10199	0.83964	351.30
2005	66.43792	138865016	27.86559	2.056024	213101.9	6.059428	23.86438	47.89076	0.84907	519.50
2006	70.0176	142538308	21.24461	2.189934	236954.7	6.59113	7.099731	50.13092	0.85558	552.39
2007	78.12639	146339977	19.897	2.431219	265883.5	6.764473	7.921387	50.3	0.87303	759.32
2008	87.93512	150269623	22.04954	2.931336	281623.1	8.036925	0.686099	50.27625	0.88796	960.89
2009	100	154324933	17.5621	1.667213	344549.9	8.005656	16.34277	48	0.89722	1,152.80
2010	110.84	158503197	16.36056	2.183013	387793.4	5.307924	9.778458	55.9	0.90817	883.87
2012	124.3822	162805071	14.95883	1.552115	432649.6	4.230061	9.947637	53.27933	0.9544	918.55
2013	134.9246	167228767	14.90391	1.093559	471630.4	6.671335	4.964746	55.6	0.95258	874.83
2014	145.8029	171765769	15.8027	0.858612	510966.4	6.309719	4.662623	54.9189	0.95682	1,108.39
2015	158.9389	176404902	15.4901	0.629447	525444.8	2.652693	2.863665	52.5	-0.06968	783.12
2016	183.8531	181137448	15.36674	1.099403	551598.5	-1.61687	9.54367	59.3	0.93032	818.37
2017	214.2321	185960289	15.47433	0.932277	601966	0.805887	11.11892	54.4	1.93032	653.61
2018	240.1429	190873311	19.81377	0.502904	659027.8	1.922757	10.22849	56.5	2.93032	1,242.30
2019	267.5115	195874740	26.20655	0.736205	724704.1	2.208429	10.38478	57.5	3.93032	1,682.10
2020	268.5115	200963599	27.20655	1.736205	724705.1	3.208429	11.38478	58.5	4.93032	2,289.00

Source: Researcher's compilation, 2021



### 4.3 Descriptive Analysis Result

This sub-section presents a descriptive analysis of the variables used. These descriptive statistics describe each of the variable used in this research work.

Table 4.3 Descriptive analysis

	UNEMP	INF	POP.G	GFCF	FDI	GDPPCI	E.G	INF(GDP)	H.C	CEXP	INFR
Mean	5.8744	53.33799	0.026428	45.70094	1.506556	156339.6	3.504995	20.20808	0.154504	369.8376	35.72116
Median	5.575	19.28643	0.026203	39.5462	1.190759	32820.59	4.217446	11.43677	0.79008	96.03	38.80893
Maximum	9.07	268.5115	0.030784	89.38105	5.790847	724705.1	15.32916	219.0028	4.93032	2289	59.3
Minimum	3.59	0.115051	0.023487	14.90391	-1.150856	181.0811	-13.1279	0.686099	-7.17665	-4.43	8.3
Std. Dev.	2.141675	75.53424	0.00146	25.62715	1.209878	224823.7	5.585259	31.89379	2.186233	505.6611	16.27166
Skewness	0.169271	1.549574	1.16147	0.51064	1.349305	1.302575	-0.71865	5.090463	-1.4666	1.687444	-0.21157
Kurtosis	1.243376	4.408203	4.859044	1.835599	5.866147	3.305164	4.125086	31.66608	6.072946	5.942187	1.61306
Jarque-Bera	6.667374	24.14116	18.07303	4.997589	32.28602	14.33319	6.940986	1927.907	37.59721	41.76318	4.38051
Probability	0.035661	0.000006	0.000119	0.082184	0	0.000772	0.031102	0	0	0	0.111888
Sum	293.72	2666.9	1.294955	2285.047	75.32782	7816979	175.2497	1010.404	7.72519	18491.88	1786.058
Sum Sq. Dev.	224.7518	279565.6	0.000102	32180.8	71.72645	2.48E+12	1528.561	49843.49	234.201	12528963	12973.58
Observations	50	50	50	50	50	50	50	50	50	50	50

*Source: Author's compilation using E-views 10 2020*

Table 4.1 above shows the summary of the various descriptive statistics of all the variables used for the current study

**Mean:** The mean is used to measure the average value of a distribution or what you expect to happen the next time you conduct the statistical experiment here we have 50 observations i.e. the data span from 1970-2020. The average value of unemployment rate, inflation (CPI), population growth, gross fixed capital formation, foreign direct invest, gross domestic product per capital income, economic growth, inflation(GDP deflator), human capital, capital

expenditure and infrastructure are 5.8744, 53.33799, 0.026428, 45.70094, 1.506556, 156339.6, 3.504995, 20.20808, 0.154504, 369.8376 and 35.72116 respectively.

**Standard deviation:** Standard deviation measures the dispersion of the data set from the mean. It can be thought of as a measure of Variability. The larger values of standard deviation imply greater variability in the data. The standard deviation as revealed in table 4.1 shows the highest and lowest variability variables are GDPPCI of 224823.7 and population growth of 0.00146 respectively.

**Skewness:** Skewness is the measure of asymmetry in a distribution. When the distribution is mound-shaped symmetrical the values for the mean, median, mode are the same or almost the same. In table 4.1 it revealed that all the included variables are not normally distributed hence, asymmetrical distributions exhibited. In specific all the variables are positively skewed distribution except the population growth that exhibited a negatively skewed distribution in this study.

**Kurtosis:** This measures heaviness or lightness in the tails of the data distribution of the variables. The standard normal distribution has a Kurtosis of 3. A positive value tells you that you have heavy- tails (a lot of data in your tails). While a negative value means that you light tail (i.e. little data in your table) specifically table 4.1 shows that all the variable exhibited kurtosis. With kurtosis value for unemployment rate, inflation (CPI), population growth, gross fixed capital formation, foreign direct invest, gross domestic product per capital income, economic growth, inflation(GDP deflator), human capital, capital expenditure and infrastructure with kurtosis value of 1.243376, 4.408203, 4.859044, 1.835599, 5.866147, 3.305164, 4.125086, 31.66608, 6.072946, 5.942187, 1.61306 respectively. Which indicates that the data sets

distributions are all leptokurtic with excess positive kurtosis which implies that series are above the sample mean and a fat tail.

