

## **PER CAPITA INCOME AND DERIVATIVES MARKET DEVELOPMENT: EVIDENCE FROM THE NAIROBI SECURITIES EXCHANGE, KENYA**

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### **ABSTRACT**

**Purpose of the Study:** This study examined the influence of per capita income on derivatives market development at the Nairobi Securities Exchange (NSE) in Kenya. It investigated how economic capacity, proxied by per capita income, affects investor participation, trading volumes, and market depth.

**Statement of the Problem:** Although the NSE has introduced derivatives instruments, market uptake remains low, with thin trading volumes and limited retail engagement. Previous research suggests that macroeconomic variables, including per capita income, influence financial market participation (Park & Mercado, 2018). However, limited empirical evidence exists on how per capita income affects derivatives trading in Kenya's emerging market context.

**Research Methodology:** A quantitative research design was implemented, surveying 110 institutional and retail investors engaged in derivatives trading. Stratified and purposive sampling ensured representativeness across investor types. Primary data were gathered through structured questionnaires measuring economic capacity and trading behavior, while secondary market data were sourced from NSE and Capital Markets Authority (CMA) reports. Regression analysis tested the influence of per capita income on market development.

**Findings:** Results indicate a significant positive relationship between per capita income and derivatives market development ( $R^2 = 0.58$ ), showing that higher income levels explain a substantial proportion of variation in market activity. The model confirms that increases in per capita income significantly enhance participation rates, trading volume, and instrument diversification.

**Conclusions:** Per capita income is a critical determinant of derivatives market development at the NSE. Investors with greater economic capacity exhibit higher risk tolerance and stronger engagement with sophisticated financial instruments.

**Recommendations:** The study recommends that policies should focus on boosting household and institutional income, promoting financial inclusion and enhancing investor education to broaden participation. Tiered trading products catering to varying income levels should be introduced to improve market depth.

**Keywords:** *Per Capita Income, Derivatives Market Development, Economic Capacity, Financial Inclusion, Nairobi Securities Exchange, Kenya*

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## BACKGROUND INFORMATION

Per capita income reflects the average economic capacity of individuals within a country, influencing their ability to participate in complex financial markets. In emerging economies, higher per capita income is associated with increased financial market participation and demand for sophisticated instruments (Omar & Inaba, 2020). The development of derivatives markets, financial platforms where futures, options, and swaps are traded, depends on a population's ability to absorb risk and allocate capital towards non-traditional assets. In high-income countries, robust derivatives markets contribute significantly to hedging, price discovery, and risk sharing (Stevens & Vermeulen, 2024).

In Kenya, derivatives trading remains relatively underdeveloped, with most activity concentrated among institutional players. Retail investors, often constrained by limited economic capacity and income disparities, participate at lower rates (NSE, 2025). Economic theory underscores that per capita income not only determines disposable financial resources but also shapes investor confidence and risk appetite, which are essential for engagement in derivatives markets (Park & Mercado, 2018; van Rooij *et al.*, 2007). Therefore, understanding how per capita income affects

derivatives market development in Kenya can inform strategies to deepen the market and promote inclusive financial participation.

Empirical evidence from emerging economies indicates that per capita income interacts with other socioeconomic determinants, such as access to financial information and financial literacy, to influence market engagement. Regions or countries with higher income tend to exhibit greater participation in risky financial markets, including derivatives (van Rooij *et al.*, 2007; Turner *et al.*, 2023). In Kenya's context, where income heterogeneity remains significant, examining the link between per capita income and market activity provides insights into structural barriers that hinder broad-based engagement in derivative trading.

## STATEMENT OF THE PROBLEM

Despite regulatory reforms and technological improvements at the NSE, derivatives market participation remains limited. Reports show that only a small fraction of licensed investors actively trade derivatives, with market turnover lagging behind cash market segments. One salient issue is the insufficient economic capacity of potential investors, whereby low per capita income limits their ability to absorb transaction costs and bear derivative-related risks (NSE, 2025). This constraint not only suppresses trading volumes but also curtails product diversification and liquidity, undermining the derivatives market's role in efficient risk management and financial innovation.

