



Examining the Cointegrating and Causality Relationship between Foreign Portfolio Investments and the Securities Market Returns at the Botswana Stock Exchange

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ABSTRACT

In the context of Botswana, the relationship between foreign portfolio investment and the stock market returns is unclear in both the short and long run. The study aims to empirically examine the relationship between foreign portfolio investments and securities markets performance at the Botswana stock exchange (BS E), covering the period 2004-2022. The study employed the autoregressive distributed lag (ARDL) bounds model to test for cointegration and the Toda and Yamamoto and Dolado and Lütkepohl (TYDL) model to examine the direction of causality. The findings suggest that current investment flows significantly enhance current stock market returns in the short run; considering macroeconomic factors such as interest rates, market capitalization and exchange rates. The study also finds that past investment flows do not Granger cause stock market returns, indicating that past investment flows do not contain sufficient information to predict future stock returns and past stock returns do not predict future investment flows. The BSE is urged to enhance data transparency and availability, implement risk management frameworks, improve financial market infrastructure, support capital market development, monitor and manage volatility as well as developing strategies to attract stable foreign investment.

Keywords: Foreign Portfolio Investments, Autoregressive Distributed Lag, Causality, Securities Market Returns, Botswana Stock Exchange

JEL Classifications: G10, G11, G14

1. INTRODUCTION

Foreign portfolio investment (FPI) plays a vital role in developing economies (Samuel et al., 2016). FPI positively impacts the economic performance of the recipient nation in terms of efficiency, service generation, revenue delivery and an increase in local investment (Gümüş et al., 2013). FPI addresses the savings-investment gaps caused by low capital accumulation and poverty, thereby promoting economic growth (Ngowi, 2001). In the late 1980s and early 1990s, portfolio investment developed as an important formula for capital inflow to emerging states (Ogbonna et al., 2019). FPI involves foreign capital entering an economy to seek opportunities in securities, bonds, and the money market (Ogbonna et al., 2019).

Securities markets, encompassing stock, bond, and derivatives markets, are crucial to a country's economic growth and development. They set prices and facilitate interactions between professional and non-professional participants (Wijesinghe and De Silva, 2021). These markets promote long-term economic investment, boost domestic capital accumulation, and attract foreign portfolio investment (Wijesinghe and De Silva, 2021). Foreign investors participate through FPI, purchasing stocks and bonds without seeking lasting interest or effective management in enterprises (World Bank, 2014). FPI can influence stock market movements and investment sentiment positively or negatively (Jacob, 2021). Understanding the relationship and impact of FPI on securities markets is essential, as stock markets act as economic indicators for any country (Jacob, 2021).

The securities market has consistently provided a platform that facilitates the transfer of savings from those with surplus funds to those in need, enabling smooth cash flow, risk diversification, and efficient information dissemination in the financial market (Sibindi and Bimha, 2014). The inflows and outflows of FPI occur within stock market exchanges and serve as a significant indicator of economic development in developing countries like Botswana (Samuel et al., 2016). Haider et al. (2017) explored the effect of FPI on stock market performance in China and discovered that FPI significantly positively impacts stock market performance. Loice (2017) examined the effect of foreign portfolio equity (FPE) outflows on the stock returns of listed financial institutions in Kenya, focusing on 14 institutions through purposive sampling. The panel estimation results showed that FPE outflows did not influence the stock returns of these institutions. In India, several researchers, including Kumar (2018) and Bhasin and Khandelwal (2013) investigated the relationship between FPI and exchange rates. Their studies found that exchange rates had a significant negative impact on inward FPI flows in the long run, with the depreciation of the Indian Rupee notably reducing FPI inflows. Moreover, they established that capital openness in India had a detrimental effect on FPI.

Botswana like other developing countries, its FPI has fluctuated over the years as demonstrated in Figure 1.

Figure 1 illustrates the fluctuating nature of portfolio investment flows over time, with some periods showing negative inflows. A 4-period moving average reveals a general decline until 2011, followed by an increase until 2015 and then a decrease up to 2018 before rising again. This cyclical pattern likely reflects changes in the investment climate during certain periods. These findings are consistent with Ramayandi et al. (2019), who showed that portfolio investment flows in emerging markets are sensitive to global financial conditions and investor risk perceptions. Similarly, Amaechi et al., (2020) highlighted the role of macroeconomic factors, such as interest rates, exchange rates, and inflation, in influencing Foreign Portfolio Investment (FPI) volatility in emerging economies.

As highlighted in the introduction section, different researchers have studied the relationship between FPI and the stock market, yielding varied results. This highlights the importance of

Figure 1: FPI in Botswana from 2004 to 2022



Source: World Development Indicators (WDI), 2024

investigating the relationship between the everchanging FPI and the stock market; with particular relevance to Botswana’s ongoing efforts to develop its capital market and integrate into the global financial system.

2. LITERATURE REVIEW

2.1. Theoretical Literature Review

This study draws on neoclassical theory and the corollary framework as its primary theoretical foundations.

2.1.1. Neoclassical theory

The Solow’s neoclassical growth model (1956) emphasizes that increased productivity drives higher capital inflows due to rising investment demand. The model posits that full liberalisation of capital flows represents the optimal global scenario, while any restrictions are deemed suboptimal (Janicka, 2016). According to this theory, capital tends to flow from wealthier countries with lower returns to poorer nations offering higher returns, with national savings and investment playing crucial roles in the analysis of capital flows (Amaechi et al., 2020).

Solow’s (1956) economic growth theory begins with the aggregate production function:

$$Q = F(K, L, t) \tag{2.1}$$

Where Q = Aggregate output of the economy

K = Capital input

L = Labour input

t = Time, standing for technological change

The variable t for time appears in F to allow for technical change (Solow, 1956).

Assuming Hicks – Neutral technical change progress, equation (3.1) becomes:

$$Q(t) = A(t)F(K(t), L(t)) \tag{2.2}$$

$A(t)$ is the measure of technical progress. Hicks-Neutral technological progress or the output-augmenting technological progress is where $A(t)$ appears outside the production function. That is, it has an equal effect on K and L .

Differentiating equation (2.2) with respect to time, we get:

$$\frac{dQ}{dt} = F(K(t), L(t)) \frac{dA}{dt} + A(t) \frac{\partial F}{\partial K} \cdot \frac{dK}{dt} + A(t) \frac{\partial F}{\partial L} \cdot \frac{dL}{dt} \tag{2.3}$$

$$\dot{Q} = F(K(t), L(t)) \dot{A} + A(t) \frac{\partial F}{\partial K} \cdot \dot{K} + A(t) \frac{\partial F}{\partial L} \cdot \dot{L} \tag{2.4}$$

Where dot, indicates time derivative.

