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**CAPITAL FLOW VOLATILITY, BANK ROE, AND EQUITY MARKET RETURNS IN
SANEK COUNTRIES**

by
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A thesis submitted in fulfilment of the requirements for the degree of
Doctor of Philosophy (PhD) in Economics

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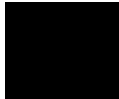
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Abstract

This thesis focuses on the volatility in cross-border capital flows, bank RoE, and equity market returns (EMR) in South Africa, Nigeria, Egypt, and Kenya (SANEK), using quarterly data from 2000 to 2021. Cross-border capital flow volatility has been decomposed into bank lending and equity flows. The volatile nature of capital flows and significant variations in equity returns and bank RoE instability in these countries raise concerns about financial system stability. This thesis is divided into three interconnected essays, each with its own distinct focus.

The first essay examines the determinants and magnitude of volatility in cross-border bank lending and equity flows using a Markov switching mean VAR model. It identifies global factors such as contagion effects, world GDP, and world interest rates as key "push" drivers, while domestic factors like institutional quality, financial openness, inflation, GDP growth, and current account balance serve as "pull" factors. These influences vary by country and regime. For example, in South Africa, push factors predominantly drive bank lending volatility, while equity flows are shaped by both push and pull dynamics. Nigeria and Egypt experience strong impacts from push factors across both capital flow types, whereas in Kenya, both factor sets significantly influence flow volatility. The findings underscore the need for targeted policy responses to stabilise capital flows.

The second essay analyses the impact of cross-border bank lending volatility on bank RoE using GARCH, EGARCH, and TGARCH models. Results reveal that lending volatility affects RoE asymmetrically across countries. In South Africa and Egypt, positive volatility shocks enhance bank RoE, while in Nigeria and Kenya, negative shocks diminish it. These outcomes highlight the importance of risk management strategies tailored to each country's financial environment. Regulators must also account for these dynamics when crafting supervisory policies to ensure banking sector stability.

The third essay explores the asymmetric effects of equity flow volatility on EMR using the NARDL model. It finds that positive shocks significantly boost returns in Egypt but suppress them in Kenya, while in Nigeria, negative shocks unexpectedly improve equity returns. In South Africa, positive shocks exert a strong influence on

EMR. These diverse reactions suggest that investors and policymakers must adopt country-specific strategies to manage risk and optimise returns in volatile capital markets.

Keywords: cross-border bank lending volatility, cross-border equity flow volatility, bank RoE, equity market returns, MSM-VAR, GARCH-type models, and NARDL.

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List of Acronyms

ADF	Augmented Dickey-Fuller	INS	Institutional Quality
AIC	Akaike Information Criterion	IR	Interest Rates
AMH	Adaptive Market Hypothesis	JKSI	Jakarta equity index
APT	Arbitrage Pricing Theory	JSE	Johannesburg Stock Exchange
ARCH	Autoregressive Conditional Heteroscedastic Model	LM	Lagrange Multiplier
ARDL	Autoregressive Distributed Lag	LR	Liquidity Risk
BIC	Bayesian Information Criterion	MC	Market Capitalization
BIS	Bank of International Settlements	MENA	Middle East and North Africa
BLV	Bank Lending Volatility	MSM-VAR	Markov-Switching Mean VAR Model
BRICS	Brazil, Russia, India, China, South Africa	MPT	Modern Portfolio Theory
BS	Bank Size	NARDL	Nonlinear Autoregressive and Distributed Lag
CAB	Current Account Balance	NIM	Net Interest Margin
CAPM	Capital Asset Pricing Model	NPL	Non-Performing Loans
CBE	Central Bank of Egypt	NSE	Nairobi Stock Exchange
CBK	Central Bank of Kenya	NSE	Nigerian Stock Exchange
CBN	Central Bank of Nigeria	OIC	Organization of Islamic Cooperation
CEE	Central and Eastern Europe	OLS	Ordinary Least Squares
COVID	Coronavirus Disease	P-ARDL	Panel Autoregressive Distributed Lag
CR	Credit Risk	PP	Phillips-Perron
CUSUM	Cumulative sum	RE	Random Effect
DEA	Data Envelopment Analysis	RGDP	Real Growth Domestic Product
ECM	Error Correction Model	RMPH	Relative Market Power Hypothesis
EFV	Equity Flow Volatility	RoA	Returns on Assets
EGARCH	Exponential GARCH	RoE	Return on Equity
EMH	Efficient Market Hypothesis	SADC	Southern African Development Community
EMR	Equity Market Returns	SANEK	South Africa, Nigeria, Egypt, Kenya
ESH	Efficient Structure Hypothesis	SARB	South African Reserve Bank
EU	European Union	SCP	Structure Conduct Performance
EXR	Exchange Rate Risk	SIC	Schwarz Information Criterion
FDI	Foreign Direct Investment	SPV	Stock Price Volatility
FE	Fixed Effect	TFPE	Total Factor Productivity Efficiency
FIH	Financial Instability Hypothesis	TGARCH	Threshold GARCH
FSCA	Financial Sector Conduct Authority	USD	United States Dollar
FO	Financial Openness	VAR	Vector Autoregressive
FPE	Final Prediction Error	VECM	Vector Error Correction Model
FPI	Foreign Portfolio Investment		

GARCH	Generalized Autoregressive Conditional Heteroskedasticity	VIX	Volatility Index
GCC	Gulf Cooperation Council	WGDP	World Gross Domestic Product
GMM	Generalized Method of Moments	WIR	World Interest Rates
HQC	Hannan-Quinn Criterion		
ICAPM	International Capital Asset Pricing Model		
IFS	International Financial Statistics		
IMF	International Monetary Fund		
INF	Inflation		

Chapter 1

Introduction and Background

1.0 Introduction

African emerging markets SANEK (South Africa, Nigeria, Egypt, and Kenya) have seen an increase in cross-border capital flows. These flows play a crucial role in driving market dynamics, influencing capital allocation, enhancing market efficiency, and facilitating risk diversification (see Bathia et al., 2023). International capital mobility theory states that capital moves across borders in search of the highest risk-adjusted returns (Golub, 1990). The liberalisation of financial markets, alongside technological advancements, has facilitated a rapid surge in cross-border capital flows in emerging economies. SANEK, with their expanding financial sectors and strong economic potential, have become key destinations for cross-border bank lending and equity flows, attracting investors seeking higher returns. These countries hold strategic economic significance as leading financial hubs in Africa. According to Abdilahi and Davis (2022) and Mathieu, Pani, Chen, and Maino (2019), the SANEK economies feature robust financial markets that contribute substantially to Africa's investment landscape. As a group, SANEK represented 68% of Africa's capital inflows in 2023 (Oluwole, 2024). With \$806 million in cross-border capital flows, Kenya came in first, followed by Egypt with \$675 million, Nigeria with \$575 million, and South Africa with \$565 million (Oluwole, 2024). These figures underscore the pivotal role of SANEK countries in attracting cross-border capital to the continent. This study focuses on two types of cross-border capital flows: bank lending and equity flows, which are generally more volatile than foreign direct investment (FDI) (Lee et al., 2013). Cross-border bank lending includes loans and debt instruments (see Opperman and Adjasi, 2017), while equity flows refer to foreign investments in domestic equities (see Bathia, Bouras, and Demirer, 2020). The significance of these flows lies in their impact on financial stability, currency valuation, and inflation rates. However, data from the Bank for International Settlements (BIS, 2023) and the World Bank (2023a) indicate that SANEK has experienced notable volatility in capital flows, often resulting in currency depreciation and inflationary pressures (Makrelov, Davies, and Harris, 2021; Adegbesan, 2022; Moody's, 2022). Aghion et al. (2004) argue that capital flow volatility is particularly high

in countries that open their capital accounts within the context of an intermediate level of financial development. Understanding these dynamics is essential for assessing the risks and benefits associated with cross-border capital flows in emerging economies like SANEK, especially within the African context. SANEK lacks comprehensive policies to mitigate the impacts of capital volatility, despite liberalising markets and encouraging cross-border capital flows. This lack of sound regulatory frameworks leaves SANEK vulnerable to external shocks and speculative movements, as evidenced by erratic capital inflows and outflows, as seen in BIS and World Bank data.

The primary drivers of cross-border capital flow volatility in SANEK remain unclear, particularly concerning the relative influence of domestic (pull) factors versus global (push) factors. Additionally, the magnitude of these factors and their interactions are not explained. Therefore, this study examines the factors that may contribute to volatility in cross-border capital flows in SANEK. Pull factors, including institutional quality, financial openness, and exchange rate dynamics, represent domestic conditions that can attract or deter capital inflows (see Neumann, Penl, and Tanku, 2009). Conversely, push factors, such as fluctuations in global interest rates, world economic growth, and contagion risk, exert external pressure on capital flows, influencing volatility across financial markets (see Engle and Gonzalo, 2008; Pagliari and Hannan, 2017). While previous studies have established that these factors play a role in capital flow volatility, as explained in the problem background section, the existing literature fails to quantify their specific magnitudes. Quantifying the magnitude of factors driving capital flow volatility is crucial for several reasons. Understanding the relative impact of push and pull factors enables policymakers to design targeted interventions. For instance, if domestic institutional quality significantly affects capital inflows, enhancing governance and financial regulations could mitigate volatility. Conversely, if global interest rate fluctuations exert a stronger influence, central banks may need to adjust monetary policies accordingly. Investors, financial institutions, and regulators require precise estimates of factor contributions to assess potential risks. This study addresses this gap by analysing the extent to which each factor contributes to volatility and how they interact in shaping financial stability in SANEK countries. For policymakers and investors, a clearer understanding of these dynamics is essential for anticipating market fluctuations and implementing effective risk management strategies. By distinguishing between the effects of pull and push factors, this research

provides insights into the mechanisms driving capital flow volatility, equipping stakeholders with the knowledge needed to navigate financial uncertainties more effectively.

The banking sector and equity markets are the two largest financial segments in SANEK countries (Nyasha and Odhiambo, 2015; Ngugi, 2003; Omorokunwa, 2018). This study examines these sectors, which are key recipients of cross-border bank lending and equity flows. Bank return on equity (RoE) measures banking sector performance (see Kablay and Gumbo, 2021), while equity market returns (EMR) measure the performance of equity markets (Limongi and Ravazzolo, 2019). SANEK has undertaken financial reforms aimed at creating a stable and efficient financial system. These reforms include unrestricted capital movements, deregulated deposit and lending rates, and the adoption of foreign currency systems (Nyasha & Odhiambo, 2015; Ngugi, 2003; Omorokunwa, 2018). However, due to low domestic savings and investment levels, SANEK banks remain dependent on cross-border capital inflows to fill the funding gap (Omorokunwa, 2018) and face internal financial constraints (Kinda, 2010). Financial integration enables capital from developed markets to flow into capital-scarce regions like SANEK, offering higher return potential (Lothian, 2006). Equity markets play a vital role in fostering economic growth in SANEK by mobilising capital, facilitating investment, and improving market liquidity. South Africa and Nigeria possess the most liquid equity markets in the region. The Johannesburg Stock Exchange (JSE) is the largest, with a market capitalisation of approximately USD 1.36 trillion, while the Nigerian Stock Exchange (NSE) follows with USD 66.7 billion (Chikwira & Mohammed, 2023). Egypt and Kenya have also made substantial progress in developing their stock exchanges, attracting foreign investments and enhancing market efficiency. These four countries were selected for this study because they represent the most financially integrated economies in Africa, with well-established banking systems and equity markets that significantly influence regional financial dynamics. Their financial markets serve as primary channels for cross-border capital flows, making them ideal for assessing the asymmetric effects of cross-border bank lending volatility (equity flows) on bank RoE (equity market returns). According to the World Bank (2023b), bank RoE in SANEK remains volatile, while negative equity market returns strain financial markets. These uncertainties contribute to a high-risk investment environment. Addressing these challenges is crucial for sustaining

economic stability and attracting cross-border capital flows. Policymakers can enhance SANEK's economic prospects by improving banks' RoE and boosting EMR. Strengthening financial regulations, fostering investor confidence, and promoting market liquidity will create more favourable investment conditions, ultimately supporting long-term economic growth in the region.

This study addresses three gaps in the literature, enhancing our understanding of capital flow volatility in SANEK countries. First, it identifies the key drivers of capital flow volatility at a country-specific level using a regime-switching approach. This methodology offers insights that extend beyond aggregate-level analyses, enabling a more detailed understanding of volatility dynamics in individual countries. Second, the study investigates the relationship between cross-border bank lending volatility and bank RoE using both symmetrical and asymmetrical approaches. It highlights how financial shocks transmit through the banking sector and influence systemic risk. Third, it examines the asymmetrical effects of cross-border equity flow volatility on equity market returns, emphasising how unstable equity flows can disrupt capital formation and destabilise economic conditions in SANEK. A nonlinear and asymmetric approach is preferred over a linear model, as financial markets can undergo abrupt behavioural shifts in response to events such as financial crises or changes in government policies. Equity markets often exhibit nonlinear behaviour, where the responses to positive and negative shocks differ (see Ang and Timmermann, 2011). By analysing these dynamics, the study provides valuable insights into the vulnerabilities of emerging financial markets, particularly within the African context. It builds on Ahmad (2017), who stresses the importance of financial stability in maintaining systemic integrity and offers crucial implications for policymakers and financial regulators since there is a loophole in the existing policies dealing with volatile capital flows. The findings inform effective risk management strategies aimed at enhancing financial resilience and ensuring sustained economic growth in SANEK countries. The study spans from 2000Q1 to 2021Q4, with limitations in the availability of adequate data for SANEK countries, excluding South Africa, prior to 2000. This period captures crucial global events, such as the 2008 global financial crisis and the COVID-19 pandemic and allows for an analysis of the post-crisis recovery and the evolution of capital flow volatility over time. Despite these limitations, the study makes significant contributions to the literature.

1.1 Research Background

This section discusses the volatility of cross-border bank lending and equity flows and their relation to SANEK. It then discusses the banking sector's performance, followed by an analysis of equity market performance. These discussions form the basis of the problem background.

1.1.1 Cross-border bank lending and equity flow volatility in SANEK

In the mid-1990s, capital flows from advanced to developing economies increased significantly (Scheubel, Stracca, & Tille, 2021). This was spurred by liberalising capital accounts and restructuring the financial sector (see Nyasha and Odhiambo, 2015; Omorokunwa, 2018). As a result of this shift, SANEK has become an essential channel for cross-border bank lending and equity inflows. While these capital inflows have improved access to finance, supported economic growth, and facilitated investments in productive projects, they have also introduced financial vulnerabilities, such as market volatility and systemic risks. Various theoretical frameworks can be used to analyse the benefits and risks of cross-border capital flows. The Efficient Market Hypothesis (EMH) (Fama, 1970) asserts that financial markets allocate capital efficiently based on available information, enhancing investment decisions in SANEK markets. Meanwhile, Modern Portfolio Theory (MPT) (Markowitz, 1952) emphasises the importance of diversification in mitigating risk, suggesting that cross-border capital inflows contribute to financial stability by spreading investment risks across multiple markets. However, the Financial Instability Hypothesis (Minsky, 1992) warns that excessive capital flows can lead to financial fragility, especially when speculative investments dominate capital allocation. Additionally, the Capital Flow Volatility Hypothesis (Calvo and Reinhart, 2000) highlights the challenges posed by sudden capital reversals, which can destabilise emerging markets like those in SANEK.

Cross-border bank lending has played a pivotal role in strengthening financial integration by promoting capital mobility, intensifying market competition, and improving interest rate efficiency. Risk-sharing and financial deepening have been fostered by cross-border bank lending in SANEK, contributing to macroeconomic stability. However, this form of capital inflow also exposes economies to external shocks. For instance, Nigeria experienced a decline in foreign loans in 2014 due to a sharp drop in oil prices and a shortage of foreign exchange inflows, leading to an

increase in the non-performing loans (NPL) ratio and reduced credit extension (Ukpanah & Okafor, 2017). Similarly, Egypt's banking sector saw a rise in NPLs due to an economic slowdown, causing credit defaults and financial distress (Moody's, 2022). In contrast, South Africa has managed to mitigate currency risk due to the relative dominance of the Rand in regional financial markets (SARB, 2022). Kenya, facing an increase in NPLs, has seen its central bank implement liquidity support mechanisms and loan restructuring programmes to contain financial instability. These variations highlight the importance of risk management strategies in adapting to cross-border bank lending volatility.

Cross-border equity flows provide liquidity, enhance portfolio diversification, and attract foreign investors, thereby improving firms' access to capital. However, these flows can also introduce financial instability, mainly during times of global uncertainty. The Pull and Push Theory (Fernandez-Arias, 1996) posits that capital inflows are influenced by both domestic (pull factors) and global (push factors) conditions. For instance, during the COVID-19 pandemic, emerging markets experienced a reversal of equity portfolio flows as global risk aversion increased (Schneider et al., 2020). South Africa saw significant equity outflows, a depreciation of the Rand, and rising bond yields (Makrelov et al., 2021). The net sale of domestic equities and bonds by non-residents increased to R98.1 billion in November 2023, compared with R43.4 billion in 2022. Similarly, Nigeria faced a 163% increase in capital outflows between January 2021 and January 2022, negatively impacting its foreign exchange reserves (Adegbesan, 2022). Egypt's economy remains at risk to external risks, exacerbated by geopolitical uncertainties like the Russia-Ukraine conflict, which has led to increased capital flight (Moody's, 2022). Additionally, Kenya experienced a net foreign equity outflow of \$8.2 million in 2021Q4, reflecting investor concerns regarding macroeconomic stability (Owino, 2022). These capital reversals highlight the inherent fragility of equity-dependent economies and underscore the necessity for robust financial policies to mitigate the adverse effects of global market fluctuations.

While cross-border capital flows provide significant growth opportunities for SANEK economies, they also bring vulnerabilities that necessitate prudent financial management. Insights from the EMH, MPT, the FIH, and the Pull and Push Theory enhance our understanding of these dynamics. To mitigate risks and ensure

sustainable benefits from capital flows, effective policy responses are crucial. Among them are macroprudential regulations, currency risk management, and financial market development. By implementing targeted strategies, SANEK can capitalise on the advantages of financial globalisation while protecting their economies from systemic shocks.

1.1.2 Banking sector performance in SANEK

RoE is a key measure of bank profitability, reflecting both financial performance and long-term sustainability (Norman, 2017). As a critical indicator, RoE demonstrates banks' ability to generate sustainable returns for shareholders, influencing their competitive positioning and growth prospects (Menicucci and Paolucci, 2016). In the context of the SANEK countries, micro-level profitability is fundamental to the survival, expansion, and resilience of banks. At the macro level, a profitable banking sector supports economic growth by enhancing credit availability, fostering investment, and mitigating systemic risks (Kassem and Sakr, 2018). Recent trends, as illustrated in Figure 1.1, show fluctuations in RoE across SANEK banks, raising concerns about the sustainability of profitability. Notably, banks in Egypt and Kenya have consistently demonstrated high RoE, while South African and Nigerian banks have reported lower returns. Although Nigeria's RoE has remained relatively stable over the past nine years, a sharp decline was recorded in 2016, indicating potential structural weaknesses or industry-specific challenges. These disparities highlight the influence of both domestic and global factors on bank profitability, necessitating a deeper examination of the underlying determinants.

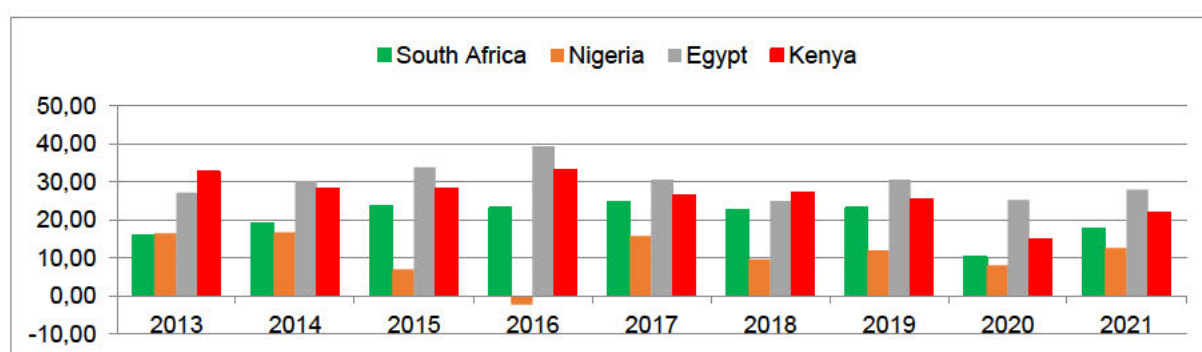


Figure 1.1 SANEK Returns on Equity, in percent, 2013-2021.

Source: Author's illustration using the World Bank (2023b) data.

Several theoretical frameworks offer insight into these variations. The Structure-Conduct-Performance paradigm suggests that market structure and competitive dynamics influence bank profitability (Mason, 1939), implying that differences in industry concentration and regulatory frameworks across SANEK countries may drive RoE disparities. Financial Intermediation Theory underscores the role of banks in efficiently channelling funds, indicating that profitability is closely linked to lending conditions, credit risk management, and interest rate spreads. Market Power Theory posits that banks with greater market dominance can maintain higher profitability due to reduced competition and enhanced pricing power (Shepherd, 1983). Conversely, the Efficient Structure Hypothesis suggests that banks with superior management and operational efficiencies can achieve sustainable RoE regardless of market conditions (Demsetz, 1973; Peltzman, 1977). Beyond domestic conditions, global risk factors such as cross-border capital flows and macroeconomic volatility also impact RoE trends. Volatility in cross-border bank lending, driven by capital reallocation, can elevate financing costs and amplify credit risks, ultimately affecting banks' ability to sustain profitability. In response, SANEK banks must adopt robust risk management strategies, improve capital adequacy, and leverage financial innovation to maintain profitability. A strong RoE not only enhances banks' capacity to absorb credit impairment losses but also ensures the continuity of financial services, thereby mitigating the adverse effects of economic downturns (see Norman, 2017). Overall, understanding RoE dynamics in SANEK banks is critical for policymakers, investors, and financial institutions, as it provides valuable insights into financial stability and long-term growth prospects. Addressing the structural, global and macroeconomic factors influencing profitability will be essential in fostering a resilient and competitive banking sector in the region.

1.1.2 Equity market performance in SANEK

Equity market return is a crucial indicator of corporate profitability and overall market performance, providing valuable insights into financial stability and investment attractiveness (Hong, Bian, and Lee, 2021). While equity markets are vital to market-based economies, most SANEK countries (except South Africa) are primarily bank-dependent economies (Orekoya, Afolabi, and Akintunde, 2021). This emphasises the importance of developing equity markets to diversify financial intermediation, improve

capital allocation efficiency, and ensure liquidity in the region. Levine and Zervos (1995) support the complementary roles of banks and equity markets in promoting financial stability and efficiency, arguing that a balanced financial system is essential for sustained economic growth. A positive EMR indicates profitability, while a negative EMR signifies loss. Throughout the analysis period, SANEK's equity market dynamics displayed considerable fluctuations, characterised by increased volatility and periodic downturns (see Figure 1.2). The instability in EMR, despite a slight increase in 2021 (excluding Egypt), highlights vulnerabilities within these markets. The highest EMR in 2017 was recorded by Egypt, averaging over 75 percent, while Nigeria's EMR has been declining since 2015. Equity market returns in South Africa have remained consistently weak, reflecting broader regional trends. These patterns necessitate a thorough examination of the structural, global, and macro-finance factors influencing EMR fluctuations in SANEK countries.

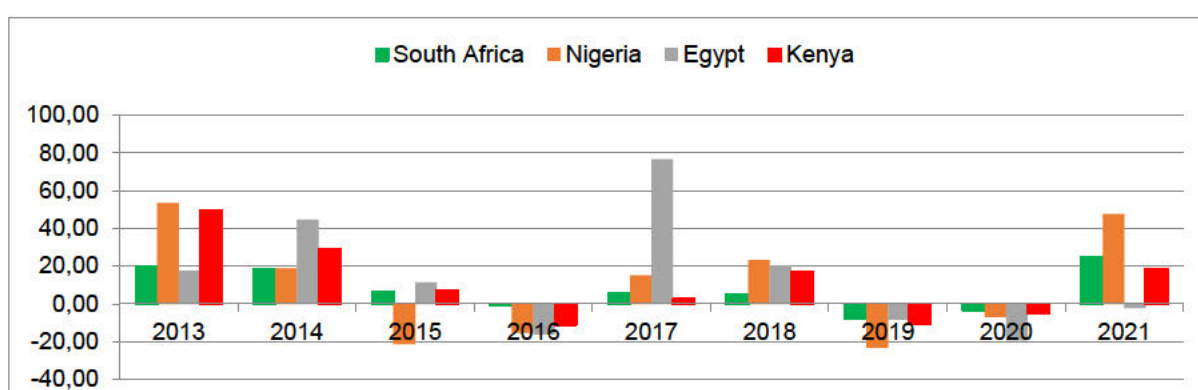


Figure 1.2 SANEK Equity Market Returns, in percent, 2013-2021

Source: Author's illustration using the World Bank (2024c) data.

Theoretical frameworks such as the Efficient Market Hypothesis (EMH) and the Financial Instability Hypothesis (FIH) offer insights into the volatility and performance of SANEK's equity markets. The EMH posits that stock prices reflect all available information, suggesting that equity market fluctuations arise from macroeconomic shocks and investor sentiment (Sharpe, 1964). In contrast, the FIH argues that financial markets are inherently susceptible to instability due to speculative cycles and endogenous risks, highlighting the need for proactive regulatory interventions (Minsky, 1992). Global financial risks significantly affect equity market performance, exacerbating economic fragility and increasing market vulnerability to external shocks. A sudden shift in SANEK's equity markets could disrupt financial stability, limit

investment, and deter capital inflows, as investors prioritise dividends and seek to expand their portfolios (Nadyayani & Suarjaya, 2021). Periods of heightened market volatility often lead to declining corporate profitability, reduced dividend payouts, and stagnating investment portfolios, further undermining investor confidence (Makrelov et al., 2021; Adegbesan, 2022; Moody's, 2022). If left unaddressed, persistent declines in EMR may intensify financial fragility, ultimately hindering long-term economic growth and capital market development in SANEK. To address these challenges, legislators must implement measures to enhance the resilience of financial markets, including improved regulatory oversight, strengthened investor protection frameworks, and enhanced market liquidity provisions. By fostering a robust and diversified financial ecosystem, SANEK countries can bolster investor confidence, mitigate systemic risks, and promote sustainable equity market growth, ensuring long-term financial stability and economic development.

1.2 Problem Background

To address research gaps, it is important to understand the context of the problem. This involves reviewing previous studies and identifying limitations or gaps in the existing literature on factors driving cross-border capital volatility, specifically pull and push factors. The following discussion will focus on the relationship between cross-border bank lending volatility and banks' return on equity. The final subsection will discuss the relationship between cross-border equity flow volatility and market returns.

1.2.1 The drivers of cross-border capital flow volatility

Research on the causes and consequences of cross-border capital flows volatility is ongoing. However, there is no consensus on whether push or pull factors are responsible for this volatility. The IMF (2007) claims open financial markets and stable institutions reduce capital flow volatility by promoting investor confidence and minimising the likelihood of sudden capital flow reversals, but Neumann, Penl, and Tanku (2009) argue that opening financial markets increases volatility as it exposes countries to global economic fluctuations and shifts in investor sentiment. Similarly, Alfaro et al. (2007) emphasise the significance of sound macroeconomic policies and institutions in dealing with shifts in volatility. They argue that stable macroeconomic environments provide a buffer against external shocks, making capital flows less susceptible to global fluctuations. Engle and Gonzalo (2008) emphasise the

importance of push factors over pull factors in capital flow volatility, as well as the role of the institutional framework. Broto et al. (2011) examined the influence of various factors on net capital inflow volatility in developing economies. They found that push factors have become increasingly significant, with global investors' behaviour and external economic conditions significantly impacting capital inflow volatility. Pagliari and Hannan (2017) discovered that U.S. monetary policy, economic performance, and risk aversion significantly affect the volatility of capital flows in emerging economies. Lee et al. (2013) identified contagion risk in cross-capital flows to emerging markets, while Allen and Gale (2000) suggested that direct exposure to asset prices could serve as sources of contagion risk (Brunnermeier, Nagel, and Pedersen, 2009). Interconnectedness of global financial markets can increase contagion risk, enabling unexpected shocks to spread rapidly. Both pull and push factors influence capital flows in developing countries. While extensive research has examined the role of push and pull factors in capital flow volatility, a significant empirical gap exists regarding the quantification of the relative magnitude of these factors in shaping the capital flow volatility of these different types of capital or applying regime-switching models. Identifying and quantifying the drivers of capital flow volatility is essential for anticipating and mitigating the associated risks. This underscores the significance of identifying these factors, enabling lawmakers and financial regulators to design policies that can reduce exposure to external shocks and foster greater stability in emerging markets.

Cross-border bank lending is gaining attention for its potential impact on financial stability and economic growth, leading to further research into its implications and risks (Opperman and Adjasi, 2017). Previous studies, such as those by Neumann et al. (2009), Broto et al. (2011), and Mercado and Park (2011), used balance of payments data from the IMF's International Financial Statistics (IFS) to measure cross-border bank lending. However, these studies have limitations in terms of data accuracy and coverage, as the IFS data may not fully capture all cross-border banking activities (Opperman and Adjasi, 2017). The categories in question include bank loans and other forms of cross-border financing, such as trade finance and cash (World Bank, 2014). Therefore, relying solely on the IFS's balance of payments data may provide only a partial understanding of cross-border bank lending. Research suggests that cross-border banking analysis should focus on gross stocks and flows (Sander,

Kleimeier, and Heuchemer, 2013), differentiate between assets (loans) and liabilities (deposits), and consider net stocks and flows. In this way, cross-border banking risks and benefits can be more precisely assessed. Inaccurate and unreliable data can have a detrimental effect on cross-border banking decisions. On the other hand, existing studies, such as Broto et al. (2011), examine the level of volatility in cross-border equity flows. However, the criticism of using levels instead of net cross-border equity flow is that levels can fluctuate greatly over time and may not accurately reflect the overall trend in cross-border equity flow (Mamvura and Sibanda, 2020). Net cross-border equity flow provides a more accurate analysis of the movement of equity investments across borders, focusing on both inflows and outflows. This approach allows scholars to better understand the balance between investments entering and leaving a country, thus providing a more accurate picture of the impact of equity flows on the economy and financial markets. Additionally, previous studies (Neumann et al., 2009; Alfaro et al., 2004; Broner and Rigobon, 2004) have used rolling window standard deviations to measure capital flow variability. However, Broto et al. (2011) argue that the GARCH (1,1) model accurately represents volatility.

Linear time-series methods such as the Generalized Method of Moments (GMM), Ordinary Least Squares (OLS), and Generalized Least Squares (GLS) are commonly used in studies. These methods, while useful in certain contexts, have significant limitations. A key drawback is their inability to capture nonlinear dynamic patterns, such as asymmetry and regime-switching, which are central to understanding volatility in capital flows (e.g., Neumann et al., 2009; IMF, 2007; Lee et al., 2013). Existing studies also fail to assess the magnitude of the factors that drive capital flow volatility. Therefore, a more sophisticated modelling approach is required. Nonlinear time-series methods, such as Markov switching models, have emerged as more suitable alternatives for capturing these complex dynamics. These methods provide a more precise representation of the data generation process by allowing regime-switching behaviour and nonlinear links (Krolzig, 2000). They allow for a comprehensive analysis of the magnitude of the factors that drive cross-border capital flows by considering asymmetry and abrupt changes. For example, a market in a state of stability and predictability (regime 1) may behave differently from a market in a volatile and uncertain period (regime 2). Regime-switching models offer a more accurate method to identify periods of low and high volatility and determine the underlying magnitude of

the factors driving capital flow volatility. By utilising these models, researchers can identify when market regimes change, enabling them to comprehend the magnitude of the factors that drive volatility flows. Financial analysts and investors can better assess and manage risks associated with sudden changes in the market using this advanced method of modelling market behaviour. Nonlinear models allow for a better understanding of how different variables interact in financial markets, given that asymmetric dependence and structural changes are characteristic of these markets (Sims and Zha, 2006; Inoue and Okimoto, 2008; Okimoto, 2008). As a result, nonlinear models enable more precise predictions and more effective risk management strategies for investors and policymakers (DiPersio and Vettori, 2014).

SANEK has a large gap in the literature regarding the drivers of cross-border bank lending and equity flows volatility. While existing studies have explored the general role of push and pull factors in influencing capital flows, they have not provided a detailed quantification of these factors' magnitudes. For example, Popokvsky (2015) suggests that South Africa's regulatory and legal framework affects FDI. The OECD (2020) found that Egypt's weak investment growth is primarily due to regulatory and institutional barriers. Aderemi, Amusa, Awomailo, and Omotayo (2019) highlight the lack of a sound business ecosystem in Nigeria, which hampers rapid FDI inflows, and emphasise the importance of robust federal regulations. In another study, Nwosa and Adeleke (2017) analysed the drivers of Nigerian FDI and foreign portfolio investment (FPI) volatility. They found that FPI volatility in Nigeria is mainly driven by interest rates and capitalisation, without specifying whether the study considers equity or debt portfolio flows. The impact of FPI volatility can vary depending on the type of investment. Nwosa and Adeleke (2017) also do not address the magnitude of the factors driving the volatility of these two capital flows. In contrast to their study, this research focuses on short-term cross-border flows, specifically bank lending and equity flows, considering the magnitude of the switching behaviour of these factors under different market conditions. Factors that are significant in regime one may have different magnitudes in regime two, for example. The stability of SANEK is significantly influenced by short-term capital flows and volatility factors, highlighting the need to understand their intensity and speed. Policymakers can anticipate risks and implement proactive measures by considering capital flow fluctuations, while maintaining stability in the financial system by continuously monitoring and adjusting regulations.

To address the literature gap, this study establishes the main factors and their magnitudes that drive cross-border bank lending and equity flow volatility in SANEK countries using the regime-switch method. The impact of these factors may vary depending on market conditions. During periods of market stability (regime 1), factors such as contagion risk and world interest rates may significantly influence, while macroeconomic indicators may dominate during times of market volatility (regime 2). To ensure the accuracy and reliability of the findings, the study adopts a country-specific analysis approach and utilises precise data from the BIS for cross-border bank data. Additionally, by focusing on cross-border banking volatility through loans instead of deposits, the study provides a more comprehensive understanding of cross-border banking activities and associated risks. Furthermore, the study considers net cross-border equity flows rather than just cross-border equity flow levels, offering a broader perspective on the overall trend in equity investment. Lastly, GARCH (1,1) is used as a measure of volatility (explained in detail in Chapter 2).

1.2.2 Cross-border bank lending volatility and bank return on equity

Credit Channel Theory explains a possible relationship between cross-border bank lending volatility and bank returns on equity. According to this hypothesis, a borrowing bank's profitability and return on equity may suffer if credit conditions tighten, as it may become more difficult for the bank to secure capital at favourable rates (Bernanke & Gertler, 1995). These strict requirements may result in a higher cost of capital for borrowers, which might lower the bank's return on equity. Furthermore, according to Global Banking Integration Theory, cross-border banks are susceptible to changes in the state of the world economy, and their profitability may be impacted by changes in the lending practices of foreign lenders. Financial instability or geopolitical unrest may lead to lower loan volumes or higher interest rates, which would raise the borrowing bank's cost of capital and lower its return on equity (De Haas & van Horen, 2013). However, the interactions between cross-border bank lending volatility and bank return on equity have not been empirically documented. The existing literature on bank RoE mainly focuses on macro-finance or bank-specific variables (e.g., Hossain and Ahmed, 2015; Phan, Hoang, and Dinh, 2020; Hosen, 2020). However, there is a notable gap in examining how cross-border activities, such as cross-border bank lending volatility, impact bank RoE.

This study aims to fill this gap by exploring the dynamic relationship between the volatility of cross-border bank lending and bank profitability, particularly within the context of SANEK countries. Understanding the fluctuations in cross-border bank lending is essential for evaluating its influence on a bank's RoE, as global capital flows are critical to the functioning of SANEK economies. Since SANEK banks depend heavily on global banks for lending, both domestically and internationally, assessing the risks associated with this volatility is crucial for informed decision-making and effective risk management. This analysis not only provides valuable insights into risk management strategies but also contributes to enhancing financial stability in the region.

While previous studies on bank RoE have predominantly assumed a symmetric relationship with macro-finance or bank-specific variables (e.g., Al-Harbi, 2019; Phan, Hoang, and Dinh, 2020; Hosen, 2020), these models often overlook the asymmetric and nonlinear effects that can occur during periods of market volatility. Financial markets, including the banking sector, are known to exhibit abrupt behavioural shifts, often triggered by crises or changes in policy (see Ang and Timmermann, 2011). Symmetric models, which assume linear relationships, may not fully capture these shifts, leading to less accurate forecasts and risk assessments. In contrast, asymmetric models, such as those proposed by Kande-Arachchi (2018), enable the modelling of different market reactions to positive and negative shocks. This approach is particularly relevant for understanding volatility in cross-border bank lending, as the impacts of capital inflows or outflows can vary significantly depending on the prevailing economic or geopolitical conditions. Incorporating asymmetric effects into financial models enhances their ability to predict and manage bank RoE more accurately, particularly during times of heightened market instability.

Risks associated with cross-border bank lending can significantly impact the profitability of SANEK banks. Fluctuations in lending activities, driven by factors such as currency fluctuations, regulatory changes, and geopolitical uncertainties, can lead to unpredictable variations in a bank's capital base, ultimately affecting its RoE. Several previous studies, such as those by Xu, Hu, and Das (2019), demonstrate the importance of bank profitability in maintaining financial stability. However, the specific relationship between cross-border lending volatility and RoE in the context of SANEK

banks has not been explored in the literature. Since the 2008 financial crisis, global credit markets have become more fragmented (Lane, 2014; Milesi-Ferretti and Tille, 2011), adding complexity to cross-border lending activities. Observed volatility in cross-border bank lending to SANEK countries increases risks to domestic banks' profitability and stability. According to Akinci and Queralto (2014), unstable RoE in banks can lead to decreased investments and further declines in profitability, which may trigger a negative cycle of falling asset prices and weakened financial stability. Given these challenges, it is essential for SANEK banks to carefully evaluate the risks associated with cross-border lending. A sudden reversal in cross-border bank lending could result in tighter credit conditions and a significant decline in bank profitability, potentially sparking a financial crisis. The unpredictable nature of bank RoE during periods of cross-border lending volatility highlights the need for robust risk assessment and strategic decision-making.

Despite cross-border bank lending's crucial role in SANEK banks' profitability, empirical studies that directly link cross-border lending's volatility to bank RoE are lacking. This study aims to address this gap by examining the dynamic effects of cross-border bank lending volatility on bank RoE in SANEK countries using advanced asymmetric regression models. It highlights the significance of asymmetric effects in understanding the volatile nature of capital flows and their varying impact on bank profitability. By considering both positive and negative shocks to cross-border lending, this study provides a more comprehensive perspective on the risks and opportunities facing SANEK banks. As financial markets continue to experience fluctuations and uncertainties, understanding the behaviour of cross-border bank lending is crucial for enhancing forecasting accuracy, risk management strategies, and financial stability in the region.

1.2.3 Cross-border equity flow volatility and equity market returns

According to the Global Risk Aversion Hypothesis (Bekaert, Harvey, & Lundblad, 2005), international investors adjust their portfolios in response to global risk factors. This may explain the relationship between cross-border equity flows and equity market returns. Market returns are directly affected by increased investor risk aversion during periods of high volatility in cross-border equity flows, leading to capital retrenchment or sell-offs in the equity market. Conversely, low volatility in cross-border flows may

indicate investor confidence, resulting in positive market returns. Furthermore, the International Capital Asset Pricing Model (ICAPM) suggests that both domestic and international market conditions influence a nation's equity returns, with volatile cross-border equity flows reflecting shifts in investor sentiment or risk perception. For instance, significant withdrawals may signal heightened risk aversion and trigger market declines, while a surge in capital inflows may suggest confidence and drive-up stock prices (Solnik, 1974). As a result, returns on equity markets in SANEK nations with strong cross-border equity flow volatility may be more volatile. However, there is currently no empirical evidence supporting a direct connection between equity market performance and cross-border equity flow volatility.

Existing equity market returns literature often focuses on macroeconomic and financial variables, ignoring global factors such as volatility in cross-border equity flows and relying on linear models, which ignore nonlinear relationships between variables (e.g., Koskei, 2017; Sapian and Auzairy, 2015). This approach fails to account for the complex, nonlinear dynamics inherent in equity markets, characterised by sudden behavioural shifts. Events such as geopolitical crises, natural disasters, global economic downturns, or capital outflows can provoke abrupt changes in market sentiment and investor behaviour, leading to volatile reactions within equity markets. For instance, the COVID-19 pandemic caused significant volatility in SANEK markets, underscoring the susceptibility of equity markets to unforeseen disruptions (see Makrelov et al., 2021; Adegbesan, 2022; Moody's, 2022). These events often trigger nonlinear responses to equity prices, which linear models inadequately capture. Overlooking these nonlinear patterns can result in unreliable predictions and ineffective risk management strategies, particularly for investors and financial institutions navigating turbulent market conditions. During periods of market disruption, less knowledgeable investors tend to imitate the behaviour of more informed actors, leading to herding behaviours (e.g., Bogdan et al., 2022). This herding effect can exacerbate market volatility and result in unpredictable bubbles or crashes. Given these behavioural dynamics, linear models may not suffice for comprehending the true relationships between market volatility and equity returns. Nonlinear models, such as those proposed by Bildirici and Turkmen (2015), provide a more accurate representation of market behaviour, especially during crises. These models are better suited to capturing the irrational decision-making and herd

behaviours that often arise during periods of high volatility, resulting in more reliable forecasts of equity market returns. Consequently, they offer a deeper understanding of the interplay between volatility, investor sentiment, and equity prices, thus serving as a more comprehensive tool for risk management and decision-making.

Despite the established role of volatility in equity markets, the relationship between cross-border equity flow volatility and equity market returns remains unclear in the existing literature. It is uncertain whether volatility in cross-border equity flows leads to higher or lower EMR in SANEK. Previous studies suggest that volatility tends to increase more during periods of lower returns than during periods of higher returns in equity markets (Anderson and Farshid, 2014). This implies that cross-border equity flow volatility could significantly impact EMR in SANEK, potentially exacerbating market fluctuations. However, the exact nature of this relationship is underexplored, particularly in emerging markets like SANEK. There is a pressing need for research that investigates how volatility in cross-border equity flows influences equity market returns in SANEK. Given the volatile nature of cross-border equity flows, especially during periods of negative equity returns, understanding this relationship is crucial for investors. By gaining insights into how cross-border equity flow volatility impacts EMR, investors can make more informed decisions regarding fund allocation and anticipate market trends. This is particularly important in the context of SANEK, where equity markets are highly sensitive to global capital movements (see Makrelov et al., 2021; Adegbesan, 2022; Moody's, 2022). Effective risk management strategies also depend on this understanding. By accurately assessing the impact of cross-border equity flow volatility on equity market returns, investors and financial institutions can better navigate market turbulence and adjust their strategies accordingly.

This study aims to address these gaps by investigating how volatility in cross-border equity flows influences equity market returns in the SANEK countries. Given the complexity of global financial markets, traditional models fall short of explaining the intricate dynamics involved. Therefore, an advanced asymmetric regression model is employed to capture the nonlinear and asymmetric relationships between these variables, offering a more accurate depiction of the underlying market behaviour. By addressing this gap in the literature, the study contributes to the understanding of the relationship between cross-border equity flows volatility and equity market returns. In

addition to helping investors and policymakers make better decisions, it also aids in developing improved risk management strategies. Its ultimate objective is to enhance the understanding of how global capital flows affect local equity markets in SANEK and to improve investment outcomes.

1.3 Problem Statement

This section provides a concise summary of the problem statement previously discussed in detail regarding cross-border lending and equity flow volatility. The following summary discusses the impact of cross-border bank lending volatility on bank returns on equity. Finally, the last section summarises the problem statement related to cross-border equity flows and their impact on EMR in SANEK.

1.3.1 The drivers of cross-border bank lending and equity flow volatility

Empirical research has extensively examined the factors driving cross-border capital flow volatility in both industrialised and emerging economies. However, existing studies have largely overlooked the magnitude and regime-dependent behaviour of these determinants. Specifically, the impact of these factors may vary across periods of market stability and certainty (Regime 1) and periods of heightened volatility and uncertainty (Regime 2). The prevailing assumption in much of the literature is a linear relationship between capital flow volatility and its driving factors, thereby disregarding potential asymmetric regime-switching behaviour (see Lebari and Wiri, 2021). Given the complexity of global financial markets and macroeconomic conditions, a linear framework is likely insufficient for capturing the full dynamics of capital flow volatility and cross-border financial risks. Regime-switching models offer a robust econometric approach to identifying structural shifts in financial and economic relationships, particularly during periods of abrupt change. Despite their advantages, such models remain underutilised in studies on capital flow volatility, particularly in the context of the SANEK countries. Additionally, country-specific characteristics may influence volatility dynamics, necessitating an approach that moves beyond aggregated panel estimations. Existing research predominantly employs panel data models, potentially overlooking country-specific heterogeneity in the determinants of capital flow volatility. This study aims to fill these gaps by identifying the key factors driving volatility in cross-border bank lending and equity flows in SANEK countries, areas that remain insufficiently explored in the literature. The study advances prior research by adopting

a country-specific econometric approach rather than a panel framework, thereby accounting for structural and institutional heterogeneity across economies. Furthermore, it emphasises the importance of employing a more sophisticated econometric methodology, namely, a regime-switching model, to better capture the nonlinear and state-dependent dynamics of capital flow volatility. To the best of the author's knowledge, this study is the first to explicitly assess the magnitude of volatility-related factors within a regime-switching framework, thereby making a significant contribution to the existing body of knowledge.

1.3.2 The effects of cross-border bank lending volatility on bank RoE

Research on bank profitability in both developed and emerging economies has largely focused on macro-financial conditions or bank-specific determinants. However, a critical gap exists in the literature regarding the role of global financial factors, particularly the impact of cross-border bank lending volatility on host-country bank profitability. Given that banks in emerging markets, such as Nigeria, Egypt, and Kenya, are heavily dependent on bank-based financial systems, fluctuations in cross-border lending can have significant implications for their stability and performance. Bank profitability is a key driver of economic activity in these countries, as highlighted by Mohieldin, Hussein, and Rostom (2019) and Orekoya, Afolabi, and Akintunde (2021). SANEK economies face persistent volatility in cross-border bank lending alongside unstable bank returns on equity, raising concerns about financial fragility. Increased volatility in external funding may lead to higher funding costs, constrained credit supply, and reduced bank profitability, as emphasised by Allen, Carletti, Krahenen, and Tyrell (2011). Despite these risks, the direct link between cross-border bank lending volatility and bank RoE in host countries remains undocumented in the literature. Most existing studies examine bank profitability through domestic factors while overlooking the external shocks stemming from global capital flows. Furthermore, the interaction between cross-border bank lending and lending market volatility remains insufficiently explored, particularly in terms of whether its effects on bank profitability are symmetrical or asymmetrical. Current research often assumes a linear relationship between macro-financial factors or bank-specific factors and bank RoE, potentially underestimating the disproportionate effects of extreme market conditions. This study aims to bridge this gap by examining the dynamic and potentially asymmetric effects of cross-border bank lending volatility on bank RoE in SANEK. By incorporating a more

nuanced framework that accounts for both symmetrical and asymmetrical effects, this research seeks to contribute significantly to the literature on bank RoE in emerging markets. The findings will provide valuable insights for legislators, regulators, financial institutions, and risk managers in designing more effective strategies for mitigating external financial shocks in an increasingly interconnected global banking system.

1.3.3 The effects of cross-border equity flow volatility on equity market return

The equity markets in SANEK countries are currently experiencing heightened volatility due to substantial cross-border equity outflows. These outflows have intensified financial risk and contributed to the depreciation of SANEK currencies against major global currencies. Increased volatility is inherently linked to higher financial risk (Chaudhary, Bakhshi, & Gupta, 2020), which, in turn, places considerable pressure on exchange rates and exacerbates inflationary pressures. Therefore, equity investors have become increasingly cautious about SANEK markets' future performance, resulting in lower trading volumes and greater volatility. In response to deteriorating market conditions, many investors have reallocated their portfolios towards more stable assets or have hedged their exposure to SANEK currencies through various financial instruments (see Makrelov et al., 2021; Moody's, 2022). Others have diversified into alternative emerging markets to mitigate risk and safeguard their investments, further contributing to declining liquidity and heightened volatility in SANEK equity markets. The combination of poor equity market returns, capital flight, and currency depreciation has led to increased market instability, adversely impacting the cost of capital and economic growth. Additionally, the inability to attract stable foreign capital has further weakened the resilience of SANEK's financial markets. Despite the growing concerns surrounding capital flow volatility in high-risk emerging markets, the specific link between cross-border equity flow volatility and host-country equity returns remains largely undocumented in the literature.

