



Assessing the Effects of Financial Technology on Unemployment and Economic Growth in Oil Exporting African Countries

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ABSTRACT

The Fintech sector is among the most appealing for investors who are looking for the next wave of disruptive innovation. However, despite the resilience of African Fintech over the past decades on economic growth and unemployment rate, the desired economic growth and unemployment rate is undermined. This study investigates the effects of Fintech on unemployment and economic growth in selected oil exporting African countries. An annual secondary panel dataset covering the years 2000-2023 was employed as obtained from WDI. The technique adopted was the Feasible Generalized Least Square (FGLS). The result revealed that only individuals using the internet accounted for a decrease of (0.1103) units on unemployment as automated teller machine and individual using the internet exacerbate unemployment rate by (0.2110 and 0.00034) units. However, individual using the internet and automated teller machine significantly influenced economic growth positively with a coefficient value of (0.00317 and 0.02813) units in oil exporting African countries while secure internet server insignificantly influenced economic growth negatively. The study recommends that government allocation should be channeled towards promoting internet services by providing sound policies to network providers on how to improve their network issues and make data subscription available to individuals at a cheaper rate thereby reducing unemployment rate by promoting economic growth. More so, Government through its financial institution should increase the widespread of automated teller machine across the region to enable easy access of fund thereby facilitate financial inclusion hence promote rapid growth in the economy.

Keywords: Unemployment, Economic Growth, Financial Technology, Feasible Generalized Least Square

JEL Classifications: E24, O33, O47, Q43, G20

1. INTRODUCTION

The issue of unemployment has globally affected economic development in different economies be it developed or developing. Although, developed countries have been curtailing the rate of their unemployment significantly especially in the recent years. However, in developing countries, especially in Africa, unemployment has been on an accelerating rise, culminating in reduction of household income and living standards and concomitant rise in the level and incidence of poverty (Iyoha, 2002).

In an assertion by Al-Habees and Rumman (2012), unemployment is considered as one of the worst situations any human society can experience since its effects are felt in different dimensions and directions. In addition, they pointed out that unemployment is a serious predicament confronted by most developed and developing nations which leads to economic and social issues. The economic issue of unemployment is denying the nation of tax revenue in the form of income tax, wastage of productive hours and many others while the social issues of unemployment had to do with depression, lack of self-respect, and other vices such as robbery, prostitution

and many others (Adarkwa et al., 2017). More so, unemployment is a multi-dimensional phenomenon encompassing economic and social phenomenon which shows the disparity in economic activity and consequence on the social structure of societies as a social activity. The nature of unemployment depends on the structures of the country and the category of which the country falls under whether it is developed, developing or undeveloped (Soylu et al., 2017). Unemployment is one of the macroeconomic indicators which emanates from the inability of a country to utilize its labour resources. This shows that there are many active people who are readily available, searching and capable of adding to productivity output but cannot get a job to do (Yilmaz, 2005). Similarly, economic growth is considered as one of the utmost imperative fiscal tools for plummeting poverty as well as improving the eminence of life (DFID, 2008). Hence, production of much goods and improved services within a continuous time period serves as the basis of increasing prosperity and reducing the disparity of revenue delivery among people in a broader perspective (Ademola and Badiru, 2016). Also, improving economic growth is viewed as an important instrument for reducing unemployment, poverty and to help enhance the living standards of people. Banda (2016) posits that an increase in the growth rates of GDP is expected to increase employment levels thus reducing unemployment. In the view of Osinubi (2005), although economic growth is of significant importance in reducing unemployment and poverty alleviation, however it is not sufficient since economic growth alone cannot overcome all the critical factors that contribute to poverty and unemployment. Therefore, there is a need to adopt more policies that help to construct investment programs which in turn will enable job creation, accelerate economic growth, eradicate poverty and unemployment hence the need for the adoption of financial technology in the globalized era to cushion the effect of unemployment and expand economic growth in the oil exporting African countries. FINTECH sector an acronym for Financial Technology is among the most appealing for investors looking for the next wave of disruptive innovation. Digital “neo-banks” are expanding their market share, especially among younger consumers, while bespoke apps and platforms are taking once-elite financial services, such as stock market investing, into the mainstream. Total investment activity globally combining venture capital, private equity and merger and acquisitions reached a peak of US\$120bn in 2018, up from US\$51bn in 2017 (Zeidy, 2022). He also states that financial innovations are unlike other inventions in that they can directly impact the efficiency of the financial sector, where savings and investment are intermediate in an economy which then affect growth. Fintech is part of the digital economy that has produced innovations that have transformed the way we live, even as productivity growth has been slowing across advanced economies for decades. Today, it remains a front-runner in financial innovation due to unprecedented growth in the number of fintech companies in Africa grew at an annual rate of 24% between 2009 and 2019 which was fueled mostly by Nigeria, Kenya and South Africa (Zeidy, 2022).

In the present day, digital transactions have become an integral part of daily life in numerous African nations. During this summer, the continent witnessed the operation of nearly 700 fintech companies, reflecting a 17% increase from the figures recorded in 2021.

However, the deceleration in the rate of new Fintech launches suggests a transitional phase in the industry, characterized by consolidation. With the exception of a few notable transactions, such as Fundamo’s acquisition by Visa for \$110 million in 2011 or the acquisition of Lagos-based Paystack by the U.S. Internet payment giant Stripe for \$200 million in 2020, mergers and acquisitions were relatively uncommon in the African fintech landscape until recently. Notably, over the past 2 years, Disrupt Africa has documented 26 acquisitions, a significant rise from the mere 9 recorded between 2019 and 2021 (Global Finance, 2023).

Despite the resilience of African fintech in 2022, funding volumes experienced a significant decline in the first half of 2023, amounting to slightly over \$600 million, including the noteworthy \$400 million MNT-Halan mega-deal. Notably, 70% of fintech startups receive backing from venture capital firms located outside the continent. Last year’s funding, which was predominantly led by foreign investors, faced a decline in 2023 due to global uncertainties, escalating interest rates, and substantial layoffs in the Western tech sector. Concurrently, the “big four” encountered economic challenges domestically, marked by historic inflation levels and increased poverty.

The crisis reached African tech after a couple of months, with a pivotal moment occurring in December 2022 when Jumia, often dubbed Africa’s Amazon, witnessed a 68% year-on-year drop in shares on the NYC stock exchange, leading to the founders stepping down. Prior to this, several FinTech’s, including Senegal’s first unicorn, Wave, had to implement downsizing measures. In June 2022, Wave, backed by U.S. Stripe, laid off 15% of its workforce (approximately 300 employees) and redirected its efforts away from new markets like Uganda, Mali, or Burkina Faso to focus on core markets, namely Senegal and Ivory Coast.

Given this new reality, some African entrepreneurs are contemplating leaving the continent for global hubs where talent is in high demand, raising concerns about brain drain. Alternatively, others are considering seeking support from foreign aid organizations that promote private sector growth. While this approach may grant access to funding, it runs the risk of pushing entrepreneurs to align with donor expectations rather than addressing market needs (Global Finance, 2023).

