Financial Development and Unemployment in Nigeria

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ABSTRACT

Every government strives to offer its citizens decent work opportunities. However, this goal has proved unrealistic in many nations particularly developing economies like Nigeria with a persistent unemployment rate. Although several studies have documented the various determinants of unemployment, there is hardly any study in Nigeria that has engaged the multidimensional nature of financial development. Additionally, there are hardly any studies in Nigeria that disaggregated the components of unemployment into gender dimensions and spatial locations. Given this, the study appraised the influence of the development of Nigeria's financial sector on the unemployment rate. The research used financial access, depth, stability and efficiency to cover the multidimensional financial development while also using aggregate, male and female, as well as urban and rural unemployment data. Engaging Nigerian data between 1981 and 2021 as well as the dynamic ordinary least square technique, the research showed that the indicators of financial development (financial depth, access, efficiency and stability) reduced aggregate unemployment. The study equally revealed that financial development reduced male and female unemployment rates in Nigeria as well as Nigeria's rural and urban unemployment rates. Consequently, the study advises decision-makers to keep implementing measures to encourage financial development to increase the number of employment while also ensuring that other fundamental issues with the labour market are properly resolved.

Dedication

I would like to dedicate this thesis to the Almighty God.

Acknowledgment

I would like to express my heartfelt gratitude to all those who have supported and guided me throughout the journey of completing my thesis. Their contributions have been invaluable, and I am truly grateful for their assistance. First and foremost, I am deeply indebted to my supervisor, Professor Christian Webersik whose unwavering support, guidance, and expertise have been instrumental in shaping the trajectory of my research. His insightful feedbacks have challenged me to push the boundaries of my knowledge and have played a significant role in the quality of this thesis.

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CHAPTER ONE

INTRODUCTION

1.1. Introduction

Full employment is a primary macroeconomic goal that every government strives to attain (Nyasha et al, 2022). Howbeit accomplishing this goal could be challenging for several economies across the globe particularly developing nations (Raifu, 2019). This could be explained by the conflict that frequently occurs when a nation attempts to attain one of the macroeconomic goals while the others are neglected (Ayadi et al., 2021). For example, it has been theoretically demonstrated that unemployment and inflation have a mutually exclusive relationship, especially in the short term. Hence, to attain full employment, a nation must be prepared to withstand high inflation at some point and vice versa (Phillips, 1958). Conversely, the inability of a nation's economic system to function structurally may be the cause of the challenges in attaining full employment or foreign shocks emanating from other economies (Raifu, 2019). Consequently, creating sustainable jobs is still a challenge for several nations across the globe regardless of the robust economic expansion witnessed in these economies over time (Ekesiobi & Dimnwobi, 2020).

One of the Sustainable Development Goals (SDGs) specifically Goal 8 intends to advance "sustained, inclusive and decent work for all". But the difficulties of high unemployment, underutilization of labour, precarious employment, enduring gendered wage inequalities, and a lack of decent work in developing economies undermine the attainment of SDG 8 (Agradi et al, 2022; Ekesiobi & Dimnwobi, 2020). As noted by ILO (2019), African economies' performance in terms of inclusive growth and decent employment has not been encouraging. For instance, in 2019, Africa recorded the highest unemployment rate in the world (28.2%), as well as five of the ten worst unemployment rates in the world (UN, 2019). The youths in the region are thrice more probable to be jobless than adults (AfDB, 2020). Across the globe, the region is home to the highest number of people with advanced educational attainment that is unemployed resulting mainly from the imbalance between jobs and skills (AfDB, 2020). Additionally, since 2008, labour underutilization has been predominant in the region (Gomis et al., 2020). As per data from the World Bank (2021), the population of urban dwellers in Africa has been increasing gradually moving from 37% in 2011 to 42% in 2021. Widespread rural-to-urban migration in search of better economic possibilities is projected to exacerbate Africa's unemployment problem. This could have

hurt the region's sustainable growth prospects because high unemployment undermines both development outcomes and environmental sustainability (Dimnwobi et al., 2021).

Nigeria is one of the major economies in Africa with persistent unemployment issues. Over time, the nation has witnessed a consistent increase in unemployment. For example, as documented by NBS (2020), the unemployment rate grew from 7.2% in 2014 to 12.2% in 2016 and 33.3% in 2020. The issue of unemployment in the nation has been documented to have begun in the 1980s and intensified thereafter. Some scholars presume that one of the major factors that gave rise to unemployment in the nation is the total neglect of the agricultural sector in the 1970s which employed the majority of the nation's population in favour of crude oil immediately after the nation discovered crude oil while other scholars attributed the unemployment crisis in the nation to the several macroeconomic crises the nation witnessed in 1980s (Ajide, 2020; Olubusoye et al., 2022). Broadly, several factors contribute to unemployment in the country namely poor infrastructure, population growth, corruption, inconsistent policies, weak supportive environment, faulty educational system, and skill obsolescence among others (Azolibe et al., 2022; Dimnwobi et al., 2017; Dimnwobi et al., 2022a; Dimnwobi et al., 2022b; Nwokoye et al., 2019; Nwokoye et al., 2020; Nwokoye et al., 2022).

There are significant political and socioeconomic repercussions when unemployment increases steadily in a nation. Economic-wise, high unemployment results in revenue loss to the government, low productivity, unbalanced income distribution, and manpower loss among others (Njoku & Ihugba, 2011). On a social level, an unemployed individual will likely experience a loss of earned skills, loss of dignity, suffer psychological issues and struggle with their health, making it difficult for them to achieve their necessities. In addition, there is an increase in crime rates like fraud, drug misuse, robbery, banditry, and terrorism that typically endanger properties and lives. Also, the rising incidence of divorce and prostitution has been linked to the persistent increase in unemployment. A nation with a high unemployment rate is bound to experience political issues such as political thuggery, a decline in faith in government, political instability, and public unrest (Raifu, 2019).

Economic scholars have been searching for plausible explanations on the factors that contribute to unemployment in a given economy. The classical economists, who reject the possibility of unemployment in an economy, made the pioneer attempt (Maqbool et al., 2013). They contend

that because an economy has full employment, the demand for labour will always equal its supply. If there is a brief state of disequilibrium, the wage rate changes to ensure that the labour market returns to equilibrium. Keynes, however, disagreed with this view of the classical school, arguing that wage rigidity may result in an equilibrium of less than full employment. Keynes (1936) averred that unemployment can be generated by a lack of aggregate demand and can endure for a long time if no conscious intervention is made. But according to Todaro (1985), neither the classical nor the Keynesian theories offer a solid explanation of the causes of unemployment. He presented a far more intricate interaction of economic factors that tries to explain the unemployment phenomena. Specifically, Todaro (1985) suggested that structural and institutional factors are primarily responsible for unemployment. Additionally, Haris and Todaro (1970) and Todaro (1985) claimed that two-sector labour transfer models that highlight unemployment as a result of rural-urban drift can explain persistent unemployment in emerging nations. Put differently, as individuals shift from rural to urban centres, the labour system becomes more complicated, which leads to more unemployment.

Theoretical explanations of the reasons of unemployment have not yet achieved convergence, the literature noted that one of the major drivers of unemployment is financial development (Ajide, 2020; Ayadi et al, 2021; Nyasha et al, 2022). According to the literature, financial development has the potential to reduce unemployment in two ways namely through the indirect route of economic expansion and the direct channel of financial access. Financial development may influence employment (thereby reducing unemployment) by lowering the cost of access to financial markets and making funds accessible for individual entrepreneurs and business investments (Ajide, 2020; Nyasha et al, 2022). To achieve these targets, Nigerian policymakers have introduced numerous reforms in the financial sector. The 1986 privatization of the banking industry marked the beginning of the Nigerian financial sector's reforms. This was followed by interest rate liberalization in 1987 (Dimnwobi et al., 2022a). Before this period, the financial sector was typified by a large reserve requirement, high financial sector taxation, government interference in corporate credit allocation, enactment of interest rate ceilings and foreign exchange regulation (Dimnwobi et al., 2022a; Folarin, 2019). The reforms in the financial sector prioritized eliminating directed credit allocation, lowering interest rates, reorganizing and privatizing banks, and improving prudential control and oversight (Folarin & Asongu 2017). It is worth noting that the nation's financial system could be considered to have been financially constrained before 1986.

A repressed financial system, as noted by McKinnon (1973) and Shaw (1973), is linked to a sluggish economy. In their respective research, they documented that the distortion brought on by financial repression inhibits the financial sector from effectively fulfilling its duty as a financial intermediary (Folarin, 2019). Following these reforms, the financial sector in Nigeria has grown significantly to become Africa's most important financial market. A report from the National Development Plan 2021-2025 shows that between 2017 and 2020, the sector's contribution to the country's GDP was roughly ₦44.2 trillion. The report further highlighted that the total size of the nation's financial services sector was around ₦78.10 trillion in 2017 but increased to ₦122.30 trillion in 2020. The nation's banking industry is generally well-structured and represents one of the greatest contributors to the country's financial sector, accounting for ₦42.7 trillion in 2019, an increase from ₦34.6 trillion and ₦37.8 trillion in 2017 and 2018 respectively (Dimnwobi et al., 2022a).

In light of the foregoing premises, the researcher scrutinizes the effects of financial development on unemployment in Nigeria which is Africa's most populous and largest economy.

1.2. Research Problem

Unemployment is a huge threat to every nation's social and economic stability, stifling its development outcomes. The literature confirms that unemployment increases the likelihood of poverty and adds to inequality. It has been suggested that to attain most of the SDGs by 2030, unemployment reduction becomes critical (Ayadi et al, 2021; Nyasha et al., 2022). Given this, remediation efforts have been taken to address the nation's unemployment. The National Directorate of Employment (NDE) was established in 1986, marking the beginning of the government's attempts to tackle the unemployment issue (Ekong & Ekong, 2016). The last decade has also witnessed the introduction of several initiatives namely Youth Enterprise with Innovation in Nigeria (YouWIN) of 2011, the Subsidy Re-investment and Empowerment Programme (SURE-P) of 2012, the N-Power Scheme of 2016 among several others (Oyekunle, 2020; Olubusoye et al., 2022). However, unemployment figures continue to increase in the nation. For instance, the unemployment rate grew from 7.2% in 2014 to 12.2% in 2016 and 33.3% in 2020 (NBS 2020). The National Bureau of Statistics figures also showed that there is a huge disparity in unemployment across gender dimensions and spatial locations. For instance, urban unemployment increased from 9% in 2015 to 31% at the end of 2020. Within the same period, rural unemployment

increased from 7% to 35%. During the same period, male unemployment increased from 6% to 32% while female unemployment expanded from 9% to 35% (NBS 2020). Sadly, the COVID-19 pandemic has exacerbated the country's labour market outcomes, causing a loss of employment and key revenue sources

The high unemployment magnitude in Nigeria has been linked to the high incidence of crime, militancy and terrorism across the nation (Olubusoye et al., 2022). As per the report from the Global Terrorism Index, there were 8,302 terrorist attacks in 2019 with an estimated 25,000 fatalities making the country one of the most terrorized nations worldwide (Olubusoye et al., 2022). Aside from causing deaths and forced relocation, terrorist activities have also destroyed several properties (Raifu et al., 2022). The literature contends that the state of the financial sector can influence the course of unemployment in an economy. In addition to serving as a predictor of economic prosperity, a thriving financial sector also helps to create jobs and fight poverty (Ajide, 2020; Raifu, 2019). On the other hand, a dysfunctional or crisis-stricken financial sector is harmful to economic expansion, job creation, and the fight against poverty. When firms are credit-constrained, they are expected to cut back on production and labour employment, which will worsen the unemployment situation (Osuka et al., 2019; Raifu, 2019).

Although there have been inquiries on how unemployment is influenced by financial advancement, there are hardly studies that disaggregated the components of unemployment into gender dimensions and spatial locations. Additionally, most of these studies captured financial development with financial depth thereby neglecting other components of financial development and measuring financial development with just one component of financial development is inadequate for assessing the multifaceted nature of the development of the financial sector. Hence, this study sidesteps this shortcoming by employing a broad-based measure of financial development. Unlike prior inquires, this study employed the dynamic ordinary least square (DOLS) which eliminates issues like endogeneity, reverse causality and bias caused by a small sample size

1.3. Study Objectives

Unemployment represents a major socioeconomic issue affecting many developing economies with the unemployment rate being one of the key macroeconomic indicators that decision-makers continually track to assess the performance and health of the economy. When there is high

unemployment in an economy, it shows that the economy is experiencing an economic downturn and this frequently raises questions about how well authorities can run the economy. The nation's and its residents' welfare are directly correlated with unemployment. A nation with a high unemployment rate sees an increase in social difficulties like a high prevalence of crime, and prostitution, as well as civil unrest and political turmoil (Azolibe et al., 2022). Furthermore, a person without a job is more prone to have psychological problems, social marginalization, and health challenges (Raifu, 2019). Despite having enormous mineral endowments, the Nigeria unemployment crisis has continued to cause great concern among decision-makers and economic managers. The political, socioeconomic as well as psychological impacts of unemployment have been the subject of several inquiries in the literature and financial development has been identified as one of the factors that could influence unemployment. The Nigerian financial sector has undergone several reforms and is considered as one of Africa's most advanced financial sectors (Dimnwobi et al., 2022a). Thus, the key objective of this investigation is to assess how Nigeria's financial development affects unemployment

1.4. Research Questions

I. Does financial development influence Nigeria's aggregate unemployment?
II. What effect does financial development have on male and female unemployment rates in Nigeria?
III. What is the effect of financial development on Nigeria's rural and urban unemployment rates?

1.5. Geographic Study Area and Context

Nigeria, an African economic giant and one of the globe's most populated economies is bordered by Benin Republic, Niger, Cameroon and Chad. The nation is composed of thirty-six states and for ease of administration, these states are further subdivided into six geopolitical zones (see Figure 1.1). The country has over 200 ethnic groups and is richly endowed with natural resources and robust financial, transport and communications sectors.

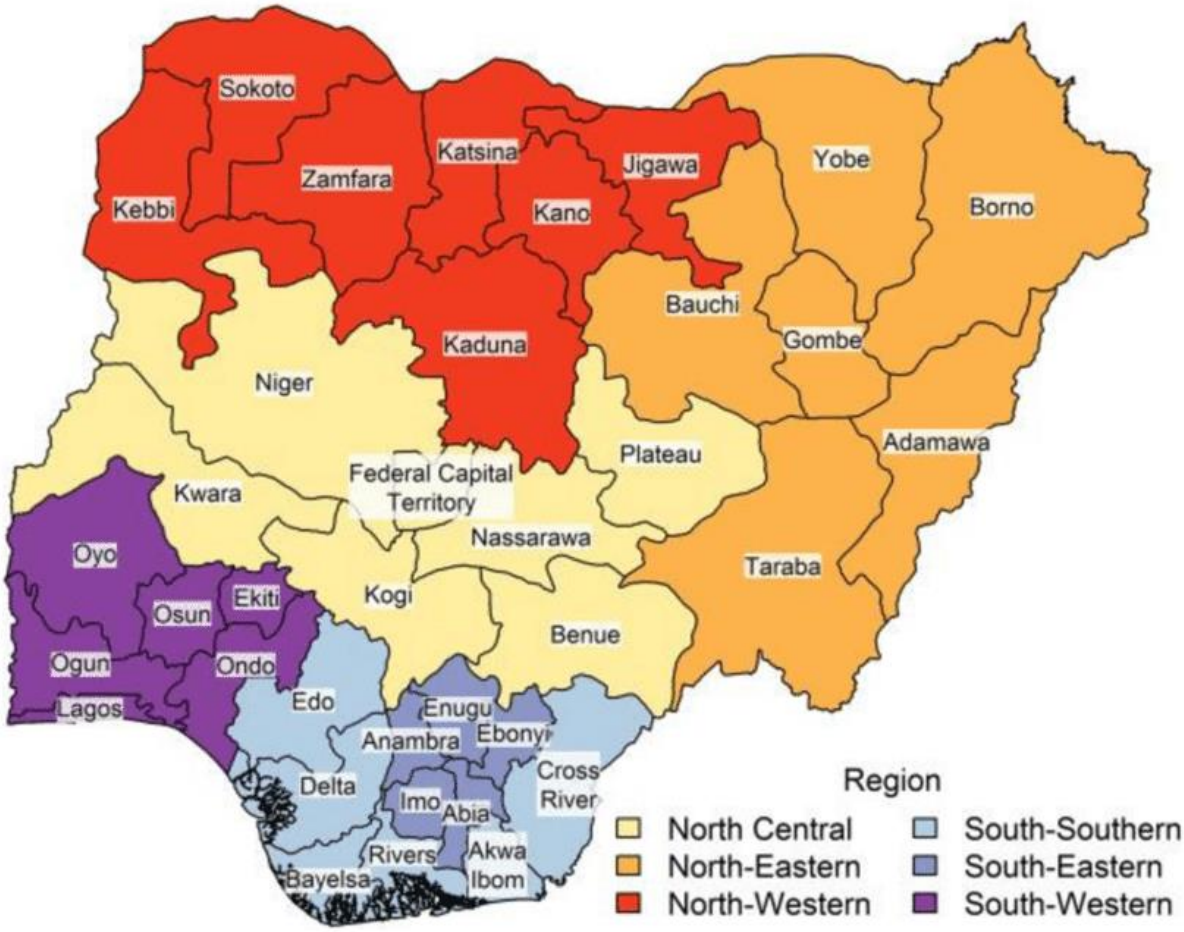

Figure 1.1: Nigeria's map
Source: Google image

With a per capita economic growth of $2,065 and a population of 213 million in 2021, Nigeria has one of the biggest and most populated economies in Africa (World Bank, 2021). The financial sector in Nigeria has grown significantly to become Africa's most important financial market. The nation's financial sector includes both banks and non-bank financial entities. They cover community banks, insurance firms, currency exchange bureaus, primary mortgage institutions, and discount houses among others (Dimnwobi et al., 2022a). On the flip side, the issue of unemployment has grown to be one of Nigeria's most persistent socioeconomic ills. The high unemployment magnitude in Nigeria has been linked to the high incidence of crime, militancy and terrorism across the nation (Olubusoye et al., 2022)

1.6. Thesis Outline

This present chapter covers the overview of the subject matter, the research problem necessitating this present investigation as well as the research questions pursued in this study. In what follows, the literature related to the subject matter will be documented followed by chapter three which covers the study's technique and data. Chapter four outlines and discusses the findings while chapter five expounds on suggested policies and outlines for additional research.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

The definition of the study's central premise opens this chapter followed by related theories on the subject matter. The fourth section focuses on a general analysis of the interventions introduced over time in Nigeria to boost the nation's financial sector as well as to reduce unemployment. The next section reviews and discusses prior studies and by doing this, the researcher was able to uncover the limitations of earlier investigations. The sixth section summarizes the chapter while outlining the various gaps in earlier investigations

2.2. Conceptual Literature

Financial development (FD) is a process of increasing the quality, quantity and effectiveness of financial services. The development of the financial sector is critical to economic success (Ayadi et al., 2021). As noted by Verma and Giri (2020), the development of a financial system can be characterized as greater access to financial markets, as well as the growth in the size, effectiveness, and stability of financial markets, all of which have significant economic advantages. Enhancing the availability, efficacy, and efficiency of financial services and the intermediaries that provide them is known as financial development (Olayungbo & Quadri, 2019). According to Bolarinwa et al (2020), financial development is viewed as increasing financial depth, expanded access to financial services, financial stability, and efficiency in financial institutions and markets. The view of Bolarinwa et al (2020) is adopted in this study. The four financial development pillars namely financial access, financial depth, financial stability, and financial efficiency were utilized in this research to take into account the multifaceted FD aspects

Conversely, unemployment occurs when individuals are willing to work and are physically and intellectually competent in doing so but are unable to secure a paying job that will allow them to make a good living. This indicates a waste of human resources (Ogbeide et al, 2016). According to Ajide (2020), the proportion of the labour force that is qualified and eager to work but unemployed is known as unemployment. This view on unemployment by Ajide (2020) is adopted in this study. Similarly, Ibrahiem and Sameh (2020) see unemployment as the fraction of the workforce that is comprised of unemployed people in a particular economy. Relatedly, Amakor

and Eneh (2021) contend that it is the number of individuals who are jobless as a proportion of the entire labour force. Unemployment is referred to by Nyasha et al (2022) as a circumstance where people are purposefully looking for employment and mentally ready themselves for whatever pay rate is accessible in the market. Given the widespread unemployment rate in Nigeria, this study employed aggregate, rural, urban, male and female unemployment rates to obtain a comprehensive understanding of the connection between Nigeria's financial advancement and the unemployment rate

2.3. Related Theories

This section covered three theories that are pertinent to the study notably the Classical theory of unemployment, Keynesian unemployment theory and the McKinnon-Shaw hypothesis

I. The Classical Unemployment Theory

The writings of J.B. Say, T. S. Mill, A.C. Pigou and David Ricardo are credited with giving rise to the classical theory of unemployment. According to this perspective, the economy generally runs at full employment without inflation for an extended period. They believed that there was a competitive market in the economy, with variable wages and pricing for goods. Howbeit, the classical model did not completely rule out the possibility of overproduction and hence, short-term unemployment in the economy. The theory contends that market forces will eradicate overproduction and bring the economy's output to the level required for full employment if they are permitted to work in the economic system. The classical adherents aver that just because the economy was at full employment did not indicate that there were no unemployed persons. This is because even at the level of full employment, there would be employees who choose to or would be forced to leave their jobs which is the case of voluntary or frictional unemployment. In a typical scenario, assuming that prices and salaries fluctuate freely and swiftly, then, over time, the economy will function at a level of full employment in both the labour and commodity markets (Maqbool et al., 2013)

Classicalism asserts that full employment is typical in a capitalist economy. This indicates that in a capitalist system, there cannot be widespread unemployment. They believe that when there is full employment, the potential and actual output is guaranteed to be equal. According to the classical perspective, in a free market economy, total production is always enough to keep everything running smoothly and keep everyone employed. They believe that unemployment is

only a transient issue. When unemployment exists, earnings fall and labour employment become more profitable when pay rates fall. Consequently, there is a greater need for labour and the abolition of unemployment. Nonetheless, even in a condition of full employment, classicalism recognized the presence of frictional and voluntary unemployment (Dwivedi, 2010). Say's law of markets and the presumption of wage flexibility, prices and interest rates serve as the foundation of the classical theory of unemployment. According to Say's Law of Markets, supply drives demand indicating that the entire production is sold and the manufacturers do not have to be concerned about the selling of their goods. When demand for a commodity declines, so does its price, and consequently, output lowers. If the drop-in output leads to unemployment, the pay rates will be cut. The decrease in pay rates will lead to a rise in labour demand since the supply will match the demand. As a result, the issue of unemployment will vanish and the state of full employment will once again exist (Jain & Khanna, 2010).