This study investigates the relationship between cross-border equity flow volatility and equity market returns in SANEK, emphasising the importance of understanding this dynamic to maintain financial stability and promote sustainable capital market growth. Given the potential for asymmetry in this relationship, the study employs an asymmetric econometric model to capture the nonlinear effects of both positive and negative shocks on market returns. To the best of the author's knowledge, this is the

first study to systematically examine this link within an asymmetric framework. Researchers may find this research useful for managing cross-border equity funds and mitigating financial risks for policymakers and investors. By addressing a critical gap in the literature on financial risk management in emerging equity markets, this study makes a significant contribution to the field.

1.4 Research Questions and Objectives

The following questions can be answered by achieving the listed objectives:

- **What are the main factors that drive cross-border bank lending and equity flow volatility in SANEK countries? What is the magnitude of these factors using a regime-switching model?**

Objective 1: To establish the main factors that drive cross-border bank lending and equity flow volatility in SANEK countries and assess the magnitude of these factors using a regime-switching model.

- **What is the dynamic effect of cross-border bank lending volatility on bank return on equity in SANEK countries?**

Objective 2: To investigate the dynamic effect of cross-border bank lending volatility on bank return on equity in SANEK countries.

- **What are the asymmetric effects of cross-border equity flow volatility on equity market returns in SANEK countries?**

Objective 3: To model the asymmetric effects of cross-border equity flow volatility on equity market returns in SANEK countries.

1.5 Hypothesis of the Study

Hypothesis I

H₀: Push and pull factors are the main drivers of cross-border bank lending and equity flow volatility in SANEK countries. It is anticipated that the magnitude of these factors will result in volatility in bank lending and equity flows. Moreover, cross-border bank lending and equity flow volatility are expected to increase during periods of market uncertainty or instability.

H₁: Push and pull factors are not the main drivers of cross-border bank lending and equity flow volatility in SANEK countries. It is expected that the magnitude of these factors will result in bank lending and equity flow remaining relatively stable. Moreover, cross-border bank lending and equity flow volatility are expected to decline during periods of market certainty or stability.

Hypothesis II

H₀: Increased cross-border bank lending volatility will have a negative impact on bank return on equity in SANEK countries. This is based on the idea that volatility in cross-border lending can lead to increased risk and uncertainty for banks, ultimately affecting their return on equity.

H₁: Increased cross-border bank lending volatility will not have a negative impact on bank return on equity in SANEK countries. The hypothesis suggests that banks operating in these countries can maintain stable returns on equity despite dynamic cross-border lending by implementing adequate risk management strategies.

Hypothesis III

H₀: Increased volatility in cross-border equity flows will have a negative impact on equity market returns in SANEK countries. This hypothesis is based on the idea that the uncertainty and risk associated with cross-border flows can lead to investor caution and a decrease in demand for equities, ultimately driving down market returns.

H₁: Increased volatility in cross-border equity flows will not have a negative impact on equity market returns in SANEK countries. This hypothesis suggests that uncertainty and risk may attract investors seeking higher returns. As a result, there is likely to be an increase in demand for equities and subsequently higher market returns.

1.6 Justification of the Study

SANEK countries aim to have stable cross-border bank and equity flows to support their low domestic savings and investments (see Omorokunwa, 2018). However, the unpredictable nature of these flows, characterised by currency instability and weak regulatory frameworks, threatens financial stability. While previous studies have focused on the magnitude and volatility of cross-border capital flows, they have neglected to examine the magnitude of the factors driving these flows. Conducting a country-specific analysis could help SANEK understand the factors that contribute to

capital flow volatility. This analysis could enable targeted regulatory changes to enhance financial stability, attract more foreign investment, and provide valuable insights for policymakers and researchers. On the other hand, SANEK addresses a gap in the literature by examining the impact of cross-border bank lending volatility on banks' return on equity. This research helps us understand how volatility affects banks' performance in SANEK countries, where returns on equity are unstable. Given that most SANEK countries have bank-based economies, fluctuations in cross-border bank lending can negatively impact their financial well-being. Studying the impact of cross-border bank lending volatility on returns on equity can offer valuable insights for policymakers and financial institutions operating in SANEK. Furthermore, it can contribute to existing knowledge and inform future decisions in the banking sector. Equity market volatility in SANEK is a major concern for investors and policymakers. Understanding the asymmetric effects of cross-border equity flow volatility on equity returns is crucial for preparing for market fluctuations, making informed decisions, and potentially reducing overall market risk. Overall, this study contributes to existing research on financial market behaviour in SANEK, providing a deeper understanding of how cross-border equity flow volatility impacts equity market performance.

1.7 Original Contribution

The existing literature has overlooked the magnitude of factors that drive capital flow volatility. While financial market uncertainty and volatility are well documented, several studies (e.g., Broner and Rigobon, 2005; Neumann et al., 2009; Broto et al., 2011; Broner et al., 2013; Lee et al., 2013) have largely neglected the potential variations in these drivers under different market conditions. It is essential to recognise that the magnitude of factors influencing capital flow volatility can fluctuate depending on prevailing market conditions. In periods of economic uncertainty, risk-averse investors may experience heightened capital flow volatility, largely due to contagion risks. On the other hand, in stable growth environments with low inflation, investors tend to be more inclined to capitalise on low interest rates, thereby increasing capital flows in search of higher yields. By introducing regime-switching models, such as the Markov-Switching Mean VAR Model (MSM-VAR), into the analysis, this study offers a novel contribution. It enhances the understanding of how various factors interact with market conditions, providing policymakers and investors with a clearer perspective on how capital flow volatility behaves across different economic regimes.

This study examines the impact of cross-border bank lending volatility on bank equity returns, addressing a critical gap in the existing literature. Prior research on bank equity returns has largely focused on bank-specific or macro-financial factors (e.g., Hossain and Ahmed, 2015; Phan, Hoang, and Dinh, 2020), often overlooking the role of cross-border bank lending volatility. Moreover, traditional econometric approaches, such as linear regression models, may fail to adequately capture the asymmetric effects between variables. Analysis of the asymmetric relationship between cross-border bank lending volatility and bank return on equity is a contribution to the field. By employing advanced econometric techniques, including symmetric and asymmetric GARCH models, it accounts for differences in the speed and magnitude of adjustment for positive and negative changes in the variables. A deeper understanding of cross-border bank lending volatility's impact on bank RoE can be gained through these methodological advancements. The findings offer valuable implications for legislators and financial institutions, enhancing their ability to assess risks and formulate strategies in response to shifting global financial conditions.

To the best of the author's knowledge, this study is the first to investigate the impact of cross-border equity flow volatility on equity market returns. By examining this relationship, it provides crucial insights into how fluctuations in equity flows influence market performance, offering valuable information for investors and policymakers. A key contribution of this study lies in its incorporation of volatility dynamics, which enhances the understanding of global financial market behaviour. Utilising advanced econometric techniques, including the asymmetric Nonlinear Autoregressive Distributed Lag (NARDL) model, it captures the differential effects of positive and negative changes in cross-border equity flows on market returns. This methodological approach allows for a more nuanced analysis of market responses to capital flow volatility. By bridging this gap in the finance literature, the study offers a novel perspective on the interaction between global capital movements and equity market performance, reinforcing its significance for financial decision-making and policy formulation.

1.8 Research Structure

The thesis is organised around three main topics that align with the objectives and research questions. Each topic has been expanded into a separate essay, resulting in a total of six chapters.

The first chapter provides an overview of the research objectives, research questions, and the justification for the study, setting the stage for subsequent chapters. Chapter 2 gives an overview of cross-border bank lending and equity flows, along with equity market trends in SANEK countries. Chapter 3 utilises the MSM-VAR model to examine the main factors that drive cross-border bank lending and equity flow volatility across SANEK countries. Chapter 4 analyses the dynamic effect of cross-border bank lending volatility on bank returns on equity in SANEK countries using GARCH-type models. Chapter 5 employs the NARDL model to investigate the effects of cross-border equity flows on equity market returns in SANEK countries. Chapter 6 focuses on policy implications and provides recommendations for future research.

Chapter 2

An overview of Capital Flow Volatility, Bank RoE, and Equity Market Returns in SANEK Countries

2.0 Introduction

This chapter provides an overview of capital flow volatility, bank RoE, and equity market returns in SANEK countries, offering essential insights into financial stability, economic resilience, and investment attractiveness. Together, these indicators shape the economic landscape and influence decision-making for policymakers, regulators, and investors. Understanding capital flow volatility is crucial for assessing the exposure of SANEK to external shocks. Policymakers and regulators rely on this measure to design policies that enhance economic resilience, manage financial risks, and ensure macroeconomic stability. High volatility can indicate increased exposure, prompting the need for capital control measures, foreign exchange interventions, or structural reforms to mitigate adverse impacts. The analysis of bank RoE provides a deeper understanding of the banking sector's profitability and operational efficiency. As banks are fundamental to economic growth, their ability to generate sustainable returns directly affects financial stability and credit availability. Regulators use RoE as an indicator of systemic risks and to shape regulatory frameworks that promote a sound and efficient banking environment. Equity market returns serve as a crucial gauge of market performance, investor sentiment, and the overall attractiveness of the SANEK financial markets. For investors, these metric aids portfolio allocation, risk assessment, and return optimisation. Simultaneously, policymakers monitor equity market trends to evaluate economic confidence, capital market depth, and the effectiveness of financial regulations. By analysing these three dimensions, capital flow volatility, bank RoE, and equity market returns, this chapter offers a comprehensive understanding of financial dynamics in SANEK. These insights are instrumental in shaping policies that foster economic stability, enhance investor confidence, and strengthen the financial sector's role in sustainable development.

After the introduction, Section 2.1 of this essay provides an overview of cross-border capital flows. Section 2.2 discusses the volatility of cross-border capital flows.

Section 2.3 presents the banking sector performance in SANEK, followed by equity market performance trends in SANEK in Section 2.4. Finally, Section 2.5 presents the summary and conclusion.

2.1 Cross-border Capital Flow

This section examines trends in cross-border bank lending and equity flow levels, with a specific focus on their volatility. Distinguishing between levels and volatility is crucial for understanding the stability of the global financial system. Levels represent the total amount of funds circulating across borders, while volatility measures the fluctuation and uncertainty within these flows. This analysis helps identify system risks and vulnerabilities, enabling policymakers to respond effectively and mitigate potential crises, as well as understand the resilience of global financial systems.

2.1.1 Cross-border Bank Lending in SANEK

Cross-border lending is essential for providing capital during prosperous times and distributing financial risks across countries during challenging periods. While it serves as a critical source of funding, it can also transmit risks from the home country to the host country. Theories such as the theory of financial intermediation and the theory of risk diversification elucidate the dynamics of cross-border lending in this context. Banks are viewed as intermediaries between lenders and borrowers, according to the theory of financial intermediation proposed by Allen and Santomero (1997). Conversely, the theory of risk diversification highlights the advantages of spreading financial risks across borders to mitigate the impact of country-specific economic shocks (Koumou, 2020). Supply factors significantly influence the cross-border lending market, which is viewed more as a service transaction than a portfolio decision, as noted by Ray and Abdulkader (2020). This is particularly relevant in emerging markets, such as those in the SANEK region, where cross-border lending is vital for expanding credit access, sharing risks, diversifying financial portfolios, and enhancing financial intermediation. Additionally, the theory of financial contagion underscores the risks associated with over-reliance on foreign credit, illustrating how cross-border lending can transmit financial instability between economies (see Hansen, 2021). This issue is especially pertinent in emerging markets like those in the SANEK region, where cross-border bank lending provides expanded credit access, improved risk-sharing, and better financial intermediation. Local banks in SANEK countries often lack the

capacity to offer the full range of financial services needed, making cross-border lending an essential tool for bridging these gaps. It facilitates the expansion of services such as loans, deposits, and payments, which are crucial for economic growth and stability. Furthermore, cross-border lending enables risk diversification, lessening the negative effects of economic shocks on the financial systems of host countries. The importance of cross-border lending in SANEK countries is evident in the quarterly variation of lending patterns from 2000Q1 to 2021Q4, as illustrated in Figure 2.1. Countries like Nigeria and Egypt exhibit significant volatility in their cross-border lending, likely due to economic shocks and unstable market conditions. In contrast, South Africa and Kenya demonstrate high levels of fluctuation, indicating both risks and opportunities within their financial systems. Over the past two decades, these fluctuations have highlighted the complex nature of cross-border lending in the region and underscored the need for ongoing analysis of lending trends to assess economic stability and growth prospects in SANEK countries.

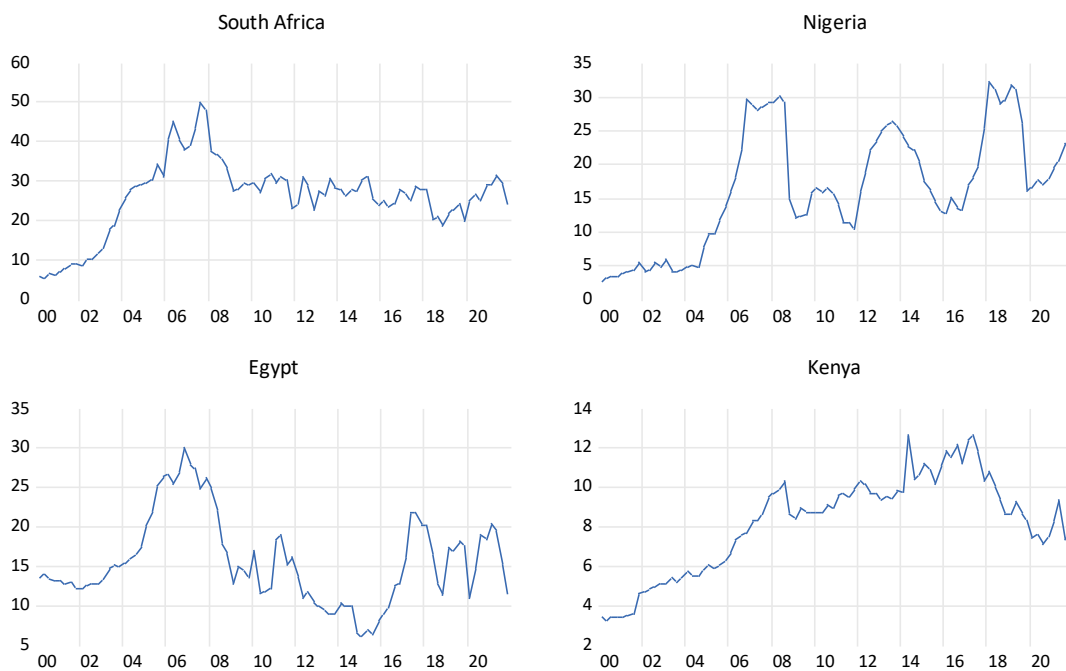


Figure 2.1: Cross-border Bank Lending Flows for Individual SANEK Countries, 2000Q1-2021Q4.

Source: Author's calculations using BIS (2023) data.

Figure 2.2 shows that South Africa has a higher share of cross-border bank lending compared to other SANEK nations. This is due to South Africa's robust banking infrastructure, which enables more effective cross-border lending. In contrast, Kenya has generally experienced low levels of cross-border bank lending. This

indicates that South Africa has a competitive advantage in this area. However, cross-border bank lending is still uneven across SANEK countries, which is concerning due to the potential risks involved, such as currency and liquidity risks. This highlights the need for enhanced financial market stability in these countries. To achieve this goal, it is important to strengthen regulatory and supervisory frameworks and promote greater coordination among the central banks of SANEK countries to ensure safer and more efficient cross-border banking.

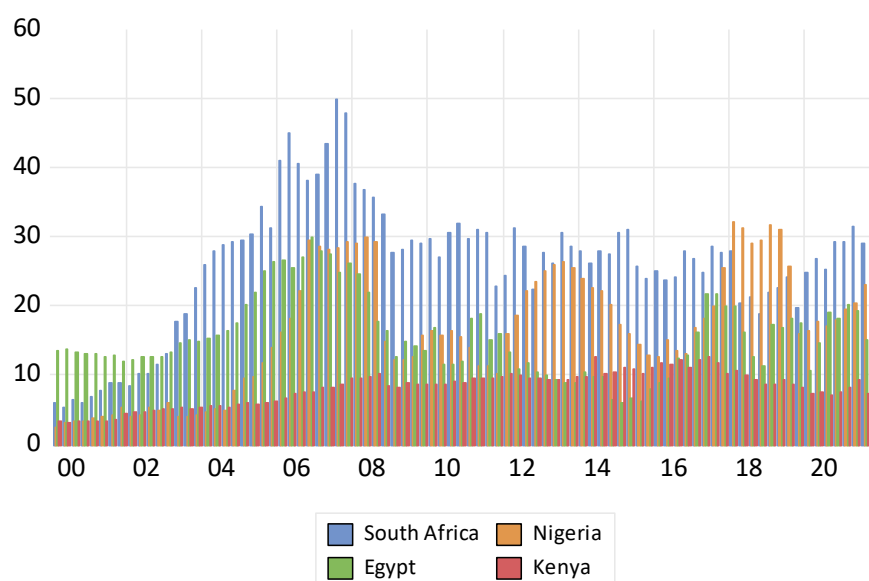


Figure 2.2: Cross-border Bank Lending in SANEK Countries, 2000Q1-2021Q4.

Source: Author's calculations using BIS (2023) data.

The following section examines cross-border equity flows in SANEK countries. This is crucial because such flows can have a significant impact on the economies of these countries by increasing the availability of capital and enhancing the liquidity of financial markets.

2.1.2 Cross-border Equity Flows in SANEK

Cross-border equity flows are essential for capital formation and financial sector development in emerging economies, particularly in SANEK countries. Heckscher and Ohlin (1991) argue that international capital flows occur when capital moves from one country to another in search of higher returns, benefiting emerging markets by increasing the amount of capital available for productive investments. However, these flows carry inherent risks. Capital mobility can increase volatility, especially when capital is repatriated, which may destabilise the economy if outflows exceed inflows

according to the Mundell-Fleming model (see Mundell, 1963). This study prioritises net equity flows over gross equity flows, as the former provides a more accurate representation of actual capital within a nation's financial system. In SANEK countries, net equity flows have a particularly large impact on the development of the financial sector and the stability of the economy. Capital repatriation, where foreign investors withdraw their investments, can lead to liquidity shortages, potentially hindering economic growth. Therefore, analysing net equity flows enables policymakers to better understand how these movements affect long-term economic stability and growth prospects. Figure 2.3 illustrates the volatility of equity flows in SANEK countries over the past two decades.

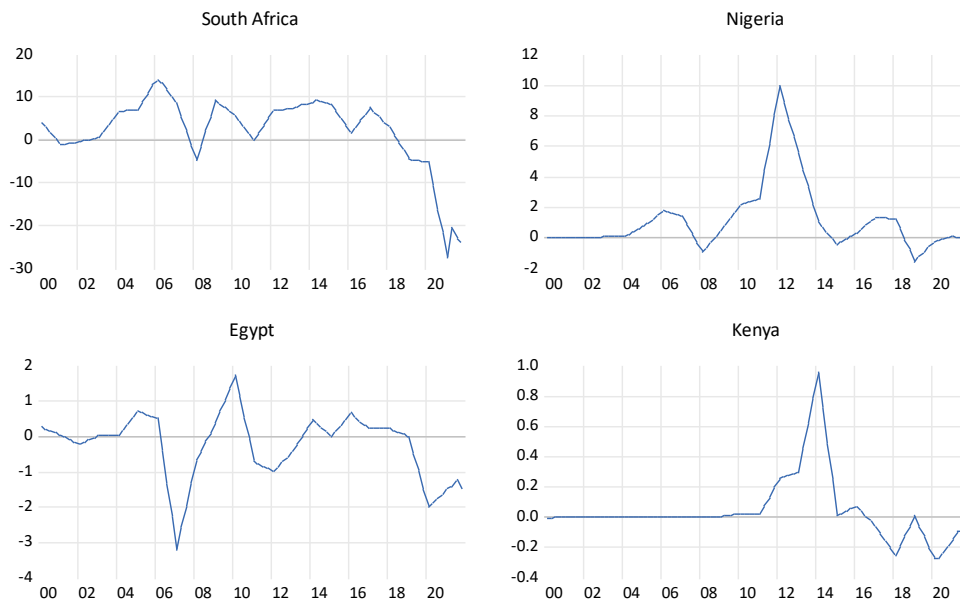


Figure 2.3: Cross-border Equity Flows (net-flows) for Individual SANEK Countries, 2000Q1-2021Q4.

Source: Author's calculations using World bank (2023) data

South Africa experienced a notable rise in negative net equity inflows from the first quarter of 2019 to the fourth quarter of 2021. Nigeria also experienced negative net equity flows during this period but recovered in the third quarter of 2020. Egypt experienced negative net equity flows from the third quarter of 2018 to the fourth quarter of 2021. Kenya experienced negative equity flows in the second quarter of 2016, which were recovered in the third quarter of 2018, but faced another negative net equity flow in the fourth quarter of 2021. Negative equity flows indicate a higher outflow of equity capital from a country, potentially reflecting a decrease in investor confidence in the economy or financial markets. The unstable investment environment

in SANEK countries necessitates that policymakers address the underlying issues, create a more favourable investment climate, attract stable foreign capital flows, and promote local investment to stabilise economies and ensure sustainable growth.

Figure 2.4 illustrates the fluctuating cross-border net equity flows in SANEK. The chart demonstrates significant variations in net equity flows over time. The most notable peaks occurred in South Africa during the mid-2000s and 2014. The peak in the mid-2000s was particularly remarkable, with net equity flows reaching nearly \$14 billion. In contrast, the peak in late 2014 was much lower, at around \$9 billion. In Nigeria, the most significant peak occurred in 2012Q1, reaching over \$9 billion. Egypt and Kenya experience relatively low cross-border net equity flows. South Africa has the highest net equity flows, followed by Nigeria. Egypt and Kenya have lower flows. Net flows exhibited a downward trend during the global financial crisis of 2007-08 but then recovered in 2009. Since 2018, net flows across SANEK countries have been decreasing. The South African equity market experienced significant negative net cross-border equity flows from 2018Q3 to 2021Q4. Similar to Nigeria, Egypt, and Kenya, this negative net flow is significant. Despite the decrease, South Africa continues to lead in net equity flows, with Nigeria in second place, and Egypt and Kenya trailing behind. The chart illustrates the highly volatile and unpredictable nature of net equity flows across SANEK countries.

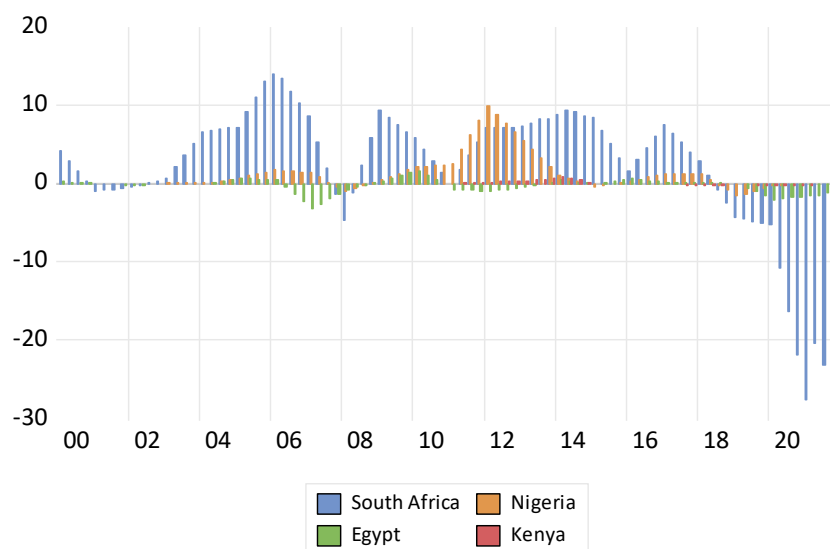


Figure 2.4: Cross-border Net Equity Flows in SANEK Countries, 2000Q1-2021Q4.

Source: Author's calculations using World Bank (2023) data.

In the following section, the study examines the trends in cross-border bank lending and equity volatility of gross cross-border bank lending flows and cross-border net equity flows to SANEK countries.

2.2 Cross-border Capital Flow Volatility

Volatility is a key risk indicator on global financial markets, playing a crucial role in risk estimation, management, and derivative pricing. Investors depend on volatility to assess potential risks in their portfolios and adjust their strategies accordingly. Financial markets display distinct volatility patterns, characterised by periods of high and low fluctuations (see Ang and Timmermann, 2011). This phenomenon, known as volatility clustering, indicates that large price changes tend to be followed by large changes and small changes by small changes. Understanding and managing volatility is essential for mitigating risk exposure, as the choice of a volatility model significantly influences future financial forecasts. Heteroscedasticity is a key characteristic of financial time series data, where the variance of returns changes over time. The historical volatility, often impacted by autocorrelation, influences the future volatility, necessitating predictive models to estimate unobservable future volatility.

Traditional methods of estimating volatility, such as the rolling window standard deviation and the exponentially weighted moving average (EWMA), have been widely utilised in the financial literature (Broner & Rigobon, 2005; Neumann et al., 2009). However, these approaches assume constant variance, which does not accurately reflect the time-varying nature of financial market volatility. To address this limitation, Engle (1982) introduced the Autoregressive Conditional Heteroscedasticity (ARCH) model, which models volatility based on past squared returns. Bollerslev (1986) then extended this framework by developing the Generalised ARCH (GARCH) model, which includes both past squared returns and past conditional variances, making it more effective at capturing volatility clustering. GARCH models are widely recognised for their ability to provide accurate volatility forecasts using historical data. In particular, the GARCH (1,1) model is extensively used in financial studies due to its parsimonious structure and effectiveness in modelling financial time series data. It expresses conditional variance as a function of past squared returns and past conditional variance, enabling it to accommodate volatility clustering and mean reversion in financial markets.

This study distinguishes between cross-border bank lending and equity flows, drawing on the research of Broto et al. (2011) and Neumann et al. (2009). It employs the GARCH (1,1) model to measure the volatility of capital flows in SANEK countries, analysing data from 2000Q1 to 2021Q4. Unlike traditional methods based on standard deviation, the GARCH (1,1) model effectively captures the dynamic evolution of capital flow volatility, providing a more precise estimation of risk exposure. By examining the differences in volatility between cross-border bank lending and net equity flows, this study offers insights into the behaviour of capital movements across different economies. The approach used here contrasts with the moderate rolling window standard deviation and exponentially weighted moving average methods employed by Broner & Rigobon (2005) and Neumann et al. (2009). Instead, it aligns with the methodology of using absolute values of residuals to analyse gross capital flows. This technique is computationally efficient, adaptable to diverse datasets, and allows straightforward interpretation and evaluation of results.

Agenor (2003) and Pagliari and Hannan (2017) identified factors that drive capital flow volatility, emphasising the limitations of conventional theories regarding cross-border capital flow fluctuations, particularly in bank lending and equity flows. To measure this volatility, the GARCH approach is widely used in the literature (see Broto et al., 2011; Lee et al., 2013). Unlike other methods, such as the coefficient of variation or rolling window standard deviation, GARCH effectively distinguishes between the expected and stochastic components of capital inflows. This differentiation reduces the risk of amplifying volatility, making GARCH a more reliable measure. The following paradigm has been proposed.

To measure the volatility in cross-border bank lending and equity flows using a GARCH(1,1) model, this study employed Eviews and analysed quarterly data from 2000Q1 to 2021Q4. The approach entails specifying both the mean equation (for returns) and the variance equation (for volatility). Prior to analysis, cross-border bank lending and equity flows must be converted into returns

$$Return_t = flow_t / flow_{t-1}$$

Where $flow_t$ is the value of cross-border bank lending or equity flow at time t

Mean Equation (Return Model): The return series can be specified as:

$$xR_t = \mu + \epsilon_t$$

Variance Equation (Volatility Model): For volatility, the GARCH(1,1) model is specified as:

$$\sigma_t^2 = \omega + \alpha\epsilon_{t-1}^2 + \beta\sigma_{t-1}^2$$

σ_t^2 is the conditional variance (volatility) at time t , ω is a constant, α is the coefficient for the lagged squared error terms (ARCH effect) and β is the coefficient for the lagged conditional variance (GARCH effect).

2.2.1 Cross-border bank Lending Volatility in SANEK

Figure 2.5 presents the results of the GARCH (1,1) model, which measures the volatility of cross-border bank lending in individual SANEK countries from 2000Q1 to 2021Q4. The results reveal substantial fluctuations in cross-border bank lending volatility across the SANEK region, emphasising the need for robust financial risk management practices.

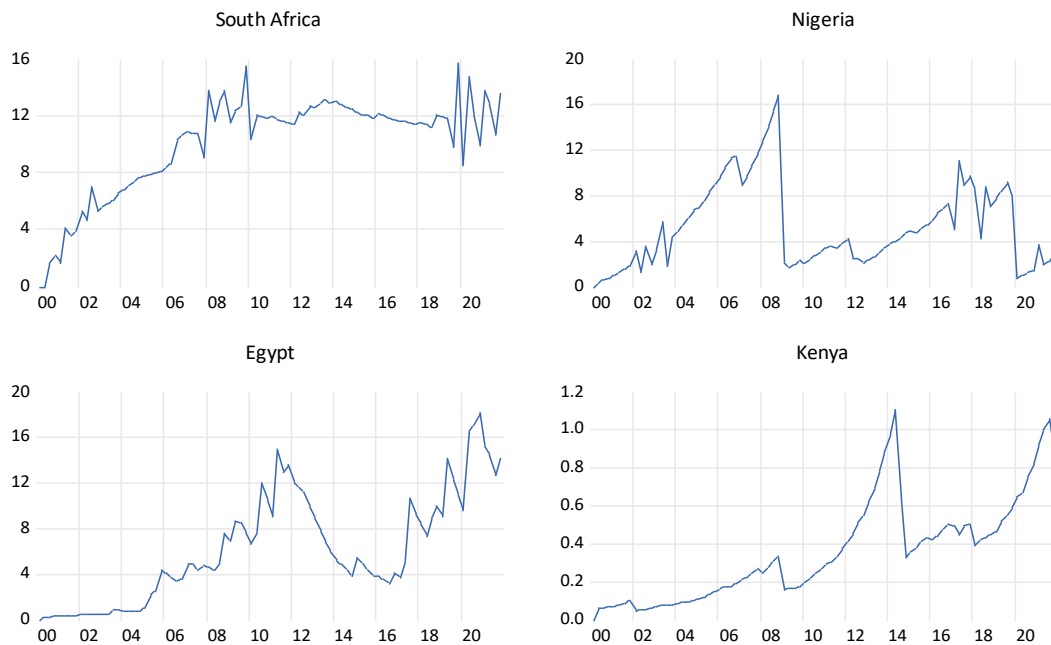


Figure 2.5: Cross-border Bank Lending Volatility for Individual SANEK Countries, 2000Q1-2021Q4.

Source: Author's calculations using BIS (2023)

The empirical evidence from different literature implies that push factors such as global economic conditions, investor sentiment, and changes in monetary policy in advanced economies are driving capital flows in unpredictable directions (Engle and Gonzalo, 2008; Pagliari and Hannan, 2017). In contrast, pull factors such as domestic macroeconomic stability, institutional quality, and the regulatory environment can either mitigate or exacerbate capital flow volatility (Alfaro et al., 2007; Neumann et al., 2009). The specific drivers and their magnitudes behind capital flow volatility in SANEK countries remain largely misunderstood. To address this gap, further research is needed to conduct in-depth analyses of both pull and push factors influencing cross-border bank lending volatility in the region. This research will be crucial for financial institutions aiming to enhance their risk management strategies, as well as for policymakers who can utilise these findings to develop more effective regulatory frameworks that tackle the root causes of cross-border capital flow volatility.

Figure 2.6 illustrates cross-border bank lending trends in SANEK countries. South Africa exhibited significant volatility in the early 2000s, followed by Nigeria. In the mid-2000s, Nigeria experienced a surge in cross-border bank lending volatility. Between 2009 and 2011, South Africa experienced a period of high volatility levels, which continued from 2013 to 2018. In contrast, Nigeria, Egypt, and Kenya consistently demonstrated low to moderate volatility during the same period. Notably, Egypt has recently experienced an increase in volatility since late 2019, which is expected to persist until 2021. These findings indicate that the level of cross-border bank lending volatility is not constant and can change rapidly between countries. Compared to other SANEK countries, Kenya consistently maintained lower levels of cross-border bank lending volatility. Thus, it can be concluded that the level of cross-border bank lending volatility varies across SANEK countries. Furthermore, this volatility is dynamic, with certain countries experiencing higher levels at specific points in time.

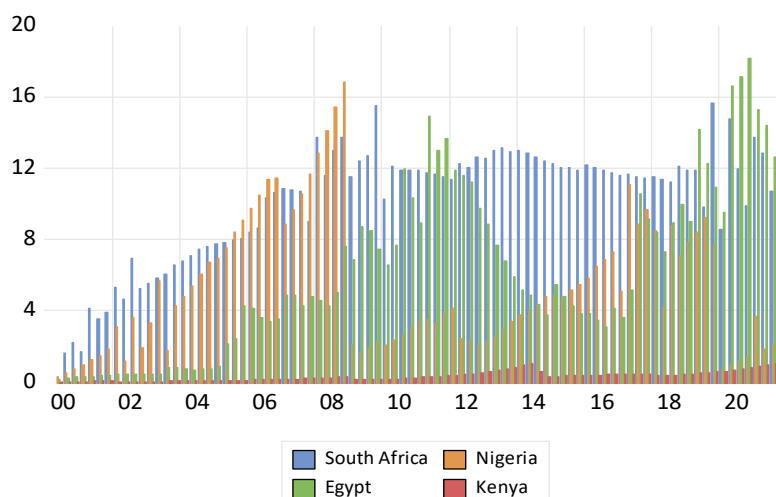


Figure 2.6: Cross-border Bank Lending Volatility in SANEK Countries, 2000Q1-2021Q4.

Source: Author's calculations using BIS (2023).

What are the main factors that drive cross-border bank lending volatility in SANEK countries? What is the magnitude of the factors driving volatility in cross-border bank lending? This study aims to address these empirical questions by identifying and evaluating the factors that drive such volatility. By understanding these factors and their significance, this study seeks to provide insights into fostering financial stability and mitigating risks in these countries. As a result of this research, SANEK countries can promote sustained economic growth. Bank lending volatility may be influenced by push factors, pull factors, or both. Thus, this study aims to investigate and analyse the role of both types of factors in cross-border bank lending volatility.

2.2.2 Cross-border Equity Flow Volatility in SANEK

Equity flows are known to be volatile private capital flows (Ferreira and Laux, 2009). They are highly influenced by global events and financial crises, which makes them prone to sudden shifts in investor preferences and risk appetite. As a result, policymakers and investors need to closely monitor and analyse these capital flows to anticipate potential disruptions and mitigate associated risks. This study, similar to Broner and Rigobon (2005), focuses on net cross-border equity flows instead of gross cross-border equity flows to calculate volatility. The advantage of using net flows is that they represent the difference between cross-border inflows and outflows, providing a more accurate measurement of actual capital flow trends. By reducing the impact of spurious flows in the data, net flows provide a more accurate representation

of actual capital flows. Consequently, net flows are a better indicator of capital flow volatility compared to gross flows.

Figure 2.7 displays the GARCH (1,1) results for cross-border net equity flow volatility in each country. It is noteworthy that volatility in net equity flows varies across SANEK countries. For instance, South Africa experienced a notable surge in volatility between 2020 and 2021, suggesting increased uncertainty in cross-border equity flows during that timeframe. In contrast, Nigeria exhibited a high volatility trend between 2011 and 2014, indicating a period of heightened instability in the country's net equity flows. Egypt, on the other hand, exhibited a consistent upward trend in volatility from 2006 to 2017, indicating a sustained level of uncertainty and fluctuation in net equity flows during that period. In Kenya, the highest trend was observed between 2014 and 2015. This implies that each SANEK country has unique factors and events that contribute to its net equity flow volatility. Understanding these country-specific dynamics is crucial for investors and policymakers to make informed decisions and mitigate risks associated with volatile cross-border equity flows.

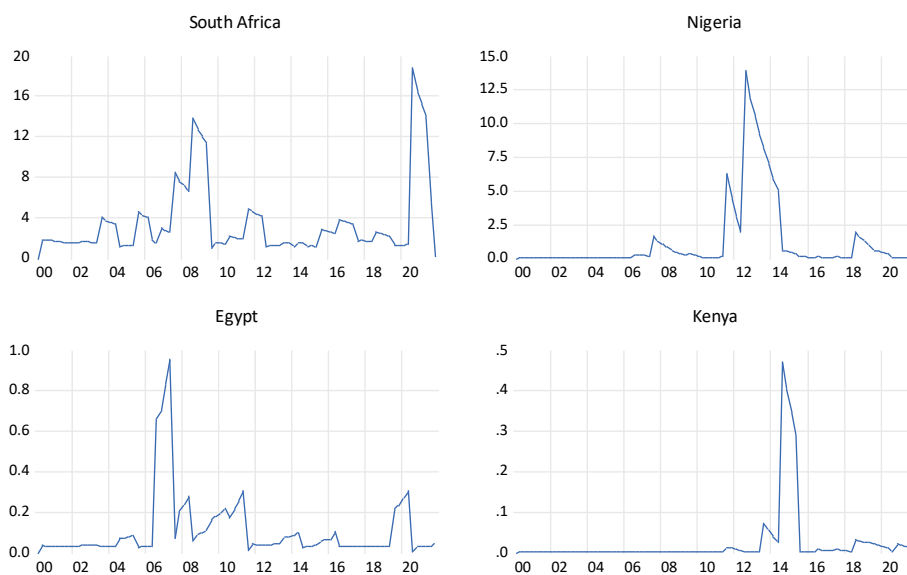


Figure 2.7: Cross-border Equity Flow Volatility for Individual SANEK Countries, 2000Q1-2021Q4.

Source: Author's calculations using World Bank (2023).

Figure 2.8 depicts the cross-border net equity flow volatility of SANEK countries as a whole. According to the chart, South Africa exhibited a high level of cross-border equity flow volatility compared to Nigeria, Egypt, and Kenya during the periods 2000Q1-2012Q2 and 2015Q1-2021Q4. Among the other three nations, there are relatively lower levels of volatility. This suggests that South Africa may be more

vulnerable to cross-border shocks. Between 2012Q3 and 2014Q4, Nigeria experienced the highest volatility among the countries. During this timeframe, it is evident that while South Africa may have experienced higher overall volatility, Nigeria was notably more vulnerable. During the analysed period, Egypt and Kenya, on the other hand, experienced low levels of volatility. This indicates that efforts to reduce volatility should be tailored to each country. Further studies should delve into the underlying causes of this volatility and propose potential mitigation strategies. Understanding the impact of external and internal factors on volatility is essential for developing effective strategies. For instance, Nigeria's high volatility may have been influenced by fluctuating oil prices and political unrest, while South Africa's volatility may be attributed to its heavy dependence on mining and external economic factors. Identifying the specific factors contributing to volatility in each country will enable policymakers to formulate targeted strategies to address these issues and reduce volatility.

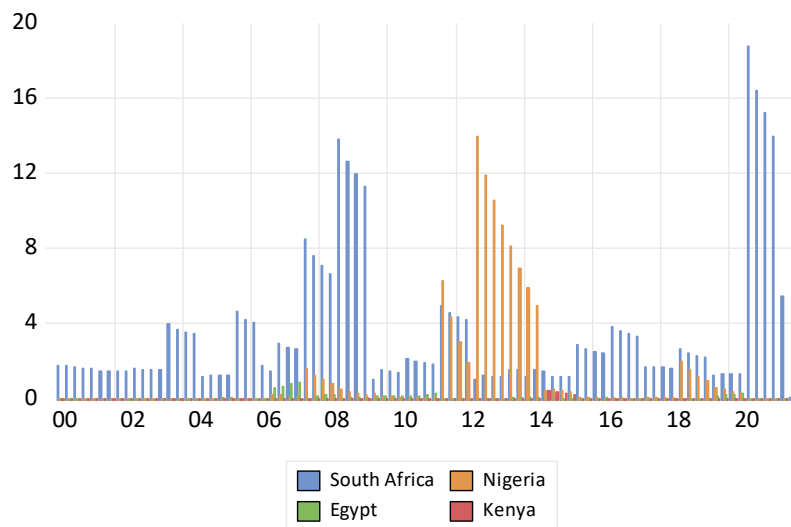


Figure 2.8: Cross-border Equity Flow Volatility in SANEK Countries, 2000Q1-2021Q4.
 Source: Author's calculations using World Bank (2023) data.

Cross-border equity flow volatility differences in SANEK countries may be attributed to various factors, including pull factors, push factors, or a combination of both. However, the underlying cause of these differences is still not fully understood. Further research is necessary to gain more insight into the dynamics of equity flow volatility in these countries. Additionally, more research is needed to understand the implications of equity flow volatility in SANEK countries. Therefore, this study aims to explore the drivers of cross-border equity flow volatility in SANEK. The results of this

research will provide valuable information to investors and policymakers in SANEK countries and beyond, helping them better understand and prepare for the risks associated with equity flow volatility. Furthermore, this research can inform the design of policies and regulations that can mitigate the risks associated with equity flow volatility.

2.3 Banking Sector Performance in SANEK Countries

RoE has been and continues to be a crucial performance indicator for banks, as evidenced by numerous anecdotal reports (Moussu and Petit-Romec, 2017). Analysts and investors often use RoE to assess banks' efficiency and profitability. RoE is a critical financial stability indicator for banks and is integrated into various banking frameworks and regulations, such as Basel III. As a result, RoE remains a crucial performance indicator in the banking sector, providing a consistent profitability metric and facilitating comparisons between banks. Investing in a competitive market relies heavily on RoE, which reveals a bank's management's resource utilisation and profitability. It aids in identifying areas for improvement and guiding strategic decision-making in the banking industry. In SANEK countries, the performance of the banking sector is crucial, as most rely heavily on it compared to equity markets. Monitoring and evaluating bank profitability and stability is essential for policymakers and investors (lenders) to make informed decisions and ensure economic well-being. Organic profits are a crucial buffer against economic shocks (see Abad and Pascual, 2022), as banks generate income from core business operations without relying on external sources or variables. They are resilient to market volatility and governmental policies, providing a cushion during economic downturns. As a result, banks with a good track record of profitability are better positioned to weather economic shocks and raise capital (Ali and Puah, 2018). Banks with high organic profits are more resilient to market shocks and financial crises due to their stable financial base. Risky banking practices, such as price competition or betting on a bank's recovery, can jeopardise financial stability.

Figure 2.9 shows the return on equity of individual countries in SANEK. The chart reveals that RoE varied across SANEK countries from 2000Q1 to 2021Q4. Nigeria and Egypt experienced the highest peaks and lowest troughs in RoE, while South Africa and Kenya had more consistent returns on equity during this period. Overall, bank RoE in SANEK countries has been volatile. Therefore, financial institutions in

these countries should consider implementing financial risk management strategies to achieve higher returns without compromising the stability of their banking systems. This study aims to investigate the factors driving the fluctuations in bank RoE in SANEK, as it remains an empirical question. The data indicate that RoE has been highly unpredictable in SANEK countries. Understanding the drivers of these fluctuations is crucial for developing effective financial risk management strategies that ensure higher returns while maintaining stability. The study will explore the volatility of cross-border bank lending and various economic and financial factors that may influence RoE in SANEK countries. Additionally, it will provide insights into how banks in SANEK countries can improve risk management and maximise returns. The findings from this study can also assist policymakers in formulating regulations and policies that promote a resilient and profitable banking sector in SANEK countries.

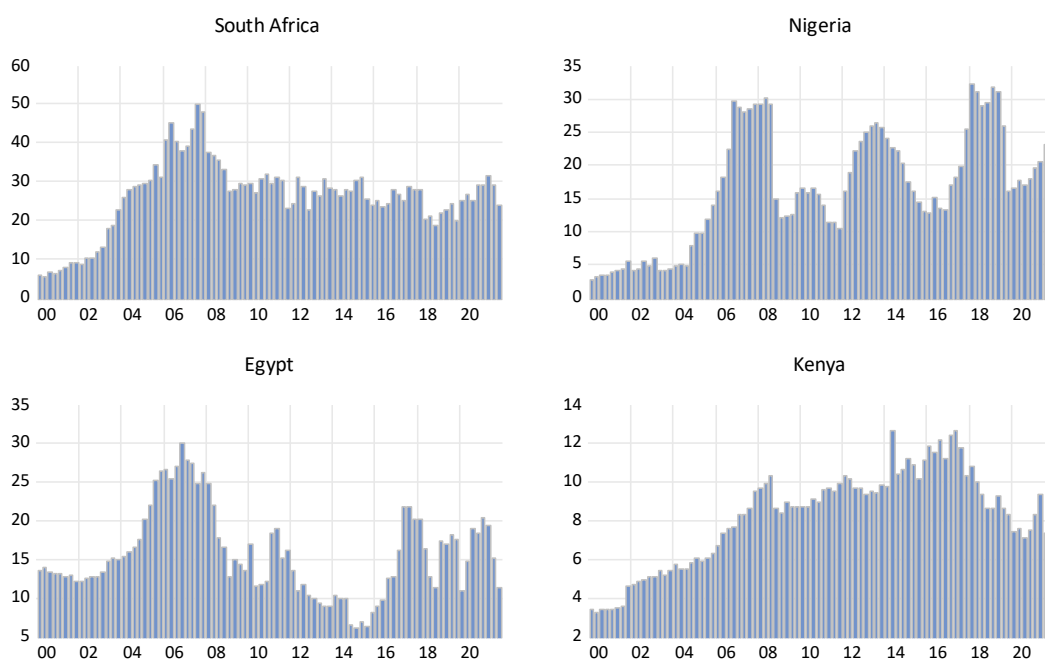


Figure 2.9: Bank RoE of individual SANEK Countries, 2000Q1-2021Q4.

Source: Author's calculations using World Bank (2023) data.

The RoE of SANEK countries has fluctuated significantly over the last two decades, with some countries experiencing higher or lower returns than others, as shown in Figure 2.10. It was highest in the mid-2000s and reached its lowest point in the late 2000s. Although it has since recovered, it remains comparatively low compared to the peak. The RoE of SANEK banks has been steadily increasing since the late 2010s and is currently close to pre-recession levels. However, there is still a significant gap between the highest and lowest RoEs. Despite these fluctuations, the

overall performance of South African banks has consistently been high compared to other SANEK nations. In contrast, Kenyan banks have experienced relatively low RoE levels. Following South Africa, Egypt ranks second in terms of RoE, with Nigeria trailing behind. These variations in RoE highlight the differing economic landscapes and banking sectors within the SANEK countries.

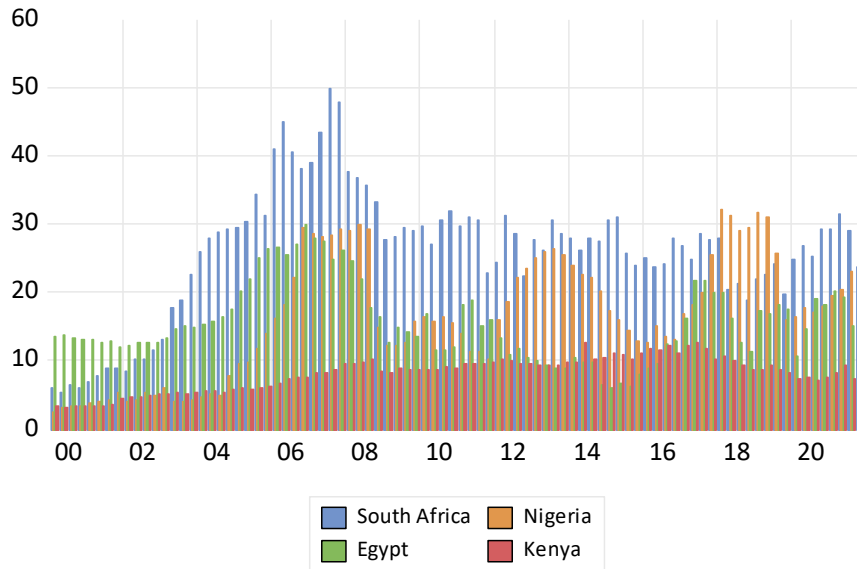


Figure 2.10: Bank RoE in SANEK Countries, 2000Q1-2021Q4.
Source: Author's calculations using World Bank (2023) data.

The following section analyses trends in bank return on equity in SANEK. RoE is a crucial metric for measuring bank profitability. Banks utilise their equity to finance their operations, and the return on equity indicates the amount of profit the bank is generating from its investments. This helps in evaluating the bank's performance and determining if investing in it is advisable.

2.4 Equity Market Performance in SANEK Countries

In this section, the essay provides an overview of SANEK countries' equity market performance from 2000Q1 to 2021Q4. It analyses the trends and variations in equity returns across SANEK. Figure 2.11 illustrates that the EMR in SANEK has significantly fluctuated during the analysis period, indicating notable instability in equity market returns in these countries. In the mid-2000s, South Africa and Egypt reached their highest peak of returns. Conversely, SANEK experienced a negative return during the 2008 financial crisis. In 2020, equity market returns of SANEK countries decreased during the peak of the COVID-19 pandemic. The returns have shown a significant upward trend since 2019, indicating a more favourable outlook for the equity markets

in South Africa, Nigeria, and Kenya, while a downward trend is observed in Egypt. Despite the overall positive trend, the markets remain volatile and unpredictable. This suggests that investors should be aware of the risks related to SANEK equity markets. Equity is a significant explanatory factor for market value in the event of negative profits, as pointed out by Jan and Ou (2012). They argue that firms with negative profits have lower market values than those with positive profits. Investors view negative profits as a sign of financial instability and potential insolvency. As a result, investors may be less inclined to invest in such firms, leading to a decrease in their market prices. To enhance market values and regain investor confidence, Jan and Ou (2012) recommend that companies experiencing financial losses focus on improving their financial performance and outlining a clear path to profitability. To gain further insight, an analysis of the underlying factors responsible for the variability in SANEK equity markets is required. By doing so, investors can enhance their understanding of the risks linked to investing in these markets and make informed decisions accordingly.

