



Strathmore
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**THE EFFECT OF FINANCIAL LITERACY ON NATIONAL ECONOMIC GROWTH IN
SUB-SAHARAN AFRICA**

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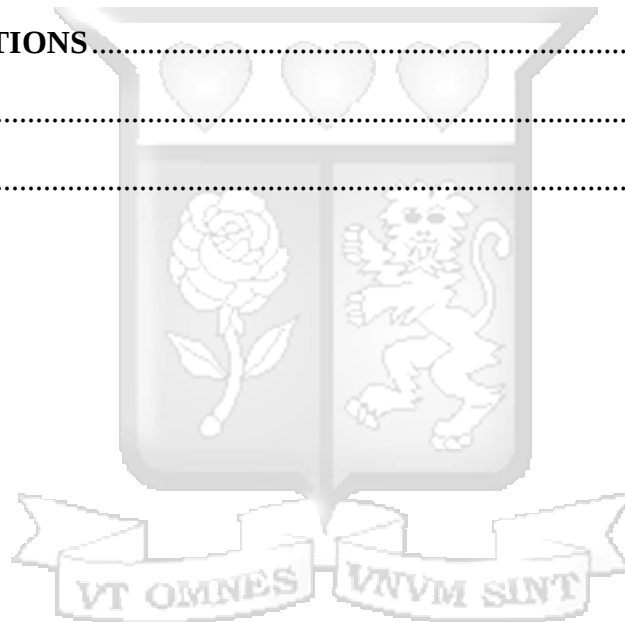
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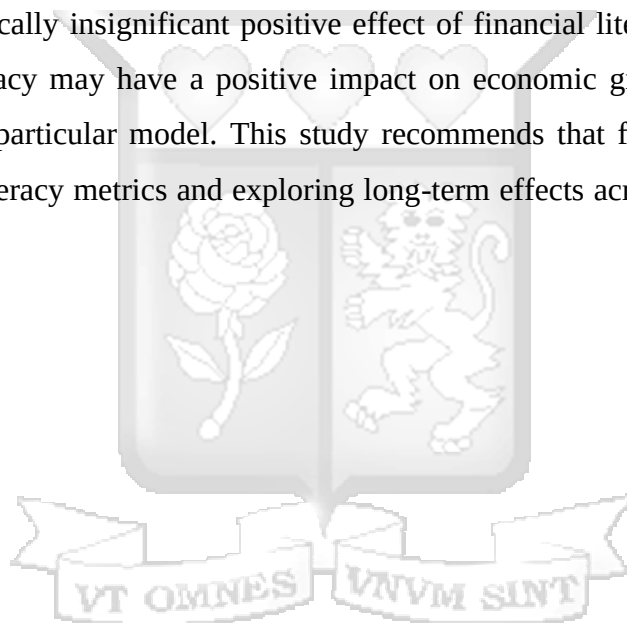
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ABSTRACT

This study examines the relationship between financial literacy and economic growth in Sub-Saharan Africa. The overarching objective of this study is to investigate whether financial literacy has a positive effect on economic growth with the existence of reverse causality. Using data from the 2021 Global Findex database, a financial literacy index is created to evaluate individual engagement in financial activities related to savings, borrowing, and financial planning. An instrumental variable regression was conducted to test the hypothesis of reverse causality in the relationship between financial literacy and economic growth. The results of this model confirmed that financial literacy is exogenous to GDP per capita, nullifying the possibility of reverse causality. Subsequently, a multiple linear regression is conducted to test the hypothesis that financial literacy has a positive effect on economic growth. The results indicated a statistically insignificant positive effect of financial literacy on GDP, suggesting that, while financial literacy may have a positive impact on economic growth, it lacks substantial predictive power in this particular model. This study recommends that future research focuses on standardizing financial literacy metrics and exploring long-term effects across broader temporal data for robust insights.



1.INTRODUCTION

1.1 BACKGROUND

1.1.1 FINANCIAL LITERACY

In a world with rapidly evolving and growing financial systems and markets, the knowledge of basic financial concepts and expertise in applying this knowledge to the financial life of an individual is paramount. The concept of financial literacy has recently sparked interest as the financial system grows in complexity and the attention to individual financial well-being from policy makers increases. With individual investors being a vital class of participants in the financial system, it is indisputable that financial literacy plays a key role in the performance of financial markets and the overall economy of a country.

Financial literacy can be defined as the capacity to apply one's knowledge and skills to achieve financial well-being through efficient management of financial resources (Knoll & Houts, 2012). According to Nye and Cinnamon (2013), "Financial literacy is a measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate short-term decision-making and sound, long-range financial planning, while mindful of life events and changing economic conditions." This entails having an understanding of financial products and services, and the application of this understanding in saving, investing, borrowing and budgeting, all for the purpose of achieving financial well-being.

In past studies, the financial literacy level in different countries has been measured by assessing individuals' financial knowledge. Lusardi and Mitchell (2011a) developed the "Big Three" questions which tested knowledge on compound interest, inflation and risk diversification to measure financial literacy in America. Klapper, Lusardi, and Oudhesden (2016) in their analysis of the results of the S & P global survey on financial literacy containing a question on each of the following four main concepts: basic numeracy, interest compounding, inflation and risk diversification whereby a person would be deemed financially literate when he/she correctly answered three out of the four financial concepts, i.e. scored 75 percent, found that only 33 percent of adults possess financial literacy globally. In addition to the four main financial concepts, Vovchenko et al. (2018) note that financial literacy also covers fiscal literacy which is the understanding of the key regulations and legislative acts related to the budget system, including its structure and areas of application, and taxation literacy which is the understanding of the taxation system, and the duties and entitlements of taxpayers.

Besides the level of financial knowledge, financial literacy also comprises: financial behaviour, which is the tendency of an individual to behave in financially literate ways such as keeping track of cash flows, saving, budgeting and long-term planning, and planned purchasing; and financial attitudes which can be defined as a person's attitude towards money. Therefore, the average level of financial literacy of an individual is dependent on the amount of knowledge on financial matters they bear, their financial behaviour and attitudes.

Studies have found the levels of financial literacy to differ among distinct socio-demographic factors such as marital status, age, level of income, gender, and educational attainment. According to Klapper et al.(2016), the number of financially literate men worldwide exceeds that of women by 5%, while individuals with higher income were found to be more likely to be financially literate. Additionally, the difference between financial literacy levels among individuals with primary, secondary and tertiary education stood at 15%. Generally, the survey results indicated that financial literacy levels decrease with age. However, the trend is different for the developed countries where financial literacy is lower among the youngest and oldest adults and higher among adults aged 36-50 years. Bhushan and Medury (2014) in their study of financial literacy in India found that financial literacy level is also affected by the type and location of employment.

The skill of financial literacy has been proven to be beneficial in that financially literate adults have been found to have higher financial resilience towards crises. They are also less likely to fall victim of financial frauds or scams (OECD, 2020), better at preparing financially and saving for retirement (Lusardi & Mitchell, 2014) and more inclined to diversify their risk by distributing funds across multiple ventures (Abreu & Mendes, 2010). From a larger perspective, financial literacy among individuals stimulates competitiveness in the financial markets through evaluating different financial service options and negotiating more effectively, thus improving the quality of financial services offered by financial institutions (James, 2009). Financial literacy also benefits financial institutions by generating a chain reaction that boosts the uptake of financial products and services, leading to increased profits for financial institutions and encouraging innovation in developing a wider range of financial products and services (Damayanti, Murtaqi, & Pradana, 2018).

On the other hand, the costs of financial illiteracy among consumers include increased expenditure on transaction charges, increased indebtedness and incurring higher interest rates on loans due to lack of an understanding of compounding (Lusardi & Tufano, 2015; Lusardi & de Bassa Scheresberg, 2013). Additionally, borrowing increases while savings reduce among financially illiterate consumers (Stango & Zinman, 2009). Apart from individual costs, financial ignorance could also be harmful on

a larger scale by increasing financial market instability by promoting excessive risk taking (Moagar-Poladian & Clichici, 2022). Morton (2005) asserted that profuse financial illiteracy among individuals is likely to negatively impact the prosperity of the whole population. Additionally, financial illiteracy is economically taxing if it inhibits individuals' ability to optimise their own welfare, or to deploy the kind of competitiveness required to enhance financial market efficiency (Hastings, et al., 2012). On a macroeconomic level, financial illiteracy among the citizens of a country may have implications such as impaired business cycles, decreased value of a currency, and greater variation in income and wealth distribution (Mandell & Klein, 2009).