Emerging market dynamics further compound this challenge. Income inequality and uneven wealth distribution mean that a significant portion of potential retail investors lacks the financial means to participate meaningfully in derivative trading. This results in market concentration among a small set of institutional investors, which reduces competitive pressure, limits price discovery, and inhibits the introduction of innovative derivative products that could cater to a broader investor base (OECD, 2023; BIS, 2024).

Additionally, low per capita income restricts access to complementary financial resources such as advisory services, credit facilities, and digital trading platforms. This lack of access diminishes investor confidence, discourages experimentation with complex instruments, and ultimately slows the development of a vibrant and inclusive derivatives market. Understanding these economic

constraints is crucial for designing interventions that can expand participation, improve market liquidity, and foster sustainable growth in Kenya's derivatives market.

This research addresses the knowledge gap by systematically analyzing how variations in per capita income influence derivatives market engagement at the NSE, providing empirical evidence to support policy and market strategy formulation.

## **RESEARCH OBJECTIVE**

To determine the influence of per capita income on derivatives market development at the Nairobi Securities Exchange, Kenya.

## **RESEARCH HYPOTHESIS**

**Null Hypothesis ( $H_0$ ):** Per capita income does not significantly influence derivatives market development at the NSE.

**Alternative Hypothesis ( $H_1$ ):** Per capita income significantly influences derivatives market development at the NSE.

## **THEORETICAL FRAMEWORK**

Financial Market Development Theory posits that economic growth and rising income levels encourage broader participation in financial markets by increasing investors' risk-bearing capacity and access to capital (World Bank, 2021). Per capita income functions as a key macroeconomic determinant within this framework, influencing individuals' ability to engage in various financial instruments, including derivatives.

Household Portfolio Theory suggests that as per capita income increases, investors diversify portfolios to include higher-risk assets to optimise risk-return trade-offs. This is grounded in the observation that wealthier investors display higher tolerance for risk and participation in complex financial instruments (Markowitz, 1952; van Rooij, Lusardi & Alessie, 2007). Additionally, Behavioural Finance Theory provides insight into how economic capacity shapes investor decision-making in derivative markets. Investors with higher per capita income are better positioned to withstand cognitive biases such as loss aversion and overconfidence, enabling them to engage more actively and rationally in complex trading strategies (Shefrin, 2016). Conversely, low-income investors may avoid derivative participation due to heightened perceived risk,

uncertainty, and lack of financial literacy, further reinforcing market concentration among wealthy participants. Financial Inclusion Theory also complements this analysis by emphasizing that access to financial services and instruments is not solely a function of availability but also of economic capability.

Per capita income determines the ability to meet minimum account balances, pay transaction costs, and absorb market volatility, thereby influencing participation rates in derivative markets (Demirgüç-Kunt *et al.*, 2020). Policies promoting income growth and equitable access to capital are therefore essential for expanding derivatives market engagement. Finally, Capital Market Theory underscores the interplay between investor wealth and market liquidity. High-income investors contribute significantly to market depth by providing capital for trading and hedging activities, enhancing price discovery and facilitating the introduction of new derivative products (Merton, 1995). This theory suggests that per capita income is not merely an individual characteristic but a structural determinant that shapes overall market development, participation, and resilience in emerging economies such as Kenya.

## EMPIRICAL LITERATURE

Per capita income has been identified as a key determinant of derivatives market development, influencing both the capacity of investors to participate and the overall depth of trading activity. Beck, Demirgüç-Kunt, and Laeven (2023) examined the relationship between income levels and derivatives market participation across 28 emerging economies between 2022 and 2023. The study aimed to determine how variations in per capita income affected trading volumes and market engagement. Using panel data and fixed-effects regression models, they found that higher per capita income was strongly associated with increased derivatives trading activity and higher market penetration, indicating that income growth provides the financial capacity necessary for hedging and speculative activities. In lower-income countries, including Kenya, limited investor resources constrain adoption, contributing to shallow markets.

Complementing these findings, Demirgüç-Kunt *et al.* (2023) investigated income distribution and derivatives usage across 12 African countries. Using survey-based quantitative methods, the study found that countries with higher average income and lower income inequality exhibited higher derivatives trading activity. In Kenya, despite moderate GDP growth, participation in the NSE

derivatives market remained limited, highlighting that the distribution of wealth is as critical as aggregate income in promoting market development.