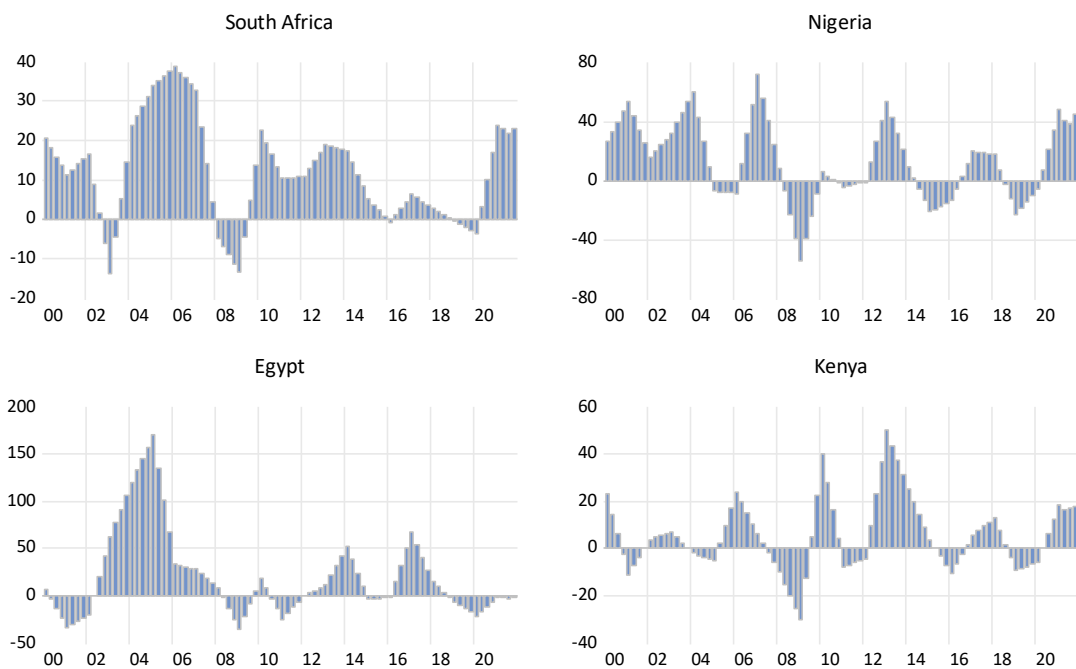


Figure 2.11: Equity Market Returns of individual SANEK Countries, 2000Q1-2021Q4.

Source: Author's calculations using World Bank (2023) data.

Egypt has shown higher returns during the mid-2000s compared to other SANEK countries, as depicted in Figure 2.12. This is notable considering that South Africa has a well-developed and highly capitalised equity market compared to Egypt, Nigeria, and Kenya in terms of market capitalisation. This suggests that Egypt outperforms South

Africa in equity market returns. Egypt has also demonstrated resilience to financial shocks, performing better during the global financial crisis in 2008-2009. Similarly, Nigeria and Kenya have shown higher returns than South Africa, likely because their equity markets are less mature, making them less vulnerable to global economic events. Furthermore, their economies have grown faster, resulting in stronger equity returns. However, these countries experienced more negative returns than South Africa during the analysed period, indicating that the higher returns are not sustainable, and investors should be cautious when investing in these countries.

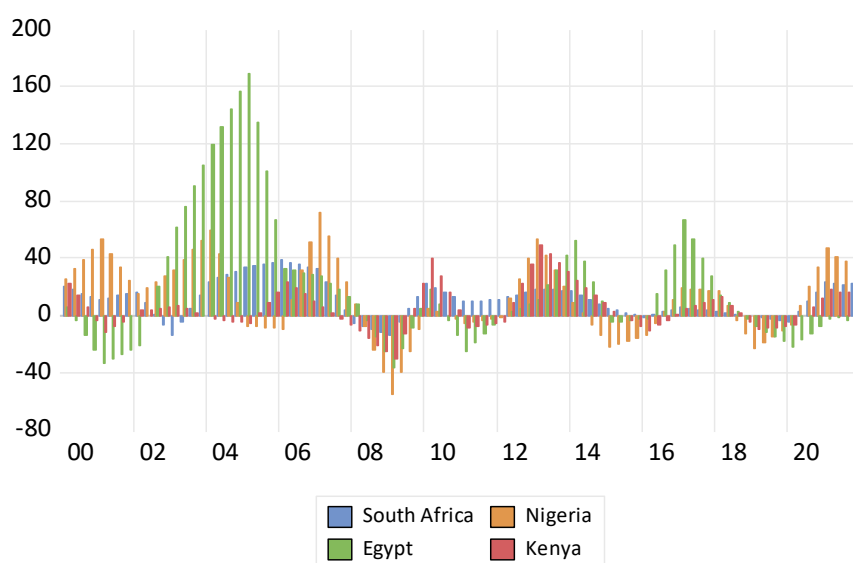


Figure 2.12: Equity Market Returns in SANEK Countries, 2000Q1-2021Q4.

Source: Author's calculations using World Bank (2023) data.

Cross-border bank lending and equity flows in SANEK are evidently volatile. Bank RoE and equity market returns also fluctuate, with negative returns being common. The financial landscape in SANEK is unpredictable and risky. The volatility in cross-border bank lending and equity flows indicates instability in the financial sectors of these countries. Additionally, persistently negative equity market returns pose challenges for investors looking to capitalise on opportunities in SANEK. To effectively navigate this volatile financial environment, it is crucial for investors to carefully assess and manage these risks. Therefore, SANEK should adopt a balanced approach when dealing with volatile capital flows. The key research questions are as follows: What are the factors and magnitudes that drive the volatility of cross-border bank lending and equity flows in SANEK? What are the dynamics of the impact of cross-border bank lending volatility on bank RoE? What are the effects of cross-border equity flow

volatility on the SANEK equity market? To answer these questions, SANEK needs to understand the factors and their magnitudes that drive the volatility of cross-border bank lending and equity flows. Consequently, it is essential to determine the impact of these types of volatile capital flows on bank RoE and equity market returns. This study aims to deepen our understanding of the factors that contribute to volatility in cross-border bank lending and equity flows and their impact on bank RoE and equity market returns. The hypothesis suggests a positive correlation between the factors that drive volatile capital flows and their magnitudes. Furthermore, it hypothesises that cross-border bank lending volatility may negatively affect bank returns on equity, and cross-border equity flow volatility may also negatively impact EMR. The purpose of this study is to provide valuable insight into how volatile equity flows affect financial performance in SANEK countries.

2.5 Summary and Conclusion

This essay explores the data-driven trends in cross-border bank lending and equity flows in SANEK countries, both in terms of level and volatility, alongside the performance of bank returns on equity and equity market returns. By examining these dynamics, the research highlights potential vulnerabilities within the region's financial system. Given the volatility in cross-border capital flows, understanding the risk-return profile of the banking sector and equity markets is crucial for financial stability. As a result of this study, policymakers, financial institutions, regulators, and researchers will be able to assess and mitigate financial risks. Ultimately, these findings will contribute to the development of risk management strategies that promote long-term financial stability and resilience in SANEK's financial system.

Chapter 3

The Drivers of Cross-Border Bank Lending and Equity Flow Volatility in SANEK Countries

3.0 Introduction

The chapter examines the key factors driving volatility in cross-border bank lending and equity flows in SANEK countries using the MSM-VAR model. By quantifying the magnitude of these factors, the study identifies the primary forces behind capital flow volatility. Unlike traditional approaches, the MSM-VAR model effectively captures shifts between stable and unstable periods, offering a more nuanced understanding of the variable linkages during abrupt changes (Lebari and Wiri, 2021). This methodological innovation is particularly valuable, as previous studies often overlooked the importance of regime-switching models in assessing capital flow volatility. By analysing periods of stability and instability, this study provides crucial insights into the behaviour of cross-border capital flows in emerging economies. These findings hold significant implications for policymakers and investors, enabling them to better anticipate and respond to market fluctuations. The study explores the drivers of cross-border capital flow volatility in emerging economies using various theoretical frameworks. The Push-Pull Theory suggests that global factors like risk appetite and liquidity conditions interact with country-specific factors like institutional quality and financial openness (Calvo et al., 1993). The Global Financial Cycle Hypothesis emphasises the influence of global financial conditions, particularly the VIX and U.S. monetary policy (Rey, 2013). Sudden Stop Theory explains how external shocks can lead to abrupt reversals in capital flows, especially in emerging markets (Calvo, 1998). The Imperfect Capital Mobility Framework highlights the role of frictions like capital controls and asymmetric information in amplifying capital flow volatility (Obstfeld and Rogoff, 1996). Portfolio Balance Theory illustrates how investors adjust asset allocations based on risk and return considerations, leading to fluctuations in cross-border equity and debt flows (Branson and Henderson, 1985). The findings offer valuable insights for policymakers and investors to anticipate and mitigate market fluctuations.

Following the introduction, Section 3.1 presents the literature review, 3.2 presents Methodology and section 3.3 data analysis and results. Section 3.4 Summary and Conclusion

3.1 Literature Review

3.1.1 Theoretical Review

3.1.1.1 Capital Account Liberalisation

Capital account liberalisation refers to a country's decision to transition from a closed capital account system, where there are no provisions for capital to freely enter or leave the country, to an open capital account system with no restrictions on capital movements (Henry, 2007). This involves granting greater freedom for financial assets, such as cross-border bank lending, equity flows, and other forms of capital, to flow in and out of the country. One perspective, known as allocative efficiency, is based on the Neoclassical growth model developed by Solow (1956). Neoclassical models advocate opening the capital account as it facilitates more efficient global resource distribution. This has several positive effects. Resources are transferred from advanced economies with an abundance of capital and low returns on investment to emerging economies with limited capital and high investment returns. The influx of resources into emerging nations reduces their cost of capital, leading to a temporary increase in investment and growth that ultimately improves their standard of living in a lasting manner (Obstfeld, 1998; Rogoff, 1999; Summers, 2000). Over the past 30 years, governments in the SANEK countries have made various efforts to liberalise their capital accounts. This is partly driven by the potential benefits of incorporating allocative efficiency arguments into their economic strategies. The opening of capital accounts allows for the unrestricted flow of capital in and out of a country, which can have both positive and negative impacts on the economy. On the one hand, it enables capital flows to enter the country, stimulating economic growth and development. On the other hand, it also exposes the country to the risk of sudden capital outflows, which can destabilise the economy and lead to financial crises. Nevertheless, the potential benefits of attracting foreign investment and the belief in the efficiency of markets have been strong incentives for governments to pursue capital account liberalisation.

Critics of the Capital Account Liberalisation

The debate on the benefits of financial liberalisation revolves around the effectiveness of free capital flow in distributing resources. Opponents argue that the concept of efficiency in allocation is absurd and that predictions based on it only hold true for economic distortions. A study by Rodrik (2000) found no direct link between a country's capital account openness and investment or economic expansion. The benefits of an open capital account are not immediately apparent, but recurring crises in emerging markets highlight their consequences. The "efficient markets" theory suggests that liberalised financial markets are distorted by imperfect information and other issues, resulting in unfavourable societal effects (see IMF, 1999). Bhagwati (1998), a prominent advocate of free trade in commodities and services, argues that liberalising capital accounts is unsuitable for developing economies due to the lack of regulatory and institutional frameworks. He suggests that nations should focus on gradual liberalisation to establish the necessary institutions and infrastructure for sustaining free markets in capital. Bhagwati (1998) proposes that emerging nations can mitigate the negative impacts of early capital account liberalisation, such as increased inequality and financial instability, by adopting this strategy. This challenges the notion that unrestricted capital flows always lead to equitable resource distribution. Private capital transfers to developing countries are well-documented as volatile and procyclical components of global capital movements. Inflows of foreign capital, often sudden and unreliable, can exacerbate economic crises in emerging countries and contribute to financial instability (Occampo, 2001; Williamson, 2002). Financial liberalisation can pose risks to emerging economies, affecting economic stability and inequality, and potentially compromising the government's ability to pursue independent monetary and fiscal policies, despite its potential positive effects such as increased access to capital. Conway (2015) advocates for nations to implement monetary policies that align with their domestic interests, ensuring full employment and preventing international capital flows from obstructing this freedom. SANEK countries must balance protecting social cohesion and economic stability with attracting foreign investors to avoid the adverse effects of financial deregulation.

The Implication of Capital Account Liberalisation in SANEK

Capital account liberalisation theory has major implications for SANEK countries. It increases their exposure to external shocks and financial crises, leading to sudden capital outflows, such as the COVID-19 episode and the Russia-Ukraine war (see Makrelov et al., 2021; Moody's, 2022; Adegbesan, 2022). These outflows destabilise the economy, leading to currency depreciation, inflation, and higher borrowing costs. This situation makes it more challenging for the government and businesses to access finance. Furthermore, external shocks can lead to a decline in investor confidence and the outflow of foreign capital from SANEK countries. While capital account liberalisation offers benefits such as financial integration and access to global markets, it also poses risks. SANEK countries may face difficulties attracting foreign financing and developing projects. Moreover, global capital flows can impact local interest rates and inflation, which can hinder independent monetary and fiscal policies.

3.1.1.2 Capital Flow Volatility

Capital flow volatility refers to the unpredictable fluctuations in the movement of financial assets, such as money, stocks, bonds, and foreign investments across international borders. While capital mobility can theoretically enhance economic growth and stability by facilitating efficient resource allocation, excessive volatility often leads to economic instability and financial crises. Prasad (2013) argues that capital flows are not inherently detrimental and can signal a robust and expanding economy. However, their overall impact largely depends on their nature and direction. Economic theory suggests that capital flows should counterbalance fluctuations in the domestic business cycle. According to the risk-sharing hypothesis, struggling economies should attract capital inflows as investors seek diversification opportunities, while well-performing economies should receive fewer inflows (Obstfeld, 1994). This countercyclical behaviour is expected to stabilise economic fluctuations. However, empirical evidence contradicts this expectation, as capital flows are often procyclical rising during economic booms and retreating during downturns (Kaminsky, Reinhart, and Végh, 2004). This procyclicality exacerbates economic volatility, fuelling asset bubbles and credit expansion during upswings while deepening recessions through capital flight during downturns. Claessens, Kose, and Terrones (2011) emphasise how procyclical capital flows amplify economic fluctuations, leading to heightened

instability. During periods of economic expansion, excessive capital inflows can drive asset price bubbles, currency overvaluation, and unsustainable credit growth. Conversely, during downturns, capital flight can precipitate liquidity crises, currency depreciation, and balance of payments difficulties, further worsening economic distress (Claessens and Ghosh, 2012).

Theoretical models, such as the Sudden Stops framework (Calvo, 1998), highlight the dangers of capital flow volatility. Sudden reversals of capital inflows have historically triggered financial crises, as seen in events like the Asian Financial Crisis (1997) and the Global Financial Crisis (2008). These episodes underscore the necessity for macroprudential policies to manage capital flow volatility, including capital controls, foreign exchange interventions, and regulatory measures aimed at mitigating systemic risks (Rey, 2013). Several theoretical perspectives examine the causes and effects of capital flow volatility. During financial liberalisation, which many emerging economies have recently undergone, Bacchetta and van Wincoop (1998) argue that imperfect information initially increases volatility. However, as investors gain more knowledge of new opportunities, volatility tends to decline. Aghion et al. (2004) develop a dynamic open-economy model showing that countries opening their capital accounts often experience heightened volatility, particularly during the second stage of financial development. Martin and Rey (2007) explore the interplay between trade and financial globalisation, suggesting that countries integrating into the global financial system without full liberalisation may face greater capital flow volatility and an increased likelihood of financial crises. In conclusion, while capital flows are integral to global financial integration, their volatility presents significant risks, particularly due to their procyclical nature. To ensure that capital flows contribute to economic stability rather than exacerbate financial crises, policymakers must implement robust regulatory frameworks, including macroprudential policies and financial safeguards.

Critics of cross-border capital flow volatility theories

Critics argue that fluctuations in capital flows are a natural part of the global economy and should not be overly regulated (see Prasad, 2013). They believe that attempts to control capital flows can lead to inefficiencies and distortions in the market. Additionally, they argue that volatility in capital flows can be beneficial as it allows for the quick adjustment of resources and investment to changing economic conditions

(see Prasad, 2013). Critics also point out that attempts to regulate capital flows can be difficult to implement and may have unintended consequences. Overall, they argue that market forces should be allowed to operate freely without excessive government intervention. They argue that the benefits of a flexible and responsive financial system outweigh the risks associated with capital flow volatility. Attempts to regulate capital flows could harm economic growth and undermine global market efficiency, according to some experts. As a result, they advocate hands-off management of capital flow volatility to facilitate a more dynamic and resilient global economy.

The Implications of Capital Flow Volatility in SANEK

SANEK countries, due to their high integration into the global financial system, are more susceptible to sudden financial crises. The volatility of cross-border capital bank lending and equity flows can have a significant impact on the stability and growth of financial institutions. This volatility increases vulnerability to sudden capital outflows, leading to financial instability and currency depreciation. During the COVID-19 pandemic, some nations in the SANEK countries experienced significant capital outflows, leading to financial instability and currency depreciation. Volatility can also disrupt domestic financial markets, making it difficult for firms and households to access credit and investment opportunities. Managing and controlling capital flow volatility is crucial for ensuring sustainable growth in SANEK.

3.1.2 Empirical Literature Review on Capital Flow Volatility.

To the author's knowledge, there is limited literature on the drivers of capital inflow volatility, especially within the banking industry. Some studies have explored the differences in volatility between capital flows to emerging and developed economies.

International Studies

Various economic variables have been identified as potential drivers of capital flow volatility in early research. Some studies have found that both push and pull factors play a critical role in driving volatility. For example, Kaya and Erden (2022) examined the effect of push and pull forces on capital flows in emerging countries. For 16 emerging countries, Kaya and Erden (2022) utilised the panel GARCH technique developed by Cermeño and Grier (2006). Net capital flow volatility is primarily

determined by internal variables, which account for two-thirds of the fluctuations. Both push and pull factors impact the co-movement of capital, primarily driven by economic developments and international risks. However, their impacts differ depending on the type of capital flow. The findings suggest that domestic economic conditions and external risks play a significant role in determining capital flow volatility in emerging countries. This study has limitations, such as not taking into account political instability or the impact of government policies on capital flow volatility. Its generalisability may not extend to all emerging countries.

From 1980 to 2020, Çetinkaya and Çankaya (2022) estimated capital flow volatility in 33 developing nations using three different methods: FDI, portfolios, and other investments. They also examined factors influencing capital flow volatility. Panel data regression was used to analyse the data. The findings suggest that capital flow volatility is significantly influenced by push variables related to global financial conditions. The country's inflation rate and the IMF's financial development index are identified as strong pull factors. However, the study overlooks the impact of political instability or regulatory changes on capital flow volatility. Furthermore, it fails to distinguish between short-term and long-term capital flows, which could have provided additional insights into the factors influencing volatility.

A panel study conducted by Mamvura and Sibanda (2020) examined the factors influencing net FPI volatility in low-income Southern African Development Community (SADC) countries from 2000 to 2015. The study utilised the Panel Autoregressive Distributed Lag (P-ARDL) model to identify both short-term and long-term causes of capital flow volatility. The findings indicated that the money supply, global output, overall prices, real GDP, national interest rates, and global interest rates significantly contribute to the volatility of net FPI. However, global GDP, real GDP, prices, and the money supply exhibit positive long-term effects, while local interest rates and global interest rates display a negative long-term association. One limitation of the study is its failure to consider the potential impact of geopolitical events on FPI volatility, which may result in an incomplete understanding of the factors driving FPI volatility. Therefore, future research should incorporate the analysis of geopolitical events.

Opperman and Adjasi's (2017) panel analysis examined the inflows of portfolio equity, foreign direct investment, and cross-border bank lending in sub-Saharan

African countries from 1990 to 2011. Their findings suggest that increasing global liquidity reduces volatility in foreign direct investment but increases volatility in the private sector. The study emphasises the importance of economic growth and effective macroeconomic policies in reducing volatility. It also highlights the impact of global liquidity on portfolio equity volatility. Cross-border bank lending volatility is significantly reduced by effective macroeconomic policies and trade openness, while financial openness increases volatility. However, the study does not consider other potential factors, such as political instability, and may oversimplify the relationship between macroeconomic factors and volatility. A more comprehensive analysis that considers a broader range of variables would be beneficial in gaining a better understanding of volatility in both the public and private sectors.

A strand of literature examines volatility spillover. Lee, Park, and Byun (2013) conducted a GMM estimation on a panel of 49 underdeveloped economies to determine whether there are global or regional impacts on capital flow volatility. The standard deviation of these normalised capital flows is calculated using a 5-year rolling window after normalisation. The findings suggest that institutional strength significantly reduces capital flow volatility and has spillover effects globally and regionally. However, the results for other factors, such as inflation and foreign reserves, vary depending on the type of capital movement considered. One limitation of this study is its focus on a 5-year rolling window, which may not capture long-term trends in capital flow volatility. Future research could include longer timeframes to improve our understanding of the factors that influence capital flow volatility.

Lee et al. (2013) analysed the correlation between capital flow volatility and the volatility of various forms of capital flow in emerging markets. They quantified three types of net capital flow volatility: FDI, FPI, and other investments. The results indicated that intraregional volatility in emerging market flows has severe contagion. This suggests that capital flow volatility within emerging markets, including SANEK, can spread from one country to another.

Another set of studies examined the volatility between emerging and developed economies. Becker and Noone (2008) identified three key issues related to the volatility of capital flows. Firstly, when expressed as a percentage of GDP, capital flows in emerging nations are slightly higher. Secondly, underdeveloped countries

experience greater volatility in capital flows compared to advanced economies. Lastly, various types of capital flows exhibit similar trends in volatility. These concerns suggest that emerging economies may face significant losses due to increasing volatility and more volatile capital flows. However, this study fails to consider the potential impact of external factors, such as political instability or changes in global economic conditions, on capital flows in emerging economies.

Neumann et al. (2009) analysed the drivers of capital flow volatility using panel data from developed and emerging countries. They found that increased industrial output in advanced economies leads to less volatile capital flows. On the other hand, emerging nations with uncertain growth experience more volatile FPI and other investment flows, while FDI remains stable. However, this study only considers economic variables and does not consider factors such as political instability or global market shocks. Future research should encompass a broader range of variables to enhance the understanding of capital flow volatility across various regions. Additionally, conducting more detailed analyses of specific country cases could provide valuable insights into the factors influencing capital flow volatility in different contexts.

Müller and Uhde (2005) examined the impact of countries and sectors on international bank lending volatility during the financial crises from 1993 to 2005. During the crisis, they found that macroeconomic push factors had less impact on cross-border bank lending compared to before and after. The study also found that the stability of FDI remained unaffected, while other investment flows were more susceptible to volatility. However, the study may not have considered the nuances of different financial institutions and economic policies that affect cross-border bank lending. Additionally, it does not address the potential long-term effects of fluctuating cross-border bank lending on global financial markets and economic stability.

Hegerty (2011) compared the volatility of capital flows in emerging economies in South America and Eastern Europe using quarterly data from 1990 to 2008. The analysis calculated volatility as a percentage of GDP by employing a rolling standard deviation. Additional explanatory variables such as GDP growth, foreign reserves, inflation, and financial openness were also considered. The study found that inflation and financial openness generally increase capital flow volatility in most nations.

Foreign reserves can either increase or decrease volatility, while GDP growth typically reduces it. However, the study's weakness lies in its failure to consider external shocks, global economic trends, and the ARDL model's inability to capture complex relationships between variables. Further research is needed to fully understand these factors and develop effective strategies.

The IMF analysed the factors influencing capital flows in its 2007 Global Financial Stability Report (IMF, 2007). A weighted matrix based on least squares and cross-sectional fixed effects was utilised as part of the GMM. Macroeconomic and financial indicators were used to explain the volatility of capital inflows. The IMF estimates that a more open economy and increased global liquidity have resulted in reduced capital volatility in both the overall dataset and emerging market economies. These findings suggest that policies aimed at promoting economic openness and improving global liquidity can help stabilise capital flows and reduce volatility. However, the study has limitations, such as not considering the impact of political instability and external factors on capital inflow volatility. Additionally, it only briefly explored the long-term consequences of policies that emphasise economic openness and global liquidity. Therefore, further study is needed to provide more effective policy recommendations.

Scholars have debated the role of pull and push factors in explaining capital flow volatility. Broner and Rigobon's (2005) study found that local and global macroeconomic factors only partially account for capital flows in emerging nations. Strong financial markets, stable legal systems, and high per capita income are key pull factors that attract and stabilise capital flows. Push factors, such as political instability and economic uncertainty, may drive volatility. The analysis of capital flow volatility in emerging nations should consider both pull and push factors. However, the study's weakness lies in its potential oversight of external factors, such as global economic conditions, trade policies, and investor sentiment, and its inability to fully understand an individual country's economic and political landscape.

Alfaro et al. (2007) argue that domestic variables, such as institutional quality and the effectiveness of macroeconomic policies, play a crucial role in explaining variations in volatility. The type of investment a country receives may also differ between developing and emerging markets. For instance, developing countries may rely more on FDI for economic growth, while emerging markets may attract more portfolio

investment due to their stronger institutional frameworks. However, this study fails to consider the impact of external factors, such as global market conditions and geopolitics, on volatility levels in various market types. Furthermore, the definitions of developing and emerging markets are subjective and may not encompass the full range of economic contexts present in the world today.

Broto et al. (2011) analysed annual data from 1980 to 2006 to identify factors affecting the volatility of net capital inflows into emerging markets and developing countries. Their study reveals that global factors have been more influential than country-specific factors since 2000. However, they also found that certain domestic macroeconomic and financial variables can either reduce or increase volatility. Thus, while global factors impact capital inflows, domestic policies and conditions can either moderate or exacerbate volatility. One limitation of this study is the exclusion of an analysis of the specific domestic policies and regulations that determine their impact on capital inflow volatility.

Empirical studies, such as Neumann et al. (2009), examine the effects of financial market integration on cross-border capital flows. In developed markets, they discovered that capital flows become less volatile as industrial production becomes more unpredictable. In emerging markets, on the other hand, stock and other investment flows become more sporadic during periods of volatile global growth, resulting in a decrease in direct investment flows. The volatility of investment flows in both advanced and emerging economies is further exacerbated by fluctuations in domestic growth. However, one weakness of the study is its failure to explore the asymmetric effects of certain determinants on capital flow volatility.

Empirical Studies on SANEK Countries

SANEK lacks studies on the volatility of cross-border capital flows. Nwosa and Adeleke's (2017) study on FDI and FPI volatility in Nigeria found that FPI volatility is driven by interest rates and capitalisation, while FDI volatility is driven by trade openness and global GDP. However, the study does not differentiate between equity and debt measurements, which could impact the findings. The current study focuses on short-term capital flows, such as cross-border bank lending and equity flows, using the VAR Markov switching model. This approach allows for a comprehensive analysis

of the factors driving volatility in short-term capital flows in SANEK. It considers regime or state-switching dynamics and incorporates variables such as institutional quality and contagion risk effects. This approach provides a nuanced understanding of how various factors interact and influence the volatility of capital flows.

3.1.3 Synthesis of the Reviewed Studies.

The existing literature on capital inflow volatility and cross-border bank lending primarily distinguishes between the volatility patterns observed in advanced and emerging economies. It analyses the influence of push and pull factors and applies various econometric techniques to quantify the determinants of volatility. Kaya and Erden (2022) utilise a panel GARCH model to examine how domestic and global factors drive capital flow volatility in 16 emerging markets, emphasising the predominance of domestic factors in explaining variations. Çetinkaya and Çankaya (2022) employ a panel regression model using quarterly data from 1980 to 2020 for 33 developing countries, demonstrating that both global financial conditions and domestic financial development significantly impact capital flow volatility. Opperman and Adjasi (2017) investigate capital inflow volatility in Sub-Saharan Africa from 1990 to 2011 through a panel framework, revealing that higher macroeconomic policy quality and trade openness reduce volatility, whereas financial openness tends to increase it. Nwosa and Adeleke (2017) apply the E-GARCH method for Nigeria, covering the period from 1986 to 2016, and find that FDI volatility is influenced by trade openness and world GDP, while FPI volatility is driven by interest rates and market capitalisation. Other studies, such as those by Becker and Noone (2008), Lee et al. (2013), and Hegerty (2011), use standard deviation techniques, panel GMM, or rolling-window standard deviations to analyse capital flow volatility across different regions, highlighting the importance of institutional strength, financial openness, and inflation. Additionally, works by Neumann et al. (2009) and Müller and Uhde (2005) explore sector-specific and crisis-period effects on capital flow fluctuations, while Broner and Rigobon (2005) underscore the significance of legal stability and financial development in mitigating volatility.

3.1.4 Research Gap in Cross-border Capital Flow Volatility.

Existing studies on capital flow volatility have largely overlooked the magnitude of the factors driving this volatility. Many of these studies are also outdated and fail to

provide an up-to-date assessment of the current state of evidence. Despite valuable contributions, methodological gaps remain. The predominant reliance on static models such as panel regression, GARCH, GMM, OLS, GLS and ARDL fails to capture the potential nonlinear regime shifts that may characterise volatility patterns. It is possible that the factors influencing volatility behave in a nonlinear manner and exhibit sudden, unpredictable shifts. Most studies assume a constant structural relationship, neglecting the possibility of multiple equilibrium states in capital flows, particularly in emerging economies such as SANEK. Additionally, past research commonly employs rolling-window or standard deviation techniques to measure volatility, which may not fully capture abrupt changes in market regimes. This study addresses these limitations by employing a regime-switching model that allows for endogenous transitions between volatility regimes. This approach more effectively captures the asymmetric effects of global and domestic shocks on cross-border bank lending and equity flows. To measure volatility, the study utilises GARCH, which has been found to outperform other models in this context (Bhowmik and Wang, 2020). Furthermore, while previous research has primarily focused on broad groups of emerging markets, this study provides a country-specific analysis of SANEK economies, filling a critical gap in the literature by offering insights into their unique financial dynamics.

3.2 Methodology

3.2.1 Data Sources

This study utilised quarterly data spanning the period from 2000Q1 to 2021Q4, obtained from a combination of international and national data sources. These include the World Bank, the BIS, the IMF's IFS database, and the central banks of the respective SANEK countries. Given the nature of macroeconomic datasets, not all variables were readily available in quarterly format. Where only annual data existed, particularly for institutional and structural indicators, the EViews frequency conversion tool was applied, employing the Quadratic Match Average (QMA) method in accordance with the approach outlined by Mamvura and Sibanda (2020).

The QMA method is designed to interpolate higher-frequency data (e.g., quarterly) from lower-frequency data (e.g., annual) using a fitted quadratic polynomial. The principal advantage of this method is that it generates a smooth transition between periods and preserves the average values of the original annual data across the

interpolated quarters (EViews, 2023). This smoothness is crucial when integrating time series data into econometric models, as it helps avoid artificial volatility or discontinuities that can distort regression results. Moreover, the method is user-friendly and widely adopted in macroeconomic and financial research due to its compatibility with common econometric software platforms (Hodrick & Prescott, 1997).

The QMA method, however, has some limitations. As noted by Ravn and Uhlig (2002), interpolated data may lack the underlying economic dynamics that would be observed with true quarterly observations. The method assumes a smooth transition between data points, which may be inappropriate for variables subject to abrupt changes, structural breaks, or policy shocks. Additionally, the interpolated values are synthetic estimates and may introduce measurement errors or reduce the accuracy of estimations when used in dynamic models. Therefore, while QMA is a practical solution, its application must be carefully justified depending on the specific context of each variable.

Transformed Variables:

- *Institutional Quality Index* – obtained from the World Bank’s Worldwide Governance Indicators (WGI); converted from annual to quarterly using the QMA method.
- *Financial Openness (Chinn-Ito Index)* – available annually; interpolated using the QMA method to align with the quarterly frequency of the study.

Non-Transformed Variables (Available in Quarterly Format):

- *Cross-border Bank Lending Flows* – sourced from BIS Locational Banking Statistics.
- *Cross-border Equity Flows* – derived from IMF Balance of Payments data.
- *World GDP, GDP growth rate, world interest rates, and current account balance* – retrieved from the IMF’s IFS and the World Bank.
- *Inflation Rate* – measured using quarter-on-quarter changes in the CPI; data sourced from national central bank databases.
- *Implied Volatility Index (VIX)* – obtained from the Chicago Board Options Exchange (CBOE).

3.2.2 Research Design

The study has twofold objectives: (i) to establish the main driver of cross-border bank lending volatility and assess the magnitude of the factors driving volatility in SANEK; and (ii) to establish the main driver of cross-border equity flow volatility and assess the magnitude of the factors driving volatility in SANEK. By researching both flows, the study aims to provide a detailed understanding of the dynamics and drivers of these two vital financial variables in SANEK countries. The quantitative method aligns with the research questions, hypothesis testing, and data availability.

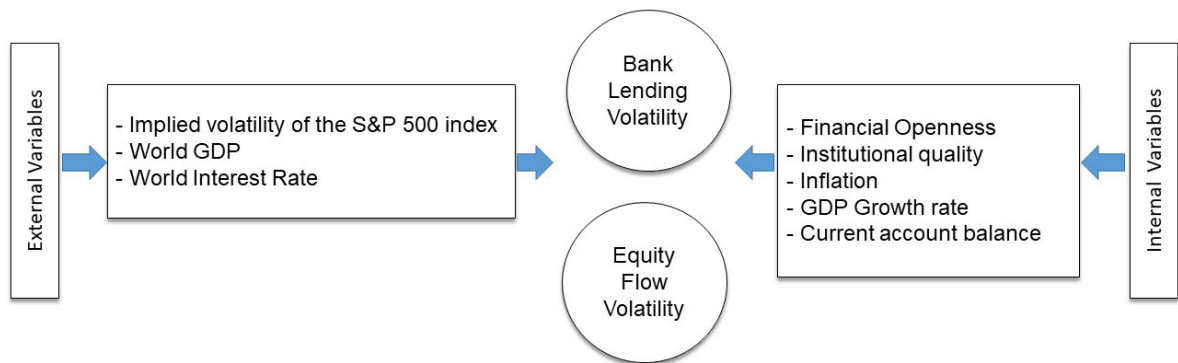


Figure 3.1 Conceptual Framework for analysis the drivers of cross-border bank lending and equity flow volatility.
Source: Author's own compilation

Figure 3.1 illustrates the research model for this study. Part I focuses on the dependent variable of cross-border bank lending volatility, while Part II examines cross-border equity flow volatility as the dependent variable. The independent variables for both models include push factors (VIX, world GDP, and world interest rate) and pull factors (financial openness, institutional quality, inflation, GDP growth rate, and current account balance). Including both push and pull factors in the research model allows for a comprehensive analysis of the factors that drive cross-border bank lending volatility and cross-border equity flow volatility. Push factors, such as the VIX, world GDP, and world interest rate, capture global market conditions and economic trends. In contrast, pull factors, such as financial openness, institutional quality, inflation, GDP growth rate, and current account balance, reflect country-specific characteristics that may influence these variables. By considering a wide range of factors, this study aims to provide a thorough understanding of the drivers of cross-border financial flows. Previous literature has confirmed that these variables drive volatility, but there is still limited knowledge about the magnitude of their impact.

3.2.3 Theoretical development of variables

This section discusses the theoretical development of the variables used in this investigation. The dependent variable, cross-border bank lending volatility, is discussed first, followed by cross-border equity flow volatility. The following section explains the exploratory variables, which include push and pull variables.

Dependent Variables

- BLV = cross-border bank lending volatility of country.
- EFV = cross-border equity flow volatility of country.

Cross-border bank lending volatility (BLV): The theoretical underpinnings of cross-border bank lending volatility are still lacking (Lee et al., 2013). Global financing has facilitated banking globalisation, optimised capital transfer, and enhanced risk-sharing opportunities. According to Lane and Milesi-Ferretti (2017), cross-border bank lending experienced significant growth before the 2008 financial crisis. They attribute this spike to local banking regulation reforms and a decrease in lending resistance and constraints. However, cross-border bank lending by SANEK has been volatile in recent years. This study aims to investigate the empirical question of what causes volatility in cross-border bank lending.

Cross-border equity flow volatility (EFV): There is a lack of theories that can explain the multitude of models and variables used to measure equity flow volatility (Lee et al., 2013). Foreign investors seeking short-term gains but withdrawing rapidly when uncertainty arises affect cross-border equity flow volatility. It is influenced by various factors, including market changes, geopolitical events, and economic instability. Market fluctuations, such as changes in share prices and interest rates, can trigger sudden shifts in investor sentiment. Geopolitical events, such as political unrest or trade disputes, can create uncertainty and prompt foreign investors to withdraw funds. Economic instability, such as recessions or currency fluctuations, can exacerbate volatility in equity flows. Risk management professionals must closely monitor these factors and adapt their strategies accordingly. Unlike many existing studies, such as Lee et al. (2011), this study used net equity flows, calculated by subtracting outflows from inflows, to provide a more comprehensive view of the overall volatility of equity flows.

Independent Variables

As part of the regression analysis, the study includes several variables related to capital flow volatility in SANEK. The independent variables considered are the contagion effect (VIX), world GDP growth, and world interest rates.

- VIX (+): Implied Volatility of the S&P 500 Index (SPX)
- WGDP (-): World GDP Growth Rate
- WIR (-): World Interest Rate

VIX: Historically, the VIX has been considered a risk and risk-taking indicator (Scheubel, Livio, and Tille, 2019). The VIX was introduced by the Chicago Board of Options Exchange in 1993 (Omer and Akdag, 2020). It measures global volatility using the S&P 500 index and a 30-day maturity. Global volatility plays a crucial role in determining whether there is a risk of contagion in SANEK's capital flows. Contagion refers to the spread of financial shocks from one country or region to another (Pritsker, 2000; Allen and Gale, 2000; Bekaert, Harvey, and Lundblad, 2005). By measuring global volatility using the VIX, analysts can evaluate the potential impact of market fluctuations on SANEK's capital flow. A high VIX indicates a higher risk of contagion and potential adverse effects on SANEK's capital flow. Therefore, it is important to monitor the VIX to evaluate SANEK's vulnerability to external financial shocks. Melis and Bonga-Bonga (2019) use S&P 500 implied volatility as a proxy for global volatility (contagion effects). Consistent with Melis and Bonga-Bonga (2019), S&P 500 implied volatility is used to represent global volatility. Empirical studies, such as the one conducted by Lee et al. (2013), have confirmed a positive correlation between contagion and capital flow volatility. It is expected that SANEK's volatility will be positively correlated with global volatility. Therefore, during times of market turmoil when global volatility, as indicated by S&P 500 implied volatility, increases, a higher degree of contagion risk in SANEK is expected.

World GDP growth rate (WGDP): The world GDP growth rate measures how much the global economy expands on a yearly or quarterly basis. Bank profitability is typically influenced by GDP growth because a robust economic environment promotes investment and borrowing. In particular, the expansion of the U.S. economy influences positive global capital flows (Forbes and Warnock, 2012). The connection between

volatility and GDP is unclear in theory. This study uses the total monetary value of global output, according to Broto et al. (2011) and Lee et al. (2013).

World Interest Rate (WIR): Possibly the most significant price on international financial markets is the interest rate. It determines the rate at which global economy participants are willing to exchange current consumption for future consumption. It also reflects the pressures that financial demands place on the availability of global savings. It is reasonable to assume that changes in interest rate differentials narrow capital movements within portfolio balance specifications (Haynes, 1998). This study, like Neumann et al. (2009), uses the overnight lending rates of depository banks in the United States.

The study examines the relationship between capital flow volatility and various pull variables in SANEK countries. Five pull variables are considered: financial openness, institutional quality, inflation, real GDP growth rates, and capital account balances.

- Financial Openness (-): Financial Openness of country
- Institutional Quality (+): Institutional Quality of country
- Inflation (-/+): CPI-based Inflation Rate of country
- RGDP (-): Real GDP Growth Rate of country
- CAB (-): Current Account Balance (percent of GDP) of country

Financial Openness (FO): Given the interconnected nature of global financial markets, the concept of financial openness has gained significance in academic discourse. Financial openness refers to the integration of financial transactions and operations across international financial markets (Okunade, 2020). Higher levels of financial openness can make countries more vulnerable to certain factors, although not all of them (Cerdeiro and Komaromi, 2019). Frankel and Cavallo (2004) found no significant or negative connection between sudden stops and financial openness. On the other hand, Calvo, Izquierdo, and Mejia (2004) discovered a positive relationship between financial openness and volatility. However, the impact of financial liberalization on the volatility of capital flows varies depending on the type and location of capital flows (Broner and Ventura, 2010). It is generally believed that Foreign Direct Investment (FDI) is more stable and easier to liquidate compared to portfolios and other investment flows (Lipsev, 2001). In this study, financial openness is measured

using Chin and Ito's (2010) financial openness index, which includes capital controls. Anticipated results from this research are similar to those found by Mercado and Park (2011), who concluded that financial openness reduces cross-border equity volatility.

Institutional Quality (INS): The quality of an institution can be defined by its governance structures, which are the customs and institutions that exercise authority (Kaufman, Kraay, and Mastruzzi, 2004). A country's institutional quality is determined by property rights security, efficiency, the fairness of regulations and rules, and the level of corruption (Mulugeta, Hailu, Nondo, & Schaeffer, 2011). Sound governance is crucial for financial prosperity and cross-border capital flows. Kaufmann, Kraay, and Mastruzzi (2010) developed the Worldwide Governance Indicators to assess institutional quality.¹ Acemoglu, Johnson, Robinson, and Thaicharoen (2003) argue that institutions are interconnected with volatility. Therefore, this study uses regulatory quality as a measure of institutional quality to examine how institutional quality influences capital flow volatility in SANEK.

Inflation (INF): INF is a sign of poor economic management, leading to volatility in cross-border capital flows (Melis and Bonga-Bonga, 2019). Therefore, cross-border capital flows are more volatile during eras of high inflation than during periods of low inflation (Nwosa and Adeleke, 2017). CPI-based inflation rates are typically used to measure macroeconomic stability. Countries experiencing higher inflation rates are anticipated to have greater volatility in capital flows.² In line with Nwosa and Adeleke (2017), SANEK's inflation rates are used as proxies for macroeconomic stability.

Real GDP Growth Rate (RGDP): The GDP growth rate of a country, also referred to as the economic growth rate, measures the change in its GDP over time. In a strong economy, bank profitability is generally positively affected by GDP growth. However, the relationship between GDP growth rate and the volatility of cross-border capital flows has received little theoretical attention. According to Lee et al. (2013), as the GDP growth rate reflects the dynamism of beneficiary nations, it is likely to be negatively associated with capital inflow volatility in SANEK.

¹ For a detailed explanation of the methodology, please refer to Kaufmann, Kraay, and Mastruzzi (2010).

² The assumption is consistent with the findings of Broto et al. (2008).

Current Account Balance (CAB): Data on a country's financial inflows and outflows include the current account balance, which is a component of the balance of payments. The current account balance indicates whether a nation is in deficit or surplus. Research has found a link between capital flows and current account deficits through exchange rate mechanisms (Abell, 1990; Hobza and Zeugner, 2014). These studies argue that capital inflows increase the value of a nation's currency, making imports less costly and exports more expensive. Consequently, the current account balance deteriorates when the imports of goods and services increase while exports decline. Based on Lee et al. (2013), the current account balance is expected to be negatively correlated with volatility.

3.2.4 Research Methodology

3.2.4.1 Model Specification

The study examines the factors that cause volatility in cross-border bank lending and equity flows in SANEK. Equation (3.1) illustrates a country-specific regression analysis as an example. Cross-border bank lending and equity flow volatility are the dependent variables, while push and pull variables are considered independent variables. To achieve its research objective, the study uses a regression model based on Lee et al.'s (2013) modified models.

$$\sigma_{it} = \beta_0 + EV_{it}\beta_1 + IV_{it}\beta_2 + \varepsilon_{it} \quad (3.1)$$

In this case, " σ_{it} " represents the normalised capital flow volatility (bank lending and equity flow), and "represents" each estimation coefficient. EV, and IV denote the external and internal variables, respectively. β denotes vector with undefined coefficients, plus an error term, is denoted by ε_{it} .

3.2.4.2 Unit root test

Augmented Dickey-Fuller (ADF) test

The Augmented Dickey-Fuller (ADF) (1981) test is a statistical tool used to determine whether a time series dataset is stationary or non-stationary. Stationary time series data, characterised by a constant mean and variance over time, allow for more accurate predictions of future values. On the other hand, non-stationary time series data exhibit varying mean or variance, which can result in inaccurate

projections. The ADF test identifies unit roots as indicators of non-stationarity in the data, assisting scholars in selecting appropriate models for prediction and analysis based on the test results.

The ADF test's null hypothesis indicates non-stationarity in the time series, while the alternative hypothesis indicates stationarity.

This regression equation is estimated using the ADF test:

$$\Delta y_t = \alpha + \beta_t + \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \delta_2 \Delta y_{t-2} + \dots + \delta_p \Delta y_{t-p} + \varepsilon_t \quad (3.2)$$

where

- Δy_t represents the first difference of the time series at time t .
- y_{t-1} represents the lag value of the time series.
- α, β and γ represent parameters that require calculation.
- $\delta_1, \delta_2, \dots, \delta_p$ the coefficients of the time series are lagged first differences.
- ε_t is the error term.

Test statistics are compared with critical values derived from Dickey-Fuller distributions to verify or reject the null hypothesis of a unit root. We reject the null hypothesis by testing whether the test statistic is less than the critical value, indicating that the series is stationary. If the test statistic exceeds the critical level and we are unable to reject the null hypothesis, it suggests that the series may not be stationary. In such cases, further analysis may be required to identify any underlying trends or patterns in the data. It is imperative to test hypotheses rigorously and understand data stationarity to ensure the validity and reliability of time series analyses.

The Phillips-Perron (PP) test

The PP test, developed by Phillips and Perron in 1988, is another popular unit root test in time series analysis. It can be used to assess whether a time series is stationary or non-stationary, similar to the ADF test. However, the PP test adjusts for heteroscedasticity and serial correlation differently than the ADF test. When there are heteroscedastic or serially correlated errors in the time series, the PP test can be considered a robust alternative to the ADF test. To perform the PP test, a deterministic trend component and the initial differences of the time series are regressed on their

lagged values. The alternative hypothesis in the PP test is that the series is stationary, while the null hypothesis suggests that the series has a unit root, indicating non-stationarity.

Based on the given regression equation, the PP test statistic is computed.

$$\Delta_{yt} = \alpha + \beta_t + \gamma y_{t-1} + \varepsilon_t \quad (3.3)$$

where

- Δ_{yt} represents the first difference of the time series at time t .
- γy_{t-1} refers to the lagged value of the time series.
- $\alpha, \beta,$ and γ represent parameters that require calculation.
- t is a time trend.
- ε_t is the error term.

The null hypothesis of a unit root is tested for rejection by calculating the PP test statistic and comparing its significance to critical values from the Phillips-Perron distribution or tables. We reject the null hypothesis of a unit root if the test statistic is smaller than the critical values, indicating that the series is stationary. If we fail to reject the null hypothesis, it indicates that the series may not be stationary when the test statistic surpasses the critical levels. The Phillips-Perron test is particularly useful for addressing autocorrelation and heteroscedasticity issues.

3.2.4.3 Johansen Juselius Test for Cointegration

The Johansen-Juselius cointegration test is an econometric tool used to analyze the relationship between multiple time series variables. It allows researchers to ascertain whether these variables exhibit a long-term equilibrium relationship, despite short-term fluctuations. Johansen and Juselius (1990) developed a methodology that involves estimating a Vector Autoregression (VAR) model and conducting statistical tests on the rank of the coefficient matrix to assess cointegration. This approach considers the possibility of multiple cointegrating relationships, providing a more comprehensive understanding of the data.

The VAR model captures the dynamics of the time series variables. Typically, the model is described as follows:

$$Y_t = \Pi Y_{t-1} + \epsilon_t \quad (3.4)$$

Where Y_t represents a vector of K time series variables, while Π is a matrix of coefficients, and ϵ_t is a vector of error terms.

The number of cointegrating vectors is determined by the matrix rank Π , which is tested in the Johansen-Juselius test for cointegration. The rank Π reveals how many long-term correlations there are between the variables. If the rank of Π is zero, it means that there are no cointegrating relationships between the variables, indicating that they do not have a long-term relationship. On the other hand, if the rank of Π is greater than zero, it suggests that there is at least one cointegrating vector, indicating a long-term relationship between the variables.

The null hypothesis H_0 often assumes that there is no cointegration, meaning that each eigenvalue is equal to 1. On the other hand, the alternative hypothesis H_1 implies cointegration by allowing at least one eigenvalue to be smaller than 1. To determine the long-term relationships between the variables, Juselius' methodology also involves testing for the number of cointegrated vectors in the data. In this VAR framework, researchers can analyze relationships and interactions between time series variables more accurately and insightfully.