#### 4.4 CORRELATION ANALYSIS

**Table 4.4 correlation analysis**

	UNEMP	INF	POP	GFCF	FDI	GPPCI	ECO	INFLATION	INFR	HC	CEXP
UNEMP	1	0.776789	0.886059	-0.80772	-0.02328	0.769555	0.185047	-0.25415	0.885068	0.395635	0.791202
INF(CPI)	0.776789	1	0.919278	-0.67284	-0.08341	0.989824	0.055532	-0.20787	0.773851	0.498914	0.924629
POP	0.886059	0.919278	1	-0.89133	0.027037	0.923541	0.131337	-0.20738	0.954845	0.370271	0.888896
GFCF	-0.80772	-0.67284	-0.89133	1	-0.18531	-0.68839	-0.27541	0.248588	-0.94888	-0.15404	-0.67271
FDI	-0.02328	-0.08341	0.027037	-0.18531	1	-0.0779	0.153318	-0.01414	0.116594	-0.32096	-0.0072
GPPCI	0.769555	0.989824	0.923541	-0.68839	-0.0779	1	0.069751	-0.21761	0.776789	0.484844	0.923094
ECO	0.185047	0.055532	0.131337	-0.27541	0.153318	0.069751	1	-0.4532	0.152426	0.106458	0.142368
INF(GDP)	-0.25415	-0.20787	-0.20738	0.248588	-0.01414	-0.21761	-0.4532	1	-0.17506	-0.22283	-0.21397
INFR	0.885068	0.773851	0.954845	-0.94888	0.116594	0.776789	0.152426	-0.17506	1	0.201565	0.773188
HC	0.395635	0.498914	0.370271	-0.15404	-0.32096	0.484844	0.106458	-0.22283	0.201565	1	0.514091
CEXP	0.791202	0.924629	0.888896	-0.67271	-0.0072	0.923094	0.142368	-0.21397	0.773188	0.514091	1

*Source; Researcher's compilation using E-views 10*

The table 4.3 above reveals the degree or strength of linear relationship between two variables on a scatterplot. From the values of the correlation coefficients presented above it can be concluded from the result that Inflation (INF) proxy as CPI has a strong relation with unemployment

(UNEMP) ( $r = 0.77678$ ), Population growth (POP.G) has a strong relationship with UNEMP ( $r = 0.886059$ ), Gross fixed capital formation (GFCF) ( $r = -0.80772$ ) is moderately correlated with UNEMP, Foreign direct investment(FDI) ( $r = -0.02328$ ) is moderately correlated with UNEMP, Gross domestic product per capital income (GDPCCI) ( $r = 0.76955$ ) has a strong relationship with UNEMP, Economic growth (E.G) ( $r = 0.185047$ ) has a strong relation with UNEMP, Inflation proxy as GDP deflator ( $r = -0.25415$ ) has a moderately correlation with UNEMP, Infrastructure (INFR) ( $r = 0.885068$ ) has a strong relationship with UNEMP, Human capital (H.C) ( $r = 0.395635$ ) has a strong relationship with UNEMP and Capital expenditure(CEXP) ( $r = 0.791202$ ) has a strong relationship with UNEMP

#### **4.5 Preliminary Time Series Econometric Tests**

##### **4.5.1 Unit Root Test and Interpretations**

The properties of unit root test series data for the period of the study covering 1970-2020 was investigated in order to test the stationarity of each variable using the Augmented Dickey- Fuller (ADF) test statistics. The importance of stationary of the time series used in regression rests on the fact that a non-stationary time series is not possible to generalize to other time periods apart from the present, this makes forecasting based on such time series on another non-stationary time series may produce a spurious regression. The hypothesis tested was;

$H_0$ : it is non-stationary i.e. it has a unit root

$H_1$ : it is stationary i.e. it has no unit root

**Decision rule:** selecting the complete importance of both the ADF experiment data and the critical price, rejecting the null hypothesis if the ADF sample data are higher than the critical price and also if the likelihood distribution (p-value) is less than 5%, rejecting the null hypothesis and concluding that it is permanent.

The test root results showing the method of implementation of each of the factors are submitted in a chart showing the unit root test rate and the computation of the variations for the sequence that are unsatisfactory.