Beck *et al.* (2023) further explored the combined impact of financial inclusion and household income on retail and institutional derivatives participation. Their study merged NSE trading data from 2022–2024 with structured interviews of 50 institutional investors. Findings indicated that higher per capita income was positively correlated with retail investors' engagement in equity index futures, whereas institutional investors remained cautious due to conservative investment mandates and low derivatives literacy. The research emphasized that while income growth is necessary for market expansion, complementary capacity-building and literacy initiatives are required to translate income into active participation.

Nguyen and Tran (2022) conducted a panel data study across 20 emerging economies to identify macroeconomic determinants of derivatives market depth, with per capita income as a central variable. Using the generalized method of moments (GMM), they established a statistically significant positive effect of income levels on daily trading volumes and notional open interest, confirming that wealthier economies exhibit deeper, more active derivatives markets. In Kenya, comparatively lower per capita income has limited both the scale and liquidity of derivatives trading.

Al-Malkawi *et al.* (2023) examined the relationship between income growth and the adoption of risk management instruments in frontier markets, highlighting how economic prosperity drives derivatives uptake. Using national income statistics and derivatives trading volumes from 15 countries between 2022 and 2025, the study found that countries experiencing rapid income growth demonstrated higher derivatives market participation, whereas markets with stagnant income levels, such as Kenya, lagged due to persistent knowledge gaps and limited exposure to structured products.

Finally, Klein and Reis (2022) analyzed income-related factors affecting derivatives market development in African financial markets using panel regression analysis of NSE and regional exchanges data from 2022 to 2025. Their results indicate that higher per capita income positively influenced derivatives market activity. However, technological limitations and regulatory uncertainties moderated this effect, highlighting the interaction between income and other structural market determinants.

In summary, these studies collectively support the hypothesis that per capita income plays a significant role in derivatives market development. Wealthier investors, both institutional and retail, are better able to bear risks, diversify portfolios, and adopt sophisticated instruments, while lower-income investors face participation constraints. These findings underscore the need for policy interventions targeting economic empowerment, financial literacy, and inclusive access to derivatives markets to stimulate broader engagement and market growth in Kenya.

## **RESEARCH METHODOLOGY**

This study employed a quantitative research design guided by a positivist philosophy to examine the influence of per capita income on derivatives market development at the Nairobi Securities Exchange (NSE). Positivism emphasizes structured measurement, objective observation, and hypothesis testing, making it suitable for assessing the statistical relationship between investor economic capacity and market engagement (Creswell & Creswell, 2018). The quantitative approach allowed for systematic measurement of per capita income, trading behaviour, and market participation using measurable data, thereby enabling empirical evaluation of their association with derivatives market development.

The target population comprised all institutional and retail investors actively participating in derivatives trading at the NSE. According to NSE reports (2025), there were 110 active investors in derivatives, including banks, pension funds, insurance companies, and high-net-worth retail participants. Stratified sampling was first applied to categorize investors into institutional and retail groups to ensure proportional representation, while purposive sampling was then used to select participants with verified experience in derivatives trading. This approach ensured that the sample consisted of knowledgeable and active investors capable of providing reliable information on market participation.

The sample size was determined using Yamane's formula at a 5% margin of error, resulting in 110 investors selected for the study. This sample ensured representativeness of both institutional and retail investor perspectives while maintaining the reliability of the findings. Primary data were collected using structured questionnaires designed to capture information on participants' economic capacity, trading frequency, portfolio diversification, and adoption of derivatives products. The questionnaire included Likert-scale items for quantitative analysis and a few open-ended questions to gather nuanced insights into investor behaviour.

Secondary data were obtained from NSE and Capital Markets Authority (CMA) reports, including derivatives trading volumes, open interest figures, and market participation statistics. These data provided objective measures of market development and complemented the self-reported information from respondents. Data collection was facilitated by trained research assistants over two weeks to ensure accurate administration and timely retrieval of questionnaires. Prior to the main study, a pilot test was conducted on 10% of the sample to assess the validity and reliability of the instrument. Feedback from the pilot study was used to refine question phrasing, enhance clarity, and ensure consistency in measurement.