3.2.4.4 Markov Switching Means VAR (MSM-VAR)

Markov switching models, also known as regime switching models, were introduced by Hamilton (1989) and are used in nonlinear time series modelling. Tools for time series analysis are essential for examining data in fields such as economics and finance. These models capture the dynamic nature of data states or regimes over time, allowing distinct parameters to represent various patterns or behaviours. Therefore, they provide insight into the density and nonlinearity of real-world data. There are two main classes of MS-VAR: the Markov-Switching Intercept VAR Model and the Markov-Switching Mean VAR Model (MSM-VAR). Both models account for the presence of multiple states or regimes in the data, each characterised by its own mean and intercept (Lebari and Wiri, 2021). This allows analysts to make more accurate predictions based on the various states to which the data can transition in response to changes in its structure. By incorporating Markov switching into a VAR equation, deeper insights into the underlying dynamic patterns can be achieved,

leading to more precise forecasts. While conventional Markov models, such as the standard Markov-Switching Autoregressive (MS-AR) model, are effective for identifying regime shifts in univariate time series (Hamilton, 1989), MSM-VAR extends this approach by incorporating multiple interdependent variables. This makes it particularly valuable for examining macroeconomic and financial phenomena where relationships between variables evolve over time. The Credit Market Imperfections hypothesis by Bernanke, Gertler, and Gilchrist (1999) highlights how external shocks and financial frictions create regime-dependent lending patterns, which MSM-VAR effectively captures. In this study, the MSM-VAR method was applied, following the approach of Lebari and Wiri (2021), to model and estimate the interdependence between push and pull factors that drive cross-border bank lending and equity flow volatility in the context of SANEK economies. The Push-Pull Theory of Capital Flows (Calvo et al., 1996) differentiates between external (push) and domestic (pull) factors that drive cross-border capital flows, aligning well with MSM-VAR's capability to model their interdependence.

Y_t at time t is represented by $K \times 1$ vector of endogenous variables, while X_t is represented by $p \times 1$ vector of exogenous variables. The following is a representation of the MSM-VAR(p) model.

$$Y_t = \sum_{i=1}^p A_i S_{t-i} Y_{t-1} + BX_t + \epsilon_t \quad (3.5)$$

where

- A_i is a $K \times K$ matrix of coefficients for lag i ,
- S_t is the state variable, which stands for the regime at time t ,
- B is a $K \times p$ coefficient matrix for exogenous variables,
- ϵ_t is a $K \times 1$ vector of error terms, with multivariate normality being assumed,
- p represents the lag order of the VAR model.

There are m states in the state variable S_t as part of a Markov chain, where m represents the number of regimes. $m \times m$ transition probability matrix Π capture the probabilities of Markov chain transitions.

In terms of regime switching transition equations, they are as follows:

$$Pr (S_t = j | S_{t-1} = i) = \pi_{ij} \quad (3.6)$$

In this case, π_{ij} denotes the probability of a switch between regimes i and j .

A maximum likelihood estimate is applied to estimate model parameters, such as coefficient matrices A_i and B , along with the transition probabilities π_{ij} . This approach allows for modelling different states or regimes in a time series, capturing changes in behaviour or trends that may not be observable with traditional models. By estimating the transition probabilities, we can better understand the likelihood of moving between regimes and the impact of different variables on these transitions. The regime-switching model is a flexible and powerful tool for analysing complex and dynamic data. In this study, the two regimes are implemented concurrently with those utilised by Abdymomunov (2013) and Augustyniak (2014). During a low volatility period, regime one is prevalent, whereas regime two is associated with high volatility periods.

3.3 Analysis and Results

This section presents and discusses the results of data analysis. First, summary statistics are presented, followed by tests for stationarity and cointegration. In the final section, an analysis of volatility in cross-border bank lending and equity flows is presented.

3.3.1 Descriptive Analysis

South Africa

Table 3.1 presents key macroeconomic and financial indicators for South Africa. BLV has a mean of 10.09, indicating moderate average volatility in cross-border lending. The VIX, at 0.179, represents a low average level of market volatility, suggesting relatively stable market conditions. WGDP is recorded at 2.94, signalling moderate global economic growth. WIR stands at 2.16, reflecting relatively higher average global interest rates. FO is negative at -0.7987, indicating lower levels of INS scores than 0.6716, suggesting moderate institutional quality. INF is notably high at 108.05, which is unusually large and may indicate an outlier in the dataset. RGDP is 2.33, suggesting moderate economic growth in South Africa. Finally, the CAB is recorded at -2.396, reflecting a negative current account balance on average, which is typical for developing economies like South Africa.

Table 3.1: South Africa Cross-border Bank Lending Volatility (BLV) Descriptive Statistics

Description	BLV	VIX	WGDP	WIR	FO	INS	INF	RGDP	CAB
Mean*	10.08939	0.178925	2.943182	2.157531	-0.798750	0.671591	108.0484	2.328409	-2.396080
Median*	11.56984	0.176650	3.100000	0.526750	-0.800000	0.700000	101.7150	2.500000	-2.878725
Maximum*	15.68299	0.241600	5.900000	6.125900	0.600000	1.100000	174.9900	5.600000	4.123380
Minimum*	0.000000	0.136800	-3.100000	0.048600	-1.000000	-0.900000	58.14000	-6.300000	-5.836930
Standard Deviation	3.493541	0.022089	1.545315	2.188496	0.231536	0.238264	35.06533	2.248062	2.604292
Skewness	-1.133330	0.300617	-1.466614	0.520923	2.859609	-3.398109	0.336017	-1.143259	0.780839
Kurtosis	3.628134	2.792761	6.061100	1.456818	16.90179	22.84967	1.789708	5.318787	2.87193
Jarque-Bera (JB)	20.28510	1.482915	65.90524	12.71179	828.5542	1614.060	7.026933	38.88478	9.001369
Probability	0.000039	0.476419	0.000000	0.001736	0.000000	0.000000	0.029793	0.000000	0.011101
Observations	88	88	88	88	88	88	88	88	88

Source: Authors' Estimation using EViews 12.

The standard deviation analysis of macroeconomic and financial indicators reveals varying levels of volatility and variability. BLV has a standard deviation of 3.49, indicating moderate fluctuations in cross-border bank lending. The VIX, with a standard deviation of 0.022, demonstrates very low variability, suggesting stable market conditions. WGDP exhibits a standard deviation of 1.55, reflecting moderate variability in global GDP growth. In contrast, WIR shows considerable fluctuation, with a standard deviation of 2.19. FO and INS present relatively small variations, with standard deviations of 0.232 and 0.238, respectively. INF displays an extremely high standard deviation of 35.07, indicating significant variability in inflation rates across the data. RGDP has a standard deviation of 2.25, suggesting moderate variation in GDP growth. Finally, the CAB shows a standard deviation of 2.60, reflecting some variability in the current account balance.

There is negative skewness in the BLV distribution (-1.13), which indicates more extreme negative values at the left tail of the distribution. In contrast, VIX (0.30) demonstrates positive skewness, suggesting that most observations cluster at the lower end of the VIX scale, with a few instances of high volatility. WGDP (-1.47) also shows negative skewness, indicating a higher frequency of lower global growth observations and fewer higher values. WIR (0.52) reveals moderate positive skewness. FO (2.86) displays significant positive skewness, suggesting that most observations are concentrated around low financial openness values, with a few larger values present. INS (-3.40) shows strong negative skewness, highlighting a tendency towards lower institutional quality, with only a few high-quality observations. INF (0.34) shows slight positive skewness. Finally, RGDP (-1.14) exhibits negative skewness, indicating a greater frequency of lower growth rates, while CAB (0.78) is positively

skewed, signifying that more observations reflect negative current account balances, albeit with a few positive ones.

BLV (3.63) is near normal kurtosis, suggesting a distribution with moderately heavy tails. VIX (2.79) has slightly lower kurtosis, indicating a more evenly spread distribution with fewer extreme values. WGDP (6.06) shows very high kurtosis, highlighting the presence of extreme outliers in global GDP growth. WIR (1.46) has low kurtosis, indicating a distribution with fewer extreme outliers. FO (16.90) and INS (22.85) exhibit extremely high kurtosis, pointing to significant outliers in financial openness and institutional quality. INF (1.79) is close to normal, suggesting a relatively standard distribution with no extreme outliers. RGDP (5.32) has relatively high kurtosis, indicating a few extreme observations of growth rates. CAB (2.87) has moderate kurtosis, suggesting a slightly heavier tail in the distribution.

Nigeria

Table 3.2 shows that, on average, Nigeria's cross-border bank lending volatility (5.26) is lower than South Africa's (10.09), indicating a less volatile lending environment in Nigeria. The VIX (0.179) is almost identical to the value for South Africa, suggesting similar contagion effects. Global GDP growth is the same as in South Africa, indicating comparable global economic conditions. World interest rates are also similar to those in South Africa. However, financial openness in Nigeria is slightly more negative than in South Africa (-0.799), suggesting greater restrictions on financial openness. Institutional quality is also more negative in Nigeria (0.672), indicating weaker institutions compared to South Africa. Inflation is significantly lower in Nigeria (87.35) than in South Africa (108.05), suggesting more stability in price levels. Furthermore, Nigeria's GDP growth rate (5.20) is higher than South Africa's (2.33), indicating stronger economic growth. Additionally, Nigeria's current account balance is positive, in contrast to South Africa's negative value (-2.40), reflecting a surplus rather than a deficit.

Table 3.2: Nigeria Cross-border Bank Lending Volatility (BLV) Descriptive Statistics

Description	BLV	VIX	WGDP	WIR	FO	INS	INF	RGDP	CAB
Mean*	5.256141	0.178925	2.943182	2.157531	-0.813182	-0.841477	87.35409	5.202273	4.368560
Median*	4.207288	0.176650	3.100000	0.526750	-0.800000	-0.800000	97.66000	6.050000	3.003924
Maximum*	16.87156	0.241600	5.900000	6.125900	-0.060000	-0.200000	136.1300	15.30000	20.73933
Minimum*	0.000000	0.136800	-3.100000	0.048600	-1.000000	-0.500000	27.29000	-1.800000	-3.948820
Standard Deviation	3.7444523	0.022089	1.545315	2.188496	0.181384	0.232179	31.95586	3.416020	5.790211
Skewness	0.904484	0.300617	-1.466614	0.520923	1.014332	-0.370338	-0.411008	0.076809	1.021385
Kurtosis	3.242036	2.792761	6.061100	4.637886	3.695789	3.695789	1.806496	3.144663	3.486301
Jarque-Bera (JB)	12.21347	1.482915	65.90524	12.71179	24.92654	3.786649	7.700595	0.163261	16.16781
Probability	0.002228	0.476419	0.000000	0.001736	0.000004	0.150570	0.021273	0.9216112	0.000308
Observations	88	88	88	88	88	88	88	88	88

Source: Authors' Estimation using EViews 12.

In terms of standard deviation, the BLV (3.74) is substantial, indicating significant fluctuations in external economic conditions that impact lending. Nigeria's market is stable, as evidenced by the VIX's low standard deviation (0.022). WGDP (1.55) shows moderate variability, as anticipated. WIR (2.19) is subject to considerable variability, which can affect Nigeria's borrowing and lending conditions. FO (0.181) reveals low variability, indicating consistent market access policies. Similarly, institutional quality (0.232) exhibits low variability, indicating stable governance and institutional performance over time. The extremely high variability in inflation highlights significant fluctuations in Nigeria's inflation rate (31.96), a common characteristic among many developing economies. The RGDP also varies moderately, reflecting fluctuations in economic growth. A high standard deviation in the CAB (5.79) suggests considerable fluctuations in Nigeria's trade balance over time.

Positive skewness indicates a longer right tail for BLV (0.90), characterised by frequent lower values and spikes in volatility. VIX (0.30) has a slight positive skewness, indicating that most values are clustered towards the lower end of the scale, with occasional higher levels of volatility. In contrast, the negative skewness for WGDP growth (-1.47) indicates a tendency towards lower values, with more observations falling below the mean. A moderate positive skew in higher WIR (0.52) suggests that while such rates are less frequent, they still appear in the data. Similarly, positive skewness in FO (1.01) indicates that most observations are concentrated near the lower end, with fewer on the higher end. Slight negative skewness in INS (-0.37) reveals a prevalence of lower values, with fewer observations of higher quality. Negative skewness in inflation indicates that rates are generally below average, with occasional instances of higher inflation (-0.41). Finally, a very slight positive skewness in RGDP (0.08) suggests that most observations cluster around the mean, while a

positive skewness in CAB (1.02) shows that although there are more negative balances, a few observations reflect positive balances.

The kurtosis value near 3 suggests that the distribution is approximately normal, albeit with moderately heavy tails, indicating the presence of some extreme observations. The kurtosis for VIX (2.79) is slightly lower than normal, signifying fewer extreme values in its distribution. In contrast, global GDP growth shows a very high kurtosis (6.06), indicating a distribution with significant outliers. The high kurtosis for WIR (4.64) also suggests several extreme observations. For FO (3.70), the slightly elevated kurtosis indicates a distribution with heavier tails. Similarly, the kurtosis for institutional quality in Nigeria (3.70) suggests a distribution containing some extreme values. The lower kurtosis for inflation (1.81) points to a relatively normal distribution with no extreme outliers. Nigeria's GDP growth rate has a moderately high kurtosis (3.14), indicating some outliers, although they are not extreme. Finally, the moderate kurtosis for the CAB (3.49) suggests a distribution that includes some extreme values.

Egypt

Table 3.3 indicates that the mean BLV in Egypt (6.22) is moderate, lower than South Africa's (10.09) but higher than Nigeria's (5.26). This suggests some volatility in lending, though it is not extreme. Egypt's VIX aligns with global trends, indicating moderate contagion effects similar to those observed in other countries in the sample. The average WGDP (2.94) reflects these trends and is comparable to the rates in both South Africa and Nigeria. WIR is consistent with global averages, mirroring typical international conditions. Financial openness in Egypt (1.81) is relatively high when compared to Nigeria (-0.81) and South Africa (-0.80), indicating a more liberalised financial sector. Institutional quality in Egypt (-0.32) is slightly negative, demonstrating moderate institutional performance, which is somewhat better than Nigeria's (-0.84). Egypt's inflation rate is notably higher (133.63) than that of South Africa (108.05) and Nigeria (87.35), indicating significant inflationary pressures. The GDP growth rate in Egypt (4.29) is strong compared to South Africa's (2.33) but slightly lower than Nigeria's (5.20), suggesting robust economic growth. Egypt's current account balance (-1.44) is negative, reflecting a moderate deficit that is more manageable than South Africa's larger deficit (-2.40), yet still points to external economic challenges.

Table 3.3: Egypt Cross-border Bank Lending Volatility (BLV) Descriptive Statistics

Description	BLV	VIX	WGDP	WIR	FO	INS	INF	RGDP	CAB
Mean*	6.224700	0.178925	2.943182	2.157531	1.806818	-0.323864	133.6288	4.288636	-1.435149
Median*	4.932669	0.176650	3.100000	0.526750	1.900000	-0.300000	105.5450	4.250000	-1.926638
Maximum*	18.22754	0.241600	5.900000	6.125900	2.000000	-0.100000	328.6700	8.900000	5.053290
Minimum*	0.000000	0.136800	-3.100000	0.048600	0.800000	-0.800000	41.95000	1.800000	-7.583210
Standard Deviation	4.804801	0.022089	1.545315	2.188496	0.244853	0.175509	89.80290	1.608986	3.014308
Skewness	0.553215	0.300617	-1.466614	0.520923	-2.148844	-0.876589	0.889039	0.532338	0.452056
Kurtosis	2.392178	2.792761	6.061100	1.456818	8.501748	3.168475	2.420815	2.631052	2.698944
Jarque-Bera (JB)	5.843326	1.482915	65.90524	12.71179	178.7109	11.37407	12.82239	4.655403	3.329523
Probability	0.053844	0.476419	0.000000	0.001736	0.000000	0.003390	0.001643	0.097520	0.189236
Observations	88	88	88	88	88	88	88	88	88

Source: Authors' Estimation using EViews 12.

In terms of standard deviation, BLV in Egypt (4.80) is the highest in the group, indicating greater unpredictability in lending compared to South Africa (3.49) and Nigeria (3.74). Similar to other countries, the VIX remains stable with little variation. Global GDP growth shows moderate variability (1.55), consistent with other countries. WIR exhibits high variability, similar to South Africa. FO has moderate variability (0.245), indicating some fluctuations while maintaining relatively stable financial conditions. INS in Egypt (0.176) shows low variability, reflecting steady institutional performance. INF in Egypt (89.80) demonstrates very high variability, significantly exceeding that of South Africa (35.07) and Nigeria (31.96), suggesting considerable fluctuations in the inflation rate. There are some fluctuations in Egypt's RGDP (1.61), which indicates a moderately variable economy. Lastly, Egypt's current account balance (3.01) exhibits moderate variability, suggesting fluctuations but not extreme swings like those seen in Nigeria (5.79).

Positive skewness indicates that while most values for cross-border bank lending volatility (0.55) are lower, there are some extreme positive outliers, suggesting occasional spikes in volatility. Similarly, positive skewness suggests that VIX values are generally lower, accompanied by occasional spikes in volatility. In contrast, negative skewness indicates that global GDP growth (-1.47) is more likely to exhibit lower values, with a few periods of very high growth. Furthermore, positive skewness shows that most world interest rates (0.52) are on the lower end, with a few higher outliers. Strong negative skewness indicates that financial openness in Egypt (-2.15) tends to be low, with a few higher values. Additionally, negative skewness reveals that institutional quality is generally lower, with fewer periods of high quality (-0.88). Positive skewness also indicates that inflation in Egypt (0.89) is typically higher, with

fewer instances of low inflation. Likewise, positive skewness suggests that GDP growth (0.53) is more often positive, with a few periods of strong growth. Lastly, positive skewness indicates that Egypt's current account balance (0.45) tends to be negative, with occasional surpluses.

The low kurtosis of BLV (2.39) in Egypt indicates a relatively flat distribution, with fewer extreme outliers compared to a normal distribution. Similarly, the VIX exhibits a moderate kurtosis, suggesting that the volatility index has a typical distribution with few extreme values. In contrast, the high kurtosis of global GDP growth (6.06) points to the presence of extreme values and significant deviations from the normal distribution. Low kurtosis indicates that world interest rates are more evenly distributed, with fewer extreme values. The very high kurtosis associated with financial openness in Egypt suggests the presence of extreme values, indicating potential instability or fluctuations in financial conditions. Moderate kurtosis in institutional quality in Egypt implies that while there are some occasional outliers, it generally adheres to a typical distribution. The moderate kurtosis of inflation (2.42) indicates occasional spikes but overall follows a relatively normal distribution. Similarly, the moderate kurtosis suggests that Egypt's GDP growth rate (2.63) has a few significant outliers while generally conforming to a normal distribution. Lastly, the current account balance (2.70) in Egypt also shows moderate kurtosis, indicating occasional outliers but generally aligning with a typical distribution.

Kenya

Table 3.4: Kenya Cross-border Bank Lending Volatility (BLV) Descriptive Statistics

Description	BLV	VIX	WGDP	WIR	FO	INS	INF	RGDP	CAB
Mean*	0.358150	0.178925	2.943182	2.157531	0.839773	-0.376136	131.5256	4.326136	-4.262273
Median*	0.303963	0.176650	3.100000	0.526750	0.850000	-0.400000	105.6200	4.600000	-4.625000
Maximum*	1.106598	0.241600	5.900000	6.125900	1.000000	0.500000	371.9800	8.100000	0.710000
Minimum*	0.000000	0.136800	-3.100000	0.048600	0.500000	-0.900000	27.900000	-0.300000	-9.470000
Standard Deviation	0.270760	0.022089	1.545315	2.188496	0.148200	0.200571	90.41382	1.852026	2.765284
Skewness	0.896395	0.300617	-1.466614	0.520923	-0.449377	0.477444	0.928707	-0.471724	0.003850
Kurtosis	3.114756	2.792761	6.061100	1.456818	2.040810	6.423363	2.873866	2.686703	1.810794
Jarque-Bera (JB)	11.83330	1.482915	65.90524	12.71179	6.335280	46.31450	12.70829	3.623576	5.185655
Probability	0.002694	0.476419	0.000000	0.001736	0.042103	0.000000	0.001740	0.163362	0.074808
Observations	88	88	88	88	88	88	88	88	88

Source: Authors' Estimation using EViews 12.

Table 3.4 illustrates that the mean cross-border bank lending volatility in Kenya (0.36) is very low compared to South Africa (10.09), Nigeria (5.26), and Egypt (6.22),

indicating relatively stable lending conditions in Kenya. The VIX aligns closely with the global average, suggesting moderate contagion effects from global market conditions. Global GDP growth is in line with the global average, reflecting consistent economic growth worldwide. World interest rates are comparable to global rates, indicating international conditions that influence lending and investment. Financial openness in Kenya (0.84) is moderately positive, suggesting some accessibility to international financial markets, although it is less than that of Egypt (1.81). Institutional quality in Kenya (-0.38) is slightly negative, indicating moderate institutional challenges, yet it is better than in Nigeria (-0.84). Inflation in Kenya (131.53) is quite high, similar to that of Egypt (133.63), pointing to significant inflationary pressures within the country. Kenya's GDP growth rate (4.33) is robust and comparable to Egypt's (4.29), indicating strong economic expansion. However, the current account balance (-4.26) is significantly negative, revealing a large trade deficit, which is worse than that of Egypt (-1.44) and South Africa (-2.40).

In terms of standard deviation, BLV in Kenya (0.27) indicates low variability, suggesting that lending volatility is relatively stable and significantly lower than in Egypt (4.80) and South Africa (3.49). The low standard deviation for the VIX (0.02) indicates minimal fluctuations in market volatility. WGDP exhibits moderate variability, consistent with trends observed in other countries. World interest rates display high variability, comparable to that of other nations. Financial openness in Kenya (0.15) is relatively stable, showing low variability similar to other countries. Institutional quality in Kenya also reflects moderate variability, indicating some fluctuations but generally stable institutions. Inflation in Kenya (90.41) is extremely volatile, with much higher variability than in other countries, demonstrating significant fluctuations. The GDP growth rate in Kenya shows moderate variability, suggesting periodic fluctuations while maintaining generally stable growth. Additionally, the current account balance exhibits moderate variability, indicating fluctuations in Kenya's trade balance.

Positive skewness indicates that the majority of BLV values (0.90) are lower, with occasional higher spikes. A slight positive skewness suggests that most VIX values are concentrated at the lower end, with infrequent increases in market volatility. Negative skewness implies that WGDP tends to be on the lower side, with rare instances of very high growth. Similarly, positive skewness indicates that most WIR is

low, with some high outliers. A slight negative skewness suggests that FO (-0.45) is typically at lower levels, with occasional periods of greater financial openness. Positive skewness also indicates that institutional quality (0.48) in Kenya is generally on the lower end, though there are instances of better institutional performance. Additionally, positive skewness signifies that inflation (0.93) is generally high, but there are fewer periods of low inflation. Slight negative skewness indicates that most GDP growth rates are positive, although there are occasional periods of low growth. Finally, zero skewness indicates that the current account balance in Kenya is symmetrically distributed, presenting an equal probability of positive or negative balances.

The kurtosis values suggest varying characteristics of different financial indicators in Kenya. A kurtosis close to 3 indicates that cross-border bank lending volatility follows a relatively normal distribution, with no significant extreme outliers. Similarly, a moderate kurtosis for the VIX values implies that they typically adhere to a standard distribution, again with few extreme outliers. In contrast, a high kurtosis for global GDP growth indicates the presence of significant extreme values, suggesting a distribution that contains outliers. Low kurtosis for world interest rates reflects fewer extreme outliers and a more even distribution, while a low kurtosis for financial openness in Kenya implies a more uniform distribution with fewer extreme values. High kurtosis in institutional quality (6.42) indicates considerable variability, characterised by some extreme values where institutional performance is exceptionally low or high. Moderate kurtosis for inflation (2.87) suggests that it generally follows a typical distribution, albeit with occasional large fluctuations. Additionally, a moderate kurtosis for the GDP growth rate (2.69) indicates the presence of some extreme values while still conforming to a relatively normal distribution. Finally, a low kurtosis for the current account balance (1.81) suggests an even distribution with no extreme outliers.

South Africa

In table 3.5, the EFV mean is 4.134, accompanied by a high standard deviation of 6.699, indicating significant variability in cross-border equity flow lending volatility. The VIX has a mean of 0.179 and a relatively low standard deviation of 0.022, suggesting that the contagion effect remains stable. The mean of WGDP is 2.925, with a standard deviation of 1.545, indicating moderate variability. WIR has a mean of 2.116 and a standard deviation of 2.166, reflecting significant fluctuations. FO shows a mean of -

0.798 and a standard deviation of 0.233, indicating predominantly negative values with moderate dispersion. The mean for INS is 0.674, with a standard deviation of 0.239, suggesting moderate fluctuations. Inflation rates have a mean of 108.622 and a standard deviation of 34.851, demonstrating a wide dispersion. Economic growth has a mean of 2.307 and a standard deviation of 2.252, indicating moderate variation. Lastly, the mean for the deficit tendency is -2.422, with a standard deviation of 2.608, reflecting moderate variation.

Table 3.5: South Africa Cross-border Equity Flow Volatility (EFV) Descriptive Statistics

Description	EFV	VIX	WGDP	WIR	FO	INS	INF	RGDP	CAB
Mean*	4.134052	0.178690	2.925287	2.116100	-0.797586	0.673563	108.6221	2.306897	-2.422039
Median*	1.823019	0.176600	3.100000	0.522400	-0.800000	0.700000	102.4500	2.500000	-2.881710
Maximum*	54.88010	0.241600	5.900000	6.125900	0.600000	1.100000	174.9900	5.600000	4.123380
Minimum*	0.107924	0.136800	-3.100000	0.048600	-1.000000	-0.900000	59.54000	-6.300000	-5.836930
Standard Deviation	6.699066	0.022105	1.545076	2.166194	0.232619	0.238922	34.85080	2.251965	2.607913
Skewness	5.431110	0.326272	-1.461470	0.547296	2.838692	-3.430116	0.330938	-1.128514	0.809125
Kurtosis	39.42014	2.821656	6.055149	1.485310	16.72657	22.97531	1.782723	5.294592	2.916060
Jarque-Bera (JB)	5236.002	1.658875	64.80599	12.66001	799.8610	1617.025	6.959436	37.55254	9.518452
Probability	0.000000	0.436295	0.000000	0.001782	0.000000	0.000000	0.030816	0.000000	0.008572
Observations	88	88	88	88	88	88	88	88	88

Source: Authors' Estimation using EViews 12.

The EFV has a mean of 4.134 and a high standard deviation of 6.699, indicating significant variability in cross-border equity flow lending volatility. The VIX, which measures contagion effects, has a mean of 0.179 and a relatively low standard deviation of 0.022, suggesting that the contagion effect remains stable. The mean of WGDP is 2.925, with a standard deviation of 1.545, reflecting moderate variability. WIR has a mean of 2.116 and a standard deviation of 2.166, indicating substantial fluctuations. FO shows a mean of -0.798 and a standard deviation of 0.233, suggesting it is predominantly negative and moderately dispersed. INS has a mean of 0.674 and a standard deviation of 0.239, indicating moderate fluctuations. INF has a mean of 108.622 and a standard deviation of 34.851, showing a wide dispersion. Economic growth presents a mean of 2.307 with a standard deviation of 2.252, indicating moderate variation. Finally, a mean of -2.422 and a standard deviation of 2.608 reflect a tendency towards deficits with moderate variation.

The skewness values reveal asymmetry in the distribution of each variable for South Africa. The distribution exhibits a lengthy right tail with exceptionally high values, as reflected by the EFV of 5.431110, indicating a significant positive skew. In contrast, the VIX, with a value of 0.326272, shows a slight right tilt and a modest positive skew.

The WGDP shows a negative skew of -1.461470, indicating a concentration of data at the higher end alongside some extremely low values. The WIR, with a skewness of 0.547296, also indicates a rightward tail but contains more lower values. FO presents a significant positive skew of 2.838692, suggesting that the mean is elevated due to exceptionally high values. On the other hand, INS has a severely negative skew of -3.430116, with data primarily concentrated to the right and notable lower outliers. The INF skewness of 0.330938 indicates a slight positive skew, resulting in a distribution that is almost symmetrical but tilts slightly to the right. The RGDP displays a negative skew of -1.128514, characterised by severe low outliers and a concentration of high values. Lastly, CAB, with a skewness of 0.809125, suggests a tendency toward lower values while still exhibiting a rightward tail.

Kurtosis values for South Africa reveal the distribution characteristics of each variable: EFV has a kurtosis of 39.42014, indicating a highly leptokurtic distribution with extreme outliers and heavy tails. The VIX shows a kurtosis of 2.821656, suggesting a slightly platykurtic distribution with moderate tails. WGDP has a kurtosis of 6.055149, indicating leptokurtic characteristics with heavy tails and a higher frequency of extreme values. WIR displays a kurtosis of 1.485310, suggesting platykurtic characteristics with lighter tails and fewer extreme values. FO has a kurtosis of 16.72657, indicating a highly leptokurtic distribution with significant outliers and heavy tails. INS shows a kurtosis of 22.97531, indicating a high leptokurtic distribution with extreme values and heavy tails. INF has a kurtosis of 1.782723, suggesting platykurtic characteristics with lighter tails and fewer outliers. RGDP exhibits a kurtosis of 5.294592, indicating leptokurtic characteristics with moderate peakedness and some heavy tails and outliers. Finally, CAB has a kurtosis of 2.916060, indicating a platykurtic distribution with moderate tails.

Nigeria

Table 3.6 presents key statistical measures related to various economic indicators. The mean of 1.230632 suggests moderate volatility in EFV, while the standard deviation of 2.788979 indicates substantial variability in this volatility. The mean of 0.178690 shows low levels of contagion effects, similar to the South African case, with a standard deviation of 0.022105 reflecting very low volatility in these effects. In terms of WGDP, the mean of 2.925287 suggests moderate global GDP growth on average,

with a standard deviation of 1.545076 indicating variability in world GDP. The mean of 2.116100 points to moderate WIR, accompanied by a standard deviation of 2.166194, which demonstrates substantial variability in these rates.

Table 3.6: Nigeria Cross-border Equity Flow Volatility (EFV) Descriptive Statistics

Description	EFV	VIX	WGDP	WIR	FO	INS	INF	RGDP	CAB
Mean*	1.230632	0.178690	2.925287	2.116100	-0.812184	-0.840805	88.04448	5.204598	4.295850
Median*	0.103226	0.176600	3.100000	0.522400	-0.800000	-0.800000	97.97000	6.100000	2.903713
Maximum*	13.98811	0.241600	5.900000	6.125900	-0.060000	-0.200000	136.1300	15.30000	20.73933
Minimum*	3.16E-06	0.136800	-3.100000	0.048600	-1.000000	-1.500000	29.16000	-1.800000	-3.948820
Standard Deviation	2.788979	0.022105	1.545076	2.166194	0.182192	0.233438	31.47410	3.435753	5.783230
Skewness	2.898979	0.326272	-1.461470	0.547296	0.997334	-0.377147	-0.420118	0.074336	1.059710
Kurtosis	10.92287	2.821656	6.055149	1.485310	4.586941	3.663471	1.820383	3.108976	3.580173
Jarque-Bera (JB)	349.4051	1.658875	64.80599	12.66001	23.55191	3.658174	7.603409	0.123175	17.50347
Probability	0.000000	0.436295	0.000000	0.001782	0.000008	0.160560	0.022333	0.940270	0.000158
Observations	88	88	88	88	88	88	88	88	88

Source: Authors' Estimation using EViews 12.

Regarding FO, the mean of -0.812184 indicates a negative average, with a standard deviation of 0.182192 showing low to moderate variability. The mean of 88.04448 suggests that inflation is extremely high on average, while the standard deviation of 31.47410 reveals significant variability in inflation rates. For Nigeria, the mean of 5.204598 indicates a high average GDP growth rate, with a standard deviation of 3.435753 highlighting significant variability in this growth rate. Finally, the mean of 4.295850 reflects a positive average CAB, with a standard deviation of 5.783230 indicating high variability in the current account balance.

EFV has a skewness of 2.898979, indicating a strong positive skew. This suggests that the data is heavily weighted towards lower values, with a few extreme high values pushing the mean upward. VIX, with a skewness of 0.326272, shows a mild positive skew, indicating that the distribution is slightly tilted to the right, with a few higher values pulling the mean. WGDP exhibits a skewness of -1.461470, indicating a negative skew, meaning the distribution is skewed to the left, with a higher frequency of lower world GDP values and a few higher values. WIR has a skewness of 0.547296, indicating a moderate positive skew, with the distribution somewhat tilted toward higher values, though not as drastically as in EFV. FO has a skewness of 0.997334, revealing a moderate positive skew, indicating that most data points are concentrated on the lower end of the distribution, with a few higher values raising the mean. INS shows a skewness of -0.377147, indicating a slight negative skew, with more values on the higher end and a few lower values causing a slight left tilt. INF has a skewness

of -0.420118, reflecting a slight negative skew, with most inflation values on the higher side and a few extreme low values pulling the distribution to the left. RGDP, with a skewness of 0.074336, is very close to 0, indicating a nearly symmetric distribution, suggesting that the data is balanced on both sides of the mean. Finally, CAB has a skewness of 1.059710, indicating a moderate positive skew, with a slight rightward tilt due to a few extreme positive values pushing the mean upward.

Kurtosis values reflect the "tailedness" or sharpness of the distribution for each variable in Nigeria. EFV has a kurtosis value of 10.92287, indicating a highly leptokurtic distribution, which suggests heavy tails and extreme outliers. VIX has a kurtosis value of 2.821656, showing a slightly platykurtic distribution, indicating a moderate shape with light tails, close to normal. WGDP, with a kurtosis of 6.055149, is also leptokurtic, which indicates a distribution with heavy tails and a higher frequency of extreme values. WIR has a kurtosis of 1.485310, showing a platykurtic distribution, characterised by lighter tails and fewer extreme values than a normal distribution. FO has a kurtosis of 4.586941, indicating a leptokurtic distribution that suggests the presence of extreme values or outliers. INS has a kurtosis of 3.663471, indicating a leptokurtic distribution with a moderately peaked shape and some heavy tails. INF has a kurtosis of 1.820383, showing a platykurtic distribution, which is less peaked and has lighter tails compared to a normal distribution. RGDP has a kurtosis of 3.108976, indicating a slightly leptokurtic distribution with moderate peakedness and some heavy tails. CAB has a kurtosis of 3.580173, indicating a leptokurtic distribution with a peaked shape and some extreme values. Overall, most variables exhibit leptokurtic distributions, suggesting heavy tails and the presence of extreme values, while VIX, WIR, INF, and INS display platykurtic distributions, characterised by lighter tails and fewer outliers.

Egypt

Table 3.7 presents various economic indicators. The mean of 0.110146 for EFV suggests low volatility, while the small standard deviation of 0.170166 indicates that data points are closely clustered around the mean. Similarly, the mean of 0.178690 for VIX reflects modest contagion effects, supported by a low standard deviation of 0.022105, which suggests consistent values. The average WGDP is slightly above 2, indicating global economic growth; however, a standard deviation of 1.545076 reveals

considerable dispersion in world GDP values. The mean world interest rate stands at approximately 2.12%, with a standard deviation of 2.166194, highlighting significant variation. FO averages 1.81, suggesting a moderately open financial environment, while its standard deviation of 0.246065 points to moderate variability.

Table 3.7: Egypt Cross-border Equity Flow Volatility (EFV) Descriptive Statistics

Description	EFV	VIX	WGDP	WIR	FO	INS	INF	RGDP	CAB
Mean*	0.110146	0.178690	2.925287	2.116100	1.805747	-0.324138	134.6628	4.264368	-1.439980
Median*	0.037500	0.176600	3.100000	0.522400	1.900000	-0.300000	105.9800	4.200000	-1.940180
Maximum*	0.958947	0.241600	5.900000	6.125900	2.000000	-0.100000	328.6700	8.900000	5.053290
Minimum*	4.90E-05	0.136800	-3.100000	0.048600	0.800000	41.95000	41.95000	1.800000	-7.583210
Standard Deviation	0.170166	0.022105	1.545076	2.166194	0.246065	0.176507	89.79506	1.602032	3.031440
Skewness	3.288196	0.326272	-1.461470	0.547296	-2.129508	-0.867215	0.876684	0.564547	0.454410
Kurtosis	14.36147	2.821656	6.055149	1.485310	8.395866	3.128376	2.396874	2.396043	2.672375
Jarque-Bera (JB)	624.7036	1.658875	64.80599	12.66001	171.2979	10.96465	12.46296	4.934581	3.383186
Probability	0.000000	0.436295	0.000000	0.001782	0.000000	0.004160	0.001967	0.084814	0.184226
Observations	88	88	88	88	88	88	88	88	88

Source: Authors' Estimation using EViews 12.

INS has a negative mean of -0.324138, indicating generally weak institutions in Egypt, with a standard deviation of 0.176507 reflecting moderate variation. Inflation rates are notably high, suggesting potential economic instability, and a large standard deviation of 89.79506 signifies substantial variability. RGDP has a moderate mean of 4.264368, indicating positive economic expansion; however, its standard deviation of 1.602032 suggests significant fluctuations. Lastly, the negative mean of -1.439980 for the current account balance highlights a consistent deficit in Egypt, with a standard deviation of 3.031440 indicating considerable variability.

Most variables exhibit positive skewness, except for WGDP, FO, and INS, which are negatively skewed, indicating variations in data distribution across economic indicators. EFV is highly positively skewed (3.288196), suggesting the presence of extreme high values. The VIX shows slight positive skewness (0.326272), reflecting a mild rightward tilt. In contrast, WGDP is negatively skewed (-1.461470), implying that most values are relatively high, with a few extreme low values. WIR exhibits slight positive skewness (0.547296), indicating a modest tendency toward higher values. FO is highly negatively skewed (-2.129508), suggesting that it is generally high but includes some extreme low values. Similarly, INS is negatively skewed (-0.867215), indicating that it is mostly higher, although there are some low extreme values. Inflation rates are positively skewed, reflecting a tendency toward higher values, while GDP

growth rates (0.564547) and CAB (0.454410) is mildly and slightly positively skewed, respectively, showing a subtle rightward tilt.

The kurtosis values for Egypt indicate varying degrees of peakedness and tail behaviour across key economic variables. EFV (14.36) and FO (8.40) demonstrate extreme peakedness, suggesting a high concentration of values around the mean, accompanied by significant outliers. WGDP (6.06) also shows heavy tails, indicating notable volatility in global economic growth. INS (3.13) and CAB (2.67) have slight kurtosis above 3, which signifies that their distributions are moderately concentrated around the mean, with some outliers present. In contrast, VIX (2.82), INF (2.40), RGDP (2.40), and WIR (1.49) exhibit lower kurtosis values, reflecting broader distributions with fewer extreme values. Overall, Egypt's EFV and FO are highly susceptible to extreme fluctuations, while VIX, INF, and RGDP display more stable distributions.

Kenya

In Table 3.8, the mean of 0.0405 indicates positive but small average volatility in cross-border equity flows, while a standard deviation of 0.2093 reflects moderate variability in EFV. The mean VIX of 0.1789 suggests low average contagion effects, accompanied by a very small standard deviation of 0.0221, indicating minimal variation in VIX values. WRGD averages slightly above 2.9%, yet the standard deviation of 1.5056 signifies considerable variation in global GDP. The average WIR stands at about 2.16%, with a standard deviation of 2.1885 revealing significant variability in interest rates worldwide. In Kenya, FO is relatively high, with a mean of 0.8557; however, the standard deviation of 0.1492 points to low variation in this openness. Conversely, Kenya's INS shows a negative mean of -0.3761, indicating weak institutions on average, with moderate variability as reflected by a standard deviation of 0.1983. The average INF in Kenya is notably high (mean: 131.5256), suggesting potential instability, and the very high standard deviation of 90.4138 indicates substantial variation. Kenya's RGDP averages 4.3261, which reflects moderate growth, while the standard deviation of 1.8520 suggests moderate variation in GDP growth. Finally, the negative mean of -4.2623 for the CAB indicates a consistent deficit, with a high degree of variability (standard deviation: 2.7653) in this balance.

Table 3.8: Kenya Cross-border Equity Flow Volatility (EFV) Descriptive Statistics

Description	EFV	VIX	WGDP	WIR	FO	INS	INF	RGDP	CAB
Mean*	0.040500	0.178925	2.907955	2.157531	0.855682	-0.376136	131.5256	4.326136	-4.262273
Median*	0.003000	0.176650	3.100000	0.526750	0.900000	-0.400000	105.6200	4.625000	-4.625000
Maximum*	0.954000	0.241600	5.900000	6.125900	1.000000	0.500000	371.9800	8.100000	0.710000
Minimum*	-0.274000	0.136800	-3.100000	0.048600	0.500000	-0.900000	27.90000	-0.300000	-9.470000
Standard Deviation	0.209298	0.022089	1.505562	2.188496	0.149219	0.198265	90.41382	1.852026	2.7652884
Skewness	2.186846	0.300617	-1.603314	0.520923	-0.653366	0.467191	0.928707	-0.471724	0.003850
Kurtosis	8.950963	2.792761	6.423405	1.456818	2.238175	6.682383	2.873866	2.686703	1.810794
Jarque-Bera (JB)	199.9915	1.482915	80.67458	12.71179	8.389055	52.92106	12.70829	3.623576	5.185655
Probability	0.000000	0.476419	0.000000	0.001736	0.015078	0.000000	0.001740	0.163362	0.074808
Observations	88	88	88	88	88	88	88	88	88

Source: Authors' Estimation using EViews 12.

The skewness values of key economic variables reveal distinct distribution patterns. EFV exhibits a strong positive skew of 2.1868, indicating a long right tail with extreme high volatility observations. VIX shows a slight positive skew at 0.3006, suggesting a mild shift towards higher values. In contrast, WGDP is negatively skewed at -1.6033, indicating a distribution that leans towards lower values. WIR has a slight positive skew of 0.5209, favouring higher interest rates. FO demonstrates a negative skew of -0.6534, with data concentrated at the higher end. INS shows a slight positive skew of 0.4672, reflecting a modest concentration of higher values. INF presents a positive skew of 0.9287, indicating a concentration at the lower end with a few extreme inflation values. RGDP has a slight negative skew of -0.4717, suggesting a tendency towards lower growth rates. Finally, the current account balance shows nearly symmetric skewness at 0.0039, indicating a balanced distribution.

The kurtosis values of key economic variables indicate their distribution shapes and tail behaviours. The EFV has a high kurtosis value of 8.951, signifying a leptokurtic distribution with heavy tails and a sharper peak compared to a normal distribution. The VIX, with a kurtosis of 2.793, displays a near-normal distribution with moderately heavy tails. WGDP has a kurtosis of 6.4234, suggesting a leptokurtic distribution characterised by heavy tails and a more pronounced peak. Both WIR (1.4568) and CAB (1.8108) exhibit platykurtic distributions, featuring lighter tails and a flatter peak than normal distributions. FO (2.2382) and INF (2.8739) show near-normal distributions with moderate to slightly heavier tails. INS (6.6824) also indicates a leptokurtic distribution, reflecting a higher concentration around the mean and more extreme values. Finally, RGDP (2.6867) suggests a distribution that is close to normal with a slight peak.

3.3.2 Unit root test

The study examines time series data for non-stationarity, addressing this issue through detrending, deseasonalisation, and stationarity testing. To determine the appropriate econometric technique, the ADF and PP unit root tests are employed, both of which account for autocorrelation and heteroskedasticity. If the series is stationary, it can be used in regression analysis; otherwise, it must be transformed. Model specification (None, Intercept, Trend, or Intercept and Trend) is crucial, as it affects the sensitivity of the tests. Drawing on the work of Enders (2014) and Schwert (1989), the study incorporates trends and intercepts, which are particularly relevant for financial time series that exhibit volatility.

Table 3.9: ADF Unit Root Test Results.

Variables	South Africa		Nigeria		Egypt		Kenya	
	ADF Test		ADF Test		ADF Test		ADF Test	
	t-statistic	Critical Value (5%)	t-statistic	Critical Value (5%)	t-statistic	Critical Value (5%)	t-statistic	Critical Value (5%)
Status (0)								
<i>lnBLV</i>	-2.673797	-3.463547	-3.030864	-3.462292	-2.505120	-3.462292	-2.385284	-3.465548
<i>lnEFV</i>	-2.526617	-3.465548	-2.778820	-3.462912	-4.175508***	-3.462292	-3.155597	-3.465548
<i>lnVIX</i>	-3.037963	-3.462292	-3.037963	-3.462292	-3.037963	-3.462292	-3.037963	-3.462292
<i>lnWGDP</i>	-4.491419***	-3.463547	-4.491419***	-3.463547	-4.491419***	-3.463547	-4.491419***	-3.463547
<i>lnWIR</i>	-2.324675	-3.462912	-2.324675	-3.462912	-2.324675	-3.462912	-2.324675	-3.462912
<i>lnFO</i>	-11.86980***	-3.462292	-12.33981***	-3.462292	-5.163720***	-3.463547	-5.383212***	-3.462912
<i>lnINS</i>	-8.180881***	-3.462292	-3.089793	-3.463547	-3.472817**	-3.463547	-3.767702**	-3.462912
<i>lnINF</i>	-0.964134	-3.462292	-1.942253	-3.462292	-7.706709***	-3.462292	3.591219*	-3.465548
<i>lnRGDP</i>	-4.916879***	-3.465548	-3.486188**	-3.465548	-1.910233	-3.462912	-4.884421***	-3.462912
<i>lnCAB</i>	-2.240821	-3.462912	-3.847358**	-3.462912	-3.721558**	-3.462912	-2.185343	-3.465548
Status (1)								
<i>lnBLV</i>	-14.77957***	-3.463547	-10.98442***	-3.462912	-10.36161***	-3.462912	-6.526863***	-3.462912
<i>lnEFV</i>	-3.979473**	-3.466248	-10.48673***	-3.463547	-3.534845**	3.465548	-3.611855**	-3.462912
<i>lnVIX</i>	-10.69075***	-3.462912	-10.69075***	-3.462912	-10.69075***	-3.462912	-10.69075***	-3.462912
<i>lnWGDP</i>	-6.010348***	-3.464865	-6.010348***	-3.464865	-6.010348***	-3.464865	-6.010348***	-3.464865
<i>lnWIR</i>	-6.433222***	-3.462912	-6.433222***	-3.462912	-6.433222***	-3.462912	-6.433222***	-3.462912
<i>lnFO</i>	-9.43139***	-3.464198	-7.344781***	-3.466248	-16.11799***	-3.462912	-9.652607***	-3.464198
<i>lnINS</i>	-8.609188***	-3.464198	-10.25941***	-3.463547	-7.253847***	-3.464865	-9.570163***	-3.464198
<i>lnINF</i>	-6.675498***	-3.462912	-9.735655***	-3.462912	-5.169796***	-3.463547	-0.869540	-3.464865
<i>lnRGDP</i>	-3.490626*	-3.466248	-3.314864	-3.465548	-13.26706***	-3.462912	-6.748298***	-3.464865
<i>lnCAB</i>	-3.446653*	-3.462912	-3.048011	-3.462912	-3.136991	-3.462912	-3.498042*	-3.462912

Note. (***), (**), (*), indicate significant at 1%, 5%, 10%. All the variables are log linearized. Source: Authors' Estimation using EViews 12.

In South Africa, only *lnWGDP*, *lnFO*, *lnINS*, and *lnRGDP* are stationary at the level, indicating that there is no unit root for global economic production, financial openness, institutional quality, or real GDP growth rate. After initial differencing, the remaining variables become stationary, suggesting they follow an I(1) process. The strong mean-reverting tendencies of long-term World GDP, financial openness, and institutional quality support endogenous growth theory (Romer, 1986). BLV and EFV, both of which

are non-stationary at current levels, indicate ongoing shocks according to Minsky's financial instability theory (1977). In Nigeria, WGDP, FO, RGDP, and CAB are all level and stable, suggesting they are in short-term equilibrium. Most financial variables, such as *lnBLV* and *lnEFV*, are non-stationary at level but become stationary after differencing $I(1)$, indicating long-term dependencies. The stationarity of CAB, in line with the intertemporal approach to the current account, implies a self-correcting current account (Obstfeld & Rogoff, 1995). In accordance with adaptive expectations theory, the INF exhibits inflation persistence and remains non-stationary even after differencing (Friedman, 1968).

In Egypt, the stationarity of *lnWGDP*, *lnFO*, *lnINS*, *lnINF*, and *lnCAB* at level suggests short-term stability. Other variables show stationarity after differencing but are non-stationary at level. The efficient market theory is supported by the stationary values of EFV, indicating a prompt market correction (Fama, 1970). According to Taylor's Rule (1993), the significance of *lnINF* at 5% denotes the credibility of monetary policy. In Kenya, the stationarity of WGDP, FO, and RGDP at level implies stable economic dynamics in the medium term. Following differencing, financial variables (*lnBLV*, *lnEFV*) become stationary, indicating that financial shocks endure. All variables, except for INF, become stationary after differencing. The stationarity of *lnRGDP* aligns with the Solow growth model (1956) and indicates mean-reverting growth. Persistent shocks in financial variables, which show market inefficiencies, support Stiglitz's (1981) asymmetric information hypothesis.

