Innovations

The Effect of Capital Market Operations on Per Capita Income of the Selected Sub-Saharan African Countries

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Abstract: *The underdevelopment of capital markets in Sub-Saharan Africa (SSA) continues to hinder economic progress, raising questions about the extent to which capital market operations influence per capita income. This study examines the relationship between capital market development and economic growth in selected SSA countries, focusing on key indicators such as the number of listed companies, market capitalization, stock turnover, and foreign direct investment (FDI). Utilizing a panel dataset spanning 1990–2023, the study employs the Feasible Generalized Least Squares (FGLS) estimation technique to address heteroscedasticity and autocorrelation issues. The findings reveal that while market capitalization and stock turnover exert a significant positive effect on per capita income, the number of listed companies does not have a statistically meaningful impact. Furthermore, FDI is found to be a key driver of economic expansion, reinforcing the importance of external capital inflows in fostering industrialization and employment creation. These results highlight that merely increasing the number of publicly traded firms is insufficient to stimulate income growth unless accompanied by improved market liquidity and investor confidence. The study's implications underscore the necessity for stronger regulatory frameworks, enhanced financial market transparency, and policies that encourage institutional investor participation to improve capital market efficiency. Moreover, fostering an investment-friendly climate to attract sustainable FDI is essential for long-term economic prosperity in SSA. Policymakers, corporate managers, and financial market regulators should focus on strengthening financial institutions, integrating digital financial platforms, and deepening market participation to enhance capital market efficiency. While this study provides robust empirical evidence on the capital market-income nexus, future research should explore the role of financial technology (FinTech), regional capital market integration, and the impact of institutional quality on financial market*

performance to gain a more comprehensive understanding of how SSA's capital markets can be leveraged for sustainable economic growth.

Keywords: *Capital Market Development, Per Capita Income, Market Capitalization, Stock Turnover, Foreign Direct Investment, Sub-Saharan Africa, Economic Growth*

1.   Introduction

The capital market plays a pivotal role in economic growth by providing a platform for long-term financing, fostering investment, and facilitating wealth creation. Across the globe, well-functioning capital markets have been identified as key drivers of economic prosperity, as they enable the efficient allocation of financial resources, stimulate corporate expansion, and enhance financial stability (Afonso & Reimers, 2022). The interconnection between capital market operations and economic indicators, such as per capita income, has gained increasing scholarly attention, particularly in emerging economies where financial market depth remains a crucial determinant of development trajectories (Zulkifli et al., 2024). While advanced economies benefit from robust financial infrastructure and deep capital markets, developing regions, including Sub-Saharan Africa (SSA), grapple with inefficiencies that may constrain the extent to which capital market activities translate into income growth (Adeleke, 2024). This necessitates a thorough investigation into the extent to which capital market operations influence per capita income in selected SSA countries.

At the continental level, Africa's capital markets remain underdeveloped relative to global standards, despite their increasing importance in driving economic growth. Empirical evidence suggests that capital markets in African economies are often characterized by low market liquidity, high transaction costs, and regulatory constraints, which hinder their ability to function as efficient mechanisms for economic development (Eshun & Tweneboah, 2024). While countries such as South Africa, Nigeria, and Kenya have made strides in enhancing capital market activities, many other economies in the region still struggle to establish well-structured financial systems capable of fostering sustainable income growth (Aguwamba & Osimen, 2023). The persistent gap in financial market development raises pertinent questions regarding the effectiveness of capital market operations in influencing per capita income across different SSA economies.

Within the SSA region, capital market operations remain fragmented, with disparities in stock exchange performance, financial infrastructure, and regulatory frameworks (Borteye & Peprah, 2022). Despite efforts to deepen financial markets through reforms and technological advancements, SSA stock exchanges exhibit significant variations in the number of listed companies, market capitalization, and trading activity, all of which impact their effectiveness in stimulating economic growth

(Akkutay, 2024). The ability of capital markets to enhance per capita income depends on a range of factors, including investor confidence, foreign capital inflows, and corporate governance practices (Gachugu, Kalio, & Kibet, 2022). However, limited empirical consensus exists on the extent to which capital market expansion directly influences income levels in SSA economies, underscoring the need for further scholarly exploration.

The theoretical foundation of this study is rooted in financial development theories, particularly the Endogenous Growth Theory, which posits that well-functioning financial markets drive capital accumulation, technological innovation, and productivity growth, ultimately enhancing income levels (Afonso & Reimers, 2022). This perspective underscores the role of capital market operations in fostering investment and economic expansion. However, empirical inconsistencies in the literature suggest that capital market development does not always yield uniform benefits across different economies, necessitating further exploration of the mechanisms through which market activities influence income levels (Badr, 2015). This study, therefore, contributes to existing literature by offering an empirical assessment of the capital market-income nexus in SSA, addressing critical gaps in understanding the role of financial market operations in driving economic development.

This paper is structured as follows: The next section presents a comprehensive review of the literature, examining theoretical perspectives and empirical evidence on the relationship between capital market operations and per capita income. This is followed by the methodology section, which details the data sources, model specifications, and estimation techniques employed in the study. The results and discussion section provides an in-depth analysis of the findings, highlighting key patterns, policy implications, and comparative insights across SSA economies. Finally, the conclusion offers a synthesis of the study's contributions, limitations, and recommendations for future research. Through this structured approach, the study aims to provide a robust empirical contribution to financial development research and inform policy measures aimed at strengthening capital market efficiency in SSA.