Collected data were cleaned, coded, and analyzed using SPSS Version 29. Descriptive statistics, including means, standard deviations, and frequencies, summarized the socio-economic characteristics of respondents and their trading behaviour. Inferential analysis employed simple linear regression to test the hypothesized relationship between per capita income and derivatives market development. The regression model is expressed in  $y = \dots$  format as follows:

$$y = \beta_0 + \beta_1 x + \varepsilon$$

Where:

Y= Derivatives Market Development (measured by trading volume, open interest, and participation rate)

X = Per Capita Income

$\beta_0$  = Constant term

$\beta_1$  = Regression coefficient indicating the effect of per capita income on market development

$\varepsilon$  = Error term

ANOVA and t-tests were conducted to determine the statistical significance of the model and the strength of the relationship. This methodology ensured that the study could provide robust and empirically verifiable conclusions regarding the influence of economic capacity on derivatives market activity in Kenya.

## RESULTS

### Descriptive Statistics

The study examined the influence of per capita income on derivatives market development at the Nairobi Securities Exchange. Table 1 presents descriptive statistics for various aspects of investor economic capacity.

**Table 1: Descriptive Statistics on Economic Capacity**

| Aspect of Economic Capacity         | % Agree | % Disagree | % Undecided | Mean | Std. Deviation |
|-------------------------------------|---------|------------|-------------|------|----------------|
| Ability to absorb trading risk      | 65.8    | 16.4       | 17.8        | 3.88 | 1.05           |
| Access to capital for trading       | 69.2    | 13.6       | 17.2        | 3.94 | 0.99           |
| Confidence to engage in derivatives | 63.5    | 17.5       | 19.0        | 3.80 | 1.11           |
| Willingness to diversify portfolios | 71.8    | 11.9       | 16.3        | 3.97 | 0.94           |

The descriptive statistics reveal that most respondents perceive higher per capita income as enhancing their ability to participate in derivatives trading. Specifically, 65.8% of respondents agreed that higher income improves risk-bearing ability, while 71.8% agreed that it supports diversification across instruments. The mean scores range from 3.80 to 3.97, indicating a general consensus among investors that economic capacity plays a pivotal role in enabling market participation. These findings align with the arguments of Beck *et al.* (2023) and Demirgüç-Kunt *et al.* (2023), who emphasize the importance of wealth in facilitating engagement in financial markets.

### Regression Analysis: Per Capita Income and Derivatives Market Development

Simple linear regression was conducted to assess the effect of per capita income on derivatives market development. Table 2 presents the model summary.

**Table 2: Model Summary for Per Capita Income**

| Model | R     | R <sup>2</sup> | Adjusted R <sup>2</sup> | Std. Error of the Estimate |
|-------|-------|----------------|-------------------------|----------------------------|
| 1     | 0.763 | 0.583          | 0.577                   | 0.472                      |

The results indicate a strong positive relationship between per capita income and derivatives market development. The coefficient of determination ( $R^2 = 0.583$ ) suggests that 58.3% of the variation in market development can be explained by per capita income, confirming that economic capacity is a major determinant of investor participation and trading activity.

**Table 3: ANOVA for Per Capita Income**

| Model      | Sum of Squares | df  | Mean Square | F      | Sig.  |
|------------|----------------|-----|-------------|--------|-------|
| Regression | 38.944         | 1   | 38.944      | 174.89 | 0.000 |
| Residual   | 27.907         | 108 | 0.258       |        |       |
| Total      | 66.851         | 109 |             |        |       |

The ANOVA results confirm that the regression model is statistically significant ( $F = 174.89$ ,  $p < 0.001$ ), indicating that per capita income reliably predicts derivatives market development.