Dividing equation (2.4) through by Q , dropping the t for convenience and given that $Q(t) = A(t)F(K(t), L(t))$ from equation (2.2), we get:

$$\frac{\dot{Q}}{Q} = \frac{\dot{A}}{A} + A \frac{\partial F}{\partial K} \cdot \frac{\dot{K}}{Q} + A \frac{\partial F}{\partial L} \cdot \frac{\dot{L}}{Q} \quad (2.5)$$

From equation (2.2),

$$\frac{\partial Q}{\partial K} = A \frac{\partial F}{\partial K} \quad (2.6)$$

$$\frac{\partial Q}{\partial L} = A \frac{\partial F}{\partial L} \quad (2.7)$$

Equations (2.6) and (2.7) show marginal product of K and marginal product of L respectively.

Substituting questions (2.6) and (2.7) into equation (2.5), we get:

$$\frac{\dot{Q}}{Q} = \frac{\dot{A}}{A} + \frac{\partial Q}{\partial K} \cdot \frac{\dot{K}}{Q} + \frac{\partial Q}{\partial L} \cdot \frac{\dot{L}}{Q} \quad (2.8)$$

Multiplying the last two terms on the right hand side of equation (2.8) by $\frac{K}{K}$ and $\frac{L}{L}$ respectively, we get:

$$\frac{\dot{Q}}{Q} = \frac{\dot{A}}{A} + \frac{\partial Q}{\partial K} \cdot \frac{K}{Q} \cdot \frac{\dot{K}}{K} + \frac{\partial Q}{\partial L} \cdot \frac{L}{Q} \cdot \frac{\dot{L}}{L} \quad (2.9)$$

By definition:

$$W_K = \frac{\partial Q}{\partial K} \cdot \frac{K}{Q} \quad (2.10)$$

$$W_L = \frac{\partial Q}{\partial L} \cdot \frac{L}{Q} \quad (2.11)$$

Where W_K and W_L are the relative shares of capital and labour respectively.

Equations (2.10) and (2.11) show elasticity of output Q with respect to K and elasticity of output Q with respect to L respectively.

Substituting questions (3.10) and (3.11) into equation (3.9), we get:

$$\frac{\dot{Q}}{Q} = \frac{\dot{A}}{A} + W_K \cdot \frac{\dot{K}}{K} + W_L \cdot \frac{\dot{L}}{L} \quad (2.12)$$

Equation (2.12) is the Solow growth model where:

$\frac{\dot{Q}}{Q}$, is the proportional growth rate of Q, and \dot{Q} is derivative of Q with respect to time (t)

$\frac{\dot{A}}{A}$, is the proportional growth rate of A, and \dot{A} is derivative of A with respect to time (t)

$\frac{\dot{K}}{K}$, is the proportional growth rate of K, and \dot{K} is derivative of K with respect to time (t)

$\frac{\dot{L}}{L}$, is the proportional growth rate of L, and \dot{L} is derivative of L with respect to time (t)

The Solow (1956) growth model, equation (2.12), states that growth in output depends on growth in capital (K), labour (L), and technological change or technological progress (A).

This model is useful for assessing the impact of portfolio investment on a country's stock exchange. It suggests that capital moves from developed countries, where it is abundant, to developing countries, where it is scarce. This transfer helps reduce information asymmetry in developing markets by leveraging the technical expertise of developed nations (Muhammad, 2019). The traditional school of thought on capital flows stresses the importance of free markets, rational decision-making, and comparative advantage in shaping international trade and investment. Unrestricted capital flows are viewed as essential for the growth of emerging markets, with FPI playing a key role (Abdulkadir, 2018).

2.1.2. The corollary framework

The term "corollary framework" does not refer to a single, stand-alone theory developed by one scholar. Instead, it is used in academic literature, particularly in economics and finance, to describe a composite analytical model derived from the logical extensions, or corollaries, of several established theories. In this analysis, the Corollary Framework is a synthesized model that builds on the extended implications of key macroeconomic theories. As articulated by Abdulkadir (2018), the framework combines the core policy constraints of the Mundell–Fleming model (Mundell, 1963; Fleming, 1962) with empirical insights on the indirect benefits of capital flows (Eichengreen, 2007; Prasad et al., 2007). This integration provides a comprehensive policy toolkit for understanding and managing financial volatility. This synthesized framework is grounded in the following key concepts:

- **The Impossible Trinity:** The foundation of the framework is the Mundell–Fleming model (Mundell, 1963; Fleming, 1962) which highlights the inherent policy trade-off that countries face among exchange rate stability, capital mobility, and monetary policy autonomy. This requires strategic management of capital flows.
- **Indirect Benefits of Capital Flows:** While the immediate effect on stock market performance may be limited, the framework includes empirical findings that emphasize the significant indirect benefits of capital flows such as improved corporate governance, increased competition, and technological transfer (Eichengreen, 2007; Prasad et al., 2007).
- **Policy Toolkit:** The framework recommends an adaptive, balanced policy approach to managing external shocks. This approach involves prioritizing monetary policy autonomy and using flexible exchange rates to absorb shocks, along with strategically applying macroprudential policies and capital controls (e.g., taxes, reserve requirements) to reduce financial instability and systemic risk. This integrated framework offers valuable insights into maximizing the advantages of financial globalization while actively managing its inherent risks (Abdulkadir, 2018).

2.2. Empirical Literature Review

2.2.1. Foreign portfolio investment

While FPI can promote market efficiency and economic growth, it is often considered short-term and less stable than domestic savings due to its ease of reversal (Jacobs, 2021; Opperman and Adjasi, 2017). FPI complements domestic savings, introduces advanced technology and enhances productivity and employment. It also lowers capital costs for companies and diversifies the investor base, making it crucial for market expansion (Huni et al., 2025),

Investors are drawn to economies with stable macroeconomic conditions, including low inflation, stable exchange rates, and open capital markets. Key factors for attracting FPI include economic growth, financial market development, and political stability (Makoni, 2020). FPI is influenced by global “push” factors such as risk perceptions and macroeconomic stability in developed countries, as well as domestic “pull” factors such as interest rate differentials, exchange rates and political stability in emerging markets (Atobrah, 2015; Kumar and Dua, 2024; Fiandy and Saadah, 2024). Countries like Malaysia, China and India demonstrate how these factors significantly impact FPI inflows.

However, FPI is highly volatile and sensitive to global financial conditions. Sudden capital outflows can occur in response to shifts in risk perceptions or economic factors. Volatility is affected by interest rates, exchange rates and inflation risks (Tille and Zymek, 2018). Recent evidence shows that financial volatility and spillovers in global markets can exacerbate investment sensitivity in both developed and emerging economies (Mohammed, 2021; Ndubuisi et al., 2024; Ntare et al., 2025). While FPI enhances liquidity and lowers capital costs, it also carries risks, including abrupt outflows and vulnerability to external shocks, especially during financial crises (Ojong et al., 2017; Byrne and Fiess, 2016).

Studies in developing countries, including Nigeria, show a positive relationship between FPI, market capitalization, and trade openness; though FPI remains sensitive to both domestic and global economic changes (Ekeocha et al., 2012; Osemene and Arotiba, 2018; Ndugbu et al., 2021).