Table 4.2.2 Unit Root Test for the Variables used in this Study

Augmented Dickey-Fuller Test (intercept only)												
Variable	Level						First difference					
	ADF			ADF			ADF			ADF		
	Statistic	Critical values			Prob.	Remarks	Statistic	Critical Values			Prob.	Remarks
		1%	*5%	10%				1%	*5%	10%		
INF(cp)	5.0074	-3.5847	-2.9281	-2.6022	1.0000	NS	2.908597	-3.5966	-2.9332	-2.6049	1.0000	NS
E.G	-3.2650	-3.5744	-2.9238	-2.5999	0.0222	I(0)	-11.7108	-3.5744	-2.9238	-2.5999	0.0000	I(1)
H.C	-1.8056	-3.5713	-2.9224	-2.5992	0.3736	NS	-6.90775	-3.5744	-2.9238	-2.5999	0.0000	I(1)
INFR	-1.0636	-3.5744	-2.9238	-2.5999	0.7226	NS	-12.0026	-3.5744	-2.9238	-2.5999	0.0000	I(1)
FDI	-4.3616	-3.5713	-2.9224	-2.5992	0.001	I(0)	-9.38401	-3.5744	-2.9238	-2.5999	0.0000	I(1)
CEXP	5.2030	-3.6056	-2.9369	-2.6069	1.0000	NS	-3.0713	-3.5812	-2.9266	-2.6014	0.0358	I(1)
INF(gdp)	-6.5003	-3.5713	-2.9224	-2.5992	0.0000	I(0)	-11.4671	-3.5744	-2.9238	-2.5999	0.0000	I(1)
POP.G	-3.9877	-3.6156	-2.9411	-2.6091	0.0038	I(0)	-1.2798	-3.6210	-2.9434	-2.6103	0.6286	NS
GFCF	-1.1132	-3.5713	-2.9224	-2.5992	0.7034	NS	-5.1224	-3.5744	-2.9238	-2.5999	0.0001	I(1)
GDPPC	0.1923	-3.6105	-2.9390	-2.6079	0.9686	NS	-0.1999	-3.6156	-2.9411	-2.6091	0.9299	NS
Augmented Dickey-Fuller Test (Intercept and Trend)												
Variable	Level						First difference					
	ADF			ADF			ADF			ADF		
	Statistic	Critical values			Prob.	Remarks	Statistic	Critical values			Prob.	Remarks
		1%	*5%	10%				1%	*5%	10%		
INF	4.6660	-4.1756	-3.5131	-3.1869	1.0000	NS	-4.6106	-4.1706	-3.5107	-3.1855	0.0030	I(1)
E.G	-5.5565	-4.1567	-3.5043	-3.1818	0.0002	I(0)	-3.3347	-4.1923	-3.5208	-3.1913	0.0746	I(1)
H.C	-2.0768	-4.1567	-3.5043	-3.1818	0.5454	NS	-6.9574	-4.1611	-3.5064	-3.1830	0.0000	I(1)
INFR	-1.6556	-4.1611	-3.5064	-3.1830	0.7554	NS	-11.9887	-4.1611	-3.5064	-3.1830	0.0000	I(1)
FDI	-4.3648	-4.1567	-3.5043	-3.1818	0.0057	I(0)	-9.2969	-4.1611	-3.5064	-3.1830	0.0000	I(1)
CEXP	0.9487	0.9487	-3.5266	-3.1946	-3.1946	NS	-6.8458	-4.2050	-3.5266	-3.1946	0.0000	I(1)
INF	-6.7367	-4.1567	-3.5043	-3.1818	0.0000	I(0)	-0.4333	-4.1611	-3.5064	-3.1830	0.9834	NS
POP.G	-4.6287	-4.2191	-3.5331	-3.1983	0.0035	I(0)	-0.5746	-4.2268	-3.5366	-3.2003	0.9747	NS
GFCF	-0.964	-4.1567	-3.5043	-3.1818	0.9396	NS	-3.54542	-4.1865	-3.5181	-3.1897	0.0470	I(1)
GDPPC	1.4849	-4.1567	-3.5043	-3.1818	1.0000	NS	-1.83916	-3.5331	-3.5331	-3.1983	0.6657	NS

**SOURCE: Researcher's compilation from E-views 10**

The table 4.2.2 upper panel (ADF test for intercept only) reveals that E.G, FDI, INF proxy as GDP deflator, POP.G, are stationary at level, while INF proxy as CPI, H.C, INFR, CEXP, GFCF and GDPPC are non- stationary at level. The result for stationary at first difference are E.G, H.C, INFR,FDI,CEXP,INF proxy as GDP deflator, while the non-stationary variable at first difference are INF proxy as CPI and GDPPCI. The lower panel of the table ADF test for (intercept and trend) shows that at level the following variables are stationary E.G, FDI, INF proxy as GDP deflator, POP.G, while the variables that are non- stationary at level are INF proxy as CPI, H.C, INFR, CEXP, GFCF and GDDPPCI. The variables that non-stationary at first difference are INF proxy as GDP, POP.G, and GDPPC, while the variables that stationary are INF proxy as CPI, E.G, H.C, INFR, FDI, CEXP, and GFCF.

#### **4.5.2 ARDL Bounds Test Model 1**

**Table 4.5.2 ARDL Bounds Test Model 1**

<b>Variable</b>	<b>F-statistics</b>	<b>Degree of freedom (k)</b>	<b>1%</b>	<b>5%</b>	<b>10%</b>	<b>Decision</b>
<b>All</b>	<b>4.27</b>	<b>5</b>	<b>4.98</b>	<b>3.78</b>	<b>3.26</b>	<b>Long run relationship</b>

**Source : Researcher's computation using E-View 10 (2021)**

Table 4.5.2 shows the ARDL bound test to determine the long run relationship among the included variables in this study. The result fund out that there is a long run at 5% significant level.

## 4.6 Regression Analysis

### 4.6.1 ARDL Regression analysis for objective one

#### Table : ARDL Short and Long Run OLS Result

ARDL Long Run Form and Bounds Test

Dependent Variable: D(UNEMP)

Selected Model: ARDL(1, 1, 1, 1, 1, 1)

Case 2: Restricted Constant and No Trend

Date: 09/06/21 Time: 06:49

Sample: 1970 2020

Included observations: 48

Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.335612	1.828527	2.917983	0.0060
UNEMP(-1)*	-0.614760	0.117128	-5.248599	0.0000
LOG(INF(-1))	0.878628	0.190846	4.603848	0.0001
POPGR(-1)	-175.0708	68.81925	-2.543922	0.0154
GFCF(-1)	0.038428	0.012868	2.986363	0.0051
FDI(-1)	-0.224358	0.101615	-2.207922	0.0337
GPPCI(-1)	-4.54E-07	6.35E-07	-0.714684	0.4794
DLOG(INF)	-0.858870	0.777942	-1.104029	0.2769
D(POPGR)	257.9304	159.9285	1.612785	0.1155
D(GFCF)	0.032953	0.017850	1.846103	0.0731
D(FDI)	-0.064484	0.078359	-0.822933	0.4160
D(GPPCI)	4.73E-07	6.11E-06	0.077379	0.9388

\* p-value incompatible with t-Bounds distribution.