The situations necessitate the need to examine the effects of financial technology on unemployment and economic growth in some selected oil exporting African countries. The rest of the paper is structured as follow; section two is the reviews relevant literature and theories, section three gives the methodology adopted for the study, part four contains data/analysis and interpretation of result while section five is the conclusion and recommendations for policy implementation.

2. LITERATURE REVIEW

2.1. Financial Technology

Fintech, a code word for financial technology, refers to innovative technology designed to enhance and streamline the provision and utilization of financial services. Fintech is primarily used to assist

organizations, entrepreneurs, and customers in managing their financial operations, procedures, and lives more effectively and efficiently. It is made up of algorithms and specialized software that are utilized by computers and smartphones. Although fintech appears to be a relatively new wave of technical innovations, the fundamental idea has been around for a while. Since they eliminated the necessity for users to carry physical currency daily, early credit cards from the 1950s are typically seen as the first fintech products made available to the general public. Subsequently, fintech expanded to encompass online stock trading services and bank mainframes. One of the first fintech businesses to operate exclusively online was PayPal, which was established in 1998. Social media, mobile technology, and data encryption have further transformed this innovation. The fintech revolution has resulted in the widespread adoption of mobile payment apps, blockchain networks, and social media-based payment choices.

The effect of financial technology on numerous sectors and countries have been very much influential in the global economy. It is critical to consider several important factors while analyzing its effects on unemployment and economic growth in African countries, particularly in oil-exporting nations, such as technological adoption, labour market dynamics, and economic structure. Regarding the adoption of FinTech, the degree of technological infrastructure and preparedness in oil-exporting African countries. The extent to which these countries incorporate FinTech solutions into their financial systems influences how their economies grow and how much unemployment they experience. For example, nations with sophisticated FinTech infrastructure might witness swifter and more significant transformations in their economic terrain.

Understanding the employment market dynamics variable is essential to comprehending how FinTech affects unemployment. FinTech's inherent automation and digitalization have the potential to replace traditional occupations, particularly in repetitive and routine work. New job prospects in the FinTech industry and adjacent sectors are also made possible by this, though. The workforce's skill level and the labour market's ability to adjust to these developments are key determinants of whether the adoption of fintech results in net job creation or destruction.

FinTech may present prospects for diversification in oil-exporting African nations whose economies are mostly dependent on the oil industry. Economic resilience can be enhanced by the growth of a strong FinTech sector, which lessens reliance on an industry. On the other hand, FinTech might stimulate innovation and expansion in non-oil exporting countries, opening new business opportunities and fostering economic growth. Ham Serunjogi, co-founder and CEO of Chipper Cash which entered the Nigerian market in September 2019, describes the country as one of the more mature fintech and tech markets in Africa. It has definitely been a pioneer and a leader on many fronts, with a lot of great companies (Zeidy, 2022). Fintech revenues are forecast to grow from US\$153m in 2017 to US\$543m by 2022, driven by expanding payment services, the e-commerce market and rising smartphone penetration while unique subscriber penetration was at 50% in Nigeria at the end of 2019 less than peers like South Africa and Ghana in absolute

terms that still amounts to 100 m unique subscribers. That is South Africa, Kenya, Ghana and Cote d'Ivoire put together, which gives you an idea of the size of the market of mobile and the impact it could have (The Economist Intelligence Unit Limited, 2020).

2.2. Unemployment

Africa has the youngest and fastest-growing population in the world, with 800 million people under the age of 25, or around 60% of the continent's total population. Highlights of a new study by the International Labour Organisation (2020) indicate that over half of all youth worldwide will be African by the year 2100. For many African nations, creating long-term employment possibilities for the continent's burgeoning youth population has proven to be a formidable challenge, in part because economic expansion has not produced enough jobs. Nonetheless, recent data from the International Labour Organisation (2020) indicates that youth unemployment in Africa may be the lowest globally. Africa's young unemployment rate fell to 11.7% in 2012 and has been steadily declining over the previous 8 years (Segbefia, 2021). The International Labour Organisation (ILO) defines unemployment based on three important conditions of which must be met simultaneously and these conditions are; not working, ready to get employed and searching for a job (ILO, 2019). Hussmanns, Mehran and Verma (1990) postulated that unemployment encompass all individuals who meet the recommended age to engage in economic activities and meets the conditions of without work, that, individuals, are not self-employment or who are not engaged in any job that fetches them income; currently available for work, that is, individuals who are readily available to be engaged any income earn job or employment and; seeking work, that is, individuals who are making an effort to get income-earning job or employment. Different forms of unemployment exist in African nations that export or do not export oil, depending on the unique economic frameworks of these groups. Although structural and frictional unemployment is widespread, there are differences between the experiences of these two contexts due to the influence of global oil markets on cyclical unemployment and the different levels of labour market flexibility (Adeola, 2019).

In African cultures, unemployment has a variety of causes. Oil-exporting economies struggle with the resource curse, which causes them to be unstable economically as a result of changes in oil prices and issues related to the Dutch Disease phenomena. On the other hand, structural issues including inadequate diversification, mismatches in education, and population pressures affect non-oil exporting nations (Adam and O'Connell, 2012).

Governmental approaches to reducing unemployment vary throughout countries that export and those that don't. Oil-exporting countries need to prioritise economic diversification tactics to lessen their reliance, whilst non-oil-exporting countries need to prioritise policies about skill development, education, and sustainable economic growth (Odozi, 2017).

New employment trends that are driven by changes in the global oil markets, technology, and population patterns need customised strategies. Opportunities and difficulties related to the gig economy, digital changes, and renewable energy sectors

differ for African countries that export oil and those that don't (Tchamyou, 2017).

The interdependence of economies is shown by global viewpoints on unemployment in African nations. Studies that compare countries that export and those that don't offer important information on the efficiency of legislative solutions, the makeup of labour markets, and the ability of economies to withstand shocks from the outside world (ILO, 2021).

2.3. Economic Growth

Economic growth is generally defined as a variation in a nation's Gross Domestic Product (GDP) which is analyzed as various contributions made by the populace in consonance with national income or capital (Piketty, 2014). According to (Jhingan, 2003), economic growth is the procedure by which the real income per person of a nation rises over an extensive period of duration, which is determined through the rising in productivity output (goods and services manufactured) in a nation. In both situations, institutional quality and governance are crucial. Transparent institutions are necessary for oil-exporting nations to efficiently manage resource profits and steer clear of the "resource curse" (Karl, 2017). Oil-exporting countries work to overcome the problems brought on by resource dependence by diversifying their economies through trade (Brenton and Hoppe, 2019). Countries that don't export oil use regional and global trade agreements to gain access to markets, draw in foreign capital, and promote economic growth (World Bank, 2019).