Table 3.10 shows that in South Africa, while other variables require differencing to achieve stationarity, the variables *lnBLV*, *lnEFV*, *lnFO*, and *lnINS* are stationary at level (0) at a 5% significance level. All variables become stationary after the first differencing. According to Stiglitz and Weiss's (1981) asymmetric information hypothesis, which posits that credit rationing influences capital flows, the stationarity of BLV and EFV suggests that financial volatility in South Africa is responsive to economic policy. Additionally, consistent with North's (1990) institutional theory, the stationarity of *lnINS* indicates the presence of robust institutions that mitigate economic shocks. In Nigeria, while *lnBLV*, *lnEFV*, *lnVIX*, *lnWGDP*, *lnINF*, and *lnRGDP* require differencing, *lnFO* and *lnINS* remain stationary at level (0) at a 5% significance level. All variables achieve stationarity following the first differencing. According to the

Financial Accelerator Model (Bernanke et al., 1999), in which flaws in the capital market amplify economic fluctuations, the non-stationarity of BLV and EFV suggests ongoing external shocks. Additionally, Friedman's (1968) monetary theory implies that the volatility of inflation indicates prolonged inflation, highlighting inadequate monetary transmission mechanisms.

Table 3.10: PP Unit Root Test Results.

Variables	South Africa		Nigeria		Egypt		Kenya	
	PP Test		PP Test		PP Test		PP Test	
	t-statistic	Critical Value (5%)	t-statistic	Critical Value (5%)	t-statistic	Critical Value (5%)	t-statistic	Critical Value (5%)
Status (0)								
<i>lnBLV</i>	-4.355486***	-3.462292	-2.929511	-3.462292	-9.397557***	-3.462292	-2.395916	-3.462292
<i>lnEFV</i>	-7.146272***	-3.462292	-2.760162	-3.462292	-2.656750	-3.462292	-2.215670	-3.462292
<i>lnVIX</i>	-2.924210	-3.462292	-2.924210	-3.462292	-2.924210	-3.462292	-2.92210	-3.462292
<i>lnWGDP</i>	-3.161836	-3.462292	-3.161836	-3.462292	-3.161836	-3.462292	-3.161836	-3.462292
<i>lnWIR</i>	-1.993120	-3.462292	-1.993120	-3.462292	-1.993120	-3.462292	-1.993120	-3.462292
<i>lnFO</i>	-11.93989***	-3.462292	-15.66769***	-3.462292	-6.760308***	-3.462292	-11.92337***	-3.462292
<i>lnINS</i>	-8.178170***	-3.462292	-5.986462***	-3.462292	-9.397557***	-3.462292	-8.695787***	-3.462292
<i>lnINF</i>	-1.130289	-3.462292	-1.816280	-3.462292	-0.665014	-3.462292	6.236644***	-3.462292
<i>lnRGDP</i>	-2.665250	-3.462292	-3.129121	-3.462292	-2.738141	-3.462292	-3.278903*	-3.462292
<i>lnCAB</i>	-1.031185	-3.462292	-2.240193	-3.462292	-2.563979	-3.462292	0.199364	-3.462292
Status (1)								
<i>lnBLV</i>	-31.19122***	-3.462912	-11.26584***	-3.462912	-29.24653***	-3.462912	-6.129574***	-3.462912
<i>lnEFV</i>	-17.36263***	-3.462912	-10.72276***	-3.462912	-4.239096	-3.462912	-4.647823	-3.462912
<i>lnVIX</i>	-12.30121***	-3.462912	-12.30121***	-3.462912	-12.30121***	-3.462912	-6.408478***	-3.462912
<i>lnWGDP</i>	-7.007151***	-3.462912	-7.007151***	-3.462912	-7.007151***	-3.462912	-7.007151	-3.462912
<i>lnWIR</i>	-6.408478***	-3.462912	-6.408478***	-3.462912	-6.408478***	-3.462912	-6.408478***	-3.462912
<i>lnFO</i>	-66.99416***	-3.462912	-70.18210***	-3.462912	-23.41037***	-3.462912	-110.6347***	-3.462912
<i>lnINS</i>	-42.85651***	-3.462912	-16.00907***	-3.462912	-29.24653***	-3.462912	-38.30415***	-3.462912
<i>lnINF</i>	-6.644514***	-3.462912	-11.73514***	-3.462912	-10.39118***	-3.462912	-6.378973***	-3.462912
<i>lnRGDP</i>	-5.797729***	-3.462912	-4.535103***	-3.462912	-12.94242***	-3.462912	-4.639169***	-3.462912
<i>lnCAB</i>	-3.540030**	-3.462912	-3.105739	-3.462912	-3.389210*	-3.462912	-3.783595	-3.462912

Note. (***), (**),(*), indicate significant at 1%, 5%, 10%. All the variables are log linearized. Source: Authors' Estimation using EViews 12.

In Egypt, *lnEFV*, *lnVIX*, *lnINF*, and *lnCAB* require differencing, while *lnBLV*, *lnFO*, and *lnINS* are stationary at level (0) at a 5% significance level. All variables become stationary after the first differencing. According to efficient market theory (Fama, 1970), the stationarity of BLV indicates that Egypt's cross-border lending adjusts effectively. However, Taylor's Rule (1993) is supported by the significant volatility of *lnINF*, which necessitates differencing and reflects erratic inflation predictions. In Kenya, *lnINF*, *lnINS*, and *lnFO* are all stationary at level (0) at a 1% significance level. Conversely, *lnBLV*, *lnEFV*, *lnVIX*, *lnRGDP*, and *lnCAB* are non-stationary but achieve stationarity upon first differencing. The persistence of BLV and EFV indicates inefficiencies in the financial market, aligning with Akerlof's (1970) theory of

asymmetric information. The stationarity of $\ln INF$ at level (0) suggests price rigidity, which is consistent with the New Keynesian Phillips Curve (Gali & Gertler, 1999).

In summary, the sustained volatility in BLV and EFV in Nigeria and Kenya supports Stiglitz and Weiss's (1981) assertion that moral hazard and adverse selection affect loan flows, highlighting market inefficiencies. According to North's (1990) institutional economics, the stationarity of $\ln INS$ in South Africa, Nigeria, and Egypt underscores the importance of strong institutions in mitigating economic shocks. Furthermore, Friedman's (1968) adaptive expectations theory aligns with the persistence of inflation ($\ln INF$) in Egypt and Nigeria, suggesting the need for inflation-targeting frameworks (Taylor, 1993) to enhance monetary stability.

3.3.3 Optimum Lag Selection Criteria

The study's optimal lag selection criteria, including Final Prediction Error (FPE), LR test statistic (each test at the 5% level), Akaike Information Criterion (AIC), Hannan-Quinn Information Criterion (HQ), and Schwarz Information Criterion (SC), indicate that lag 2 should be chosen as the maximum lag, as shown in Tables 3.11 and 3.12 (appendix).

3.3.4 Cointegration Test Result

Cointegration between dependent variables (BLV and EFV) and independent variables is essential for indicating long-run links. The Johansen-Juselius cointegration test was used to determine whether cointegration existed among the variables. The results indicate that the variables are cointegrated, implying a robust long-term link between them. Table 3.13 presents the BLV cointegration test results, and Table 3.14 presents the EFV cointegration test results.

Based on the Johansen-Juselius cointegration results presented in Table 3.13, both the Trace statistic and the Max-Eigenvalue tests indicate the presence of three cointegrating equations for South Africa and Nigeria. This implies the existence of stable long-run relationships among the variables in these two countries. For Egypt, the Trace statistic confirms the existence of three cointegrating vectors, while the Max-Eigen test supports only one. Given this inconsistency, the study relies on the Trace test as the more reliable criterion. The Trace test evaluates the joint significance of all cointegrating vectors and is generally regarded as more robust, particularly when

multiple long-run relationships are present or when working with finite samples (Johansen & Juselius, 1990; Enders, 2014; Lütkepohl et al., 2000). In the case of Kenya, both the Trace and Max-Eigen statistics confirm the presence of four cointegrating equations, providing strong and consistent evidence of long-run equilibrium relationships among the model variables. Overall, the findings support the hypothesis that the independent and dependent variables across all four countries are cointegrated, indicating a long-run equilibrium relationship. This validates the model specification and offers strong empirical support for a stable and meaningful linkage between the variables over time.

Table 3.13: BLV Johansen Juselius Test for Cointegration.

	Hypothesized No. of CE9s)	Eigenvalue	Trace Statistics	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
South Africa	None*	0.600862	276.4346 ***	197.3709	78.06813***	58.43354
	At most 1*	0.490479	198.3665***	159.5297	57.31410***	52.36261
	At most 2*	0.426355	141.0524***	125.6154	47.23828**	46.23142
Nigeria	None*	0.644167	286.6151 ***	197.3709	87.82999***	58.43354
	At most 1*	0.513309	198.7851***	159.5297	61.21065***	52.36261
	At most 2*	0.433314	137.5745***	125.6154	48.27579**	46.23142
Egypt	None*	0.500431	231.9790 ***	197.3709	58.99088***	58.43354
	At most 1*	0.395817	172.9881***	159.5297	42.82962	52.36261
	At most 2*	0.352281	130.1585**	125.6154	36.91531	46.23142
Kenya	None*	0.704785	327.1128***	197.3709	103.7043***	58.43354
	At most 1*	0.585845	223.4085***	159.5297	74.92885***	52.36261
	At most 2*	0.429286	148.4797***	125.6154	47.67372**	46.23142
	At most 3*	0.376486	100.8060**	95.75366	40.07757**	40.07757

Authors' computation using EViews 12.

Table 3.14 presents the results of the Johansen-Juselius cointegration test for South Africa, Nigeria, Egypt, and Kenya, using both the Trace and Maximum Eigenvalue (Max-Eigen) statistics. The results reveal that both tests identify four cointegrating equations in South Africa and Nigeria, indicating strong evidence of long-run equilibrium relationships among the modelled variables. For Egypt, the Trace test indicates the presence of four cointegrating vectors; however, the Max-Eigen test fails to confirm this. Given this discrepancy, the study adopts the Trace statistic as the preferred decision criterion. The Trace test assesses the joint significance of all cointegrating vectors and is generally considered more comprehensive and robust, particularly when multiple long-run relationships are present. In contrast, the Max-

Eigen test focuses on the largest individual eigenvalue at each stage and may underestimate the number of cointegrating relationships, especially in small or finite samples (Enders, 2014). This approach is supported by the empirical literature. Johansen and Juselius (1990) highlight the reliability of the Trace test in identifying multiple cointegrating vectors, while Lütkepohl, Saikkonen, and Trenkler (2000) demonstrate its superior performance in small-sample contexts. Enders (2014) also notes that when the Trace and Max-Eigen tests yield conflicting results, the Trace test is often the more reliable indicator of long-run dynamics. In the case of Kenya, both the Trace and Max-Eigen statistics confirm the presence of four cointegrating equations. This further underscores the presence of stable long-term relationships in the data. Overall, the results suggest the existence of long-run equilibrium relationships between the independent and dependent variables across all four countries (South Africa, Nigeria, Egypt, and Kenya). This implies that these variables move together over time, and changes in the independent variables have a meaningful and sustained impact on the dependent variables, reflecting a stable long-term equilibrium.

Table 3.14: EFV Johansen Juselius Test for Cointegration.

	Hypothesized No. of CE9s)	Eigenvalue	Trace Statistics	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
South Africa	None*	0.638610	290.7180***	197.3709	85.49499***	58.43354
	At most 1*	0.572982	205.2230***	159.5297	71.47813***	52.36261
	At most 2*	0.352468	133.7448**	125.6154		
	At most 3*	0.307548	97.23946**	95.75366		
Nigeria	None*	0.437663	233.4781***	197.3709	86.31855***	58.43354
	At most 1*	0.407553	185.1232***	159.5297	62.78839***	52.36261
	At most 2*	0.377094	141.1497***	125.6154		
	At most 3*	0.342735	101.3875***	95.75366		
Egypt	None*	0.642136	298.4343***	197.3709	48.35487	58.43354
	At most 1*	0.526442	212.1158***	159.5297	43.97346	52.36261
	At most 2*	0.402361	149.3274***	125.6154	39.97346	46.23142
	At most 3*	0.360572	106.0868***	95.75366		
Kenya	None*	0.726834	328.4577***	197.3709	109.0047***	58.43354
	At most 1*	0.518787	219.4530***	159.5297	61.44143***	52.36261
	At most 2*	0.458099	158.0116**	125.6154	51.46438**	46.23142
	At most 3*	0.360130	106.5472**	95.75366		

Authors' computation using EViews 12.

3.3.5 Regression Results and Discussion

The study aimed to determine the main factors that drive cross-border bank lending and equity flow volatility in SANEK countries, utilising the Markov Switching Means VAR (MSM-VAR) model. Similar to Agyemang-Badu et al. (2024), this study utilised two regimes: a low-volatility regime and a high-volatility regime. Regime 1 represents economic expansion, a stable market, or a state with low volatility, while regime 2 represents economic decline, an unstable market, or a crisis with high volatility. These regimes were selected to demonstrate the dynamic nature of the financial market and the impact of changing economic conditions on cross-border bank lending and equity flow volatility. The findings of this study provide valuable insights for legislators and investors regarding the magnitude of the key factors driving cross-border bank lending and equity flow volatility in SANEK. The results suggest that the SANEK financial market is highly sensitive to both domestic (pull) and global (push) economic conditions. Consequently, this study emphasises the importance of monitoring and adapting to evolving economic conditions to mitigate risks and optimise investment strategies in SANEK.

3.3.5.1 Results and Interpretation

SANEK country-specific regression results are presented in Table 3.15. These results enable us to examine the influence of various push and pull factors on the dependent variables.

Table 3.15: MSM-VAR Estimation Results for the Volatility Switching Models.

Variables	Cross-border bank lending volatility (BLV) Analysis				Cross-border equity flow volatility (EFV) Analysis				
	South Africa	Nigeria	Egypt	Kenya	South Africa	Nigeria	Egypt	Kenya	
	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	
	Coefficients				Coefficients				
	Regime 1 (low volatility)				Regime 1 (low volatility)				
C	-2.588007	15.10791	-6.046051	-0.487887	C	-1.900476	30.28631	1.368017	-0.936249
lnVIX	1.990743	16.29125	40.15762	0.259329	lnVIX	-116.8694	-27.67905	0.891925	0.083449
lnWGDP	-0.482906	0.304836	-0.013881	0.118076	lnWGDP	-4.052890	-0.333903	0.018003	-0.001509
lnWIR	0.013153	1.004990	-0.678741	0.027113	lnWIR	-1.242970	10.44606	-0.057012	-0.003160
lnFO	-0.960392	0.358316	-2.222900	0.186531	lnFO	14.24262	0.069948	0.034189	0.003160
lnINS	0.074571	-0.417359	3.586721	-0.242344	lnINS	15.49947	-0.971823	0.027551	-0.003936
lnINF	0.074571	-0.006703	0.065982	0.001452	lnINF	0.393044	0.222268	0.000272	-0.000787
lnRGDP	0.541365	-0.034104	-0.116109	-0.080529	lnRGDP	7.444786	-3.278673	0.005004	0.009518
lnCAB	-0.493376	0.062231	-2.062791	-0.030916	lnCAB	-0.786355	2.101547	-0.003312	-0.012975
	Regime 2 (high volatility)				Regime 2 (high volatility)				
C	13.36905	0.660612	0.982666	-0.140802	C	-6.164017	-2.164017	-0.042900	-0.061037
lnVIX	74.67663	-11.46077	19.06178	-0.173319	lnVIX	-2.700392	-3.295411	-0.517830	-15.23934
lnWGDP	0.718143	-0.854672	0.250878	-0.017423	lnWGDP	-0.195397	-0.044836	0.000953	0.329157
lnWIR	-0.364187	-0.447573	-0.575077	0.009880	lnWIR	0.299737	0.046168	0.183285	0.070052
lnFO	-0.671305	1.706624	0.022356	0.017287	lnFO	0.639420	-0.103467	0.005672	0.219072
lnINS	-7.888861	-2.278915	-0.674393	0.035153	lnINS	0.746299	0.156806	0.013028	-0.077083
lnINF	0.036627	0.087852	0.070813	0.001781	lnINF	0.032650	0.010853	-5.71E-05	-0.002173
lnRGDP	-0.803294	1.274617	0.062207	0.017292	lnRGDP	0.366373	0.035758	0.001941	0.008760
lnCAB	0.488717	0.438953	-0.134064	-0.030042	lnCAB	0.341224	0.001770	-0.010098	-0.270454
	Common				Common				
BLV(-1)	0.392873	0.496821	0.822376	1.441789	EFV(-1)	0.787996	0.697983	1.244146	1.704260
BLV(-2)	0.464878	0.389732	0.189199	-0.567865	EFV(-2)	-0.206031	-0.073305	-0.491524	-0.842246
SIGMA-BLV	0.337363	0.540143	0.677759	0.001856	SIGMA-EFV	4.691132	0.500654	0.001181	0.000291
	Transition Matrix Parameters				Transition Matrix Parameters				
P11-C	1.937981	0.988117	0.742703	-25.61327	P11-C	0.353701	1.866285	2.815486	3.683462***
P21-C	0.820670	-2.521867***	-2.322569***	-3.164567***	P21-C	-3.652097***	-4.426298***	-2.753125	-1.257320

In Table 3.15, South Africa exhibits a positive relationship between VIX and BLV (1.990743) in regime one, while regime two shows a strong positive link (74.67663). The magnitude is more pronounced in regime two, indicating a stronger contagion effect on cross-border bank lending volatility during periods of high volatility compared to regime one. This suggests that South Africa is more susceptible to global financial shocks. Results indicate that VIX and EFV are negatively correlated in regime one at -116.8694 and in regime two at -2.700392. The magnitude is more apparent in regime one, suggesting that during times of low volatility, there is a stronger negative link between the VIX and cross-border equity volatility in South Africa. This suggests that South Africa's financial markets are more resilient and less susceptible to global shocks when volatility is low. However, the contagion effect is much stronger when volatility spikes, leading to increased volatility in cross-border bank lending. This emphasises the importance of monitoring global volatility levels and their impact on South Africa's financial stability.

In regime one, the relationship between VIX and BLV is positive (16.29125), while in regime two, it is negative (-11.46077) in Nigeria. The difference in magnitude is more apparent in regime one, indicating higher volatility in cross-border bank lending when the VIX is high. Other results indicate a negative correlation between VIX and EFV (-27.67905) in regime one and -3.295411 in regime two. The difference in magnitude is greater in regime one, suggesting that higher market stability is associated with lower volatility in cross-border equity flows. Overall, these findings emphasise the significant role of market conditions in determining the relationships between various volatility indicators in Nigeria's financial system. The VIX in Nigeria affects both cross-border bank lending and equity flow volatility, with a more pronounced impact in regime one, underscoring the importance of market stability in influencing cross-border capital flows.

There is a positive link between VIX and BLV in regime one (40.15762) and in regime two (19.06178) in Egypt. The magnitude is higher in regime one, indicating that market stability has a more significant impact on cross-border bank lending volatility compared to market instability. In regime one, the link between VIX and EFV is positive at 0.891925, whereas in the other regime, it is negative at -0.517830. The magnitude is pronounced in regime one, suggesting that market stability has a stronger influence

on cross-border equity flow volatility compared to market instability in Egypt. The VIX drives cross-border bank lending and equity flow volatility in regime one. In regime two, it has varying effects on both types of volatility. These findings underscore the significance of market conditions in driving the volatility of cross-border capital flows. They indicate that investors and policymakers should vigilantly monitor market stability to gain a deeper insight into and effectively manage these dynamics.

In regime one, the link between VIX and BLV is positive (0.259329), whereas in regime two, it is negative (-0.173319) in Kenya. The magnitude is more pronounced in regime one compared to regime two. As a result, BLV in Kenya has increased during periods of low market volatility. During times of high volatility on the VIX, there is a decrease in BLV. The study shows a positive link between VIX and EFV in regime one, with a value of 0.083449, whereas in regime two, it is negative at -15.23934. The magnitude is more significant in regime one compared to regime two. The positive link in regime one suggests that as the VIX increases, the volatility in cross-border equity flows in Kenya also increases. Conversely, the negative link in regime two indicates that during periods of high market volatility, cross-border bank equity flow volatility decreases in Kenya. Overall, the results suggest that the VIX drives BLV in regime 1 while reducing it in regime 2. Additionally, the VIX drives EFV in regime 1 and reduces it in regime 2.

In regime one, the relationship between world GDP (WGDP) and BLV is negative (-0.482906), while in regime two, it is positive (0.718143) for South Africa. The relationship is stronger in regime two, indicating a more robust link between world GDP and cross-border bank lending volatility. The study also shows a negative link between WGDP and EFV in regime one (-4.052890) and a negative link in regime two (-0.195397). The magnitude is more evident in regime one, suggesting that during times of market stability, the relationship between world GDP and cross-border equity flow volatility is stronger. This indicates that global economic conditions have a significant impact on South Africa's financial market stability. Conversely, during times of market instability, the link between world GDP and cross-border equity flow volatility weakens, indicating that additional factors may drive volatility during these periods. These findings offer valuable insights into the financial market dynamics of South Africa and its stability in relation to global economic conditions.

In regime one, the link between WGDP and BLV is positive (0.304836), whereas in regime two, it is negative (-0.854672) in Nigeria. The magnitude is more evident in regime 1, indicating a stronger positive link between world GDP and cross-border bank lending volatility. In regime one, the nexus between WGDP and EFV is negative (-0.333903), whereas in regime two, it is negative at -0.044836. The scale is more evident in regime 1, suggesting a stronger negative link between world GDP and cross-border equity flow volatility. In other words, WGDP drives the volatility in BLV in regime one and reduces it in regime 2. WGDP also reduces EFV in both regimes. Understanding these dynamics can help policymakers and investors navigate the complexities of the global financial system more effectively and mitigate risks associated with fluctuations in world GDP.

In regime one, the link between WGDP and BLV is negative (-0.013881), whereas in regime two, it is positive (0.250878) in Egypt. World GDP and cross-border bank lending volatility are strongly correlated in regime two. This suggests that changes in global economic conditions have a greater impact on the volatility of cross-border bank lending in Egypt during regime two. In regime 1, the volatility is reduced due to more stable market conditions. The study also indicates a positive nexus between WGDP and EFV in regime one (0.018003) and a positive nexus in regime two (0.000953). Compared to regime two, regime one shows greater sensitivity to changes in world GDP, as evidenced by the magnitude of the change. The study suggests that global economic conditions in regime one significantly impact cross-border bank lending volatility in Egypt, underscoring the need to consider different regimes.

The relationship between WGDP and BLV in Kenya is positive in regime one (0.118076) and negative in regime two (-0.017423). The magnitude of the relationship is more pronounced in regime one, suggesting that as WGDP increases, cross-border bank lending volatility also increases. In one regime, the relationship between WGDP and EFV is negative (-0.001509), whereas in another regime, it is positive (0.329157). The strength of the relationship is stronger in regime two, indicating that as WGDP increases, cross-border equity flow volatility also increases in Kenya. In regime one, WGDP and EFV exhibit a negative correlation, suggesting that equity flow volatility decreases as economic growth increases. This relationship could influence investment decisions and market stability. Therefore, WGDP drives BLV in regime one

and reduces it in regime two, while WGDP reduces EFV in regime one and drives it in regime two.

In regime one, the link between world interest rates (WIR) and BLV is positive (0.013153), whereas in regime two, it is negative (-0.364187) for South Africa. The magnitude is more evident in regime one compared to regime two. Other results indicate that in regime one, the link between WIR and EFV is negative (-1.242970), whereas in regime two, it is positive at 0.299737. The scale is more evident in regime two compared to regime one. These findings suggest that in regime one, an increase in world interest rates is associated with higher cross-border bank lending volatility, while in regime two, it is associated with lower volatility. In regime one, an increase in world interest rates leads to lower cross-border equity flow volatility, while in regime two, it results in higher volatility. Global factors, such as interest rates, can impact capital flows in South Africa, thereby affecting economic conditions. Policymakers must understand these dynamics to manage potential cross-border bank and equity flow volatility, thereby enhancing South Africa's economic stability.

In regime one, the relationship between WIR and BLV is positive (1.004990), while in regime two, it is negative (-0.447573) in Nigeria. The magnitude of WIR is greater in regime one than in regime two, suggesting that it is a stronger driver of BLV. In regime one, the link between WIR and EFV is positive (10.44606), whereas in regime two, it is positive at 0.046168. The magnitude is more pronounced in regime one, indicating a stronger connection between WIR and EFV compared to regime two in Nigeria. The study reveals that global interest rate fluctuations significantly affect cross-border bank lending and equity flow volatility in Nigeria. Higher rates in regime one lead to increased volatility, while lower rates decrease it. This suggests the need for policymakers and investors to adapt.

The link between WIR and BLV in Egypt is negative in regime one (-0.678741) and also negative in regime two (-0.575077), suggesting a more pronounced inverse link in the first regime. In regime one, the link between WIR and EFV is negative (-0.057012), whereas in regime two, it is positive at 0.183285. The magnitude is more evident in regime two compared to regime one, indicating the increased risk and instability of cross-border equity flows during market instability. These findings suggest that WIR reduces BLV in both regimes, but the effect is more pronounced during

periods of market stability. Additionally, the contrasting effects of WIR on EFV in the two regimes indicate that investors may react differently to cross-border equity flows depending on market conditions. The study highlights the importance of considering market conditions when examining the link between WIR and EFV. It reveals that WIR's impact on BLV is more significant during stable periods, suggesting that investors need to adjust their strategies.

The analysis of the Kenyan regime reveals a strong positive relationship between WIR and BLV (0.027113) in regime one, while regime two exhibits a slightly weaker relationship (0.009880). Additionally, the study indicates a negative link between WIR and EFV in regime one (-0.003160), while in regime two, it is positive at 0.070052. The difference in scale is more pronounced in regime two compared to regime one. The findings of the study suggest that global interest rate fluctuations significantly impact cross-border bank lending and equity flow volatility in Kenya. For instance, an increase in world interest rates in regime one will lead to an upsurge in cross-border bank lending volatility, while in regime two, the effect will be relatively small. Conversely, a decrease in world interest rates in regime one will result in a decline in cross-border equity flow volatility, whereas in regime two, it will lead to an increase. The study emphasises the importance of implementing a comprehensive risk management strategy in Kenya's financial sector to effectively handle cross-border bank lending and equity flow volatility influenced by global interest rate shifts.

The link between financial openness (FO) and BLV in South Africa is negative in regime one (-0.960392) and negative in regime two (-0.671305), with a more pronounced negative link in regime one. The study shows a positive link between FO and EFV in regime one (14.24262), while in regime two, the correlation is also positive (0.639420), with a more pronounced effect in regime one. The study reveals a robust negative link between financial openness and cross-border bank lending volatility in South Africa during periods of market stability. During market instability, the link weakens but remains negative. Conversely, there is a positive link between financial openness and cross-border equity flow volatility, with a more pronounced connection during market stability. These findings underscore the importance of considering the varying impacts of financial openness on different cross-border capital flows.

The link between FO and BLV is positive in regime one (0.358316) and also positive in regime two (1.706624) in Nigeria. Other findings indicate that in regime one, the link between FO and EFV is positive (0.069948), but in regime two, it is negative (-0.103467). Different regimes in Nigeria affect volatility in different ways. Financial openness has a greater impact on the volatility of cross-border bank lending in regime two compared to regime one, suggesting that the risk associated with BLV is higher during that period. Contrary to regime one, regime two shows a negative link between financial openness and volatility in equity flows. This means that in regime one, financial openness led to an increase in equity flow volatility, while in regime two, it resulted in a decrease. Capital flows in Nigeria should be assessed considering the unique economic conditions and regulatory environment.

The link between FO and BLV is negative in regime one (-2.222900), while it is positive in regime two (0.022356) in Egypt. Other findings indicate that in regime one, the link between FO and EFV is positive (0.034189), but in regime two, it is also positive (0.005672). Depending on the specific regime, financial openness affects cross-border bank lending and equity flow volatility differently. For example, in regime one, increased financial openness may result in greater stability in cross-border bank lending volatility, whereas in regime two, it may lead to higher volatility. Similarly, in regime one, increased financial openness may lead to higher volatility in cross-border equity flows, while in regime two, it may have a lesser impact on volatility levels. Policymakers can gain a better understanding of market volatility by examining various regimes in Egypt.

The link between FO and BLV in Kenya is positive in regime one (0.186531) and regime two (0.017287), with a more significant magnitude observed in regime one. The study shows a positive link between FO and EFV in regime one (0.003160), but a more pronounced positive link in regime two (0.219072). According to the study, financial openness affects the volatility of Kenya's financial markets differently depending on the regime. During market stability, increased openness may lead to higher volatility in cross-border bank lending and equity flows, while during periods of uncertainty or crisis, its impact may be less significant.

The study found a positive correlation between institutional quality (INS) and BLV in regime one (0.074571), but a negative correlation in regime two (-7.888861), with

regime one showing a greater magnitude. Additionally, the study indicated a positive link between INS and EFV in regime one (15.49947), while in regime two, the link is positive at 0.746299, with regime one showing a more pronounced effect. The study suggests that institutional quality plays a significant role in influencing cross-border bank lending and equity flow volatility in South Africa. In regime one, high institutional quality leads to increased cross-border bank volatility, whereas in regime two, it reduces lending volatility. Furthermore, better institutional quality is associated with higher volatility in regime one, whereas its positive impact is less pronounced in regime two. These findings highlight the crucial role of strong institutional quality in shaping volatility levels in both the banking and equity markets in South Africa.

In Nigeria, the link between INS and BLV is -0.417359 under regime one and -2.278915 under regime two. The magnitude is more pronounced in regime two. The study shows a negative link between INS and EFV in regime one (-0.971823) and in regime two (0.156806), with the magnitude being more pronounced in regime two. It appears that institutional quality significantly influences the volatility of the Nigerian equity and banking markets. Institutional quality negatively impacts cross-border bank volatility in regime one, suggesting that higher quality leads to lower volatility. In regime two, this link becomes stronger, showing how robust institutions effectively reduce market volatility. The study reveals that institutional quality can stabilise regime one equity flow volatility, but it may also drive volatility in regime two. The study suggests that improving institutional quality is crucial for reducing volatility, but understanding the context in which these institutions operate is also essential.

The link between INS and BLV in Egypt is positive in regime one (3.586721) and negative in regime two (-0.674393). The magnitude is more pronounced in regime one compared to regime two. Other findings indicate that in regime one, the association between INS and EFV is positive (0.027551), but in regime two, it is also positive (0.013028). The scale is more pronounced in regime one compared to regime two. In Egypt, institutional quality influences the volatility of cross-border bank lending and equity flows based on the prevailing regime. In regime one, higher institutional quality is associated with increased cross-border bank volatility, while in regime two, it is linked to decreased volatility. In contrast, institutional quality has a positive impact on cross-border equity flow volatility under both regimes, although to varying extents. A

broader institutional context must be considered when evaluating the effectiveness of cross-border financial institutions in Egypt.

In Kenya, regime one has a negative (-0.242344) link between INS and BLV, whereas regime two has a positive (0.035153) link. The magnitude was more pronounced in regime two compared to regime one. Other findings revealed that, in regime one, the association between INS and EFV is negative (-0.003936), whereas in regime two, it is also negative (-0.077083). The regulatory environment significantly impacts cross-border bank lending volatility in regime two, with a more pronounced effect. The study indicates that the impact of institutional quality on cross-border bank and equity flow volatility in Kenya is not consistent across different regimes. Higher institutional quality reduces bank volatility during market stability but increases cross-border bank volatility during uncertainty and crises. The inconsistency in the link between institutional quality and cross-border bank lending volatility suggests that Kenyan legislators need to consider specific regulatory conditions when designing regulations and interventions. Additionally, the negative correlation between institutional quality and cross-border equity flow volatility in both regimes suggests that enhancing institutional quality could help stabilise equity flows and attract more foreign capital to Kenya.

In regime one, the link between inflation (INF) and BLV is positive (0.074571), while in regime two, it remains positive (0.036627) in South Africa. The magnitude is more pronounced in regime one compared to regime two. In one regime, the link between INF and EFV is positive (0.393044), whereas in regime two, it is positive at 0.032650. The magnitude is more pronounced in regime one compared to regime two. These findings suggest that inflation has a significant impact on both cross-border bank volatility and cross-border equity flow volatility in South Africa. For example, higher levels of inflation can lead to increased volatility in both the cross-border bank lending and equity flow markets. This could be due to inflation eroding the value of assets, prompting investors to take on more risks to counteract the impact of inflation. Additionally, the positive link between inflation and volatility may suggest that investors in South Africa are more responsive to changes in inflation, leading to fluctuations in both the banking and equity markets. Overall, these results underscore the

significance of monitoring inflation rates to enhance comprehension and prediction of volatility in South Africa's cross-border markets.

The link between INF and BLV in Nigeria is negative (-0.006703) in regime one, whereas it is positive (0.087852) in regime two. The magnitude is more prominent in regime two compared to regime one. In regime one, the link between INF and EFV is positive (0.222268), while in regime two, it remains positive (0.010853). The magnitude is more pronounced in regime one compared to regime two. These findings suggest that inflation rates have a varying impact on cross-border bank and equity flow volatility in Nigeria, depending on regime. Negative links between inflation and BLV in regime one may indicate a more stable market situation, while positive links indicate greater market uncertainty in regime two. Both regimes show a positive link between inflation and EFV, indicating that inflation influences cross-border equity volatility. The impact of inflation on BLV and EFV underscores the importance of considering economic conditions and market environments when analysing its link to cross-border capital flows, highlighting the necessity for vigilant monitoring.

In regime one, the relationship between INF and BLV is positive (0.065982), and in regime two, it is also positive (0.070813) in Egypt. The magnitude is more pronounced in regime two compared to regime one. In regime one, the relationship between INF and EFV is positive (0.000272), whereas in regime two, it is negative at $-5.71E-05$. The magnitude is more pronounced in regime one compared to regime two. These findings suggest that inflation significantly impacts both cross-border bank volatility and equity flow volatility in Egypt, with varying effects depending on regime. The positive link between inflation and BLV in both regimes indicates that higher inflation levels drive volatility in cross-border bank lending. Conversely, the mixed results regarding the link between inflation and EFV suggest a more nuanced impact of inflation on cross-border equity flow volatility. This highlights the importance of considering different regime environments when analysing the relationship between macroeconomic factors and cross-border capital flows.

The relationship between BLV and INF in regime one is positive (0.001452), and in regime two, it is also positive (0.001781) in Kenya. Other findings indicate that in regime one, the link between INF and EFV is negative (-0.000787), while in regime two, it is also negative (-0.002173). These results suggest that the impact of inflation

on cross-border bank lending and equity flow volatility in Kenya varies depending on regime conditions. During periods of market stability, inflation drives cross-border bank lending volatility, while equity flow volatility is less affected. During periods of market instability, the link between inflation and volatility intensifies, as inflation drives volatility in cross-border bank lending. During periods of market stability, inflation reduces equity flow volatility by a smaller amount compared to regime two. This highlights the significance of understanding the various economic regimes that may influence the operation of such links may operate to efficiently manage and reduce volatility in the financial sector.

In regime one, the relationship between the current account balance (CAB) and BLV is negative (-0.493376), while in regime two, it is positive (0.488717) in South Africa. The magnitude of the effect is more pronounced in regime 2 compared to regime 1. Other results indicate that in regime one, the link between CAB and EFV is negative (-0.786355), whereas in regime two, it is positive at 0.341224. The magnitude is more pronounced in regime two than in regime one. These results suggest that the impact of the current account balance on both cross-border bank lending volatility and cross-border equity flow volatility in South Africa is contingent on the prevailing regime. In regime one, a higher current account balance is associated with lower levels of both BLV and EFV, while in regime two, a higher current account balance is linked to higher levels of both BLV and EFV. This suggests that economic conditions and market dynamics play a crucial role in determining the link between these variables. The study emphasises the importance of having a nuanced understanding of macroeconomic indicators and market behaviour to effectively manage and stabilise financial markets in South Africa.

In regime one, the link between CAB and BLV is positive (0.062231), whereas in regime two, it is positive (0.438953) in Nigeria. The magnitude is more pronounced in regime two, indicating a stronger link between CAB and BLV during periods of market instability. In one regime, the link between CAB and EFV is positive (2.101547), while in the other regime, it is positive at 0.001770. The magnitude is more pronounced in regime one, suggesting a stronger relationship between CAB and EFV during times of market stability. These results suggest that the current account balance has a significant impact on both cross-border bank volatility and cross-border equity flow

volatility in Nigeria. The different patterns of volatility observed in regimes one and two suggest that the drivers of volatility may differ based on current economic conditions. This analysis highlights the significance of considering macroeconomic indicators and market behaviour to efficiently manage and stabilise financial markets in the country.

The link between CAB and BLV in Egypt is negative in regime one (-2.062791) and negative in regime two (-0.134064). In regime one, the link between CAB and EFV is negative (-0.003312), while in regime two, it is also negative (-0.010098). These findings suggest that the current account balance plays a significant role in influencing both cross-border bank volatility and equity flow volatility in Egypt. For instance, the negative link between CAB and BLV in regime one suggests that a higher current account balance results in lower cross-border bank volatility. Conversely, the negative link in regime two implies a similar but less pronounced impact. Similarly, the negative link between CAB and EFV in both regimes suggests that a higher current account balance is associated with lower volatility in cross-border equity flows. Overall, these results underscore the significance of monitoring and managing the current account balance to reduce cross-border capital volatility in Egypt.

In Kenya, the relationship between CAB and BLV is negative in regime one (-0.030916) and regime two (-0.030042). The impact is more significant in regime one, suggesting that changes in the CAB have a stronger effect on BLV during periods of market stability. In regime one, the link between CAB and EFV is negative (-0.012975), whereas in regime two, it is -0.270454. The effect is more pronounced in regime two, indicating that changes in the CAB have a greater impact on EFV during times of market instability. This study emphasises the importance of managing and monitoring the current account balance in Kenya to reduce cross-border capital volatility. The negative relationship between the current account balance and both cross-border bank lending volatility and equity flow volatility underscores the importance of maintaining a stable CAB to mitigate financial risks. The coefficients demonstrate that changes in the current account balance affect capital volatility differently, underscoring the need for policymakers to monitor and respond to these changes.

In South Africa, BLV (-1) is 0.392873, and EFV (-1) is 0.787996. In South Africa, BLV (-2) is 0.464878, while EFV (-2) is -0.206031. As a result, cross-border equity flows are more volatile than bank lending in South Africa. The negative value of EFV

(-2) indicates a decrease in cross-border equity flow volatility, while the positive value of BLV (-1) indicates an increase in cross-border bank lending volatility. These fluctuations in volatility levels highlight the dynamic nature of capital flows and their potential impact on the economy. In South Africa, the SIGMA-BLV is 0.337363, and the SIGMA-EFV is 4.691132. The higher value of SIGMA-EFV compared to SIGMA-BLV further underscores the greater volatility in cross-border equity flows in South Africa. The variance in volatility levels between bank lending and equity flows implies that the risks linked to investing in equities may be higher than those associated with bank lending. To make informed decisions and mitigate potential economic risks, policymakers and investors should closely monitor these fluctuations.

BLV (-1) is 0.496821, while EFV (-1) is 0.697983 in Nigeria. BLV (-2) is 0.464878, while EFV (-2) is 0.073305 in Nigeria. These volatility values indicate significant volatility in cross-border bank lending and equity flows in Nigeria. The higher volatility in cross-border equity flows compared to bank lending indicates a higher level of risk associated with equity investments in the country. Making informed decisions about financial activities in Nigeria will require investors to closely monitor these fluctuations. In Nigeria, the SIGMA-BLV is 0.540143, and the SIGMA-EFV is 0.500654. These values underscore the significance of closely monitoring the volatility of cross-border equity flows in Nigeria, as it is relatively high compared to the overall volatility of cross-border bank lending. The SIGMA-BLV and SIGMA-EFV indicators suggest a moderate level of risk in cross-border bank lending and equity flows. Therefore, investors are advised to proceed with caution and conduct comprehensive risk assessments before participating in financial activities in Nigeria.

BLV (-1) is 0.822376, while EFV (-1) is 1.244146 in Egypt. BLV (-2) is 0.189199, while EFV (-2) is -0.491524 in Egypt. Consequently, cross-border equity flows in Egypt have higher volatility than cross-border bank lending. The negative values for EFV (-2) could indicate a decrease in the volatility of equity flows from the previous period. In contrast, positive values for BLV suggest that bank lending is becoming more volatile. As a result, Egypt's financial system may be at risk due to the volatility in cross-border capital flows. Further insight into the stability of cross-border financial flows in Egypt can be gained by analysing the SIGMA-BLV and SIGMA-EFV values. A SIGMA-BLV value of 0.677759 indicates a moderate level of volatility in cross-border

bank lending, while a SIGMA-EFV value of 0.001181 suggests a very low level of volatility in cross-border equity flows. The data assists investors and policymakers in evaluating market volatility levels, enabling informed decisions to minimise risks and maximise returns in the Egyptian market.

BLV (-1) is 1.441789, while EFV (-1) is 1.704260 in Kenya. BLV (-2) is -0.567865, while EFV (-2) is -0.842246 in Kenya. Equity flows and cross-border bank lending in Kenya appear to be significantly volatile. The negative values in the second period suggest a decrease in volatility compared to the previous period, indicating a certain level of stability in capital flows in Kenya during that time. Monitoring and managing these variables is crucial for maintaining a stable financial environment in the country. In Kenya, the SIGMA-BLV is 0.001856, while the SIGMA-EFV is 0.000291. The SIGMA-BLV and SIGMA-EFV values in Kenya indicate a low level of volatility in both bank lending and equity flow markets. Kenya's financial sector is stable, but policymakers and institutions need to manage volatility to maintain a secure environment, attract cross-border capital, and strengthen Kenya's global market position.

This section summarises the main factors that drive cross-border bank lending and equity flow volatility in SANEK countries, with a specific focus on their magnitude.

Table 3.16: Summarised MSM-VAR Estimation Results.

Description	South Africa				Nigeria				Egypt				Kenya			
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Regime	BLV	BLV	EFV	EFV	BLV	BLV	EFV	EFV	BLV	BLV	EFV	EFV	BLV	BLV	EFV	EFV
<i>lnVIX</i>	+	+	-	-	+	-	-	-	+	+	+	-	+	-	+	-
<i>lnWGDP</i>	-	+	-	-	+	-	-	-	-	+	+	+	+	-	-	+
<i>lnWIR</i>	+	-	-	+	+	-	+	+	-	-	-	+	+	+	-	+
<i>lnFO</i>	-	-	+	+	+	+	+	-	-	+	+	-	+	+	+	+
<i>lnINS</i>	+	+	+	+	-	-	-	+	+	-	+	+	-	+	-	-
<i>lnINF</i>	+	+	+	+	-	+	+	+	+	+	+	-	+	+	-	-
<i>lnRGDP</i>	+	+	+	+	-	+	-	+	-	+	+	+	-	+	+	+
<i>lnCAB</i>	-	+	-	+	+	+	+	+	-	-	-	-	-	-	-	-

Note:

+ sign means factors (variables) that drive volatility.

- sign means factors (variables) that reduce volatility.

Shaded areas indicate positive factors (variables) and a market condition (regime) where the magnitude of the factors that drive cross-border bank lending and equity flow volatility is more pronounced.

Table 3.16 presents a summary of the main factors and their magnitudes that drive the volatility of cross-border bank lending and equity flows in SANEK, as depicted in Table 3.15. It is clear from Table 3.16 that these factors and their magnitudes vary depending on market conditions.

In South Africa, cross-border bank lending volatility is influenced by the VIX, institutional quality, inflation, and RGDP. This impact is more evident in regime one, a period of market certainty, compared to regime two, a period of market uncertainty. These factors determine the risk associated with cross-border bank lending in South Africa. During regime one, investors are more willing to take on risks, while during regime two, they exercise more caution, resulting in lower volatility. Similarly, institutional quality, inflation, RGDP, and financial openness drive cross-border equity flow volatility in both regimes. The magnitude of these factors is more significant in regime one, representing a period of market certainty for institutional quality, RGDP, and financial openness, and more significant in regime two, representing a period of market uncertainty for inflation. This suggests that investors may prioritise factors such as institutional quality, RGDP, and financial openness during times of market certainty. Understanding these factors is crucial for investors navigating the complexities of the global financial markets.

Financial openness and current account balances in Nigeria contribute to the volatility of cross-border bank lending, especially during periods of market uncertainty. In regime two, these factors are more pronounced, especially when market uncertainty is present. Monitoring and managing these factors is crucial for mitigating risks and stabilising the market. In regime one, factors such as the VIX, world GDP, and interest rates significantly impact cross-border bank lending. High VIX levels indicate higher market volatility, while high GDP growth indicates greater economic uncertainty. Inflation and RGDP also drive bank lending volatility in regime 2, as they reflect the overall economic health of the country. Cross-border equity flow volatility is influenced by world interest rates, inflation, and current account balances in both economic environments. In regime one, world interest rates are monitored because they impact borrowing costs, while inflation can discourage foreign investment. The current account balance measures a country's trade balance and financial flows. In regime two, institutional factors and RGDP drive volatility during market uncertainty, with the

regulatory environment and RGDP being key factors. These factors can impact investor confidence.

In Egypt, cross-border bank lending volatility is influenced by the VIX and inflation. This magnitude is more pronounced in regime 1, which is a period of market certainty. Inflation drives volatility in regime two, which is a period of market uncertainty. Understanding these dynamics can help policymakers and financial institutions manage risks and ensure stability in the banking sector. World GDP, financial openness, and RGDP drive volatility in regime two, while institutional quality drives it in regime 1. Cross-border equity flow volatility is influenced by world GDP, institutional quality, and RGDP in both regimes, with a greater impact in regime one when the market is stable and predictable. However, these factors still play a role in uncertain regimes. VIX, financial openness, and inflation drive volatility in regime one, while the world interest rate drives volatility in regime two. In regime two, investors are more cautious and risk-averse, which leads to fluctuations in equity flow volatility.

In Kenya, the volatility of cross-border bank lending is influenced by world interest rates, financial openness, and inflation. In regime one, world interest rates and financial openness have a greater impact compared to regime two, which is more significant for inflation. Global economic factors have a stronger influence on market certainty, while domestic economic conditions are more significant during market uncertainty. Understanding these factors can help policymakers and financial institutions manage and mitigate risks associated with cross-border bank lending. In Kenya's two economic regimes, cross-border equity flow volatility is driven by financial openness and RGDP. In regime two, increased financial openness leads to higher volatility because investors react more strongly to market conditions. In regime one, the impact of RGDP is more significant, indicating that the economic growth rate plays a larger role in driving fluctuations in cross-border investment. Different global factors influence equity flows in Kenya. The VIX drives volatility in regime one, while world GDP and interest rates drive volatility in regime two.

The findings emphasise the importance of considering market conditions and the magnitude of these factors that drive cross-border bank lending and equity flow volatility. Policymakers should consider these conditions when evaluating and controlling risks related to cross-border financial flows. Analysing the factors driving

volatility can help financial institutions make informed decisions and develop risk mitigation strategies. This study emphasises the complexity of international financial markets and the necessity of a comprehensive approach to managing cross-border capital flows. In addition to providing valuable insights for investors and policymakers, this research makes a unique contribution to the field of international finance.

3.3.5.2 Discussion of the results

The study compares regression analysis results with previous research on factors influencing the volatility of cross-border capital flows. It reveals that previous studies focused only on the magnitude of volatility, neglecting the magnitude of the factors driving it. The study explores the factors contributing to cross-border capital flow volatility under different market conditions and reveals significant differences between linear regression and regime-switching models. This indicates the need to consider market conditions. The study also reveals that certain factors have a greater impact during periods of economic uncertainty or market volatility. This nuanced understanding could provide valuable insights for legislators and investors, as traditional models may not fully capture all the dynamics shaping cross-border capital flows.

This study confirms that contagion risk drives cross-border capital flow volatility in South Africa and Egypt in both regimes one and two, consistent with Lee et al. (2013). In Nigeria and Kenya, the risk of contagion increases cross-border bank lending volatility in regime one but reduces it in regime two. This study provides country-specific insights into the impact of contagion risk on cross-border bank lending volatility in SANEK countries, which differs from Lee et al.'s (2013) focus. MSM-VAR switching introduces a novel approach to examining contagion risk and capital flow volatility. The study also examines how capital flows in Nigeria and Kenya can be affected by different regimes. Nigerian and Kenyan cross-border bank lending is more volatile during periods of higher contagion risk but less volatile during periods of lower contagion risk. This highlights the significance of taking into account contagion risk when analysing cross-border capital flows in emerging markets. On the other hand, contagion risk reduces cross-border equity flow volatility in both regimes in South Africa and Nigeria. In Egypt and Kenya, it drives volatility in regime one and reduces it in regime two. Contagion risk affects capital flows differently in emerging market

economies, with South Africa and Nigeria showing greater resilience, while Egypt and Kenya exhibit nuanced effects.