2.2.2. Stock markets and foreign portfolio investment

Stock markets are vital to modern economies, serving as platforms for capital allocation and wealth creation. They function through key performance indicators such as share index, market capitalization, stock returns, volatility and liquidity. Studies underscore their efficiency in reflecting corporate information and the influence of highfrequency trading (Chordia et al., 2019; Easley et al., 2017; Nahar et al., 2024; Sanusi and Dickason-Koekemoer, 2025). FPI is recognised as a major driver of stock market performance, enhancing liquidity, price discovery, and market integration (Afaq et al., 2017). Recent evidence suggests that FPI inflows are dynamically linked to stock prices and market performance in emerging markets (Sanusi and Dickason-Koekemoer, 2025).

Developing countries are increasingly shifting towards stock marketoriented financial systems; relying on FPI to boost economic growth (Pal, 2010; Ustaoglu, 2021). A developed stock market fosters economic progress by offering diverse investment options, increasing liquidity and promoting domestic savings. Recent empirical evidence also shows that foreign capital inflows including FPI enhance financial market development and economic performance by improving capital mobility and market efficiency in emerging markets (Otsapa et al., 2025). The presence of foreign financial institutions further encourages the growth of derivative markets, supporting broader market development and integration.

In countries like Nigeria, globalization and financial development have been shown to enhance stock market performance, with

critical factors including market capitalization, private sector credit and exchange rates (Ayunku and Etale, 2014; Olubodun et al., 2024). However, inflation and savings rates tend to negatively impact market growth, while monetary policy dynamics including interest rate movements play a significant role in shaping investor outcomes (Otsapa et al., 2025). Investor behavior, particularly as shaped by behavioral finance theories, also significantly influences stock market dynamics (Barberis and Xiong, 2018).

FPI has a multifaceted impact on stock markets. It boosts liquidity, aids in price discovery, and integrates markets with global capital flows. However, its effect on volatility is mixed. While FPI may stabilize markets through diversification, it can also heighten volatility during market stress (Ojong et al., 2017; Byrne and Fiess, 2016; Cai, 2020; Rudiawarni, 2024). Long-term FPI contributes to higher stock returns and market capitalization, but in emerging markets with weaker regulations, it can distort price signals and amplify informational asymmetries (Sharma, 2023; Odi, 2024)

Studies across various countries, including Kenya, Turkey, and the United States, generally demonstrate a positive link between foreign portfolio investment (FPI) and stock market performance (Gümüř et al., 2013). However, the relationship can weaken during economic downturns or in countries with less developed regulatory frameworks, as observed in studies from India and Turkey (Pal, 2010; Araç and Özcan, 2014). Moreover, during economic crises, foreign investors often withdraw funds, reducing the positive impact of FPI on stock market performance (Ordu-Akkaya and Soytaş, 2020; Phan et al., 2023).

FPI plays a crucial role in improving stock market performance by increasing liquidity, enhancing price discovery, and strengthening market integration with global financial systems (Sharma, 2023). However, its short-term volatility and sensitivity to global financial shocks and risk sentiment necessitate strong regulatory and institutional frameworks to mitigate potential destabilising effects, particularly in emerging markets (Phan et al., 2023). Despite these risks, empirical evidence continues to show that FPI remains a key driver of stock market growth and broader economic development when supported by sound macroeconomic and regulatory conditions.

3. METHODOLOGY

3.1. Model Specification

The Autoregressive Distributed Lag (ARDL) model was utilised to model the relationship between stock returns and portfolio investment flows. The variables were log transformed to reduce skewness of the data and make the data normal (West, 2022). The general underling ARDL model is specified as follows:

$$\begin{aligned} \log(R_t) = & \alpha + \sum_{i=1}^p \beta_i \log(R_{t-i}) + \sum_{j=0}^{q1} \gamma_{1j} \log(I_{t-j}) \\ & + \sum_{j=0}^{q2} \gamma_{2j} \log(M_{t-j}) + \sum_{j=0}^{q3} \gamma_{3j} \log(MIR_{t-j}) \\ & + \sum_{j=0}^{q4} \gamma_{4j} \log(E_{t-j}) + \varepsilon_t \end{aligned} \quad (3.1)$$

$$\begin{aligned} \log(I_t) = & \alpha + \sum_{i=1}^p \beta_i \log(I_{i,t-i}) + \sum_{j=0}^{q_1} \gamma_{1j} \log(R_{t-j}) \\ & + \sum_{j=0}^{q_2} \gamma_{2j} \log(M_{t-j}) + \sum_{j=0}^{q_3} \gamma_{3j} \log(MIR_{t-j}) \\ & + \sum_{j=0}^{q_4} \gamma_{4j} \log(E_{t-j}) + \varepsilon_t \end{aligned} \quad (3.2)$$

Where:

$\log(R_t)$ are the log-transformed stock returns.

$\log(I_t)$ are the log-transformed portfolio investment flows.

β_i are the coefficients of the log-transformed lagged dependent variable for $i = 1, 2, \dots, p$

$\log(I_{t-j})$ is the log transformed portfolio investment flows lagged by j periods

$\log(R_{t-j})$ is the log transformed returns lagged by j periods

$\log(M_{t-j})$ is the log transformed market capitalization values lagged by j periods

$\log(MIR_{t-j})$ are the log transformed market interest rates lagged by j periods.

$\log(E_{t-j})$ are the log transformed exchange rates lagged by j periods.

γ_{mj} are the coefficients of the log-transformed m -the independent variable for $m = 1, 2, 3, 4$ and $j = 0, 1, 2$ up to q_m

ε_t error term at time t .

p number of lags of the dependent variable.

q_m number of lags of the m th independent variable where, $m = 1, 2, 3, 4$

3.2. Stationarity Test

The ARDL model is applicable when variables are a mix of stationary and non-stationary; some integrated at order zero $I(0)$ and others at order one $I(1)$ or higher. Before estimating the ARDL model, the study applied the Augmented Dickey-Fuller (ADF) unit root test to check for stationarity. This test, based on an autoregressive model, helps determine if an ARDL model is appropriate for the analysis and is specified as follows:

$$\Delta y_t = \alpha + \beta_t + \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \delta_2 \Delta y_{t-2} + \dots + \delta_p \Delta y_{t-p} + \varepsilon_t \quad (3.3)$$

Where:

Δy_t is the difference of a times series y at time t .

Δy_{t-p} is the difference of a times series y at time $t-p$ for $p = 1$ to p .

Δy_{t-1} is time series y at time $t-1$

α is the constant term.

β_t is the coefficient of a time trend.

γ is the coefficient of the lagged time series y_{t-1}

δ is the coefficient of the differenced time series ($\Delta y_{t,p}$)

ε_t is the error term

The null hypothesis for the unit root ADF test is that a time series is non-stationary or has a unit root ($\gamma=0$). The alternative hypothesis is that the time series is stationary ($\gamma<0$).

3.3. Optimal Lag Length and Model Selection

The next step in modelling an ARDL model is determining the maximum lag length. The maximum lag length in the model was determined using the Akaike Information Criterion (AIC). The AIC helps in selecting the optimal lag length for independent variables that balances model complexity and goodness of fit. Based on the

optimal lag lengths determined using AIC, the best fitting ARDL was selected. This best model provides the most accurate and parsimonious representation of the data.