Despite the indisputable advantages of financial literacy and the dire costs of the lack thereof, researchers have found that financial illiteracy is generally widespread even in the wealthy nations that have well developed financial markets like Canada, Japan, Italy, Sweden, New Zealand, and the Netherlands (Lusardi & Mitchell, 2011b; 2014; and Boisclair, Lusardi, & Michaud, 2014).

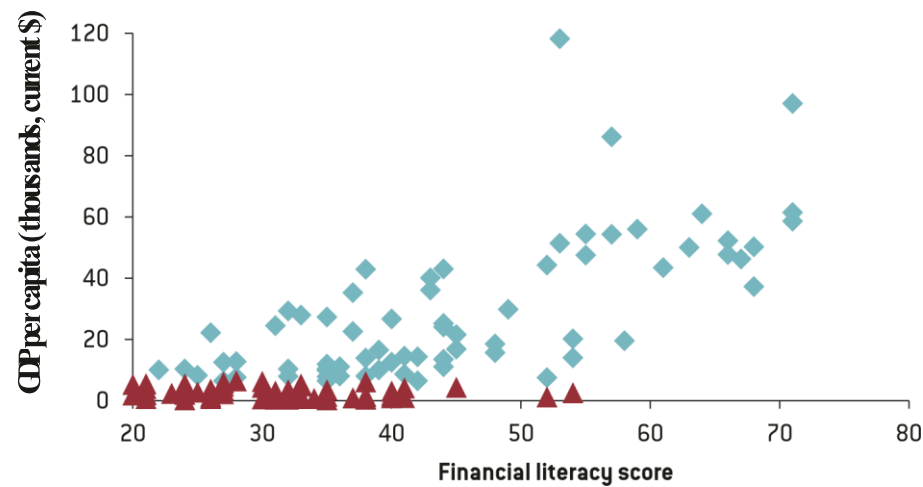
1.1.2 ECONOMIC GROWTH

The phenomenon of economic growth can be defined as the growth in the ability of a country or region to produce goods and services over a given period of time. Economic growth can be measured using different metrics such as Gross Domestic Product (GDP) which measures the market value of the final goods and services produced in an economy, and GDP per Capita which takes into account the size of the population by measuring the average value of goods produced by each individual in the economy.

Different economies have varying economic growth rates proxied by the growth rate in GDP. Past studies have found that this disparity can be attributed to factors such as the level of GDP in the prior period, the country's natural resource endowment, volume of exports, public debt, net foreign aid received, life expectancy, level of domestic investment in the country, and foreign direct investment, labour force growth rates, inflation, and technological progress (Upreti, 2015; Zieba, Dong, & Mbugua, 2022).

The S&P Global FinLit Survey results show that there exists an association between financial literacy and economic growth (proxied by GDP per Capita). However, as shown in Figure 1, this relationship is less clear in the developing countries as compared to the developed countries in which it is eminent.

Figure 1: Relationship between financial literacy and GDP per Capita



1.2 PROBLEM STATEMENT

The benefits and costs of financial literacy are often transferred to the economy through the financial activities of individuals. An individual's level of financial literacy influences their decisions on savings, investing and borrowing habits which consequently determine a country's economic growth in terms of GDP.

Financial literacy is important in the growth and development of financial systems in that financially literate individuals have more confidence participating in the financial system which increases market participation and thus demand for financial products and services. Furthermore, financial literacy reduces information costs associated with market participation. Refera et al.(2016) note that financial literacy in developing countries in Africa fosters poverty reduction, financial inclusion and stability of the financial sector, all of which are prudent for ensuring sustainable economic growth.

The study by Klapper et al. (2016) deduced that there existed a relationship between financial literacy levels and GDP per capita in the richest 50 percent of economies. However, this relationship was not evident among the poorer half of economies. These findings are empirically supported by Clichici & Moagăr-Poladian (2022) while other studies such as Bucci et al. (2022) provide contrary findings. Ndigwa (2011) concludes, in the study of the relationship between financial development and

economic growth, that the latter is positively affected by financial development. Therefore, one can prudently infer that a channel of transmission exists in explaining the link between financial literacy and economic growth.

There is a scarcity of research on the macroeconomic effects of a population's financial literacy on economic growth, especially in the African context. The vast majority of existing research analyses financial literacy at a microeconomic level. This study therefore seeks to fill the existing gap in literature by investigating the relationship between financial literacy and economic growth, with a focus on 24 Sub-Saharan African countries which include: Benin, Burkina Faso, Cameroon, Republic of Congo, Côte d'Ivoire, Gabon, Namibia, Nigeria, Senegal, Sierra Leone, Ghana, Guinea, Kenya, Liberia, Malawi, Mali, Mozambique, South Africa, South Sudan, Tanzania, Togo, Uganda, Zambia, and Zimbabwe.

1.3 RESEARCH OBJECTIVES

This study aims to investigate the relationship between financial literacy and economic growth of Sub-Saharan African countries.

1.4 RESEARCH QUESTION

What is the relationship between financial literacy and economic growth among Sub-Saharan African countries in quantitative terms?

1.5 SIGNIFICANCE OF THE STUDY

The study of the relationship between financial literacy and economic growth is beneficial to policy makers. With knowledge of how financial literacy impacts economic growth, policy makers can make better informed decisions regarding promoting financial literacy and enhancing economic growth, especially in less developed countries. Given that Sub-Saharan Africa has the highest percentage of the young population, fastest growing population, largest free trade areas and highly diverse ecosystems, the region's importance to the development of Africa and the world as a whole is indisputable.

2. LITERATURE REVIEW

2.1 THEORETICAL LITERATURE REVIEW

2.1.1 BEHAVIORAL FINANCE THEORY

This theory was first developed in the 1950s by Herbert Simon who introduced the concept of bounded rationality. Herbert argued that, contrary to the proposition of the theory of choice that consumers are rational, consumers' decision-making is not fully rational but is limited to the knowledge that the individual has. The concept of bounded rationality views consumers' decisions as "satisficing" rather than optimal due to cognitive limitations and incomplete information.

The theory was further developed in the 1960s to 1970s by psychologists Amos Tversky and Daniel Kahneman who studied heuristics (mental short-cuts for decision making) and cognitive biases such as overconfidence, confirmation bias and hindsight bias. Their research led to the development of the prospect theory which introduced the concept of loss aversion under uncertainty, where individuals are affected more emotionally by losses than gains of equal amounts (Kahneman Daniel & Tversky, 1979).

Further development of the theory was undertaken in the 1980s and 1990s by Richard Thaler who introduced mental accounting: the concept of how individuals mentally separate their money into different accounts based on subjective criteria, such as its source or intended use. This implies that the spending and investment decisions that individuals face are based on their mental accounts, which may lead to irrational financial behaviour (Thaler, 1985).

These theories are what make up the behavioural economics school of thought, which postulates that though individuals making financial decisions are rational, they also have cognitive limitations that may lead to irrationality in decision making.

This theory is relevant to this study because through its assumptions of bounded rationality, loss aversion and mental accounting, it highlights some key behavioural factors that affect individuals' financial behaviour with regards to savings and investments. However, the theory does not explain how financial literacy affects the economic growth of a country.

2.1.2 HUMAN CAPITAL THEORY

This theory was first hinted at by Adam Smith in “The wealth of Nation” and was later developed in the 1950s by Jacob Mincer who studied human capital through income distribution and earnings functions (Mincer, 1958). Later, in the 1960s, Theodore Schultz expanded the theory by emphasising the importance of investment in human capital, especially in education, health and training in improving individual’s productivity and economic growth (Schultz, 1961). In 1964, Gary Becker provided a detailed theoretical framework for Human capital theory which explored the implications of human capital on earnings, the economy and social outcomes (Becker, 1964).

This theory explains the impact of human capital in the economic growth of nations. It assumes that education and training are investments in human capital, similar to investment in physical capital, and result in an economic return in form of higher earnings for the individual. It argues that investment in human capital, especially in education, health and training, drives economic growth by enhancing productivity and driving innovation which boost production.

This study applies this theory to deduce the importance of education, specifically in instilling financial knowledge among individuals to promote financial literacy, and to emphasise the role that the difference in financial literacy levels plays in the existing gaps in economic growth among countries. As Kim et al. (2013) noted, understanding how to model financial knowledge as an investment in human capital has potentially overarching implications for education and training policy. Studies by Kendall (2012) and Arrondel (2018) found that financial literacy has a strong and significant positive relationship with human capital since individuals are capable of applying general mathematical and economic knowledge gained during their school years to make financial decisions.