2. Literature and Hypotheses Development

2.1 Per Capita Income

Per capita income (PCI) is a fundamental economic indicator used to assess the economic well-being of a population. It is typically defined as the total income of a country divided by its population, reflecting the average income per person within an economy. According to Park, Ryu, and Lee (2019), per capita income is an essential measure of economic progress, often serving as a proxy for standard of living. Similarly, McKinsey (2022) emphasizes that PCI provides insight into the purchasing power and economic capacity of individuals in a given region. From a

macroeconomic perspective, per capita income serves as a comparative measure for evaluating economic disparities among nations. Arellano and Bond (2021) suggest that PCI is often utilized in policy formulation to determine income inequality, economic growth patterns, and the effectiveness of fiscal policies. Furthermore, Baral (2019) posits that rising PCI levels are generally associated with improvements in quality of life, higher consumption levels, and enhanced investment in human capital development.

Various authors have measured per capita income using different approaches. One common method is based on Gross Domestic Product (GDP) per capita, calculated by dividing a country's total GDP by its total population (Afonso & Reimers, 2022). This approach provides a broad economic perspective but does not account for income distribution inequalities. In contrast, Borteye and Peprah (2022) advocate for using Gross National Income (GNI) per capita, which includes net income from abroad, providing a more comprehensive view of national wealth. Additionally, Azad et al. (2023) highlight the use of adjusted PCI metrics that consider purchasing power parity (PPP) to offer a more accurate representation of real income levels across different economies. Beyond national aggregates, researchers have explored sectoral contributions to PCI. Jermsittiparsert et al. (2019) argue that industrial and financial sector developments significantly influence PCI growth, while services and informal economic activities often present challenges in accurately measuring income levels. Similarly, Dhungana (2023) identifies digital financial inclusion as a modern determinant of PCI growth, as greater financial access enhances individual earning capacities. In this regard, Radke (2021) suggests that PCI should be analyzed in tandem with employment statistics and inflation rates to better assess real economic well-being.

2.2 Capital Market Operations

Capital market operations encompass a broad range of financial activities that facilitate long-term investments through the issuance and trading of securities. These markets are essential for economic development, as they provide the necessary infrastructure for raising capital, allocating resources efficiently, and promoting financial stability. According to Adeleke (2024), capital market operations include the buying and selling of equity and debt instruments, stock market transactions, bond issuance, and financial derivatives trading. Similarly, Adeleye (2018) highlights that these operations play a crucial role in mobilizing savings and channeling them into productive investments. The structure of capital markets varies across economies, with some featuring well-established stock exchanges, while others rely on over-the-counter (OTC) trading mechanisms. Adesanya, Adediji, and Okenna (2020) classify capital market operations into primary and secondary markets. The primary market involves the issuance of new securities, such as initial public offerings (IPOs) and

corporate bonds, while the secondary market facilitates the trading of existing securities to ensure liquidity and price discovery.

Measurement of capital market operations has been approached differently in empirical literature. Abbas, Pei, and Rui (2016) suggest that market capitalization, turnover ratio, and value traded as a percentage of GDP are commonly used indicators of capital market efficiency. Additionally, Ahmed Olatunji (2023) emphasizes the role of financial market depth, liquidity ratios, and investor participation rates in assessing market performance. Similarly, Al Salamat and Batayneh (2022) highlight the importance of stock exchange indices, such as the All-Share Index, in reflecting overall market trends and investor sentiment. The effectiveness of capital market operations is also influenced by regulatory frameworks and institutional quality. Afonso and Reimers (2022) argue that well-regulated capital markets enhance investor confidence, promote transparency, and reduce information asymmetry. On the other hand, Aguwamba and Osimen (2023) note that weak regulatory oversight can lead to market distortion, increased volatility, and potential financial crises. Moreover, Azimi (2022) suggests that technological advancements, such as algorithmic trading and blockchain-based settlements, have significantly improved the efficiency of capital market operations. In emerging markets, the development of capital market operations is often constrained by limited financial literacy, inadequate infrastructure, and macroeconomic instability (Chikwira& Mohammed, 2023). However, Grbić (2021) argues that financial sector reforms, investor protection policies, and integration with global capital markets can enhance market efficiency and attract foreign investment.

2.2.1 Number of Listed Companies

The number of listed companies refers to the total count of firms that have their shares publicly traded on a stock exchange. It serves as a crucial indicator of stock market depth, diversity, and the overall level of market development. According to Adeleke (2024), an increasing number of listed companies signifies an expanding capital market, allowing businesses to access external financing through equity issuance. Similarly, Acha and Akpan (2019) highlight that a higher number of listed companies enhances market liquidity, broadens investment opportunities, and fosters competition within the financial ecosystem. From a regulatory perspective, stock exchanges impose specific listing requirements that influence the number of firms entering public markets (Ahmed Olatunji, 2023). These requirements typically include financial disclosures, corporate governance standards, and minimum capital thresholds, which help ensure investor protection and market efficiency. Adesanya, Adediji, and Okenna (2020) argue that relaxed listing requirements in emerging markets can encourage more firms to go public, thereby deepening capital market activities.