3.4. Cointegration Test

The bounds test was then employed to test for the existence of a long-run relationship between stock returns and independent variables in the model. Both the Bounds F and t tests were used to determine whether the variables are cointegrated.

3.5. Model Specification With or Without Error Correction

Depending on the results of the cointegration test, the underlying ARDL model was specified with or without an error correction. If cointegration is absent, the model would be estimated without an error correction term. Conversely, if the cointegration is present, the model would be estimated with an error correction. The Error Correction Model (ECM) accounts for short run dynamics whilst maintaining long run equilibrium. Equations 3.1 and 3.2. will be specified with error correction as follows:

$$\begin{aligned} (R_t) = & \alpha + \varphi_1 \log(R_{i,t-1}) + \varphi_2 \log(I_{t-1}) + \varphi_3 \log(M_{t-1}) \\ & + \varphi_4 \log(MIR_{t-1}) + \varphi_5 \log(E_{t-1}) + \sum_{j=1}^{p_j} \beta_{1j} \Delta \log(R_{t-j}) \\ & + \sum_{i=1}^{p_j} \beta_{2j} \Delta \log(I_{t-j}) + \sum_{j=1}^{p_j} \beta_{3j} \Delta \log(M_{t-j}) \\ & + \sum_{j=1}^{p_j} \beta_{4j} \Delta \log(MIR_{t-j}) + \sum_{j=1}^{p_j} \beta_{5j} \Delta \log(E_{t-j}) + \delta ECT_{t-1} + \varepsilon_t \end{aligned} \quad (3.4)$$

$$\begin{aligned} \Delta \log(I_t) = & \alpha + \varphi_1 \log(I_{t-1}) + \varphi_2 \log(R_{t-1}) + \varphi_3 \log(M_{t-1}) \\ & + \varphi_4 \log(MIR_{t-1}) + \varphi_5 \log(E_{t-1}) + \sum_{j=1}^{p_j} \beta_{1j} \Delta \log(I_{t-j}) + \\ & \sum_{j=0}^{p_j} \beta_{2j} \Delta \log(R_{t-j}) + \sum_{j=1}^{p_j} \beta_{3j} \Delta \log(M_{t-j}) + \sum_{j=1}^{p_j} \beta_{4j} \Delta \log \\ & (MIR_{t-j}) + \sum_{j=0}^{p_j} \beta_{5j} \Delta \log(E_{t-j}) + \delta ECT_{t-1} + \varepsilon_t \end{aligned} \quad (3.5)$$

Where:

$\log(R_t)$ are the log-transformed returns.

$\log(I_t)$ are the log-transformed returns.

β_{ij} are the coefficients of the i th log-transformed lagged dependent variable for $i = 1, 2, \dots, p_j$

$\log(I_{t-j})$ is the log transformed portfolio investment flows lagged by j periods

$\log(R_{t-j})$ is the log transformed portfolio investment flows lagged by j periods

$\log(M_{t-j})$ is the log transformed market capitalization values lagged by j periods

$\log(MIR_{t-j})$ are the log transformed market interest rates lagged by j periods.

$\log(E_{t,j})$ are the log transformed exchange rates lagged by j periods.
 ϕ_i is the i th coefficient of the of an independent variable lagged by 1
 β_{ij} is the i th coefficient of a differenced independent variable lagged by j
 p_j is the maximum lag of j th independent variable.
 ECT is the Error correction term
 δ . Is the coefficient of the error correction term.

3.6. Granger Causality

To examine causality, the study used the Toda and Yamamoto (1995) procedure for Granger causality, which is suited for non-stationary or mixed-order data. This method tests if past values of one variable can predict future values of another. Initially, the two variables, stock returns and portfolio investment, are modelled as a Vector Autoregressive (VAR) model as follows:

$$\text{Log}(R_t) = \beta_{10} + \beta_{11}\text{log}(R_{t-1}) + \dots + \beta_{1p}\text{log}(R_{t-p}) + \gamma_{11}\text{log}(I_{t-1}) + \dots + \gamma_{1p}\text{log}(I_{t-p}) + \mu_{1t} \quad (3.6)$$

$$\text{Log}(I_t) = \beta_{20} + \beta_{21}\text{log}(I_{t-1}) + \dots + \beta_{2p}\text{log}(I_{t-p}) + \gamma_{12}\text{log}(R_{t-1}) + \dots + \gamma_{2p}\text{log}(R_{t-p}) + \mu_{2t} \quad (3.7)$$

Where:

p is the maximum lag-length of the VAR models.

The study determined the maximum lag length for the VAR(p) models using the Akaike Information Criterion (AIC). To test for causality, the Wald test was applied at a 5% significance level. First, it tests if the coefficients of the lagged values of portfolio investment ($\log(I)$) are zero in the stock returns ($\log(R)$) equation, and then if the lagged values of stock returns are zero in the portfolio investment equation. If the null hypothesis is rejected in either test, it indicates Granger causality, meaning the independent variable Granger-causes the dependent variable.

4. EMPIRICAL RESULTS AND ANALYSIS

4.1. Stationarity Test

Table 1 presents the results for unit root test. The null hypothesis assumes the existence of a unit root (non-stationary), while the alternative suggests the series is stationary.

Table 1: Unit root test

| Variable | ADF test | |
|----------|----------------|---------|
| | Dickey -Fuller | P-value |
| R | -0.33249 | 0.082 |
| I | -0.36709 | 0.04494 |
| M | -1.9778 | 0.5808 |
| MIR | -3.2232 | 0.1064 |
| E | -2.0263 | 0.5624 |

Table 2: Optimal lag selection-equation 3.1

| Lag | R | I | M | MIR | E | AIC |
|-----|---|---|---|-----|---|------------|
| 1 | 1 | 0 | 0 | 2 | 1 | -10.459982 |
| 2 | 1 | 0 | 0 | 2 | 2 | -8.492797 |
| 3 | 1 | 0 | 0 | 1 | 1 | -8.065526 |
| 4 | 1 | 0 | 1 | 1 | 1 | -6.590042 |
| 5 | 1 | 1 | 1 | 1 | 1 | -5.317200 |
| 6 | 2 | 2 | 2 | 2 | 2 | -3.431332 |

Using a 5% significance threshold, only investment flows were stationary, while stock returns, market capitalization, interest rates, and exchange rates were non-stationary. The mixed order of integration indicates that an ARDL model could be applied.

4.2. ARDL Model

The optimal lags for each variable are selected based on AIC scores. The AIC scores for the best 6 ARDL models for equation 3.1 are shown under Table 2.

The best model for equation 3.1 is the ARDL (1,0,0,2,1) with the lowest AIC score of -10.459982.

The best model for equation 3.2 is the ARDL (1,2,2,0,2) with the lowest AIC score of -33.60170 as presented under Table 3. Consistent with the Granger causality results, investment returns do not have a lag in the best ARDL model.