This theory is therefore informative in this study as it calls to attention the relationship that human capital, which can be inclusive of financial literacy and with which it is positively related, impacts economic growth.

2.1.3 CIRCULAR FLOW OF INCOME MODEL

The Circular flow of income model was developed by John Maynard Keynes in the 1930s to describe the flow of income and expenditure in an economy. This model postulates that in an open economy, money changes hands between households and firms as the former purchase goods and services and the latter purchase factors of production. According to the model, the government, financial institutions and the rest of the world act as intermediaries between households and firms.

The Model provides for two types of actions: withdrawals which are actions that lead to a decrease in the money circulating in the economy and include net savings, net taxes and import expenditure, and injections which are actions that result in an increase in the money circulating in the economy and include investment, government expenditure and export expenditure.

The model assumes that all financial activity in the economy is accounted for and there is no unscrupulous activity that generates or leaks money. It also assumes that all goods and services produced are sold, that is, there isn't any consumption at home.

With this model, one can calculate the GDP of a country using the expenditure approach where the GDP(Y) is the sum of the expenditure on consumption(C), investment(I), government purchases(G) and net exports (NX).

$$Y = C + I + G + NX$$

Equation 1

Financial literacy involves having the financial knowledge to make informed financial decisions, which include consumption, saving and investment decisions. Financial literacy among individuals fosters informed decision-making regarding individuals' consumption habits which results in higher and effective consumption (Ma et al., 2022). With more savings, individuals can invest more in financial markets, thus increasing the available sources of capital for institutions and businesses which increases the investment(I) component of GDP. This model informs this study by providing a basis to question the impact financial literacy has on a country's economic growth.

In conclusion, the behavioural finance theory discussed provides insights into how financial behaviour is not always rational, the human capital theory suggests that financial literacy as an investment in human capital influences economic growth while the circular flow of income highlights the channels through which financial literacy may impact economic growth and thus provide grounds to investigate the relationship.

2.2 EMPIRICAL LITERATURE REVIEW

Hastings et al. (2012) conducted a study where they examined existing literature on the interrelation between financial literacy and economic results including credit outcomes wealth accumulation, investment choices and savings decisions. The findings of the study indicate that although financial

literacy has a positive relationship with financial education, it is challenging to define precisely the causality between financial literacy and improved economic outcomes is, suggesting the likelihood of a reverse causality element in the relationship between financial literacy and economic growth.

Mahdzan and Tabiani (2013) performed a survey-based study on the relationship between financial literacy and individual saving in the Malaysian market. The study employed a probit regression with a binary variable of individual saving as the dependent variable and number of children, income, age, work experience, financial literacy, gender, income, number of children, educational level and risk-taking behaviour and saving regularity as the independent variables. The regression results showed a significant link between overall financial literacy and the likelihood of having positive savings at the 0.01 significance level. This implies that individuals with higher levels of financial literacy were more likely to save compared to those with lower levels of financial literacy, *ceteris paribus*. Ribaj (2021) asserted that an increase in the level of savings has a positive effect on economic growth which alludes to the fact that financial literacy influences economic growth through savings. This study further confirms the need to quantify the effects of financial literacy. However, the results of this study cannot be used to form general conclusions for other emerging markets because the findings were plausibly biased towards more knowledgeable people who made up the sample.

Yoshino, Morgan and Wignaraja (2015) conducted a study on the benefits of financial education and how to improve it in Asia. The study's discussion on the expected macroeconomic effects of financial literacy highlights two major ways in which financial literacy can impact economic growth. First, the study finds that financial literacy increases the aggregate demand by increasing household income which will increase consumption. Secondly, financial education also boosts aggregate supply through increased sales as companies have more sources of capital arising from increased household savings and investments. This study infers a positive effect of financial literacy on economic growth and provides an explanation for the expected effects of financial literacy on economic growth.

Klapper et al. (2016) conducted a study to draw insights from the Standard & Poor's Ratings Services Global Financial Literacy Survey that was conducted on 140 economies in 2014. The study found that the overall level of financial literacy across the world was low. With regards to financial literacy and national income (GDP per capita), the findings of the study indicated that the positive effect of financial literacy on national income only holds when looking at the richest 50 percent of economies which include Canada, France, Germany, Italy, Japan, United Kingdom and United States; while there was no proof of a relationship between income and financial literacy in the poorer half of economies.

The conclusions drawn from the study indicated that national income levels were not substantially related to financial literacy due to the general lack of financial literacy across countries.

Olubanjo and Olayinka (2019) conducted an investigative study on the significance of earnings and financial literacy in accelerating the demand for financial services, and hence, how these factors fast-track economic growth in the Nigerian context. Applying frequency of savings as a proxy for financial inclusion and the respondents' income levels and financial literacy levels as the independent variables, the study applied a multiple linear regression model to determine the relationship between income and financial literacy, and frequency of savings. The results indicated that financial literacy has a significant positive effect on the demand for formal savings products and thus higher financial literacy is associated with greater access to financial services and subsequently, greater economic growth as supported by the findings of (Hasan, Dowla and Tarannum, 2024). These results are consistent with the findings of (Mahdzan and Tabiani, 2013)

Hidayatinnisa et al. (2021) conducted a study investigating the impact of financial literacy and financial inclusion on economic growth in Indonesia. The study used a panel regression with provincial data from 34 provinces over two survey periods. The results of the study indicated that financial literacy and financial inclusion had no effect on economic growth in the different provinces, both independently and simultaneously. These results, which were possibly due to the global economic downturn between 2018 and 2019 which was one of the research periods, were in agreement with prior research conducted by Klapper et al. (2016).

Rusminingsih and Damayanti (2021) studied the effect financial literacy has on economic growth and human capital in Thailand. The study applied vector analysis with GDP as the dependent variable regressed against financial literacy and human capital and found that financial literacy had a positive relationship with economic growth. Additionally, financial literacy was also regressed against human capital and GDP and the findings showed a positive effect of GDP on financial literacy, supporting the notion that there is a reverse causation in the relationship between GDP and financial literacy. This is in agreement with the earlier findings of (Hastings et al., 2012).

Teodora, Picatoste and Gherghina (2022) conducted a study to analyse financial literacy as a driver of financial well-being and economic growth in three of the most recent EU Member States; Bulgaria, Romania and Croatia. The study involved the use of primary data on a sample of 7422 observations in the three countries and involved the use of a two-stage least-squares regression using a simultaneous equations model. The results of the study suggested that financial literacy influenced financial well-being which in turn affected GDP growth only in EU member states. These findings support the notion

that the effects of financial literacy are country specific as suggested by Klapper et al. (2016). However, its conclusions are based on Eastern European countries, and therefore the conclusions are not applicable to African countries due to the different economic states of the countries.

Clichici and Moagăr-Poladian (2022) in their investigative study on the link between financial literacy, financial development and economic development in European countries found that the income per capita at purchasing power parities (PPP) of countries such as Poland, Croatia, Greece, Poland and Latvia were almost equal to that of Romania despite Romania having approximately twice the level of financial literacy. These results are indicative of the lack of correlation between financial literacy and economic performance. This is contradictory to the majority of the existing research which supports the existence of a relationship between the two variables.

Bucci et al. (2022) extend the Uzawa-Lucas framework to incorporate the role of a financial sector that facilitates the intertemporal transfer of savings. The study highlights a “financial return channel,” which reflects changes in the financial sector's efficiency over time, as one of the two major mechanisms through which finance can drive economic growth. The findings suggest that financial literacy, defined as the specific knowledge and skills related to the finance sector, positively influences long-term economic growth if the financial sector's returns improve with increased investment in financial literacy or its overall level. This paper contributes to the theoretical understanding of how financial literacy affects economic growth but does not provide empirical evidence to validate the model's applicability in establishing this relationship.

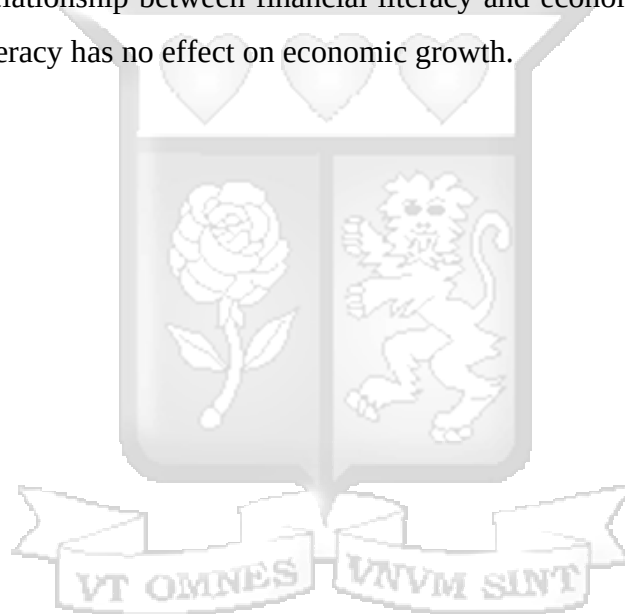
2.3 OVERVIEW OF LITERATURE

The research on financial literacy and its effects on individual and economic levels is extensive. In this study we conduct a literature review on three major theories that relate to financial literacy and economic growth, and an empirical review on the existing literature from different parts of the world on financial literacy.