This study reveals that world GDP affects cross-border bank lending volatility in South Africa and Egypt differently under two regimes. The results of regime one align with Nwosa and Omolade's (2017) findings, which used E-GARCH and confirmed that world GDP reduces capital flow volatility in Nigeria. In Nigeria and Kenya, world GDP drives volatility in regime one and reduces it in regime two. Other findings suggest that world GDP reduces cross-border equity flow volatility in South Africa and Nigeria in both regimes, while in Egypt, global GDP drives volatility in both regimes. In Kenya, volatility is driven by regime one and reduced by regime two. The study highlights the significant impact of world GDP on cross-border bank lending and equity flows in South Africa, Egypt, Nigeria, and Kenya. Unlike Nwosa and Omolade (2017), this study examines the drivers of volatility while considering the varying effects of different regimes. This unique approach contributes to the existing literature on the subject.

World interest rates have an impact on bank lending volatility in Kenya and Egypt, but the effects vary. In South Africa, Nigeria drives bank lending volatility in one regime and mitigates it in another. This indicates that the impact of global interest rates on the volatility of cross-border bank lending varies among different countries in SANEK. Similar to Mamvura and Sibanda's (2020), study which confirmed that global interest rates significantly affect net FPI volatility in SADC, this study also confirms that world interest rates drive cross-border equity flow volatility in Egypt in both regimes. In South Africa, Nigeria, and Kenya, they reduce it in one regime and then drive it in another. This indicates that changes in global interest rates have varying effects on capital flow volatility depending on the country and regime. While Mamvura and Sibanda (2020) focused on the impact of world interest rates on FPI volatility in SADC, this study delves deeper into the specific effects on individual countries in SANEK. The MSM-VAR approach, instead of P-ARDL, offers a more comprehensive analysis of the dynamic relationships between world interest rates and capital flow volatility in individual countries. It considers asymmetries and allows for a more accurate assessment of the impact of global interest rate movements on individual countries.

Based on the IMF (2007) study, which utilised GMM to determine that financial openness negatively impacts capital flow volatility in emerging and advanced markets,

this study, employing MSM-VAR, similarly concludes that financial openness influences cross-border bank lending volatility in Nigeria and Kenya across both regimes. In the case of South Africa, financial openness reduces volatility in both regimes. In Egypt, financial openness reduces volatility in regime one but increases it in regime two. These findings indicate that in countries like Nigeria and Kenya, financial openness tends to increase volatility, whereas in South Africa, it has a stabilizing effect. Moreover, financial openness amplifies equity flow volatility in South Africa, Egypt, and Kenya across both regimes, but reduces volatility in Nigeria during regime one. The study underscores the importance of considering country-specific factors in the implementation of financial openness policies. By employing MSM-VAR models to provide a comprehensive understanding of volatility, while considering different regimes and country-specific characteristics, this study offers valuable insights.

In line with Broner and Rigobon (2005) and Alfaro et al. (2007), who emphasised the importance of institutional quality in reducing volatility in developing countries, this study examines the impact of institutional quality on cross-border bank lending volatility in SANEK countries. The findings show that institutional quality reduces volatility in Nigeria under both regimes. In South Africa and Egypt, it drives volatility in regime one but reduces it in regime two. In Kenya, institutional quality reduces volatility in regime one but increases it in regime two. On the other hand, institutional quality drives equity flow volatility in South Africa and Egypt, while reducing it in Kenya under both regimes. In Nigeria, institutional quality reduces volatility in regime one but increases it in regime two. These results underscore the importance of customised policies to address the diverse impacts of institutional quality on capital flow volatility, considering country-specific factors and regime variations. This study contributes to the existing literature on the impact of institutional quality on capital flow volatility in emerging markets.

In accordance with Lee et al. (2013), who used the GMM estimator, a higher GDP growth rate is linked to reduced volatility in cross-border capital flows in emerging market economies. This study suggests that the GDP growth rate reduces cross-border bank lending volatility in Nigeria, Egypt, and Kenya in regime one, but increases it in regime two. In South Africa, the GDP growth rate increases volatility in regime one

and reduces it in regime two. Thus, the relationship between GDP growth rate and bank lending volatility can vary depending on the country and regime. This research contradicts Lee et al.'s (2013) claim of a positive correlation between the GDP growth rate and cross-border capital flow volatility, indicating a more complex relationship influenced by the country and regime. On the other hand, in line with Neumann et al. (2009), who used a panel estimator and found that the domestic growth rate generally increases volatility, the results indicate that the GDP growth rate drives cross-border equity flow volatility. This phenomenon is observed in South Africa, Egypt, and Kenya under both regimes. In Nigeria, the GDP growth rate reduces volatility in regime one and increases it in regime two. The study suggests that the impact of GDP growth on equity flow volatility is more consistent across countries than bank lending, with mixed effects that depend on country and regime. This finding contributes to the existing literature on the link between GDP growth rate and capital flow volatility in emerging markets.

Broto et al. (2008) suggest that domestic inflation may indicate that developing nations are implementing policies that distort the market and increase capital flow volatility. This study supports Broto et al. (2008) and finds that inflation drives cross-border bank lending volatility in South Africa, Egypt, and Kenya in both economic conditions. In Nigeria, inflation reduces volatility in regime one and drives volatility in regime two. Additionally, the study shows that inflation drives cross-border equity flow volatility in South Africa and Nigeria, while reducing volatility in Kenya in both regimes. In Egypt, inflation drives volatility in regime one and reduces volatility in regime two. The study emphasizes the significance of considering country-specific factors when analysing capital flow dynamics, as the relationship between inflation and volatility is not linear.

In Egypt and Kenya, current account balances reduce bank lending volatility in both regimes, while in Nigeria, they drive volatility. This is consistent with the findings of Lee et al. (2013). In South Africa, the current account balance drives volatility in regime one and reduces it in regime two. These findings underscore the importance of considering country-specific factors when analysing the relationship between the current account balance and the volatility of cross-border capital flows. Other findings suggest that current account balances decrease equity flow volatility in Egypt and

Kenya, whereas in Nigeria, they drive volatility. In South Africa, volatility decreases in regime 1, while it increases in regime 2. The varied effects of current account balances on volatility across different regimes illustrate that there is no universally applicable method for assessing and comprehending capital flow dynamics. This contributes to the existing literature on the topic.

These results suggest that external factors are the primary drivers of cross-border bank volatility in South Africa, with P11-C having a stronger impact compared to P21-C. In other words, the magnitude of push factors has a greater influence on cross-border bank volatility than pull factors in South Africa. Conversely, cross-border equity flows in South Africa are significantly influenced by both domestic and external factors, with P21-C playing a more prominent role. In Nigeria, these results indicate that P21-C has a significant influence on both cross-border bank volatility and equity flow volatility. The study on P21-C suggests that push factors have a substantial impact on market volatility, indicating that the magnitude of these factors is more pronounced in shaping market dynamics in Nigeria. Furthermore, the negative values of P21-C in both BLV and EFV models indicate a strong connection between push factors and volatility in the Egyptian markets. This suggests that external factors have a significant influence on cross-border bank and equity flow volatility in Egypt. Understanding the magnitude of both push and pull factors is crucial in comprehending market dynamics in Egypt. Additionally, the study found that various factors contribute to volatility in cross-border bank and equity flows in Kenya. The negative values for P11-C and P21-C in the BLV model suggest that push factors have a significant impact on bank volatility in the country. Hence, external factors play a more significant role in influencing the volatility of bank lending. In contrast, the positive value of P11-C and the negative value of P21-C in the EFV model indicate a different set of drivers for equity flow volatility. The Kenyan financial market is influenced by both external and internal factors. Thus, the magnitude of both push and pull factors influences equity flows in Kenya. It is important to note that each country has its own unique set of factors contributing to cross-border bank and equity flow volatility. This finding is a valuable contribution to the literature on financial market volatility, emphasising the need to understand the specific drivers in each country. By recognising the unique characteristics of each market, policymakers and investors can better assess and manage risk in a globalised economy.

3.3.5.3 Transition Matrix parameters

Table 3.17 indicates a significant correlation between transition probabilities and volatility in both cross-border bank lending and equity flows in South Africa. The high P21-C value for BLV indicates a higher likelihood of transitioning to a volatile state, while the opposite is true for EFV, where a high P21-C value indicates a more stable transition. These findings have important implications for legislators and financial institutions in managing and monitoring volatility in the country's financial markets. In Nigeria, these findings suggest that BLV is more likely to undergo abrupt and unpredictable transitions, necessitating a proactive approach to monitoring and managing volatility. On the other hand, EFV demonstrates greater stability in its transitions, indicating more predictable and consistent market behaviour. Legislators and financial institutions in Nigeria should consider these results when developing risk management strategies and policies for the country's financial markets. Other findings indicate that BLV in Egypt is more likely to transition to a volatile state, whereas EFV tends to be more stable during its transition. These results underscore the importance of policymakers and financial institutions closely monitoring and managing volatility in Egypt's financial markets.

Table 3.17: Goodness of Fit.

Description	South Africa	Nigeria	Egypt	Kenya
	<i>Cross-border bank lending volatility</i>			
Determinant Resid covariance	1.778602	4.006928	2.637702	0.004177
Log likelihood	-103.6463	-122.8364	-133.5684	136.0232
Akaike info criterion	2.898752	3.345034	3.594615	-2.674959
Schwarz criterion	3.498069	3.944351	4.193932	-2.075641
	<i>Cross-border equity flow volatility</i>			
Determinant Resid covariance	44.00733	3.739613	0.018075	0.002517
Log likelihood	-199.0087	-99.65916	146.1313	214.5311
Akaike info criterion	5.176676	2.839039	-2.944267	-4.500723
Schwarz criterion	5.780155	3.442518	-2.340788	-3.901405

Source: Authors' Estimation using EViews 13.

A high residual covariance of 1.778602 is observed in cross-border bank lending volatility in South Africa, indicating that fluctuations in equity flows can affect overall financial market volatility. This highlights the importance for policymakers and investors to take into account these covariance differences when making decisions regarding cross-border capital transactions. The determinant residual covariance for

Nigeria is 4.006928, slightly lower than South Africa's 3.739613. This underscores the importance for policymakers and investors to analyse the impact of equity flow fluctuations on financial market stability as global economic conditions evolve. In Egypt, the residual covariance for BLV is 2.637702, and for EFV it is 0.018075. As fluctuations in equity flows impact Egypt's financial market stability, it is crucial to carefully manage risk and investment strategies. The determinant residual covariance for Kenya is 0.004177 for BLV and 0.002517 for EFV, indicating a strong relationship between equity flow and financial stability. Equity flow dynamics significantly impact Kenya's financial market, emphasising the importance for policymakers and investors to focus more on risk mitigation and investment opportunities.

The log likelihood for BLV in South Africa is -103.6463, indicating a better fit than EFV's -199.0087. This suggests that BLV's model is more reliable for predicting volatility in cross-border bank lending in South Africa. In Nigeria, the BLV model has a lower log-likelihood value of -122.8364, indicating a better fit for the data than EFV. This confirms its reliability in predicting cross-border bank lending volatility. Overall, these findings suggest that the BLV model is more accurate and effective in analysing cross-border capital flows in both South Africa and Nigeria. The BLV model in Egypt has a lower log-likelihood value of -133.5684 compared to the EFV model of -146.1313, indicating a better fit for the data in Egypt. The model is found to be more reliable in predicting cross-border bank lending volatility in Egypt, indicating its efficacy in analysing financial flows across South Africa, Nigeria, and Egypt. The log likelihood for BLV in Kenya is 136.0232, while the log likelihood for EFV is -214.5311 in the country. The BLV model outperforms the EFV model in analysing cross-border capital data in Egypt and Kenya. In countries with higher log-likelihood values, the BLV model is a more reliable predictor of cross-border bank lending volatility.

Compared to the EFV model in South Africa, the BLV model has a higher AIC value of 2.898752. This suggests a more concise explanation for the dynamics of the data. The AIC for BLV in Nigeria is 3.345034, while for EFV it is 2.839039. This indicates that the EFV model is a better fit for Nigerian data. Both models provide good explanations, but the EFV model appears slightly more favourable for capturing Nigerian data patterns and dynamics. In Kenya, EFV has a lower AIC value than BLV, indicating that it is a better fit for the data. Based on the significant difference in AIC

values between the two models, this is in line with the findings in Nigeria, suggesting that the model is appropriate for these regions. The EFV model outperforms the BLV model in Kenya and Egypt, with an AIC value of -2.944267 in Egypt. This indicates a strong fit to the data and confirms its effectiveness in capturing patterns and dynamics. The consistent results across different regions support the EFV model as the preferred choice for data analysis.

The SIC for BLV is 3.498069, while for EFV it is 5.780155 in South Africa. The volatility of cross-border equity flows in South Africa is higher than that of cross-border bank lending. This suggests increased risk and variation in equity investments compared to bank loans, requiring investors and financial institutions to take this difference into consideration. Nigerian SICs for EFV and BLV are 3.442518 and 3.944351, respectively. Nigeria's systemic risk in cross-border bank lending is higher than that in equity flows, making it more prone to external shocks and economic downturns. Investors and financial institutions should assess risk levels to make informed decisions. The SIC for BLV and EFV in Egypt is 4.193932 and 2.340788, respectively. These values indicate a higher risk in cross-border bank lending compared to equity flows. Investors should assess their risk tolerance and investment goals before deciding between bank loans and equity investments. It is important to consider all factors, including systemic risk levels, when diversifying investment portfolios in Egypt. In Kenya, the SIC for BLV is -2.075641, while for EFV it is -3.901405. This suggests a lower systemic risk associated with cross-border bank lending compared to equity flows. This suggests that investing in Kenyan bank loans may be a more stable option. Investors should conduct thorough risk assessments before making investment decisions.

3.3.5.4 Probability Plots

Probability plots for the smoothed regime-switching model of BLV and EFV are presented for each SANEK country. The plots display distinct patterns for each country, indicating varying levels of risk in bank lending and equity flows. These trends provide valuable insights into the factors driving volatility in capital flows within each nation. The probability charts serve as a valuable tool for policymakers and investors to enhance their understanding of the risks linked to cross-border bank lending and equity flows in each SANEK country. In the complex realm of international finance, this

information can assist in making informed decisions and implementing effective risk management strategies.

South Africa

The regime probabilities for BLV and EFV, based on the smoother, are presented in Figure 3.2. South African cross-border bank lending and equity flow volatility probabilities differ significantly, with bank lending being more stable compared to equity flows, as explained below.

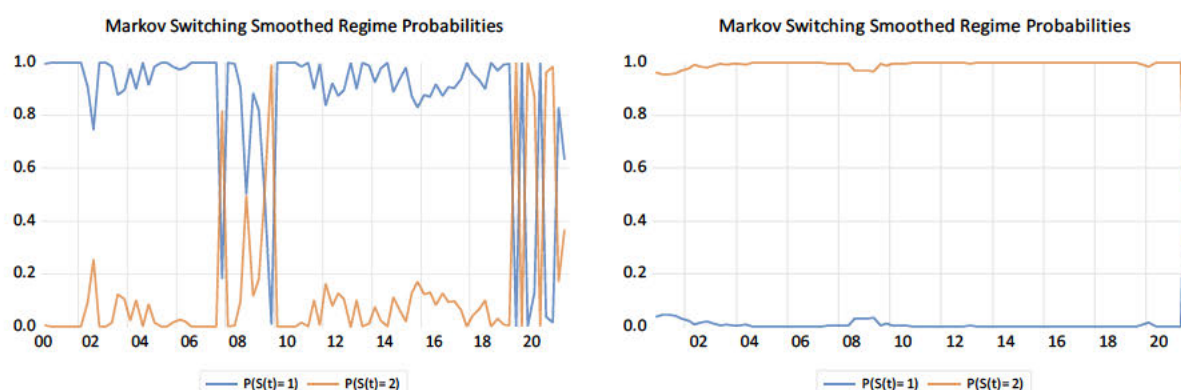


Figure 3.2: BLV (left) and EFV (right) Smoothed Probabilities in the MSM-VAR model.

These probabilities indicate that in the case of cross-border bank lending volatility in South Africa, there is a high likelihood (86.32%) of being in regime 1, while for cross-border equity flow volatility, there is a much higher likelihood (97.61%) of being in regime 2. There is a greater likelihood of cross-border equity flows switching regimes than cross-border bank lending volatility. The disparities in these probabilities could have significant implications for investment decisions and risk management strategies in South Africa. Understanding the probabilities of being in each regime can help investors navigate cross-border investment variations, adjust risk management plans, and protect investments. For South African financial institutions and policymakers, this is crucial for minimising risks.

Nigeria

Figure 3.3 shows the regime probabilities for EFV and BLV in Nigeria. These probabilities suggest a higher likelihood of cross-border bank lending volatility being in regime 2. Additionally, cross-border equity flow volatility is also more likely to be in regime 2, as explained below.

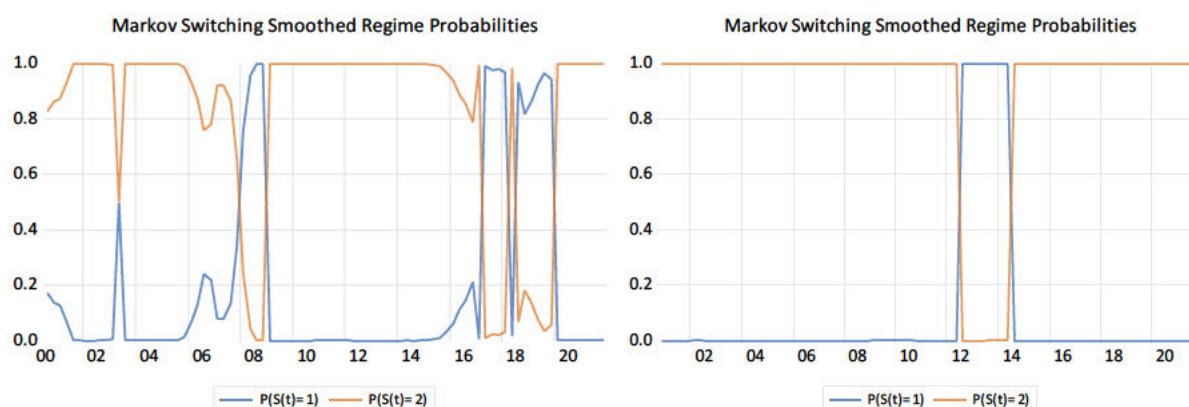


Figure 3.3: BLV (left) and EFV (right) Smoothed Probabilities in the MSM-VAR model.

The results suggest that there are two distinct regimes for both cross-border bank lending (BLV) and equity flow volatility (EFV) in Nigeria. The higher probability regime, with a mean of 0.813954 for BLV and 0.905797 for EFV, indicates periods of high volatility and uncertainty in cross-border capital flows. On the other hand, the lower probability regime, with a mean of 0.186046 for BLV and 0.094203 for EFV, represents periods of relative stability and low volatility. Understanding these two distinct regimes is essential for policymakers and investors to anticipate and prepare for increased volatility in cross-border bank lending and equity flows. It can also help develop policies to mitigate risks and capitalise on opportunities during stable periods, ultimately contributing to Nigeria's financial stability.

Egypt

The regime probabilities for BLV and EFV in Egypt are shown in Figure 3.4. The higher probability of being in regime 2 for cross-border bank lending volatility suggests that this market may be more stable and less prone to sudden changes compared to the equity flow market.

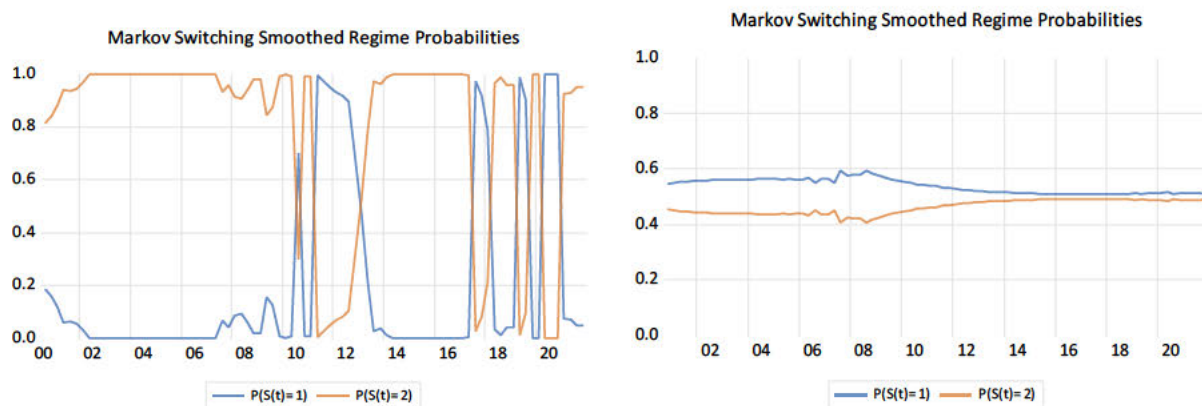


Figure 3.4: BLV (left) and EFV (right) Smoothed Probabilities in the MSM-VAR model.

These probabilities indicate that there are two distinct regimes for both cross-border bank lending volatility and cross-border equity flow volatility in Egypt. The first regime, with a mean probability of 0.199706 for BLV and 0.537602 for EFV, represents a period of low volatility. The second regime, with a mean probability of 0.800294 for BLV and 0.462398 for EFV, implies a period of high volatility. Both types of cross-border capital flows in Egypt are volatile, experiencing both stable and turbulent periods. The study reveals the unpredictable nature of cross-border capital flows in Egypt, with two distinct regimes of bank lending and equity flow volatility. It is imperative to closely monitor financial markets in Egypt, implement risk management policies, and comprehend and adapt to these fluctuations.

Kenya

Figure 3.5 illustrates the probabilities of BLV and EFV regimes in Kenya. The data indicate that cross-border bank lending in Kenya is more stable, with most of the time spent in regime 2 (high volatility). On the other hand, cross-border equity flows experience higher volatility, with most of the time spent in regime 1 (low volatility).

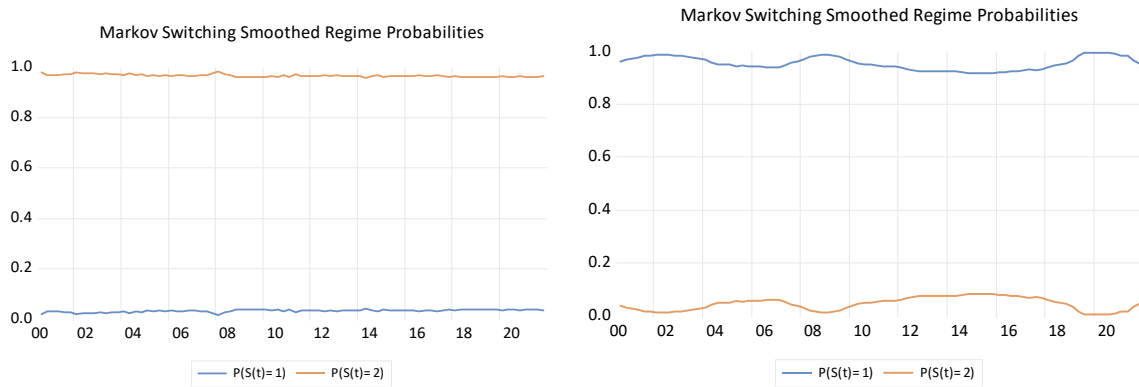


Figure 3.5: BLV (left) and EFV (right) Smoothed Probabilities in the MSM-VAR model.

These statistics suggest that cross-border bank lending volatility in Kenya is likely to be stable, with a regime probability of the mean significantly higher at 0.966863. However, Kenya has a higher likelihood of experiencing fluctuations in cross-border equity flow volatility, as indicated by 0.954686. This information highlights the varying levels of volatility in the two sectors within Kenya's financial market. Cross-border bank lending has been more stable in Kenya compared to cross-border equity flows. Investing in bank lending in this country may be less risky and uncertain than investing in equity flows. Investors interested in Kenya's financial market should carefully consider these probabilities and levels of volatility.

3.3.5.5 Diagnostics for Markov Switching

Transition probability typically refers to the likelihood of transitioning from one state to another within a system or process. As shown in Table 3.18, higher BLV and EFV values indicate a greater likelihood of transitioning between SANEK states. Probabilities play a crucial role in risk management and decision-making in SANEK. They assist policymakers and financial institutions in preparing for and mitigating risks associated with cross-border banking and equity flows.

According to the results, the volatility of cross-border bank lending in South Africa is primarily driven by state 1, with a mean probability of 0.874130, while state 2 only contributes 0.125870. Cross-border equity flow volatility is evenly distributed between states 1 and 2, with probabilities of 0.587515 and 0.412485, respectively. The expected durations of these volatility states reveal that bank lending tends to stay in state 1 for approximately 7.944719 quarters, while equity flow volatility remains in state 2 for much longer periods of around 39.55544 quarters. Various factors influence

cross-border bank lending and equity flows in South Africa. Equity flow volatility has a longer duration than state 2, indicating greater stability. This understanding can be beneficial for investors and policymakers navigating the complexities of the South African financial landscape.

Table 3.18: Transition Probability.

	Bank lending volatility (BLV)		Equity flow volatility (EFV)	
South Africa	<i>Regime 1</i>	<i>Regime 2</i>	<i>Regime 1</i>	<i>Regime 2</i>
Regime 1	0.874130	0.125870	0.587515	0.412485
Regime 2	0.694378	0.305622	0.025281	0.974719
Nigeria	<i>Regime 1</i>	<i>Regime 2</i>	<i>Regime 1</i>	<i>Regime 2</i>
Regime 1	0.728716	0.271284	0.866028	0.133972
Regime 2	0.074339	0.925661	0.011817	0.988183
Egypt	<i>Regime 1</i>	<i>Regime 2</i>	<i>Regime 1</i>	<i>Regime 2</i>
Regime 1	0.677587	0.322413	0.943507	0.056493
Regime 2	0.089271	0.910729	0.059910	0.940090
Kenya	<i>Regime 1</i>	<i>Regime 2</i>	<i>Regime 1</i>	<i>Regime 2</i>
Regime 1	7.52E-12	1.000000	0.975481	0.024519
Regime 2	0.040521	0.959479	0.221436	0.778564

Source: Authors' Estimation using EViews 13

The study's results show that cross-border bank lending volatility in Nigeria is more likely than equity flows, with a $P(1|1)$ of 0.866028. This indicates a strong preference for bank lending. Bank lending volatility is expected to last around 3.686170 quarters, while equity flow volatility is closer to 84.62125 quarters. This suggests that investors may be more cautious about cross-border equity flows in Nigeria. Additionally, the average values for $P(2|2)$ in bank lending and equity flows suggest a greater likelihood of negative outcomes, emphasising the risks associated with cross-border capital activities.

These results indicate that BLV dynamics in Egypt are characterised by a higher probability of remaining in the same regime ($P(1|1)$ mean = 0.677587) compared to switching to a different regime ($P(2|1)$ mean = 0.322413). On the other hand, in Egypt, EFV is more likely to undergo regime switching, with a higher probability of transitioning from regime 1 to regime 2 ($P(1|2)$ mean = 0.059910) compared to remaining in the same regime ($P(2|2)$ mean = 0.940090). The expected durations of these two types of volatility also indicate that BLV tends to persist for shorter periods (3.101608 and 11.20185) compared to EFV (17.70130 and 16.69160). These findings

suggest that cross-border bank lending volatility in Egypt is more stable and less likely to switch between regimes compared to cross-border equity flow volatility. Over time, equity flow volatility is likely to increase as the probability of transitioning from regime 1 to regime 2 rises. Furthermore, the expected durations of these volatility highlight the differences in persistence, with bank lending volatility exhibiting shorter periods of variability compared to equity flow volatility.

Results suggest significant differences in volatility patterns between BLV and EFV in Kenya. For BLV, the probability of staying in the same state ($P(1|1)$ and $P(2|2)$) is close to 1, indicating high persistence. Conversely, $P(1|2)$ and $P(2|1)$ are relatively higher for EFV, indicating a greater probability of transitioning between states. This implies that equity flows in Kenya may be more dynamic and unpredictable compared to other markets. The expected durations in each state for BLV and EFV further highlight the differences in the stability and predictability of these two types of cross-border capital flows. The longer expected durations in each state for BLV compared to EFV reinforce the idea of greater stability and predictability in the volatility regime for BLV. On the other hand, the shorter expected durations for EFV indicate a more erratic and changing pattern of equity flow volatility. To make informed investments in the Kenyan market, it is important to understand the variances and behaviours among various types of cross-border capital flows.

3.3.5.6 VAR Model Stability Tests (AR Root Circle)

The diagnostic tests were conducted on the MSM-VAR model. These tests are important because skewed parameter estimates and residuals can indicate inefficiency in the model. The VAR model was tested for AR roots and serial correlation. The results for each SANEK nation are presented below. The diagnostic tests showed that the AR roots for most SANEK nations were within acceptable ranges, indicating that the model was well-specified.

South Africa: Based on the AR roots tests for both BLV and EFV in Figure 3.6, all roots are within the unit circle, indicating stationarity. Additionally, the serial correlation test failed to find any correlation between residuals, further undermining the model's efficiency. Diagnostic tests validate the parameter estimates of the MSM-VAR model to ensure accuracy and reliability.

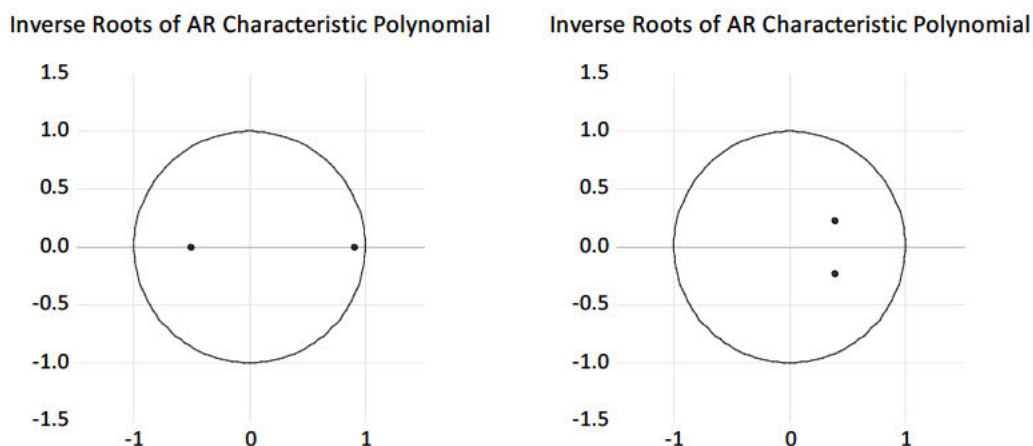


Figure 3.6: BLV (left) and EFV (right) Inverse Roots of AR Characteristic Polynomial

Nigeria: A clear pattern of convergence toward the unit circle can be seen in Figures 3.7 for BLV and EFV, proving that the model remains stable as the lag order increases. Inverse roots always lie inside the unit circle, implying a stationary and well-behaved AR process. These results provide confidence in the reliability of our model and its ability to accurately capture the underlying dynamics of the data.

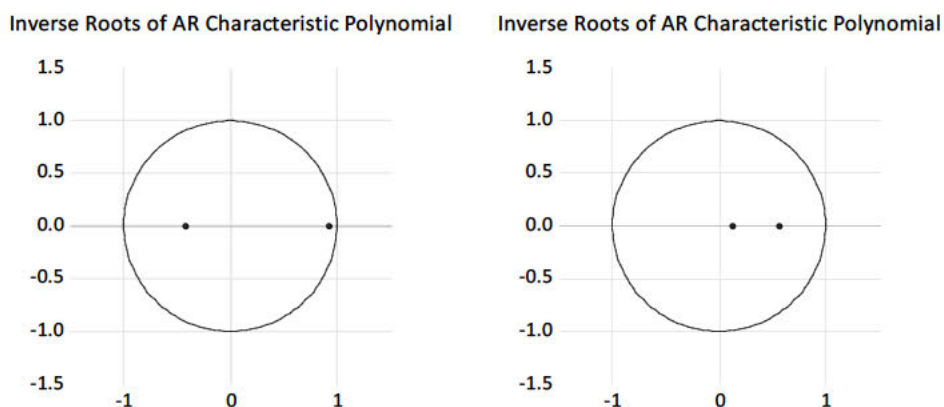


Figure 3.7: BLV (left) and EFV (right) Inverse Roots of AR Characteristic Polynomial

Egypt: In Figure 3.8, the AR roots test for BLV and EFV indicated that all roots were within the unit circle, suggesting the stationarity of the model. The serial correlation test provided additional validation of the model's efficiency by revealing no correlation in the residuals. These diagnostic tests confirm the reliability of the MSM-VAR model and provide confidence in the accuracy of the parameter estimates derived from it.

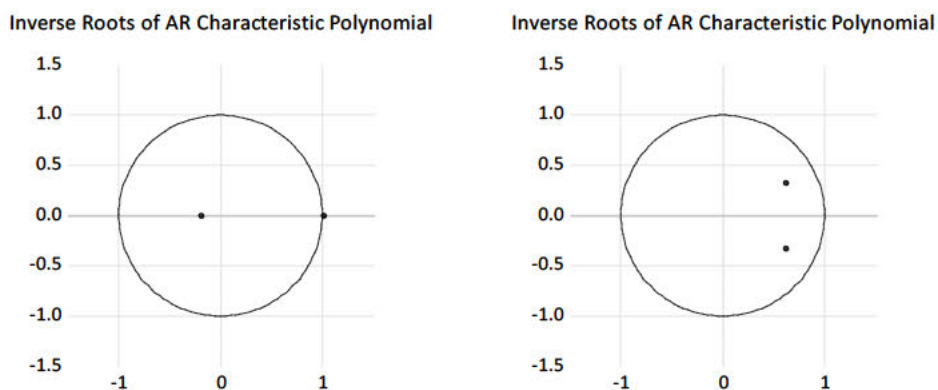


Figure 3.8: BLV (left) and EFV (right) Inverse Roots of AR Characteristic Polynomial

Kenya: The diagnostic tests for the MSM-VAR models for both BLV and EFV indicated that the model was suitable for analysis. The absence of any significant issues with the residuals confirmed the efficiency of the model and provided confidence in the validity of the parameter estimates. The results presented in Figure 3.9 show that the VAR passed the required checks, further supporting the credibility of the analysis conducted.

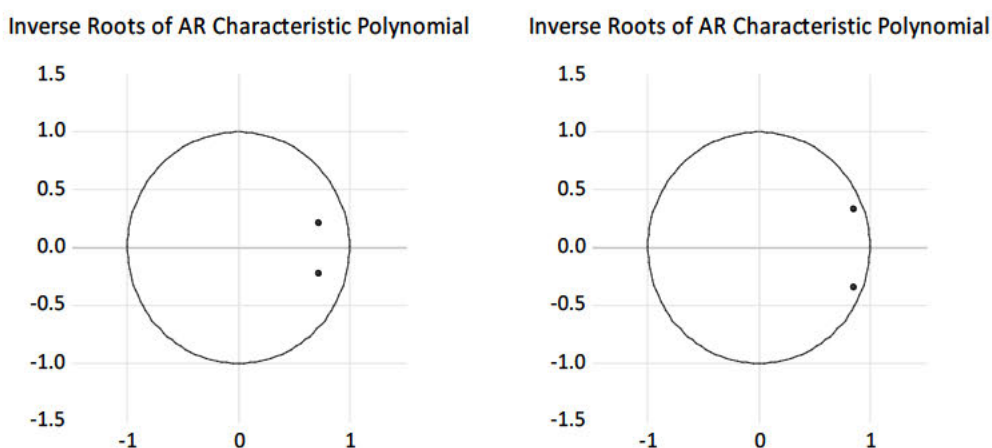


Figure 3.9: BLV (left) and EFV (right) Inverse Roots of AR Characteristic Polynomial

3.4 Summary and Conclusion

The study aimed to identify the main factors driving volatility and assess their magnitude in cross-border bank lending and equity flows in SANEK countries. Time series data from 2000Q1 to 2021Q4 were utilised for this analysis. The Markov Switching Means VAR (MSM-VAR) model was chosen for its ability to capture the dynamic behaviour of variables more effectively than traditional linear models.

Based on the findings, push factors were identified as the primary drivers of cross-border bank volatility in South Africa. Conversely, the magnitude of cross-border equity

flows was significantly influenced by both push and pull factors. In Nigeria, push factors were found to play a substantial role in driving both cross-border bank volatility and equity flow volatility. The study also revealed that the magnitude of push factors significantly impacted cross-border bank and equity flow volatility in Egypt. Additionally, multiple factors were identified as responsible for the volatility of cross-border bank and equity flows in Kenya. The magnitude of push factors had a significant impact on bank volatility in the country, while both push and pull factors drove equity flow volatility.

Therefore, it is crucial to consider both domestic and external factors when analysing the volatility of cross-border bank and equity flows in SANEK countries. These findings highlight the complexity of the factors influencing this volatility. By considering the diverse range of factors involved, stakeholders can better assess and manage the risks associated with cross-border capital flows in SANEK countries.

3.5 Contribution, Originality, and Implications

Originality/value: To the best knowledge of the author, this study is the first to utilise a nonlinear and regime-switching approach, specifically the MSM-VAR model, to identify and quantify the factors driving the volatility of cross-border bank lending and equity flows in SANEK. By adopting a country-specific framework, this research offers a more robust and dynamic assessment of capital flow volatility compared to traditional linear models. Given the structural complexities and financial market dynamics in emerging African economies, this methodological advancement significantly contributes to the literature. The findings highlight the importance of recognising regime shifts and nonlinear patterns in capital flows, which are often overlooked in conventional approaches. By capturing these complexities, this study provides deeper insights for policymakers and investors, enabling them to anticipate and mitigate risks more effectively. Based on the results, policy responses should be tailored to each country's unique economic and financial characteristics. **Policy Recommendations:** South Africa must strengthen macroprudential policies to mitigate the effects of external shocks on cross-border bank lending volatility. Additionally, it should implement policies that attract long-term capital inflows, thereby reducing its dependence on short-term, volatile bank lending. Nigeria needs to enhance its monetary and fiscal policies to buffer against external push factors

affecting financial market stability. It should also promote financial inclusion policies to diversify capital sources and lessen reliance on external capital inflows. Egypt must adopt measures to improve investor confidence, such as ensuring regulatory transparency and providing legal protections for foreign investments. Furthermore, it should develop strategies to mitigate external push factors by strengthening trade agreements and fostering regional financial cooperation. Kenya should enhance financial market oversight to reduce speculative activities that contribute to volatility, as well as improve risk management frameworks for financial institutions to bolster resilience against external shocks. **Practical Recommendations for Investors:** South Africa must diversify its portfolios to reduce exposure to short-term market fluctuations driven by global economic conditions. It should also monitor global financial trends and central bank policies that impact capital flows into the country. Nigeria needs to hedge against currency risks by incorporating financial instruments such as forward contracts and swaps. Furthermore, it is essential to conduct thorough risk assessments before engaging in cross-border bank lending and equity investments. Egypt must utilise government-backed financial instruments and incentives to secure stable returns while maintaining flexibility in investment strategies to respond to external economic shifts affecting capital flows. Kenya should assess both macroeconomic and microeconomic factors when making investment decisions to mitigate risks. Additionally, it should develop adaptive investment strategies that consider both push and pull factors influencing market dynamics.

3.6 Limitations of the Study

Limitations of the study include the reliance on only one measure of volatility, GARCH. Further research could consider including multiple measures of volatility, such as exponentially weighted moving averages, standard deviations over a rolling window, autoregressive integrated moving averages, and others, to provide a more comprehensive analysis. The study's scope was limited by a lack of available data for a specific period and market, potentially rendering the findings inaccurate for other markets or conditions. Future studies could broaden the analysis to various markets and time periods to offer a more comprehensive understanding of market volatility. It is prudent for researchers to refrain from generalizing the findings from this study to broader contexts without conducting additional research using additional measures of volatility.

3.7 Areas of Future Research

Future research could investigate the relationship between capital flow volatility and financial stability in developing countries. This could provide insights into mitigating the negative effects of capital flows on financial stability. Further research into the impact of exchange rate regimes and capital controls on managing capital flows could help identify potential policy measures to enhance financial stability. Additionally, analysing the influence of global economic trends and external shocks on capital flow volatility in developing nations can assist policymakers in predicting and getting ready for potential risks.

3.8 Ethical Consideration

The research in this essay did not involve direct contact with humans or animals, which complies with all ethical guidelines. Additionally, the research was conducted in accordance with the university's ethical review board guidelines.

Chapter 4

The Dynamic Effects of Cross-Border Bank Lending Volatility on Bank RoE in SANEK Countries

4.0 Introduction

This chapter analyses the dynamic effects of cross-border bank lending volatility on bank return on equity in SANEK. The study employs symmetric GARCH and asymmetric models, such as EGARCH and TGARCH, to capture the nonlinear relationship between cross-border bank lending volatility and bank RoE. These models also consider the potential asymmetry in the impact of positive and negative shocks. By incorporating both symmetric and asymmetric models, this study provides a comprehensive understanding of how fluctuations in cross-border bank lending volatility influence bank profitability in SANEK. The findings contribute to the existing literature on the effects of cross-border bank lending on financial stability and assist policymakers in designing effective regulatory measures to mitigate the risks associated with volatile cross-border bank lending. Additionally, this chapter includes country-specific analyses. Several financial and economic theories may explain the connection between bank RoE and cross-border bank lending volatility. According to the idea proposed by Bernanke, Gertler, and Gilchrist (1996), financial frictions can exacerbate economic fluctuations. Increased volatility may worsen financial constraints in the context of cross-border lending, leading to greater instability in SANEK bank revenues. Furthermore, Van den Heuvel (2002) posits that changes in external funding affect bank capital adequacy, which in turn impacts lending capacity and profitability. When cross-border lending becomes unstable, SANEK banks may struggle to maintain steady capital buffers, directly affecting their return on equity. This chapter enhances the body of knowledge on international banking and financial stability by integrating these theoretical perspectives and employing advanced econometric methods.

The chapter is organised into sections. Section 4.1 discusses the literature review, section 4.2 presents Methodology, section 4.3 presents data analysis and results, and Section 4.4 present conclusion and summary of the study.

4.1 Literature Review

4.1.1 Theoretical Literature Review on Bank Profitability

The section explores the literature on the profitability and performance of banks in the banking industry. There is a noticeable lack of theoretical frameworks that directly link cross-border bank lending volatility to the RoE of banks in host countries.

4.1.1.1 The Structure Conduct Performance (SCP) Hypothesis

The SCP paradigm, which originated from neoclassical market analysis, was developed by Mason in 1939. Mason introduced fundamental concepts, while Bain developed the original structure in 1959. The SCP, a key concept in the Harvard school of thought, gained popularity between 1940 and 1960 due to statistical research that established the relationship between industry structure and profitability. Early empirical explanations based on the SCP hypothesis interpreted the relationship between concentration and profitability as positive (Godard, Molyneux, and Wilson, 2004). The SCP paradigm suggests a correlation between market concentration and firm competition levels, arguing that market structure factors influence firm behaviour and competition. The intense competition in the sector, which includes entry requirements, business size distribution, and pricing, is leading to unprecedented levels of market performance metrics, as stated by Berger, Allen, and Hannan (1989). The SCP hypothesis suggests that monopoly profits arise from increased market dominance, enabling banks to extract rents in concentrated markets by reducing deposit and loan rates. The Relative-Market-Power (RMP) hypothesis, a variant of the SCP hypothesis, suggests that only firms with significant market shares and unique products can attain noncompetitive profits (Berger, 1995).

Multiple studies have found a strong association between market concentration, as measured by concentration ratio, and performance, as measured by profits, using the SCP hypotheses. SCP acknowledges that the profitability of major market share banks is positively correlated with market concentration, which makes smaller banks with larger market shares less competitive (Berger et al., 1989). Market concentration in industries leads to collusion among key industry players and higher profits, according to the SCP paradigm. Shifts in market concentration directly affect a firm's profitability. Firms in more concentrated markets can generate higher profits

regardless of their efficiency (Goldberg & Rai, 1996). Hence, market concentration has a significant impact on a bank's profitability. It can also impact a firm's ability to attract new entrants, as high capital requirements and strong brand loyalty can deter new competitors, maintaining the dominance and profitability of incumbent banks. In less concentrated sectors, new entrants may lead to increased competition and reduced profit margins, affecting both current profitability and long-term market viability.

SCP is a valuable tool for studying banks' profit behaviour. It helps to explain the functions of banks' profits and the factors that limit or broaden their market activities. It aids in interpreting sources of output and effectiveness gains or losses, especially in profitability studies. SCP not only offers a logical framework for analysing market behaviour but also assesses the structure, conduct, and performance of banks. It helps determine competition in the banking market and variables that impact profit levels. SCP can reveal potential market dominance or anticompetitive actions by banks, enabling a thorough examination of factors affecting profitability in the market.

Critics of Structure Conduct Performance Hypothesis

Critics of the SCP paradigm, particularly scholars from the Chicago School, primarily raised theoretical and empirical concerns. They argued that the SCP suffered from a significant endogeneity issue, rendering its findings meaningless. Instead of market structure determining performance, as the SCP suggests, these critics pointed out that performance was influenced by the market performance of individual firms within the industry (Brozen, 1971; Demsetz, 1973). They emphasised that efficient firms could expand rapidly and generate higher profits due to lower overhead costs compared to less efficient competitors. However, these correlations should not be viewed as competitive issues or serve as a basis for creating public policies. The Chicago School contends that firm performance is influenced by factors beyond market structure. Efficient firms are credited with their ability to outperform less efficient competitors, leading to their expansion and profitability. According to this school of thought, market structure is determined by firms' actions, rather than the other way around. To understand market dynamics, it is essential to analyse the behaviour and performance of individual firms (banks) instead of solely depending on cross-sectional correlations from industry research. The Chicago School argued that focusing solely on market structure could lead to ineffective policy changes. Instead,

they advocated for laws that promote competition and growth in banks, believing that firm activities and strategies shape the competitive landscape, rather than external forces.

The second criticism of SCP was theoretical. According to Chicago School scholars (Reder, 1982; Giocoli, 2015), markets tended to reach long-run equilibria that were approximately competitive. A new entrant to the market could make a profit if firms had significant market dominance, with temporary and minimal entry barriers. Since market power is temporary, those who claim otherwise should provide evidence, as the a priori hypothesis only applies to perfect markets. There has never been a lighter burden of proof (Giocoli, 2015). Chicago scholars argued that the "old industrial organization" lacked a solid theoretical foundation and that applying rigorous pricing theory would lead to illogical results. They believed that market power would not exist in a competitive market with many small businesses that come and go. They argued that anyone who disagreed with their a priori hypothesis, the "old IO" of Harvard, would produce different results, even when employing a rigorous theoretical approach. Chicago scholars also asserted that the "old IO" approach overlooked innovation and changes in the market. They argued that technological and entrepreneurial innovations would disrupt the market balance, preventing the emergence of oligopolies or monopolies. Competitive forces may hinder free-market economies from attaining market dominance. To gain a better understanding of industrial organization dynamics, comprehensive theoretical research is necessary.

Implications of Structure Conduct Performance Hypothesis in SANEK

High concentration in an industry leads to reduced competition, high prices, and high profits, according to the SCP paradigm. Bain attributes elevated concentration levels to certain barriers to entry, primarily the existence of economies of scale. South Africa's banking system is highly concentrated, dominated by the three major banks (Standard Bank, FNB, and ABSA), leading to limited competition and high profits for these banks compared to other SANEK countries. In South Africa, the banking industry demonstrates the SCP paradigm's causality from concentration to profitability. Scale efficiencies in the sector serve as a barrier to new competitors, thereby strengthening the dominant positions of existing banks. Other SANEK countries' banking environments are more competitive, diversified, and characterised by smaller banks,

which results in lower prices and narrower profit margins. The absence of significant scale efficiencies in SANEK countries' industries enables competitors to enter and exit freely, thus preventing any single bank from establishing a monopoly. The causality in the SCP paradigm may not be as significant in other SANEK countries.

4.1.1.2 The Efficient Structure Hypothesis (ESH)

The Efficient Structure Hypothesis (ESH) is a theoretical paradigm that examines the factors influencing bank profitability. It emerged as an alternative to the SCP hypothesis and addressed the arguments against it (Demsetz, 1973; Peltzman, 1977). Positive correlations between concentration and profitability may suggest a favourable relationship between size and efficiency. Larger banks with higher X-efficiency levels can potentially achieve increased profitability by leveraging economies of scale and scope. These banks can reduce expenses and optimise resource allocation. Market-efficient banks aim to increase their size and market share through aggressive behaviour, enabling them to concentrate, expand their market share, and maximise profits. According to Smirlock (1985), firms can maintain current product prices and service charges while increasing their size to maximise profits. Efficient banks play a crucial role in fostering firm growth and profitability by providing competitive services at affordable rates, which, in turn, facilitate business expansion and market share acquisition. This approach ensures maximised profits without compromising product or service quality, acting as a catalyst for increased company growth and profitability.

ESH suggests that profit and concentration are positively correlated due to lower costs resulting from superior administration and production methods. However, it is uncertain if high profits among big banks are solely due to collusion and product concentration. ESH also suggested that higher levels of concentration would result in more efficient and effective performance, ultimately leading to increased profitability. On the other hand, SCP posited that higher levels of concentration would lead to reduced competition, enabling firms to exert more market power and consequently increase profitability. Both hypotheses acknowledge the positive relationship between concentration and profitability, but their divergent interpretations shed light on different mechanisms through which concentration can influence performance.