4.3. Cointegration Test

To identify a potential long-term relationship between stock returns and investment flows, the initial ARDL (1,0,0,2,1) model needs to be adjusted to incorporate an error correction component. However, before estimating the ARDL (1,0,0,2,1) model with error correction, a cointegration test was performed to determine whether a long-term relationship exists between stock returns and the independent variables. The results of the Bounds t-test and F-tests are presented in Table 4.

The results indicate that the Bounds t-test was not significant ($t = 3.43$, $P = 0.1510$), providing no evidence of cointegration between stock returns and the independent variables. A follow-up Bounds F-test was also conducted and similarly found to be insignificant ($F = 3.42$, $P = 0.05767$). These results confirm the absence of a significant long-term relationship between stock returns and the independent variables, indicating no long-run equilibrium. Therefore, the ARDL (1,0,0,2,1) model was not adjusted for error correction. Additionally, the Bounds t-test and F-test were applied to the ARDL (1,2,2,0,2) model to evaluate cointegration, with the results shown in Table 5.

The results shows that the Bounds t-test was insignificant ($t = 3.20$, $P = 0.2205$). This indicates that there is no evidence of cointegration between portfolio investment flows and the

Table 3: Optimal lag selection-Equation 3.2

| Lag | I | R | M | MIR | E | AIC |
|-----|---|---|---|-----|---|----------|
| 1 | 1 | 2 | 2 | 0 | 2 | 33.60170 |
| 2 | 1 | 1 | 2 | 0 | 2 | 35.40433 |
| 3 | 1 | 0 | 2 | 0 | 2 | 36.52863 |
| 4 | 2 | 2 | 2 | 2 | 2 | 37.12314 |
| 5 | 1 | 0 | 2 | 0 | 1 | 40.89293 |
| 6 | 1 | 0 | 2 | 1 | 1 | 42.86313 |

Table 4: Bounds F and t test- ARDL (1,0,0,2,1)

| Statistic | Lower-bound | Upper-bound | Alpha | P-value |
|-----------|-------------|-------------|-------|------------|
| | I (0) | I (1) | | |
| t | -3.439448 | -4.582573 | 0.01 | 0.1510377 |
| F | 3.417718 | | | 0.05767685 |

independent variables in the model. The Bounds F- test also found to be insignificant ($F = 3.52, P = 0.102266$). This further confirms that there is no significant long-term relationship between portfolio investments and independent variables. Essentially, this means that no long-run equilibrium exists between portfolio investment flows and independent variables and as such the ARDL (1,2,2,0,2) was not adjusted for error correction.

4.4. ARDL Without Error Correction - Model Diagnostics

4.4.1. Model diagnostics-ADRL (1,0,0,2,1)

The ARDL (1,0,0,2,1) without error correction was then evaluated for the presence of heteroskedasticity and serial autocorrelation using the Breusch Pagan test and Durbin-Watson test respectively. The results are shown in Table 6.

Table 6 shows that the null hypothesis of no heteroskedasticity is not rejected at 5% level of significance ($BP = 9.0488, P > 0.05$). This means that the residuals of the ARDL (1,0,0,2,1) are homoscedastic. However, the Durbin-Watson test rejects the null hypothesis of no serial correlation at 5% level of significance. This means that the residuals were not free from serial autocorrelation.

To fix the problem of serial autocorrelation, the original ARDL (1,0,0,2,1) model was transformed and estimated iteratively using the Cochrane-Orcutt statistical procedure. The results of the transformed ARDL (1,0,0,2,1) model Durbin-Watson test are shown in Table 7.

In the transformed ARDL (1,1,0,0,2,1) model, the null hypothesis of no autocorrelation is not rejected. This shows that the model is now moderately free of serial autocorrelation.

4.4.2. Model diagnostics-ADRL (1,2,2,0,2)

The same process of checking heteroskedasticity and serial correlation was also conducted for the ADRL (1,2,2,0,2) model without error correction. The results are shown in Table 8.

Table 8 shows that the null hypothesis of no heteroskedasticity is not rejected at 5% level of significance ($BP = 11.239$,

$P > 0.05$) implying that the residuals of the ARDL (1,2,2,0,2) are homoscedastic. The null hypothesis of no serial correlation at 5% level of significance was also not rejected ($DW = 2.0501, P > 0.1993$). This implied that the residuals of the ARDL (1,2,2,0,2) did not exhibit serial autocorrelation.

4.4.3. ARDL without error correction - Final estimated transformed model

The results of the final estimated transformed ARDL (1,0,0,2,1) model without error correction are shown in Table 9.

Table 9 shows that portfolio investment flows significantly influence stock market returns in the short run ($t = 2.916, P = 0.02247 < 0.05$). This means that investment flows significantly enhance current stock market returns in the presence of macroeconomic factors such as interest rates, market capitalisation and exchange rates.

The estimated transformed ARDL (1,2,2,0,1) model Table 10, shows that stock returns at level do not significantly influence portfolio investment flows in short run ($t = 0.607, P = 0.5704 > 0.05$). The results also show that stock returns at lag 1 do not significantly influence portfolio investment flows in the short run ($t = -1.101, P = 0.3210 > 0.05$). Lastly, the results indicate that stock returns at lag 2 do not significantly influence portfolio investment flows in short run ($t = -1.120, P = 0.3138 > 0.05$). This means that current and past stock market returns do not significantly influence portfolio investment flows in the short run in the presence of macroeconomic factors such as interest rates, market capitalisation and exchange rates. Such findings are consistent with recent empirical evidence indicating that foreign portfolio investors tend to respond more strongly to macroeconomic stability and global risk conditions than to short-term stock return movements (Phan et al., 2023).

The absence of short-run effects aligns with the argument that foreign portfolio investment decisions are often guided by medium- to long-term expectations rather than transitory market fluctuations, particularly in emerging markets characterised

Table 5: Bounds F and t test- ARDL (1,2,2,0,2)

| Statistic | Lower-bound I (0) | Upper-bound I (1) | Alpha | P-value |
|-----------|----------------------|----------------------|-------|----------|
| t | -3.2072 | -3.4441 | 0.01 | 0.2205 |
| F | 3.519551 | -4.5826 | | 0.102266 |

Table 6: Heteroskedasticity and serial autocorrelation-ADRL (1, 0, 0, 2, 1)

| Test | Statistic | Df | P-value |
|------------------------|-----------|----|---------|
| Heteroskedasticity | BP=9.0488 | 8 | 0.3382 |
| Serial Autocorrelation | DW=1.2082 | | 0.0151 |

Table 7: Serial correlation - Original versus Transformed Model – ARDL (1,0,0,2,1)

| Model | Durbin-Watson statistic | P-value |
|------------------------|-------------------------|---------|
| Original ARDL model | 1.2082 | 0.0151 |
| Transformed ARDL model | 1.5406 | 0.1285 |