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(INF)	1.429223	0.200478	7.129070	0.0000
POPGR	-284.7793	106.1081	-2.683859	0.0109
GFCF	0.062509	0.018389	3.399269	0.0017
FDI	-0.364953	0.157248	-2.320872	0.0261

GPPCI	-7.38E-07	1.04E-06	-0.706759	0.4843
C	8.679184	2.681746	3.236394	0.0026

---


$$EC = UNEMP - (1.4292*LOG(INF) -284.7793*POPGR + 0.0625*GFCF -0.3650*FDI -0.0000*GPPCI + 8.6792 )$$


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F-Bounds Test Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	4.268968	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15
			Finite Sample: n=50	
Actual Sample Size	48	10%	2.259	3.264
		5%	2.67	3.781
		1%	3.593	4.981
			Finite Sample: n=45	
		10%	2.276	3.297
		5%	2.694	3.829
		1%	3.674	5.019

**Source: Author's compilation using E-views 10**

Table 4.6.1 presents the ARDL long run and bound tests result of this model that investigated the impact of inflation on unemployment between the study periods of 1970-2020 in Nigeria specifically this model is to test the Philip curve model.

First the ARDL long run test result in table 4.6.1 shows that inflation has a positive relationship on unemployment which is against the Apriori expectations which means that an increase in inflation leads to a decrease in unemployment which is statistically significant in the result. Nonetheless only POPG,FDI and GDPPCI has a negative relationship in the long run which is also statistically significant meaning that an increase in the variables leads to an increase in unemployment.



The short run results shows that there is a negative relationship between inflation on unemployment meaning an increase in inflation leads to an increase in unemployment which is conformed to the Apiori expectations and also statistically significant. Nonetheless only FDI has a negative relationship in the short run which is conformed to the Apiori expectations.

#### 4.7 ARDL Bound Test Model 2

**Table 4.7 ARDL Bound Test Model 2**

Variable	F- statistic	Degree of freedom(K)	1%	5%	10%	Decision
All	-1.17	5	4.98	3.78	3.26	No long run

*Source: Researcher's compilation using E-View 10 (2021)*

The table 4.7 shows the ARDL bound test to determine the long run relationship among the included variables in this study. The result found out that there is no long run relationship among the variables.

#### 4.7.1 Regression Analysis

#### 4.7.2 ARDL Regression Analysis for Objective Two

**Table ARDL Short and Long run OLS Result**

ARDL Long Run Form and Bounds Test  
 Dependent Variable: D(UNEMP)  
 Selected Model: ARDL(1, 1, 1, 1, 1, 1)  
 Case 2: Restricted Constant and No Trend  
 Date: 09/06/21 Time: 07:15  
 Sample: 1970 2020  
 Included observations: 49

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Conditional Error Correction Regression					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	

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C	0.272437	0.382821	0.711656	0.4811
UNEMP(-1)*	-0.177288	0.103709	-1.709475	0.0957
ECO(-1)	0.003466	0.023471	0.147687	0.8834
INFLATION(-1)	0.000143	0.004627	0.030872	0.9755
INFR(-1)	0.024031	0.014326	1.677497	0.1019
HC(-1)	-0.030366	0.058355	-0.520365	0.6059
CEXP(-1)	-0.000135	0.000414	-0.324995	0.7470
D(ECO)	-0.002996	0.019257	-0.155584	0.8772
D(INFLATION)	-0.001717	0.003099	-0.553916	0.5830
D(INFR)	0.005301	0.036785	0.144120	0.8862
D(HC)	0.034545	0.074757	0.462091	0.6467
D(CEXP)	0.000881	0.000541	1.629390	0.1117

\* p-value incompatible with t-Bounds distribution.

Levels Equation  
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECO	0.019552	0.132921	0.147095	0.8839
INFLATION	0.000806	0.026192	0.030763	0.9756
INFR	0.135548	0.060443	2.242589	0.0310
HC	-0.171279	0.380326	-0.450348	0.6551
CEXP	-0.000759	0.002424	-0.312972	0.7561
C	1.536691	1.748522	0.878851	0.3852

$$EC = UNEMP - (0.0196*ECO + 0.0008*INFLATION + 0.1355*INFR - 0.1713 *HC - 0.0008*CEXP + 1.5367)$$

F-Bounds Test Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	1.172144	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15
Actual Sample Size	49		Finite Sample: n=50	

	10%	2.259	3.264
	5%	2.67	3.781

1%	3.593	4.981
Finite Sample: n=45		
10%	2.276	3.297
5%	2.694	3.829
1%	3.674	5.019

*Source; Researcher's compilation using E-view 10*

Table 4.7.2 presents the ARDL long run and bound test result of this model that investigated the impact of economic growth on unemployment between the study periods of 1970-2020 in Nigeria. Specifically to test the Okun's law.

First the ARDL long run test result in table 4.7.2 shows that there is a positive relationship which is contrary to the Apiori expectation which means that an increase in economic growth will reduce the unemployment rate which is not statistically significant, while HC and CEXP have a negative relationship in the long run which is also not statistically significant.

In the short run economic growth has a negative relationship on unemployment which is conformed to the Apiori expectation although not statistically significant, while INFR, HC, CEXP have a positive relationship on unemployment.

## **4.8 GRANGER CAUSALITY TEST**

### **4.8.1 Pairwise Granger result**

Pairwise Granger Causality Tests

Date: 09/06/21 Time: 07:23

Sample: 1970 2020

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LOG(INF) does not Granger Cause UNEMP	48	7.06320	0.0022
UNEMP does not Granger Cause LOG(INF)		1.96422	0.1526
ECO does not Granger Cause UNEMP	48	0.04893	0.9523
UNEMP does not Granger Cause ECO		1.67903	0.1986
ECO does not Granger Cause LOG(INF)	48	0.30782	0.7367

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***Source; Author's compilation using E-view***

The table 4.5.1 shows the granger causality test between inflation, economic growth and unemployment with the study periods 1970-2020 specifically, the result shows that inflation causes inflation which is statistically significant. Further unemployment does not cause inflation, economic growth does not cause unemployment and lastly economic growth does not cause inflation. The pairwise Granger causality test found that a univariate causality existed between inflation, economic growth and unemployment with the study periods 1970-2020.