The theoretical literature reviewed above highlights theories that shed light on the connection between the three pillars of financial literacy: individual financial behaviour, attitudes and knowledge, and how that connection translates to economic outcomes, particularly economic growth. The Behavioural Finance theory which was developed by Herbert Simon and expanded by Amos Tversky, Daniel Kahneman and Richard Thaler highlights that consumers' decisions are often irrational due to cognitive limitations and biases. The theory reveals how factors such as bounded rationality, heuristics, and mental accounting affect the financial behaviour of individuals but fails to draw a connection

between financial literacy and economic growth. The second theory is the human capital theory which was developed by Jacob Mincer, Theodore Schultz, and Gary Becker. It argues that investments in education, health, and training enhance individual productivity and economic growth. Though the theory underscores the importance of financial education, it only partially addresses the role of financial literacy in economic growth. Lastly, the circular flow of income model aids in understanding the link between financial literacy and a nation's economic growth by demonstrating how financial activities contribute to GDP through savings and investments.

The empirical review discusses several past studies on the relationship between financial literacy and economic outcomes in different regions of the world. The studies can be grouped into three categories: 1) studies that infer a positive effect of financial literacy on economic growth, 2) studies that infer reverse causality in the relationship between financial literacy and economic growth, and 3) studies that infer that financial literacy has no effect on economic growth.



3. METHODOLOGY

3.1 INTRODUCTION

This section consists of discussions pertaining to the research design applied in the study, the methods and sources of data collection, and lastly a section describing the steps taken in the analysis of the data.

3.2 RESEARCH DESIGN

This study takes on an explanatory research design which is often used when the researcher aims to explain the relationship between variables, especially one that is already known to some extent. This design is consistent with the research objectives and questions of this study since it seeks to explain the relationship between financial literacy and economic growth in Sub-Saharan African countries.

3.3 DATA COLLECTION

This study utilises secondary quantitative data in the analysis of the relationship between financial literacy and economic growth measured by GDP per capita. Data on the GDP per capita and other control variables such as the rate of inflation, unemployment, population growth and female population (15-64 years) indicator are sourced from the World Bank Group database. The data collected and applied in this study on financial literacy levels in 24 out of the 48 Sub-Saharan Africa countries is sourced from the 2021-2022 Global Findex Database.

3.4 DATA ANALYSIS

3.4.1 DATA CLEANING & PREPROCESSING

The data collected from the Global Findex database represents individuals' financial behaviour in different countries across the world. The data is first filtered to include only Sub-Saharan African countries. This is followed by the selection of specific variables to come up with a financial literacy variable for individuals in each country. Lastly aggregation of the individuals' financial literacy score to acquire a national aggregate. The final cross-sectional data set is a compilation of the data with the following variables:

- Financial literacy as a percentage of individuals who partake in financially savvy activities,
- GDP per Capita-measured in current US\$
- Unemployment rate measured as a percentage of the total population,

- Inflation as measured by the annual consumer price index,
- population growth rate, and
- female population between the ages of 15 and 64 years.

3.4.2 EXPLORATORY DATA ANALYSIS

With the data collected and cleaned, we compute the summary characteristics of the data before analysis including the mean and variance of the variables.

We generate visual representations of the data through scatter plots to further explore the relationships between the variables.

3.4.3 PRELIMINARY TESTS

Multiple tests are conducted to verify key properties of the data. These include a multicollinearity test using the variance inflation factors (VIF) to check for multicollinearity among the independent variables and a homoscedasticity test to check for constant variance of residuals.

3.4.4 MODEL SPECIFICATION

To analyse the relationship between economic growth and financial literacy, this study applies an instrumental variable (IV) regression model, with GDP per capita as the dependent variable and financial literacy as the independent variable. Three control variables are applied: unemployment rate, literacy rate, inflation rate and population growth.

The data analysis is executed in two stages:

Stage 1:

Involves the regression of financial literacy against the instrumental variable and the control variables.

$$fin_Lit = \beta_0 + \beta_1 F.Pop + v \quad \text{Equation 2}$$

This regression is then used to obtain predicted values which are used in the second stage.

Stage2:

Involves the Ordinary Least Squares (OLS) regression of GDP per Capita against the predicted values of financial literacy and the control variables.

The regression equation is as follows:

$$GDP = \beta_0 + \beta_1 fin_lit + \beta_2 Unemp + \beta_3 CPI + \beta_4 pop_growth + \beta_5 F.Pop \quad \text{Equation 3}$$

Where:

GDP represents the GDP per capita, *fin_lit* represents the level of financial literacy per country; *Unemp* represents the rate of unemployment in the country; *CPI* represents the inflation rate; *Pop_growth* represents the population growth rate; and *F.Pop* represents the female population between 15-64.

β_0 , β_1 , β_2 , β_3 , β_4 , and β_5 are the coefficients representing the relationship between each independent variable and the dependent variable.

The possibility of reverse causality in the relationship between financial literacy and economic growth brings about endogeneity. This study therefore uses the instrumental variables regression model to correct for endogeneity, thus ensuring that the estimated relationship between financial literacy and economic growth is free of bias.

3.4.5 CONCLUSION

This study applies an explanatory research design in the investigation of the relationship between financial literacy and economic growth. Using the instrumental variable model, the study conducts a two-stage regression process to correct for the problem of endogeneity between financial literacy and economic growth error terms that arises as a result of possible reverse causality of the two variables. The results of this study are expected to contribute to the understanding of the relationship between financial literacy and economic growth and inform decision making by policymakers.

4. DATA ANALYSIS AND RESULTS

4.1 CREATION OF FINANCIAL LITERACY INDEX

As a preliminary step, this study creates a financial literacy index from the 2021 Global Findex database. The data set contained observations from around 140 countries regarding financial activities of individuals and included 128 variables, from which three were selected to be used in the creation of the financial literacy index. The variables were as follows: i) the saved for old age variable representing financial planning, ii) saved using an account at a financial institution representing savings, and iii) borrowed from a financial institution representing borrowing.

For each variable, if an individual's score was equal to 1 (indicating a participation in the respective financial activity), the individual was allocated a score of 1 on the financial literacy index, otherwise, the individual's financial literacy index score was allocated 0. Individuals who scored 2/3 on the financial literacy index were classified as financially literate. A country's level of financial literacy was estimated by calculating the percentage of the observed individuals that are financially literate.

4.2 EXPLORATORY DATA ANALYSIS

The study explores the characteristics of the data set variables by analysing the summary statistics and the correlation coefficients between the respective variables using Excel.

Table 1: Summary Statistics

Variables	Observations	Mean	Median	Std. dev.	Min	Max
GDP Per Capita (current US\$)	24	1942.896	1167.604	2075.065	408.000	8635.797
Fin_lit (%)	24	37.428	34.5	18.755	7.390	81.500
Unemp (%)	24	7.056	4.547	7.010	1.694	28.770
Pop_growth (%)	24	2.401	2.44981	0.569	0.999	3.223
CPI (%)	24	30.032	5.359804	95.738	1.087	470.200
F.Pop	24	9,594,112	5,522,705	11,821,302	676,764	56,738,759

Table 2. Correlation Matrix for Variables

	GDP Per Capita	Fin_lit	Unemp	Pop_growth	CPI	F.Pop
GDP Per Capita	1					
Fin_lit	0.579	1				
Unemp	0.824	0.4827	1			
Pop_growth	-0.5333	-0.3665	-0.7306	1		
CPI	-0.1475	-0.0066	-0.0899	-0.1541	1	
F.Pop	0.0158	0.2345	-0.0207	0.0875	-0.1435	1

As seen above, the independent variables that are highly positively correlated with the dependent variable (GDP per capita) are financial literacy and unemployment. Population is highly negatively correlated with the GDP per Capita, while inflation CPI has a low negative correlation with GDP per Capita. Additionally, the correlation between the instrumental variable *F.Pop* and GDP per capita is very low as desired, while its positively correlated with financial literacy.