Table 8: Heteroskedasticity and serial autocorrelation- ADRL (1,2,2,0,2)

| Test | Statistic | Df | P-value |
|------------------------|-----------|----|---------|
| Heteroskedasticity | BP=11.239 | 11 | 0.4235 |
| Serial Autocorrelation | DW=2.0501 | | 0.1993 |

Table 9: Estimated model ARDL (1,0,0,2,1) model without error correction

| Variable | Estimate | Standard error | t-value | Pr(> t) |
|-------------|-----------|----------------|---------|----------|
| (Intercept) | 16.044294 | 6.423053 | 2.498 | 0.04112* |
| L (R, 1) | -0.287299 | 0.197130 | -1.457 | 0.18836 |
| I | 0.142047 | 0.048715 | 2.916 | 0.02247* |
| M | 0.132721 | 0.074379 | 1.784 | 0.11754 |
| MIR | 0.281325 | 0.666626 | 0.422 | 0.68567 |
| L (MIR, 1) | -0.861763 | 0.659762 | -1.306 | 0.23277 |
| L (MIR, 2) | -2.277356 | 0.710278 | -3.206 | 0.01493 |
| E | 0.717660 | 0.518231 | 1.385 | 0.20863 |
| L (E, 1) | -1.379469 | 0.663012 | -2.081 | 0.07602 |

Residual standard error: 0.1165 on 7° of freedom. Multiple R-squared: 0.7177, Adjusted R-squared: 0.3952. F-statistic: 2.2 on 8 and 7 DF, P-value: < 1.542e-01

by higher volatility and information asymmetries. Okuyan and Erbaykal (2011) similarly identified a positive long-term relationship between financial variables and capital flows, despite finding no significant short-run association. Paramati et al., (2016) showed that foreign investment contributes positively to stock market development over time, while Phan et al. (2023) confirms that the impact of foreign investment on stock market performance is predominantly long-term and sensitive to global uncertainty shocks.

Evidence from Nigeria also supports the relevance of macroeconomic fundamentals in shaping portfolio flows. While some studies such as Osemene and Arotiba (2018) and Ogundipe et al., (2019) documented significant relationships between exchange rate volatility and foreign portfolio investment, more other analyses indicate that exchange rate stability and market size remain critical determinants of sustained portfolio inflows (Ogundipe et al., 2019). Ojong et al., (2017) demonstrated a positive link between market capitalization and foreign portfolio investment.

Furthermore, Kim and Wei (2017) highlighted the role of foreign portfolio investment in improving price discovery and market depth through information integration. This view is reinforced by recent empirical evidence showing that while FPI enhances market liquidity and informational efficiency, its short-run impact on stock returns is often muted by global risk aversion, capital flow reversals, and macroeconomic shocks (Prabheesh, 2021; Prabheesh et al., 2023).

Overall, the findings of this study are consistent with contemporary literature, suggesting that foreign portfolio investment plays a more significant role in influencing stock market performance in the long run rather than in the short run.

4.5. The Causal Relationship between Stock Market Foreign Portfolio Investment

To explore the causal relationship between stock returns and investment flows, Toda and Yamamoto (1995) for Granger causality procedure was followed.

4.5.1. Maximum lag-length of VAR(p) model

Firstly, VAR(p) model was specified for the relationship between stock returns and investment flows. The maximum lag length was determined using AIC. The results are shown in Table 11.

The best maximum lag-length for the VAR model was found to be 1, with the highest AIC of -4.9583; a VAR (1) was therefore estimated.

4.5.2. Wald tests of VAR(p) model

Wald tests were then conducted on the estimated VAR (1) model to check causality. The results are shown in Table 12.

Table 12 shows that investment flows do not Granger cause stock market returns ($\chi^2 = 0.002$, $P = 0.964$), meaning that past investment flows do not provide significant information to predict future stock market returns. Similarly, stock market returns do not

Table 10: Estimated model ARDL (1,2,2,0,1) model without error correction

| Variable | Estimate | Standard error | t-value | Pr(> t) |
|-------------|----------|----------------|---------|----------|
| (Intercept) | 28.3006 | 22.2764 | 1.270 | 0.2598 |
| L (I, 1) | -0.2662 | 0.3948 | -0.674 | 0.5300 |
| R | 0.6920 | 1.1401 | 0.607 | 0.5704 |
| L (R, 1) | -1.5328 | 1.3918 | -1.101 | 0.3210 |
| L (R, 2) | -1.3007 | 1.1618 | -1.120 | 0.3138 |
| M | 0.1690 | 0.3555 | 0.475 | 0.6546 |
| L (M, 1) | 0.1444 | 0.4144 | 0.349 | 0.7416 |
| L (M, 2) | -0.3407 | 0.3407 | -1.000 | 0.3632 |
| MIR | 1.7704 | 3.5031 | 0.505 | 0.6348 |
| E | -0.9169 | 3.1386 | -0.292 | 0.7819 |
| L (E, 1) | 8.3892 | 4.1752 | 2.009 | 0.1007 |
| L (E, 2) | -7.5187 | 3.1158 | -2.413 | 0.0606 |

Residual standard error: 0.558 on 5 degrees of freedom. Multiple R-squared: 0.8647, Adjusted R-squared: 0.5669. F-statistic: 2.904 on 11 and 5 DF, P-value: 0.1246

Table 11: The maximum lag length using AJC

| Lag | 1 | 2 | 3 | 4 |
|---------|--------------|-------------|-------------|-------------|
| AIC (n) | -4.958326512 | -4.64050893 | -4.43649166 | -4.76119336 |

Table 12: The causality test

| Cause | Effect | Chi-square | P-value |
|-------|--------|-------------|-----------|
| I | R | 0.002015481 | 0.9641917 |
| R | I | 0.004312582 | 0.9476404 |

Granger cause investment flows ($\chi^2 = 0.004$, $P = 0.947$), suggesting that past stock returns cannot forecast future investment flows.

These findings are consistent with some previous studies. Evidence from markets such as Turkey found no relationship between foreign investment and stock market returns (Albayrak et al., 2012), while more recent country-specific studies from Nigeria and other African markets similarly report the absence of causality between foreign portfolio investment and stock market returns (Odi, 2024).

However, contrasting evidence was realised. Egly et al., (2010), Gümüş et al., (2013) and Byrne and Fiess (2016) identified positive associations between stock market returns and foreign portfolio investment. Studies employing time-varying Granger causality and Toda–Yamamoto frameworks, especially those examining periods of heightened uncertainty such as the COVID-19 pandemic found uni-directional or bi-directional causality between foreign portfolio investment and stock market returns, as evidenced in markets such as India and Turkey (Prabheesh, 2023).

The mixed findings suggest that the relationship between foreign portfolio investment and stock market returns is highly context dependent. It is influenced by market structure, crisis episodes, and the econometric techniques employed, including standard versus time varying causality approaches (Fromentin, 2022).

5. CONCLUSION AND POLICY IMPLICATIONS

FPI demonstrated a cyclical pattern, fluctuating in response to economic conditions, investor sentiment, and global trends,

suggesting transitional dynamics rather than a steady-state capital level in Botswana's economy, as per the Solow growth model. Neoclassical theory supports that these fluctuations occur as capital flows seek optimal returns based on comparative risk and stability.