The measurement of the number of listed companies is straightforward, often reported in annual stock exchange reports or financial market statistics. According to Afonso and Reimers (2022), the number of listed firms is typically assessed in conjunction with market capitalization and trading volumes to provide a comprehensive evaluation of stock market performance. Furthermore, Aguwamba and Osimen (2023) emphasize the need to adjust for delistings, mergers, and acquisitions to obtain an accurate representation of market expansion. While a higher number of listed firms is generally associated with financial market growth, Al Salamat and Batayneh (2022) caution that excessive listings without corresponding liquidity or investor participation may lead to inefficient market performance. Consequently, policymakers and financial regulators must balance market accessibility with stringent governance frameworks to sustain a healthy number of publicly traded companies.

2.2.2 Market Capitalization

Market capitalization (market cap) represents the total value of a stock exchange's listed equities, calculated as the product of a company's outstanding shares and its current share price. It is a widely used metric for assessing the size, depth, and overall economic relevance of capital markets. Adeleke (2024) defines market capitalization as a measure of financial market stability and investor confidence, as larger market caps are generally associated with more developed and resilient financial systems. In financial literature, market capitalization is often categorized into three segments: small-cap, mid-cap, and large-cap markets (Acha& Akpan, 2019). These classifications help investors evaluate risk exposure, growth potential, and portfolio diversification strategies. Ahmed Olatunji (2023) emphasizes that market capitalization is influenced by macroeconomic factors such as interest rates, inflation, and investor sentiment, which collectively determine stock market valuations.

The measurement of market capitalization varies across financial reporting systems. According to Afonso and Reimers (2022), total market capitalization is commonly expressed as a percentage of Gross Domestic Product (GDP) to assess the relative size of stock markets within national economies. Additionally, Al Salamat and Batayneh (2022) highlight that variations in market cap can indicate financial market expansion, economic downturns, or speculative bubbles, depending on the broader economic context. Despite its widespread use, market capitalization has limitations as an indicator of financial development. Aguwamba and Osimen (2023) note that while high market capitalization suggests a strong capital market, it does not necessarily imply market liquidity or efficiency. Thus, complementary metrics such as trading volume and turnover ratio should be considered when evaluating market performance.

2.2.3 Stock Turnover

Stock turnover refers to the frequency at which shares of listed companies are traded on a stock exchange relative to total market capitalization. It is a key liquidity measure that reflects investor activity, market efficiency, and the ease of buying or selling financial securities. Adeleke (2024) describes stock turnover as a fundamental indicator of market vibrancy, where higher turnover ratios suggest greater market depth and efficient price discovery mechanisms. The stock turnover ratio is typically calculated by dividing the total value of shares traded by the average market capitalization over a specific period (Acha& Akpan, 2019). This ratio is widely used to compare market liquidity across different stock exchanges and assess the impact of market reforms or financial regulations. According to Afonso and Reimers (2022), emerging markets often exhibit lower stock turnover due to limited investor participation, regulatory constraints, and structural inefficiencies in trading systems.

Stock turnover is influenced by several factors, including investor sentiment, transaction costs, and financial market integration. Ahmed Olatunji (2023) argues that active institutional investors, advanced trading platforms, and favorable regulatory environments contribute to higher stock turnover. Conversely, Al Salamat and Batayneh (2022) highlight that stock illiquidity, economic uncertainty, and restrictive market policies can lead to lower turnover rates, discouraging investor engagement. While stock turnover is a critical metric in evaluating stock market performance, Aguwamba and Osimen (2023) caution against relying solely on this measure. They emphasize that high turnover does not always translate to market stability, as excessive trading activity may indicate speculative trading patterns rather than genuine capital allocation efficiency. Therefore, a comprehensive market analysis should incorporate turnover ratios alongside broader market performance indicators.

2.2.4 Foreign Direct Investment (FDI)

Foreign Direct Investment (FDI) refers to cross-border investments in which an investor from one country establishes a long-term interest in a business entity in another country. It is distinguished from portfolio investment by its focus on managerial control, technological transfer, and sustained economic engagement (Adeleke, 2024). According to Acha and Akpan (2019), FDI serves as a critical driver of economic growth by providing capital inflows, enhancing industrial productivity, and fostering global trade linkages. FDI can be classified into different forms, including greenfield investments, mergers and acquisitions (M&A), and joint ventures. Greenfield investments involve the establishment of new business operations in a foreign country, while M&A transactions involve acquiring existing firms (Ahmed Olatunji, 2023). Afonso and Reimers (2022) note that host countries

often prefer greenfield investments due to their job creation potential and long-term economic benefits.

The measurement of FDI is typically conducted using data on net inflows, expressed as a percentage of GDP, to assess the relative impact of foreign investments on national economies (Al Salamat &Batayneh, 2022). Additionally, stock measures of FDI, which account for cumulative foreign ownership in domestic industries, provide insights into long-term investment trends (Aguwamba& Osimen, 2023). Several factors influence FDI flows, including market size, regulatory frameworks, and political stability. According to Acha and Akpan (2019), countries with well-developed financial markets, transparent legal systems, and investor-friendly policies tend to attract higher FDI inflows. Conversely, Al Salamat and Batayneh (2022) argue that economic instability, policy uncertainty, and weak infrastructure deter foreign investors from committing long-term capital to emerging markets. While FDI contributes to economic development, it also presents challenges such as profit repatriation, market dominance by multinational corporations, and potential crowding out of domestic industries (Ahmed Olatunji, 2023). Therefore, policymakers must implement strategic investment policies to maximize the benefits of FDI while safeguarding national economic interests.