The adoption of Fintech can be a stimulating instrument to exacerbate economic diversification in oil-exporting nations whose economies have historically depended on resource exports. By integrating fintech technologies, the impact of fluctuating oil prices on unemployment rates may be lessened by facilitating the creation of revenue streams other than oil. The dynamics of resource reliance, trade, governance, and the development of human capital are closely linked to economic growth in African countries, especially when separating those that export oil from those that do not. The revolutionary impact of Fintech is also considered in this integrated conceptual inquiry, acknowledging its potential to influence 21st-century economic landscapes.

2.4. Theoretical and Empirical Review

2.4.1. Unified theory of acceptance and use of technology (UTAUT)

The growth of the e-commerce sector, and emerging digital technologies, such as big data, Artificial Intelligence, cloud computing and robotics, drive the implementation of new technologies in organizations (Verhoef et al., 2021). The advances in information communication technology (ICT) have dramatically changed the way organizations conduct business. The application of the technologies in the workplace has redefined inter- and intra-organizational communication which has streamlined business processes to ensure benefits, such as higher productivity, the well-being of employees and the satisfaction of consumers. To achieve such benefits, companies make massive spending on technologies. The results of market research suggest that the success rate of new technology adoption in organizations, whereby technologies

bring expected return on investment (i.e. improved performance), is below 30%. The number is less optimistic if consider the companies, that could improve performance but could not sustain the improvements in the long run. Given the consequences of technology adoption on organizations' performance and a cost-revenue structure, the technology utilization-acceptance gap remains one of the major areas of research in the IS literature. Venkatesh et al. sought to integrate important components that predict behavioral intention and use them to create a unified theory of technology acceptance, which would offer a comprehensive understanding of technology adoption. To achieve this goal, a study of the fundamental literature on IS acceptance was conducted to identify theoretical and contextual parallels and differences between the theories of technology acceptance that come from the three research streams of social psychology, IS management, and behavioral psychology. Human-computer interaction has been studied using this idea. According to this notion, behavioral purpose dictates how technology is used. The direct impact of four major constructs performance expectancy, effort expectancy, social influence, and facilitating conditions which determines the perceived likelihood of technology adoption.

2.4.2. Solow growth model

The Solow growth model is an exogenous model of economic growth that examines how variations in the rates of saving, population increase, and technological advancement affect an economy's output levels over time. The first neoclassical growth model was the Solow Growth Model, created by Nobel Prize-winning economist Robert Solow. It was based on the Keynesian Harrod-Domar model. The contemporary theory of economic growth is based on the Solow model.

2.4.2.1. Assumptions of the model

1. There is a constant rate of population growth, g . As a result, the population growth equation $N' = N(1+g)$ links the existing population (represented by N) to the future population (represented by N'). The population in the future will be 102 if the current population of 100 continues to grow at a rate of 2%.
2. Every consumer in the economy sets aside a fixed percentage, denoted as " s ," of their earnings and spends the remainder. As a result, the consumption equation $C = (1-s)Y$ links consumption (represented by C) with output (represented by Y). A customer who makes 100 units of output as income and has a 40% savings rate will save 40 units and consume 60 units.
3. The same production technology, which uses labour and capital as inputs, is used by all businesses in the economy to create output. Consequently, the production function equation $Y = F(K, L)$ links the levels of output (represented by Y), capital (represented by K), and labour (represented by L). The production function is assumed to demonstrate constant returns to scale (CRS) by the Solow Growth Model. Assuming this, doubling the amount of labour and capital stock will result in an exact double increase in output. Because of this, a large portion of the Solow model's mathematical analysis concentrates on capital and output per worker rather than total production and total capital stock.

4. The capital accumulation equation $K' = K(1-d) + I$ link the present capital stock (represented by K), future capital stock (represented by K'), rate of capital depreciation (represented by d), and level of capital investment (represented by I).

2.4.2.2. Consequences of the solow growth model

Long-term growth is nonexistent. The Solow Growth Model predicts conditional convergence if countries have the same g (population growth rate), s (savings rate), and d (capital depreciation rate). This indicates that they have the same steady state and will converge. A poorer country grows quickly along this convergence path. The Solow Growth Model does not predict absolute convergence since differing saving rates lead to different steady states, which will not converge. Growth is not necessarily higher in a country with a lower beginning capital stock when saving rates differ.

The choice of the theory of the Solow growth model and the unified theory of acceptance and use of technology stemmed from the fact that, both theories emphasize the need for technology in advancing business which will further create more job opportunities thereby reduce unemployment and propel the desired economic growth in an economy.

Several studies have been undertaken by different scholars across the globe and on continental and regional basis on the effect of financial technology on unemployment and economic growth in some selected African countries. To explore on the subject matter, the following investigations were empirically made based on what other scholars have done regarding the topic. In an assertion, İlayda and Tuğba (2023) investigated the relationship between GDP and Fintech investment using panel causality methods from 2014Q1 to 2020Q4 for eight high-income countries: The United States, United Kingdom, Singapore, Australia, Canada, Germany, Israel, and France. The results indicate the existence of cross-sectional dependence among countries. The results reveal a long-run relationship among the variables. In the short run, panel Granger causality variables were found only in Germany. The study also finds a positive effect of Fintech investment on GDP in seven countries.

Furthermore, in an examination of several factors that promote the establishment of Fintech startups in 55 countries Haddad and Hornuf (2018) used multivariate panel regression to forecast the annual number of Fintech startups in 55 countries between 2006 and 2014 to see which country-level factors promote the development of new Fintech formations. According to the results, when the economy of the country is well-developed and venture capital is readily suitable, more Fintech startups are formed. The result indicated that the number of safe internet servers, mobile phone subscriptions, and labour force availability all contribute to the growth of this new market area. It was also found that having access to venture capital is a critical element in promoting the formation of Fintech startups. In addition, the result stated that when the companies have more difficulty accessing the loans, the number of Fintech startup formations is higher in the country. However, the study did not consider the causal relationship among the variables.

In another investigation, Deng et al. (2019) analyzed the relationship between Fintech and sustainable development and proposed an indicator system. They used the data from peer-to-peer platforms (P2P) in 31 Chinese provinces. They created a China-specific sustainable development indicator system and utilized principal component analysis (PCA) to measure sustainable development levels. The study employed mediation effect analysis, and the dynamic system generalized method of moments (DS-GMM). Their findings show that there is a U-shaped relationship between Fintech and sustainable development. They stated that this U-shaped relationship is the substantial reason mostly due to China's long-term extensive pattern of economic growth. Nevertheless, the study only takes into consideration a single country but there is a need to assess the effect among different economies.