The study found that current FPI flows positively influence short-term stock market returns, moderated by factors like interest rates and market capitalization. However, Solow's model suggests the immediate impact of FPI on growth may be constrained by diminishing returns and macroeconomic conditions, highlighting the need for stability and market infrastructure.

The Granger causality test indicated no causal link between past values of FPI and stock market returns, consistent with the Efficient Market Hypothesis (EMH); suggesting that historical stock market returns do not forecast future FPI.

The policy implications of this study suggest that enhancing data transparency and accessibility at the Botswana Stock Exchange (BSE), alongside advanced trading and risk management frameworks, would improve decision making, market stability and resilience against FPI volatility. Investments in financial market infrastructure and capacity building for market participants would support effective market operations and foster sustained growth.

Additionally, fostering capital market development through infrastructure improvements and promoting financial literacy would deepen local participation and broaden the investor base.

For the government, attracting stable, long term foreign investments through incentives, stabilizing investment flows and encouraging domestic investment are essential to building a resilient market. Strengthening regulatory frameworks and maintaining macroeconomic stability would further enhance market efficiency and investor confidence, supporting Botswana's financial market in attracting both domestic and foreign investments.

These results highlight the importance of macroeconomic stability and investment in Botswana's market infrastructure to fully capitalize on FPI for growth and enhanced stock market performance.

REFERENCES

- Abdulkadir, I., Jimoh, R., Badru, B. (2018), Foreign portfolio investment and stock market performance in Nigeria. *Ago-Iwoye Journal of Social and Behavioural Sciences*, 5(2), 56-75.
- Afaq, M., Khan, M.A., Saddique, S., Hashami, S.H. (2017), The impact of stock market performance on foreign portfolio investment in China. *International Journal of Economics and Financial Issues*, 7(2), 460-468.
- Albayrak, A.S., Öztürk, N., Tüylüoğlu, Ş. (2012), Makroekonomik değişkenler ile sermaye hareketlerinin IMKB-100 endeksi üzerindeki etkisinin incelenmesi. *Ekonomik ve Sosyal Araştırmalar Dergisi*, 8(2), 1-22.
- Amaechi, B.O., Ahmed, I.I., Ogbonnaya, K.L. (2020), The determinants of foreign portfolio investment in Nigeria: An ARDL bounds testing technique. *West African Journal of Monetary and Economic Integration*, 20(2), 63-77.
- Araç, A., Özcan, S.K. (2014), The causality between financial development and economic growth: The case of Turkey. *Journal of Economic Cooperation and Development*, 35(3), 171-198.
- Atobrah, R. (2015), *Determinants of Foreign Portfolio Investment: Evidence from Sub-Saharan Africa* [Masters Thesis]. Sweden: Södertörns University.
- Ayunku, P.E., Etale, L.M. (2014), Determinants of stock market development in Nigeria: A cointegration approach. *Advances in Research*, 3(4), 366-373.
- Barberis, N., Xiong, W. (2018), Realization utility. *Journal of Financial Economics*, 104(2), 251-271.
- Bhasin, N., Khandelwal, V. (2013), *Foreign Institutional Investment in India: Determinants and the Impact of Crises* [Working paper].
- Byrne, J.P., Fiess, N. (2016), International capital flows to emerging markets: National and global determinants. *Journal of International Money and Finance*, 61(1), 82-100.
- Cai, J. (2020), Foreign investors, private information, and price discovery. *Journal of Financial Economics*, 136(2), 373-395.
- Chordia, T., Goyal, A., Saretto, A. (2019), Cross-sectional variation in stock returns: Liquidity and idiosyncratic risk. *Journal of Financial Economics*, 131(2), 367-394.
- Easley, D., Prado, L., O'Hara, M. (2017), The microstructure of the flash crash: Flow toxicity, liquidity crashes and the probability of informed trading. *Journal of Portfolio Management*, 44(5), 30-42.
- Egly, P., Johnk, D., Daniel Liston, D. (2010), Foreign portfolio investment inflows to the United States: The impact of investor risk aversion and US stock market performance. *North American Journal of Finance and Banking Research*, 4(4), 25-41.
- Eichengreen, B. (2007), *The Cautious Case for Capital Flows*. Rating Agency Malaysia Conference on Free Capital Mobility: What's in Store for Asia. Singapore: University of California.
- Ekeocha, P.C., Ekeocha, C.S., Malaolu, V., Oduh, M.O. (2012), Modelling the long run determinants of foreign portfolio investment in Nigeria. *Journal of Economics and Sustainable Development*, 3(8), 194-205.
- Fiandy, E., Saadah, S. (2024), Analysis of pull and push factors of foreign portfolio investment flows in ASEAN-4. *Indian Journal of Applied Business and Economic Research*, 5(1), 43-59.
- Fleming, J.M. (1962), Domestic financial policies under fixed and under floating exchange rates. *IMF Staff Papers*, 9(3), 369-380.
- Fromentin, V. (2022), Time-varying causality between stock prices and macroeconomic fundamentals: Connection or disconnection? *Finance Research Letters*, 49(39), 103073.
- Gümüş, G.K., Duru, A., Gungor, B. (2013), The relationship between foreign portfolio investment and macroeconomic variables. *European Scientific Journal*, 9(34), 209-226.
- Haider, M.A., Khan, M.A., Abdulahi, E. (2017), Determinants of foreign portfolio investment and its effects on China. *International Journal of Economics and Finance*, 8(12), 143-150.
- Huni, S., Sibindi, A.B., Makoni, P.L. (2025), Tangible and intangible determinants of FDI and FPI inflows: Evidence from BRICS countries. *Economies*, 13(12), 353.
- Jacobs, P. (2021), An empirical analysis of foreign portfolio investment on stock market return: A Comparative Study of India and Brazil. *Pratibimba*, 21(1), 15-19.
- Janicka, M. (2016), Lucas paradox in the light of neoclassical theory. *Central European Review of Economics and Finance*, 11(1), 27-40.
- Kim, S.J., Wei, S.J. (2017), Foreign portfolio investors before and during a crisis. *Journal of International Economics*, 56(1), 77-96.
- Kumar, B. (2018), Risk, uncertainty and stock returns predictability-a case of emerging equity markets. *Journal of Financial Economic Policy*, 10(14), 438-455.
- Kumar, V., Dua, P. (2024), What explains foreign portfolio investment inflows to BRICS countries? *Economic Analysis and*