2.4 Hypotheses Development
2.4.1 Number of Listed Companies and Per Capita Income

The relationship between the number of listed companies and per capita income is rooted in the financial intermediation and economic growth theories, particularly the Endogenous Growth Theory, which posits that financial market expansion fosters economic development through capital accumulation and productivity growth (Afonso & Reimers, 2022). An increase in the number of listed companies enhances financial market depth, improving access to capital and investment opportunities, which in turn drives per capita income growth. The financial markets provide a platform for firms to raise funds, expand operations, and contribute to employment generation, ultimately influencing national income levels (Adeleke, 2024). Studies abound in terms of the relationship between the number of listed companies and per capita income. In terms of those that found a positive linkage, we review the studies of Aguwamba and Osimen (2023) in Nigeria, who examined the effect of stock market growth on per capita income using data from 1990 to 2022. Through an autoregressive distributed lag (ARDL) model, they found that an increasing number of listed companies enhances per capita income growth through capital expansion and employment generation. Similarly, in Turkey, Akkutay (2024) employed a dynamic panel estimation model to examine the relationship between stock market growth and income levels, revealing that a higher number of listed companies stimulates economic activities, resulting in per capita income improvements.

However, conflicting findings exist in theliterature. Adesanya, Adediji, and Okenna (2020) examined Sub-Saharan African economies and reported an insignificant effect of the number of listed companies on per capita income due to weak financial market infrastructure and liquidity constraints. Similarly, Al Salamat and Batayneh (2022) studied stock market depth in the MENA region and found that despite an increasing number of listed firms, economic impact remained minimal due to low investor participation and underdeveloped regulatory frameworks. Critically, while stock market expansion can drive income growth, other studies argue that mere increases in the number of listed firms do not necessarily translate into per capita income improvements if capital market efficiency remains weak (Acha& Akpan, 2019). Adeleye (2018) emphasized that financial literacy, investor confidence, and regulatory quality play crucial roles in determining the effectiveness of stock market expansion in boosting per capita income. Given the mixed empirical findings, further research is needed to explore the conditional factors—such as financial deepening, corporate governance, and macroeconomic stability—that influence the strength of the relationship. Therefore, we hypothesize:

H1:   The number of listed companies positively affects per capita income

2.4.2 Market Capitalization and Per Capita Income

The theoretical underpinning of the relationship between market capitalization and per capita income is based on the Financial Development Theory, which suggests that stock market expansion enhances wealth distribution, investment flows, and economic growth (Afonso & Reimers, 2022). A larger market capitalization signifies increased investor participation and liquidity, leading to economic expansion and higher per capita income. Empirical studies largely support a positive relationship between market capitalization and per capita income. In Ghana, Borteye and Peprah (2022) analyzed stock market size and economic growth using data from 1995 to 2020. Their findings suggest that market capitalization expansion leads to increased per capita income through improved investment flows. Similarly, Adeleke (2024) examined Nigeria's stock market and found that larger market capitalization correlates with economic productivity and income growth through wealth creation and financial market intermediation.

Further evidence from Malaysia by Zulkifli et al. (2024) supports the positive linkage, showing that a higher market capitalization-to-GDP ratio enhances investment efficiency and income distribution. Likewise, Gachugu, Kalio, and Kibet (2022) examined Kenya's stock market and confirmed that stock market deepening fosters economic activities, resulting in per capita income improvements. However, some studies indicate a weak or negative relationship between market capitalization and per capita income. For instance, Eshun and Tweneboah (2024) found that while market capitalization in ECOWAS countries has expanded, per capita income growth

remains stagnant due to financial exclusion and low domestic participation. Similarly, Abbas, Pei, and Rui (2016) reported in Tanzania that while market capitalization increased, economic gains were not evenly distributed, limiting per capita income growth. The divergence in findings suggests that the impact of market capitalization on per capita income depends on financial market accessibility, investor participation, and policy stability. Therefore, we hypothesize:

H2:   Market capitalization positively affects per capita income.

2.4.3 Stock Turnover and Per Capita Income

The Stock Market Liquidity Theory posits that stock turnover is a critical indicator of market efficiency, which in turn influences economic growth and income distribution (Afonso & Reimers, 2022). Higher stock turnover reflects active trading, enhancing capital allocation efficiency and fostering wealth creation, leading to higher per capita income. Several empirical studies confirm a positive relationship between stock turnover and per capita income. Adeleke (2024) examined the Nigerian stock market using data from 2000 to 2023 and found that increased stock turnover enhances financial market liquidity, promoting investment and income growth. Similarly, studies by Hamzah, Abdullah, and Abdul Hamid (2020) in Thailand revealed that high trading activity correlates with wealth distribution and increased per capita income.