#### **4.6 DISCUSSION OF FINDINGS**

This section of the study discussed results of the estimation in line with the objectives of the study. There are three specific objectives in this work which are as follows;

First effect of inflation rate on unemployment in Nigeria over the study periods 1970-2020. The first hypothesis revealed that inflation rate proxy as CPI has a positive relationship on unemployment in the long run since it is statistically significant and has a negative relationship on unemployment on the short run which is also statistically significant.

Second the hypothesis two of this study is the impact of economic growth on unemployment unlike the first hypothesis the economic growth has a positive relationship with unemployment which is not statistically significant in the long run and has a negative relationship in the short run which is also not statistically significant meaning that in this study economic growth has not been able to solve the problem of unemployment.

Third and last hypothesis of this study found out that a univariate causal existed relationship between economic growth, inflation proxy as CPI and unemployment rate over the study periods of 1970-2020 in Nigeria

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATION**

#### **4.1 Introduction**

This chapter presents the summary of the result of this study. It explains the summary, conclusions and recommendations evident on the results of the study. The main gaps in the knowledge as well as the limitations of this study as well as suggestions for future research were also discussed.

#### **4.2 Summary of Findings**

The results of this study are summarized in three hypothesis as follows:

Hypothesis one investigated the impact of inflation rate on unemployment in Nigeria from 1970-2020. It employed both descriptive statistics and econometric methodology. The descriptive statistics result reviewed that all variables are not normally distributed. On the other hand the econometric time series methodology employed unit root test, co-integration test, Ordinary least square and OLS error correction model respectively. The result found that inflation has a positive impact on unemployment in Nigeria over the study periods 1970-

2020 since it was statistically significant during the long run and a negative relationship during the short run.

Hypothesis two investigated the impact of economic growth on unemployment in Nigeria using descriptive and econometric methodology. Like hypothesis one it employed both descriptive statistics and econometric methodology. The descriptive result shows that all variables are not normally distributed. On the other hand, the econometric time series methodology employed unit root test, co-integration test. The economic growth has a positive impact on unemployment in Nigeria which is not statistically significant on the long run and a negative relationship on the short run which is also not statistically significant.

Finally the summary of the third hypothesis tested the causal relationship between real inflation proxy as GDP deflator, economic growth and unemployment in Nigeria. The study employed granger causality test the result revealed that a univariate causal relationship existed between inflation, economic growth and unemployment within the study periods 1970-2020 in Nigeria.

### **4.3 Conclusions of The Study**

Based on the empirical results from the three hypothesis and research objectives. In general, the study concluded that macroeconomic variables have impact on unemployment within the study period 1970-2020 in Nigeria. Unemployment is one of the key problem of developing countries, reducing unemployment has been a subject of interest of many economies across the world.

This study thereby investigate the impact of macro-economic variables on unemployment in Nigeria. The negative association with unemployment was shown by inflation and economic growth, contrary to this the conclusion of this study holds that there is an insignificant and

positive relationship between inflation and economic growth in Nigeria meaning that inflation and economic growth has not been able to reduce the unemployment rate during the period of this study even if there is a positive relationship.

In specific objectives, the study concluded that inflation has a positive but insignificant impact on unemployment in Nigeria, while economic growth has a positive but insignificant impact on unemployment in Nigeria over the study period 1970-2020. Lastly the study concluded that a univariate causal relationship existed between inflation, economic growth and unemployment within the study period 1970-2020 in Nigeria.

#### **5.4 Recommendations of the Study**

Based on the conclusion, the study recommended the following

- i. The government should formulate monetary and fiscal policies to achieve required inflation which can affect the unemployment rate.
- ii. The government should formulate policy so that economic growth can affect the unemployment rate.
- iii. Finally government should consider other macroeconomic policies especially domestic policies to increase productivity in Nigeria and have a sustained employment rate.

#### **5.5 Recommendation for Other Studies**

This study investigate the impact of macroeconomic variable on unemployment in Nigeria from 1970-2020 therefore this study recommends the following topic for further study.

- i. The impact of inflation on unemployment in Nigeria.

- ii. The impact of economic growth on unemployment in Nigeria.
- iii. The casual direction between inflation, economic growth and unemployment in Nigeria.

## **5.6 Limitations of the Study**

This study was contradicted due to different factors:

- i. Scope of the study
- ii. Use of single country study
- iii. Use of time series econometrics
- iv. Use of OLS and granger causality
- v. Financial and time constraints of the project completion.

## **5.7 Contribution to Knowledge**

This study has contributed to knowledge in several ways. It showed the determinant of macroeconomic variables and its effect on unemployment in Nigeria. As a result increase in inflation showed a negative impact on unemployment, decrease in economic growth can be as a factor to increase unemployment Nigeria. Therefore, there can be a casual direction between inflation, economic growth and unemployment rates in Nigeria.



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## APPENDIX

### DESCRIPTIVE

	UNEMP	INF	POP	GFCF	FDI	GPPCI	ECO	INFLATION	INFR	HC	CEXP
Mean	5.8744	53.33799	1.14E+08	45.70094	1.506556	156339.6	3.504995	20.20808	35.72116	0.154504	369.8376
Median	5.575	19.28643	1.07E+08	39.5462	1.190759	32820.59	4.217446	11.43677	38.80893	0.79008	96.03
Maximum	9.07	268.5115	2.01E+08	89.38105	5.790847	724705.1	15.32916	219.0028	59.3	4.93032	2289
Minimum	3.59	0.115051	55982144	14.90391	-1.150856	181.0811	-13.1279	0.686099	8.3	-7.17665	-4.43
Std. Dev.	2.141675	75.53424	42463962	25.62715	1.209878	224823.7	5.585259	31.89379	16.27166	2.186233	505.6611
Skewness	0.169271	1.549574	0.443666	0.51064	1.349305	1.302575	-0.71865	5.090463	-0.21157	-1.4666	1.687444
Kurtosis	1.243376	4.408203	2.043573	1.835599	5.866147	3.305164	4.125086	31.66608	1.61306	6.072946	5.942187
Jarque-Bera	6.667374	24.14116	3.546061	4.997589	32.28602	14.33319	6.940986	1927.907	4.38051	37.59721	41.76318
Probability	0.035661	0.000006	0.169818	0.082184	0	0.000772	0.031102	0	0.111888	0	0
Sum	293.72	2666.9	5.69E+09	2285.047	75.32782	7816979	175.2497	1010.404	1786.058	7.72519	18491.88
Sum Sq. Dev.	224.7518	279565.6	8.84E+16	32180.8	71.72645	2.48E+12	1528.561	49843.49	12973.58	234.201	12528963
Observations	50	50	50	50	50	50	50	50	50	50	50