II. Keynesian Unemployment Theory

John Maynard Keynes's famous publication in 1936, introduced new ideas on the income and employment hypothesis. At every chance, Keynes stated his opposition to classical adherents. To make his case more straightforward, Keynes's theory presumes a constant nominal wage. As a general rule, nominal wages were viewed in the Keynesian theory as a function of activity that changes with production and employment levels. Keynes also claimed that contrary to what classical economists projected, a nominal pay cut was unlikely to result in a decline in real wages. In terms of the overall economy, a nominal wage cut that is not accompanied by a price decrease indicates a "fallacy of composition". Nominal wage decreases in this scenario may not lead to lower unemployment because wage levels would mainly be unchanged. As noted by Meccheri (2005), nominal wage adjustments, in general, can have cumulative effects on employment and output

Nevertheless, Keynes contends that a lack of aggregate demand was the primary factor contributing to unemployment. Keynes consequently claimed that by raising aggregate demand, unemployment might be eliminated. Government spending, consumer demand and investment make up the three elements of aggregate demand. Jain and Khanna (2010) observed that Keynes was in favour of governmental intervention and considers the role of government as essential for reducing unemployment and achieving the goal of full employment.

III. Mckinnon-Shaw Hypothesis

The key works of McKinnon and Shaw (1973), which launched the thesis of financial emancipation, served as the foundation for the literature on the concept and emphasized the negative influence of financial repression on economic outcomes. They referred to emerging markets as being "financially repressed". Their main claim is that financial repression results in aimless alteration in financial pricing (Fry 1995). To put it another way, financial repression, caused primarily by a mixture of high taxes, interest rate regulations, and government involvement in the allocation of credit would result in the decline of financial efficiency and depth (Sen & Vaidya 1997). Financial reform advocates (McKinnon-Shaw) contend that financial liberalization raises domestic private savings-to-income ratios (Shaw 1973). Hence, the liberalization of the financial sector will have a positive economic impact by enhancing the mobilization of domestic savings, increasing financial depth and effective use of resources. Interest rate caps are put in place to limit competition for money obtained from the private sector for the public sector. Measures which include enforcing foreign exchange restrictions, setting interest rate limits and underdevelopment of private capital markets can all be used to boost the level of domestic resources going to the public sector without a rise in taxes, prices, or interest rates (Fry 1973). Additionally, McKinnon and Shaw contend that by removing interest rate ceilings and reducing reserve requirements, a positive real interest rate should be set on deposits and loans. Their emphasis was on the investment-savings theory, which postulated that real interest rates would affect economic outcomes via investment and savings. In their framework, real interest rates are negatively correlated with investment, and interest rates have an impact on savings.

The McKinnon and Shaw (1973) financial liberalization hypothesis was likewise predicated on the idea that the degree of financial deepening will increase as real interest rates rise, more savings will be made, and those savings will be utilized more effectively than they would be if savings were made directly in the industry in which they occur, without the use of financial intermediaries. The neo-Keynesian which contended that lowering interest rates would encourage capital formation predominated in the literature on finance and growth until the 1960s (Sen & Vaidya 1997). The governing ideology of governments in most developing economies throughout this time was to incorporate guided credit programs and interest rate regulations into economic planning. These gained popularity as a way to cheaply allocate scarce resources to "favoured sectors".

2.4. Policy Context on Financial Development and Unemployment

2.4.1. Overview of Nigeria's Financial Sector Reforms

The financial industry is the heart of an economy's productive activity (Onwuka et al., 2020). Nigeria's financial system is composed of financial institutions like banks, capital markets and insurance companies each of which specializes in a specific field of activity (Gidigbi, 2017). In a bid to rejig Nigeria's financial sector, several policies have been introduced over the years. These reforms are divided into four phases namely the deregulation period (1986-1993), the distress period (1994-1998), the liberalization period (1999-2003) and the period of consolidation and reorganization (2004-2012). The researcher follows these phases in highlighting the key reforms in the nation's financial sector

I. Deregulation period (1986-1993): This phase coincides with the time of the Structural Adjustment Program (SAP). The easing of credit restrictions in 1986 represents the first major reform in Nigeria's financial sector (Ebohon, 2015; Folarin, 2019). In the following year, the number of authorized sectors for the aim of allocating bank credit was limited to two. These two sectors are priority and other sectors with the former containing the real sectors of the nation's economy. Another important policy initiative implemented during this period was the banking authorization deregulation (Adeleye et al., 2017). This became necessary as three banks dominated the nation's economy. Consequently, the measure which was made to disrupt the market's oligopolistic structure, and encourage competition, innovation, and effectiveness in the delivery of financial services instead led to a rise in the number of banks and bank branches, causing a significant crisis in the sector that was marked by low bank capital and high levels of bad debts in the financial system (Ogujiuba & Obiechina, 2011; Umejiaku, 2017)

Moreover, interest rates were deregulated beginning in January 1987 when banks were permitted to set their interest rates on loans and deposits (Ebohon, 2015). The deregulation process was completed in August 1987 when the lending rate cap and deposit rate floors were eliminated. After the lending rate cap and deposit rate floors were eliminated in August of the same year, the process of full deregulation had been completed (Ogujiuba & Obiechina, 2011). Howbeit, as a result of producers' complaints regarding the high leading rate prevalent at that time, the deregulated interest rate regime was not able to last through November 1989. The minimum rediscount rate (MRR) which 18.5% was lowered to 15.5%, the maximum disparity between the lending rate and the rate on savings deposits was set at 7.5%, and the maximum lending rate was set at 21% by the

monetary authorities to improve the untenable situation. As bankers started to complain that capping the maximum lending rate would hurt the overall sector, the cap on lending rates was repealed by the government, and the MRR was hiked from 15.5% to 17.5% in 1992, indicating the government's support for a high-interest rate (Umejiaku, 2017).

II. The distress period (1994-1998): The return of pre-reform policy adjustments signalled the beginning of this period, which was also marked by a moratorium on bank licensing. This resulted in a decline in the number of financial institutions and their branches, thus halting the expansion of banks in the country (Ebohon, 2015). To narrow the growing gap between the autonomous and official exchange rates, a sudden devaluation of the nation's local currency ended the official exchange rate's steady market-based depreciation in 1994. Similarly, in the same year, the government banned the autonomous foreign exchange market (AFEM) and reinstated exchange regulation as a result of the increasing difference between both exchange rates. Nonetheless, the AFEM was reinstated in 1995 to cohabit with the official currency rate with the government permitting the use of official rates in some cases like sporting activities and pilgrimages (Ogujiuba & Obiechina, 2011).

III. The liberalization period (1999-2003): This stage began in 1999, the year Nigeria adopted civilian democracy. The financial industry was once more liberalized, and initiatives to deal with financial distress were implemented. In addition, universal banking was introduced in 2001, giving banks the ability to conduct business in all facets of the financial markets to guarantee an effective supply of all financial services at lower costs (Ogujiuba & Obiechina, 2011). A Central Bank of Nigeria (CBN) monitoring report from March 2004 showed that 62 of the 89 remaining banks were in good shape, 14 were classified as marginal, while the number of unstable banks climbed from 9 to 11. The report further noted that during the time frame, two of the banks were unable to file statutory returns. Current industry analysis also suggests that 30 banks controlled the market, with the remaining 69 of the 89 regulated banks acting as minor participants. Interestingly, the industry's concentration and oligopolistic nature continued (Umejiaku, 2017)

IV. The period of consolidation and reorganization (2004-2012): The CBN governor at that time noticed that the banking system was ineffective, plagued by inadequacies in operation and structure, and hence incapable of acting as a catalyst to encourage the participation of the private sector (Ogujiuba & Obiechina, 2011). Consequently, in a July 6, 2004 announcement, the governor

outlined a 13-point plan of banking sector reforms centred on increased deregulation of banking activities that will guarantee the system's safety and competition and proactively set up the sector to play intermediary functions and spur economic advancement. The reform's goal was to create a dependable, diversified, and robust banking industry that would protect depositors' funds, participate actively in the Nigerian economy's development and display competence and competition and participate effectively in the global, regional and African financial systems. Most of the 89 banks that existed during this period were insolvent before the nation's apex bank introduced a new minimum capital requirement of ₦25 billion with a deadline being the end of 2005 (Ogujiuba & Obiechina, 2011).

This represents an initiative that effectively increased the obstacles to the entrance to those desiring to launch banking operations and the policy led to the emergence of 25 consolidated banks from the 89 banks in operations in the country at that time. Before this time, banks in Nigeria were largely concentrated in the urban centres but this policy led to a significant expansion of bank branches across the nation covering both rural and semi-urban areas (Ebohon, 2015). Sadly, the benefits of this initiative were temporary due to the detrimental effect of the global financial disaster, which damaged the banking industry so severely that by 2007, certain banks were already experiencing liquidity concerns. In 2008, several banks that had borrowed at distressed rates on the interbank market had begun to experience issues and were unable to pass the test on liquidity ratio. The banks' ownership design was diluted as a result of consolidation, unlike in the past, when a small number of people held significant portions of the bank's stock at the expense of the institutions' performance. The year 2009 came with another policy referred to as the "Alpha Initiative" which attempted at eradicating the financial system's innate flaws and fragmentation thereby reducing the number of banking institutions in the country (Umejiaku, 2017). Asset Management Corporation of Nigeria (AMCON) was founded in 2010 to handle the issue of bad debts in the banking sector after the National Assembly passed its enabling Act. To strengthen public trust in the financial sector, the Consumer and Financial Protection Division was created by the CBN as a forum for customers to seek redress. Women's empowerment initiatives were introduced in 2012 to guarantee that a predetermined proportion of senior management positions are designated to women. The same year witnessed the introduction of a cashless policy initiative aimed at creating a setting where most business transactions are made online (Umejiaku, 2017).

2.4.2. Synopsis of Nigeria's Unemployment Policies

Unemployment remains one of the most pressing macroeconomic issues Nigeria is currently experiencing as population growth continues to outpace economic expansion and the number of individuals looking for work keeps rising (Raifu & Abodunde, 2020). The World Bank highlighted that since Nigeria's 2016 economic slump, the increase in unemployment has been particularly severe. It has gotten worse as a result of the recent pandemic's economic and health disaster, which in 2020 caused the greatest recession in forty years, as well as increased inflationary pressures, supply-chain bottlenecks, and current international tensions related to the Russia/Ukraine war. Adu, Edosomwan, Babajide, and Olokoyo (2018) contend that unemployment has negative effects on the economy's overall growth.

To tackle the issue of unemployment in Nigeria, several interventions have been implemented over the years, some of which were specifically designed to directly address the issue, some are indirect approaches through initiatives to combat poverty and others were included in national development strategies (Ogbeide et al, 2016). One of the recent notable initiatives is the Subsidy Reinvestment Program (SURE P), which was launched in 2012 and aims to reinvest fuel subsidy savings into vital infrastructure and social safety initiatives. The primary goal of this initiative was to alleviate social vulnerability by employing graduates through internship programs. Likewise, in 2016, the nation's policymakers introduced the N-Power strategy to combat the issue of youth unemployment in Nigeria. The intervention is targeted at youth aged 18 and 35 and is a two-year paid initiative designed to engage people in their home states. The initiatives cover diverse scopes ranging from agriculture, teaching, health, and technology among others. This program has been heavily criticized because of its unsustainability (Ekesiobi & Dimnwobi, 2020). Analogously, the Nigerian decision makers enacted the Medium-Term National Plan (2021-2025) in 2021 as a blueprint for the nation's future, with goals to encouraging private sector participation and economic diversification. The long-term objectives of the economic strategy include boosting employment possibilities, particularly in the private sector to significantly lower the nation's unemployment rate. Similarly, in 2021, the Nigerian Youth Employment Action Plan (NIYEAP) was launched to create 3.7 million jobs annually to combat youth unemployment in Nigeria. The initiative was conceived and developed in collaboration with the International Labour Organization by the Federal Ministry of Youth and Sports Development. The NIYEAP prioritizes

four areas namely employment creation, entrepreneurship development, employability and equality and rights (Adeyemo, 2021)

While these interventions discussed above are national policies targeted at reducing unemployment in Nigeria, there have been several policies introduced across the thirty-six-state government in Nigeria to create employment in Africa's largest nation. Howbeit, notwithstanding these interventions, the country is still experiencing rising unemployment which according to Ekesiobi and Dimnwobi (2020) could be attributed mostly to weak institutional infrastructures, a lack of continuity, a lack of a technical framework to implement these initiatives as well weak enabling environment.

2.5. Review of Prior Studies

Despite prior research recognizing the criticality of a robust financial sector in addressing national economic expansion concerns, scholars have just recently begun concentrating on appraising how financial development (FD) influences unemployment rates. Previous studies have obtained mixed outcomes. While some scholars highlighted that FD reduces unemployment (Ayadi et al, 2021; Çiftçioğlu & Bein, 2017; Ndubuaku et al, 2021), others reported the opposite (Ibrahiem & Sameh, 2020; Memon et al, 2021; Ogbeide et al 2016). This divergent outcome can be credited to the measures of FD employed, the scope of the study, and the analytical technique adopted as most studies failed to employ a technique that addresses several economic issues such as reverse causality, endogeneity, and serial correlation among others. It is also worth noting that most of these studies have majorly employed aggregate unemployment rate thereby ignoring the gender dimensions and spatial locations which may require a different policy prescription that is different from aggregate unemployment. Prior studies are documented across three strands (cross-country, single-country studies and Nigerian studies).

2.5.1. Cross-Country/Panel Evidence

Bayar (2016) applied the Augmented Mean Group (AMG) to estimate the implications of domestic investment and FD on unemployment between 2001 and 2014. Applying domestic lending to the private sector to capture FD, the study found that unemployment was not significantly influenced by FD in 16 emerging economies. Similarly, in 10 EU nations between 1991 and 2012, Çiftçioğlu and Bein (2017) assessed the effect of FD on unemployment. The authors revealed that FD lowers unemployment in these economies. In a study of 49 economies between 1991 and 2014, Kim et al

(2018) utilized dynamic ordinary least squares (DOLS) and fully modified OLS (FMOLS) to uncover the influence of FD on unemployment. The financial structure size and activity were applied by the researchers to proxy FD and found that FD increases unemployment. A study by Tsaurai (2020) examined the macroeconomic factors that influence unemployment in Africa between 2001 and 2015. The authors applied diverse analytical techniques and the study reported that among other things unemployment is considerably increased by the FD

Employing the Quasi-maximum likelihood (QML) technique, Ayadi et al (2021) sampled 143 economies from 1995 to 2015 to discover the impact of FD on employment and conclude that FD promotes employment. In selected South Asian economies between 2004 and 2018, Memon et al (2021) assessed the criticality of the development of the financial sector on unemployment using a fixed effect model. The authors employed three FD proxies namely broad money, domestic private sector credit as well as domestic credit provided by banks and reported that unemployment in the region is exacerbated by FD. Shabbir et al (2021) employed data from South Asian economies between 1994 and 2016 to appraise the efficacy of economic factors on the rate of unemployment. The activity of the financial sector is employed as one of the economic variables. The authors using the vector error correction model (VECM) detected that financial activity increases unemployment in South Asia. Analogously, El-Bourainy et al (2021) used data from 43 developing economies across 5 regions of the world as well as GMM to determine the influence of financial inclusion on unemployment from 2009 to 2018. The authors reported that the unemployment rate in these economies can be reduced with financial inclusion.

2.5.2. Single Country Study

The preceding studies are cross-country evidence. However, the subject matter has also been documented by country case researchers. For instance, Ibrahiem and Sameh (2020) appraised the influence of clean energy utilization and FD on unemployment. The study employed domestic private-sector credit to capture the development of the Egyptian financial sector. Relying on Egyptian data between 1971 and 2014 as well as VECM and auto-regressive distributed lag (ARDL), the authors discovered that while unemployment is increased by FD and population, access to clean energy reduces unemployment. The connection between bank development and unemployment in Kenya between 1991 and 2019 were assessed by Nyasha et al (2022). Employing ARDL, the authors documented that the influence of bank development on unemployment is contingent on the proxy of bank development utilized. When bank development

is captured with deposit money bank assets, composite banking index, bank deposits, and liquid liabilities, unemployment is reduced but no significant influence was obtained when private sector credit is utilized. The outcome suggests that the influence of bank development on Kenya's unemployment is mixed. In South Africa, Nyasha et al (2021) employed ARDL to appraise the connection between stock market development and unemployment between 1980 and 2019 and confirmed that unemployment is significantly reduced by stock market development.

2.5.3. Nigerian Studies

Aliero et al (2013) applied the ARDL to unearth the connection between FD and Nigeria's unemployment from 1980 to 2011. The authors employed four FD proxies namely broad money supply, private sector credit, mobilized deposit by rural bank branches as well as loans provided to rural dwellers by the rural banks and the study concluded that unemployment is reduced by financial development. In appraising the predictors of unemployment in Nigeria between 1981 and 2013, Ogbeide et al (2016) employed the error correction model (ECM) and credit extended to the private sector as the analytical technique and financial development proxy respectively to conclude that unemployment is aggravated by financial development. Osuka et al (2019) utilized data from 1981 to 2015 to discover the unemployment impact of financial deepening in Nigeria. The authors relied on ECM as well as three variables to proxy financial deepening namely broad money, private sector credit and market capitalization and established that financial deepening lowers unemployment in Nigeria.

Unlike prior studies that have focused on the linear connection between the subject matter, Ajide (2020) employed nonlinear ARDL to assess the asymmetric relationship between both variables in Nigeria from 1980 to 2017. The study documented that financial development aggravates unemployment. Sakanko et al (2020) employed ARDL as well as quarterly Nigeria time-series data between 2007 and 2018 to evaluate how financial inclusion impacts inclusive growth. The employment rate is applied as one of the measures of inclusive growth and the study highlighted that employment chances are decreased by access to credit, internet use and loans to SMEs, however, employment opportunities are increased by account ownership and bank access. Using data between 1986 and 2019, Amakor and Eneh (2021) appraised the implications of financial inclusion on the unemployment rate. The authors employed loans and advances from commercial and microfinance banks to rural regions to capture financial inclusion and using OLS, the authors concluded that loans and advances from commercial banks to rural regions are negatively and

insignificantly correlated with unemployment while loans and advances from microfinance banks to rural regions have a positive and significant association with unemployment. Ndubuaku et al (2021) utilized ARDL to study the criticality of financial development in promoting employment in Nigeria between 1999 and 2019. The authors captured financial development using financial efficiency and financial depth and demonstrated that the employment rate is boosted by financial development. The summary of prior studies reviewed in this study is chronicled in Table 1

Table 1: Synopsis of prior studies reviewed

Author(s)	Scope	Methodology	FD measure employed	Conclusion
Cross-Country Evidence				
Bayar (2016)	16 economies	AMG	Domestic private-sector credit	FD does not influence unemployment
Çiftçioğlu & Bein (2017)	EU nations	Fixed affects model	3 variables that capture credit expansion	FD lowers unemployment
Kim et al (2018)	49 economies	DOLS, FMOLS	Financial structure size & activity	FD increases unemployment
Tsaurai (2020)	Africa	Pooled OLS, random effects, fixed effects, GMM	Domestic loans from the financial sector	FD increases unemployment
Ayadi et al (2021)	143 economies	QML	Broad-based index of financial development	FD spurs employment
Shabbir et al (2021)	South Asia	VECM	Credit	Financial activity increases unemployment
Memon et al (2021)	South Asia	Fixed effect model	Broad money, domestic private sector credit, and domestic credit provided by banks	Unemployment is exacerbated by FD
Single Country Study				
Ibrahiem & Sameh (2020)	Egypt	ARDL & VECM	Domestic private-sector credit	Unemployment is increased by FD
Nyasha et al (2022)	Kenya	ARDL	Bank development variables	Mixed outcome depending on the proxy of FD employed
Nigerian/Domestic Studies				
Aliero et al (2013)	Nigeria	ARDL	Broad money supply, credit to private sector mobilized deposit by rural bank branches, loans provided to rural dwellers by the rural banks	FD lowers unemployment
Ogbeide et al (2016)	Nigeria	ECM	Credit extended to the private sector	Unemployment is aggravated by FD
Osuka et al (2019)	Nigeria	ECM	3 financial deepening indicators	Financial deepening lowers unemployment
Sakanko et al (2020)	Nigeria	ARDL	Access to credit, internet use, loans to SMEs, account ownership & bank access	Diverse influence of the proxies on employment
Ajide (2020)	Nigeria	NARDL	Broad-based index of FD	The unemployment rate is increased by FD

Author(s)	Scope	Methodology	FD measure employed	Conclusion
Ndubuaku et al (2021)	Nigeria	ARDL	Financial efficiency and depth	The employment rate is boosted by FD
Amakor & Eneh (2021)	Nigeria	OLS	Loans and advances from commercial and micr ofinance banks to rural regions	Different effects of the proxies on unemploym ent

Source: Researchers' Computation

2.6. Literature Summary and Value Additions

This chapter began by documenting the definitions of two major concepts of this study notably unemployment and financial development. It is critical to emphasize that different scholars provided diverse descriptions of these concepts, however, the study adopted the definitions provided by Ajide (2020) and Bolarinwa et al (2020) for unemployment and FD respectively. Additionally, the study reviewed three related theories. One such theory is the classical unemployment theory which avers that unemployment is influenced by the level of real wages. Put differently, classical economists contend that unemployment is primarily caused by excessively high wage levels in an economy. High wages could prevent businesses from having the resources to hire all eligible workers thereby leaving some of those that are actively seeking employment without jobs. Conversely, Keynesian unemployment theory highlighted that unemployment arises when there is insufficient overall demand to cover all available employment for those who are available to work. Keynes maintained that extended periods of high unemployment could result from insufficient general demand.