Further evidence from Ghana by Antwi, Issah, and Kpodo (2021) suggests that active stock trading stimulates economic activities, translating into higher per capita income. Likewise, Datta, Nath, and Barua (2021) found that stock turnover positively affects income levels in Bangladesh due to efficient capital allocation. Conversely, conflicting findings exist in emerging markets with shallow financial markets. Eje (2022) examined Nigeria's stock market and reported that while stock turnover increased, per capita income remained unchanged due to speculative trading rather than productive investment. Similarly, Alam and Hussein (2019) found that in Oman, stock turnover fluctuations had minimal impact on income growth due to weak investor confidence. Given these insights, we propose the following hypothesis:

H3:   Stock turnover positively affects per capita income

2.4.4 Foreign Direct Investment (FDI) and Per Capita Income

The linkage between Foreign Direct Investment (FDI) and per capita income is grounded in the Endogenous Growth Theory, which posits that foreign investment inflows contribute to technological transfer, industrial expansion, and human capital development, thereby influencing per capita income growth (Afonso & Reimers, 2022). Studies indicate a generally positive relationship between FDI and per capita income. Adeleke (2024) examined Sub-Saharan African economies and found that higher FDI inflows enhance economic productivity and income levels through

industrialization and employment generation. Similarly, Mamun et al. (2018) found that FDI inflows positively affect per capita income in Bangladesh through capital expansion. Further evidence from ECOWAS nations by Eshun and Tweneboah (2024) suggests that FDI stimulates economic activities, contributing to income growth.

Likewise, Gollopeni et al. (2023) found that European economies with strong FDI inflows experienced rapid income growth due to investment in high-value industries.However, some studies challenge this assertion. Idris (2020) found that while FDI inflows into Nigeria increased, income disparity widened due to profit repatriation by multinational firms. Similarly, Azimi (2022) examined China's economy and reported that FDI-induced income growth is highly dependent on domestic policy frameworks. The mixed findings suggest that the effect of FDI on per capita income depends on sectoral allocation and investment regulations. Hence, we hypothesize:

H4:   **FDI positively affects per capita income.**

3.   Methodology and Data

This study adopts an ex-post facto design within a panel data framework. This design is chosen because the dataset used is extracted from data sources without any manipulation of the values. The geographical coverage of this study is Sub Saharan Africa, which refers to African the countries south of the Sahara Desert. The African continent has about 2 billion people and GDP of about 3.1 trillion dollar (Statista, 2023). 2023 Africa capital market report estimated market capitalization of African stock exchanges to be about 1.6 trillion dollars. According to the World Bank Report (2024), there are 48 countries in sub – Saharan Africa, with a population of about 1.24billion as at 2023. Sub Saharan Africa comprises four major sub – regions as follows: Central Africa, East Africa, Southern Africa and West Africa.Purposive sampling techniques are adopted for this study. The selection is based on data availability of the top 10 most capitalized capital markets in the continent according to 2023 Africa capital market report.Secondary data is utilized for this study, covering a period of thirty-four years from 1990 to 2023. A panel time series analysis will be conducted using data sourced from the World Bank's World Development Indicators. This data is chosen because it is well-suited to answering the research questions and empirically testing the formulated hypotheses to achieve the study's objectives.To evaluate the effect of capital market operations on sustainable economic growth in SSA, the following models are specified, based on the objectives stated:

$$PCI_{it} = f(NLC_{it}, MCAP_{it}, STURN_{it}, FDI_{it}, MS_{it}, INR_{it}, GOVQ_{it}) \qquad (1)$$

Where: PCI isPer Capital Income; NLC is **Number of listed companies**; MCAP is market capitalization; STURN is stock turnover; FDI is foreign direct investment; MS is money supply; INR is interest rate; GOVQ is governance quality. To complete the

specification of the econometric model, we consider the algebraic or linear relationships among the economic variables. The corresponding econometric model is given by:

$$PCI_{It} = \beta_0 + \beta_1 NLC_{It} + \beta_2 MCAP_{It} + \beta_3 STURN_{It} + \beta_4 FDI_{It} + \beta_5 MS_{It} + \beta_6 INR_{It} + \beta_7 GOVQ_{It} + \mu_{It} \qquad (2)$$

Where: β_0 = Intercept, the mean value of the response variable when all independent variablesare equal to zero; $\beta_{1,2,3,4,5,6,7}$= Parameters to be estimated; μ_{it} = Stochastic or error term which reflects the unaccounted variables not included in the model.

4 Results and Discussion
In this section, we present the findings of the study on the effect of capital market operations on sustainable economic growth in Sub-Saharan Africa.

4.1 Descriptive Statistics
The descriptive statistic of the study is presented in Table 1. It offers a detailed summary of the data, highlighting the distribution and key characteristics of each variable in the analysis. These statistics provide valuable insights into measures of central tendency, variability, skewness and kurtosis, illustrating the overall structure and dispersion of the dataset.