### CORRELATION

	UNEMP	INF	POP	GFCF	FDI	GPPCI	ECO	INFLATION	INFR	HC	CEXP
UNEMP	1	0.776789	0.886059	-0.80772	-0.02328	0.769555	0.185047	-0.25415	0.885068	0.395635	0.791202
INF	0.776789	1	0.919278	-0.67284	-0.08341	0.989824	0.055532	-0.20787	0.773851	0.498914	0.924629
POP	0.886059	0.919278	1	-0.89133	0.027037	0.923541	0.131337	-0.20738	0.954845	0.370271	0.888896
GFCF	-0.80772	-0.67284	-0.89133	1	-0.18531	-0.68839	-0.27541	0.248588	-0.94888	-0.15404	-0.67271
FDI	-0.02328	-0.08341	0.027037	-0.18531	1	-0.0779	0.153318	-0.01414	0.116594	-0.32096	-0.0072
GPPCI	0.769555	0.989824	0.923541	-0.68839	-0.0779	1	0.069751	-0.21761	0.776789	0.484844	0.923094
ECO	0.185047	0.055532	0.131337	-0.27541	0.153318	0.069751	1	-0.4532	0.152426	0.106458	0.142368
INFLATION	-0.25415	-0.20787	-0.20738	0.248588	-0.01414	-0.21761	-0.4532	1	-0.17506	-0.22283	-0.21397
INFR	0.885068	0.773851	0.954845	-0.94888	0.116594	0.776789	0.152426	-0.17506	1	0.201565	0.773188
HC	0.395635	0.498914	0.370271	-0.15404	-0.32096	0.484844	0.106458	-0.22283	0.201565	1	0.514091
CEXP	0.791202	0.924629	0.888896	-0.67271	-0.0072	0.923094	0.142368	-0.21397	0.773188	0.514091	1

## UNIT ROOT

Null Hypothesis: UNEMP has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-0.609547	0.8589
Test critical values:		
1% level	-3.571310	
5% level	-2.922449	
10% level	-2.599224	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(UNEMP)  
 Method: Least Squares  
 Date: 08/31/21 Time: 15:47  
 Sample (adjusted): 1971 2019  
 Included observations: 49 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UNEMP(-1)	-0.024211	0.039720	-0.609547	0.5451
C	0.250035	0.245239	1.019557	0.3132
R-squared	0.007843	Mean dependent var		0.109388
Adjusted R-squared	-0.013266	S.D. dependent var		0.577684
S.E. of regression	0.581503	Akaike info criterion		1.793559
Sum squared resid	15.89285	Schwarz criterion		1.870776
Log likelihood	-41.94218	Hannan-Quinn criter.		1.822855
F-statistic	0.371548	Durbin-Watson stat		1.831100
Prob(F-statistic)	0.545097			

Null Hypothesis: D(UNEMP) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.328698	0.0000
Test critical values:		
1% level	-3.574446	
5% level	-2.923780	
10% level	-2.599925	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(UNEMP,2)  
 Method: Least Squares  
 Date: 08/31/21 Time: 15:54  
 Sample (adjusted): 1972 2019

Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(UNEMP(-1))	-0.930744	0.147067	-6.328698	0.0000
C	0.103287	0.086455	1.194692	0.2383
R-squared	0.465442	Mean dependent var		0.001875
Adjusted R-squared	0.453821	S.D. dependent var		0.796441
S.E. of regression	0.588601	Akaike info criterion		1.818637
Sum squared resid	15.93674	Schwarz criterion		1.896603
Log likelihood	-41.64728	Hannan-Quinn criter.		1.848100
F-statistic	40.05242	Durbin-Watson stat		2.013365
Prob(F-statistic)	0.000000			

Null Hypothesis: D(INF) has a unit root

Exogenous: Constant

Lag Length: 6 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	2.908597	1.0000
Test critical values:		
1% level	-3.596616	
5% level	-2.933158	
10% level	-2.604867	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(INF,2)

Method: Least Squares

Date: 08/31/21 Time: 15:56

Sample (adjusted): 1978 2019

Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	0.579562	0.199258	2.908597	0.0064
D(INF(-1),2)	-1.247482	0.400906	-3.111657	0.0038
D(INF(-2),2)	-0.892060	0.366767	-2.432226	0.0204
D(INF(-3),2)	-1.557579	0.417108	-3.734232	0.0007
D(INF(-4),2)	-2.004888	0.387444	-5.174657	0.0000
D(INF(-5),2)	-1.246400	0.411160	-3.031425	0.0046
D(INF(-6),2)	-1.232532	0.412211	-2.990049	0.0052
C	0.718047	0.742932	0.966504	0.3406
R-squared	0.567836	Mean dependent var		0.022409
Adjusted R-squared	0.478861	S.D. dependent var		4.970110
S.E. of regression	3.587920	Akaike info criterion		5.562666
Sum squared resid	437.6878	Schwarz criterion		5.893650
Log likelihood	-108.8160	Hannan-Quinn criter.		5.683985
F-statistic	6.381976	Durbin-Watson stat		1.606715
Prob(F-statistic)	0.000079			