On the other hand, the McKinnon-Shaw hypothesis argued that the liberalization of interest in developing economies will increase real interest rates, increasing savings and encouraging investments that would finally result in economic development. According to the McKinnon-Shaw framework, the financial sector's intermediation role, which supports reliable payment systems might increase output and employment through savings mobilization, distribution or rationing of credit, and risk diversification. The study adopted this theory and the justifications for adopting this theory are elaborated on in the next chapter. On the empirical front, scholars have obtained mixed findings. For example, Ayadi et al (2021) and Ndubuaku et al (2021) recorded that FD reduces unemployment while Ibrahiem and Sameh (2020) and Memon et al (2021) reported the opposite. This divergent outcome can be credited to the measures of FD employed, the scope of

the study and the analytical technique adopted as most studies failed to employ a technique that addresses several economic issues such as reverse causality, endogeneity among others

This study makes significant additions to the literature. First, most prior studies like Bayar (2016) Ogbeide et al (2016) Ibrahiem and Sameh (2020) Amakor and Eneh (2021) have either utilized domestic private-sector credit or domestic loans from the financial sector to capture FD. However, in recent times, the financial industry has significantly advanced and financial development has been multifaceted. For example, in recent times, while banks have continued to be the most prominent actors in the financial sector, insurance firms, investment banks, and private equity firms among others are performing important roles in the financial industry and making substantial contributions to financial development. Considering the increasingly diversified financial system, especially in developing countries, it is crucial to take into account several indicators that go beyond the traditional metrics when measuring financial development. To avoid the potential biases associated with using single metrics to proxy financial development, a thorough contextual framework was created by the World Bank's Global Financial Development Database to assess the advancement of the financial industry globally which are financial depth, access to financial services, the efficiency of financial services and stability of the financial sector. These measures transverses both financial institutions and financial markets. For an accurate assessment of financial development, this study uses reliable metrics that encompass all four FD pillars (deepening, efficiency, stability and access) as recommended by World Bank. Besides, the adoption of this multi-dimensional financial development measure in this study is critical given that these four indicators of financial access, stability, efficiency, and depth all take place simultaneously in a developing economy like Nigeria. Consequently, if any of these indicators are absent, it shows that financial development is not sufficiently measured and cannot be relied on for robust policy formulation

Second, previous studies have utilized aggregate unemployment to capture the unemployment situation in an economy. This study, aside from focusing on aggregate unemployment, the study also decoupled the unemployment into gender divide (male vs female unemployment) and spatial location (rural and urban regions). To my knowledge, studies focusing on these frontiers are rare in the literature. The disaggregation is pertinent because the unemployment trends are not uniform and may require different policy responses. Consequently, knowing how different types of

unemployed people are influenced by financial development can help decision-makers create and put into practice comprehensive labour and financial strategies. Third, this study will employ the dynamic ordinary least square (DOLS) which eliminates issues like endogeneity, and reverse causality among others. Lastly, following the economic disruptions caused by the recent pandemic, the results of this inquiry are anticipated to direct and intensify policy alternatives for strengthening Nigeria's labour market outcomes.

CHAPTER THREE

METHODOLOGY

3.2 Introduction

The procedures employed in carrying out this study are discussed in this chapter. Traditionally, scientific research follows systematic and well-defined procedures and methods, and these must be documented for two major reasons. First, it allows the research community and other stakeholders to evaluate the appropriateness of the research outcome. If the procedure or method adopted in arriving at a research outcome is faulty, such an outcome or research result will also be faulty. Second, it makes it easier for others to replicate the research findings. Thus, the empirical strategy employed in carrying out this research is clearly but concisely discussed in the subsections that follow.

3.2. Research Method

There are different research methods that a researcher may adopt. However, the choice of methods is largely contingent on the research questions. As stated in Chapter 1, this research determines the effect of FD on Nigeria's unemployment. Consistent with the research questions, this research adopts a quantitative research method. Quantitative research involves measuring variables using a numerical system and implementing research processes using mathematical models, which can be analyzed using a range of statistical and econometric methods. It aims at establishing links, associations, causations, and correlations between the variables. Quantitative research also involves the collection and manipulation of quantitative data to better describe, comprehend and predict a phenomenon, especially through the development of models and hypotheses. Given that this study involves a test of hypothesis, the quantitative research method is preferred because it allows for obtaining robust parameters that will be utilized in the test of hypothesis.

3.3. Theoretical Framework

This study is hinged on the McKinnon-Shaw (1973) complementarity hypothesis. The interactive framework offered by McKinnon-Shaw describes how the development of the financial sector affects the way an economy's economic activities are shaped. According to the McKinnon-Shaw framework, the financial sector's intermediation role, which supports reliable payment systems

might increase output and employment through savings mobilization, distribution or rationing of credit, and risk diversification.

As shown in Figure 1, the financial industry consists of the financial market and financial institutions. According to the World Bank, the development of each division (whether markets or institution), could be measured through four indicators, namely, depth, access, stability and efficiency. For example, improvement in financial institution depth (measured by the proportion of private sector loans to GDP, the proportion of the money stock to GDP, etc) and financial market depth (captured using the stock market capitalization to GDP ratio, etc) could lead to the creation of more jobs (through business expansion and supporting startups) and an overall boost in economic activities which will further lead to the creation of more jobs. These would lead to a reduction in unemployment. The same analogy applies to other indicators, namely access and efficiency. However, whether the reduction in unemployment could be reflected in gender distribution (male vs female) or spatial location (rural vs urban) is purely an empirical issue.

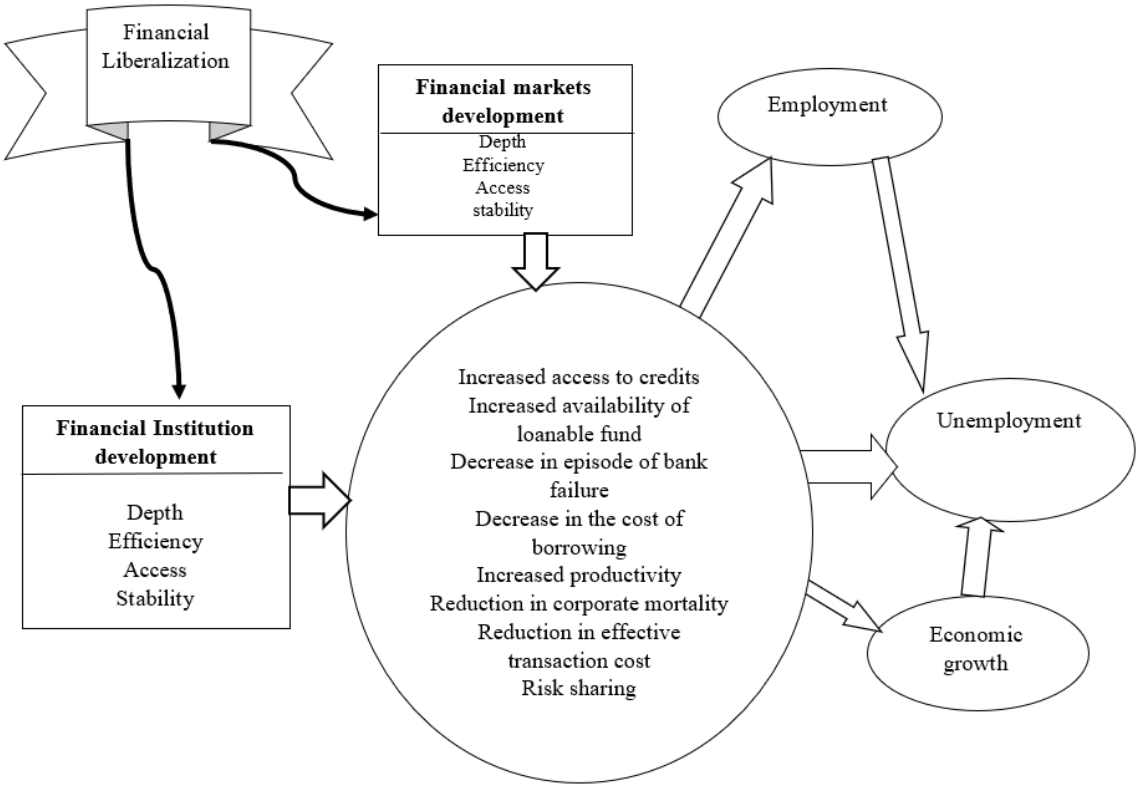

Figure 1: Schematic explanation of the connection between FD and unemployment

Source: Researchers sketch (2022)

McKinnon-Shaw's framework emphasizes that financial development characterized by the liberalization of interest rates will boost real money balances, savings and investment - all of which are employment-promoting. According to the McKinnon-Shaw framework, the real money balance or real money demand function is specified as follows:

$$m = f(y, v, r) \qquad 3.1$$

Where $m = \frac{M}{P}$ = real money stock which includes time deposits, demand deposits, savings and currency in circulation

$v = \frac{I}{Y}$ = the ratio of gross investment to the nominal GDP (Y)

$r = d - \pi^*$ = real return on deposit where "d" refers to the interest rate on deposit while π^* is the expected inflation.

y = real GDP

Notice that the McKinnon-Shaw real demand function specified in Equation 3.1 is in contrast with the neoclassical money demand function where the marginal return on capital is used as the opportunity of holding money instead of "v" which is the investment-GDP ratio. The premise is that in developing economies, physical capital has limited relevance (Alfaro et al, 2008; Avdjiev et al., 2017).

The complementarity hypothesis also holds that the demand for real balances is correlated positively with real GDP, the investment-GDP ratio (since people need to build up their cash reserves before investing), and the real deposit rate (since a high real deposit rate promotes the building up of cash reserves). In other words,

$$\frac{\partial m}{\partial y} > 0, \ \frac{\partial m}{\partial v} > 0, \ \frac{\partial m}{\partial r} > 0$$

As noted by Xu and Gui (2014), complementarity works two ways: the real interest rate (which is indicative of the conditions in the money market), has a positive impact on investment propensities

through savings, and investment has a positive impact on employment through its impact on the real GDP. The equation of investment-GDP ratio (v) is written as:

$$v_t = \alpha_1 r_t + \alpha_2 m_t + \alpha_3 y_t + \alpha_4 z_t \qquad 3.2$$

Where z = other variables.

If we assume that other variables are negligible, Equation 3.2 could be written in terms of r,m and v as follows:

$$y_t = \beta_1 v_t + \beta_2 m_t + \beta_3 r_t \qquad 3.3$$

Where $\beta_1 = \frac{1}{\alpha_1}$, $\beta_2 = \frac{\alpha_2}{\alpha_3}$, $\beta_3 = \frac{\alpha_1}{\alpha_3}$

On labour demand, Borio et al (2016), observed that real GDP, wage rate and efficiency of capital are determinants of aggregate demand for labour. They specified labour demand function as follows:

$$L_t = y_t \left(\frac{(1-\theta)k_t^{\delta}}{w_t} \right)^{1/\theta} \qquad 3.4$$

Where L = labour demand, k = capital per labour, w = wage rate

Taking the log of Equation 3.4, we have:

$$l_t = (1/\theta) y_t + (\delta/\theta)(1-\theta) k_t - (1/\theta) w_t \qquad 3.5$$

Plugging Equation 3.3 into Equation 3.5 and rearranging yields:

$$l_t = \lambda_1 v_t + \lambda_2 m_t + \lambda_3 r_t + \lambda_4 k_t + \lambda_5 w_t + \varepsilon_t \qquad 3.6$$

Where

$$\lambda_1 = \frac{\beta_1}{\theta},\ \lambda_2 = \frac{\beta_2}{\theta},\ \lambda_3 = \frac{\beta_3}{\theta},\ \lambda_4 = \frac{\delta}{\theta}(1-\theta),\ \lambda_5 = -\frac{1}{\theta}$$

Equation 3.6 shows that labour demand positively correlates with investment (which in turn depends on savings), real money balance, and efficiency of capital stock and negatively correlates

with the real wage rate. In other words, financial sector development could have significant implications for unemployment in an economy. According to the complementarity hypothesis, all investments are self-financed because everyone who saves money has the potential to invest. Therefore, the capacity of the financial sector to assemble savings and deploy them to investment will result in an uptick in investment spending which will then bolster labour demand and reduce unemployment.

3.4. Model Specification

This research determines the effect of financial development on unemployment. As earlier stated, this study is quantitative research which requires the research to carry out econometric estimations that would allow for a test of hypothesis and making of inferences. The study employed the dynamic ordinary least square (DOLS) for obtaining quantitative estimates that address the research questions.

The corollary of the predictions of Equation 3.6 is that unemployment is a function of the financial sector and labour market conditions. That is,

$$uem_t = \lambda_1 \sum_{j-0}^{J} F_t + \lambda_2 k_t + \lambda_3 w_t + \varepsilon_t \qquad 3.7$$

Where F stands for the aggregation of the indicators of the financial sector condition.

Following the World Bank's recommendation of four broad indicators of financial sector development, namely, financial depth (FD), financial access (FA), financial stability (FS) and financial efficiency (FE). Plugging this into Equation 3.7 yields:

$$uem_t = \lambda_1 FD_t + \lambda_2 FA_t + \lambda_3 FS_t + \lambda_4 FE_t + \lambda_5 FA_t + \lambda_6 k_t + \lambda_7 w_t + \varepsilon_t \qquad 3.8$$

Bakare (2011) further argue that unemployment is a negative function of economic growth (EG). In addition, Nwokoye et al (2019) opine that models of the macroeconomy or an aspect thereof in Nigeria will need to account for oil revenue (OILR). This is because oil constitutes over 80% of Nigeria's export and over 50% of the revenue of the central government. This suggests that changes in oil revenue could have nontrivial implications for economic outcomes, including labour market outcomes. Incorporating these into Equation 3.8 yields:

$$uem_t = \lambda_1 FD_t + \lambda_2 FA_t + \lambda_3 FS_t + \lambda_4 FE_t + \lambda_5 k_t + \lambda_6 w_t + \lambda_7 EG_t + \lambda_8 OILR_t + \varepsilon_t \qquad 3.9$$

Where

λ_i stands for the ith parameter ε_t is the error term which is assumed to be identically and independently distributed.

$(\lambda_1, \lambda_2\ \lambda_3\ \lambda_4\ \lambda_5\ \lambda_7\ \lambda_8) < 0$ and $\lambda_6 > 0$

3.5. Model Justification

The proposed model as enshrined in Equation 3.9 was chosen based on theoretical and empirical justifications. Based on the McKinnon-Shaw framework, Gatti, Rault and Vaubourg (2009) and Borio et al (2016) proposed that unemployment (or employment) is a function of both labour market and financial sector conditions. They showed that savings mobilization raises investment and output which in turn increases the level of employment and therefore leads to a decrease in the rate of unemployment. Specifically, World Bank (2016) identified four broad measures of financial sector development, namely financial depth, access to financial services, the efficiency of financial services and stability of the financial sector. These measures transverses both financial institutions and financial markets.

In the same, the adoption of the DOLS as advanced by Stock and Watson (1993) was due to its dynamism, estimation efficiency and robustness. Stock and Watson (1993) assert that DOLS produces accurate estimates even in the presence of some multicollinearity or serial autocorrelation in the data. In addition, DOLS follows an asymptotic transformation that could obliterate the endogeneity generated by the long-term correlation of the stochastic regressors innovations and cointegrating equation.

3.6. Description of Variables

The description and measurement of the model variables are outlined in Table 2

Table 2: Variables Description

S/N	Variable	Description/Measurement	Apriori Expectation
1	Unemployment (UNEM)	This refers to the ratio of unemployed persons to the number of persons in the labour force. The study also decoupled unemployment into gender divides (male vs female	This is the dependent variable. It is expected to be a negative function of the indicators of financial

S/N	Variable	Description/Measurement	Apriori Expectation
		unemployment) and spatial location (rural vs urban)	development and a positive function of the wage rate
2	Financial depth (FD)	FD is an indicator of the ability of the financial sector to create money and influence the money stock. It would be captured using the money stock-GDP ratio as captured in CBN (2021).	$\lambda_1 < 0$
3	Financial access (FA)	FA is an explanatory variable that measures the ease of access to financial services. The number of DMB branch networks would be used as a proxy for FA.	$\lambda_2 < 0$
4	Financial efficiency (FE)	FE captures the efficiency of financial institutions in rendering financial services. FE would be measured using lending-deposits spread.	$\lambda_4 < 0$
5	Financial stability (FS)	FS measures the ability of financial institutions to fulfil their immediate obligations, such as daily cash withdrawals by consumers. It would be proxied using the liquidity ratio	$\lambda_3 < 0$
6	Capital-labour ratio (K)	This is a measure of the efficiency of capital use by each worker. It is computed by dividing the total stock of capital by the total supply of labour.	$\lambda_5 < 0$
7	Real wage rate (W)	The real wage refers to the inflation-adjusted wage rate. Given that there is hardly any comprehensive wage data in Nigeria for all job levels, we would employ the minimum wage as a proxy for the wage rate. The minimum wage will be deflated by the consumer price index.	$\lambda_6 > 0$
8	Oil revenue (OILR)	OILR refers to the total revenue that accrues to the Federal Government of Nigeria (FGN) from crude oil sales.	$\lambda_8 < 0$
9	Economic growth (EG)	EG refers to the growth of the real GDP.	$\lambda_7 < 0$

Source: Authors Computation

3.7. Model Estimation and Procedure

The main estimation technique is the DOLS. Nevertheless, prior to evaluating the models, time series properties of the data are examined using unit root and cointegration tests. The next subsections provide an explanation of the study's econometric approaches.

Stationarity Test

In statistics or econometrics, the "mean and autocovariance" of a series are regarded to be (weakly or covariance) stationary if they are not dependent on time (Asteriou & Hall, 2015). A series is

considered nonstationary if it is not stationary. Random walks are a common instance of a nonstationary series:

$$X_t = X_{t-1} + \varepsilon_t$$

Where ε is the random disturbance term and X is a variable

The series has a constant predicted value that depends on X, and the variance grows over time. A difference-stationary series is one that is integrated of order d denoted as I (d) where d represents the integration order. d is a measure of how many differencing operations are required to render a series stationary. Because there is only one unit root in the random walk above, it is an I (1) series. In the same vein, a series that is stationary at level is written as I (0).

In this study, we propose to examine the stochastic nature of the variables by testing for stationarity using the augmented Dickey-Fuller (ADF) test. The decision rule is predicated on a 5% significance level for accepting or rejecting the null hypothesis ($\beta i = 0$; has unit root: i = 1, 2, 3 ….. k). At this stage, the research would assess each explanatory variable's stationarity or lack thereof and also look at each explanatory variable's order of integration (Asteriou & Hall, 2015; Enders, 2014).

Cointegration Test

As defined by Enders (2014), two variables are cointegrated of order one (I(1,1)), if each variable is individually integrated of order 1, but some linear combination of the variables is integrated of order 0. This suggests that the variables have a long-term relationship. In a statistical sense, it also means that a regression of x on y is not spurious.

The Johansen maximum likelihood cointegration technique was employed in this research. This basically involves testing at a 5% level of significance for the presence of cointegrating vectors in the model and rejecting the null hypothesis that there are not any.

Dynamic Ordinary Least Square

The DOLS technique was proposed by Saikkonen (1992) and Stock and Watson (1993). It entails the construction of an asymptotically efficient estimator in a manner that allows for the elimination of the feedback in a cointegrating environment. It achieves this by augmenting the regression system with lags and leads. Resultantly, the stochastic error term of the cointegrating equation

becomes orthogonal to the entire stochastic regression innovations. Suppose we assume that there are p lags and q leads, the DOLS will be set up as follows:

$z_t = X_t'\Psi + D_{1t}'\eta_1 + \sum_{i=-p}^{q} \Delta X_{t+i}'\Pi + u_{1t}$ soaks up the long-run correlation between the error terms.

In Equation 3.11 the difference regressors ΔX

The orthogonality of the error term in a DOLS system implies that DOLS generates asymptotically efficient estimators and provides asymptotic chi-square tests devoid of unwanted parameters

3.8. Diagnostic Assessment

To ascertain the robustness of the estimates, certain diagnostic assessments will be implemented. This would be based on both statistical and econometric criteria.