Table 1. Descriptive Analysis

	NLC	MCAP	STURN	FDI	MS	INR	PCI	GOVQ
Mean	104.0777	1.36E+11	67.68484	2.339662	50.10733	7.619016	8675.998	0.056812
Median	55.00000	8.68E+09	5.824499	0.870632	38.46383	6.476857	5271.865	0.070958
Maximum	429.0000	1.23E+12	1721.544	18.5764	159.9491	28.16667	27279.96	1.983780
Minimum	6.000000	1152430.	0.088500	-1.4189	11.30051	10.09600	2476.524	2.014682
Std. Dev.	109.8647	3.11E+11	248.4167	2.777796	30.31694	6.086062	5747.965	0.981267
Skewness	1.303948	2.327743	4.432642	2.520592	1.303011	0.519449	1.019920	0.092994
Kurtosis	3.44606	6.87331	22.7812	8.64091	4.47999	4.08107	3.24867	2.38242

	8	8	2	1	5	5	3	1
Jarque-Bera	42.5839 4	223.113 2	2858.49 8	66.74	54.6388 9	13.6755 3	25.6886 1	2.53064 0
Probability	0.00000 0	0.00000 0	0.00000 0	0.00000 0	0.00000 0	0.00107 2	0.00000 3	0.28214 9
Observation s	146	146	146	146	146	146	146	146

Source: Author's Computation (2025)

Table 1 shows that the number of listed companies (NLC) exhibits a high mean relative to its median, suggesting a right-skewed distribution, reinforced by its positive skewness. The wide range between its maximum and minimum values reflects disparities in market development across the SSA countries. Market capitalization (MCAP) follows a similar pattern, with a substantial standard deviation and high kurtosis, indicating extreme variations in market size across SSA economies. These trends imply that while some countries have well-developed capital markets with substantial listings and market capitalization, others remain largely underdeveloped.Stock market efficiency indicators reveal further disparities. Stock turnover (STURN) exhibits extreme skewness and kurtosis, with significantly higher means than medians. The large standard deviations highlight substantial volatility in stock market activities across SSA countries. The presence of extreme values suggests that a few markets have highly liquid stock exchanges, while others experience relatively limited level of trading activities. This variation could indicate uneven investor confidence, differences in financial infrastructure and the role of institutional quality in influencing market efficiency. Also, the mean FDI inflow is 2.34% of GDP, indicating that, on average, SSA countries attract a modest level of foreign investment relative to their economic size. However, the standard deviation of 2.78 suggests substantial fluctuations in FDI inflows, reflecting the diverse investment climates, economic policies and structural conditions across countries in the region. The minimum FDI value of -1.42% suggests that some economies experienced net FDI outflows, potentially due to capital flight, repatriation of profits, or divestment by foreign firms. Conversely, the maximum FDI inflow of 18.58% highlights instances where certain economies attracted exceptionally high foreign direct investment, likely driven by large-scale infrastructure projects or policy incentives aimed at enhancing investment attractiveness.

Per capita income (PCI)demonstrates considerable disparities across SSA countries. The high standard deviation suggests significant income inequality, with some countries achieving high per capita income while others remain at low levels.Finally, in the case of the control variables, the result shows that money supply (MS) and

interest rates (INR) provide further insight into financial stability and policy effectiveness. The standard deviation and skewness of money supply data indicate substantial variations, reflecting different monetary policy strategies across SSA countries. Interest rates, though moderately dispersed, show a wide range from negative to extremely high values, suggesting that while some countries experience restrictive monetary policies, others adopt expansionary measures. The presence of high interest rates in some periods could indicate inflationary pressures or investor risk premiums in less stable economies. Governance quality (GOVQ) variable has a low mean and a slightly negative skewness, indicating that governance challenges persist in many SSA countries. These findings underscore the crucial role of institutional reforms, capital market deepening and macroeconomic stabilization in driving sustainable economic growth across the SSA countries.

4.2   Correlation Analysis

The correlation analysis for this study, used to detect the presence or otherwise of multicollinearity in the independent variables, is presented in Table 2:

Table 2: Correlation Matrix

Correlation	NLC	MCAP	STURN	FDI	MS	INR	PCI	GOVQ
NLC	1.000000							
MCAP	0.766693	1.000000						
STURN	0.176525	-.070774	1.000000					
FDI	-0.27790	-0.09720	0.22870	1.000000				
MS	0.105230	0.209175	0.071865	-0.1494	1.000000			
INR	-0.321913	-0.265761	-0.193314	0.1411	-0.222418	1.000000		
PCI	0.210646	0.304261	0.123551	-0.0872	0.940789	0.281489	1.000000	
GOVQ	0.054392	0.195099	0.082960	0.1091	0.815118	-0.072750	0.810209	1.000000

Source: Author's computation using Stata 15 (2025)

The correlation analysis in Table 2 suggests that multicollinearity is not a significant concern among the explanatory variables in the study. While some variables, such as market capitalization (MCAP) and the number of listed companies (NLC), exhibit a strong positive correlation (0.767), their inclusion in the same model does not necessarily imply redundancy but rather reflects the interconnected nature of some variables in capital market operations. The relationships between stock market

indicators and macroeconomic variables reveal important trends. The number of listed companies (NLC) is positively correlated with market capitalization (0.767), highlighting the importance of having new listings to drive higher market capitalization. Macroeconomic indicators such as money supply (MS) and interest rates (INR) display expected relationships with economic growth indices. MS is positively correlated with PCI (0.941) reinforcing the role of monetary expansion in boosting income levels and economic growth. Interest rates (INR) show negative correlations with most capital market variables, including MCAP (-0.266), indicating that higher borrowing costs may dampen investment and trading activities in SSA capital markets. This negative correlation is further supported by the conventional inverse relationship between interest rates and capital market operations. As interest rates increase, investible funds typically shift from the capital markets to the money markets and vice versa, all things being equal. Finally, governance quality (GOVQ) demonstrates a strong positive correlation with income measures such as PCI (0.810) indicating that stronger institutions and better governance structures are associated with higher income levels.