4.3 PRELIMINARY TESTS

For the purpose of running the instrumental variable regression analysis, this study conducts two preliminary tests to ensure that the assumptions of the Ordinary Least Squares (OLS) estimation model hold.

4.3.1 Linearity assumption

The first test is a test of linearity which is conducted through graphs that illustrate the relationships between the dependent variable (GDP per Capita) and the independent variables.

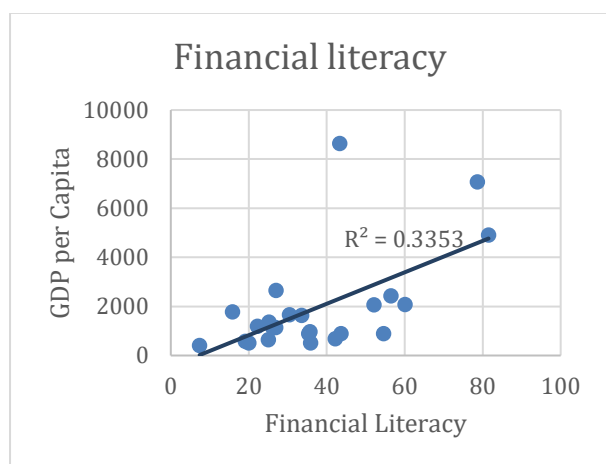


Figure 2: Plot of GDP per capita against financial literacy

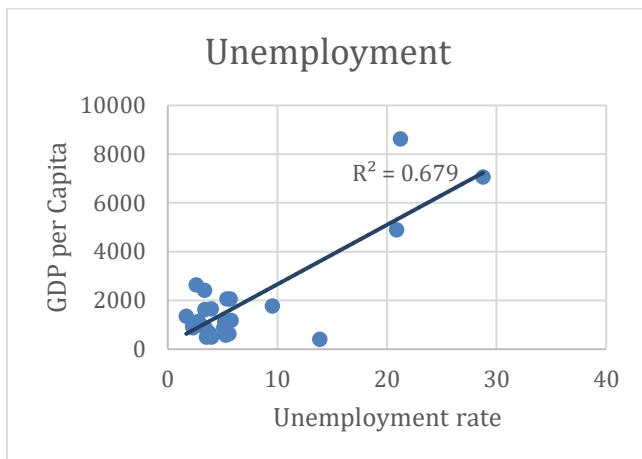


Figure 3: Plot of GDP per Capita against Unemployment rate

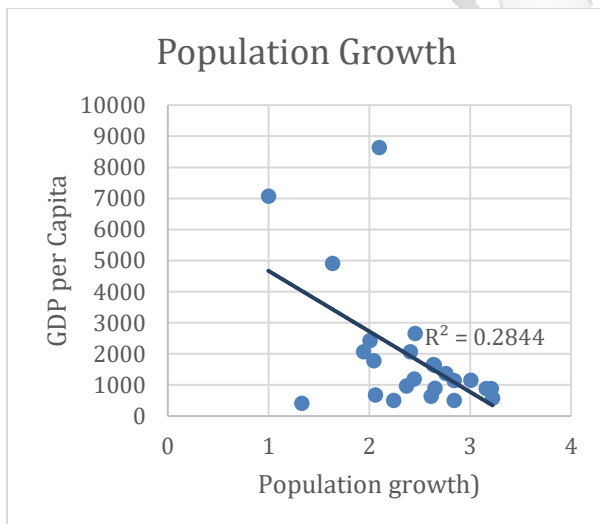


Figure 4: Plot of GDP per Capita against Population growth

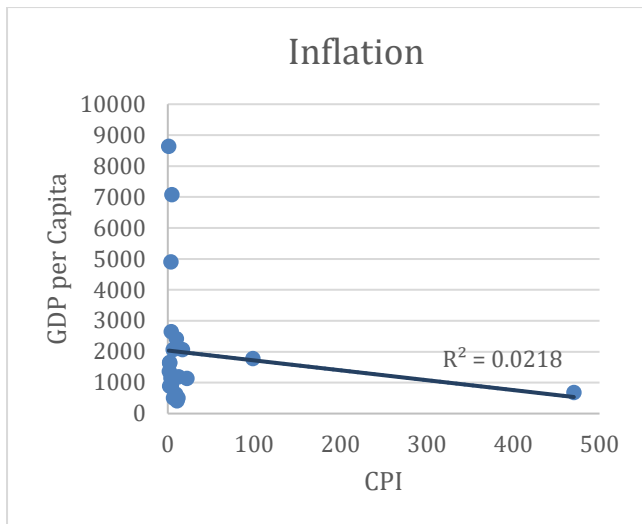


Figure 5: Plot of GDP per Capita against Inflation rate

The following graphs illustrate the relationships between the explanatory variables and GDP per capita, and to what extent the variables explain the variation in GDP per Capita through the r-squared values. The variable of interest-financial literacy explains 33.33% of the variation in GDP per capita, while employment explains 66.79% and population growth explains 28.44%. Inflation CPI explains the least amount of variation 2.18%. As per the graphs above, the linearity assumption holds for the financial literacy, unemployment rate and population growth rate variables. However, the inflation variable does not seem to have a linear relationship with GDP per Capita, a phenomenon that could be attributed to the presence of an outlier observation for Liberia.

4.3.2 Zero Conditional Mean Assumption

This assumption stipulates that the independent variables in an OLS regression model should not be correlated with the error term, that is, the variables should be exogenous.

Due to the existing possibility of reverse causality, that is economic growth having an effect on financial literacy, in the relationship between financial literacy and economic growth, this study conducts an instrumental variable regression to estimate whether financial literacy is exogenous. The instrument of choice is the female population,15-64 indicator, the endogenous variable is set as financial literacy, the dependent variable as GDP per capita and unemployment, population growth rate and CPI as the control variables. The results of the 2-step least squares estimation model are illustrated in table 2.

After the regression, we conduct postestimation tests for endogeneity with a null hypothesis that the variables are exogenous. The p-values of the two tests conducted: the Durbin score (0.4788) and the Wu-Hausman test (0.6005) are very large, resulting in a failure to reject the null hypothesis and the inference that the variables, including financial literacy, are exogenous. Therefore, to investigate the relationship between financial literacy and economic growth, this study proceeds with a normal multiple linear regression model.

4.3.3 No perfect collinearity assumption

The OLS model assumes that the independent variables do not have perfect linear relationships with each other. To test for multicollinearity, this study estimates the Variance Inflation Factor for the independent variables, from the regression of GDP per Capita against financial literacy rate, unemployment rate, population growth rate and inflation CPI, which are as follows:

Table 3. Variable Variance Inflation Factor

Variable	VIF	1/VIF
Fin_lit	1.31	0.376937
Unemp	2.65	0.417494
Pop_growth	2.40	0.765568
CPI	1.13	0.887156
Mean	1.87	

The variance inflation factors of all the predictors are relatively low, with the maximum being 2.65. Additionally, the average of 1.87 is well below 5, indicating very low levels of multicollinearity.

4.3.4 Homoscedasticity assumption

The OLS model also assumes that the error term is normally distributed with a zero mean and constant variance, that is, the residuals are homoscedastic. To test for the presence of heteroscedasticity, this study conducts the Breusch-Pagan test for heteroskedasticity with the null hypothesis that the model has constant variance.

The results of the test provide a chi-squared statistic of 7.58 with a probability of 0.0059. With a significance level of 5%, the null hypothesis can be rejected, indicating the presence of heteroskedasticity in the error term.