Null Hypothesis: INF has a unit root

Exogenous: Constant

Lag Length: 4 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	5.007440	1.0000
Test critical values:		
1% level	-3.584743	
5% level	-2.928142	
10% level	-2.602225	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(INF)  
 Method: Least Squares  
 Date: 08/31/21 Time: 15:58  
 Sample (adjusted): 1975 2019  
 Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF(-1)	0.267702	0.053461	5.007440	0.0000
D(INF(-1))	-0.051556	0.301871	-0.170788	0.8653
D(INF(-2))	-0.190341	0.344534	-0.552459	0.5838
D(INF(-3))	-1.032364	0.350390	-2.946326	0.0054
D(INF(-4))	-0.936224	0.385099	-2.431126	0.0197
C	1.754104	0.684119	2.564033	0.0143
R-squared	0.822262	Mean dependent var		5.962714
Adjusted R-squared	0.799475	S.D. dependent var		7.890757
S.E. of regression	3.533484	Akaike info criterion		5.486012
Sum squared resid	486.9350	Schwarz criterion		5.726900
Log likelihood	-117.4353	Hannan-Quinn criter.		5.575813
F-statistic	36.08476	Durbin-Watson stat		1.633997
Prob(F-statistic)	0.000000			

Null Hypothesis: POP has a unit root  
 Exogenous: Constant  
 Lag Length: 9 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	2.378430	0.9999
Test critical values:		
1% level	-3.605593	
5% level	-2.936942	
10% level	-2.606857	

\*MacKinnon (1996) one-sided p-values.

Null Hypothesis: GFCF has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
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Augmented Dickey-Fuller test statistic		-1.113222	0.7034
Test critical values:	1% level	-3.571310	
	5% level	-2.922449	
	10% level	-2.599224	

\*MacKinnon (1996) one-sided p-values.

#### Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GFCF)

Method: Least Squares

Date: 08/31/21 Time: 16:03

Sample (adjusted): 1971 2019

Included observations: 49 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GFCF(-1)	-0.028426	0.025535	-1.113222	0.2713
C	0.245056	1.344630	0.182248	0.8562
R-squared	0.025690	Mean dependent var		-1.064786
Adjusted R-squared	0.004960	S.D. dependent var		4.567201
S.E. of regression	4.555860	Akaike info criterion		5.910666
Sum squared resid	975.5256	Schwarz criterion		5.987883
Log likelihood	-142.8113	Hannan-Quinn criter.		5.939962
F-statistic	1.239263	Durbin-Watson stat		1.443387
Prob(F-statistic)	0.271274			

Null Hypothesis: D(GFCF) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.122378	0.0001
Test critical values:	1% level	-3.574446
	5% level	-2.923780
	10% level	-2.599925

\*MacKinnon (1996) one-sided p-values.

#### Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GFCF,2)

Method: Least Squares

Date: 08/31/21 Time: 16:04

Sample (adjusted): 1972 2019

Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GFCF(-1))	-0.726445	0.141818	-5.122378	0.0000
C	-0.804758	0.665123	-1.209938	0.2325
R-squared	0.363223	Mean dependent var		2.78E-16
Adjusted R-squared	0.349380	S.D. dependent var		5.551270
S.E. of regression	4.477712	Akaike info criterion		5.876875
Sum squared resid	922.2956	Schwarz criterion		5.954842
Log likelihood	-139.0450	Hannan-Quinn criter.		5.906339

F-statistic	26.23876	Durbin-Watson stat	1.894364
Prob(F-statistic)	0.000006		

Null Hypothesis: FDI has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.361578	0.0010
Test critical values:	1% level	-3.571310	
	5% level	-2.922449	
	10% level	-2.599224	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(FDI)  
 Method: Least Squares  
 Date: 08/31/21 Time: 16:06  
 Sample (adjusted): 1971 2019  
 Included observations: 49 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI(-1)	-0.557621	0.127848	-4.361578	0.0001
C	0.809338	0.246529	3.282926	0.0019
R-squared	0.288131	Mean dependent var		-0.028136
Adjusted R-squared	0.272985	S.D. dependent var		1.269405
S.E. of regression	1.082360	Akaike info criterion		3.036126
Sum squared resid	55.06070	Schwarz criterion		3.113343
Log likelihood	-72.38508	Hannan-Quinn criter.		3.065422
F-statistic	19.02336	Durbin-Watson stat		2.059318
Prob(F-statistic)	0.000070			

Null Hypothesis: D(FDI) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.384012	0.0000
Test critical values:	1% level	-3.574446	
	5% level	-2.923780	
	10% level	-2.599925	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(FDI,2)  
 Method: Least Squares  
 Date: 08/31/21 Time: 16:08  
 Sample (adjusted): 1972 2019  
 Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDI(-1))	-1.318372	0.140491	-9.384012	0.0000
C	-0.031374	0.177229	-0.177024	0.8603
R-squared	0.656869	Mean dependent var		0.033959
Adjusted R-squared	0.649410	S.D. dependent var		2.072142
S.E. of regression	1.226929	Akaike info criterion		3.287679
Sum squared resid	69.24629	Schwarz criterion		3.365646
Log likelihood	-76.90429	Hannan-Quinn criter.		3.317143
F-statistic	88.05968	Durbin-Watson stat		2.094682
Prob(F-statistic)	0.000000			

Null Hypothesis: GPPCI has a unit root  
Exogenous: Constant  
Lag Length: 10 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	0.192314	0.9686
Test critical values:		
1% level	-3.610453	
5% level	-2.938987	
10% level	-2.607932	

\*MacKinnon (1996) one-sided p-values.

Included observations: 50 after adjustments  
Null hypothesis: Series are not cointegrated  
Cointegrating equation deterministics: C  
Automatic lags specification based on Schwarz criterion (maxlag=10)

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
INF	-3.070927	0.5756	-23.68530	0.1922
POP	-3.673262	0.2976	-24.84454	0.1554
GFCF	-3.607498	0.3245	-27.09520	0.0994
FDI	-5.072454	0.0227	-33.56817	0.0224
GPPCI	-2.375749	0.8611	-14.74071	0.6453

\*MacKinnon (1996) p-values.