Khiewngamdee and Yan's (2019) examine if Fintech e-payment has an impact on economic development in APEC countries, specifically on productivity, income inequality, income growth, and price volatility. They employed RMIT University's and TRPC's e-payment index, as well as quantile regression with the GME technique. According to their empirical results, Fintech has a significant influence on APEC economic development. They also stated that Fintech not only supports low-level growth and productivity but also helps to reduce income inequality and low-level price volatility. Furthermore, they determined that Fintech's contributions to economic development are high during the low levels of economic factors and reduced at medium and high levels of economic variables. Nevertheless, the study only takes into consideration a single country but there is a need to assess the effect among different economies.

Additionally, Parvez et al. (2023) unveiled the impact of FinTech through financial development, financial inclusion, and institutional quality on the inclusive growth of 25 developing countries in Asia. To serve this purpose, the Human Development Index (HDI), was taken as the proxy for inclusive growth along with a set of independent variables in a well-balanced panel data set from the period of 2014-2021 and the ADRL approach was employed for data analysis. The results show that increasing the level of FinTech along with Findex, financial inclusion, and institutional quality may increase human development. Nevertheless, the study employs the ARDL approach for data analysis which assumes a linear relationship between variables in the model

Utilizing the World Bank Global Findex Database for 91 countries in 2014, 2017, and 2021, Yoon et al. (2023) examined whether fintech levels influence bank performance and whether fintech's interaction with GDP per capita causes differential effects on bank performance globally. AbFintech was estimated by regressing fintech levels on GDP per capita by year. Using multiple regression analyses, the study investigated the impact of AbFintech on bank performance worldwide, focusing on the differential effects of AbFintech and GDP levels on bank performance. The study found that AbFintech significantly increases bank performance, primarily in less developed countries. However, the regression technique did not take into account the causal relationship among the variables.

Moreso, Bua and Hui (2022) examined the nonlinear impact of FinTech on real economic growth in China and employed a threshold regression model to solve the endogenous problem. The empirical results show that FinTech has a significant promoting effect on real economic growth, manifested as a U-shaped relationship and double threshold effect. In the early stage of FinTech development, it will restrain economic growth. The continuous improvement will positively impact economic growth, and the result shows a law of marginal decline. Moreover, there are significant regional differences in the nonlinear characteristics. However, the study did not consider the causal relationship among the variables.

In the same vein, Lakshmanasamy (2021) analysed the static and dynamic causal relationship between the performance of the capital market and economic growth in India using daily time series data for 17 years from January 2000 to December 2016. The study employed a correlogram, Cointegration, and causality test using VECM for data analysis. The results showed the dynamic procedures converge as the projected value of the error correction terms are negative, but statistically insignificant and there is no strong long-run causal relationship between the capital market performance and economic growth in India. Nevertheless, the study only takes into consideration a single country but there is a need to assess the effect among different economies.

In a comparative study between Nigeria and South Africa Osakwe et al. (2020) relatively evaluate the role of the capital market on the economic growth of both Nigeria and South Africa from 2000 to 2018 using yearly time-series data. The data Ordinary Least Squares (OLS) regression was employed, and results showed there is a positive relationship between market capitalization and economic progression for South Africa but insignificant for Nigeria. However, due to the passage of time, the study fails to cover most of the recent global macro-economic shocks hence this study seeks to cover a more recent time.

Sandri et al. (2022) investigated the effect of digitalization on unemployment reduction. Digital transformation and the digitalization of economic activity are ongoing trends profoundly shaping the global economy. Digitalization reflects digital inputs in the production process and new household and government consumption modes, investment possibilities, and financial instruments, increasingly envisaged by digital technologies and tools. This is also impacting the labour markets, on the one hand substituting machines to labour for routinized tasks and thus decreasing the demand for soft skills labour, but on the other hand, increasing the need for new professions revolving around new production and consumption modalities and digital skills. Considering these contrasting effects, it is essential to estimate the overall impact of digitalization on employment. Therefore, this study captures the impact of economic growth and digitalization on unemployment change, evaluating a modified version of Okun's Law on a balanced panel data set for 58 countries between 2013 and 2019. The results from the estimation of a fixed-effect model show the empirical validity of Okun's law for the sampled countries and a significant contribution of digitalization on unemployment reduction.

The limitation in the works is that most of the work focused on either high or low-income countries. Secondly, they do not directly investigate the impact of fintech on unemployment and economic growth in oil exporting African countries. Thirdly, none of the empirical review employed the used of feasible generalized least square estimation technique which this study finds relevant due to cross sectional dependency. Finally, the chosen dataset spanning from 2000 to 2023 offers a more comprehensive and recent temporal analysis compared to previous studies. Thus, the need to investigate the effect of fintech on unemployment and economic growth in oil exporting African countries.

3. METHODOLOGY AND DATA

The analysis employs a panel data for 11 oil exporting countries namely Nigeria, South Africa, Ghana, Guinea, Congo, Gabon, Chad, Egypt, Libya, Angola and Algeria from the period of 2000-2023 sourced from world development indicators (WDI). The study uses the feasible generalized least squares to investigate this effect. For simplicity purposes, the analysis is run on a self- developed multivariate model by the researcher.

$$Y_{it} = \alpha_i + \sum_{k=1}^N \beta_k X_{k,it} + \mu_{it} \quad (1)$$

Where;

i = Selected countries and t = time periods from 2000 to 2023

α_i ($i = 1 \dots n$) is the unknown intercept for each country (n – specific intercepts)

Y_{it} = the Dependent Variable (Unemployment & Economic growth)

$X_{k,it}$ = Represents the i^{th} independent and control variables

β_k = the coefficient for respective independent and control variables

μ_{it} Error term

Unemployment and Economic growth are (Y_{it}) as defined in equation 1 it is the function of financial technology and other control variables that quantify macroeconomic activity ($X_{k,it}$) β_k clarifies how each endogenous variable contributes to unemployment and economic growth. The indicators employed are unemployment rate (UNR) and economic growth is measured using real gross domestic growth rate (RGDP) while the disaggregated FINTECH indicators are automated teller machine (AUTM), secure internet servers (SEIS) and individual using the internet (INDI). The control variables are foreign direct investments (FDI), inflation rate (CPI) and Net official flow from UN agencies (NFF). Similarly, the control variables are, inflation rate (CPI), and foreign direct investments (FDI) were obtained from (WDI).

3.1. Model One: To Examine the Effects of Financial Technology on Unemployment in Oil Exporting African Countries

Model one meets objective one of this study which empirically examines the effects of FINTECH on unemployment and economic growth in Oil Exporting African Countries. The study uses the following as an implicit function to represent such a relationship.

$$UNR_{it} = f(AUTM_{it}, SEIS_{it}, INDI_{it}, FDI_{it}, CPI_{it}, NFF_{it}, \mu_{it}) \quad (2)$$

Where UNR denotes unemployment rate, AUTM represents automated teller machine, SEIS is secure internet servers, INDI is individual using the internet. The control variables are foreign direct investments (FDI), inflation rate (CPI) and Net official flow from UN agencies (NFF).