Statistical criterion

A first-order test is another name for statistical criterion. It verifies the statistical soundness of parameter estimates and regression models. To determine the statistical significance of a regression model's variable, t-test, R-square and F-test are utilized. Both the t-test and f-test are statistical tests that are employed to assess the robustness of the regression parameters. The t-test is applied to each of the parameter estimates to ascertain whether the parameter is statistically significant or not. On the other hand, the F-test assesses the joint significance of all the parameters. Similarly, the R-square is a test of the explanatory powers of the explanatory variable. In order words, it gives a rough estimate of the robustness of the model.

Econometric Criterion

A second-order test is another name for the econometric criterion. This seeks to determine whether the classical regression function's presumptions are true. They assess the regression model's dependability, consistency, and objectivity. The serial correlation test, normality test and heteroscedasticity test were used in accordance with the econometric criterion. In setting up the model of Equation 10, one of the assumptions made is that the $\varepsilon \sim$ i.i.d. $N(0, \sigma^2)$. Thus, the normality test investigates the realization of this claim of the behaviour of the error term. In the same vein, the serial correlation and heteroscedasticity test evaluates the orthogonal properties of the explanatory variable.

3.9. Research Hypotheses Test

The study hypotheses are assessed utilizing the confidence interval approach rather than the typically utilized point estimate approach. The study created an interval around the point estimate so that the interval has a 95% probability of containing the genuine population value(s), as opposed to solely relying on point estimates. To create a 100 (1-α)% confidence interval for the parameters, the study take $\hat{\Pi}_j \pm t_{\alpha/2} Se(\Pi_j)$

where $t\ \alpha/2$ is the critical value of t with n-2 degree of freedom and a probability to the right.

The decision rule is to reject the null hypothesis if the true population parameter (Π_j) falls within the limits, otherwise accept it.

3.10. Data Scope and Source of Data

The scope of the data is 1981-2021. This period was chosen for several reasons. First, it represents a period of substantial changes in the level of unemployment. Within this period, unemployment recorded its lows and highs. Second, this period is known for marked policy changes aimed at stimulating developments in the financial sector. Finally, it was chosen to ensure that the study obtain samples that are large enough to satisfy the asymptotic properties of the model. The annual time series will be sourced from the National Bureau of Statistics (NBS), Central Bank of Nigeria (CBN) Statistical Bulletin and the World Development Indicators (WDI)

3.11. Overview of Ethical Issues

Research in humanities and social sciences often involves participants, especially when the study or data-gathering process requires field study. To provide researchers with a simple frame work for reviewing the ethics of their study throughout the research cycle, an ethics self-assessm ent is usually required. It is therefore required that a researcher assesses the ethical issues involved in the study. A review of ethical risks to both the participant and the researcher is also necessary for the approval of research studies in most institutions of higher learning. Plans for dealing with issues relating to ethics must be well spelt out after they have been discovered. This part evaluates potential ethical dilemmas, associated risks, and a well-defined strategy for risk mitigation and ethical compliance. This is a quantitative study that makes use of time series data. Most of the data

is related to financial institutions and the economy. The study does not require field research or a survey. No interview is intended. In other words, there is a limited risk of ethics violations.

3.11.1. Risks for Participants

One of the ethical issues to be considered is the risk to participants. This refers to risks that the study poses to those that will participate in the study as subjects or respondents. These risks could range from physical, social, economic, legal, and psychological to confidentiality risks.

(a) *Physical risks* – Physical risks include those risks caused by the processes and methodologies employed by the researcher, such as accidents, discomfort, damage, illness, or disease. Exposure to violent social contexts can lead to physical safety risks. As earlier stated, this study uses time series data and does not involve participants. Hence, the researcher presumes that there are no physical risks, whatsoever.

(b) *Social risks* – Social risks are connected to altering interpersonal connections in a manner that harms the subject, such as humiliating people and losing their respect. Participating in research may make one lose the trust and association of friends and associates. To the extent that this study does not involve human or institutional participants, there are no social risks.

(c) *Economic risks* - Economic risk emerges when participants lose money because they participated in the study. It also includes loss of job which may lead to loss of wages or any other financial costs as a consequence of participation in the research. This study does not pose any economic risk. There are no identifiable human or institutional participants. The data to be used are purely macroeconomic aggregate data for the financial system and the economy.

(d) *Psychological risks* - Studies involving human beings may involve tickling or altering people's emotions or behavioural systems. This could raise psychological risks such as stress, hopelessness, shock, regret and a loss of self-worth among others. Psychological risks may also include hypnosis, mental stress and sensory deprivation. Again, this study involves the use of data that are largely inanimate and does not have any psychological entanglement. The study, therefore, does not envisage any psychological risk to participants – there are no identifiable participants

(e) *Legal risks* - Legal risk may arise when persons who are not legally allowed to participate in a study or research are involved in a study. This study does not involve any such legal encumbrance or risk in whatever way. There is no legal restriction involved with using financial system data as we propose to use it in this study.

(f) *Confidentiality risks* - This is a common risk in social science research. In social science research, it is presumptive that personally identifiable information will be kept private and must be maintained unless the investigator or researcher gets the subject's express permission to do differently. Subjects have the right to be protected against harm and unwanted invasions of their privacy, as well as to be treated with dignity. Data collection, handling, and storage must be done with extreme caution. The data employed in this research is public data obtainable from the NBS, World Bank, and the CBN. However, if any of the data or subset thereof requires confidentiality, we shall ensure that such confidentiality is guaranteed. The confidentiality requirements shall not be violated in the course of this research.

In general, a researcher must minimize, if not entirely avoid, any exposure to risk that might affect the subjects. There are no known risks to participants in this study since this study does not involve individual entities, whether human beings or institutions. It is a study of aggregate systems and economic behaviour and performance. The data to be used in this study is aggregate data for the entire financial system or the entire economy.

3.11.2. Covid-19 Risk Assessment for Participants

Researchers using primary data or engaging in field exercises or work could be at risk of COVID-19 because it involves social or physical contact. It is worth noting that COVID-19 has become a major threat across the globe due to its pandemic nature and model of transmission. It has also presented the world with a new normal to live with the reality of its existence. There are risks of new variants of the virus. Although COVID-19 symptoms might range widely, some patients have no symptoms at all. Examining participant exposure risks is crucial in light of this. It is also crucial to remember that some people are more susceptible to COVID-19 than others. For instance, individuals with underlying illnesses may be more at risk of the virus and it is commonly accepted that elderly persons are more vulnerable to COVID-19 than the middle-aged population.

The researcher does not envisage the pandemic disrupting the research process because secondary data from World Bank, CBN and NBS will be utilized in the study. That is to say, the researcher will not be engaging in any physical contact to collect data from participants since there are no participants. The data to be utilized are in the public domain and are easily accessible by researchers across the world and the researcher will not be going to the field for data collection. The data the study will utilize are macro data and do not contain information on individual units.

The primary focus of this study is Nigeria which is regarded as the largest economy in the African region and the most populous black nation. According to the statistics from the World Health Organization, between 3 January 2020 and 28 October 2022, there were 266,043 confirmed COVID-19 cases in Nigeria, with 3,155 fatalities. A total of 83,127,883 vaccine doses have been delivered as of October 16, 2022. The vaccination rate is very poor considering that the nation has over 200 million persons. Currently, the researcher has received all the required COVID-19 vaccines and since the study does not require a direct engagement with people to collect data as the required data will be collected from the data agencies' web pages, the researcher will not pose any direct risk of COVID-19 to anyone during the research activities. It is also essential to highlight that there is no chance of community transmission in undertaking this study. This is contingent on the fact that there will not be any physical meeting during the study as all the materials needed to achieve the goals of this study will be collected online

3.11.3. Risks for Yourself

Generally, social science research as well as research in humanities may pose various levels of risks to the researcher. Expectedly, a researcher could encounter physical dangers like accidents in the process of research activities. As already stated in the preceding sections, the researcher is currently not faced with any potential physical risks because the research does not involve a field exercise as all the materials needed for this study are available on the internet. Put differently, the data that will be utilized for the study will be collected from the online portals of the World Bank, CBN and NBS

A researcher might also be exposed to psychological risks or behavioural risks like being drawn to participants' dangerous activities, etc. Psychological risks usually come from the data collection process. This study does not require field data collection. The data required shall be sourced from the World Bank, NBS and the CBN. The data to be collected are aggregate data and therefore do

not require the researcher to interact in whatever way with micro units of the financial system or the economy.

Although the researcher is not vulnerable to physical and psychological risks or behavioural risks, it is expected that the researcher could be prone to legal risks. These legal risks could emanate from the study's data sourcing and usage. The legal risk involved in the study is the copyright requirement that the source of the data (World Bank/NBS/CBN) should be cited and referenced. Given that this is a basic norm in research, the researcher is aware of this and shall ensure full compliance. The data sources shall be cited and referenced as required by law and research codes. The data obtainable from the World Bank, NBS and CBN does not require anybody who wants to use it to obtain permission from the data agencies. It only requires that the sources should be referenced or cited. Online materials, articles, e-books, etc to be used in this study shall be cited and referenced.

3.11.4. Covid-19 Risk Assessment for Yourself

The researcher is a young lady, and she is undoubtedly in a low-risk age bracket. The researcher has tested positive for the virus in the past and followed religiously the physician's instructions on her path to recovery. It is critical to emphasize that the researcher is COVID-19 compliant having received all the necessary vaccination against the virus. It has been established that the vaccine may not protect one from the risk of the virus and as such the researcher is aware that vaccination does not provide 100% protection from COVID-19. The researcher is a resident of Norway which is a developed economy with a robust health infrastructure and adheres to all COVID-19 protocols, hence the researcher's risk of COVID-19 is minimized. Since the researcher is not carrying out a field survey, there are no conceivable COVID-19 risks associated with this study. Where such risks evolve, the researcher is prepared to observe all COVID-19 protocols, including isolation, or any pharmaceutical requirement.

3.11.5. Informed Consent

The criticality of informed consent in research cannot be over-emphasized. Conducting field research that involves participants requires that informed consent is obtained from the participants. It entails notifying the subject (who is anticipated to engage in a research process) about the study's aim and the procedure to be used in the investigation, the subjects' rights (in engaging in the research), as well as the potential dangers and advantages of the subject's participation in research

(Norwegian National Research Ethics Committees - NNREC, 2014). In this present research, informed consent is not necessary because no identifiable person (s) is (are) required. As previously highlighted, the researcher does not need to conduct a field survey or exercise as it will utilize data from reputable data agencies. The data of interest from these reputable organizations have equally been utilized in peer-reviewed articles. Utilizing the existing macro data obtainable from these agencies' websites shows that the study does not require the participant's informed permission.

3.11.6. Internet Research

Internet research entails gathering information from the internet and it can be applied in online-focused group discussions, online key informant interviews, and online surveys among others. This present inquiry is not essentially an internet research study. The data collection process does not require gathering data from participants over the internet such as through online interviews. However, to assess related studies and identify the gaps in the literature, the researcher will source relevant literature from the internet. These materials utilized in the study will be given adequate credit. Additionally, the researcher will also collect data from World Bank, NBS and CBN webpage while also giving them the required credit

3.11.7. Personal Data Protection

According to NNREC (2016), personal data includes any information that relates to a person who provided such information. Research ethics require that the privacy of those taking part in research must be protected. Their identifiable details should not be revealed. In Nigeria, which is the study scope, the constitution of the nation demands preserving the citizen's privacy and other related private details. Aligning with relevant research ethics, the researcher will not infringe on the privacy of the participant's data as this study utilizes macro data collected by reputable data agencies which are accessible from their various websites. The data the study will utilize are aggregate and do not reveal any identifiable traits of the units that make up the aggregate. There will be no infringement of the privacy of the participant's data and the research does not require participants. The data are aggregated and do not reveal any identifiable traits of the units that make up the aggregate.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF RESULTS

This research appraises the influence of financial development on Nigeria's unemployment. This chapter presents the analysis of data and a discussion of the results obtained from several econometric estimations. First, the data pattern is presented using descriptive statistics and correlation analysis. Second, the results of econometric estimations are presented and discussed. Finally, the estimates obtained were evaluated and the earlier stated hypotheses were tested.

4.1. Descriptive statistics

The underlying patterns in the data are x-rayed using descriptive statistics and correlation analysis. Table 3 shows that the mean value for capital per worker is ₦12.90 per worker with a standard deviation of 5.72 units.

Table 3: Summary of descriptive statistics

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
Capital-labour ratio (K, ₦)	12.90	12.66	34.02	5.47	5.72	1.16	3.16
Financial access (FA, number of banks)	3258.66	2407.00	5904.00	869.00	1719.52	0.37	1.57
Financial depth (FD, %)	27.77	27.80	43.60	13.70	7.44	0.19	2.67
Financial efficiency (FE, %)	67.11	68.63	85.66	37.97	12.23	-0.58	2.73
Financial stability (FS, %)	48.01	46.50	75.80	29.10	10.93	0.51	2.82
Oil revenue (OILR,N'bn)	2,533.5	1,591.7	8,879.0	7.3	2694.56	0.61	2.85
Real wage rate (W, ₦)	113.16	108.38	255.44	10.59	56.47	0.36	3.19
Unemployment (UNEM, %)	13.05	10.20	33.30	5.30	7.90	1.15	3.29
Female unemployment (F_UNEM, %)	13.80	10.78	35.20	5.60	8.35	1.10	2.98
Male unemployment (M_UNEM, %)	12.47	9.74	31.80	5.06	7.54	1.01	2.02

Urban unemployment (U_UNEM ,%)	12.27	9.59	31.30	4.98	7.43	1.24	2.29
Rural unemployment (R_UNEM, %)	13.52	10.57	34.50	5.49	8.19	1.31	1.49
Economic growth (EG, %)	3.26	3.44	33.74	-13.13	7.19	1.37	1.76

Source: Researcher's Estimations (2023)

In other words, each worker is assigned an average of ₦12.90. This is indicative of a low level of capital, a phenomenon that is predominant in low-income countries (Araujo et al, 2016; Araujo et al, 2017). The minimum and maximum units of capital per worker are ₦5.47 and ₦34.02 respectively. Table 3 also shows that the maximum oil revenue between 1981 and 2021 was ₦8.88 trillion ($19.22 billion). This peak revenue was realized in 2011 during the oil boom of 2011 to 2014. However, the mean oil revenue was ₦2.53 trillion ($5.48 billion). The high standard deviation of ₦2.69 trillion ($5.82 billion) is indicative of the nature of volatility in oil revenue.

For the scope of the study (1981-2021), the average rate of unemployment was 13.05% with a maximum unemployment rate of 33.3% in 2020. For the female gender, the maximum unemployment rate was 35.2% while the mean rate was 13.8%. The male gender was slightly lower at the mean and maximum rates of 31.8% and 12.47% respectively. In the same vein, the rural unemployment rate was higher than urban unemployment at a mean rate of 13.52%. For the financial development data, the financial depth indicator achieved its highest score of 43.6% in 2009 and a minimum score of 13.7% in 1996. Financial depth was measured using money stock as a ratio of GDP. The ease of access to financial services was measured using the number of bank branches. The maximum number of branches was 5,904 in 2017. The number of branches shrank after the recession of 2017. The number of branches shrank to 5548 after the recession of 2017 and has remained below the high of 2017. In the same vein, the minimum number of branches was 869 recorded in 1981. In terms of financial stability measured using the liquidity ratio, the average liquidity ratio stood at 48.01% with maximum and minimum values of 75.8% and 29.10% respectively. The regulatory requirement currently is 30%. Similarly, the financial efficiency indicator measured using the lending-deposit ratio averaged 67.11% over the study period with maximum and minimum values of 85.66% and 37.97% respectively.

Another important statistic reported in Table 3 is skewness. Skewness is a statistical concept that assesses the level of asymmetry in a probability distribution. In simpler terms, it is a measure of the lopsidedness of a data set around its mean. Skewness can have a positive, negative, or zero value. A positive skew implies that the distribution's tail is longer on the right, whereas a negative skew suggests that the tail is longer on the left. A perfectly symmetrical distribution will have a skewness of zero. The importance of skewness lies in its ability to provide information about the shape of the distribution of a data set. Skewed data sets can have a substantial effect on the outcomes of statistical analyses, particularly when it comes to measures of central tendency (e.g., mean, median, mode) and variability (e.g., standard deviation). For example, if a data set is skewed positively, the mean will be higher than the median, and if it is negatively skewed, the median will be greater than the mean. Understanding the skewness of a data set is crucial for choosing appropriate statistical tests and interpreting their results accurately.

Skewness can range from zero (-infinity) to infinity (+infinity). Symmetrical distribution, moderately skewed distribution, or fairly skewed distribution (skewness between -0.5 and 0.5) may not raise substantial concern in statistical analysis (Kothari, 2004). Highly skewed distributions, on the other hand, are said to seriously limit statistical inference (skewness less than -1 or larger than 1). Standard statistical inference techniques such as a confidence interval for a mean will be erroneous in that the true level of confidence will differ from the reported level of confidence and will also lead to unequal error probabilities on each side when there is pronounced skewness (Kothari, 2004). The result obtained show that the skewness of the data is within acceptable limits. This suggests that the data does not pose a serious challenge to statistical inference.

Another statistic of interest is the kurtosis. Kothari (2004) defined kurtosis as a statistic that that quantifies the degree to which a probability distribution is peaked or flat in comparison to a normal distribution. In simpler terms, it is a measure of the amount of data that is located in the tails of a distribution. Kurtosis can have a positive or negative value, or it can be zero. A positive kurtosis indicates that the data has a sharper peak and heavier tails than a normal distribution, while a negative kurtosis indicates that the data has a flatter peak and lighter tails. The importance of kurtosis lies in its ability to provide information about the shape of the tails of a distribution. Data sets with high kurtosis have more extreme values than a normal distribution, which can have

important implications for statistical analyses. For example, high kurtosis can affect the accuracy of traditional statistical tests that assume a normal distribution, such as the t-test.

Generally, the kurtosis of any univariate normal distribution is 3 (or approximately 3). Distributions are classified as leptokurtic or platykurtic depending on the value of the kurtosis, which ranges from 0 to 3. According to Kothari (2004), kurtosis larger than 3 may be a symptom of significant outliers in statistical analysis, which could jeopardize the accuracy of statistical forecasts. From the results presented in Table 3, no kurtosis is significantly greater than 3. This indicates that the distributions are either mesokurtic (kurtosis around 3) or platykurtic (kurtosis less than 3).

4.2. Correlation Analysis

It is a statistical technique that evaluates the link between two variables in terms of their direction and strength. It helps in understanding how modifications in one variable influence the other variable. The concept of correlation analysis is based on the idea that if there is a relationship between two variables, then the values of one variable can be utilized to forecast that of another variable.

Table 4: Correlation coefficients

	EG	FA	FD	FE	FS	K	OILR	UNEM	F_ UNEM	M_ UNEM	U_ UNEM	R_ UNEM
FA	0.24											
FD	-0.24	-0.07										
FE	-0.16	-0.25	0.15									
FS	0.06	0.09	-0.08	-0.33								
K	-0.46	-0.04	0.47	0.14	-0.15							
OILR	0.16	0.05	0.02	-0.25	0.22	0.07						
UNEM	0.72	-0.65	-0.69	-0.35	0.35	0.47	0.85					
F_ UNEM	0.10	-0.31	-0.50	-0.14	-0.49	0.28	-0.24	0.31				
M_ UNEM	0.27	-0.64	-0.54	0.49	0.30	0.50	0.51	0.69	-0.59			
U_ UNEM	0.65	0.54	0.78	-0.58	0.61	0.57	0.75	0.52	-0.08	0.46		

R_ UNEM	0.43	-0.65	-0.55	0.45	-0.41	0.60	0.55	0.84	0.32	0.21	0.12	
W	-0.14	-0.18	0.15	0.07	0.23	0.20	-0.06	-0.83	-0.79	-0.69	-0.85	-0.52

Source: Researcher's Estimations (2023)

The correlation coefficient has a value between +1 and -1 depending on how strong the link is. If there is a perfect degree between two variables, the correlation coefficient is indicated by a value of ±1. As the correlation coefficient value approaches zero, it is claimed that there is less of a link between the two variables. A positive association is indicated by a plus sign (+) and a negative relationship is indicated by a minus sign (-) in the coefficient (Kothari, 2004). Additionally, Woodridge (2001) points out that correlation analysis in econometrics has real-world applications. It serves as a sign of linear dependency. According to his prediction, variables with linear dependence will have correlation coefficients higher than 0.70. While this kind of linear dependence is expected between dependent and independent variables, it could indicate the presence of multicollinearity among explanatory variables. In other words, a correlational coefficient greater than 0.70 between two explanatory variables is *prima facie* evidence of the existence of multicollinearity. The result shows that there are no correlation coefficients between two explanatory variables that exceed 0.70.

4.3. Time series properties of the data

A collection of data points across time, typically at regular intervals, is known as a time series. These data points can represent various measurements such as stock price, temperature readings, or sales figures. The data employed in this research are time series ranging from 1981 to 2021. Thus, this study adopts a time series analytical technique. One of the concerns about time series analysis is that it is largely built on asymptotic properties as well as the assumption of well-behaved distribution. This includes the assumptions of stationarity. If a time series' statistical features remain consistent across time, it is said to be stationary. The properties are the mean, variance, and covariance. Stationarity is essential because most time series models assume that the data follows a stationary process.