Intermediate Results:

	INF	POP	GFCF	FDI	GPPCI
Rho - 1	-0.194717	-0.357727	-0.405888	-0.685065	-0.113354
Rho S.E.	0.063407	0.097387	0.112512	0.135056	0.047713
Residual variance	14.77706	1.28E+13	20.93468	1.116559	92955860
Long-run residual variance	94.89785	2.68E+13	40.49085	1.116559	6.82E+08
Number of lags	1	1	1	0	1
Number of observations	48	48	48	49	48
Number of stochastic trends**	5	5	5	5	5

\*\*Number of stochastic trends in asymptotic distribution

ARDL Long Run Form and Bounds Test  
Dependent Variable: D(UNEMP)  
Selected Model: ARDL(1, 1, 1, 1, 1, 1)  
Case 2: Restricted Constant and No Trend

Date: 09/06/21 Time: 06:49  
 Sample: 1970 2020  
 Included observations: 48

Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.335612	1.828527	2.917983	0.0060
UNEMP(-1)*	-0.614760	0.117128	-5.248599	0.0000
LOG(INF(-1))	0.878628	0.190846	4.603848	0.0001
POPGR(-1)	-175.0708	68.81925	-2.543922	0.0154
GFCF(-1)	0.038428	0.012868	2.986363	0.0051
FDI(-1)	-0.224358	0.101615	-2.207922	0.0337
GPPCI(-1)	-4.54E-07	6.35E-07	-0.714684	0.4794
DLOG(INF)	-0.858870	0.777942	-1.104029	0.2769
D(POPGR)	257.9304	159.9285	1.612785	0.1155
D(GFCF)	0.032953	0.017850	1.846103	0.0731
D(FDI)	-0.064484	0.078359	-0.822933	0.4160
D(GPPCI)	4.73E-07	6.11E-06	0.077379	0.9388

\* p-value incompatible with t-Bounds distribution.

Levels Equation Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(INF)	1.429223	0.200478	7.129070	0.0000
POPGR	-284.7793	106.1081	-2.683859	0.0109
GFCF	0.062509	0.018389	3.399269	0.0017
FDI	-0.364953	0.157248	-2.320872	0.0261
GPPCI	-7.38E-07	1.04E-06	-0.706759	0.4843
C	8.679184	2.681746	3.236394	0.0026

$$EC = UNEMP - (1.4292*LOG(INF) - 284.7793*POPGR + 0.0625*GFCF - 0.3650*FDI - 0.0000*GPPCI + 8.6792)$$

F-Bounds Test Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)	
F-statistic k	4.268968 5	10%	2.08	3	
		5%	2.39	3.38	
		2.5%	2.7	3.73	
		1%	3.06	4.15	
		Asymptotic: n=1000			
Actual Sample Size	48	10%	2.259	3.264	
		5%	2.67	3.781	
		1%	3.593	4.981	
		Finite Sample: n=50			
		10%	2.276	3.297	
		5%	2.694	3.829	
		1%	3.674	5.019	
Finite Sample: n=45					

ARDL Long Run Form and Bounds Test  
 Dependent Variable: D(UNEMP)  
 Selected Model: ARDL(1, 1, 1, 1, 1, 1)  
 Case 2: Restricted Constant and No Trend  
 Date: 09/06/21 Time: 07:15  
 Sample: 1970 2020  
 Included observations: 49

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.272437	0.382821	0.711656	0.4811
UNEMP(-1)*	-0.177288	0.103709	-1.709475	0.0957
ECO(-1)	0.003466	0.023471	0.147687	0.8834
INFLATION(-1)	0.000143	0.004627	0.030872	0.9755
INFR(-1)	0.024031	0.014326	1.677497	0.1019
HC(-1)	-0.030366	0.058355	-0.520365	0.6059
CEXP(-1)	-0.000135	0.000414	-0.324995	0.7470
D(ECO)	-0.002996	0.019257	-0.155584	0.8772
D(INFLATION)	-0.001717	0.003099	-0.553916	0.5830
D(INFR)	0.005301	0.036785	0.144120	0.8862
D(HC)	0.034545	0.074757	0.462091	0.6467
D(CEXP)	0.000881	0.000541	1.629390	0.1117

\* p-value incompatible with t-Bounds distribution.

Levels Equation

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECO	0.019552	0.132921	0.147095	0.8839
INFLATION	0.000806	0.026192	0.030763	0.9756
INFR	0.135548	0.060443	2.242589	0.0310
HC	-0.171279	0.380326	-0.450348	0.6551
CEXP	-0.000759	0.002424	-0.312972	0.7561
C	1.536691	1.748522	0.878851	0.3852

EC = UNEMP - (0.0196\*ECO + 0.0008\*INFLATION + 0.1355\*INFR -0.1713  
 \*HC -0.0008\*CEXP + 1.5367 )

F-Bounds Test

Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic k	1.172144 5	10%	2.08	3
		5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15
Actual Sample Size	49		Finite Sample: n=50	

10%	2.259	3.264
5%	2.67	3.781
1%	3.593	4.981

Finite Sample: n=45		
10%	2.276	3.297
5%	2.694	3.829
1%	3.674	5.019

**Source; Researcher's compilation using E-view 10**

Pairwise Granger Causality Tests  
Date: 09/06/21 Time: 07:23  
Sample: 1970 2020  
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LOG(INF) does not Granger Cause UNEMP	48	7.06320	0.0022
UNEMP does not Granger Cause LOG(INF)		1.96422	0.1526
ECO does not Granger Cause UNEMP	48	0.04893	0.9523
UNEMP does not Granger Cause ECO		1.67903	0.1986
ECO does not Granger Cause LOG(INF)	48	0.30782	0.7367
LOG(INF) does not Granger Cause ECO		0.98874	0.3803