Critics of the Efficient Structure Hypothesis

Smirlock's (1985) study supported the efficient structure hypothesis by demonstrating a positive correlation between market share and profitability. However, Shepherd (1986) argues that market share is not a reliable indicator of efficiency, as it can also reflect a firm's market strength or ability to exert market power. Consequently, a company with a large market share may not necessarily be operating effectively, as it could potentially raise prices and stifle competition. This challenges Smirlock's (1985) hypothesis that profitability is directly correlated with market share. To address these concerns, Berger and Hannan (1998) as well as Berger (1995) have introduced two alternative metrics: scale efficiency and X-efficiency. X-efficiency measures a firm's ability to reduce costs and eliminate resource waste without compromising the quality of its output. It focuses on internal operations and management rather than market share. On the other hand, scale efficiency assesses a firm's ability to achieve optimal output while capitalising on economies of scale. Both metrics provide a comprehensive evaluation of a firm's productivity and profitability, making them reliable indicators of market structure and efficiency. They help identify inefficiencies, streamline processes, and minimise waste. By prioritising internal factors over market share, these metrics contribute to enhancing competitiveness and achieving overall market success. Ultimately, these metrics offer a more accurate and comprehensive perspective on a firm's efficiency and effectiveness.

Implications of the Efficient Structure Hypothesis in SANEK countries

Market share will increase as the most profitable and market-shared banks become more concentrated in the market (see Maudos, 1998). South Africa's banking sector is highly concentrated, with a few major banks dominating the market. This is attributed to efficient structural theory, as these dominant banks have increased profitability and market share. Opponents argue that a consolidated banking system could limit competition and consumer choices, leading to calls for stronger regulation and competition in South Africa's banking industry. However, firm-specific efficiencies are considered exogenous, resulting in more concentrated and profitable markets (see Berger and Hannan, 1989). The efficient structure hypothesis suggests that the ability of dominant banks to increase market share and profitability is evidence of their effectiveness and competitiveness. This theory suggests that market concentration in

the banking industry is the result of efficient firms. However, Nigeria and Kenya have lower concentration levels than Egypt and South Africa, indicating lower competitiveness and efficiency in their banking sectors. Factors such as poor regulations, an underdeveloped financial infrastructure, and delayed technological advances could contribute to this. However, concentration alone may not necessarily indicate inefficiency.

4.1.1.3 The Relative Market Power Hypothesis (RMPH)

Shepherd (1983) proposed the RMPH, which states that market shares impact banking performance. The RMPH measures a firm's size relative to the entire sector. If a firm has low market power, it cannot control the market, whereas a firm with high market power can dominate the entire market. RMPH, a specific example of SCP, suggests that banks with significant market shares and unique services can utilise their market power to maximise profits through anticompetitive pricing, such as service charges. In simpler terms, RMPH argues that if a firm has significant market share and unique products, it can attain market dominance and generate exceptional profits (see Shepherd, 1983). Consequently, Smirlock (1985) asserts that market share is positively correlated with profitability. For instance, a dominant SANEB bank can demand higher rents due to its increased market share compared to smaller banks. However, this link is more complex than it may seem and is influenced by various institutional and sector factors.

Critics of the Relative Market Power Hypothesis

Berger (1995) and Berger and Hannan (1989) analysed the relationship between profit structure and banking. They suggested that improved management and a larger market share, particularly for small-to-medium-sized banks, can lead to increased profits. However, operational efficiencies and product diversification also impact banking profitability. The RMPH provides insights into the link between market structure and profitability, but banks must consider various factors for financial sustainability. Mirzaei, Moore, and Liu (2013) found that only affluent markets experience increased profitability with a larger market share. Bhatti and Hussain (2010) showed that profitability is negatively correlated with market share, contradicting the RMPH. The link between market share and bank profitability remains

a skewed and ambiguous topic. Some researchers argue that market share does not necessarily lead to increased profits, while some studies suggest otherwise.

Implications of the Relative Market Power Hypothesis in SANEK

The relative-market power theory posits that major banks can boost profits and affect prices, whereas smaller banks wield less influence because of their lower market reputation and profit-generating capacity. Large banks with a strong reputation can leverage their brand identity to negotiate better terms and attract more clients. This underscores the importance of market power and brand equity in the banking industry, which directly impacts profitability. The RMPH argues that large institutions are more profitable with larger market shares (Talpur, 2023) as they can spread fixed expenses across a larger client base, achieving economies of scale. Big banks often achieve higher profit margins and lower client expenses by offering a wider range of products and services, attracting a broader clientele, and enhancing profitability. Big banks outperform smaller ones due to their market strength, brand equity, and larger market shares. South Africa, followed by Egypt, has a highly concentrated banking system. Larger banks possess greater market power due to their concentration of power, allowing them to set prices and attract customers. Regulators in South African banks must balance competition with stability and profitability to prevent reduced competition and the abuse of market power. Low-concentration markets and smaller firms are more efficient due to increased competition and innovation. Banks with smaller market shares are less likely to engage in anti-competitive behaviour. South Africa's banking sector experiences similar benefits to those observed in Nigeria and Kenya. To ensure a robust and long-lasting banking sector, a regulatory framework that promotes fair competition and prohibits the misuse of market power is essential.

4.1.1.4 The Theoretical Gap in Literature

The relationship between bank profitability and the volatility of cross-border bank lending is a gap that needs to be addressed to understand its impact on a bank's financial performance. This study argues that volatility in cross-border bank lending can impact a borrower's profitability in various ways. Firstly, increased volatility can lead to higher borrowing costs because lenders may demand higher interest rates to compensate for perceived risk. Secondly, the uncertainty and unpredictability associated with volatile cross-border lending can hinder a bank's ability to plan and

manage its operations, leading to inefficiencies and potential losses. To mitigate these impacts, banks can adjust their lending rates, employ skilled risk managers, and diversify their lending portfolios. This strategy helps spread the risk associated with volatile markets and takes advantage of potentially higher returns in stable markets. Additionally, banks can collaborate with international regulatory bodies and adopt standardized risk assessment frameworks to ensure compliance and stability in cross-border lending activities. By implementing these strategies, banks can navigate the challenges of volatile cross-border lending markets while maintaining profitability and safeguarding their long-term financial success.

4.1.2 Empirical Literature Review on Bank Profitability.

The relationship between the volatility of cross-border bank lending and bank RoE has not been investigated in the literature. However, there is a considerable amount of research into the factors that impact bank profitability. The existing literature provides conflicting evidence on the factors that affect bank profitability.

International Studies

Jigeer and Koroleva (2023) utilised panel data regression to investigate the profitability of city commercial banks in China from 2008 to 2020. They found that liquidity had no significant impact on profitability. However, external variables such as inflation and GDP, as well as internal factors like credit quality and bank size, did affect profitability. The study's limitations include its narrow focus on city commercial banks in China, which may limit the generalisability of the findings to other types of banks or countries. Furthermore, the study did not consider possible alterations in regulations or global market conditions that could impact bank profitability in the long run.

Isayas' (2022) study on Ethiopian commercial banks' profitability found that firm age and inflation rate have a negative impact on profitability, but the impact is not statistically significant. On the other hand, liquid ratios, firm size, total assets, leverage, capital adequacy, and real GDP growth have a positive and statistically significant effect on profitability. This conclusion is based on the GMM using dynamic panel data spanning 12 years. However, it is important to note that this study may not consider other potential variables that could affect a bank's profitability, such as changes in

regulatory policies, global risk factors, or competitive pressures within the industry. Additionally, the study may have limitations in terms of sample size or methodology.

Horobet, Alexandra, Radulescu, Belascu, and Dita (2021) used the GMM panel data approach to investigate the factors influencing bank profitability in Central and Eastern Europe (CEE) economies from 2009 to 2018. They found that factors such as non-government lending, high concentration rates, non-performing loans, and capitalization rates have a negative effect on bank profitability. However, one limitation of this study is the omission of macroeconomic indicators such as GDP growth, exchange rates, and inflation rates, which could also influence bank profitability in the region. Furthermore, the study's narrow focus on the 2009-2018 period may not fully capture the dynamic nature of the CEE banking sector. Finally, the GMM panel data approach used in the study may have limitations in accurately capturing the complex interactions between variables that affect bank profitability, as shown in previous research by Picone, Sloan, and Trogdon (2004).

From 2014 to 2018, Hosen (2020) used a regression model to identify internal factors influencing the profitability of 23 Bangladeshi commercial banks. The study found that credit risk and capital adequacy were the most significant factors related to profitability. Interest rate spread and cost-to-income ratio had a significant impact on the profitability of Islamic commercial banks, while deposit growth significantly affected the profitability of private commercial banks. However, this study had a limitation in that it only focused on internal factors and did not consider external factors that could also influence bank profitability. It is important to identify both internal and external factors to develop a comprehensive understanding. Additionally, conducting a longitudinal study can provide insights into how factors interact over time. This can assist policymakers and bank managers in enhancing profitability and sustainability in the banking sector.

From 2008 to 2018, Phan, Hoang, and Dinh (2020) conducted a study on the profitability of ten Vietnamese commercial banks using descriptive statistics, IV regression, and OLS regression analysis. The study found that operational efficacy, loan size, retail loan share, state ownership, inflation rate, and GDP growth influence profitability. However, liquidity risk, capital size, bank size, credit risk, and revenue diversification were found to be insignificant. These findings suggest that both internal

and external factors play a crucial role in determining the profitability of commercial banks in Vietnam. One limitation of the study is the small sample size of only ten banks, which may not be representative of the entire banking sector in Vietnam. To draw more general conclusions, future studies should consider examining a larger and more diverse sample.

Neves et al. (2020) studied 66 Portuguese and Spanish banks using a GMM system model. The study found that macroeconomic and internal management variables significantly impact banking performance on the Iberian Peninsula. The study also revealed a non-linear positive and negative link between bank size, profitability, and efficiency, which is a novel discovery in the Iberian banking sector. The study underscores the importance of conducting a thorough analysis of bank profitability, emphasising the necessity of utilising a combination of macroeconomic indicators and internal management strategies. However, the study's weakness is that it only focuses on Portuguese and Spanish banks, excluding other countries on the Iberian Peninsula. Despite this limitation, the study provides useful insights for banking executives and policymakers seeking to enhance the efficiency and profitability of banks on the Iberian Peninsula.

Using a panel dataset, Sinişin and Socol (2020) studied the banking profitability of 13 European Union member nations over an 18-year period from 2007 to 2017. They examined independent variables such as inflation, GDP growth, loan-to-deposit ratio, and bank capital-to-total assets ratio. The results indicated a significant relationship between RoA or RoE and GDP growth, while the other independent variables had a lesser impact. The study suggests that the profitability of banks in EU member nations is strongly influenced by GDP growth, emphasising the significant role of economic conditions in determining the financial health of banks. It provides valuable insights into EU banks' profitability by emphasising the importance of maintaining a balance between loans and deposits. However, it does not provide specific strategies or policies for maximising profitability under varying economic conditions. Nonetheless, it underscores the necessity of a resilient financial system capable of adapting to changing economic circumstances.

Islam and Rana (2019) conducted a study that examined the profitability of 23 commercial banks in Bangladesh. They identified several bank-specific and

macroeconomic variables that influence profitability. The study utilised regression analysis and fixed effect models to assess profitability, measuring it through RoA, RoE, and Net Interest Margin (NIM). The findings indicated a positive association between profitability and asset structure and earning variables, while asset quality had a negative impact. Additionally, earnings and capital strength were positively correlated with profitability. Interestingly, the study did not reveal any clear impact of macroeconomic variables on profitability. One limitation of the study was the exclusion of global factors, such as changes in bank lending or market conditions, which could significantly impact banking profitability and should be explored further.

Gaber (2018) investigated the profitability of the Palestinian banking system by analysing bank balance sheet data from 1995 to 2015. The findings revealed that size has a positive impact on profitability indicators such as RoA and RoE, while capital is positively associated with RoA. RoA and RoE have positive correlations with loans, but they are inversely related to deposits. Internal and external factors significantly impact F-statistics, but they do not significantly impact NIM. Despite inflation and growth, the banking industry has not experienced significant increases in profitability. The study highlights the significance of both internal and external factors in influencing the profitability of the Palestinian banking system. Study limitations include ignoring the impact of geopolitical events and other global factors on the profitability of Palestinian banks, which could limit the study's overall conclusions.

Using panel data from 1980 to 2015, the study by Lacobelli (2017) examined the profitability of sixteen international banks. The study found that macroeconomic indicators, bank characteristics, and industry structure contribute to profitability. Bank capital and productivity increase profitability, while higher GDP growth and inflation improve it. The study also suggests that the business cycle enhances the profitability of global banks. Lacobelli's study highlights the influence of various factors on the profitability of international banks. However, the study's weakness is that it may not account for all potential variables that could impact bank profitability. The findings may not be applicable to all banks worldwide due to the study's limited sample size of only sixteen international banks.

GMM estimates were used by Jabra and Mighri (2017) to investigate the correlation between bank capital, risk, and profitability in the BRICS banking sector.

According to the findings, capital has a positive effect on profitability but a negative effect on risk. The research did not examine the relationship between capitalisation and profitability in the BRICS economies or these theories in general. One of the study's shortcomings is its failure to consider the unique characteristics of each BRICS economy, which could impact bank capital, risk, and profitability. Future studies should explore these characteristics and include other factors that influence bank profitability and risk to provide a more comprehensive understanding.

Alshatti (2016) utilised a panel data set comprising 130 bank observations from 2005 to 2014 to investigate the factors influencing the profitability of commercial banks in Jordan. The results showed that capital, capital adequacy, and leverage have a positive impact on profitability, while asset quality has a negative effect. RoA and RoE are important measures of bank profitability. Although Alshatti's research has limitations, such as its inability to consider all factors that affect profitability and investigate individual bank strategies and management practices, it provides valuable insight into the relationship between specific financial metrics and bank profitability in Jordan.

In the EU27, Petria, Capraru, and Ilnatov (2015) examined factors influencing bank profitability from 2004 to 2011. They categorised these factors into bank-specific, macroeconomic, and industry-specific factors. The study identified several factors that affect bank profitability, including market concentration, competition, credit and liquidity risk, managerial efficacy, company diversification, and growth. The study found that competition positively impacts bank profitability in the EU27. However, it is important to note that the study did not consider all relevant variables, such as regulatory changes or technological progress, which may also affect bank profitability. Therefore, the results of the study may not be applicable to all EU27 countries.

Al-Harbi (2019) examined the impact of external and internal factors on profitability in conventional banks operating in the Organisation of Islamic Cooperation (OIC) states. The study used data from 686 banks operating in 52 OIC countries between 1989 and 2008 to test an ordinary least squares fixed-effects model. The findings revealed that equity, foreign ownership, RGDP, off-balance-sheet activities, concentration, and real interest rates enhance bank profitability. However, the study only focused on conventional banks and did not consider Islamic banks. Factors such

as the regulatory environment, technological innovation, and market competition could have been analysed to provide a more comprehensive understanding of bank profitability in OIC countries. Further exploration and refinement are needed to enhance the current literature.

Empirical studies on SANEK countries

Using a fixed-effect regression model from 2008 to 2017, Kajola, Sanyaolu, Alao, and Ojunrongbe (2019) studied the profitability of ten Nigerian listed commercial banks. The study found that size, loan-to-asset ratio, nonperforming loans, and capital adequacy significantly increased profitability. Age had a negative impact. Bank profitability was not significantly affected by macroeconomic variables such as economic growth or interest rates, while inflation had a modest but negative effect. One shortcoming of this study is that it only examined a limited period, disregarding any potential changes or advancements in banking. Additionally, the study did not consider external factors such as changes in regulations or market conditions that could also impact the profitability of banks.

Maredza's (2014) study examined the factors affecting bank profitability in South African banks using a two-step approach. The study involved four large and four small banks and used the Data Envelopment Analysis (DEA) approach to generate Total Factor Productivity Efficiency (TFPE) scores. The study assessed each bank's efficiency score for each period and examined the impact of TFPE and other internal drivers on bank profitability measures. Results showed that higher profitability was associated with improved factor production efficiency and capital adequacy, while lower profitability was linked to higher cost inefficiency, diverse activities, increased credit risk, and large bank sizes. However, this study did not consider external factors that could also impact bank profitability, such as changes in the economy or regulatory policies. Global factors such as cross-border capital flows, geopolitical events, and market volatility could also significantly influence a bank's profitability.

Lawa, Zogli, and Dlamini (2017) analysed the factors impacting bank performance in South Africa from 1995 to 2013. They focused on non-performing loans, capital adequacy, and GDP market prices. The study used random effects panel data analysis and identified these factors as crucial for the advancement of the country's banking

industry. However, the study had limitations. It did not consider external factors such as political instability, interest rate fluctuations, and regulatory changes that could impact bank performance. Additionally, the scope of the study was limited, and future research should consider a longer time frame for a more comprehensive analysis of factors influencing the performance of South African banks. Despite these limitations, Lawa et al.'s (2017) study provides valuable insights for legislators and banking industry stakeholders to enhance bank stability and profitability in the country.

Wayiera's (2017) study of 43 Kenyan commercial banks found that bank-specific characteristics have conflicting effects on profitability. The study specifically revealed a positive relationship between bank size and profitability, while bank capitalisation was found to have a negative impact. Additionally, industry-specific factors were found to have a negative effect on profitability, with market growth and industry concentration being particularly significant. The study also highlighted a strong negative association between macroeconomic indicators and bank profitability, specifically GDP and interest rates. To achieve profitability, internal stakeholders, including management and the board of directors, should aim for a minimum level of bank capitalisation and a maximum bank size. One limitation of this study is that it does not consider external factors that may influence bank profitability, such as regulatory changes or global economic trends.

Using ordinary least squares (OLS) and Pearson correlation, Macharia's (2016) study of Kenya's commercial banks found a weak negative relationship between profitability, capital sufficiency, credit risk, and operational effectiveness from 2011 to 2015. Adequate capital is crucial for profitability, while increasing credit risk and levels of nonperforming loans have a negative impact on profitability. Increased liquidity leads to higher profitability and interest income, while mismanagement has a negative impact on operational efficiency, leading to reduced profitability. However, it should be noted that this study's short-term analysis may not provide a comprehensive understanding of long-term trends in Kenya's commercial banking sector. It may overlook macroeconomic conditions or regulatory changes that influence profitability and operational efficiency.

In their study of Nigerian commercial and microfinance banks' profitability from 2010 to 2018, Tosin and Otonne (2020) used the Random Effects Panel Estimation

Technique. They found that liquidity ratios do not significantly affect profitability, while capital adequacy is crucial. Real GDP was identified as a crucial factor in determining the profitability of commercial banks. The weakness of this study is that it only focused on a specific period and may not capture long-term trends in the banking industry. Additionally, the study may not have considered other external factors that could impact bank profitability, such as regulatory changes or market competition. Furthermore, this study does not consider global factors, such as currency exchange rates and cross-border loans.

Adeusi, Kolapo, and Adewale's (2014) study of Nigeria's fourteen commercial banks found that managerial effectiveness, asset quality, and economic growth are the main factors influencing profitability. The study used a pooled regression analysis of the OLS and discovered that asset quality continues to be a significant predictor of profitability in all models. A bank's profitability is primarily influenced by the quality of its assets and the credit risk it faces. This highlights the importance of addressing these factors to enhance profitability in the banking sector. The weakness of this study was its failure to consider other potential variables that could impact profitability, such as global factors like foreign bank loans to Nigerian banks. Commercial banks' profitability could also be affected by global shocks, and future studies should take this into consideration.

Youssef (2016) used a time-series model to investigate factors that influence bank profitability in Egypt. The model utilised cointegration and the Vector Error Correction Model to examine the long-term relationship between return on equity, bank-specific variables, liquidity, non-performing loans, and capital adequacy. The results revealed that capital adequacy, loan provisions, and deposits have a negative impact on profitability, while firm size has a positive correlation with profitability, suggesting economies of scale within the industry. However, this study did not consider external variables, such as legislative changes or prevailing economic conditions, which could potentially affect the profitability of the banking industry.

El-Ansary and Megahed (2016) examined the profitability of Egyptian banks before and after the financial crisis using the GMM. Results showed that banks with higher capital strength, substantial assets, and efficient management are more profitable, while those with larger credit risks and loan amounts are less profitable. The

study's weakness is its failure to consider external factors, such as regulatory changes or economic conditions, that could impact bank profitability. Future research should incorporate these factors to enhance the understanding of the key determinants of bank profitability. This understanding can help banks improve their financial performance and resilience.

Kassem and Sakr (2018) conducted an OLS regression analysis and discovered that bank profitability is affected by bank size and loan loss provision ratio, showing significant correlations with profitability metrics. The capital ratio is significantly correlated with RoA and NIM but not with RoE, and deposit and loan ratios remain unaffected. However, a limitation of this study is its narrow focus on the factors influencing bank profitability. Therefore, future research should consider interest rate risk, credit risk, and operational efficiency for a more comprehensive analysis.

4.1.2.1 Synthesis of the Reviewed Studies

Many international studies, including those by Jigeer and Koroleva (2023), Isayas (2022), and Horobet et al. (2021), examine both internal and external factors that influence bank profitability. Several researchers, such as Neves et al. (2020) and Hosen (2020), employ GMM and other panel data regression models to analyse the determinants of profitability across various regions, including Ethiopia, Central and Eastern Europe, and the Iberian Peninsula. While these studies highlight bank-specific and macroeconomic variables, they do not specifically address how volatility in cross-border lending impacts bank profitability. Some studies, like those by Hosen (2020) and Islam and Rana (2019), focus on bank-specific factors in determining profitability. Other research, including that of Sinițin and Socol (2020) and Lacobelli (2017), investigates macroeconomic variables and their relationship to bank profitability. Although some studies, such as those by Petria et al. (2015) and Harbi (2019), explore the effects of various factors on bank profitability across broad geographical regions like the EU or OIC countries, there is a notable lack of focused research on the dynamic effects of cross-border bank lending on profitability within specific contexts, such as the SANEK countries. In the case of SANEK, Kajola et al. (2019) and Wayiera (2017) suggest that macroeconomic factors have minimal or negative effects on profitability. In contrast, studies in South Africa (e.g., Lawa et al., 2017) and Egypt (e.g., Youssef, 2016) have reported more pronounced effects of GDP on bank

profitability. Capital adequacy is commonly identified as a key driver of profitability across various studies (Kajola et al., 2019; Maredza, 2014; Youssef, 2016). However, the impact of bank size is mixed; some research (e.g., Wayiera, 2017) finds a negative relationship while others (e.g., Maredza, 2014) show a positive relationship. Studies such as Maredza (2014) and Wayiera (2017) emphasise the importance of internal operational factors. Overall, a significant gap exists in the literature regarding the dynamic effect of cross-border bank lending volatility on profitability.

4.1.2.2 Research Gap on Bank RoE

The relationship between cross-border bank lending volatility and bank RoE has been unexplored in existing literature. This is particularly relevant for SANEK banks, where sudden reductions or withdrawals of cross-border lending could introduce volatility, affecting profitability and financial stability. Previous studies on bank RoE have primarily focused on linear models, neglecting potential asymmetry in how banks respond to positive and negative shocks. Further research is needed to understand how fluctuations in cross-border lending influence RoE using more sophisticated modelling approaches like symmetric and asymmetric GARCH models. This study aims to fill this gap by examining the dynamic effects of cross-border bank lending volatility on RoE in SANEK.

4.2 Methodology

4.2.1 Data Sources

This study employed secondary macro-financial data covering the period from 2000Q1 to 2021Q4. The dataset was compiled from various authoritative sources, including the central banks of the selected countries, the BIS, and the IMF. While most variables were available in quarterly formats, some key indicators were published annually. In such cases, frequency conversion tools within EViews were applied to ensure consistency in the dataset's temporal structure. Following the methodology outlined by Mamvura and Sibanda (2020) and EViews (2023), annual data were converted to quarterly frequency using the Quadratic Match Average (QMA) method. This approach provides a smooth approximation of quarterly values based on a quadratic polynomial fit, minimising abrupt transitions and preserving long-term trends in the series.

Transformed Variables (Originally Annual):

- *Interest Rates and Bank RoE* – Converted from annual to quarterly frequency using the QMA method in EViews to harmonise with other macro-financial variables and sourced from the World Bank.

Non-Transformed Variables (Available in Quarterly Format):

- *Cross-border Bank Lending Flows* – Sourced from BIS Locational Banking Statistics.
- *Credit Risk* – Measured using the non-performing loans (NPL) to total loans ratio, sourced quarterly from central bank and IMF databases.
- *Liquidity Risk* – Proxied by the loan-to-deposit ratio or liquid assets to short-term liabilities, available from central banks and IMF (FSIs).
- *Bank Size* – Measured by the natural logarithm of total bank assets, reported quarterly in central bank or supervisory authority data.
- *Exchange Rate Risk* – Obtained from national central banks, based on quarterly exchange rate fluctuations, particularly the standard deviation of local currency units per USD or a trade-weighted index.
- *Inflation Risk* – Obtained from national central banks or IMF databases, measured by quarter-on-quarter changes in consumer price indices (CPI).

4.2.2 Research Design

This study investigates the dynamic effect of cross-border bank lending volatility on bank return on equity in SANEK countries using a theoretical model as illustrated in Figure 4.1. A quantitative technique was the most appropriate for this study (e.g., objective measurement, statistical analysis, large sample sizes, replicability).

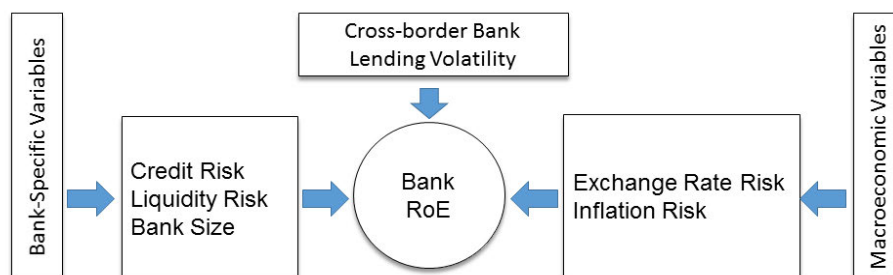


Figure 4.1 Conceptual Framework on cross-border bank lending volatility on bank RoE
Source: Author's own compilation

The research model in Figure 4.1 outlines the variables that affect bank RoE in SANEK. These variables include cross-border bank lending volatility, internal and external bank control variables, bank-specific variables (credit risk, liquidity risk, bank size), and macroeconomic variables (exchange rate and inflation risk).

4.2.3 Theoretical Development of Variables

This section explores the theoretical development of variables used in the study, including bank return on equity, cross-border bank lending volatility, and control variables to enhance internal validity. This study evaluates existing theories that underlie current research, demonstrating their appropriateness and their foundation in previously held views. Bank profitability is determined by internal factors such as credit risk, bank size, and liquidity risk, as well as external factors like exchange rate and inflation risks.

Dependent Variable: Bank RoE (bank profitability) is a dependent variable and is a function of the remaining six variables.

Bank RoE: RoE is a crucial indicator for measuring bank performance (Moussu and Petit-Romec, 2017), as it evaluates the returns on the initial capital invested. A high RoE indicates effective capital utilization, which is important for banks and other establishments to profit from their capital investments. RoE is a crucial factor for investors when determining whether to invest in a bank (Norman, 2017), and regulators oversee RoE to maintain financial stability. Therefore, RoE plays a crucial role in evaluating bank performance, and stakeholders closely monitor it.

Explanatory Variable: In the regression analysis, the study incorporates a cross-border bank lending volatility variable associated with bank RoE. Many studies have been conducted on BLV and RoE individually, but there is still a lack of theoretical and empirical evidence regarding their relationship.

Cross-border bank lending volatility (BLV): BLV is not fully explained theoretically, but it has led to bank globalisation, improved risk-sharing, and optimised capital allocation. The surge in cross-border lending in the three decades leading up to the 2008 financial crisis can be attributed in part to reforms in local bank regulation and a decrease in lending constraints (Lane and Milesi-Ferretti, 2017). Emerging markets

utilise regulations to reduce their vulnerability to unpredictable short-term bank loans from foreign sources (Nuguer, 2018). This study aims to model the effects of volatile cross-border bank lending on SANEK bank RoE. SANEK banks borrow abroad to support operational projects within their countries and across Africa. The literature does not clearly establish the connection between cross-border bank lending volatility and bank RoE. However, this study addresses this gap by demonstrating that bank RoE is significantly associated with the volatility of bank lending capital flows. The cross-border bank lending volatility variable is calculated using GARCH, as explained in Chapter 2.

Control Variables: Several control variables are also included in the regression analysis to examine their relationship with the bank's return on equity (RoE) in SANEK countries. This study includes five control variables: credit risk (CR), liquidity risk (LR), bank size (BS), exchange rate risk (EXR), and inflation risk (INF).

Credit Risk (CR): Credit risk, which is the proportion of non-performing loans to total loans, is a significant risk faced by banks (Ekinici and Poyraz, 2019). It is crucial for maintaining the soundness and profitability of the banking sector and contributing to systemic stability and resource allocation (Psillaki, Tsolas, and Margaritis, 2010). Gestel and Baesems (2008) argue that a small number of clients defaulting can result in significant losses for banks. Credit risk occurs when a creditor misses a payment deadline, often due to financial distress or poor credit profiles (Gestel and Baesems, 2008). Controlling credit risks significantly impacts bank profitability (Nelson, 2020). Banks' ability to manage credit risks is an effective tool for evaluating the state of the banking industry (Kutum, 2017). Credit risks and bank asset quality are interlinked, with non-current receivables and loan profitability contributing to a bank's overall value (Baral, 2005). Bank profitability and credit risk are inversely linked, as supported by Minh and Canh (2015) and Nguyen, Ta, and Nguyen (2018), suggesting that SANEK's credit risk and bank RoE are inversely related.

Liquidity Risk (LR): Liquidity risk is a significant issue in the banking industry and is often assessed using balance sheet positions. Banks must deposit the positive rate of their credits into a central bank account to meet interbank obligations and ensure contributor protection (Khalid, Md, and Hossain, 2019). Frequent client fund transfers, however, can have a negative impact on bank performance. This can repel potential

clients and reduce profitability (Ejoh, Okpa, & Egbe, 2014). Effective liquidity risk management is crucial for banks and the entire financial system because it is essential for efficient functioning. Banks must maintain adequate liquidity levels to manage liquidity risk and be prepared to handle various situations, liabilities, or weak funding sources. It is important to note that bank profitability is inversely correlated with liquidity risk, as supported by Le (2017) but inconsistent with Abel and Le Roux (2016). Additionally, assets with low liquidity risk generally have more available assets. Therefore, profitability and liquidity risks are expected to be unfavourable in SANEK.

Bank Size (BS): Bank size is a crucial factor in business, affecting its interactions within operational and external environments. It affects the ability to compete with other banks through cost-saving measures and increased profit prospects. Bank size significantly impacts financial health, especially profitability (Kirimi, Kariuki, and Ocharo, 2022). Chodorow-Reich, Darmouni, Luck, and Plosser (2022) argue that large banks can capitalize on economies of scale to expand their services while keeping fixed costs stable (Garca-Herrero, Gavilá, and Santabárbara, 2009). This leads to higher efficiency and profit generation (Nelly, Ambrose, & George, 2019). Total assets measure a bank's capacity for revenue generation and profitability (Kurshev and Strebulaev, 2015). As total assets increase, a bank's capacity to disburse funds to debtors also increases (Dzeha, Boachie, Kriese, & Kusi, 2022; Nzioka, 2013). A larger SANEK bank operates more safely and efficiently, thereby increasing profitability. The size of the bank generally has a beneficial impact on profitability in the literature (Saona, 2016). Therefore, RoE is expected to benefit from its size.

Exchange Rate Risk (EXR): Exchange rate risk refers to the impact of currency exchange rates on bank profitability and operations. Increased globalisation and currency volatility can significantly affect bank profitability, both directly and indirectly impacting specific banks. Foreign currency-denominated obligations, off-balance sheet exposures, and non-asset-based services are directly affected (Martin and Mauer, 2003). Exchange rate fluctuations impact the value of assets and liabilities denominated in local currency when obligations are invoiced in foreign currencies. According to Chamberlain, Howe, and Popper (1997), the indirect effects of exchange rates on banks' profitability are largely mediated by loan demand, competition intensity, and other characteristics of the banking environment. Exchange rates

significantly impact banks that engage in transactions with foreign countries (Combey and Togbenou, 2017). Consequently, the bank's RoE is expected to be negatively affected by exchange rate risk.

Inflation Risk (INF): Minh and Canh (2015) argue that inflation is correlated with bank profitability. It affects bank lending, interest rates, and net interest revenue. Countries with higher inflation tend to have smaller equity markets and face more challenges lending to the private sector. The impact of inflation on interest rates varies, and profitability should exhibit a positive or negative correlation with the inflation rate. This emphasizes the importance of understanding and managing inflation in the banking sector. This study predicts that countries with high inflation and inflation risk will have a negative impact on bank RoE.

4.2.4 Research Methodology

4.2.4.1 Model Specification

Objective two of the study employs a dynamic time series regression model (Equation 4.1) to examine the impact of cross-border bank lending volatility (BLV) and other banking and macroeconomic factors on the RoE of banks over time in SANEK countries. In line with GARCH-type models, which differentiate between conditional mean and conditional variance processes (Engle, 1982; Bollerslev, 1986), Equation 4.1 focuses on the conditional mean dynamics of bank RoE. It models how bank profitability evolves as a function of BLV and key fundamental variables. The inclusion of lagged RoE terms introduces a dynamic component, acknowledging that profitability is influenced by its own past values as well as bank-specific and macroeconomic factors. To account for structural differences across banking sectors, the model is estimated separately for each country, allowing for country-specific dynamics to be captured. The specification of the country-level regression model is presented below.

$$RoE_t = \alpha + \rho RoE_{t-1} + \beta_1 BLV_t + \beta_2 CR_t + \beta_3 LR_t + \beta_4 BS_t + \beta_5 EXR_t + \beta_6 INF_t + \varepsilon_t \quad (4.1)$$

Where RoE_t = Return on equity for the banking sector at time t , representing bank profitability. ρ = Measures the persistence or inertia (i.e., current RoE is influenced by past RoE) of bank profitability over time. RoE_{t-1} = Lagged dependent variable to capture dynamic effects or persistence in profitability. BLV_t = Cross-border bank lending volatility at time t , capturing fluctuations in international bank lending. CR_t =

Credit risk at time t , proxied by the ratio of non-performing loans to total loans. LR_t = Liquidity risk at time t , measured by indicators such as loan-to-deposit ratio or liquid assets to short-term liabilities. BS_t = Bank size at time t , typically proxied by the natural logarithm of total bank assets. EXR_t = Exchange rate risk at time t , calculated as the volatility or changes in the country's exchange rate. INF_t = Inflation rate risk at time t , measured by quarterly changes in the consumer price index. α = The intercept term, representing the baseline profitability when all explanatory variables are zero. $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$, and β_6 = Coefficients capturing the marginal effects of each explanatory variable on bank profitability. ε_t = The error term at time t , capturing unobserved factors affecting RoE.

4.2.4.2 The GARCH Models

This study investigates the dynamic impact of cross-border bank lending volatility on bank RoE in SANEK countries. The term dynamic refers to how this relationship evolves over time, capturing time-varying effects rather than assuming a constant relationship, as in static models. To this end, the study employs GARCH(1,1), EGARCH(1,1), and TGARCH(1,1) models, which are well suited for capturing key features of financial time series, namely volatility clustering, asymmetric responses to shocks (leverage effects), and time-varying conditional variance (Engle, 1982; Bollerslev, 1986; Nelson, 1991; Zakoian, 1994). These models are applied to the mean equation specified in Equation 4.1, where RoE is modelled as a function of its own lag, cross-border bank lending volatility, and relevant bank-specific and macroeconomic variables. By incorporating these GARCH-family models, the study not only estimates the conditional mean but also models the dynamic behaviour of volatility in the error term. Volatility clustering reflects the tendency for periods of high volatility to follow one another, while leverage effects capture asymmetries in how negative and positive shocks affect volatility. These dynamics are critical for assessing how shifts in cross-border lending conditions influence bank profitability over time. By analysing financial data and macroeconomic indicators, the study identifies the risks and opportunities inherent in cross-border banking within SANEK. The findings offer insights for policymakers and financial institutions on managing exposure to global lending volatility. As De Haas and van Lelyveld (2010) argued, cross-border banking is particularly sensitive to both regional instability and global financial shocks, a sensitivity that is heightened in developing markets, where external shocks can

significantly disrupt bank performance (Obstfeld & Rogoff, 1996). Overall, the use of dynamic volatility models enhances our understanding of how international financial disturbances impact RoE, underscoring the vulnerability of SANEK banks to asymmetric and time-dependent volatility, especially in response to negative external shocks (Black, 1976; Nelson, 1991).

4.2.4.2.1 The Generalized-ARCH model (GARCH)

The study investigates the effects of cross-border bank lending volatility on bank RoE in SANEK countries using the GARCH (1,1) model. The model estimates the conditional variance, representing the volatility of cross-border bank lending, and analyses how these variations impact the RoE of banks in SANEK countries. The aim of this study is to provide insights into the impact of cross-border bank lending volatility on bank profitability. This model offers valuable insights into the risks and opportunities associated with volatile cross-border bank lending in these countries. GARCH is a revision of the Bollerslev (1986) ARCH model, which requires fewer parameters to accurately explain the volatility process while sharing many of the same fundamental characteristics. Bollerslev (1986) developed the GARCH model to overcome the limitations and rigid assumptions of ARCH. The goal of the GARCH method is to identify volatility bands, providing a reliable tool for forecasting future volatility. Financial returns are usually modelled using the GARCH (p,q) parameters (Engle, 1982), which provide accurate estimates with relatively few parameters. This is a presentation of the GARCH model.

$$\sigma_t^2 = \omega + \sum_{i=1}^q (\alpha_i \varepsilon_{t-i}^2) + \sum_{j=1}^p (\beta_j \sigma_{t-j}^2) \quad (4.2)$$

Where ε_i represents the ARCH terms (previous period volatility shocks), The term " β_j " in GARCH stands for "the continued existence of volatility", ω is the constant term, q is the number of lagged errors (ε^2) and p is the number of lagged conditional variance terms (σ^2).

4.2.4.2.2 The Exponential GARCH (EGARCH) Model

The research used the EGARCH (1.1) model to analyse the dynamic effects of cross-border bank lending volatility on bank RoE in SANEK countries. The EGARCH model considers the asymmetry, persistence, and leverage effects commonly observed in financial time series data. By incorporating cross-border bank lending

volatility as a variable in the model, the study aimed to evaluate its impact on the RoE of banks in SANEK countries. This study is significant as it provides insights into the potential risks and vulnerabilities in the banking sector resulting from cross-border lending volatility. Understanding the impact of such volatility on bank RoE can help legislators and regulators make informed decisions to ensure the stability and resilience of the financial system. Furthermore, the findings of this study can assist banks in managing their exposure to cross-border lending and devising strategies to mitigate potential risks. Nelson introduced the logarithmic form of the variance equation when he developed the EGARCH model in 1991. Due to its lack of parameter restrictions, the EGARCH model is more practical for estimating two parameters.

$$\ln(\delta^2) = \omega + \sum_{i=1}^p \alpha_i \left| \frac{\mu-1}{\sigma_{t-1}} - E \left(\frac{\mu-1}{\sigma_{t-1}} \right) \right| + \sum_{j=1}^q \beta_j \ln(\delta^2_{t-j}) + \sum_{k=1}^r \gamma_k \frac{\mu-k}{\sigma_{t-k}} \quad (4.3)$$

No matter the value of the coefficient on the right side of Equation (4.3), δ^2_t is always positive. On the left side of the equation, the logarithmic conditional variance allows negative coefficients, which is not allowed in the GARCH model. This increases the flexibility of the solution process. The influence of the EGARCH model is quantified exponentially rather than quadratically. This is as long as the equation contains unsymmetrical terms $\gamma \neq 0$ in the model.

4.2.4.2.3 The Threshold GARCH (TGARCH) model

The TGARCH (1.1) model is applied to investigate the effects of cross-border bank lending volatility on bank RoE in SANEK countries. The TGARCH model is chosen because it captures the asymmetry and nonlinearities in the relationship between cross-border bank lending volatility and bank RoE. Additionally, it helps identify the threshold level at which this relationship may change. This information is crucial for understanding the potential risks and implications of cross-border bank lending on financial profitability. By analysing this relationship, policymakers and banking institutions can better understand the impact of excessive volatility in cross-border bank lending on the financial system. The TGARCH model identifies threshold effects through regimes or shifts in variance. For a deeper understanding of volatility asymmetry, refer to Zakoian (1994). The equation presented is the result of incorporating the simulated variables into the initial model.

$$d_{t-1} = \{1, \mu_{t-1} < 0\}$$

$$\{0, \mu_{t-1} \geq 0\} \quad (4.5)$$

The TGARCH variance equation is expressed as follows:

$$\delta^2 = \omega + \sum_{i=1}^p \alpha_i \mu^2_{t-1} + \sum_{i=1}^p \beta_j \delta^2_{t-j} + \sum_{k=1}^r \gamma_k \mu^2_{t-k} d_{t-k} \quad (4.6)$$

According to equation (6.5), the value of δ^2_t is influenced by the values of the squared residual μ^2_{t-1} of the previous period δ^2_{t-1} and its conditional variance. Additionally, the model is affected differently by positive and negative market shocks. The model's asymmetric effect is represented by $\gamma_k \mu^2_{t-k} d_{t-k}$. There will always be asymmetry in the time series if the asymmetry coefficient is not zero. When adverse shocks suddenly show, $\mu_{t-1} < 0$ and $d_{t-1} = 1$. When positive shocks occur $\mu_{t-1} \geq 0$ and $d_{t-1} = 0$. If $\gamma > 0$, the series has a leverage effect. The asymmetric impact, however, lessens volatility if $\gamma < 0$.

4.2.4.3 Test for ARCH Effect and Lagrange Multiplier (LM) Test

The null hypothesis of no ARCH effect (serial correlation) in the bank RoE series must be rejected before implementing the GARCH model. To conduct the LM test for ARCH in the residuals μ_t of the estimated mean equation, use the following equation. This tests the null hypothesis that there is no statistically significant ARCH influence in the estimated mean equation.

$$\xi^2_0 = \psi_0 + \sum_{t=1}^q \pi_l \xi^2_{t-1} + \mu_t \quad (4.7)$$

By allowing ε_t in each variance equation to follow different distributions (normal, student's t, and generalized error), we estimate volatility models. We use the Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC) to determine the most appropriate model for each bank's RoE. To assess the resilience of the computed models, we examine serial correlation in the residuals using Q-Statistics (correlogram of residuals). We also investigate the presence of the leverage effect in the asymmetric models by testing the null hypothesis. The existence of the leverage effect is implied if the null hypothesis is rejected.

4.2.4.4 Test for stationarity

In 1979, Dickey and Fuller developed the Augmented Dickey-Fuller (ADF) test model. The ADF test statistics were used to test the individual unit root properties of

time series data before estimating the models. These checks are important as they help to understand structural breaks, trends, and stationarity (Brooks, 2008). Assessing trends and stationarity also helps determine the reliability and validity of the data, leading to accurate results in the subsequent modelling process.

4.2.4.5 Correlation coefficient

In statistics, a correlation is a linear relationship between two continuous variables (Mukaka, 2012). It ranges from -1 to 1, where -1 indicates a perfect negative correlation and 1 indicates a perfect positive correlation. The degree and direction of correlation can help scholars predict outcomes or draw conclusions from data. However, correlation does not necessarily imply causation, as other factors may influence the relationship between the variables.

4.3 Analysis and Results

This section presents the data analysis results for individual SANEK countries. The first results are descriptive statistics, followed by a correlation analysis, stationary tests, the ARCH effect test, the LM test, and the results and discussion of the analysis of the symmetric GARCH (1,1) model and asymmetric GARCH models (such as EGARCH (1,1) and TGARCH (1,1)).

4.3.1 Descriptive Statistics

Descriptive data analysis was conducted to provide a summary of the variables modelled for each SANEK country bank RoE.

South Africa

Table 4.1 presents descriptive statistics for the observation period from 2000Q1 to 2021Q4. The RoE has a mean of 14.33, indicating a moderate average return for banks in South Africa, with a standard deviation of 6.30, suggesting a notable spread in profitability. The BLV has a mean of 10.21, reflecting the average level of volatility in cross-border lending, and a standard deviation of 3.34, indicating moderate variation. The CR has a mean of 3.45, implying relatively low average credit risk, with a standard deviation of 1.28, showing a low spread between risk levels. The LR has a mean of 16.53 and a standard deviation of 4.36, suggesting moderate variation in liquidity risk among banks.

Table 4.1: South Africa Bank RoE Descriptive Statistics.

Description	RoE	BLV	CR	LR	BS	EXR	INF
Mean*	14.33456	10.20536	3.451724	16.53105	98.26459	86.78563	108.6221
Median*	14.51610	11.57272	3.300000	17.38208	99.30992	83.77000	102.4500
Maximum*	28.91479	15.68299	5.900000	22.09582	100.0000	108.9900	174.9900
Minimum*	4.570380	0.000000	1.100000	4.559288	90.46090	64.68000	59.54000
Standard Deviation	6.297763	3.339081	1.282608	4.357753	2.668741	11.61304	34.85080
Skewness	0.527419	-1.095368	0.086721	-0.807868	-1.934729	0.194867	0.330938
Kurtosis	2.873049	3.563794	2.205280	3.034268	5.017023	1.873301	1.782723
Jarque-Bera (JB)	4.091895	18.54980	2.398525	9.467684	69.02392	5.152373	6.959436
Probability	0.129258	0.000094	0.301416	0.008793	0.000000	0.076064	0.030816
Observations	88	88	88	88	88	88	88

Source: Authors' Estimation using EViews 12.

The BS has a mean of 98.26, indicating that the average size of banks is close to the maximum (100), with a standard deviation of 2.67, meaning banks are similar in size. The EXR has a mean of 86.79, with a standard deviation of 11.61, suggesting relatively high fluctuations in exchange rates. Lastly, the INF has a mean of 108.62, reflecting high inflation risks, with a standard deviation of 34.85, indicating significant volatility in inflation levels.

The skewness values for South Africa's banking sector indicators reveal varying degrees of asymmetry in their distributions. The RoE has a skewness of 0.53, indicating positive skewness, meaning that more banks have RoE values lower than the mean. BLV has a skewness of -1.10, reflecting a negative skew that implies a longer left tail with lower BLV values. CR has a skewness of 0.09, suggesting a nearly normal distribution. LR has a skewness of -0.81, indicating negative skewness, meaning that lower liquidity risks are more common. BS has a skewness of -1.93, showing a highly negative skew, indicating that most banks are close to maximum bank size. EXR has a skewness of 0.19, suggesting a near-normal distribution. Finally, INF has a skewness of 0.33, indicating a slight positive skew, suggesting that occurrences of higher inflation risk are somewhat more frequent.

The kurtosis values for South Africa's banking sector indicators offer insights into the tail heaviness of their distributions. The RoE has a kurtosis of 2.87, which is close to 3, indicating a distribution that is nearly normal. BLV has a kurtosis of 3.56, making it slightly leptokurtic, suggesting the presence of more extreme values in lending volatility. CR has a kurtosis of 2.21, classifying it as platykurtic, meaning the distribution has flatter tails with fewer extreme values. LR has a kurtosis of 3.03, which is near normal, indicating a balanced spread of liquidity risk values. BS has a kurtosis

of 5.02, making it leptokurtic, suggesting that bank sizes are tightly clustered around the mean with a few extreme values. EXR has a kurtosis of 1.87, classifying it as platykurtic, indicating fewer extreme variations in exchange rate risk. Lastly, INF has a kurtosis of 1.78, which is also platykurtic, suggesting that inflation risk is more evenly distributed with fewer extreme fluctuations.

Nigeria

Table 4.2 presents an analysis of the mean and standard deviation for key financial indicators in Nigeria's banking sector. The RoE has a mean of 14.16, which is slightly lower than in South Africa, and a standard deviation of 6.64, indicating significant variation in bank profitability. BLV has a mean of 5.26, suggesting lower average volatility in cross-border lending compared to South Africa, while its standard deviation of 3.74 reflects moderate dispersion. CR has a mean of 12.73, which is significantly higher than in South Africa, indicating a riskier credit environment, with a standard deviation of 8.08 that highlights a widespread change in credit risk levels. LR has a mean of 45.54, much higher than South Africa's 16.53, pointing to greater liquidity risk concerns, and a standard deviation of 21.77 shows considerable variation among Nigerian banks. BS has a mean of 75.71, suggesting that Nigerian banks are smaller compared to those in South Africa, with a standard deviation of 23.75 reflecting substantial diversity in bank sizes. EXR has a mean of 232.80, significantly higher than South Africa's 86.79, indicating greater exchange rate volatility. Its exceptionally high standard deviation of 1253.96 suggests extreme fluctuations. Lastly, the INF has a mean of 87.35, which is lower than in South Africa, with a standard deviation of 31.96 reflecting notable variability in inflation levels.

Table 4.2: Nigeria Bank RoE Descriptive Statistics.