4.3 Test of Cross-Sectional Dependence

The results of the Pesaran (2015) cross-sectional dependence (CD) test presented in Table 3 indicate the presence of cross-sectional dependence in most of the variables analyzed. The CD-Statistic values for market capitalization (MCAP), stock turnover (STURN), foreign direct investment (FDI), money supply (MS), governance quality (GOVQ), and per capita income (PCI), are all statistically significant at the 1% level ($p < 0.01$). The results of the cross-sectional dependence test indicate significant interdependencies among key economic variables across Sub-Saharan African countries. While this can be attributed to globalization, financial market linkages and economic integration, it is also attributable to the structural similarities across most of the SSA countries. Given that SSA countries are generally categorized as developing markets, they tend to exhibit fairly similar economic trends and fundamentals. Conversely, the results show that the number of listed companies (NLC) and interest rate (INR) do not exhibit significant cross-sectional dependence, as their CD-statistics are statistically insignificant. This suggests that variations in these variables are more country-specific and are less likely to be influenced by external factors from other cross-sectional units. The lack of cross-sectional dependence in interest rates could be attributed to differences in national monetary policies and labour market structures, which vary acrossthe SSA countries.

Table 3: Pesaran (2015) Cross sectional dependence

Variable	CD-Statistic
NLC	0.083
MCAP	9.048***
STURN	4.217***
FDI	3.690***
MS	7.819***
INR	-0.067
GOVQ	6.093***
PCI	16.950***

Note: "***" p<0.01
Source: Author's computation using Stata 15 (2025)

4.4 Test of Heteroscedasticity and Autocorrelation

Table 4 presents the results of the heteroscedasticity and autocorrelation tests conducted on the models in this study. The Modified Wald test was employed to detect heteroscedasticity, which examines whether the variance of the error terms remains constant across observations. The results indicate the presence of heteroscedasticity in all models, as the Chi-squared values are statistically significant. Specifically, the p-value for per capita income (PCI), is equal to 0.0000, leading to the rejection of the null hypothesis of homoscedasticity.The existence of heteroscedasticity implies that standard errors may be biased, which can distort statistical inferences such as hypothesis testing and confidence intervals. When the variance of residuals differs across observations, ordinary least squares (OLS) estimators may no longer be the best linear unbiased estimators, necessitating alternative estimation techniques that can correct for this issue.

Furthermore, the Wooldridge test was used to examine the presence of first-order autocorrelation in the panel data. The results confirm autocorrelation in all models, as the F-statistics are statistically significant with p-values below conventional thresholds. For instance, PCI model exhibits stronger evidence of serial correlation with p-values approaching 0.0000. This indicates that residuals from one period are correlated with residuals from previous periods, violating the assumption of independent errors.The presence of autocorrelation can lead to inefficiency in parameter estimates and incorrect statistical inferences. When errors are correlated over time, standard errors tend to be underestimated, increasing the likelihood of Type I errors (false positives) in hypothesis testing. To address this issue, estimation techniques such as Feasible Generalized Least Squares (FGLS) may be more appropriate. Given the combined presence of heteroscedasticity and autocorrelation, the use of Feasible Generalized Least Squares (FGLS) is strongly justified.

Table 4: Test for Heteroscedasticity and Autocorrelation

Test for Heteroscedasticity		
Model	**Modified Wald Test (Chi^2)**	**Probability**
$PCI_{it} = f(NLC_{it}, MCAP_{it}, STURN_{it}, FDI_{it}, MS_{it}INR_{it}, GOVQ_{it})$	68.34	0.0000
Test of Autocorrelation		
	Wooldridge Test (F)	**Probability**
$PCI_{it} = f(NLC_{it}, MCAP_{it}, STURN_{it}, FDI_{it}, MS_{it}INR_{it}, GOVQ_{it})$	59.863	0.0002

Source: Author's Computation using Stata 15 (2025)

4.5 FGLS Regression

Given the results, the Feasible Generalized Least Squares (FGLS) is adopted as the method to be used for statistical inference. Studies such as Abbas et al. (2024), Shahzad et al. (2021), Mukhopadhyay and Nayak (2024) and Lawal et al (2021) support the use of FGLS where panel data is characterized by heteroskedasticity.FGLS is designed to correct for both issues simultaneously by adjusting for non-constant error variances and accounting for serial correlation in the residuals (Abbas et al., 2024; Shahzad et al., 2021; Mukhopadhyay and Nayak 2024).

Table 5: FGLS Regression Results

Variable	Coefficient	Std. Err.	z-value	P>z
NLC	-0.0321451	0.0439884	-0.73	0.465
MCAP	0.0604447	0.0187006	3.23	0.001
STURN	0.0004936	0.000099	4.98	0.000
FDI	0.0255319	0.0095538	2.67	0.008
MS	0.0136772	0.0012791	10.69	0.000
INR	-0.0091339	0.0036153	-2.53	0.012
GOVQ	0.1734516	0.0385422	4.5	0.000
Cons	6.887197	0.3125578	22.03	0.000
Observations	146			
Number of cid	7			
Wald (chi^2)	921.54***			

Note: "***" p<0.01

Source: Author's Computation using Stata 15 (2025)

The coefficient for NLCis -0.0321, with a z-statistic of -0.73 and a p-value of 0.465, indicating that this variable is not statistically significant at any conventional level.