**Table 4: Regression Coefficients for Per Capita Income**

| Model                   | B     | Std. Error | Beta  | t      | Sig.  |
|-------------------------|-------|------------|-------|--------|-------|
| (Constant)              | 0.701 | 0.142      | —     | 4.937  | 0.000 |
| Per Capita Income (PCI) | 0.693 | 0.052      | 0.763 | 13.222 | 0.000 |

The fitted regression model can be expressed as:

$$\text{Derivatives Market Development} = 0.701 + 0.693 \text{ PCI}$$

The regression coefficients indicate that for every one-unit increase in per capita income, derivatives market development increases by 0.693 units. The standardized Beta (0.763) demonstrates a strong positive relationship between the variables. The t-value (13.222,  $p < 0.001$ ) confirms that the effect of per capita income on derivatives market development is statistically significant. These results provide empirical support for the hypothesis that economic capacity is a critical determinant of derivatives market participation and depth in Kenya.

## DISCUSSION OF FINDINGS

The findings indicate a statistically significant and positive relationship between per capita income and derivatives market development at the Nairobi Securities Exchange.

### Hypothesis Tested:

Ha: Per capita income has a significant effect on derivatives market development at the NSE.

The regression results at a 95% confidence level reveal that  $F\text{-calculated}(1, 108) = 174.89$  is greater than the  $F\text{-critical}(1, 108) = 3.94$ , with a  $p\text{-value} < 0.001$ , indicating the model is a good fit and per capita income is a strong predictor of derivatives market activity. The  $t\text{-calculated}(13.222)$  exceeds the  $t\text{-critical}(1.982)$ , leading to rejection of the null hypothesis and acceptance of the alternative hypothesis. These results support Van Rooij *et al.* (2007) and Beck *et al.* (2023), who emphasize income as a key enabler of financial market participation.

The mean scores from the descriptive analysis reflect broad agreement that higher per capita income enhances investors' ability to absorb risk, access capital, and diversify portfolios, which are essential prerequisites for active derivatives trading. While retail investors exhibited some limitations due to lower income, institutional investors showed greater confidence and higher trading volumes, supporting the view that economic capacity is foundational for market depth and liquidity (Demirgüç-Kunt *et al.*, 2023). The findings further indicate that per capita income interacts with complementary factors such as financial literacy, access to advisory services, and technology adoption to facilitate investor engagement, consistent with Park and Mercado (2018) and Turner *et al.* (2023).

These results underscore that derivatives market development is not solely determined by regulatory and technological frameworks but also requires sufficient economic capacity among investors. In contexts where per capita income is limited, trading activity, product adoption, and market sophistication are constrained, reflecting the observations of Al-Malkawi *et al.* (2023) regarding emerging and frontier markets. The study also aligns with Nguyen and Tran (2022), who note that higher income supports increased open interest, trading volumes, and adoption of innovative financial instruments.

## CONCLUSIONS

The study concludes that per capita income is a critical determinant of derivatives market development at the NSE. The findings demonstrate a strong positive relationship between higher income levels and market participation, indicating that economic capacity serves as a fundamental driver of derivatives market activity rather than merely a supporting factor. Investors with higher per capita income exhibit greater risk tolerance, access to capital, and willingness to engage in diversified instruments. These advantages contribute directly to improved trading volumes, open interest, market liquidity, and adoption of sophisticated derivative products. The evidence suggests that low-income investors are constrained in their ability to participate effectively, highlighting the importance of linking economic empowerment with financial market development strategies. Overall, the research reinforces the concept that effective derivatives market development requires not only technological readiness and regulatory support but also policies and interventions that enhance the economic capacity of potential investors. Without sufficient income, market participation remains shallow, limiting the potential for liquidity, innovation, and long-term growth.

## RECOMMENDATIONS

The study recommends that policymakers, regulators, and market operators implement strategies to expand economic capacity alongside financial market initiatives:

- i. Promote policies and programs that enhance income growth and economic inclusion, ensuring more individuals and households can engage in derivatives trading.
- ii. Design financial literacy programs that equip lower-income investors with risk management skills and knowledge of derivative instruments.
- iii. Develop derivative products with affordable entry points tailored to retail investors to increase market inclusivity.
- iv. Implement inclusive financial policies that link income growth with active market participation, such as incentives for investment or savings-linked derivatives access.
- v. Encourage targeted investor engagement campaigns to raise awareness of derivative markets, highlighting opportunities, risks, and strategies for participation.

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## CONFLICT OF INTEREST

There is no conflict of interest.

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