Explicitly, the econometric model in equation 2 can be written as thus;

$$UNR_{it} = \beta_0 + \beta_1 AUTM_{it} + \beta_2 SEIS_{it} + \beta_3 INDI_{it} + \beta_4 FDI_{it} + \beta_5 CPI_{it} + \beta_6 NFF_{it} + \mu_{it} \quad (3)$$

Where, i = 1, 2..... N =Selected countries for each group, t = 1, 2..... T=25. In equation 3

β_0 denotes the intercept while $\beta_1 \dots \beta_6$ are the parameters or coefficients of the estimated variables; i, t,1 denote the i^{th} country t^{th} refers to time period respectively. The error term is represented by μ which represents uncaptured variables in the model.

3.2. Model Two: To Investigate the Effects of Financial Technology on Economic Growth in Oil Exporting African Countries

Model two meets objective two of the study which empirically investigate the effects of FINTECH on unemployment and economic growth in Non-oil Exporting African Countries. The implicit form of the equation is represented as follows;

$$GDPPC_{it} = f(AUTM_{it}, SEIS_{it}, INDI_{it}, FDI_{it}, CPI_{it}, NFF_{it}, \mu_{it}) \quad (4)$$

Where GDPPC represents GDP per capita, AUTM represents automated teller machine, SEIS is secure internet server, and INDI represents individual using the internet. The control variables are foreign direct investment (FDI), inflation rate (CPI), and Net official flow from UN agencies (NFF).

Explicitly, the econometric model in equation 4 can be written as thus;

$$RGDP_{it} = \beta_0 + \beta_1 AUTM_{it} + \beta_2 SEIS_{it} + \beta_3 INDI_{it} + \beta_4 FDI_{it} + \beta_5 CPI_{it} + \beta_6 NFF_{it} + \mu_{it} \quad (5)$$

Where, i = 1, 2..... N = Selected countries for each group, t = 1, 2..... T = 25. In equation 3

β_0 denotes the intercept while $\beta_1 \dots \beta_6$ are the parameters or coefficients of the estimated variables; i, t,1 denote the i^{th} country t^{th} refers to time respectively. The error term is represented by which represents uncaptured variables in the model.

3.3. A Priori Expectation

This is the expected sign and size of the parameters of the economic relationship among the variables. In this study, it is expected that the a priori sign for unemployment (UNR) and AUTM, SEIS, INDI, FDI and NFF in model (1) be inversely related and >0 while inflation rate (CPI) is indeterminate. While for model two, the indicators are expected to be positively related to economic growth. Symbolically, $\beta_1 \dots \beta_5$ should be (-) >0 while β_6

be indeterminate for unemployment while for economic growth, $\beta_1 \dots \beta_6$ be (+) >0 for all the indicators.

4. RESULTS AND DISCUSSION

4.1. Summary/Descriptive Statistics on the Effect of Fintech on Unemployment in Oil Exporting African Countries

Table 1 shows a detailed summary statistic of eleven Oil-exporting African countries. The countries include Nigeria, South Africa, Ghana, Guinea, Congo, Gabon, Chad, Egypt, Libya, Angola and Algeria. The average observation of this income group is 345 for all the series.

The result show that, UNR has a mean value of 11.81356 and a standard deviation of 7.140819, it indicates a significant variability from the mean value, it has a minimum value of 0.63 and maximum value of 29.77. The mean value of AUTM for the oil exporting Africa countries is 6.511913 and a standard deviation of 12.42118, this implies that the distribution on average is clustered around the mean. The observation has a minimum value of 0 and a maximum value of 68.96. In addition, SEIS has a mean value of 169.4463 and a standard deviation of 1378.133, this implies significant variability from the mean value. Meanwhile, the observation has a minimum value of 0 and a maximum value of 14546.1. While the mean value of INDI is 13.32599 and a standard deviation of 18.48687, this implies a substantial variability from the mean value. In addition, FDI1 has an average value of 2.37e-09 and a standard deviation of 1 this implies that the dataset is not closer to the mean, the minimum value is -11.92856 and the maximum value is 2.981992. CPI has a mean value of 14.37211 and a standard deviation of 38.35087 this reveals that the distribution is far apart from the mean. The observation also has a minimum value of -9.797647 and a maximum value of 379.9996, this can be as a result of some country’s inflation rate.

Finally, NFF has a mean value of 3.12e-09 and a standard deviation of 1, this shows that the distribution far apart from the mean. NFF also have a minimum value of -0.5604893 and maximum value of 6.639856.

4.2. Correlation Matrix on the Effect of Fintech on Unemployment in Oil Exporting African Countries

The results of the correlation are shown in Table 2. Unemployment rate (UNR) is positively related to itself. Unemployment rate (UNR) for example is positively correlated to automated teller machine (ATM), secure internet server (SEIS), individual using the internet (INDI), inflation rate (CPI), foreign direct investment (FDI) and net official flow (NFF). The relationship as indicated in the results is inconsistent with economic theory in the case of all the variables which is also not conform to our a priori expectation. Nevertheless, it should be noted that descriptive statistics merely show the direction of relationship and not causation. The strongest level of correlation (0.554) is between automated teller machine (ATM) and individual using the internet (INDI) suggesting no issue of multicollinearity, followed by automated teller machine (AUTM) and individual using the internet (INDI) (0.514) while the weakest level of correlation (-0.004) is between secure internet

Table 1: Descriptive statistics on the effect of fintech on unemployment in oil exporting African countries

Variable	Mean	Standard deviation	Min	Max	Observations
UNR					
Overall	11.81356	7.140819	0.63	29.77	N=345
Between		7.094275	0.9327391	22.2327	n=15
Within		1.970092	7.017643	26.96764	T=23
AUTM					
Overall	6.511913	12.42118	0	68.96	N=345
Between		9.973082	0.3569565	40.72435	n=15
Within		7.822041	-34.21243	34.74756	T=23
SEIS					
Overall	169.4463	1378.133	0	14546.1	N=345
Between		586.1571	0.1872763	2281.997	n=15
Within		1256.042	-2112.551	12433.55	T=23
INDI					
Overall	13.32599	18.48687	0	72.31049	N=345
Between		9.91873	1.404348	30.72668	n=15
Within		15.8011	-17.40069	64.77015	T=23
FDI					
Overall	2.37e-09	1	-11.92856	2.981992	N=345
Between		0.5243891	-1.214947	0.7106948	n=15
Within		0.8617438	-11.08868	2.806202	T=23
CPI					
Overall	14.37211	38.35087	-9.797647	379.9996	N=345
Between		15.84043	2.116505	47.2157	n=15
Within		35.15561	-32.53416	354.1527	T=23
NFF					
Overall	3.12e-09	1	-0.5604893	6.639856	N=345
Between		0.4390511	-0.3951405	0.9194948	n=15
Within		0.9052967	-1.479984	6.265814	T=23

Source: Author’s computation (2024)

Table 2: Result of correlation matrix on the effect of Fintech on unemployment in oil exporting African countries

Variables	UNR	AUTM	SEIS	INDI	FDI	CPI	NFF
UNR	1.000						
AUTM	0.316	1.000					
SEIS	0.205	0.514	1.000				
INDI	0.116	0.554	0.309	1.000			
FDI	0.010	-0.182	-0.004	-0.248	1.000		
CPI	0.068	-0.080	-0.031	-0.084	0.010	1.000	
NFF	0.028	0.480	0.031	0.662	-0.303	0.032	1.000

Source: Author’s COMPUTATION (2024)

server (SEIS) and foreign direct investment (FDI). In general, the results of the correlation matrix would be of information value when we embark on empirical analysis.