This result suggests that changes in the number of listed companies do not have a significant effect on per capita income in the context of this study. The negative sign of the coefficient contradicts the a priori expectation of a positive relationship, implying that an increase in the number of listed companies does not necessarily lead to higher income per capita in SSA. This could be due to factors such as limited market depth or inefficiencies in the capital markets.For MCAP, the coefficient is 0.0604, with a z-statistic of 3.23 and a p-value of 0.001, which is statistically significant at the 1% level. This suggests that a 1% increase in market capitalization is associated with a 0.06% increase in per capita income. The positive relationship aligns with the apriori expectation, indicating that a larger market capitalization contributes to higher income levels.The coefficient for STURN is 0.00049, with a z-statistic of 4.98 and a p-value of 0.000, which is statistically significant at the 1% level. This suggests that a 1% increase in stock turnover is associated with a 0.0005% increase inper capita income. The positive relationship supports theapriori expectation of a beneficial effect, indicating that more active stock markets (with higher turnover) can improve income levels. For FDI, the coefficient is 0.0255, with a z-statistic of 2.67 and a p-value of 0.008, which is statistically significant at the 1% level. This indicates that a 1% increase in FDI is associated with a 0.026% increase in per capita income. The positive relationship aligns with the apriori expectation, suggesting that foreign direct investment plays a crucial role in driving economic growth and improving income levels in SSA countries. Increased FDI can enhance capital formation and create employment opportunities, leading to higher per capita income.

The results of this study provide important insights into the relationships between capital market operations and economic growth in Sub-Saharan Africa (SSA), building on and extending the existing literature. This aligns with the findings of Thaddeus et al. (2024) as well as Eshun and Tweneboah (2024), who found that stock market operations have a positive and significant impact on economic growth in the long run, despite short-term inefficiencies. Further, the positive impact of stock turnover (STURN) on per capita income (PCI) highlights the importance of liquidity and external capital inflows in driving income levels. This is consistent with Nyamute & Barasa (2021) and Osakwe et al. (2020), who found that market capitalization and gross capital formation positively influence income levels.From the study, market capitalization (MCAP) has positive impact on per capita income (PCI), thereby contributing positively to overall economic growth in SSA countries. This position aligns with Lambe et al (2021) and Nnyanzi et al (2018) who concluded that market capitalization has positive impact on economic growth in Nigeria and selected sub-Saharan African countries respectively.The study also highlighted the critical role

that foreign direct investment (FDI) plays in economic growth in SSA countries, as the findings revealed that FDI has significant positive impact on per capita income (PCI).

5.   Conclusion and Recommendation

The findings of this study provide compelling evidence on the intricate relationship between capital market operations and per capita income in selected Sub-Saharan African countries. The study establishes that while capital market expansion has the potential to drive economic growth, its effectiveness is contingent upon the efficiency and depth of financial markets. The empirical results demonstrate that market capitalization and stock turnover exert a positive and significant effect on per capita income, suggesting that well-developed capital markets facilitate wealth distribution and economic expansion. Conversely, the number of listed companies, though indicative of market depth, does not exhibit a statistically significant impact, implying that merely increasing the number of publicly traded firms without improving market liquidity and investor participation does not translate into higher income levels. Foreign direct investment (FDI) is also found to be a crucial driver of per capita income growth, reinforcing the argument that external capital inflows enhance economic performance by fostering industrialization and employment creation. While the positive effects of stock market deepening are evident, the results suggest that structural inefficiencies, regulatory challenges, and limited investor participation remain significant barriers to maximizing the benefits of capital market operations in the region. Additionally, the findings highlight the role of macroeconomic stability in determining the extent to which capital markets can contribute to income growth. Countries with well-functioning financial systems and stable policy environments are better positioned to leverage capital markets for economic advancement.

In line with these findings, this study offers practical recommendations for key stakeholders. The results underscore the need for strengthening regulatory frameworks to enhance financial market efficiency. Effective oversight mechanisms should be put in place to reduce information asymmetry, mitigate insider trading risks, and promote fair market practices. Strengthening investor protection laws and enforcing disclosure requirements can enhance market transparency and stability, making capital markets a more reliable driver of economic growth. Furthermore, policies that encourage institutional investors' participation and broaden access to financial markets can enhance liquidity, thereby improving the impact of stock market activities on income levels. While this study provides valuable insights, there are opportunities for further research to expand the understanding of capital market operations and their broader economic implications. Future studies could explore the role of financial technology (FinTech) and digital trading platforms in enhancing capital market accessibility and efficiency. Additionally, a comparative analysis of Sub-Saharan African capital markets with those in more developed economies could

provide deeper insights into best practices for financial market development. Further research could also examine the role of institutional investors, pension funds, and sovereign wealth funds in shaping capital market performance and economic outcomes. By expanding the scope of analysis, future studies can offer more comprehensive policy recommendations and investment strategies tailored to the unique economic landscapes of developing regions.

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