Table 5: Stationarity test

	ADF Test		Philip-Perron Test	
Variable	ADF statistics	Integration Order	PP statistics	Integration Order
Wage rate (W)	-4.548***	I(1)	-4.380***	I(1)
Oil Revenue (OILR)	-8.027***	I(1)	-8.109***	I(1)
Financial depth (FD)	-26.355***	I(1)	-25.872***	I(1)
Financial access (FA)	- 8.578***	I(1)	-4.554***	I(1)
Financial efficiency (FE)	-4.929***	I(1)	-4.929***	I(1)
Financial stability (FS)	-8.671***	I(1)	-8.452	I(1)
Unemployment (UEM)	-7.441***	I(1)	-7.403***	I(1)
Female Unemployment (F_UNEM)	-6.023***	I(1)	-6.192***	I(1)
Male Unemployment (M_UNEM)	-6.389***	I(1)	-6.407***	I(1)
Urban Unemployment (U_UNEM)	-5.902***	I(1)	-6.119***	I(1)
Rural Unemployment (R_UNEM)	-7.001***	I(1)	-7.218***	I(1)
Capital per labour (k)	-4.278***	I(1)	-16.479***	I(1)
Economic growth (EG)	-4.599	I(1)	-5.139***	I(1)

Source: Researcher's Estimations (2023)

*Note: *, **, *** denotes statistical significance at 10%, 5% and 1% respectively*

As shown on Table 5, both augmented Dicker-Fuller (ADF) and Phillip-Perron (PP) tests were employed in this study. The result shows that all the series are integrated of order one (I(1)). This implies that they become stationarity after the first differencing. This result is in line with Hayashi's (2000) and Faciane's (2006) proposition that time series is the realization of stochastic processes.

Another implication of the result of the stationary test is that the regression of the series could be spurious except if they are cointegrated. As noted by Hayashi (2000), the cointegration of the dependent and a set of independent variables means that the variables have a long-term relationship. Simply put, it means that the regression of such series or variables is not spurious (or nonsensical). Statistical inferences made from the regression of variables that are not cointegrated are meaningless since no meaningful relationship exists between such variables (Hayashi, 2000; Faciane, 2006). In this study, the cointegration test was implemented using Phillip-Qualiris (PQ) cointegration test procedure. For the null hypothesis of no cointegration to be rejected, it is required that there must be at least one cointegrated equation. The PQ test is a multi-equation test with the number of equations equal to the number of variables. For an equation to be cointegrated, the p-value of the tau statistic must be equal to or less than 0.05. In Table 6, the cointegration result

shows that there are 10 cointegrated equations. This implies that the null hypothesis of no cointegration cannot be accepted. In other words, the series are cointegrated. This suggests that there is a long-term relationship between the study's variables. It also shows that the correlation between the dependent and explanatory variables is valid.

Table 6: Summary result of the PQ cointegration test

Dependent	tau-statistic	Prob.*	Remark
UEM	-13.652**	0.032	Cointegrated
F_UNEM	-22.089***	0.002	Cointegrated
M_UNEM	-12.057**	0.048	Cointegrated
U_UNEM	-20.510***	0.003	Cointegrated
R_UNEM	-18.921***	0.004	Cointegrated
FA	-20.219***	0.003	Cointegrated
W	-19.308***	0.003	Cointegrated
K	-6.097	0.743	Not cointegrated
OILR	-5.976	0.714	Not cointegrated
FS	-12.017**	0.050	Cointegrated
FD	-18.427***	0.004	Cointegrated
FE	-4.550	0.802	Not cointegrated
EG	-23.214***	0.011	Cointegrated

Source: Researcher's Estimations (2023)

*Note: *, **, *** denotes statistical significance at 10%, 5% and 1% respectively*

4.4. Evaluation of the research questions

The thrust of the study is to evaluate the effect of financial development on unemployment in Nigeria. The study, therefore, aims to answer the following questions. First, does financial development influence Nigeria's aggregate unemployment? Second, what is the effect of financial development on the male and female unemployment rate in Nigeria? Third, what is the impact of financial development on rural and urban unemployment rates in Nigeria? To answer these research questions, several regression analyses were conducted, and the results are presented and discussed in alignment with the research questions. All the regression results were obtained using the dynamic ordinary least square technique.

Dynamic Ordinary Least Squares (DOLS) is a statistical technique that is often employed to evaluate the long-run relationship between non-stationary variables. Note that the stationarity test of the series shows that all the series are integrated of order one rather than order zero. This makes

it technically unreliable to use traditional regression methods such as ordinary least squares. The use of DOLS offers several advantages. DOLS is a dynamic model that takes into account the time series properties of the data. It also corrects for endogeneity and yields consistent estimates (Stock & Watson, 1993).

4.4.1. Impact of financial development on unemployment

In investigating the influence of financial development on unemployment, the unemployment rate was used as the dependent variable while indicators of financial development entered the model as explanatory variables. Two models were estimated, model 1 and model 2.

Table 7: Summary result for the impact of financial development on unemployment

	Model 1		Model 2	
	Coef	Std error	Coef	Std error
EG	0.015**	0.007	0.021***	0.006
FA	-0.027**	0.011	-0.037***	0.014
OILR*FA			-0.042***	0.014
FD	-0.064***	0.020	-0.087***	0.031
OILR*FD			-0.098***	0.034
FE	-0.165***	0.060	-0.224***	0.050
OILR*FE			-0.254**	0.111
FS	-0.029**	0.014	-0.039**	0.017
OILR*FS			-0.044	0.013
K	-0.187***	0.040	-0.254**	0.104
OILR	0.002***	0.001	0.003***	0.001
W	0.075***	0.030	0.101***	0.032
C	28.428	38.118	12.581	14.310

Source: Researcher's Estimations (2023)

*Note: *, **, *** denotes statistical significance at 10%, 5% and 1% respectively*

Model 2 is an interaction model – oil revenue interacted with the indicators of financial development to access the amplifying effect. The result presented in Table 7 shows that the

coefficients of the indicators of financial development in Model 1 are -0.027, -0.064, -0.165 and -0.029 for financial access (FA), financial depth (FD), financial efficiency (FE), and financial stability (FS) respectively. This suggests that if FA, FD, FE and FS are increased by ten units, unemployment will decrease by -0.27 units, -0.64 units, -1.65 units and -0.29 units respectively. All the coefficients of the indicators of financial indicators are statistically significant, at least at a 5% significance level. This clearly shows that unemployment is a negative function of financial development.

The result also shows that the coefficient of economic growth (EG) is 0.015 with a standard error of 0.007. The estimated coefficient of EG is statistically significant. This indicates that if economic growth increases by one unit, unemployment increases by 0.015. This result is contrary to the apriori expectation of an inverse relationship. However, as observed by Datt (1994), this is indicative of the prevalence of jobless growth.

The result also shows that the coefficient of capital (K) is -0.187. The coefficient of K with a standard error of 0.040 is statistically significant at a 1% significance level. This shows that doubling the level of capital stock will reduce unemployment by 18.7%. This corroborates Jain and Khanna's (2010) and Maqbool et al. (2013) conclusion that capital investment is potent in reducing unemployment in developing economies. The result obtained also shows that the coefficient of the wage rate (W) is 0.075 and this is statistically significant. This suggests that, in line with the classical doctrine, raising the wage rate through minimum wage legislation would lead to an increase in unemployment. Another interesting result obtained is that contrary to the apriori expectation, unemployment is a positive function of oil revenue in Nigeria. To be precise, the coefficient of oil revenue is 0.002. This result corroborates Nwokoye et al (2019) who found that high oil revenue in Nigeria did not reduce unemployment between 1990 and 2016. This could be explained by the dynamics of the political economy of oil in Nigeria. Most periods of increased oil revenue are periods that there is an increase in the oil price (Nwokoye et al, 2019). An increase in oil revenue could increase unemployment through the following channels. First, the value-chain price effect. Aregbeyen and Kolawole (2016) observed that although Nigeria is a significant exporter of crude oil, it also imports refined petroleum products. Thus, an increase in crude oil prices leads to an increase in the price of refined petroleum products which raises the energy cost profile of firms. This also leads to a spike in logistics costs. Also, given that Nigeria is a net

importer of both consumables and capital goods, such an increase in the international price of energy induces imported inflation. Thus, the rising oil price is followed by spiralling inflation, which in turn causes the monetary authority to raise the interest rate. This squeezes liquidity and induces job loss in the long run.

Second, channel as suggested by Altay et al. (2013), Alkhateeb et al. (2017) and Awunyo-Vitor et al. (2018), the prevalence of the Dutch disease phenomenon or resource curse syndrome could precipitate job losses when oil revenue increases. According to Awunyo-Vitor et al. (2018), Dutch disease relates to a situation whereby the oil boom in developing countries leads to the deindustrialization of the non-oil sector, which in turn leads to macroeconomic instability such as currency crisis, rising unemployment and weak growth. The Dutch disease may simply be the outcome of unfair distribution of natural resource rents. During a resource boom, spending on oppulent non-tradable goods and services increases disproportionately. Because there is more demand for and opportunity in the oil sector, workers leave other businesses like manufacturing which induces a shift away from the manufacturing sector. This further leads to an increase in the level of unemployment (Altay et al., 2013; Alkhateeb et al., 2017).

In Model 2, which is the interaction model, the result shows that the impact of financial development on unemployment improves when the indicators of financial development interact with oil revenue. For example, interacting OILR with FA yields a coefficient of -0.042 as against -0.027 for FA. Similar outcomes were obtained for other indicators. For example, the coefficients of OILR*FD, OILR*FE and OILR*FS are -0.098, -0.0254 and -0.013 respectively. This suggests that investing oil revenue in the development of the financial sector will engender greater gains.

4.4.2. Impact of financial development on unemployment based on gender

In this subsection, the estimates of the impact of financial development on male and female unemployment are presented and analyzed. Model 1 is the estimate of the impact of financial development on male unemployment while Model 2 is the summary estimates of the impact of financial development on female unemployment. The results obtained for Model 1 show that the coefficients of FA, FD, FE and FS are -0.028, -0.139, -0.034, and -0.377 respectively. all the estimates are significant at least at a 5% significance level. This suggests that raising FA, FD, FE and FS by 10% will reduce male unemployment by 0.28%, 1.39%, 0.3.4%, and 3.77%

respectively. Again, the coefficient of economic growth (0.083) and oil revenue (0.032) are positive and statistically significant. This reinforces the earlier finding discussed in section 4.4.1.

Table 8: Summary result for the impact of financial development on unemployment based on gender

	Model 1: Male unemployment		Model 2: Female unemployment	
	Coef	Std error	Coef	Std error
EG	0.083***	0.013	-0.092***	0.007
FA	-0.028***	0.008	-0.322***	0.087
FD	-0.139***	0.015	-0.249***	0.037
FE	-0.034***	0.010	-0.034	0.028
FS	-0.377***	0.073	-0.188	0.130
K	-0.052**	0.021	-0.014**	0.006
OILR	0.032**	0.016	0.061***	0.024
W	0.197***	0.023	-0.130***	-0.012
C	-0.007***	0.002	0.005**	0.002
@TREND	0.007**	0.004	0.253***	0.030
@TREND^2	-0.132***	0.020	0.019	0.017

Source: Researcher's Estimations (2023)
*Note: *, **, *** denotes statistical significance at 10%, 5% and 1% respectively*

In Model 2, the coefficients of FA and FD are -0.322 and -0.249 with standard errors of 0.087 and 0.037 respectively which suggests that both coefficients are statistically significant. This implies that increasing the accessibility of banks by one unit reduces female unemployment by 0.322 units. It also suggests that if the financial depth increases by one unit, female unemployment could decline by 0.249 units. However, although the coefficients of FE and FS were entered with the apriori sign (negative), the coefficients are not statistically significant. The coefficients are -0.034 and -0.188 for FE and FS respectively.

Another interesting finding is that the coefficient of economic growth is negative in Model 2 in line with the apriori expectation. The coefficient of economic growth (EG) is -0.092 with a standard error of 0.007, indicating that the coefficient is statistically significant. This suggests that economic growth is a veritable tool for lifting women from unemployment. Other coefficients include -0.014 (for K), 0.061 (for OILR) and -0.130 (for W). Notice that women's unemployment rate declines as the minimum wage increases. This is contrary to the result obtained for the

aggregate unemployment rate and male unemployment. This could suggest that raising the wage rate could induce more women to accept job offers. This could happen if the new wage rate exceeds the reservation wage of married women in the labour market whose reservation wage is usually set above the allowances obtainable from their husbands.

4.4.3. Impact of financial development on unemployment based on spatial location

Another research question of this study is to ascertain the impact of financial development on unemployment based on spatial location, namely urban and rural areas. Estimates obtained from DOLS estimation are summarized in Table 9. Model 1 refers to estimates of urban unemployment while Model 2 represents estimates of rural unemployment.

Table 9: Summary result for the impact of financial development on unemployment based on spatial location

	Model 1: urban unemployment		Model 2: rural unemployment	
	Coef	Std error	Coef	Std error
EG	0.062*	0.036	-0.028***	0.007
FA	-0.040***	0.007	-0.015**	0.006
FD	-0.013**	0.006	-0.004**	0.002
FE	-0.006***	0.001	-0.008*	0.004
FS	-0.005***	0.002	-0.024	0.019
K	-0.007***	0.002	-0.018***	0.005
OILR	0.087**	0.036	0.006**	0.003
W	0.031***	0.003	0.008***	0.001
C	0.011***	0.001	0.007***	0.001
@TREND	-0.003***	0.001	-0.019***	0.003
@TREND^2	0.008	0.007	-0.052***	0.021

Source: Source: Researcher's Estimations (2023)
*Note: *, **, *** denotes statistical significance at 10%, 5% and 1% respectively*

In Model 1, the coefficients FA, FD, FE and FS are -0.040, -0.013, -0.006 and -0.005 respectively. As shown in Table 9, these coefficients are statistically significant. However, in Model 2, the coefficients of FE (measured by the deposit-lending ratio) and FS (measured by the liquidity ratio) are not statistically significant. This suggests that the rural economy does not sufficiently benefit from the booming credit in the banking sector. However, economic growth has a significant

negative impact on rural unemployment (with a coefficient of -0.0028 and a standard error of 0.007). This indicates that economic growth could lead to increased labour demand in the rural economy, through increased demand for raw materials or increased rural-urban migration.

4.5. Post-Estimation Assessment

In this section, the estimated regression model is evaluated to ascertain whether it is robust, efficient or consistent. Some of the post-estimation tests include variance inflation factors, multiple parameter Wald (MPW) test and normality test.

Variance Inflation factor

Variance inflation factors (VIFs) are a measure of multicollinearity in regression analysis. Multicollinearity happens when two or more predictor variables in a regression model are highly correlated with one another, making it difficult to determine their individual effects on the outcome variable. VIF is calculated for each predictor variable in the model by regressing it against all the other predictor variables. The VIF value for a predictor variable represents how much the variance of that variable's coefficient estimate is increased because of correlations between the predictor variables.

Table 10: Summary estimates of VIFs for all the models (using centered VIFs)

	UNEM	F_UNEM	M_UNEM	U_URBAN	R_UNEM
EG	1.590	1.641	1.404	1.342	1.167
FA	1.004	1.403	3.388	1.215	1.105
FD	1.751	1.377	1.367	2.201	1.098
FE	1.200	3.312	1.298	2.167	3.081
FS	1.973	4.218	1.192	1.116	1.057
K	2.415	1.559	1.548	3.299	1.146
OILR	1.828	1.389	1.379	1.208	1.101
W	2.660	2.446	2.469	1.772	1.377
C	2.145	1.638	2.668	1.875	1.427
@TREND	2.495	2.270	2.281	1.678	1.669
@TREND^2	1.381	1.422	1.388	1.225	1.890

Source: Researcher's Estimations (2023)

VIF values range from 1 (no multicollinearity) to infinity (perfect multicollinearity). Usually, a VIF value greater than 5 or 10 is considered to indicate moderate to severe multicollinearity in the model. If multicollinearity is present and the VIF values are high, it can make it challenging to interpret regression coefficients and standard errors and decrease the accuracy of the regression model. In this case, it might be essential to remove some of the predictor variables or take other steps to reduce multicollinearity. Given that our models have intercept terms, the centred VIFs are used to assess the presence of multicollinearity. The VIF result presented in Table 10 shows that there is VIF that is greater than 5. Thus, we conclude that there is no problem with multicollinearity.

Multiple parameter Wald (MPW) test

The multiple parameter Wald (MPW) test is a statistical test analogous to the F-test. It is used to test the null hypothesis that a set of coefficients in a regression model are equal to a specified value. The MPW test is a generalization of the t-test, which is used to test the null hypothesis that a single coefficient is equal to zero. It can be used to test multiple hypotheses simultaneously, and it is particularly useful for testing hypotheses about linear combinations of coefficients. The MPW test is based on the Wald statistic, which is defined as the ratio of the square of the difference between the estimated value of the parameter and the null hypothesis value to the estimated variance of the parameter. The Wald statistics follows a chi-square distribution under the null hypothesis, so the p-value of the test can be calculated using the chi-square distribution.

Table 11: Summary statistics for the Wald test

Model	Wald Statistic	p-value	Remarks
UNEM	88.392	0.000	Reject the null hypothesis
F_UNEM	55.615	0.000	Reject the null hypothesis
M_UNEM	51.997	0.000	Reject the null hypothesis
U_URBAN	43.021	0.000	Reject the null hypothesis
R_UNEM	30.032	0.000	Reject the null hypothesis

Source: Researcher's Estimations (2023)

Thus, to test the joint significance or robustness of the regression results, the MPW test is employed. The null hypothesis of no joint significance is rejected if and only if the p-value of the

Wald statistic is equal to or less than 0.05, otherwise, the null hypothesis of no significance is accepted. As shown in Table 4.9, the null hypothesis of no joint significance is rejected for all the models. Thus, the study concludes that each of the models is robust.

Normality test

Another post-estimation assessment borders on the normality assumption. A normality test of a regression result is conducted to determine whether the residuals (i.e., the discrepancies between the dependent variable's observed values and those anticipated by the regression equation) are normally distributed. If the residuals have a normal distribution, this means that the assumptions of the regression model are met and the results can be interpreted appropriately. According to Greene (2005), it is required that for regression estimates to be useful for inferences, the error term must follow a normal distribution (except in the case of count variables which follows binomial or Poisson distribution).

Table 12: Summary of the normality test

Model	Jarque-Bera statistic	p-value	Remarks
UNEM	0.107	0.921	The residual is normally distributed
F_UNEM	0.339	0.747	The residual is normally distributed
M_UNEM	0.137	0.900	The residual is normally distributed
U_URBAN	0.400	0.702	The residual is normally distributed
R_UNEM	0.177	0.869	The residual is normally distributed

Source: Researcher's Estimations (2023)

There are various ways to test for the normality of residuals, including graphical approaches (such as histograms and Q-Q plots) and statistical tests (like the Kolmogorov-Smirnov test, Shapiro-Wilk test and the Jarque-Bera test). The graphical methods involve plotting the residuals and visually inspecting whether they follow a normal distribution, whereas statistical tests entail calculating a test statistic and comparing it to a critical value based on the sample size and significance level. If the normality test indicates that the residuals are not normally distributed, this may suggest that the regression model is not appropriate for the data and that alternative models or transformations may be necessary. However, it is important to note that the normality of residuals is just one of several assumptions that must be met for regression analysis, and

violation of this assumption alone does not necessarily invalidate the results. Greene (2005) contended that if the error term does not follow a normal distribution, the inference made from the estimates using t-statistics or standard error would not be valid (howbeit, the estimates would be unbiased).

The study employed the Jarque-Bera test for the evaluation of the normality of the residual of the regression equation. The null hypothesis that the residual is normally distributed can be rejected if and only if the p-value of the Jarque-Bera statistics is less than 0.05, otherwise, the study accepts that the residual is normally distributed. In other words, the residual is said to be normally distributed if the p-value of the Jarque-Bera statistics is greater than 0.05. the result shown in Table 12 indicates that the residual of all the regression models is normally distributed. This suggests that inference can be made from the t-statistic obtained from the regression results.

4.6. Discussion of Findings

The study found that financial development is critical for reducing unemployment in Nigeria. The channels through which financial services can impact unemployment are discussed in the following subsections.

4.6.1. Access to financial services

Increased access to financial services is synonymous with increased financial inclusion. As noted by Bayar (2016), increased access to financial services can reduce unemployment through increased access to credit. Credit availability allows people and small enterprises to finance education, start their businesses, or expand their existing businesses. This can create jobs, as new businesses often require additional workers. According to Osikena and Uğur (2016), access to financial services such as bank accounts, savings accounts, and financial education can help individuals manage their finances more effectively. Alshyab et al. (2021) argue that one of the biggest challenges of small businesses in developing countries is a lack of financial management skills with several small businesses not having a bank account. Access to financial services will provide small businesses with the opportunity to improve the way business finance is managed. The increased number of bank branches reduces the distance between business locations and banks and increases the incentive to use financial services such as electronic transaction systems. This also encourages businesses to request bank loans during which they are required to keep financial

records. These practices increase business efficiency, and buoy productivity and boost labour demand (Yorulmaz, 2012; Osikena & Uğur, 2016). This can also lead to greater financial stability and the ability to weather financial shocks, reducing the likelihood of job loss (Bayar, 2016; Alshyab et al., 2021)

Increased access to financial services can also reduce unemployment through increased investment in human capital. According to Beck et al (2004), financial services can provide individuals with the resources they need to invest in their education and training. This can help individuals develop the skills needed to obtain higher-paying jobs and increase their earning potential. Beck et al (2004) emphasized that access to financial services can reduce unemployment through its impact on access to insurance. Financial services can provide individuals and businesses with access to insurance products such as unemployment insurance or business interruption insurance. This can provide a safety net in the event of job loss or business disruption, reducing the negative impact of unemployment. Overall, by providing individuals and businesses with the resources they need to invest in themselves and their futures, financial services can help reduce unemployment and promote economic growth.