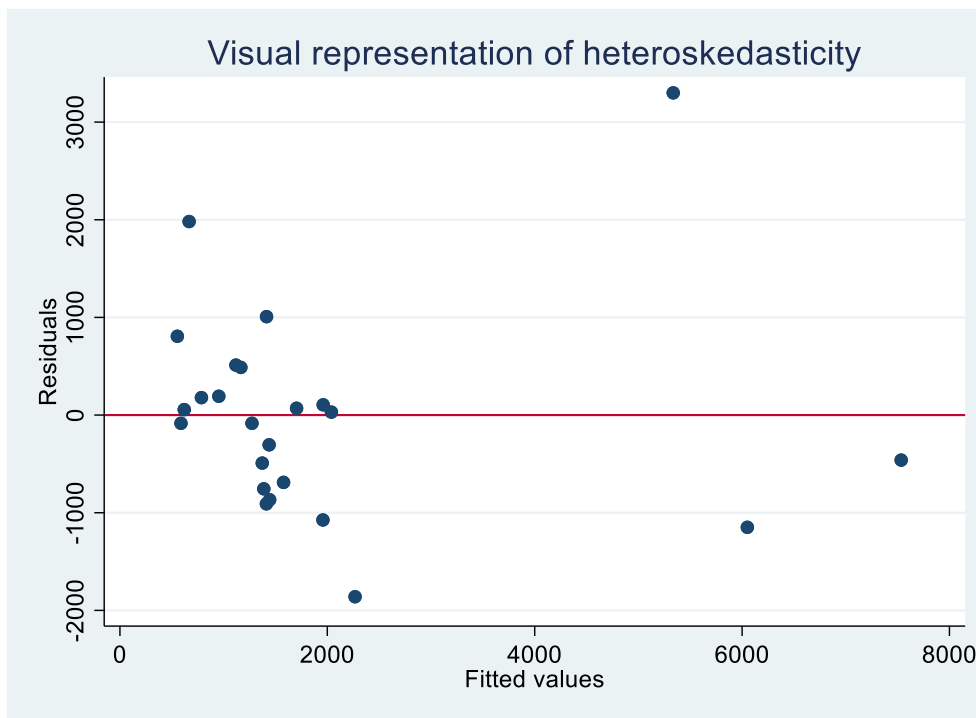


Figure 6: Visual representation of heteroskedasticity

To correct for heteroskedasticity, the regression model is run with robust standard errors for the predictor variables.

4.4 MULTIPLE LINEAR REGRESSION MODEL

Given that all the assumptions of the model hold regarding the linearity of parameters, zero conditional mean, no perfect collinearity, and heteroscedasticity, this study conducts a normal regression analysis represented by the following equation:

$$GDP = \beta_0 + \beta_1 fin_lit + \beta_2 Unemp + \beta_3 CPI + \beta_4 pop_growth + U$$

The results of the estimate are as follows:

Linear regression

gdp per capita	Coef.	St.Err.	t- value	p- value	[95% Conf	Interval]	Sig
fin_lit	26.693	17.569	1.52	.145	-10.079	63.465	

unemp	235.869	100.223	2.35	.03	26.1	445.637	**
pop_growth	470.008	892.538	0.53	.605	-1398.095	2338.111	
cpi	-1.18	1.221	-0.97	.346	-3.735	1.375	
Constant	-1813.339	2779.127	-0.65	.522	-7630.118	4003.44	

Mean dependent var	1942.896	SD dependent var	2075.065
R-squared	0.736	Number of obs	24
F-test	15.946	Prob > F	0.000
Akaike crit. (AIC)	411.776	Bayesian crit. (BIC)	417.666

*** $p < .01$, ** $p < .05$, * $p < .1$

Therefore, equation 4 can be represented as:

$$GDP = -1813.339 + 26.693fin_{lit} + 235.869 Unemp + 470.008pop_growth - 1.18CPI + U$$

The following results indicate that financial literacy has a positive effect on GDP per Capita where a 1% increase in the financial literacy rate of a country results in a 26.693 current US\$ increase in GDP per Capita. However, due to the large P-values which are greater than all the significance levels, financial literacy's effect is not statistically significant given the null hypothesis that $\beta_1=0$.

The only independent variable that is statistically significant from this model is the unemployment rate at a 5% significance level.

4.5 CONCLUSION

Through the exploratory data analysis, financial literacy has a high correlation with economic growth as measured by GDP per capita. However, the results of the regression analysis indicate that financial literacy is statistically insignificant in explaining GDP per Capita. Additionally, the results of this study's instrumental variable regression indicate that financial literacy is exogenous to GDP per Capita.

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This study aimed at investigating the relationship between financial literacy and economic growth. Having identified the problem of the study and reviewed the existing literature in the second chapter, the third chapter discusses the methodology applied in the collection and analysis of data and the chapter four discusses the instrumental variable model used to analyse the data and the results of the data analysis. This chapter then summarizes the findings of the data analysis, and provides a conclusion and recommendations for future studies.

5.2 SUMMARY OF FINDINGS

This study develops a financial literacy index using the 2021 Global Findex database by selecting three variables related to financial planning, savings, and borrowing. Individuals scored as financially literate if they met two of the three criteria. Financial literacy levels for each country were calculated based on the percentage of financially literate individuals. Financial literacy was found to be highest in Namibia (81.5%) and lowest in South Sudan (7.39%).

Exploratory data analysis examined summary statistics and correlation, finding that GDP per capita was highly correlated with financial literacy and unemployment, while population growth was negatively correlated with GDP per capita. Preliminary tests confirmed that key assumptions of the Ordinary Least Squares (OLS) regression model held, except for heteroskedasticity, which was corrected using robust standard errors.

The study's regression model showed that while financial literacy positively affected GDP per capita, it was not statistically significant. Only the unemployment rate was significant at the 5% level. Through the instrumental variable regression model whose tests confirmed that financial literacy is exogenous to GDP per capita, this study posits that there is no reverse causality in the relationship between financial literacy and economic growth. In conclusion, despite high correlations, financial literacy was not statistically significant in predicting GDP per capita in this model.

5.3 CONCLUSION

The findings on the effect of financial literacy on economic growth in Sub-Saharan Africa indicate that a country's level of financial literacy has a positive impact on its economic growth, measured by

the GDP per Capita. However, this positive relationship lacks statistical significance as indicated by the high p-values of the coefficients of the regression between the two variables. These results are harmonious with those of Hidayatinnisa et al. (2021). The implication of this statistically insignificant effect is that financial literacy supposedly influences economic growth indirectly through factors such as human capital development or financial inclusion. The results of the instrumental variable regression analysis also indicate that financial literacy is exogenous to GDP per capita, suggesting the absence of reverse causality in the relationship between economic growth and financial literacy. This supports the validity of policies put in place to improve financial literacy, since the advantages are unlikely to be a byproduct of merely increasing a country's economic wealth.

5.4 LIMITATIONS OF THE STUDY

This study has several limitations arising from the data and methodology used. First, the data analysis conducted in this study uses a relatively small sample size of 24 countries. This limits the statistical power of the regression, increases the sensitivity of the model's coefficients to specific data points such as outliers in the variables, and the ability to generalize the results of this study to the greater population, that is, Africa and the world as a whole.

Additionally, the process of selection of the variables applied in the creation of the financial literacy index introduces limitations since the variables chosen are not certain indicators of financial literacy. These variables are selected due to their ability to imply the presence of knowledge and an understanding of financial concepts. However, there is no way of proving the financial activities of individuals are as a result of the presence or absence of financial literacy. The process may also have contained some level of subjectivity bias in the criteria used to select the variables. A constraint to this study is that the study uses observations for the year 2021 only, which fails to provide a temporal view of the effect of financial literacy and limits the generalizability of the results of the study.

The research design applied in this study is ex-post facto, that is, the researcher had no control over the independent variables since the effects of financial literacy on GDP per Capita already happened. Finally, the study uses an instrumental variable in the two step least squares model to test for endogeneity of financial literacy. The instrumental variable of choice, female population, has a relatively low correlation with financial literacy (23.45%) which reduces its suitability.

5.5 RECOMMENDATIONS

This study establishes that financial literacy has an insignificant positive effect on economic growth in Sub-Saharan Africa. For the purposes of further research, this study recommends the establishment

of a standardized method of measurement of financial literacy to improve comparability across countries, regions and studies. Additionally, studies should be conducted on the long-term effects of financial literacy. This would require frequent and consistent measurement of financial literacy across countries and would help establish clearer the existence or lack thereof of relationships between financial literacy and economic outcomes. Policy makers should also integrate financial literacy programs with broader based programmes such as improving human capital development since financial literacy as a standalone program may not yield significant results.