4.3. Pesaran Modified Test of Cross-Sectional Dependence Test on the Effect of Fintech on Unemployment in Oil Exporting African Countries

This test is crucial in panel data research to disprove spurious regressions and skewed results. The Pesaran (2004) modified CD test is used to examine the cross-sectional dependency for each variable used in the research. The CD test findings of some selected African nations are shown in Table 3. The countries analyzed below are oil-exporting countries.

Table 3 presents the results of these examinations. The null hypothesis for these tests posits “no cross-section dependence,”

Table 3: Pesaran modified test of cross-sectional dependence test

Variables	CD-test	P-value	Average -joint T	Mean P	Mean abs (p)
UNR	13.226	0.000	23.00	0.27	0.50
AUTM	31.141	0.000	23.00	0.63	0.66
SEIS	40.636	0.000	23.00	0.83	0.83
INDI	29.741	0.000	23.00	0.61	0.68
FDI	2.506	0.012	23.00	0.05	0.16
CPI	1.654	0.098	23.00	0.03	0.23
NFF	31.844	0.000	23.00	0.65	0.65

Source: Author’s computation (2024)

while the alternative hypothesis states “there is cross-section dependence.” The results of the tests lead to the rejection of the null hypothesis at the 1% significance level for all variables but at 10% for CPI, indicating a confirmed correlation among the cross-section units for each variable. Consequently, it is inferred that all variables employed in the study exhibit cross-sectional dependence among cross-section units. The conducted CD tests reveal the presence of cross-dependence in the dataset, aligning with our understanding of the interconnectedness of the countries.

4.4. Variance Inflation Factor for Oil Exporting Countries

The Table 4 shows that the highest variance inflation factor for oil exporting countries is 2.08. This implies that there is no multicollinearity problem in the models.

Table 4: Variance inflation factor

Variables	VIF	1/VIF
INDI	2.08	0.481
NFF	1.95	0.512
AUTM	1.83	0.548
SEIS	1.39	0.720
FDI	1.13	0.889
CPI	1.03	0.975
MEAN VIF	1.57	0.637

Source: Author's computation (2024)

4.5. Second Generation Unit Root Test for Oil Exporting African Countries

The Breitung approach is the approach adopted in this study for the unit root test. Table 5 shows the unit root test for oil exporting countries. The result focuses on the absolute values of the indicators under study. The test statistics result of Breitung for all the variables UNR, AUTM, SEIS, INDI, CPI and NFF are stationary at order zero or level while FDI is stationary after differencing at order one. This shows that the variables have a mixed order of stationarity.

4.6. Cointegration Test Result (Pedroni) on the Effect of Fintech on Unemployment in Some Selected Oil Exporting African Countries

Pedroni Cointegration tests were used to examine the long-run and short-run relationship between fintech and unemployment in selected oil exporting African countries in order to determine the existence of Cointegration among the variables. The Pedroni test result in Table 6 reveals that the Modified-Phillips Perron t with statistics 4.9489 and P-value 0.0000 indicates that there is Cointegration and a long run relationship among the variables, and the null hypothesis of no Cointegration is rejected at 1% level of significance, while Augmented Dickey Fuller $t = 1.4941$ (0.0676) and Phillips Perron- $t = 1.5723$ (0.0579) reveals that the null hypothesis of no Cointegration is also rejected but at 10% level of significance. Based on the findings of Pedroni, it is appropriate to conclude that the variables have a long-run relationship.

4.7. Cross-Sectional Time-Series FGLS Regression on the Effect of Fintech on Unemployment in Oil Exporting African Countries

Result from the technique adopted, the feasible generalized least square (FGLS) approach is shown in Table 7 which displays the findings without the interaction terms of the study's key variables.

From the result, a unit change in automated teller machine, secure internet server and individual using the internet accounted for 0.211037, 0.00033, 0.110376 unit increase in unemployment. This violates the a priori expectation of the study. The result demonstrates that automated teller machine (AUTM) has a positive and significant relationship with unemployment rate implying that AUTM does not reduce unemployment rate in oil exporting African countries. Secure internet server (SEIS) is positively related to unemployment rate and statistically insignificant this shows that secure internet server exacerbates unemployment rate in oil exporting African countries.

Table 5: Second generation unit root test for unemployment in oil exporting African countries

Variables	Breitung remark	
	I (0)	Order of integration
UNR	-1.8372 (0.0331)**	I (0)
AUTM	-3.4350 (0.0003)***	I (0)
SEIS	-6.4226 (0.0000)***	I (0)
INDI	-2.7802 (0.0027)***	I (0)
FDI	-4.3794 (0.0000)***	I (1)
CPI	-2.7307 (0.0032)***	I (0)
NFF	-1.9727 (0.0243)**	I (0)

Source: Author's computation (2024). ***, **, *denotes 1%, 5% and 10% level of significant while the P value is enclosed by the parenthesis

Table 6: Cointegration test result (Pedroni) on the effect of Fintech on unemployment in oil exporting countries

Cointegration test	Statistics	P-value
Modified Phillips Perron t	4.6753	0.0000
Phillips Perron t	1.4941	0.0676
Augmented Dickey Fuller t	1.5723	0.0579

Source: Author's computation (2024)

Also, inflation rate measured by (CPI) is positively related to unemployment rate and is statistically significant, this does not contribute to reduction of unemployment rate in oil exporting African countries. This means that, a unit change in inflation rate exacerbates unemployment rate by 0.00200806 unit. Furthermore, foreign direct investment (FDI) also worse off unemployment by 0.2060534 unit at a statistically significant P-level. This means that FDI does not reduce unemployment rate as at the period of the study.

Additionally, Net official flow is negatively related to unemployment rate and is statistically significant, this means that a unit change in net official flow decreases unemployment by 1.293301 unit. The NFF contributed to the reduction of unemployment rate in oil exporting African countries. The Fintech variables in this bloc does not reduce unemployment rate based on the result in the Table 7 this negates the a priori expectation of the study.

4.8. Summary/Descriptive Statistics on the Effect of Fintech on Economic Growth Oil Exporting African Countries

Table 8 shows a detailed summary statistic of Oil-exporting African countries. The countries are Nigeria, Angola, Ghana, Guinea, Congo, Gabon, Chad, Egypt, Libya and South Africa. The average observation of this income group is 345 for all the series.