4.6.2. Financial depth

Financial deepening refers to the expansion and improvement of financial systems and services. As noted by Akande (2019), financial deepening can lower unemployment in several ways. First, through an increase in investment, financial deepening can reduce unemployment. Financial deepening can increase the level of investment in an economy, as it allows for greater savings mobilization and effective funding distribution to viable projects. This can lead to the creation of new businesses and industries, which can in turn create new jobs (Aliero et al., 2013; Zahonogo, 2016).

Raifu (2019) also argued that a well-functioning financial system can help to direct investment and resources to the most productive areas of the economy, which can improve efficiency and reduce wastage. This can lead to overall economic growth and higher employment rates. Additionally, Zahonogo (2016) states that increased financial depth raises investment productivity, which boosts business productivity and reduces unemployment. Second, Bayar (2016) opines that financial deepening could lead to a reduction in unemployment through improved risk

management. Financial deepening can help to manage risks and uncertainties in an economy, through the provision of insurance and other risk management products. This can reduce the likelihood of economic shocks and instability, which can lead to job losses. Finally, financial deepening could boost access to credit by both firms and households. A well-functioning financial system allows individuals and businesses to access credit and other financial services, which can help them to start or expand their businesses. This can lead to an increase in economic activity, job creation and ultimately, lower unemployment rates (Bayar, 2016; Akande, 2019).

Moreso, financial liberalization and a decline in financial repression are signs of financial deepening. Particularly, McKinnon (1973) and Shaw (1973) contend that the mobilization of savings, the allocation of investments, and the promotion of economic growth are made easier by unrepressed financial markets. According to McKinnon (1973) and Shaw (1973), a "repressed" financial system hinders development in a variety of ways. Poor financial deepening, for instance, suggests that savings vehicles are underdeveloped, savings returns are negative or unreliable, financial intermediaries accumulate savings, but do not distribute them effectively and businesses avoid investing due to risky financial practices.

However, it is worth mentioning that Demetriades and Hussein (1996) found the opposite outcome. They contend that direct lending in the "curb" market suffers the most as a result of financial deepening. As a result, they conclude that, in reality, financial deepening is likely to decrease the amount of investment, the rate of economic development, and the total real supply of credit available. The results of Demetriades and Hussein (1996) should be interpreted carefully, according to Cojocaru et al. (2016) and Çiftçioğlu and Bein (2017), who also made this observation. Because the study concentrated on the capital market and employed stock market capitalization as a gauge of financial depth. Because the capital market is mostly underdeveloped in low-income and developing economies, Cojocaru et al (2016) claim that even though Demetriades and Hussein (1996) focused on financial deepening in the stock market, the findings may not apply to the entire financial system.

4.6.3. Financial sector efficiency and Stability

The finding also shows that increased financial sector stability and efficiency exert a significant negative impact on unemployment. This finding is in line with Abusharbeh (2017) and Ahulu et al (2021). Ahulu et al (2021) define financial stability as a lack of episodes of systemic crises in

which the financial system is unable to function. It also relates to the resilience and fortitude of the financial systems, especially during periods of economic headwinds. Abusharbeh (2017) and Aboura and van-Roye (2017) opine that by allocating resources effectively, evaluating and controlling financial risks, and limiting relative price movements of real or financial assets that threaten monetary stability or employment levels, a stable financial system can foster the reduction of unemployment. Financial stability also ensures that financial imbalances that develop endogenously or as a result of big unanticipated occurrences that may hurt enterprises are eradicated. This reduces or even eliminates the impact of systemic shocks and crises on the real sector, and in turn, minimizes job loss during periods of crisis.

Zahonogo (2016) and Raifu (2019) observe that a stable financial system can help to reduce uncertainty and risk in the economy, which can encourage businesses to invest and hire workers. This can help to create a more predictable and stable environment for job creation. As noted by Aboura and van-Roye (2017), the significance of financial stability for businesses would be better understood in its absence. As the economy as a whole becomes more integrated and interdependent, crises in one sector can sometimes spread freely to other sectors. In essence, financial stability is a prerequisite for achieving low unemployment. This is because financial instability entails high costs for an economy. After all, a financial sector crisis would cause corporate mortality (i.e. bankruptcy of firms), especially to the firms that are connected to such financial institutions through transactional and other business arrangements, in addition to financial institutions themselves.

Sustained financial instability will lead to massive job layoffs. Additionally, banks are hesitant to support profitable initiatives when there is a crisis, asset prices differ substantially from their intrinsic values, and payments might be delayed. Bank robberies, hyperinflation, stock market crashes or even liquidity crunches caused by significant instability can substantially reduce the net worth of businesses, thereby spurring job losses. Raifu (2019) observed that increased financial sector efficiency can lower borrowing costs. A stable and efficient financial system can help to lower borrowing costs for businesses and households, making it easier and cheaper for them to access credit. This can lead to increased investment and economic activity, which can ultimately lower unemployment rates.

4.6.4. Jobless growth

One of the findings of this study is the prevalence of the jobless growth syndrome. This corroborates Abou (2016) finding. Jobless growth is a phenomenon where an economy experiences economic growth without a corresponding increase in employment opportunities. In other words, it is a situation where the economy is expanding, but the benefits of that growth are not being widely shared in the form of increased job opportunities (Datt, 1994; Abou, 2016). As opined by Abou (2016), jobless growth can result from structural imbalances in an economy. For example, if economic growth is driven by massive growth in sectors that are job inelastic while job-elastic sectors lag behind, such growth may not lead to a decrease in unemployment. In fact, as Sen (2019) found in India, unemployment could be rising during a period of positive growth.

Another potential cause of jobless growth is excessive population growth. If economic growth lags behind population growth, more people could be joining the labour force than the economy can absorb (Damodaran, 2015, Abou, 2016). According to Abou (2016), excessive population growth spurs greater competition for jobs, leading to a situation where economic growth fails to keep pace with the growth in the labour force. Damodaran (2015) emphasized that even if the population growth is not massive, countries can experience jobless growth when economic growth is too slow to create enough new jobs. This typically occurs during periods of economic recession or depression. Nigeria recorded two recessions in less than 5 years. Other causes of jobless growth identified by Bhalotra (1998), Hanusch (2012) and Sen (2019) include automation and technological advancements, deregulation and trade liberalization and lack of investment in education and training. The increasing use of automation and advanced technology has led to the replacement of human labour in many manufacturing and industrial activities, resulting in job losses. Also, deregulation and trade liberalization have led to the entry of multinational companies into the market, which can produce goods and services at a lower cost due to economies of scale. This has led to the displacement of local producers, resulting in job losses. Similarly, lack of investment in education and training: A lack of investment in education and skills development leads to a skills gap that makes it difficult for workers to find jobs in growing industries.

4.6.5. Gender and spatial location

The finding also shows that financial development has asymmetric effects on the gender distribution of the unemployed. Specifically, the findings show that financial access (FA) and financial stability (FS) have a limited impact on women relative to men. Financial development can have different impacts on men and women depending on various factors such as socio-cultural norms, gender roles and responsibilities, educational opportunities, and access to financial resources. Setiawan (2020) and Salman and Nowacka (2020) observed that in some societies, women may face more significant barriers to accessing financial services and resources, such as credit, savings accounts, and insurance. They may also have limited control and decision-making power over household finances and assets, restricting their ability to invest in education, health, or entrepreneurship. Additionally, gender pay gaps and occupational segregation may limit women's earning potential and reduce their ability to accumulate wealth over time. Therefore, financial development initiatives that address these gender-specific issues can contribute to greater economic empowerment and equality for both men and women.

Morsy and Youssef (2017) emphasized that women entrepreneurs are less likely to apply for loans than their male counterparts due to credit rationing caused by high-interest rates, and they may also have limited access to loans due to a lack of collateral. Additionally, women often deal with stricter loan conditions than males when they do have access to credit. Morsy (2020) sees the problem differently. Morsy (2020) observed that lack of financial literacy, aversion to taking risks, and failure-related anxiety deters women business owners from applying for loans. One of the causative factors identified by Morsy is “distorted perception”. Morsy discovered that women’s businesses are more probable to self-select out of the credit market due to their poor perceived creditworthiness in a research of the credit markets of 47 African countries. Because they believed their applications would be rejected, these ladies decided not to seek loans or lines of credit. In essence, this self-selection of female entrepreneurs had little to do with the creditworthiness of their businesses. The study by Morsy found that the self-selection by women entrepreneurs in Africa persisted even in the “absence of discriminatory lending practices”.

The study finding also shows that financial development can benefit both urban and rural dwellers, but it may have a greater impact on urban dwellers due to differences in the availability and accessibility of financial services. In general, urban areas tend to have more developed financial

systems with better access to formal financial services such as banks, insurance companies, and stock markets. This can provide urban dwellers with greater access to credit, insurance, and investment opportunities, which can help them start businesses, invest in education, and improve their standard of living. In contrast, rural areas may have limited access to formal financial services, which can make it difficult for rural dwellers to access credit, save money, and invest in their futures. This can limit their ability to start businesses, purchase equipment, and improve their housing and infrastructure. In order words, financial development that leads to increased expansion of businesses through increased lending could lead to job creation in the urban areas where such businesses are cited (Villarreal, 2004; Yaron et al, 1997). This challenge is most pronounced in Nigeria because most firms are cited in urban areas due to a lack of infrastructure (such as good roads, good hospitals, schools, and portable water) in rural areas (Okoli, Okonkwo & Michael, 2020).

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CHAPTER FIVE

SUMMARY AND CONCLUDING REMARKS

This last chapter of this thesis is broken down into four sections namely summary of the study, conclusion, policy prescriptions and suggestions on areas requiring additional study efforts. In the first section, the study provides the general summary of the study, the next section contains the major findings derived from the study using the relevant techniques discussed in chapter three of this thesis. The third section is concerned with the various suggestions in line with the outcome of the study to stimulate the nation's financial sector and boost labour market outcomes. The last section covers areas requiring additional research endeavours.

5.1. Summary

The most frequently used indicator of a labour market's health and a crucial indicator of the overall health of an economy is the unemployment rate. Many developing nations have faced a significant challenge as a result of the unemployment issue. Nigeria has recently seen a severe and pervasive unemployment problem that affects people of all ages, educational levels, gender, and geographic regions. A country's standing among other countries is impacted by persistent unemployment, but it also has catastrophic effects on the domestic economy. The heinous repercussions of unemployment have pushed decision-makers to launch numerous interventions to bring Nigeria's unemployment rate down to its natural rate. However, despite all efforts to curb it, unemployment has persisted in rising sharply. The literature documented that financial development can reduce the incidence of unemployment in an economy. A sound financial system can guide resources and investment toward the most fruitful sectors of the economy, increasing productivity and minimizing waste. This may result in overall economic expansion and increased employment rates. Financial development increases investment output, which in turn raises business output and lowers unemployment. Against this backdrop, the study uncovered the effect of financial development on Nigeria's unemployment.

The research problem was also clearly expressed, followed by the study's objectives and questions. The definition of financial development and unemployment offered by Bolarinwa et al (2020) and Ajide (2020) respectively were utilized in this study. Additionally, the pertinent theories were documented, including the Keynesian theory, the classical theory of unemployment and the

McKinnon-Shaw hypothesis. First, according to the classical conception of unemployment, there will never be long-term involuntary unemployment. In other words, when the market stabilizes, the economy will achieve full employment. Consequently, unemployment is a transient phenomenon. The Keynesian hypothesis acknowledges that long-term involuntary unemployment results from a lack of demand. In other words, the economy can recover while full employment is not reached. Finally, the McKinnon-Shaw hypothesis argued that the liberalization of interest in developing economies will increase real interest rates, increasing savings and encouraging investments that would finally result in economic development. According to the McKinnon-Shaw framework, the financial sector's intermediation role, which supports reliable payment systems might increase output and employment through savings mobilization, distribution or rationing of credit, and risk diversification. According to a survey of previous literature, there are several research on the link between financial development and unemployment, but these studies did not cover the multifaceted nature of the development of the financial sector. Additionally, most studies focused solely on aggregate unemployment without decoupling the unemployment into gender divide (male vs female unemployment) and spatial location (rural and urban regions). Furthermore, a quantitative approach was used in the study to assess the research questions. The econometric approaches applied are unit root test, cointegration test and DOLS. The study found that financial development is critical for reducing unemployment in Nigeria.

5.2. Conclusion

The thrust of the study is to evaluate the effect of financial development on Nigeria's unemployment rate in Nigeria. The study, therefore, aims to answer the following questions. First, does financial development influence Nigeria's aggregate unemployment? Second, what is the effect of financial development on the male and female unemployment rate in Nigeria? Third, what is the influence of financial development on rural and urban unemployment rates in Nigeria? To answer these research questions, the dynamic ordinary least square (DOLS) technique was applied. The time series characteristics of the data are taken into account by the dynamic DOLS model. Additionally, it accounts for endogeneity and produces reliable estimates. The study revealed that the indicators of financial development (financial depth, access, efficiency and stability) reduced aggregate unemployment. The study equally revealed that financial development reduced male and female unemployment rates in Nigeria as well as Nigeria's rural and urban unemployment

rates. Financial inclusion is linked with expanded access to financial services and increased access to financial services can reduce unemployment by increasing credit availability. Individuals and small enterprises who have access to financing can invest in their education, start new firms, or grow current ones. This could lead to the creation of jobs, as new enterprises frequently need more staff. By increasing investments in human capital, more financial services accessibility can help lower unemployment. Financial deepening can enhance investment because it makes it possible to more effectively use savings and allocate money to worthwhile enterprises. This may result in the development of new companies and industries, which in turn may result in the production of new jobs. A stable and efficient financial system can assist to cut borrowing rates for firms and families, making credit more accessible and affordable. This may stimulate more spending and economic activity, which would help to reduce unemployment rates.

5.3. Policy Prescriptions

The following suggestions are provided in light of the research's findings.

1. The advancements in the financial sector are essential for reducing Nigeria's unemployment rate. The findings indicate that if the financial sector increases, Nigeria's unemployment rate will be significantly reduced. Hence, the regulatory bodies should concentrate on bolstering financial institutions in a way that promotes stability through the following means: (i) Creating the institutional and financial framework necessary for a healthy credit culture and effective market functioning. This may entail the creation of a legal system wherein the rules and terms of contracts are upheld and swift legal action, including the seizure of collateral, is accessible (ii) promote the creation of strong internal management and risk control systems, with strict accountability for owners, directors and senior management
2. Active labour market policies (ALMPs) could be a longer-term solution to the issue of persistent unemployment. These measures consist of giving replacement income during crises, concentrating on disadvantaged people as well as strengthening the balance between labour supply and demand. Examples include offering training to individuals facing layoffs, job-search help programs, the apprenticeship system and the expansion of unemployment benefit programs

3. The Nigerian government needs to redouble its efforts to promote financial inclusion since financial development is essential for unemployment reduction in Nigeria. This drive necessitates a concentrated effort that goes beyond the normal policy tokenism. Government policy initiatives should include steps to increase service affordability through a strong institutional and regulatory structure and a collaborative process engaging all stakeholders. The steps may also include a focus on the traditionally underserved to establish a financially accessible system that fosters broad-based and inclusive growth.
4. To encourage individuals to create jobs rather than just seek them, the decision-makers in Nigeria's government should support programs that train people in entrepreneurship and skill acquisition. Furthermore, the government should address the lingering infrastructure deficits (particularly the energy crisis) and insecurity which is thought to be the underlying cause of the nation's unemployment issues. This might contribute to raising the nation's employment rate, thereby raising the welfare of the populace.

5.4. Suggestions for Further Research

Looking ahead, there are some areas in which future studies can undertake. First, governance quality is thought to be a crucial means of transmission that allows financial advancement to positively affect economic outcomes. This is predicated on the idea that strong institutions allow effective resource allocations to beneficial endeavours by preventing financial system flaws and gaps that could result in opportunistic behaviour and the allocation of credit to activities that hinder economic progress. Hence, it would be useful for future research to take into account how governance quality influences the link between financial development and the unemployment rate. Second, the uncertainty of future revenues and the production costs of the enterprises, as well as savings and investment, could be significantly influenced by the exchange rate. Hence, future research endeavours should ascertain the implications of exchange on the unemployment rate in Nigeria. Lastly, as Nigeria is attempting to diversify its economy, it will be insightful to appraise the implications of financial development on Nigeria's real sectors.

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APPENDIX

APPENDIX 1: DOLS RESULTS

Impact of financial development on unemployment

Model 1

Dependent Variable: UNEM
Method: Dynamic Least Squares (DOLS)
Date: 04/15/23 Time: 20:16
Sample (adjusted): 1982 2021
Included observations: 40 after adjustments
Cointegrating equation deterministics: C @TREND @TREND^2
Fixed leads and lags specification (lead=1, lag=1)
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EG	0.015285	0.007297	2.094761	0.0359
FA	-0.027143	0.011180	-2.427710	0.0151
FD	-0.063767	0.019797	-3.220994	0.0013
FE	-0.165257	0.060419	-2.735186	0.0063
FS	-0.028546	0.013881	-2.056425	0.0394
K	-0.186829	0.039938	-4.677991	0.0000
OILR	0.001856	0.000877	2.116172	0.0340
W	0.074628	0.030130	2.476902	0.0132
C	28.42783	38.11789	0.745787	0.4648
@TREND	0.062762	0.027670	2.268263	0.0231
@TREND^2	0.235812	0.027580	8.550117	0.0000

R-squared	0.977173	Mean dependent var	12.84211
Adjusted R-squared	0.718461	S.D. dependent var	7.371737
S.E. of regression	3.911463	Sum squared resid	45.89863

Model 2

Dependent Variable: UNEM
Method: Dynamic Least Squares (DOLS)
Date: 04/15/23 Time: 20:58
Sample (adjusted): 1982 2021
Included observations: 40 after adjustments
Cointegrating equation deterministics: C @TREND @TREND^2
Fixed leads and lags specification (lead=1, lag=1)
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EG	0.020744	-0.006243	-3.322500	0.0009
FA	-0.036837	0.013716	-2.685700	0.0073
FD	-0.086541	0.030550	-2.832800	0.0047
FE	-0.224277	0.049904	-4.494200	0.0000
FS	-0.038741	0.016569	-2.338100	0.0192
K	-0.253554	0.104433	-2.427900	0.0151

OILR	0.002519	0.000896	2.811000	0.0050
W	0.101281	0.031663	3.198700	0.0014
OILR*FA	-0.041800	0.013892	-3.008976	0.0027
OILR*FD	-0.098201	0.033771	-2.907860	0.0037
OILR*FE	-0.254496	0.111095	-2.290786	0.0218
OILR*FS	-0.043961	0.013245	-3.319028	0.0009
C	12.580626	14.309500	0.879180	0.3860
@TREND	-0.280878	0.098615	-2.848214	0.0044
@TREND^2	-0.041721	0.005989	-6.966762	0.0000

R-squared	0.857728	Mean dependent var	3.794986
Adjusted R-squared	0.754693	S.D. dependent var	6.910854
S.E. of regression	1.154452	Sum squared resid	251.4120

Impact of financial development on unemployment based on gender

Model 1

Dependent Variable: M_UNEM
Method: Dynamic Least Squares (DOLS)
Date: 04/16/23 Time: 21:10
Sample: 1981 2021
Included observations: 41
Cointegrating equation deterministics: C @TREND @TREND^2
Fixed leads and lags specification (lead=1, lag=1)
Long-run variance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EG	0.083132	0.012765	6.512766	0.0000
FA	-0.028326	0.007857	-3.605370	0.0003
FD	-0.139023	0.014548	-9.556091	0.0000
FE	-0.033669	0.010211	-3.297218	0.0010
FS	-0.376660	0.072757	-5.176990	0.0000
K	-0.052115	0.020842	-2.500472	0.0124
OILR	0.032368	0.016143	2.005016	0.0446
W	0.197253	0.022672	8.700112	0.0000
C	-0.006921	0.002428	-2.850485	0.0044
@TREND	0.007375	0.003664	2.012579	0.0438
@TREND^2	-0.131777	0.020116	-6.550778	0.0000

R-squared	0.899392	Mean dependent var	3.413184
Adjusted R-squared	0.812497	S.D. dependent var	1.684867
S.E. of regression	1.459407	Sum squared resid	6.389604
Long-run variance	5.751451		

MODEL 2

Dependent Variable: F_UNEM
Method: Dynamic Least Squares (DOLS)
Date: 04/16/23 Time: 21:14
Sample: 1981 2021
Included observations: 41
Cointegrating equation deterministics: C @TREND @TREND^2
Fixed leads and lags specification (lead=1, lag=1)
Long-run variance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EG	-0.091816	0.007391	-12.422918	0.0000
FA	-0.322236	0.087413	-3.686383	0.0002
FD	-0.248760	0.036962	-6.730087	0.0000
FE	-0.034419	0.027521	-1.250614	0.2128
FS	-0.188480	0.129852	-1.451504	0.1470
K	-0.013561	0.005737	-2.363761	0.0180
OILR	0.061377	0.023547	2.606521	0.0091
W	-0.130273	0.011518	-11.310146	0.0000
C	0.004571	0.001900	2.405631	0.0160
@TREND	0.253034	0.029886	8.466596	0.0000
@TREND^2	0.018708	0.017211	1.086981	0.2806

R-squared	0.879603	Mean dependent var	66.39658
Adjusted R-squared	0.748439	S.D. dependent var	12.30463
S.E. of regression	6.171494	Sum squared resid	11.42620
Long-run variance	10.95925		