- Policy, 82(1), 32-46.
- Loice, K. (2017), The effect of foreign portfolio equity purchases on security returns in Kenya: Evidence from NSE listed financial institutions. *International Journal of Economics and Finance*, 9(4), 202-206.
- Makoni, L. (2020), Foreign portfolio investments, exchange rates and capital openness: A panel data approach. *International Journal of Economics and Business Administration*, 8(2), 100-113.
- Mohammed, W.A. (2021), Volatility spillovers among developed and developing countries: The global foreign exchange markets. *Journal of Risk and Financial Management*, 14(6), 270.
- Muhammad, A. (2019), Review of the neoclassical theory of capital flows and related empirical literature. In: *International Capital Flows and the Lucas Paradox*. Singapore: Springer. p9-24.
- Mundell, R.A. (1963), Capital mobility and stabilization policy under fixed and flexible exchange rates. *The Canadian Journal of Economics and Political Science*, 29(4), 475-485.
- Nahar, J., Nishat, N., Shoaib, A.S.M., Hossain, Q. (2024), Market efficiency and stability in the era of high-frequency trading: A comprehensive review. *International Journal of Business and Economics*, 1(3), 1-13.
- Ndubuisi, A., Maxwell, O.O., Agwu, E.C. (2024), Impact of exchange rate movements on foreign portfolio investment in Nigeria. *World Journal of Finance and Investment Research*, 8(3), 91-107.
- Ndugbu, M.O., Otiwu, K.C., Uzowuru, L.N. (2021), The effect foreign portfolio investment on economic growth in Nigeria. *South Asian Journal of Social Studies and Economics*, 11(3), 43-53.
- Ngowi, H.P. (2001), Can Africa increase its global share of foreign direct investment (FDI). *West Africa Review*, 2(2), 1-22.
- Ntare, H.B., Muteba Mwamba, J.W., Adekambi, F. (2025), Asymmetric volatility spillovers in varying market conditions and portfolio performance analysis of the South African foreign exchange market. *Economies*, 13(8), 232.
- Odi, E.R., Oji, G.U. (2024), The estimated effect of foreign portfolio investment on stock market development: A time series study from Nigeria. *World Journal of Finance and Investment Research*, 8(1), 64-84.
- Ogbonna, A.A., Calistus, O., Clement, E. (2019), Foreign portfolio investment and stock market returns in Nigeria. *IOSR Journal of Economics and Finance*, 10(6), 1-9.
- Ogundipe, A.A., Ogundipe, J.A., Abiola, J.A., Ogundipe, O.M. (2019), Exchange rate volatility and foreign portfolio investment in Nigeria. *Investment Management and Financial Innovations*, 16(3), 241-250.
- Ojong, C.M., Anthony, O., Arikpo, O.F. (2017), The impact of tax revenue on economic growth: Evidence from Nigeria. *IOSR Journal of Economic and Finance*, 7(1), 32-38.
- Okuyan, H., Erbaykal, E. (2011), The relationship between foreign investments and stock returns on istanbul stock exchange [İmkb'de yabancı işlemleri ve hisse senedi getirileri ilişkisi]. *Dogus University Journal*, 12(2), 256-264.
- Olubodun, A.O., Ogbekor, P.I., Waleawe, I. (2024), Financial market development and foreign portfolio investments in Nigeria and South Africa. *Archives of Business Research*, 12(3), 103-118.
- Opperman, P., Adjasi, C.K.D. (2017), The determinants of private capital flow volatility in Sub-Saharan African countries. *Research in International Business and Finance*, 42, 312-320.
- Ordu-Akkaya, B.M., Soytaş, U. (2020), Unconventional monetary policy and financialization of commodities. *The North American Journal of Economics and Finance*, 51, 100902.
- Osemene, O.F., Arotiba, K. (2018), Exchange rate volatility and foreign portfolio investment in Nigeria. *Global Journal of Management and Business Research*, 18(2), 13-19.
- Otsapa, O.A., Nande, A., Erhuotor, E.E. (2025), Monetary policy dynamics and stock market reactions in Nigeria: An in-depth empirical assessment. *Nigerian Journal of Sustainability Research*, 3(1), 1-24.
- Pal, P. (2010), Foreign Portfolio Investment, Stock Market and Economic Development: A Case Study of India. In: *Annual Conference on Development and Change Mission: Promoting Development in a Globalized World*. Sao Paulo, Brazil.
- Paramati, S.R., Gupta, R., Hui, A. (2016), Trade and investment linkages and stock market long-run relationship. *Australian Economic Papers*, 55(2), 149-169.
- Phan, D.H.B., Sharma, S.S., Tran, V.T. (2023), Financial crises, foreign capital flows, and stock market volatility. *International Review of Financial Analysis*, 88, 102676.
- Prabheesh, K.P. (2021), Dynamics of foreign portfolio investment and stock market returns during the COVID-19 pandemic: Evidence from India. *Asian Economics Letters*, 1(2), 1-5.
- Prabheesh, K.P., Kumar, S., Shareef, A.O. (2023), Revisiting the impact of foreign portfolio investment on stock market performance during COVID-19 pandemic uncertainty: Evidence from India. *MethodsX*, 10, 101988.
- Prasad, E.S., Rajan, R.G., Subramanian, A. (2007), Foreign capital and economic growth. *Brookings Papers on Economic Activity*, 1, 153-230.
- Ramayandi, A.M., Kumar, R., Ito, T., Mia, W. (2019), The determinants of portfolio flows to emerging markets. *Journal of Asian Economics*, 6(5) 53-71.
- Rudiawarni, F.A. (2024), The role of foreign investor stock purchases in excess returns and information quality. *International Review of Financial Analysis*, 93, 103080.
- Samuel, O.O., Stephen, O.I., Ifeyinwa, A.C. (2016), Foreign portfolio investment and stock market growth in Nigeria. *Developing Country Studies*, 6(11), 64-76.
- Sanusi, K.A., Dickason-Koekemoer, Z. (2025), Dynamics between foreign portfolio investment, stock price and financial development in South Africa: A SVAR approach. *Economies*, 13(1), 8.
- Sharma, P. (2023), Research on price discovery in financial securities: Trends and directions for future research. *Journal of Risk and Financial Management*, 16(9), 416.
- Sibindi, A.B., Bimha, A. (2014), Banking sector development and economic growth: Evidence from Zimbabwe. *Banks and Bank Systems*, 9(2), 51-8.
- Solow, R.M. (1956), A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, 70(1), 65-94.
- Tille, C., Zymek, R. (2018), The international transmission of monetary policy. *Journal of Economic Literature*, 56(2), 424-475.
- Toda, H.Y., Yamamoto, T. (1995), Statistical inference in vector autoregressions with possibly integrated processes. *Journal of Econometrics*, 66(1-2), 225-250.
- Ustaoglu, E. (2021), The relationship between foreign investments, financial development, and economic growth: Evidence from panel data. *International Journal of Management Economics and Business*, 17(3), 681-710.
- West, R.M. (2022), Best practice in statistics: The use of log transformation. *Annals of Clinical Biochemistry*, 59(3), 162-165.
- Wijesinghe, M.R.P., De Silva, A.L.C.M. (2021), Foreign portfolio investment and earnings quality: Evidence from Sri Lanka. *Kelaniya Journal of Management*, 10, 1-15.
- World Bank. (2024), *World Bank Annual Report*. Washington, DC.
- World Bank. (2024), *World Development Indicators*. Washington, DC: World Bank.