REFERENCES

- Abreu, M., & Mendes, V. (2010). Financial Literacy and Portfolio Diversification. *Quantitative Finance*.
- Arrondel, L. (2018). Financial Literacy and Asset Behaviour: Poor Education and Zero for Conduct?
- Comparative Economic Studies
- Becker, G. (1964). Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education.
- Behrman, J. R., Mitchell, O., Soo, C., & Bravo, D. (2012). How Financial Literacy Affects Household Wealth Accumulation.
- Bhushan, P., & Medury, Y. (2014). An Empirical Analysis of Inter Linkages between Financial Attitudes, Financial Behaviour and Financial Knowledge of Salaried Individuals. *Indian Journal of Commerce and Management Studies*.
- Boisclair, D., Lusardi, A., & Michaud, P.-C. (2014). Financial Literacy and Retirement Planning in Canada.
- Bucci, A., Calcagno, R., & Marsiglio, S. (2022). Financial Literacy, Human Capital and Economic Growth.
- Clichici, D., & Moagăr-Poladian, S. (2022). Financial Literacy, Economic Development and Financial Development: A Cross Country Analysis.
- Damayanti, S. M., Murtaqi, I., & Pradana, H. A. (2018). The importance of financial literacy in a global economic era. *The Business and Management Review*.
- Development, O. o. (2012). *PISA 2012 Financial Literacy Framework*.
- Hasan, A., Asif-Ud, D., & Ramisa, T. (2024). Financial Inclusion and Economic Growth in Developing Nations: A Case Study of Bangladesh.
- Hastings, J. S., Madrian, B. C., & Skimmyhorn, W. L. (2012). Financial Literacy, Financial Education and Economic Outcomes.
- Hidayatinnisa, N., Fauziah, Trivena, S. M., & Aini, Y. N. (2021). The Effect of Financial Literacy and Financial Inclusion on Economic Growth in Indonesia.

Kahneman Daniel, D., & Tversky, A. (1979). Prospect Theory: An analysis of Decision under Risk. *Econometrica*, 263-292.

Kendall, J. (2012). Local financial development and growth. *Journal of Banking and Finance*.

Kim, H. H., Maurer, R., & Mitchell, O. S. (2013). Time Is Money: Life Cycle Rational Inertia and Delegation of Investment Management. *NBER Working Paper Series*.

Kira, A. R. (2013). The Factors Affecting Gross Domestic Product in Developing Countries: The Case of Tanzania. *European Journal of Business and Management*.

Klapper, L. F., Lusardi, A., & Panos, G. A. (2012). Financial Literacy and The Financial Crisis. *NBER Working Paper Series*.

Klapper, L., Lusardi, A., & Oudhesden, P. v. (2016). *Insights from the Standard & Poor's ratings services Global financial literacy survey*. Global Financial Literacy Excellence Centre.

Knoll, M. A., & Houts, C. R. (2012). The Financial Knowledge Scale: An application of Item Response Theory to the Assessment of Financial Literacy. *Journal of Consumer Affairs*.

Lusardi, A., & de Bassa Scheresberg, C. (2013). Financial Literacy and High-Cost Borrowing in the United States. *NBER Working Paper*.

Lusardi, A., & Mitchell, O. S. (2011a). Financial Literacy and Planning: Implications for Retirement Wellbeing. *Financial Literacy: Implications for Retirement Security and Financial Marketplace*.

Lusardi, A., & Mitchell, O. S. (2011b). Financial Literacy and planning: implications for retirement wellbeing.

Lusardi, A., & Mitchell, O. S. (2014). The Economic Importance of Financial Literacy: Theory and Evidence. *Journal of Economic Literature*.

Lusardi, A., & Tufano, P. (2015). Debt Literacy, Financial Experiences and Overindebtedness. *Journal of Pension Economics and Finance*.

Ma, Y., Song, Y., Xia, N., & Zhu, J. (2022). The Impact of Financial Literacy on Household Consumption. *Frontiers in Business, Economics and Management*.

Mahdzan, N. S., & Tabiani, S. (2013). The Impact of financial literacy on Individual Saving: An Exploratory study in The Malaysia Context. *Transformations in Business and Economics*.

Mandell, L., & Klein, L. S. (2009). The impact of financial literacy education on subsequent financial behaviour.

Mincer, J. (1958). Investment in Human Capital and Personal Income Distribution. *Journal of Political Economy*.

Moagar-Poladian, S., & Clichici, D. (2022). Financial Literacy, Economic Development and Financial Development: A Cross-Country Analysis. *Romania Journal of European Affairs*.

Morton, J. (2005). The Interdependence of Economic and Personal Finance Education. *Social Education*.

Ndigwa, P. N. (2011). The relationship between financial development and economic growth in Kenya.

Nye, P., & Cinnamon, H. (2013). Personal Financial Behavior: The Influence of Quantitative Literacy and Material Values. *Numeracy*.

Olubanjo, M. A., & Olayinka, D. W. (2019). The relative impact of income and financial literacy on financial inclusion in Nigeria. *Journal of International Development*.

Refera, M. K., Dhaliwal, N. K., & Kaur, J. (2016). Financial Literacy for developing countries in Africa: A review of concept, significance and research opportunities. *academic Journal*.

Ribaj, A. (2021). The impact of savings on economic growth in a developing country (the case of Kosovo). *Journal of Innovation and Entrepreneurship*.

Rusminingsih, D., & Damayanti, L. (2021). The Role of Financial Literacy on Economic Growth and Human Capital in Thailand. *Tamansiswa Accounting Journal International*.

Schultz, T. W. (1961). Investment in Human Capital. *The American Economic Review*.

Thaler, R. (1985). Mental Accounting and Consumer Choice. *Market Science*.

Upreti, P. (2015). Factors Affecting Economic Growth in Developing Countries. *Major Themes in Economics*.

Vovchenko, N. G., Galazova, S. S., Danchenko, E. A., Ivanova, O. B., & Kostoglodova, E. D. (2018). Improvement of Financial Literacy as a Crucial Factor of Economic Development. *European Research Studies Journal*.

Yoshino, N., Morgan, P. J., & Wignaraja, G. (2015). Financial Education in Asia: Assessment and Recommendations. *ADB Working Paper Series*.

Zieba, M., Dong, T.-K.-T., & Mbugua, R. N. (2022). Factor affecting economic growth: Empirical evidence from developing countries.



APPENDICES

APPENDIX I: List of Sub-Saharan Africa Countries under study

1. Benin
2. Burkina Faso
3. Cameroon
4. Republic of Congo
5. Côte d'Ivoire
6. Gabon
7. Namibia
8. Nigeria
9. Senegal
10. Sierra Leone
11. Ghana
12. Guinea
13. Kenya
14. Liberia
15. Malawi
16. Mali
17. Mozambique
18. South Africa
19. South Sudan
20. Tanzania
21. Togo
22. Uganda
23. Zambia
24. Zimbabwe



APPENDIX II: 2021 Global Findex Database Variables

ID	Name	Label	Question
V2	economy	Economy	
V3	economycode	Economy Code	
V4	regionwb	Regional code	
V5	pop_adult	Population 15+, 2020, WDI	
V6	wpid_random	Gallup World Poll identifier	
V7	wgt	Weight	
V8	female	Respondent is female	
V9	age	Respondent age	
V10	educ	Respondent education level	
V11	inc_q	Within-economy household income quintile	
V12	emp_in	Respondent is in workforce	
V13	urbanicity_f2f	Respondent lives in rural area	
V14	account	Has an account	
V15	account_fin	Has an account at a financial institution	
V16	account_mob	Has a mobile money account	
V17	fin1_1a	Opened first account to receive a wage payment	
V18	fin1_1b	Opened first account to receive money from the government	

V19	fin2	Has a debit card	
V20	fin4	Used a debit card	
V21	fin4a	Used a debit card in-store	
V22	fin5	Used a mobile phone or internet to access account	
V23	fin6	Used a mobile phone or internet to check account balance	
V24	fin7	Has a credit card	
V25	fin8	Used a credit card	
V26	fin8a	Used a credit card in-store	
V27	fin8b	Paid credit card balances in full	
V28	fin9	Made any deposit into the account	
V29	fin9a	Make deposits into the account two or more times per month	
V30	fin10	Withdrew from the account	
V31	fin10_1a	Reason for inactive account: too far	
V32	fin10_1b	Reason for inactive account: no need	
V33	fin10_1c	Reason for inactive account: lack money	
V34	fin10_1d	Reason for inactive account: not comfortable using it	
V35	fin10_1e	Reason for inactive account: lack trust	
V36	fin10a	Withdrew from the account two or more times per month	
V37	fin10b	Used account to store money	
V38	fin11_1	Unbanked: use account without help	