Impact of financial development on unemployment based on spatial location

Model 1

Dependent Variable: U_UNEM
Method: Dynamic Least Squares (DOLS)
Date: 04/16/23 Time: 21:16
Sample (adjusted): 1983 2020
Included observations: 38 after adjustments
Cointegrating equation deterministics: C @TREND @TREND^2
Fixed leads and lags specification (lead=1, lag=1)
Long-run variance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EG	0.061642	0.035910	1.716551	0.0857
FA	-0.040412	0.007453	-5.422164	0.0000
FD	-0.013270	0.006077	-2.183652	0.0287
FE	-0.005663	0.000885	-6.397741	0.0000
FS	-0.004979	0.001760	-2.829757	0.0047
K	-0.006674	0.001621	-4.116045	0.0000
OILR	0.086928	0.036084	2.409079	0.0159
W	0.030857	0.002899	10.645843	0.0000
C	0.010857	0.000900	12.057962	0.0000

@TREND	-0.003453	0.000794	-4.349366	0.0000
@TREND^2	0.008196	0.007396	1.108213	0.2710

R-squared	0.738616	Mean dependent var	11.90474
Adjusted R-squared	0.642936	S.D. dependent var	3.824399
S.E. of regression	3.327587	Sum squared resid	33.21851
Long-run variance	1.510304		

Model 2

Dependent Variable: R_UNEM
Method: Dynamic Least Squares (DOLS)
Date: 04/16/23 Time: 21:22
Sample (adjusted): 1983 2020
Included observations: 38 after adjustments
Cointegrating equation deterministics: C @TREND @TREND^2
Fixed leads and lags specification (lead=1, lag=1)
Long-run variance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EG	-0.028138	0.007322	-3.843115	0.0001
FA	-0.014765	0.006106	-2.418060	0.0155
FD	-0.004381	0.001938	-2.260754	0.0236
FE	-0.007777	0.004158	-1.870480	0.0610
FS	-0.024200	0.018534	-1.305728	0.1929
K	-0.018375	0.005479	-3.353815	0.0008
OILR	0.006000	0.002571	2.333323	0.0195
W	0.008269	0.000953	8.674390	0.0000
C	0.007390	0.000752	9.825006	0.0000
@TREND	-0.019283	0.002531	-7.618002	0.0000
@TREND^2	-0.052198	0.020610	-2.532618	0.0113

R-squared	0.773462	Mean dependent var	10.69068
Adjusted R-squared	0.672701	S.D. dependent var	4.922415
S.E. of regression	2.816117	Sum squared resid	23.79155
Long-run variance	21.76429		

APPENDIX 2: ADF UNIT ROOT TEST

Wage rate @ LEVEL

Null Hypothesis: W has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.945780	0.6101
Test critical values:	1% level	-4.234972	
	5% level	-3.540341	
	10% level	-3.202445	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(W)
Method: Least Squares
Date: 03/23/23 Time: 21:41
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
W(-1)	-0.225431	0.115856	-1.945780	0.0605
D(W(-1))	0.425673	0.200008	2.141413	0.0411
C	-13.24818	8.197296	-1.616164	0.1159
@TREND("1981")	1.914138	0.803302	2.381219	0.0234

R-squared	0.246230	Mean dependent var	8.483541
Adjusted R-squared	0.175565	S.D. dependent var	18.09643
S.E. of regression	16.43141	Akaike info criterion	8.540690
Sum squared resid	8639.581	Schwarz criterion	8.716641
Log likelihood	-149.7324	Hannan-Quinn criter.	8.602100
F-statistic	3.484432	Durbin-Watson stat	2.035297
Prob(F-statistic)	0.026971		

Wage rate @ 1ST DIFFERENCE

Null Hypothesis: D(W) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.548415	0.0045
Test critical values:	1% level	-4.234972	
	5% level	-3.540341	
	10% level	-3.202445	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(W,2)
Method: Least Squares
Date: 03/23/23 Time: 21:45
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(W(-1))	-0.789442	0.173569	-4.548415	0.0001
C	-2.124351	6.117721	-0.347246	0.7306
@TREND("1981")	0.452458	0.298178	1.517411	0.1387

R-squared	0.386223	Mean dependent var	0.006311
Adjusted R-squared	0.349024	S.D. dependent var	21.20748
S.E. of regression	17.11084	Akaike info criterion	8.596957
Sum squared resid	9661.767	Schwarz criterion	8.741917
Log likelihood	-151.7452	Hannan-Quinn criter.	8.643014
F-statistic	10.38273	Durbin-Watson stat	1.889430
Prob(F-statistic)	0.000318		

OILR @ level

Null Hypothesis: OILR has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.551105	0.3035
Test critical values:	1% level	-4.226815	
	5% level	-3.541601	
	10% level	-3.200320	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(OILR)
Method: Least Squares
Date: 03/23/23 Time: 21:48
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OILR(-1)	-0.414915	0.111683	-2.551105	0.0154
C	0.864231	4.184822	0.206516	0.8416
@TREND("1981")	0.569527	0.257921	2.208142	0.0341

R-squared	0.168816	Mean dependent var	0.871892

Adjusted R-squared	0.119923	S.D. dependent var	12.99688
S.E. of regression	12.19269	Akaike info criterion	7.917155
Sum squared resid	5054.497	Schwarz criterion	8.047770
Log likelihood	-143.4674	Hannan-Quinn criter.	7.963203
F-statistic	3.452752	Durbin-Watson stat	1.896687
Prob(F-statistic)	0.043141		

OILR @ 1ST DIFF.

Null Hypothesis: D(OILR) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.027841	0.0001
Test critical values:	1% level	-4.234972	
	5% level	-3.540341	
	10% level	-3.202445	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(OILR,2)
Method: Least Squares
Date: 03/23/23 Time: 21:50
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(OILR(-1))	-1.069741	0.176587	-8.057841	0.0000
C	-1.098247	4.775344	-0.229983	0.8195
@TREND("1981")	0.109418	0.216416	0.505897	0.6163

R-squared	0.526916	Mean dependent var	0.568889
Adjusted R-squared	0.498244	S.D. dependent var	19.01334
S.E. of regression	13.46805	Akaike info criterion	8.118172
Sum squared resid	5985.813	Schwarz criterion	8.250132
Log likelihood	-143.1271	Hannan-Quinn criter.	8.164230
F-statistic	18.41752	Durbin-Watson stat	1.987041
Prob(F-statistic)	0.000004		

FD @ level

Null Hypothesis: FD has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-1.893316	0.6412
Test critical values:	1% level	-4.234972	
	5% level	-3.540341	
	10% level	-3.202445	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FD)
Method: Least Squares
Date: 03/23/23 Time: 21:52
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FD(-1)	-0.049084	0.025925	-1.893316	0.0674
D(FD(-1))	0.600035	0.141660	4.390724	0.0001
C	149.7201	349.5238	0.441354	0.6713
@TREND("1981")	108.5787	49.18410	2.207599	0.0346

R-squared	0.606677	Mean dependent var	1522.915
Adjusted R-squared	0.569803	S.D. dependent var	1497.889
S.E. of regression	982.4563	Akaike info criterion	16.72243
Sum squared resid	30887050	Schwarz criterion	16.89841
Log likelihood	-297.0041	Hannan-Quinn criter.	16.78384
F-statistic	16.45271	Durbin-Watson stat	1.885762
Prob(F-statistic)	0.000001		

FD* @ 1ST DIFFERENCE

Null Hypothesis: D(FD) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-26.35514	0.0000
Test critical values:	1% level	-4.234972	
	5% level	-3.540341	
	10% level	-3.202445	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FD,2)
Method: Least Squares
Date: 03/23/23 Time: 21:55
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(FD(-1))	-0.411782	0.014106	-26.35514	0.0000
C	140.6408	412.9195	0.387526	0.7009
@TREND("1981")	23.24779	20.44952	1.141838	0.2638

R-squared	0.180172	Mean dependent var	44.22111
Adjusted R-squared	0.130485	S.D. dependent var	1094.080
S.E. of regression	1020.205	Akaike info criterion	16.77305
Sum squared resid	34347022	Schwarz criterion	16.90501
Log likelihood	-298.9149	Hannan-Quinn criter.	16.81911
F-statistic	3.626168	Durbin-Watson stat	1.842699
Prob(F-statistic)	0.041707		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.385953	0.9831
Test critical values:	1% level	-4.323979	
	5% level	-3.580623	
	10% level	-3.225334	

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

FA @LEVEL

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FA)
Method: Least Squares
Date: 03/23/23 Time: 22:09
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FA(-1)	-0.462947	1.199489	-0.385953	0.7046
D(FA(-1))	1.305897	1.458213	0.895546	0.3838
D(FA(-2))	0.397647	0.877943	0.452931	0.6567
D(FA(-3))	-0.913306	1.441403	-0.639389	0.5316
D(FA(-4))	3.194953	1.631864	1.957855	0.0679
D(FA(-5))	-1.533957	0.524025	-2.927258	0.0099
D(FA(-6))	-0.642608	2.273432	-0.412660	0.7811
D(FA(-7))	5.757508	1.407278	4.091238	0.0009
D(FA(-8))	-7.332772	1.229721	-5.962955	0.0000
D(FA(-9))	6.148871	3.839125	1.601633	0.1418
C	-687.7044	454.0203	-1.514700	0.1494
@TREND("1981")	48.67499	25.80555	1.886222	0.0776

R-squared	0.889007	Mean dependent var	803.1564
Adjusted R-squared	0.812700	S.D. dependent var	1046.680
S.E. of regression	452.9843	Akaike info criterion	15.41712
Sum squared resid	3413117.	Schwarz criterion	15.93806

Log likelihood	-203.1397	Hannan-Quinn criter.	15.54166
F-statistic	11.65031	Durbin-Watson stat	1.704141
Prob(F-statistic)	0.000012		

FA @ 1ST DIFF

Null Hypothesis: D(FA) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 8 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.578110	0.0000
Test critical values:	1% level	-4.323979	
	5% level	-3.580623	
	10% level	-3.225334	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FA,2)
Method: Least Squares
Date: 03/23/23 Time: 22:09
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FA(-1))	0.319957	0.041299	8.578110	0.0000
D(FA(-1),2)	-0.572782	0.418389	-1.986140	0.0634
D(FA(-2),2)	-0.510090	0.271024	-1.882088	0.0771
D(FA(-3),2)	-1.965842	0.405414	-4.850541	0.0001
D(FA(-4),2)	0.615265	0.216083	2.847410	0.0111
D(FA(-5),2)	-1.082050	0.349907	-3.092390	0.0066
D(FA(-6),2)	-2.597114	0.505824	-5.134424	0.0001
D(FA(-7),2)	2.726231	0.397614	6.856485	0.0000
D(FA(-8),2)	-4.704396	0.834113	-5.642707	0.0000
C	-675.1518	441.4132	-1.529662	0.1445
@TREND("1981")	47.69730	25.02985	1.905616	0.0738

R-squared	0.892325	Mean dependent var	15.24071
Adjusted R-squared	0.841987	S.D. dependent var	1067.621
S.E. of regression	441.5003	Akaike info criterion	15.30496
Sum squared resid	3314183.	Schwarz criterion	15.84132
Log likelihood	-203.2694	Hannan-Quinn criter.	15.46496
F-statistic	14.08832	Durbin-Watson stat	1.688641
Prob(F-statistic)	0.000002		

FE @ LEVEL

Null Hypothesis: FE has a unit root
Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.629345	0.7551
Test critical values:	1% level	-4.323979	
	5% level	-3.580623	
	10% level	-3.225334	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FE)
Method: Least Squares
Date: 03/23/23 Time: 22:18
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FE(-1)	-0.203990	0.125198	-1.629345	0.1158
C	832067.1	1491949.	0.557705	0.5820
@TREND("1981")	7075.997	64003.64	0.110556	0.9129

R-squared	0.104176	Mean dependent var	63023.00
Adjusted R-squared	0.031970	S.D. dependent var	2606809.
S.E. of regression	2564800.	Akaike info criterion	32.45412
Sum squared resid	1.64E+14	Schwarz criterion	32.59635
Log likelihood	-451.3506	Hannan-Quinn criter.	32.49725
F-statistic	1.445853	Durbin-Watson stat	1.812140
Prob(F-statistic)	0.254573		

FE @ 1ST DIFF.

Null Hypothesis: D(FE) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.929529	0.0026
Test critical values:	1% level	-4.339330	
	5% level	-3.587527	
	10% level	-3.229230	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FE,2)
Method: Least Squares
Date: 03/23/23 Time: 22:19
Sample: 1981 2021

Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FE(-1))	-1.007192	0.204318	-4.929529	0.0000
C	942192.5	1723866.	0.546558	0.5897
@TREND("1981")	-41042.31	68322.98	-0.527541	0.6027

R-squared	0.503113	Mean dependent var	34295.67
Adjusted R-squared	0.461706	S.D. dependent var	4145418.
S.E. of regression	2747941.	Akaike info criterion	32.59503
Sum squared resid	1.81E+14	Schwarz criterion	32.73901
Log likelihood	-441.0329	Hannan-Quinn criter.	32.64185
F-statistic	12.15038	Durbin-Watson stat	1.998417
Prob(F-statistic)	0.000227		

FS @LEVEL

Null Hypothesis: FS has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 6 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.327762	0.9979
Test critical values:	1% level	-4.414580	
	5% level	-3.564182	
	10% level	-3.215267	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FS)
Method: Least Squares
Date: 03/23/23 Time: 22:31
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FS(-1)	0.075101	0.229134	0.327762	0.7462
D(FS(-1))	-0.595533	0.239774	-2.484129	0.0211
D(FS(-2))	-0.721502	0.207112	-3.484138	0.0021
D(FS(-3))	-1.381930	0.247989	-5.572541	0.0000
D(FS(-4))	-0.767880	0.243268	-3.156524	0.0046
D(FS(-5))	-1.079324	0.222591	-4.848911	0.0001
D(FS(-6))	-0.999312	0.211987	-4.714022	0.0001
C	-298.9265	189.5292	-1.577205	0.1290
@TREND("1981")	41.73434	12.82093	2.241206	0.0354

R-squared	0.775725	Mean dependent var	71.70660
Adjusted R-squared	0.694171	S.D. dependent var	408.8751

S.E. of regression	226.1154	Akaike info criterion	13.91767
Sum squared resid	1124820.	Schwarz criterion	14.33399
Log likelihood	-206.7239	Hannan-Quinn criter.	14.05338
F-statistic	9.511747	Durbin-Watson stat	1.985772
Prob(F-statistic)	0.000013		

FS @1ST DIFF

Null Hypothesis: D(FS) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 5 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.671160	0.0000
Test critical values:	1% level	-4.414580	
	5% level	-3.564182	
	10% level	-3.215267	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FS,2)
Method: Least Squares
Date: 03/23/23 Time: 22:31
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FS(-1))	-6.268913	0.722961	-8.671160	0.0000
D(FS(-1),2)	4.734341	0.632399	7.486299	0.0000
D(FS(-2),2)	4.064773	0.575847	7.058773	0.0000
D(FS(-3),2)	2.739782	0.453848	6.041790	0.0000
D(FS(-4),2)	2.017296	0.318841	6.326955	0.0000
D(FS(-5),2)	0.976558	0.196412	4.972990	0.0000
C	-347.5696	115.5702	-3.007434	0.0063
@TREND("1981")	32.44122	5.942791	5.458248	0.0000

R-squared	0.883961	Mean dependent var	34.63803
Adjusted R-squared	0.848644	S.D. dependent var	569.8180
S.E. of regression	221.6845	Akaike info criterion	13.85802
Sum squared resid	1130313.	Schwarz criterion	14.24108
Log likelihood	-206.7994	Hannan-Quinn criter.	13.97865
F-statistic	25.02983	Durbin-Watson stat	1.944584
Prob(F-statistic)	0.000000		

UEM @ LEVEL

Null Hypothesis: UEM has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.141673	0.5093
Test critical values:	1% level	-4.226815	
	5% level	-3.541601	
	10% level	-3.200320	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(UEM)
Method: Least Squares
Date: 03/23/23 Time: 22:35
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UEM(-1)	-0.212241	0.099330	-2.141673	0.0399
C	-46.17682	33.14132	-1.393877	0.1724
@TREND("1981")	6.411049	2.666679	2.404132	0.0218

R-squared	0.145302	Mean dependent var	22.17216
Adjusted R-squared	0.095026	S.D. dependent var	82.32103
S.E. of regression	78.31210	Akaike info criterion	11.64189
Sum squared resid	208514.7	Schwarz criterion	11.76750
Log likelihood	-212.4124	Hannan-Quinn criter.	11.68293
F-statistic	2.890068	Durbin-Watson stat	2.417823
Prob(F-statistic)	0.069313		

UEM @ 1^{ST} DIFF

Null Hypothesis: D(UEM) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.427991	0.0000
Test critical values:	1% level	-4.234972	
	5% level	-3.540341	
	10% level	-3.202445	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(UEM,2)
Method: Least Squares
Date: 03/23/23 Time: 04:18
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(UEM(-1))	-1.261212	0.169792	-7.427991	0.0000
C	-3.415673	41.98771	-0.117832	0.9069
@TREND("1981")	1.607410	1.323476	1.214541	0.2332

R-squared	0.625989	Mean dependent var	3.040556
Adjusted R-squared	0.603321	S.D. dependent var	129.8391
S.E. of regression	81.77581	Akaike info criterion	11.72550
Sum squared resid	220680.4	Schwarz criterion	11.85746
Log likelihood	-208.0589	Hannan-Quinn criter.	11.77155
F-statistic	27.61632	Durbin-Watson stat	1.962313
Prob(F-statistic)	0.000000		

K @LEVEL

Null Hypothesis: K has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.763910	0.2197
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(K)
Method: Least Squares
Date: 03/23/23 Time: 04:23
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
K(-1)	-0.603960	0.218517	-2.763910	0.0100
D(K(-1))	0.017652	0.213808	0.082561	0.9348
D(K(-2))	0.176996	0.190891	0.927210	0.4117
C	19.45484	7.551613	2.576249	0.0156
@TREND("1981")	-0.243981	0.243292	-1.004131	0.3245

R-squared	0.310384	Mean dependent var	-0.344141
Adjusted R-squared	0.211867	S.D. dependent var	14.75841
S.E. of regression	13.10200	Akaike info criterion	8.122134
Sum squared resid	4806.549	Schwarz criterion	8.348878
Log likelihood	-129.0152	Hannan-Quinn criter.	8.198427
F-statistic	3.150574	Durbin-Watson stat	1.984908
Prob(F-statistic)	0.029409		

K @ 1ST DIFF

Null Hypothesis: D(K) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 4 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.277791	0.0105
Test critical values:	1% level	-4.296729	
	5% level	-3.568419	
	10% level	-3.218382	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(K,2)
Method: Least Squares
Date: 03/23/23 Time: 04:24
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(K(-1))	-2.958480	0.691591	-4.277791	0.0003
D(K(-1),2)	1.413964	0.571143	2.475674	0.0211
D(K(-2),2)	1.142725	0.449696	2.541106	0.0183
D(K(-3),2)	0.758841	0.344080	2.205403	0.0417
D(K(-4),2)	0.254413	0.206103	1.234396	0.2295
C	11.83529	7.134796	1.658813	0.1107
@TREND("1981")	-0.584617	0.323233	-1.808658	0.0841

R-squared	0.745384	Mean dependent var	-0.817000
Adjusted R-squared	0.678963	S.D. dependent var	24.76915
S.E. of regression	14.03424	Akaike info criterion	8.321841
Sum squared resid	4530.077	Schwarz criterion	8.648787
Log likelihood	-117.8276	Hannan-Quinn criter.	8.426433
F-statistic	11.22202	Durbin-Watson stat	2.023966
Prob(F-statistic)	0.000007		

EG @LEVEL

Null Hypothesis: EG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 8 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.467418	0.0635
Test critical values:	1% level	-4.339330	
	5% level	-3.587527	
	10% level	-3.229230	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EG)
Method: Least Squares
Date: 03/23/23 Time: 06:14
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EG(-1)	-1.302394	0.415615	-3.467418	0.0032
D(EG(-1))	0.601661	0.334441	1.799027	0.0909
D(EG(-2))	0.212318	0.306567	0.692565	0.4985
D(EG(-3))	0.706624	0.480442	1.470779	0.1607
D(EG(-4))	0.113458	0.414001	0.274052	0.7876
D(EG(-5))	-0.948874	0.398843	-2.419066	0.0301
D(EG(-6))	-1.168092	0.464167	-2.524104	0.0226
D(EG(-7))	-1.005334	0.385578	-2.607343	0.0191
D(EG(-8))	-0.469410	0.413544	-1.134968	0.2731
C	-5.033805	1.935454	-2.600840	0.0193
@TREND("1981")	1.005094	0.227446	4.419041	0.0004

R-squared	0.756075	Mean dependent var	0.229630
Adjusted R-squared	0.604122	S.D. dependent var	3.885062
S.E. of regression	2.445979	Akaike info criterion	4.918335
Sum squared resid	95.72504	Schwarz criterion	5.446268
Log likelihood	-55.39752	Hannan-Quinn criter.	5.075317
F-statistic	4.959392	Durbin-Watson stat	2.211382
Prob(F-statistic)	0.002348		

EG @ 1^{ST} DIFF

Null Hypothesis: D(EG) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 6 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.599967	0.0053
Test critical values:	1% level	-4.323979	
	5% level	-3.580623	
	10% level	-3.225334	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EG,2)
Method: Least Squares
Date: 03/23/23 Time: 06:15
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(EG(-1))	-6.112290	1.341768	-4.599967	0.0002
D(EG(-1),2)	4.840145	1.207568	4.008176	0.0008
D(EG(-2),2)	4.259797	1.140570	3.734796	0.0014
D(EG(-3),2)	4.064188	0.987589	4.114856	0.0006
D(EG(-4),2)	3.452029	0.906022	3.810093	0.0012
D(EG(-5),2)	1.866896	0.666141	2.802577	0.0114
D(EG(-6),2)	1.041778	0.441293	2.349410	0.0298
C	-2.993872	2.034144	-1.471809	0.1574
@TREND("1981")	0.256841	0.110125	2.332226	0.0308