The result show that, the mean value of GDPPC for the oil exporting Africa countries is 3379.675 and a standard deviation of 3627.281, this indicates that, the dataset is clustered around the mean.

Table 7: FGLS results on the effect Fintech on unemployment in oil exporting African countries

UNR	Coefficient	Standard error	Z	P> z	[95% conf. interval]	
AUTM	0.211037	0.0388893	5.43	0.000	0.1348153	0.2872587
SEIS	0.0003381	0.0003057	1.11	0.269	-0.000261	0.0009372
INDI	0.0110376	0.0278731	0.40	0.002	-0.0435928	0.0656679
FDI	0.2060534	0.379248	0.54	0.587	-0.537259	0.9493659
CPI	0.0200806	0.0094412	2.13	0.033	0.0015762	0.0385849
NFF	-1.293301	0.4996591	-2.59	0.010	-2.272615	-0.313987
_cons	9.946325	0.5434491	18.30	0.000	8.881185	11.01147

Source: Author computation (2024)

Table 8: Summary/descriptive statistics on the effect of Fintech on economic growth in oil exporting African countries

Variable	Mean	Standard deviation	Min	Max	Observations
GDPPC					
Overall	3379.675	3627.281	0	19849.72	N=345
Between		3205.5	479.4696	10127.67	n=15
Within		1881.243	-5220.935	13101.73	T=23
AUTM					
Overall	6.511913	12.42118	0	68.96	N=345
Between		9.973082	0.3569565	40.72435	n=15
Within		7.822041	-34.21243	34.74756	T=23
SEIS					
Overall	169.4463	1378.133	0	14546.1	N=345
Between		586.1571	0.1872763	2281.997	n=15
Within		1256.042	-2112.551	12433.55	T=23
INDI					
Overall	13.32599	18.48687	0	72.31049	N=345
Between		9.91873	1.404348	30.72668	n=15
Within		15.8011	-17.40069	64.77015	T=23
FDI					
Overall	2.37e-09	1	-11.92856	2.981992	N=345
Between		0.5243891	-1.214947	0.7106948	n=15
Within		0.8617438	-11.08868	2.806202	T=23
CPI					
Overall	14.37211	38.35087	-9.797647	379.9996	N=345
Between		15.84043	2.116505	47.2157	n=15
Within		35.15561	-32.53416	354.1527	T=23
NFF					
Overall	3.12e-09	1	-0.5604893	6.639856	N=345
Between		0.4390511	-0.3951405	0.9194948	n=15
Within		0.9052967	-1.479984	6.265814	T=23

Source: Author's computation (2024)

The mean value of AUTM for the oil exporting Africa countries is 6.511913 and a standard deviation of 12.42118, this implies that the distribution on average is clustered around the mean. The observation has a minimum value of 0 and a maximum value of 68.96. In addition, SEIS has a mean value of 169.4463 and a standard deviation of 1378.133, this implies that the distribution is not far from the mean. Meanwhile, the observation has a minimum value of 0 and a maximum value of 14546.1. While the mean value of INDI is 13.32599 and a standard deviation of 18.48687, this implies that INDI is not far apart from the mean. In addition, FDI has an average value of 2.37e-09 and a standard deviation of 1, this implies that the dataset is far apart from the mean, the minimum value is -11.92856 and the maximum value is 2.981992.

CPI has a mean value of 14.37211 and a standard deviation of 38.35087 this reveals that the distribution is far away from the mean. The observation also has a minimum value of -9.797647 and the maximum value of 379.9996, this can be as a result of some

country's inflation rate. Finally, NFF has a mean value of 3.12e-09 and a standard deviation of 1, this shows that the distribution is far apart from the mean. NFF also have a minimum value of -.560893 and maximum value of 6.639856.

4.9. Correlation Matrix on the Effect of Fintech on Economic Growth in Oil Exporting African Countries

The results of the correlation are shown in Table 9, log of GDPPC (logGDPPC) is positively related to itself. LogGDPPC is positively correlated to automated teller machine (ATM), secure internet server (SEIS), individual using the internet (INDI), net official flow (NFF) and negatively correlated to foreign direct investment (FDI) and inflation rate (CPI). The relationship as indicated in the results is consistent with economic theory in the case of all the variables except foreign direct investment. Foreign direct investment supposed to increase the growth of the economy in any nations since people are bringing more money into the nation and providing employment opportunities. The result shows that

Table 9: Result of correlation matrix on the effect of Fintech on unemployment in non- oil exporting African countries

Variables	UNR	AUTM	SEIS	INDI	FDI	CPI	NFF1
logGDPPC	1.000						
AUTM	0.285	1.000					
SEIS	0.096	0.514	1.000				
INDI	0.304	0.554	0.309	1.000			
FDI	-0.085	-0.182	-0.004	-0.248	1.000		
CPI	-0.263	-0.080	-0.031	-0.084	0.010	1.000	
NFF	0.123	0.480	0.301	0.662	-0.303	0.032	1.000

Source: Author’s computation (2024)

all Fintech variables have a positive impact on economic growth. The negativity of inflation rate means that the lower the inflation rate, the better it is for economic growth.

Nevertheless, it should be noted that descriptive statistics merely show the direction of relationship and not causation. The strongest level of correlation (0.554) is between automated teller machine (ATM) and individual using the internet (INDI) suggesting no issue of multicollinearity, followed by automated teller machine (ATM) and secure internet server (SEIS) while the weakest level of correlation (-0.004) is between secure internet server and foreign direct investment. In general, the results of the correlation matrix would be of information value when we embark on empirical analysis.

4.10. Variance Inflation Factor for Oil Exporting Countries

Table 10 shows that the highest variance inflation factor for non-oil exporting countries is 2.08. This implies that there is no multicollinearity problem in the models.

4.11. Second Generation Unit Root Test for Oil Exporting African Countries

The Breitung approach is used in this study for the unit root test. Table 11 shows the unit root test for oil exporting countries. The result focuses on the absolute values of the indicators under study. The test statistics result of Breitung for all the variables logGDPPC, AUTM, SEIS, INDI, FDI, CPI and NFF found to be stationary at order zero or level. This shows that the variables have no mixed order of stationary.