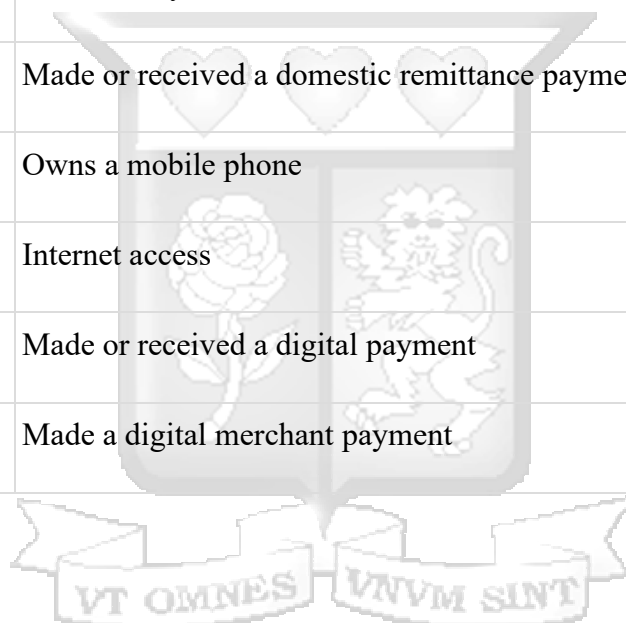
V39	fin11a	Reason for no account: too far	
V40	fin11b	Reason for no account: too expensive	
V41	fin11c	Reason for no account: lack documentation	
V42	fin11d	Reason for no account: lack trust	
V43	fin11e	Reason for no account: religious reasons	
V44	fin11f	Reason for no account: lack money	
V45	fin11g	Reason for no account: family member already has one	
V46	fin11h	Reason for no account: no need for financial services	
V47	fin13_1a	Reason for no mobile money account: too far	
V48	fin13_1b	Reason for no mobile money account: too expensive	
V49	fin13_1c	Reason for no mobile money account: lack documentation	
V50	fin13_1d	Reason for no mobile money account: lack of money	
V51	fin13_1e	Reason for no mobile money account: use agent	
V52	fin13_1f	Reason for no mobile money account: no mobile phone	
V53	fin13a	Use mobile money account two or more times a month	
V54	fin13b	Use mobile money account to store money	
V55	fin13c	Use mobile money account to borrow money	
V56	fin13d	Use mobile money account without help	
V57	fin14_1	Use mobile phone to pay for a purchase in-store	
V58	fin14_2	Paid digitally for an in-store purchase for the first time after COVID-19	

V59	fin14_2_China	Paid digitally for an in-store purchase for the first time since 2020	
V60	fin14a	Made bill payments online using the Internet	
V61	fin14a1	Send money to a relative or friend online using the Internet	
V62	fin14b	Bought something online using the Internet	
V63	fin14c	Paid online or in cash at delivery	
V64	fin14c_2	Paid online for an online purchase for the first time after COVID-19	
V65	fin14c_2_China	Paid online for an online purchase for the first time since 2020	
V66	fin16	Saved for old age	
V67	fin17a	Saved using an account at a financial institution	
V68	fin17a1	Saved using a mobile money account	
V69	fin17b	Saved using an informal savings club	
V70	fin20	Borrowed for medical purposes	
V71	fin22a	Borrowed from a financial institution	
V72	fin22b	Borrowed from family or friends	
V73	fin22c	Borrowed from an informal savings club	
V74	fin24	Main source of emergency funds in 30 days	
V75	fin24a	Difficulty of emergency funds in 30 days	
V76	fin24b	Difficulty of emergency funds in 7 days	
V77	fin26	Sent domestic remittances	

V78	fin27_1	Sent domestic remittances through an account	
V79	fin27c1	Sent domestic remittances in cash	
V80	fin27c2	Sent domestic remittances through an MTO	
V81	fin28	Received domestic remittances	
V82	fin29_1	Received domestic remittances through an account	
V83	fin29c1	Received domestic remittances in cash	
V84	fin29c2	Received domestic remittances through an MTO	
V85	fin30	Paid a utility bill	
V86	fin31a	Paid a utility bill using an account	
V87	fin31b	Paid a utility bill using a mobile phone	
V88	fin31b1	Paid a utility bill from an account or mobile phone for the first time after the	
V89	fin31b1_China	Paid a utility bill from an account or mobile phone for the first time since 202	
V90	fin31c	Paid a utility bill in cash	
V91	fin32	Received wage payments	
V92	fin33	Received public sector wage payments	
V93	fin34a	Received wage payments into an account	
V94	fin34b	Received wage payments to a mobile phone	
V95	fin34d	Received wage payments in cash	
V96	fin34e	Received wage payments to a card	

V97	fin35	Received wage payments into an account or to a phone or a card and paid higher t	
V98	fin37	Received a government transfer	
V99	fin38	Received a government pension	
V100	fin39a	Received a government transfer or pension into an account	
V101	fin39b	Received a government transfer or pension to a mobile phone	
V102	fin39d	Received a government transfer or pension in cash	
V103	fin39e	Received a government transfer or pension to a card	
V104	fin42	Received an agricultural payment	
V105	fin42a	Grow own crops or raise livestock	
V106	fin43a	Received an agricultural payment into an account	
V107	fin43b	Received an agricultural payment to a mobile phone	
V108	fin43d	Received an agricultural payment in cash	
V109	fin43e	Received an agricultural payment to a card	
V110	fin44a	Financially worried: old age	
V111	fin44b	Financially worried: medical cost	
V112	fin44c	Financially worried: bills	
V113	fin44d	Financially worried: education	
V114	fin45	Financially most worried	
V115	fin45_1	Financially worried due to COVID-19	
V116	fin45_1_China	Financial worry	

V117	saved	Saved in the past year	
V118	borrowed	Borrowed in the past year	
V119	receive_wages	Received a wage payment	
V120	receive_transfers	Received a government transfer payment	
V121	receive_pension	Received a government pension payment	
V122	receive_agriculture	Received a payment for the sale of agricultural goods	
V123	pay_utilities	Paid a utility bill	
V124	remittances	Made or received a domestic remittance payment	
V125	mobileowner	Owens a mobile phone	
V126	internetaccess	Internet access	
V127	anydigpayment	Made or received a digital payment	
V128	merchantpay_dig	Made a digital merchant payment	



APPENDIX III: Final dataset containing all the variables

Country	GDP Per Capita	Fin_lit	Unemp	Pop_growth	CPI	F.Pop
Benin	1360.911474	25.2	1.694	2.759705	1.73354	3535679
Burkina Faso	888.8036109	35.4	5.11	2.650376	3.653533	5958706
Cameroon	1654.257037	30.4	3.951	2.635819	2.271858	7503302
Congo, Rep.	576.9747294	19.1	5.273	3.222528	9	24492868
Côte d'Ivoire	2649.173048	27	2.59	2.455303	4.091952	7570214
Gabon	8635.797144	43.33	21.233	2.097988	1.086907	676764
Ghana	2422.085913	56.5	3.338	2.007745	9.971089	9794056
Guinea	1189.175999	22.2	5.767	2.444317	12.59729	3795404
Kenya	2069.661129	60.1	5.693	1.942761	6.107936	15718036
Liberia	676.442927	42.2	3.792	2.058861	470.2	1458503
Malawi	632.5331926	25	5.585	2.611418	9.330144	5602946
Mali	881.5100887	43.7	2.29	3.157964	3.925603	5424274
Mozambique	504.0377587	35.9	3.984	2.842112	6.408477	8851084
Namibia	4901.875889	81.5	20.877	1.635859	3.616905	784712
Nigeria	2065.77441	52.1	5.393	2.406363	16.95285	56738759
Senegal	1630.695072	33.6	3.368	2.645381	2.180323	4785833
Sierra Leone	504.6212876	19.98	3.516	2.241767	11.87396	2413999
South Africa	7073.612754	78.6	28.77	0.99892	4.611672	19787410
South Sudan	408	7.39	13.868	1.330372	10.51672	2877967
Tanzania	1146.031982	26.07	2.806	3.007287	3.69092	17351728
Togo	964.99811	35.7	2.285	2.367339	4.186215	2434211
Uganda	883.8920262	54.6	3.422	3.211428	2.204572	12407494
Zambia	1134.713454	26.9	5.195	2.840806	22.02077	5442463
Zimbabwe	1773.920411	15.8	9.54	2.045715	98.54611	4852267

APPENDIX IV: Results of the Instrumental Variable analysis

Instrumental variables 2SLS regression

gdppercapita	Coef.	St.Err.	t-value	p-value	[95% Conf Interval]	Sig
fin_lit	7.542	33.832	0.22	.824	-58.768 73.851	
unemp	260.253	107.378	2.42	.015	49.795 470.71	**
pop_growth	461.453	898.059	0.51	.607	-1298.711 2221.616	
cpi	-1.052	1.388	-0.76	.448	-3.773 1.669	
Constant	-1251.903	2750.899	-0.46	.649	-6643.566 4139.761	

Mean dependent var	1942.896	SD dependent var	2075.065
R-squared	0.713	Number of obs	24
Chi-square	84.208	Prob > chi2	0.000

*** $p < .01$, ** $p < .05$, * $p < .1$