R-squared	0.757920	Mean dependent var	0.144157
Adjusted R-squared	0.655991	S.D. dependent var	5.141259
S.E. of regression	3.013120	Akaike info criterion	5.298921
Sum squared resid	172.4989	Schwarz criterion	5.727129
Log likelihood	-65.18489	Hannan-Quinn criter.	5.429841
F-statistic	7.435789	Durbin-Watson stat	2.149193
Prob(F-statistic)	0.000169		

PHILIP PERRON TEST

Wage rate @ LEVEL

Null Hypothesis: W has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.129133	0.9101
Test critical values:	1% level	-4.226815	
	5% level	-3.541601	
	10% level	-3.200320	

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

Residual variance (no correction)	267.5933
HAC corrected variance (Bartlett kernel)	341.4221

Phillips-Perron Test Equation
Dependent Variable: D(W)
Method: Least Squares
Date: 03/23/23 Time: 04:30
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
W(-1)	-0.079880	0.096980	-0.824175	0.4159
C	-6.700295	7.418476	-0.903190	0.4141
@TREND("1981")	1.135222	0.720395	1.575833	0.1243

R-squared	0.141349	Mean dependent var	8.255951
Adjusted R-squared	0.090840	S.D. dependent var	17.89695
S.E. of regression	17.06471	Akaike info criterion	8.589507
Sum squared resid	9900.951	Schwarz criterion	8.720122
Log likelihood	-155.9059	Hannan-Quinn criter.	8.635555
F-statistic	2.798504	Durbin-Watson stat	1.470997
Prob(F-statistic)	0.074969		

Wage rate @ 1^{ST} DIFF

Null Hypothesis: D(W) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.380087	0.0070
Test critical values:	1% level	-4.234972	
	5% level	-3.540341	

	10% level	-3.202445

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

Residual variance (no correction)	268.3824
HAC corrected variance (Bartlett kernel)	196.9747

Phillips-Perron Test Equation
Dependent Variable: D(W,2)
Method: Least Squares
Date: 03/23/23 Time: 04:31
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(W(-1))	-0.789442	0.173569	-4.548415	0.0001
C	-2.124351	6.117721	-0.347246	0.7306
@TREND("1981")	0.452458	0.298178	1.517411	0.1387

R-squared	0.386223	Mean dependent var	0.006311
Adjusted R-squared	0.349024	S.D. dependent var	21.20748
S.E. of regression	17.11084	Akaike info criterion	8.596957
Sum squared resid	9661.767	Schwarz criterion	8.741917
Log likelihood	-151.7452	Hannan-Quinn criter.	8.643014
F-statistic	10.38273	Durbin-Watson stat	1.889430
Prob(F-statistic)	0.000318		

OILR @LEVEL

Null Hypothesis: OILR has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.554908	0.30011
Test critical values:	1% level	-4.226815	
	5% level	-3.541601	
	10% level	-3.200320	

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

Residual variance (no correction)	141.6080
HAC corrected variance (Bartlett kernel)	142.1849

Phillips-Perron Test Equation
Dependent Variable: D(OILR)
Method: Least Squares

Date: 03/23/23 Time: 04:33
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OILR(-1)	-0.414915	0.111683	-2.551105	0.0154
C	0.864231	4.184822	0.206516	0.8416
@TREND("1981")	0.569527	0.257921	2.208142	0.0341

R-squared	0.168816	Mean dependent var	0.871892
Adjusted R-squared	0.119923	S.D. dependent var	12.99688
S.E. of regression	12.19269	Akaike info criterion	7.917155
Sum squared resid	5054.497	Schwarz criterion	8.047770
Log likelihood	-143.4674	Hannan-Quinn criter.	7.963203
F-statistic	3.452752	Durbin-Watson stat	1.896687
Prob(F-statistic)	0.043141		

OILR @ 1ST DIFF

Null Hypothesis: D(OILR) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-8.108810	0.0001
Test critical values:	1% level	-4.234972	
	5% level	-3.540341	
	10% level	-3.202445	

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

Residual variance (no correction)	166.2726
HAC corrected variance (Bartlett kernel)	115.4309

Phillips-Perron Test Equation
Dependent Variable: D(OILR,2)
Method: Least Squares
Date: 03/23/23 Time: 04:33
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(OILR(-1))	-1.416225	0.176587	-8.019982	0.0000
C	-1.357388	4.553879	-0.298073	0.8012
@TREND("1981")	0.314061	0.389765	0.805769	0.6216

R-squared	0.516816	Mean dependent var	0.568889
Adjusted R-squared	0.508233	S.D. dependent var	19.01334
S.E. of regression	10.43805	Akaike info criterion	8.118172

Sum squared resid	5985.813	Schwarz criterion	8.250132
Log likelihood	-143.1271	Hannan-Quinn criter.	8.164230
F-statistic	18.41752	Durbin-Watson stat	1.987041
Prob(F-statistic)	0.000004		

FD* @ LEVEL

Null Hypothesis: FD has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.734141	0.7159
Test critical values:	1% level	-4.226815	
	5% level	-3.541601	
	10% level	-3.200320	

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

Residual variance (no correction)	1342317.
HAC corrected variance (Bartlett kernel)	2918213.

Phillips-Perron Test Equation
Dependent Variable: D(FD)
Method: Least Squares
Date: 03/23/23 Time: 04:35
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FD(-1)	-0.058094	0.030113	-1.929204	0.0621
C	67.79520	408.9656	0.165772	0.8693
@TREND("1981")	174.1656	52.54865	3.314418	0.0022

R-squared	0.391846	Mean dependent var	1474.419
Adjusted R-squared	0.356072	S.D. dependent var	1506.158
S.E. of regression	1208.618	Akaike info criterion	17.10995
Sum squared resid	49665722	Schwarz criterion	17.24056
Log likelihood	-313.5340	Hannan-Quinn criter.	17.15599
F-statistic	10.95346	Durbin-Watson stat	0.797855
Prob(F-statistic)	0.000213		

FD* @ 1ST DIFF

Null Hypothesis: D(FD) has a unit root

Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-25.87179	0.0000
Test critical values:	1% level	-4.234972	
	5% level	-3.540341	
	10% level	-3.202445	

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

Residual variance (no correction)	954084.0
HAC corrected variance (Bartlett kernel)	913041.8

Phillips-Perron Test Equation
Dependent Variable: D(FD,2)
Method: Least Squares
Date: 03/23/23 Time: 04:35
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FD(-1))	-0.411782	0.014106	-26.35514	0.0000
C	140.6408	412.9195	0.387526	0.7009
@TREND("1981")	23.24779	20.44952	1.141838	0.2638

R-squared	0.180172	Mean dependent var	44.22111
Adjusted R-squared	0.130485	S.D. dependent var	1094.080
S.E. of regression	1020.205	Akaike info criterion	16.77305
Sum squared resid	34347022	Schwarz criterion	16.90501
Log likelihood	-298.9149	Hannan-Quinn criter.	16.81911
F-statistic	3.626168	Durbin-Watson stat	1.842699
Prob(F-statistic)	0.041707		

FA @ LEVEL

Null Hypothesis: FA has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		0.173358	0.9969
Test critical values:	1% level	-4.226815	
	5% level	-3.541601	
	10% level	-3.200320	

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

Residual variance (no correction)	532303.1
HAC corrected variance (Bartlett kernel)	630077.0

Phillips-Perron Test Equation
Dependent Variable: D(FA)
Method: Least Squares
Date: 03/23/23 Time: 04:39
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FA(-1)	0.009159	0.031464	0.291101	0.7727
C	-443.6845	308.1657	-1.439760	0.1591
@TREND("1981")	53.41100	20.05441	2.656839	0.0119

R-squared	0.419750	Mean dependent var	608.4692
Adjusted R-squared	0.385618	S.D. dependent var	971.0052
S.E. of regression	761.0986	Akaike info criterion	16.18501
Sum squared resid	19695215	Schwarz criterion	16.31562
Log likelihood	-296.4226	Hannan-Quinn criter.	16.23106
F-statistic	12.29772	Durbin-Watson stat	1.581293
Prob(F-statistic)	0.000096		

FA @ 1ST DIFF

Null Hypothesis: D(FA) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.554168	0.0045
Test critical values:	1% level	-4.234972	
	5% level	-3.540341	
	10% level	-3.202445	

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

Residual variance (no correction)	524302.8
HAC corrected variance (Bartlett kernel)	526023.2

Phillips-Perron Test Equation
Dependent Variable: D(FA,2)
Method: Least Squares
Date: 03/23/23 Time: 04:39
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(FA(-1))	-0.809587	0.177885	-4.551174	0.0001
C	-426.4704	290.6690	-1.467203	0.1518
@TREND("1981")	47.94760	16.61911	2.885089	0.0068

R-squared	0.386709	Mean dependent var	11.88306
Adjusted R-squared	0.349540	S.D. dependent var	941.7242
S.E. of regression	756.4148	Akaike info criterion	16.17441
Sum squared resid	18874903	Schwarz criterion	16.30633
Log likelihood	-418.1386	Hannan-Quinn criter.	16.22043
F-statistic	10.40404	Durbin-Watson stat	1.922413
Prob(F-statistic)	0.000314		

FE @LEVEL

Null Hypothesis: FE has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.761170	0.6962
Test critical values:	1% level	-4.323979	
	5% level	-3.580623	
	10% level	-3.225334	

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

Residual variance (no correction)	5.87E+12
HAC corrected variance (Bartlett kernel)	6.83E+12

Phillips-Perron Test Equation
Dependent Variable: D(FE)
Method: Least Squares
Date: 03/23/23 Time: 04:44
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FE(-1)	-0.203990	0.125198	-1.629345	0.1158
C	832067.1	1491949.	0.557705	0.5820
@TREND("1981")	7075.997	64003.64	0.110556	0.9129

R-squared	0.104176	Mean dependent var	63023.00
Adjusted R-squared	0.031970	S.D. dependent var	2606809.
S.E. of regression	2564800.	Akaike info criterion	32.45412
Sum squared resid	1.64E+14	Schwarz criterion	32.59635
Log likelihood	-451.3506	Hannan-Quinn criter.	32.49725
F-statistic	1.445853	Durbin-Watson stat	1.812140
Prob(F-statistic)	0.254573		

FE@ 1ST DIFF

Null Hypothesis: D(FE) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.929529	0.0026
Test critical values:	1% level	-4.339330	
	5% level	-3.587527	
	10% level	-3.229230	

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

Residual variance (no correction)	6.71E+12
HAC corrected variance (Bartlett kernel)	6.71E+12

Phillips-Perron Test Equation
Dependent Variable: D(FE,2)
Method: Least Squares
Date: 03/23/23 Time: 04:56
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FE(-1))	-1.007192	0.204318	-4.929529	0.0000
C	942192.5	1723866.	0.546558	0.5897
@TREND("1981")	-41042.31	68322.98	-0.527541	0.6027

R-squared	0.503113	Mean dependent var	34295.67
Adjusted R-squared	0.461706	S.D. dependent var	4145418.
S.E. of regression	2747941.	Akaike info criterion	32.59503
Sum squared resid	1.81E+14	Schwarz criterion	32.73901
Log likelihood	-441.0329	Hannan-Quinn criter.	32.64185
F-statistic	12.15038	Durbin-Watson stat	1.998417
Prob(F-statistic)	0.000227		

FS @ LEVEL

Null Hypothesis: FS has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 12 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.874184	0.1822
Test critical values:	1% level	-4.226815	

	5% level	-3.541601
	10% level	-3.200320

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

Residual variance (no correction)	104107.1
HAC corrected variance (Bartlett kernel)	81202.22

Phillips-Perron Test Equation
Dependent Variable: D(FS)
Method: Least Squares
Date: 03/23/23 Time: 04:49
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FS(-1)	-0.472589	0.151241	-3.124851	0.0041
C	-241.8514	131.0312	-1.845755	0.0741
@TREND("1981")	29.07115	9.301416	3.125467	0.0041

R-squared	0.238820	Mean dependent var	60.21541
Adjusted R-squared	0.194044	S.D. dependent var	414.2054
S.E. of regression	335.9430	Akaike info criterion	14.54941
Sum squared resid	3841163.	Schwarz criterion	14.67998
Log likelihood	-266.1633	Hannan-Quinn criter.	14.59541
F-statistic	5.334131	Durbin-Watson stat	1.702334
Prob(F-statistic)	0.009667		

FS @ 1ST DIFF

Null Hypothesis: D(FS) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 17 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-8.451592	0.0000
Test critical values:	1% level	-4.234972	
	5% level	-3.540341	
	10% level	-3.202445	

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

Residual variance (no correction)	141244.4
HAC corrected variance (Bartlett kernel)	14138.78

Phillips-Perron Test Equation
Dependent Variable: D(FS,2)

Method: Least Squares
Date: 03/23/23 Time: 04:49
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FS(-1))	-1.090388	0.192610	-5.661124	0.0000
C	-35.87048	141.7225	-0.262410	0.7947
@TREND("1981")	5.148683	6.186206	0.832414	0.4112

R-squared	0.496847	Mean dependent var	29.24316
Adjusted R-squared	0.466353	S.D. dependent var	527.7479
S.E. of regression	385.5260	Akaike info criterion	14.82675
Sum squared resid	4904800.	Schwarz criterion	14.95871
Log likelihood	-263.8815	Hannan-Quinn criter.	14.87411
F-statistic	16.29320	Durbin-Watson stat	1.867232
Prob(F-statistic)	0.000012		

UEM @ LEVEL

Null Hypothesis: UEM has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.141673	0.5093
Test critical values:	1% level	-4.226815	
	5% level	-3.541601	
	10% level	-3.200320	

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

Residual variance (no correction)	5635.533
HAC corrected variance (Bartlett kernel)	5635.533

Phillips-Perron Test Equation
Dependent Variable: D(UEM)
Method: Least Squares
Date: 03/23/23 Time: 04:50
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UEM(-1)	-0.212241	0.099330	-2.141673	0.0399
C	-46.17682	33.14132	-1.393877	0.1724
@TREND("1981")	6.411049	2.666679	2.404132	0.0218

R-squared	0.145302	Mean dependent var	22.17216
Adjusted R-squared	0.095026	S.D. dependent var	82.32103

S.E. of regression	78.31210	Akaike info criterion	11.64189
Sum squared resid	208514.7	Schwarz criterion	11.76750
Log likelihood	-212.4124	Hannan-Quinn criter.	11.68293
F-statistic	2.890068	Durbin-Watson stat	2.417823
Prob(F-statistic)	0.069313		

UEM @ 1ST LEVEL

Null Hypothesis: D(UEM) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-7.403341	0.0000
Test critical values:	1% level	-4.234972	
	5% level	-3.540341	
	10% level	-3.202445	

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

Residual variance (no correction)	6130.010
HAC corrected variance (Bartlett kernel)	6332.757

Phillips-Perron Test Equation
Dependent Variable: D(UEM,2)
Method: Least Squares
Date: 03/23/23 Time: 04:51
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(UEM(-1))	-1.261212	0.169792	-7.427991	0.0000
C	-3.415673	41.98771	-0.117832	0.9069
@TREND("1981")	1.607410	1.323476	1.214541	0.2332

R-squared	0.625989	Mean dependent var	3.040556
Adjusted R-squared	0.603321	S.D. dependent var	129.8391
S.E. of regression	81.77581	Akaike info criterion	11.72550
Sum squared resid	220680.4	Schwarz criterion	11.85746
Log likelihood	-208.0589	Hannan-Quinn criter.	11.77155
F-statistic	27.61632	Durbin-Watson stat	1.962313
Prob(F-statistic)	0.000000		

K @LEVEL

Null Hypothesis: K has a unit root
Exogenous: Constant, Linear Trend

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.272743	0.0875
Test critical values:	1% level	-4.244144	
	5% level	-3.544414	
	10% level	-3.204699	

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

Residual variance (no correction)	146.8232
HAC corrected variance (Bartlett kernel)	145.6510

Phillips-Perron Test Equation
Dependent Variable: D(K)
Method: Least Squares
Date: 03/23/23 Time: 04:53
Sample: 1982 2021
Included observations: 40

Variable	Coefficient	Std. Error	t-Statistic	Prob.
K(-1)	-0.514139	0.156601	-3.410573	0.0025
C	15.47702	5.786547	2.674656	0.0117
@TREND("1981")	-0.178412	0.212092	-0.840965	0.4066

R-squared	0.264186	Mean dependent var	-0.193143
Adjusted R-squared	0.218197	S.D. dependent var	14.33203
S.E. of regression	12.67233	Akaike info criterion	7.998535
Sum squared resid	5138.811	Schwarz criterion	8.131850
Log likelihood	-141.9744	Hannan-Quinn criter.	8.044555
F-statistic	5.744611	Durbin-Watson stat	2.074163
Prob(F-statistic)	0.007384		

K @ 1ST DIFF

Null Hypothesis: D(K) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 20 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-16.47947	0.0000
Test critical values:	1% level	-4.254179	
	5% level	-3.548490	
	10% level	-3.207094	

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

Residual variance (no correction)	180.5524

HAC corrected variance (Bartlett kernel)	18.14717

Phillips-Perron Test Equation
Dependent Variable: D(K,2)
Method: Least Squares
Date: 03/23/23 Time: 04:54
Sample (adjusted): 1983 2021
Included observations: 39 after adjustment

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(K(-1))	-1.329688	0.171913	-7.734647	0.0000
C	3.843199	5.167604	0.744110	0.4627
@TREND("1981")	-0.218623	0.246794	-0.885850	0.3825

R-squared	0.658944	Mean dependent var	-0.541176
Adjusted R-squared	0.641940	S.D. dependent var	23.35453
S.E. of regression	14.07214	Akaike info criterion	8.210419
Sum squared resid	6138.781	Schwarz criterion	8.345047
Log likelihood	-141.5763	Hannan-Quinn criter.	8.256298
F-statistic	29.94706	Durbin-Watson stat	2.027073
Prob(F-statistic)	0.000000		

EG@ LEVEL

Null Hypothesis: EG has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.620101	0.2743
Test critical values:	1% level	-4.244144	
	5% level	-3.544414	
	10% level	-3.204699	

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

Residual variance (no correction)	10.10741
HAC corrected variance (Bartlett kernel)	11.96465

Phillips-Perron Test Equation
Dependent Variable: D(EG)
Method: Least Squares
Date: 03/23/23 Time: 06:11
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EG(-1)	-0.332694	0.141931	-2.429644	0.0209
C	1.590311	1.249239	1.273024	0.2122
@TREND("1981")	0.124114	0.079575	1.559704	0.1417

R-squared	0.157169	Mean dependent var	0.144157
Adjusted R-squared	0.104492	S.D. dependent var	3.513527
S.E. of regression	3.324896	Akaike info criterion	5.322570
Sum squared resid	353.7578	Schwarz criterion	5.455886
Log likelihood	-90.14498	Hannan-Quinn criter.	5.418591
F-statistic	2.984140	Durbin-Watson stat	1.589468
Prob(F-statistic)	0.064841		

EG @1ST DIFF

Null Hypothesis: D(EG) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.139956	0.0011
Test critical values:	1% level	-4.254179	
	5% level	-3.548490	
	10% level	-3.207094	

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

Residual variance (no correction)	12.23561
HAC corrected variance (Bartlett kernel)	7.152729

Phillips-Perron Test Equation
Dependent Variable: D(EG,2)
Method: Least Squares
Date: 03/23/23 Time: 06:12
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EG(-1))	-0.941115	0.180353	-5.146092	0.0000
C	0.468227	1.344996	0.348126	0.7301
@TREND("1981")	-0.016874	0.064221	-0.262752	0.7945

R-squared	0.460853	Mean dependent var	0.082353
Adjusted R-squared	0.426070	S.D. dependent var	4.835504
S.E. of regression	3.663291	Akaike info criterion	5.518698
Sum squared resid	416.0108	Schwarz criterion	5.653417
Log likelihood	-90.81787	Hannan-Quinn criter.	5.564641
F-statistic	13.24913	Durbin-Watson stat	1.913061
Prob(F-statistic)	0.000069		

Appendix 4: COINTEGRATION RESULT

PHILIP-QULIARIS

Date: 03/25/23 Time: 04:02
Series: UEM FA W K OILR FS FD FE EG
Sample: 1981 2021
Included observations: 41
Null hypothesis: Series are not cointegrated
Cointegrating equation deterministics: C
Additional regressor deterministics: @TREND @TREND^2
Long-run variance estimate (Bartlett kernel, Newey-West fixed bandwidth)
No d.f. adjustment for variances

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
UEM	-13.65209	0.0323	-28.7421	0.0022
F_UNEM	-22.08912	0.0023	-51.9022	0.0000
M_UNEM	-12.05732	0.0479	-33.1089	0.0011
U_UNEM	-20.51019	0.0032	-50.9087	0.0000

R_UNEM	-18.92102	0.0041	-32.1078	0.0019
FA	-20.21856	0.0023	-50.6287	0.0000
W	-19.30816	0.0009	-42.5443	0.0001
K	-6.096862	0.7434	-23.7391	0.9512
OILR	-18.97623	0.0016	-52.0186	0.0000
FS	-12.01704	0.0498	-32.6775	0.0012
FD	-18.4274	0.0018	-32.3362	0.0013
FE	-20.55028	0.0001	-50.1289	0.0000
EG	-23.21356	0.0011	-52.6535	0.0000

*MacKinnon (1996) p-values.
Warning: p-values may not be accurate for fewer than 35 observations.