4.12. FGLS Regression on the Effect of Fintech on Economic Growth in Oil Exporting Countries African Countries

The feasible generalized least square (FGLS) approach result is shown in the Table 12 which displays the findings without the interaction terms of the study’s key variables. The result shows that a significant positive relationship exist between automated teller machine (AUTM) and log of GDP per-capita. This implies that, a unit change in automated teller machine (AUTM) is accompanied by 0.0317373 unit increase on economic growth in oil exporting African countries. In the same vein, individuals using the internet (INDI) exerts a positive significant effect on the log of GDP per-capita. This means that a unit increase in individual using the internet accounted for 0.0281317 unit increase on economic growth. Also, Secure internet server (SEIS) is insignificant and negatively affects log of GDP per-capita. A unit change in secure internet server decrease GDP per capita by 0.0000848 units. This

Table 10: Variance inflation factor

Variables	VIF	1/VIF
INDUI	2.08	0.481
NFF1	1.95	0.512
AUTM	1.83	0.548
SEIS	1.39	0.720
FDI	1.13	0.889
CPI	1.03	0.975
MEAN VIF	1.57	0.637

Source: Author’s computation (2024)

Table 11: Second generation unit root test for economic growth in oil exporting African countries

Variables	Breitung remark	
	I (0)	Order of integration
logGDPPC	-2.3082 (0.0105)*	I (0)
AUTM	-3.4350 (0.0003)***	I (0)
SEIS	-6.4226 (0.0000)**	I (0)
INDI	-2.7802 (0.0027)***	I (0)
FDI	-4.3794 (0.0000)**	I (1)
CPI	-2.7307 (0.0032)***	I (0)
NFF	-1.9727 (0.0243)**	I (0)

Source: Author’s computation (2024)

shows that secure internet server does not account for economic growth as at the period of the study.

Furthermore, foreign direct investment (FDI) has an insignificant negative relationship with log of GDPPC. This does not conform with economic theory since foreign direct investment in an economy is expected to lead to growth in such economy. Inflation rate (CPI) and net official flow (NFF) has a negative insignificant relationship with log of GDPPC, this means that the two indicators do not significant impact economic growth. The overall result shows that two of the fintech variables are significant and positively related to GDP per-capita which means that Fintech promote economic growth in oil exporting African countries.

4.13. Discussion of Findings on the Effect of Fintech on Unemployment and Economic Growth in Oil Exporting African Countries

Given the result of this study, the following findings are discussed. The countries explored are oil exporting African countries

Table 12: FGLS Results on the effect Fintech on economic growth in oil exporting African countries

logGDPPC	Coefficient	Standard error	Z	P> z	[95% conf. interval]	
AUTM	0.0317373	0.0099511	3.19	0.001	0.0122335	0.0512412
SEIS	-0.0000848	0.0000782	-1.08	0.278	-0.0002381	0.0000685
INDI	0.0281317	0.0071323	3.94	0.000	0.0141527	0.0421107
FDI	-0.0358439	0.0970431	-0.37	0.712	-0.2260448	0.1543571
CPI	-0.0107949	0.0024158	-4.47	0.000	-0.0155299	-0.00606
NFF	-0.2656187	0.1278542	-2.08	0.038	-0.5162083	-0.0150291
_cons	6.915419	0.1390593	49.73	0.000	6.642868	7.18797

Source: Author computation (2024)

comprises of Nigeria, South Africa, Ghana, Guinea, Congo, Gabon, Chad, Egypt, Libya, Angola and Algeria.

From the summary statistics of all the sub-groups, the mean and standard deviation of the series show that the data are widely distributed, which indicates variation in countries' data. The result from correlation matrix indicates that unemployment rate and LOGGDP per-capita are positively correlated to automated teller machine (AUTM) and positively correlated to secure internet server (SEIS), individuals using the internet (INDI), inflation rate measured by (CPI), net official flow (NFF) and foreign direct investment (FDI) but LOGGDP per-capital is negatively correlated to foreign direct investment.

The Pesaran modified test shows that there is a correlation between the cross-section units for all the variables in oil exporting block. Therefore, it is concluded that the variables utilized in the study have cross-sectional dependence between cross-section units. The CD tests showed that CD was in the dataset, which is in line with our ideas about how the countries are connected and there is no multicollinearity problem in the models based on the VIF result.

Furthermore, the unit root test result shows that the variables have a stationary of mixed order zero and one, the approach employed for the unit root is Breitung approach. For the cointegration, Pedroni approach were used and the result shows that all the variables are cointegrated and have a long-run relationship.

The technique adopted that is the feasible generalized least square (FGLS) indicates that automated teller machine (AUTM) is positively related to unemployment rate and is statistically significant which indicated that automated teller machine (AUTM) does not reduce unemployment rate. Secure internet server (SEIS) is positively related to unemployment rate and is statistically insignificant, this also indicates that SEIS does not reduce unemployment rate in oil exporting African countries. Individuals using the internet (INDI) is positively related to unemployment rate and is statistically significant, this does not contribute to reduction of unemployment rate in oil exporting African countries. Net official flow is negatively related to unemployment rate and is statistically significant, this means that NFF contribute to the reduction of unemployment rate in oil exporting African countries. The Fintech variables in oil exporting bloc does not reduce unemployment rate base on the findings. This can be attributed to overdependence on the oil sector hence affecting the fintech in the oil exporting countries. The inability of the fintech indicators to reduce unemployment conforms to the study of Youssra et al., (2023) but connotes the findings of Sandri et al., (2022) who found out that financial technology reduced unemployment rate.

Similarly, on the effects of FINTECH on economic growth, the results reveal that a unit change in automated teller machine (AUTM) and individual using the internet (INDI) accounted for 0.0317373 and 0.0281317 increase on economic growth respectively. This means that Fintech promote economic growth in oil exporting African countries. This result aligned with the study of Ilayda and Tugba (2021); Bua and Hui (2022) who found out that financial technology aids in promoting economic growth.

5. CONCLUSION AND RECOMMENDATIONS

This study has provided detailed insights into the effects of Fintech on unemployment and economic growth in oil exporting African countries. The study conclude that automated teller machine (AUTM) has a positive and statistically significant relationship with unemployment rate and log of GDP per-capita. This implies that, automated teller machine does not reduce unemployment, but a unit change in AUTM causes 0.0317373 increase in economic growth.

Likewise, secure internet server (SIS), is positive and insignificantly related to economic growth as well as unemployment which is inversely related to log of GDP per-capita and is statistically insignificant. This means that secure internet server does not reduce unemployment rate, nor does it promote economic growth. Also, individuals using the internet (INDI) is positively related to unemployment rate and log of GDP per-capita at the thresh hole. This shows that individual using the internet promote economic growth while at some point decrease unemployment rate at some point in the long run. Furthermore, foreign direct investment is positive and statistically insignificant to unemployment rate and negatively related to economic growth and is. This shows that FDI does not reduce unemployment rate, nor does it foster economic growth

From the findings of the study, the recommendation is stated as follows;

- Since individuals using the internet aids reducing unemployment in the long-run and promote economic growth in oil exporting African countries, it is imperative that government should set aside some allocation that would help in promoting internet services and provide sound policies to network providers on how to improve their network issues and make data subscription available to individuals at a cheaper rate.
- Government through its financial agencies should increase the widespread of automated teller machine across the region to enable easy access of fund thereby facilitate financial inclusion

hence promote rapid growth in the economy.

- iii. Government should focus more on exportation rather than importation, doing that enhanced a greater margin of net official flow which in turn reduce unemployment rate and promotes economic growth in oil exporting African countries.

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