Description	RoE	BLV	CR	LR	BS	EXR	INF
Mean*	14.15836	5.256141	12.73114	45.54075	75.71416	232.7952	87.35409
Median*	13.04622	4.207288	10.53843	43.15789	89.90356	99.81000	97.66000
Maximum*	34.09249	16.87156	37.30000	91.54425	100.0000	11861.00	136.1300
Minimum*	-2.539460	0.000000	1.393390	10.66465	33.41555	64.03000	27.29000
Standard Deviation	6.6366788	3.744523	8.080573	21.76919	23.75111	1253.957	31.95586
Skewness	0.709592	0.904484	0.623694	0.182056	-0.698145	9.217049	-4.11008
Kurtosis	4.282965	3.242036	2.687848	1.647555	1.872991	85.97360	1.806496
Jarque-Bera (JB)	13.42031	12.21347	6.062526	7.192843	11.80583	26489.60	7.700595
Probability	0.001218	0.002228	0.048255	0.027422	0.002731	0.000000	0.021273
Observations	88	88	88	88	88	88	88

Source: Authors' Estimation using EViews 12.

The skewness values for indicators in Nigeria's banking sector demonstrate varying degrees of asymmetry in their distributions. The RoE has a skewness of 0.71, indicating a positive skew; this suggests that more banks have RoE values below the mean. The BLV has a skewness of 0.90, also positively skewed, which implies a tendency for lower values with occasional significant spikes in volatility. The CR shows a skewness of 0.62, indicating a higher frequency of lower credit risk values. The LR has a skewness of 0.18, which is close to zero, suggesting a roughly symmetrical distribution. The BS exhibits a skewness of -0.70, indicating negative skewness, with larger banks being more prevalent than smaller ones. The EXR has a highly positive skewness of 9.22, reflecting extreme upward fluctuations in exchange rate risk. Finally, the INF has a significant negative skewness of -4.11, suggesting a higher frequency of lower inflation risk values.

The kurtosis values for Nigeria's banking sector indicators reveal varying degrees of tail heaviness. The RoE has a kurtosis of 4.28, indicating a slight leptokurtic distribution, which suggests a moderate occurrence of extreme RoE values. The BLV has a kurtosis of 3.24, close to a normal distribution, but with a slight peak that indicates some mild outliers. The CR shows a kurtosis of 2.69, suggesting a platykurtic distribution with fewer extreme variations in credit risk. The LR has a kurtosis of 1.65, reflecting a platykurtic distribution with fewer extreme liquidity risk values. The BS exhibits a kurtosis of 1.87, indicating a platykurtic distribution and suggesting a relatively even spread between bank sizes. In contrast, the EXR has a remarkably high kurtosis of 85.97, which is extremely leptokurtic, signalling significant outliers and extreme fluctuations in exchange rate risk. Lastly, the INF has a kurtosis of 1.81, also indicating a platykurtic distribution, which shows that inflation risk values are more evenly spread with fewer extreme cases.

Egypt

Table 4.3 illustrates that Egypt's banking sector exhibits patterns similar to those of Nigeria and South Africa, yet notable differences in variability exist. The RoE in Egypt has a mean of 13.89 and a standard deviation of 4.32, indicating moderate variability in bank profitability. This is comparable to Nigeria, although Egypt shows lower variation than South Africa. The BLV has a mean of 5.22 and a relatively high standard deviation of 3.72, reflecting fluctuations in cross-border lending that are

similar to Nigeria but less pronounced than those in South Africa. The CR in Egypt averages 13.30 with a standard deviation of 6.11, demonstrating moderate variation in credit risk levels, which is higher than in South Africa but lower than in Nigeria. The LR in Egypt has a mean of 41.87 and a standard deviation of 15.53, indicating high variability in liquidity risk across banks. This level is higher than that of South Africa but more stable than in Nigeria. The BS in Egypt shows a mean of 75.26 and a standard deviation of 7.30, reflecting relatively low variability in bank sizes. The EXR has a mean of 22.80, accompanied by an extremely high standard deviation of 99.55, which indicates substantial fluctuations in exchange rates, albeit lower than Nigeria's extreme values. Finally, the INF in Egypt has a mean of 133.71 with a standard deviation of 89.73, signifying significant variations in inflation levels that are higher than those in both South Africa and Nigeria, with considerable variability.

Table 4.3: Egypt Bank RoE Descriptive Statistics.

Description	RoE	BLV	CR	LR	BS	EXR	INF
Mean*	13.89437	5.221872	13.30341	41.87179	75.26072	22.80375	133.7083
Median*	13.85622	4.242634	11.25000	39.25123	72.02649	9.205000	105.5450
Maximum*	25.00861	16.87156	26.50000	66.87931	89.61091	944.0000	328.6700
Minimum*	6.257828	0.000000	6.200000	14.77554	65.28222	4.540000	41.95000
Standard Deviation	4.316731	3.721700	6.113720	15.52606	7.300359	99.54739	89.73083
Skewness	0.402576	0.897881	0.638700	0.148093	0.652447	9.158397	0.890680
Kurtosis	2.747782	3.288221	2.059403	1.858308	1.865662	85.25800	2.422810
Jarque-Bera (JB)	2.610245	12.12872	9.227069	5.101022	10.96140	26040.24	12.85677
Probability	2.610245	0.002324	0.009917	0.078042	0.004166	0.000000	0.001615
Observations	88	88	88	88	88	88	88

Source: Authors' Estimation using EViews 12.

The skewness values for Egypt's banking sector indicators reveal various asymmetries in their distributions. The RoE has a skewness of 0.40, indicating a slight right skew, suggesting that most banks have RoE values close to the mean, with a few higher outliers. The BLV shows a skewness of 0.90, indicating positive skewness with occasional large spikes in cross-border lending volatility. The CR indicator has a skewness of 0.64, indicating a greater occurrence of lower credit risk values, accompanied by some higher outliers. The LR exhibits a skewness of 0.15, revealing a nearly symmetric distribution. The BS has a skewness of 0.65, suggesting that smaller banks are more prevalent in Egypt. The EXR displays a skewness of 9.16, which is highly positively skewed, indicating extreme fluctuations in exchange rates. Finally, the INF indicator shows a skewness of 0.89, suggesting a generally moderate inflation rate, with a few extreme high values.

The kurtosis values for indicators of Egypt's banking sector reveal the tail characteristics of their distributions. The RoE has a kurtosis of 2.75, which is close to normal, indicating a typical distribution with moderate tail heaviness. The BLV exhibits a kurtosis of 3.29, which is slightly leptokurtic, suggesting the presence of a few large outliers in its distribution. The CR shows a kurtosis of 2.06, indicating a platykurtic distribution with fewer extreme values in credit risk. LR has a kurtosis of 1.86, which is also platykurtic, suggesting that liquidity risk values are evenly distributed. The BS has a kurtosis of 1.87, reflecting a platykurtic distribution with minimal extreme bank sizes. The EXR has an exceptionally high kurtosis of 85.26, categorising it as highly leptokurtic, indicating significant fluctuations in exchange rates and the presence of extreme outliers. Lastly, the INF has a kurtosis of 2.42, which is near normal, suggesting moderate tail heaviness with a few extreme values.

Kenya

Kenya's banking sector demonstrates variable performance across key indicators. The average RoE is 19.06, with a standard deviation of 5.13, indicating moderate variability. This performance is higher than that of South Africa, Nigeria, and Egypt, yet still suggests stable lending conditions. The BLV shows significant fluctuation, with a mean of 0.358 and a standard deviation of 0.270. In terms of CR, Kenya has a mean of 13.43 and a standard deviation of 8.81, revealing a wide variation in credit risk levels among its banks. This is comparable to Egypt but exhibits greater variability. The BS in Kenya averages 70.64, with a standard deviation of 11.14, indicating some dispersion in bank sizes, although this is lower than in other countries. The EXR is relatively high but stable compared to Egypt and Nigeria, with a mean of 124.94 and a standard deviation of 18.00, suggesting moderate volatility. Finally, the INF in Kenya has a mean of 131.53 and a standard deviation of 90.41, indicating significant fluctuations and potential volatility, similar to Egypt.

The skewness values for Kenya's banking sector indicators reveal varying degrees of asymmetry in their distributions. The RoE has a skewness of -0.32, indicating a slight negative skew, with more values above the mean. The BLV exhibits a skewness of 0.90, demonstrating positive skewness and a tendency for more frequent lower values. The CR has a moderately positive skewness of 1.03, suggesting that higher values dominate the distribution. The LR shows a skewness of

0.24, indicating a slight positive skew and a near-normal distribution. The BS indicator has a skewness of -0.14, suggesting an almost symmetric distribution. The EXR has a skewness of 0.08, indicating a nearly symmetric distribution as well. Finally, the INF indicator, with a skewness of 0.93, is positively skewed, implying a prevalence of lower values alongside some extreme high values.

Table 4.4: Kenya Bank RoE Descriptive Statistics.

Description	RoE	BLV	CR	LR	BS	EXR	INF
Mean*	19.05682	0.358150	13.43254	27.15928	70.63701	124.9417	131.5256
Median*	20.14334	0.303963	10.71009	28.69308	71.30502	126.5450	105.6200
Maximum*	32.94696	1.106598	32.90000	52.78593	86.43901	158.3500	371.9800
Minimum*	4.180480	0.000000	3.300000	11.76863	48.65394	97.33000	27.90000
Standard Deviation	5.130592	0.270760	8.811120	9.649262	11.13512	18.00002	90.41382
Skewness	-0.322282	0.896395	1.034932	0.241873	-0.137983	0.077404	0.928707
Kurtosis	3.683536	3.114756	2.766067	2.181442	1.728042	1.725704	2.873866
Jarque-Bera (JB)	3.236504	11.83330	15.90991	3.314839	6.211460	6.041918	12.70829
Probability	1.198245	0.002694	0.000351	0.190630	0.044792	0.048754	0.001740
Observations	88	88	88	88	88	88	88

Source: Authors' Estimation using EViews 12.

The kurtosis values for Kenya's banking sector indicators indicate varying degrees of peakiness in their distributions. The RoE has a kurtosis of 3.68, suggesting a slightly leptokurtic distribution with heavier tails than a normal distribution. The BLV has a kurtosis of 3.11, which is near a normal distribution. The CR shows a kurtosis of 2.77, indicating it is close to normal but slightly platykurtic, with flatter tails. The LR has a kurtosis of 2.18, reflecting a platykurtic distribution with lower tail risks. Both the BS and EXR have kurtosis values of 1.73, indicating flatter tails than normal and lower tail risks. Lastly, the INF has a kurtosis of 2.87, which is also close to a normal distribution.

4.3.2 Correlation Coefficients

A correlation analysis is necessary to identify multicollinearity among the independent variables. To determine if independent predictors and bank RoE can be traded off, a pairwise correlation matrix was used. According to Gujarati (2003), multicollinearity decreases when the correlation coefficient between independent variables exceeds 0.95. The larger the coefficient size, regardless of direction, the more significant the potential pitfalls (Hoje, 2016). Table 4.5 (a, b, c, and d) displays the correlation matrix for all variables.

Table 4.5 (a): South Africa summary of the correlation test.

Variables	RoE	BLV	CR	LR	BS	EXR	INF
RoE	1.000000						
BLV	0.327379	1.000000					
CR	-0.296417	0.373315	1.000000				
LR	0.563016	0.717865	0.040685	1.000000			
BS	0.559446	0.781384	0.180102	0.702118	1.000000		
EXR	0.292115	-0.402824	-0.247194	0.009871	-0.049109	1.000000	
INF	-0.076618	0.663664	0.384890	0.251301	0.555261	-0.647511	1.000000

Source: Authors' computation using EViews 12.

The correlation analysis in Table 4.5 (a) for South Africa examines the links between bank RoE and key financial risks. The results indicate that BLV, LR, BS, and EXR positively correlate with RoE, suggesting that increased market activity, liquidity, and larger bank sizes contribute to higher returns. Conversely, CR and INF show negative correlations with RoE, implying that higher default risks and inflationary pressures reduce profitability. Notably, BLV exhibits strong correlations with BS (0.78) and LR (0.72), indicating potential multicollinearity, though all independent variable correlations remain below 0.95, suggesting it is not severe. These findings highlight the interconnected nature of banking risks and returns, emphasising the importance of risk management in maintaining financial stability.

Table 4.5 (b): Nigeria summary of the correlation test.

Variables	RoE	BLV	CR	LR	BS	EXR	INF
RoE	1.000000						
BLV	-0.371389	1.000000					
CR	0.302785	-0.067081	1.000000				
LR	0.468305	0.112795	0.282245	1.000000			
BS	-0.768875	0.511223	-0.239074	-0.439125	1.000000		
EXR	-0.078849	0.076392	-0.139095	-0.016834	0.101265	1.000000	
INF	-0.666912	0.038872	-0.668736	-0.668736	0.616872	0.119184	1.000000

Source: Authors' computation using EViews 12.

The correlation analysis in Table 4.5 (b) for Nigeria examines the relationships between bank RoE and various financial risks. The results reveal that BLV, BS, EXR, and INF negatively correlate with RoE, suggesting that increased volatility, larger bank size, exchange rate fluctuations, and inflationary pressures hinder profitability. In contrast, CR and LR positively correlate with RoE, indicating that managed credit exposure and liquidity may enhance returns. Notably, INF exhibits strong correlations with both LR (-0.6687) and CR (-0.6687), suggesting potential multicollinearity. However, since all independent variable correlations remain below 0.95, the issue is not severe. These findings highlight the distinct financial risk dynamics in Nigeria,

emphasising the need for effective risk mitigation strategies to enhance banking sector performance.

Table 4.5 (c): Egypt summary of the correlation test.

Variables	RoE	BLV	CR	LR	BS	EXR	INF
RoE	1.000000						
BLV	0.291132	1.000000					
CR	-0.797950	-0.664741	1.000000				
LR	0.355243	0.411760	-0.389894	1.000000			
BS	0.452997	0.355372	-0.555282	0.772618	1.000000		
EXR	-0.024616	0.101253	-0.084101	0.001082	-0.090773	1.000000	
INF	0.500546	0.725640	-0.760849	0.744400	0.844656	0.028226	1.000000

Source: Authors' computation using EViews 12.

The correlation analysis in Table 4.5 (c) for Egypt shows the relationships between bank RoE and key financial risks. The results indicate that BLV, LR, BS, and INF positively influence RoE, suggesting that increased market activity, liquidity, and inflationary pressures contribute to higher returns. Conversely, CR and EXR negatively affect RoE, implying that higher credit risk and exchange rate fluctuations reduce profitability. The correlation between INF and CR is particularly high at 0.76, indicating a strong relationship between these two variables. However, all correlations between independent variables remain below 0.95, indicating no significant multicollinearity in the model. These results emphasise the importance of managing credit and exchange rate risks while leveraging liquidity and inflation factors to enhance bank profitability in Egypt.

Table 4.5 (d): Kenya summary of the correlation test.

Variables	RoE	BLV	CR	LR	BS	EXR	INF
RoE	1.000000						
BLV	-0.088235	1.000000					
CR	-0.198058	-0.464178	1.000000				
LR	-0.330321	-0.402838	0.610010	1.000000			
BS	-0.528905	0.115802	0.171302	0.218939	1.000000		
EXR	-0.035904	0.786052	-0.421520	-0.479290	0.347838	1.000000	
INF	-0.224065	0.811742	-0.324045	-0.234166	0.548478	0.886705	1.000000

Source: Authors' computation using EViews 12.

The correlation analysis in Table 4.5 (d) for Kenya reveals the relationships between bank return on equity RoE and various financial risks. The results indicate that BLV, CR, LR, BS, EXR, and INF all negatively affect RoE, suggesting that higher risks in these areas lead to lower profitability for banks. Among the independent variables, INF and EXR exhibit the highest correlation at 0.89, followed by the correlation between INF and BLV at 0.81. Despite these strong correlations, all independent variables have correlations below 0.95, indicating no severe

multicollinearity in the model. These findings underscore the importance of managing these risks to maintain stable and profitable banking operations in Kenya.

4.3.3 Test for stationarity

Table 4.6 indicates that all null hypotheses regarding the presence of a unit root are rejected, with p-values less than 5 percent. This suggests that the variables in South Africa, Nigeria, Egypt, and Kenya do not exhibit a unit root and are therefore stationary.

In South Africa, RoE, BLV, CR, LR, EXR, and INF are all non-stationary at level $I(0)$, however BS is stationary at a 5% significance level. All variables become stable at 5% significance following initial differencing $I(1)$. Implications: According to the Financial Accelerator Model (Bernanke et al., 1999), which describes how financial shocks intensify business cycles, the non-stationarity of RoE and BLV points to sustained bank profitability and volatility in cross-border lending. The Too Big to Fail Hypothesis is supported by the stationarity of BS at $I(0)$, which points to a stable financial system (Mishkin, 1999). In Nigeria RoE, BLV, LR, BS, and INF are non-stationary at level $I(0)$, however CR and EXR are stationary at 5% significance. All variables become stable at 1% significance following initial differencing $I(1)$. The implications are according to Merton's (1974) Structural Credit Risk Model, Nigerian banks swiftly adapt to risk exposure, as seen by the stationarity of CR at $I(0)$. Stiglitz & Weiss's (1981) asymmetric information theory is supported by the high persistence of BLV and RoE, which indicates the banking sector's susceptibility and high sensitivity to external shocks.

In Egypt, since none of the variables are stationary at level $I(0)$, they all need to be differentiated. All variables become stable at 5% significance following initial differencing $I(1)$. The implications are that, according to Modern Portfolio Theory (Markowitz, 1952), the non-stationarity of RoE, BLV, and CR indicates that risk metrics and returns in the banking industry are extremely persistent. Based on Friedman's (1968) Adaptive Expectations Hypothesis, high volatility in INF implies long-term effects of monetary policy changes. Furthermore, Keynes' (1936) Liquidity Preference Theory is supported by the poor stationarity of Liquidity Risk (LR), which points to ongoing liquidity limitations. In Kenya, RoE, CR, LR, BS, and INF are non-stationary at level $I(0)$, but BLV and EXR are stationary at 5% significance. All variables become

stable at 5% significance following initial differencing I(1). The implications are that the Efficient Market Hypothesis (Fama, 1970) is supported by the stationarity of BLV and EXR at I(0), which indicates that financial markets respond to volatility instantly. Basel III restrictions are supported by the non-stationarity of RoE, which draws attention to erratic banking earnings and raises questions about financial stability. Furthermore, CR and LR's persistence suggests continued financial fragility, which is consistent with Diamond & Dybvig's (1983) Bank Run Model. In summary, inflation volatility is high in Egypt and Nigeria, which supports Friedman's (1968) Adaptive Expectations Theory and indicates ineffective monetary policy. According to Cassel's 1918 theory of purchasing power parity, the stationary EXR in Nigeria and Kenya at I(0) shows that foreign currency fluctuations have an instantaneous effect on banks. In line with Merton's (1974) Structural Credit Risk Model, Nigeria's stationary CR at I(0) shows how rapidly banks may adapt to credit risks. In South Africa, Nigeria, and Kenya, non-stationary LR demonstrate ongoing liquidity limitations, bolstering Keynes' (1936) Liquidity Preference Theory.

Table 4.6: ADF Unit Root Results.

Variables	South Africa		Nigeria		Egypt		Kenya	
	ADF Test		ADF Test		ADF Test		ADF Test	
	t-statistic	Critical Value (5%)	t-statistic	Critical Value (5%)	t-statistic	Critical Value (5%)	t-statistic	Critical Value (5%)
Status I(0)								
RoE	-2.415446	-3.463547	-2.655849	-3.462292	-0.927349	-3.464865	-2.013011	-3.465548
BLV	-2.673797	-3.463547	-3.030864	-3.462292	-2.505120	-3.462292	-3.611855**	-3.157836
CR	-2.575830	-3.463547	-3.539216**	-3.463547	-2.597563	-3.466966	-1.712362	-3.468459
LR	-1.769040	-3.465548	-1.570349	-3.464198	-3.518417*	-3.462912	-1.464292	-3.468459
BS	-3.890070**	-3.466248	-1.906263	-3.463547	-1.574745	-3.462912	-2.346803	-3.462912
EXR	-2.98982	-3.462912	-9.445921***	-3.462292	-9.324248***	-3.462292	-3.411262**	-3.462292
INF	-0.964134	-3.462292	-1.942253	-3.462292	-0.680329***	-3.462292	-3.591219*	-3.465548
Status I(1)								
RoE	-4.461968***	-3.463547	-11.06700***	-3.462912	-5.158012***	-3.464865	-4.669331***	-3.462912
BLV	-14.77957***	3.463547	-10.98442***	-3.462912	-10.63161***	-3.462912	-6.526863***	-3.462912
CR	-4.422441***	-3.463547	-7.408650***	-3.462912	-4.832925***	-3.464865	-4.080021***	-3.468459
LR	-5.081871***	-3.464198	-4.029865***	-3.467703	-2.393531	-3.462912	-2.450202	-3.468459
BS	-4.524171***	-3.469235	-5.773000***	-3.463547	-13.49412***	-3.462912	-3.528329**	-3.462912
EXR	-7.415463***	-3.462912	-8.885426***	-3.464198	-8.883427***	-3.464198	-8.920269	-3.462912
INF	-6.675498***	-3.462912	-9.735655***	-3.462912	-4.984774***	-3.463547	-2.869540	-3.464865

Note. (***) , (**), (*), indicate significant at 1%, 5%, 10%. All the variables are log linearized.

It is possible to estimate GARCH models because all variables are stationary at all levels. Therefore, GARCH-type models can be reliably estimated using these variables throughout the observed period from 2000Q1 to 2021Q4.

4.3.4 Test for ARCH Effect

Tests for conditional heteroscedasticity are required to determine serial correlation in SANEK Bank RoE data. Further analyses were conducted to confirm the most suitable model. The effects of variance heterogeneity at 5 percent are shown in Table 4.7 on the first-order difference in SANEK Bank RoE, supporting the existence of the ARCH effect in SANEK Bank data. Table 4.7 summarises the findings of the ARCH test.

Table 4.7: Heteroscedasticity Test (ARCH LM test) results

Description	South Africa	Nigeria	Egypt	Kenya
F-statistics	20.75525	8.031452	27.00847	41.69379
Probability F-statistics	0.0000***	0.0058****	0.0000***	0.0000***
Observed R-squared	17.03926	7.505096	20.97821	28.52700
Pro. Chi-square (1)	0.0000***	0.0062***	0.0000***	0.0000***

***, **, * indicate the significance level at 1%, 5% and 10%, respectively

Source: Authors' Estimation using EViews 12.

As shown in Table 4.7, the data can be estimated using GARCH-type models, including standard GARCH, EGARCH, and TGARCH, which are based on the ARCH effect.

4.3.5 Autocorrelation Test

Ljung-Box Q (LBQ) statistics were used to test the correlation of squared residuals. In Figures 4.2 and 4.3 (refer to the appendix), Q-statistics are used to detect autocorrelation and are associated with probability values. If the probability value is greater than 0.05 and there is autocorrelation in the sequence, the null hypothesis is rejected. It is evident from the Q-statistics in the appendix that all the p-values are less than 5 percent, indicating a significant ARCH effect on bank RoE.

4.3.6 Empirical Results and Discussion

4.3.6.1 Results and Interpretation

The study used GARCH-type models to analyse the effect of cross-border lending volatility on bank RoE in SANEK countries. The GARCH (1,1), EGARCH (1,1), and

TGARCH (1,1) models produced comparable and reliable results, indicating that cross-border lending volatility affects bank profitability. However, the GARCH (1,1) model may not fully capture the potential risks and challenges associated with cross-border bank lending volatility. In contrast, the EGARCH and TGARCH models account for these effects by incorporating asymmetric reactions to positive and negative volatility shocks, allowing for a more comprehensive examination of the dynamics involved. The results of the GARCH (1,1) model can be found in Table 4.8, the EGARCH (1,1) model in Table 4.10, and the results of the TGARCH (1,1) model in Table 4.12.

4.3.6.2 The GARCH Estimation Results

Following the LM test, a symmetric GARCH (1,1) model is used to determine the best-fit model for each country. In South Africa and Egypt, the Student's t-distribution is used, while in Nigeria and Kenya, a normal distribution is employed. The results in Table 4.8 show that the mean equation of the model demonstrates a positive and significant effect of the lagged variable RoE on bank RoE.

The results in Table 4.8 show that the coefficients for South Africa, Nigeria, Egypt, and Kenya are all positive. This indicates a positive relationship between the previous period's RoE and the current period's RoE for these countries. The study suggests that a higher RoE in the previous period is linked to a higher RoE in the current period for African countries. This information is valuable for investors and legislators.

The mean estimate results in Table 4.8 reveal that BLV has a positive but insignificant effect on bank RoE in South Africa and Egypt. In Nigeria, on the other hand, BLV has a negative and significant impact on bank RoE, while in Kenya, it is negative but insignificant. These findings indicate that BLV affects bank RoE differently in SANEK. Despite the positive correlation, the absence of statistical significance in South Africa and Egypt suggests that other factors may have a greater influence. Conversely, the negative and significant impact in Nigeria suggests that banks there are more susceptible to fluctuations in cross-border lending. In Kenya, the negative yet insignificant impact of BLV on bank RoE implies that its effect is relatively weak. To mitigate the adverse effects of cross-border bank lending volatility on bank RoE, it is necessary to implement country-specific policies and risk management strategies. This can be seen as a potentially valuable contribution to the existing literature.

Table 4.8: Estimation of results using the GARCH (1.1).

	South Africa		Nigeria		Egypt		Kenya	
Method	Student t		Normal Dist.		Student t		Normal Dist.	
Variables	Coefficient	Pro.	Coefficient	Pro.	Coefficient	Pro.	Coefficient	Pro.
C	-44.97354	0.0000***	8.814661	0.0000***	1.750225	0.3997	2.769601	0.0742*
RoE(-1)	0.780518	0.0000***	0.777395	0.0000***	0.934817	0.0000***	0.814749	0.0000***
BLV	0.008700	0.9104	-0.191558	0.0000***	0.026858	0.3918	-0.579620	0.2025
CR	-0.254976	0.0018***	-0.084151	0.0000***	-0.029176	0.3758	0.023563	0.0108**
LR	-0.004821	0.8818	-0.013761	0.0026***	-0.004754	0.4174	-0.001034	0.9349
BS	0.482472	0.0000***	0.013761	0.1350	0.000357	0.9871	-0.017794	0.0756*
EXR	0.026198	0.0023***	3.18E-05	0.9430	-0.001542	0.0046***	0.023157	0.0035***
INF	-0.007636	0.1226	-0.042798	0.0003***	-0.002442	0.3937	-0.006261	0.0020***
Variance Equation								
C	0.135838	0.7210	0.267650	0.2122	0.016556	0.0000***	0.073450	0.1126
α	8.375706	0.7702	1.818978	0.0006***	1.453182	0.0000***	1.373307	0.0099***
β	0.090830	0.2625	0.035029	0.3100	-0.013599	0.8367	0.001849	0.9393
R ²	0.900007		0.818375		0.923939		0.906368	
Adj-R ²	0.891147		0.802282		0.917199		0.898071	
D-W	2.124068		2.019943		2.270615		0.672103	

***, **, * indicate the significance level at 1%, 5% and 10%, respectively

Source: Authors' Estimation using EViews 12.

Based on the mean equation results, credit risk (CR) is statistically significant and negative in South Africa and Nigeria at a 1% level. In Egypt, however, credit risk has a negative and insignificant impact on bank RoE. This suggests that banks in South Africa and Nigeria face higher credit risk, which could have a negative impact on their return on equity. Conversely, credit risk does not significantly affect bank RoE in Egypt. Notably, in Kenya, credit risk has a significant and positive effect on bank RoE at a 1% level. This underscores the significance of effective credit risk management for the profitability of banks in Kenya.

The findings demonstrate that liquidity risk (LR) has a negative impact on bank RoE in all SANEK countries. However, the link is statistically significant at the 1% level in Nigeria. This means that a 1% increase in LR will further worsen the negative effect on bank RoE in SANEK. These findings emphasise the significance of effectively managing liquidity risk to sustain healthy returns on equity for banks in SANEK countries. It implies that Nigerian banks must focus closely on liquidity risk management to minimise its detrimental impact on their profitability.

The data show that bank size (BS) has a positive and statistically significant effect at the 1% level in South Africa but is insignificant in Nigeria and Egypt. This indicates that BS has a beneficial impact on bank RoE. However, in Kenya, BS has a negative and statistically significant relationship at the 10% significance level. This suggests that bank size is generally associated with higher RoE in South Africa, Nigeria, and Egypt. However, in Kenya, banks tend to experience lower RoE. Overall, these findings suggest that bank size is a crucial factor in determining bank RoE in SANEK countries.

The results of the mean equation show that in South Africa, Nigeria, and Kenya, the exchange rate risk variables (EXR) have positive coefficients. These positive coefficients are statistically significant at the 1% level in South Africa and Kenya. However, the coefficient for EXR in Nigeria is not statistically significant. This suggests that banks in South Africa and Kenya are more exposed to exchange rate risk compared to banks in Nigeria. Therefore, it is important for banks operating in these countries to closely monitor and manage their exposure to exchange rate fluctuations to maintain a healthy RoE. However, it should be noted that exchange rate risk has a significant impact on the profitability of banks in these three countries. In contrast, EXR has a negative impact on the RoE of Egyptian banks. A 1% increase in EXR results in a 1% decrease in bank RoE. This highlights the vulnerability of Egyptian banks to changes in exchange rates. Overall, the analysis suggests that EXR plays a crucial role in determining bank RoE in SANEK.

The results show that inflation risk, or INF, is negative in all SANEK countries. However, it is statistically significant at the 1% level in Nigeria and Kenya. South Africa and Egypt, on the other hand, are statistically insignificant. This implies that INF has a negative impact on SANEK Bank's RoE. A 1% increase in inflation risk results in a decrease in bank RoE. This indicates that high inflation poses a significant threat to bank profitability in Nigeria and Kenya. Conversely, the lack of statistical significance in South Africa and Egypt suggests that inflation risk may not have a substantial impact on the bank's RoE in these countries. However, it is crucial for SANEK banks to closely monitor inflation trends and implement financial risk management plans to mitigate the potential negative effects on their profitability.

Estimation of Variance Equation: In South Africa, there are ARCH effects but no GARCH effects, as indicated by the GARCH (1, 1) model. The model also indicated that the p-values of α and β are both statistically insignificant. According to the results of the GARCH (1, 1) model, there are ARCH effects but no GARCH effects in Nigeria, Egypt, and Kenya. The p-value of α is statistically significant, while the p-value of β is statistically insignificant. This suggests that volatility in South Africa's financial market can be attributed to past shocks or unexpected events, rather than to the persistence of volatility itself. On the other hand, in countries such as Nigeria, Egypt, and Kenya, both ARCH and GARCH effects are present. This suggests that volatility in their financial markets is influenced by both past shocks and the persistence of volatility. These findings highlight the unique characteristics and dynamics of each country's financial market. It has been discovered that the sum of α and β is greater than one, indicating that SANEK's bank RoE is volatile. This is a potentially vital contribution to the literature. The Durbin-Watson statistics in South Africa, Nigeria, and Egypt show positive autocorrelation, indicating moderate to strong dependence between consecutive observations. However, in Kenya, the statistic is less than 2, indicating negative autocorrelation or a lack of dependence.

Table 4.9 confirms that the ARCH effect is not present in all models at a 5% significance level using the Chi-squared test. Additionally, the residuals exhibit homoscedasticity, indicating a good fit quality. This implies that the assumption of equal variances is met, indicating that the models accurately capture data volatility patterns.

Table 4.9: Diagnostic Test.

Description	South Africa	Nigeria	Egypt	Kenya
F-statistics	0.276934	1.947372	0.003963	0.86559
Probability F-statistics	0.6001	0.1665	0.9500	0.3549
Observed R-squared	0.282596	1.948564	0.004057	0.877129
Pro. Chi-square (1)	0.5950	0.1627	0.9492	0.3490

Source: Authors' Estimation using EViews 12.

Moreover, the non-rejection of the null hypothesis suggests that there is no evidence of systematic volatility clustering beyond chance. These findings support the reliability and appropriateness of ARCH models in explaining the observed volatility in the data.

4.3.6.3 The EGARCH Estimation Results

The EGARCH model is used in this study to estimate the effects of unpredicted shocks on the mean bank RoE. The conditional variance has been subjected to a log transformation. An asymmetric EGARCH model is utilised, relying on the LM test. Students' t distributions are used when the data does not fit conventional normal distributions. The appropriate model and distribution are chosen using the Maximum Loglikelihood approach, with AIC/BIC values consistent with those in previous studies (Franses and Van Dijk, 1996).

The RoE(-1) results in Table 4.10 indicate that the coefficients are 0.805322 for South Africa, 0.810573 for Nigeria, 0.929989 for Egypt, and 0.197026 for Kenya, all demonstrating positive and statistically significant bank RoE. The study indicates a strong correlation between the previous period's RoE and the current period's RoE for banks in these countries, providing valuable insights for investors and policymakers.

The estimated mean equation of cross-border bank lending volatility, or BLV coefficient, is asymmetrically positive and significant in Egypt at the 5% level, compared to South Africa. This implies that BLV has an asymmetric positive effect on bank RoE. This suggests that an increase in cross-border lending activity can result in higher profitability for banks in these countries. However, the study also found that this effect is nonlinear, suggesting that excessive volatility in cross-border lending may have diminished returns on bank profitability. Therefore, it can be concluded that the relationship between BLV and bank RoE differs between these two countries, with Egypt showing a stronger positive effect compared to South Africa. This implies that the banking systems in South Africa and Egypt respond differently to BLV. In Egypt, increased volatility in cross-border lending has a significant impact on bank profitability. On the other hand, in South Africa, the impact of such volatility on bank RoE might be relatively weaker. In Nigeria and Kenya, the cross-border bank lending volatility variables are statistically significant and asymmetrically adversely related to bank RoE at the 5% and 1% levels, respectively. This suggests that BLV asymmetry negatively impacts banks' RoE in Nigeria and Kenya. This implies that the increased risk and volatility associated with cross-border lending can lead to lower profitability for banks in these countries. This remark highlights the importance of managing and reducing BLV to sustain and enhance bank profitability in these countries. It is

essential for banks in Nigeria and Kenya to effectively address the factors contributing to BLV to mitigate its negative impact on their RoE. By implementing financial risk strategies to minimise cross-border bank lending volatility, banks can strive to achieve a higher bank RoE and enhance their overall financial performance.

Table 4.10: Estimation of results using the EGARCH Asymmetric Order 1 model.

	South Africa		Nigeria		Egypt		Kenya	
Method	Student t		Student t		Student t		Student t	
Variables	Coefficient	Pro.	Coefficient	Pro.	Coefficient	Pro.	Coefficient	Pro.
C	-39.20002	0.0013***	11.12879	0.0000***	1.694419	0.2888	29.18129	0.0000***
RoE(-1)	0.805322	0.0000***	0.810573	0.0000***	0.906020	0.0000***	0.197026	0.0000***
BLV	0.011772	0.9458	-0.001519	0.0270**	0.047902	0.0436**	-8.336449	0.0000***
CR	-0.529014	0.0001***	-0.168861	0.0000***	-0.034964	0.0870*	-0.026512	0.3172
LR	-0.027563	0.6376	-0.047669	0.0001***	-0.010073	0.0475**	-0.094274	0.0000***
BS	0.428380	0.0036***	0.009116	0.0011***	0.009750	0.6570	-0.205692	0.0000***
EXR	0.033129	0.0528**	6.52E-07	0.9990	-0.001385	0.2207	0.041693	0.0511**
INF	-0.008253	0.2730	-0.071762	0.0000***	-0.003518	0.1187	0.011996	0.0262**
Variance Equation								
C(9) = ω	-0.469518	0.1823	-1.139114	0.0242**	-2.328903	0.0000***	-0.230785	0.6797
C(10) = α	1.107819	0.0168**	2.020452	0.0001***	2.471898	0.0000***	2.372846	0.0000***
C(11) = λ	-0.233837	0.3619	-0.269192	0.3435	0.111623	0.8367	-0.366831	0.0164**
C(12) = β	0.624313	0.0118**	0.590305	0.0002***	0.678266	0.0000***	-0.029014	0.8335
R ²	0.904755		0.820343		0.922050		0.401836	
Adj.-R ²	0.896316		0.804424		0.915143		0.348834	
D-W	2.306564		2.116839		2.141790		2.350445	

***, **, * indicate the significance level at 1%, 5% and 10%, respectively

Source: Authors' Estimation using EViews 12.

The findings reveal that credit risk (CR) is negative across all SANEK countries. It is statistically significant at 1% in South Africa and Nigeria, and at 10% in Egypt, while it is statistically insignificant in Kenya. Credit risk has a more significant impact on bank profitability in South Africa, Nigeria, and Egypt compared to Kenya. The asymmetric nature of credit risk suggests that South Africa and Nigeria may have underlying factors contributing to their higher levels of risk. In contrast, Kenya, where credit risk is insignificant, may have a more robust risk management framework. However, it is important for SANEK legislators and banks to address credit risk effectively to maintain a strong return on equity.

The results of the mean equation show that liquidity risk (LR) has an asymmetric adverse and statistically significant impact at the 1% level in Nigeria and Kenya, and

at the 5% level in Egypt. However, it is insignificant in South Africa. Consequently, LR has an asymmetric negative effect on bank RoE in SANEK, indicating that a 1% increase in LR will worsen the negative impact on bank RoE in SANEK. This suggests that banks operating in Nigeria and Kenya, followed by Egypt, are more vulnerable to liquidity risks, which can significantly impede their profitability. On the other hand, banks in South Africa appear to have stronger mechanisms in place to manage and mitigate liquidity risks, which leads to a less pronounced impact on their RoE. In summary, these findings highlight the importance for banks in SANEK to effectively address and manage liquidity risks to safeguard their profitability.

The results of the mean equation suggest that bank size has an asymmetrically positive and statistically significant effect on RoE in South Africa and Nigeria, at the 1% significance level. However, in Egypt, the size of banks is found to be statistically insignificant. This suggests that larger banks in South Africa and Nigeria generally exhibit higher profitability, potentially attributed to economies of scale. On the other hand, the lack of statistical significance in Egypt suggests that there may be other factors influencing RoE. It is worth noting that the data from Kenya show a significant negative effect of bank size on RoE, which contradicts the findings from South Africa, Nigeria, and Egypt. This suggests potential challenges and lower profitability for larger banks in Kenya. Therefore, the study emphasises the importance of considering country-specific factors when examining the relationship between bank size and profitability.

The findings of the mean equation indicate that exchange rate risk variables (EXR) are asymmetrically positive and statistically insignificant in Nigeria. In contrast, both South Africa and Kenya show positive and statistically significant effects at the 5% level. These results suggest that fluctuations in the exchange rate can significantly impact the profitability of banks in South Africa and Kenya. Therefore, it is crucial to adopt appropriate financial risk management approaches to mitigate the potential negative effects of exchange rate shocks on banks' financial performance. Moreover, these findings indicate that banks in Nigeria may have different risk profiles and factors influencing their RoE compared to those in South Africa and Kenya. Thus, specific strategies tailored to each country are necessary for managing exchange rate risk. On the other hand, exchange rate risk is negative and statistically insignificant in Egypt.

As a result, it has no significant impact on bank RoE. This implies that Egyptian banks can effectively manage their exchange rate risk, enabling them to generate higher profits. Therefore, it is important to emphasize the implementation of proper risk management plans in the banking sector.

The findings show that inflation risk (INF) is negative in South Africa, Nigeria, and Egypt. This suggests that INF has a negative effect on bank RoE in these countries. In Nigeria, this effect is particularly pronounced due to the statistically significant nature of the INF variable. However, it is worth noting that the impact of inflation risk on bank RoE is not statistically significant in South Africa and Egypt. This suggests that other factors or variables may have a greater influence on bank RoE in these countries, overshadowing the impact of inflation risk. Nevertheless, it is important for policymakers and banks in all three countries to effectively monitor and manage inflation risks ensuring stable and sustainable returns on equity. On the other hand, the inflation risk (INF) in Kenya is positive and relatively significant at the 5% level. This implies that INF has a positive effect on bank RoE in Kenya. Inflation risk can be beneficial for Kenyan banks as it increases returns on equity. Therefore, it is necessary to carefully monitor and implement effective risk management strategies to ensure the stability and sustainability of the country's bank returns on equity.

Estimation of Variance Equation: The study utilised the EGARCH model to assess the asymmetry of bank RoE series. The results are presented in Table 4.10. As $\delta^2 = \ln(\delta^2)$, the variance consistently remains positive. Hence, the variance remains positive despite negative parameters.

The equation below represents the variance for the RoE of the South African bank:

$$\ln(\delta^2) = -0.469518 + 1.107819 \left| \frac{\mu_{t-1}}{\sigma_{t-1}} \right| - 0.233837 \left| \frac{\mu_{t-1}}{\sigma_{t-1}} \right| + 0.624313 \ln(\delta^2_{t-1}) \quad (4.8)$$

As a result of positive shocks in the South African bank RoE, the parameter $\mu_{t-1} > 0$ has an impact of 0.873982 times the conditional variance (1.107819 - 0.233837). In contrast, when negative shocks occur, $\mu_{t-1} < 0$ has an impact of 1.341646 times (1.107819 + (-0.233837) x (-1)). Negative shocks have a greater impact on South Africa's return on equity than positive shocks. This finding is a novel and potentially significant contribution to literature.

The equation below represents the variance for the RoE of Nigerian banks:

$$\ln(\delta^2) = -1.139114 + 2.020452 \left| \frac{\mu-1}{\sigma_{t-1}} \right| - 0.269192 \left| \frac{\mu-1}{\sigma_{t-1}} \right| + 0.590305 \ln(\delta^2_{t-1}) \quad (4.9)$$

According to the Nigerian bank RoE, a positive shock would increase influence by $2.020452 - 0.269192 = 1.75126$ times, while a negative shock would increase influence by $2.020452 + (-0.269192) \times (-1) = 2.289644$ times. In Nigeria, negative shocks have stronger impacts than positive shocks. This is a novel and potential contribution to literature.

The equation for Egypt Bank's Return on Equity variance is as follows:

$$\ln(\delta^2) = -2.328903 + 2.471898 \left| \frac{\mu-1}{\sigma_{t-1}} \right| + 0.111623 \left| \frac{\mu-1}{\sigma_{t-1}} \right| + 0.678266 \ln(\delta^2_{t-1}) \quad (4.10)$$

The impact of positive shocks on the Egyptian bank's RoE is $2.471898 + 0.111623$, which equals 2.583521 times. Conversely, the impact of negative shocks would be increased by $2.471898 + (0.111623) \times (-1) = 2.36075$ times. Consequently, positive shocks have a stronger effect on Egypt's RoE than negative shocks. This finding could be a valuable addition to the existing literature.

Below is the equation that represents the variance in the RoE of Kenyan banks:

$$\ln(\delta^2) = -0.230785 + 2.372846 \left| \frac{\mu-1}{\sigma_{t-1}} \right| - 0.366831 \left| \frac{\mu-1}{\sigma_{t-1}} \right| - 0.029014 \ln(\delta^2_{t-1}) \quad (4.11)$$

Positive shocks impact the Kenyan bank RoE series $2.372846 - 0.366831 = 2.006015$ times. Negative shocks impact $2.372846 + (-0.366831) \times (-1) = 2.739677$. In Kenya, negative shocks have a greater effect than positive ones. This contribution adds to the literature.

Table 4.10 indicates that South Africa, Nigeria, and Egypt exhibit volatility clustering, as evidenced by the coefficient C(12). The significant negative coefficient C(11) also suggests asymmetric volatility in South Africa, Nigeria, and Kenya.

Based on the Durbin-Watson score for the model, 2.306564 was found in South Africa, 2.116839 in Nigeria, 2.24870 in Egypt, and 2.141790 in Kenya. This indicates that the model contains no autocorrelations. Therefore, the study suggests that the data generation mechanism is asymmetric GARCH.

Table 4.11. The chi-squared statistic does not support the rejection of the null hypothesis that no ARCH effect persists in the models at the 5% significance level. This indicates a good fit if the estimated model residuals are homoscedastic.

Table 4.11: Diagnostic Test

Description	South Africa	Nigeria	Egypt	Kenya
F-statistics	0.114895	0.272116	0.943772	4.032250
Probability F-statistics	0.7355	0.6033	0.3341	0.0479
Observed R-squared	0.117470	0.277695	0.955508	3.939164
Pro. Chi-square (1)	0.7318	0.5982	0.3283	0.0472

Source: Authors' Estimation using EViews 12.

4.3.6.4 The TGARCH Estimation Results

A TGARCH model was used to validate the outcomes of the EGARCH model. While EGARCH and TGARCH both capture conditional heteroscedasticity, their main difference lies in how they handle asymmetric shock effects on bank RoE. TGARCH models include a threshold parameter that allows for different reactions to positive and negative shocks, whereas EGARCH models directly incorporate asymmetric effects into the conditional variance equation. Based on the LM test, the study uses the asymmetric TGARCH model. The study utilises various distributions, including Student's t (Stud- t), Normal (Gaussian), Student's t with a fixed degree of freedom distribution (Stud- t *DF), and GED with a fixed parameter distribution (GED*FP), as the data do not fit the normal distribution assumption. Furthermore, the study uses the maximum log-likelihood approach to select an appropriate model and distribution, and AIC/BIC values for each SANEK country.

The results in Table 4.12 show that the coefficients for South Africa, Nigeria, Egypt, and Kenya are all statistically significant at the 5% level. The coefficients indicate that the previous period's return on equity significantly influences the current period's return on equity for these nations, emphasising the importance of considering these historical RoE values in investment and policymaking decisions.

Table 4.12: Estimation of results using the TGARCH Asymmetric Order 1 model.

	South Africa		Nigeria		Egypt		Kenya	
Method	GED*FP		Stud-t*DF		Normal Dist.		GED	
Variables	Coefficient	Pro.	Coefficient	Pro.	Coefficient	Pro.	Coefficient	Pro.
C	-40.38980	0.0002**	9.076891	0.0051***	1.754177	0.4098	22.60205	0.0000***
RoE(-1)	0.783319	0.0000***	0.784609	0.0000***	0.932095	0.0000***	0.421677	0.0000***
BLV	0.020401	0.9016	-0.183752	0.0027***	0.023559	0.4317	-9.174095	0.0000***
CR	-0.450426	0.0012***	-0.108022	0.0018***	-0.025820	0.4317	-0.044789	0.8869
LR	-0.013471	0.8355	-0.029549	0.0873*	-0.005783	0.3013	-0.091628	0.0005***
BS	0.447411	0.0005***	0.020559	0.1593	0.000471	0.9859	-0.181005	0.0000***
EXR	0.026387	0.1372	5.37E-05	0.9894	-0.001433	0.9839	0.039837	0.0000***
INF	-0.011594	0.1627	-0.051753	0.0064***	-0.001882	0.5908	0.016811	0.0028***
Variance Equation								
C	0.507424	0.1524	0.608708	0.1075	0.038227	0.3977	2.253782	0.0310**
Alpha	0.448930	0.2864	0.628433	0.1009	1.280483	0.0228**	0.637876	0.1147
gamma	0.869467	0.2574	1.785696	0.2230	-0.164632	0.8597	1.271307	0.1584
Beta	0.278430	0.2574	0.113471	0.3399	-0.023610	0.0000***	-0.183494	0.3679
GED PAR.	-	-	-	-	-	-	1.323124	0.0000***
R-squared	0.904933		0.821447		0.923588		0.362727	
Adjusted-R ²	0.896510		0.805626		0.916817		0.306260	
D-W	2.254311		2.079560		2.250840		2.976712	

Note: ***, **, * indicate the significance level at 1%, 5% and 10%, respectively. Alpha = the coefficient of $RESID(-1)^2$, gamma = the coefficient of $RESID(-1)^2 * (RESID(-1) < 0)$, beta = the coefficient of GARCH(-1).

Source: Authors' Estimation using EViews 12.

This is in line with the results of EGARCH (1.1). In South Africa and Egypt, the computed coefficient for cross-border bank lending volatility (BLV) is positive but highly insignificant. Therefore, the positive asymmetry of BLV affects bank RoE in South Africa and Egypt. This means that a 1% increase in BLV leads to an increase in bank RoE. This finding suggests that banks in South Africa and Egypt can effectively manage and absorb the volatility in cross-border lending without significant negative impacts on their profitability. The positive effect of BLV on bank RoE is consistent with the results of EGARCH (1.1). On the other hand, in countries such as Nigeria and Kenya, the computed BLV coefficient is negative and statistically significant, suggesting that the negative asymmetry of BLV affects bank RoE. This implies that a 1% increase in BLV leads to a decrease in bank RoE. The negative coefficient suggests that these countries may have higher exposure to external shocks and economic vulnerabilities, making them more susceptible to the negative effects of asymmetry in cross-border lending. As a result, banks in these countries may need to implement more robust risk management strategies to safeguard their profitability considering volatile cross-border bank lending activities. As observed in the SANЕК

countries, cross-border bank lending exhibits unique dynamics and vulnerabilities in various economic contexts. The negative effect of BLV on bank RoE is consistent with the results of EGARCH (1.1).

The coefficients in Table 4.12 indicate that the credit risk variable (CR) is negative and statistically significant at a 1% level in South Africa and Nigeria. However, Egypt and Kenya are statistically insignificant. The data indicates that credit risk has a significant adverse effect on bank RoE in SANEK. A 1% increase in CR leads to a decline in bank RoE, which is consistent with prior expectations. The results suggest that credit risk has a stronger impact on negative shocks than on positive shocks. This finding emphasises the importance of effectively managing credit risk in SANEK nations to maintain a stable and profitable RoE for banks. As a result, effective credit risk management practices are essential for mitigating the negative effects on bank performance. The negative effect of CR on bank RoE is consistent with the EGARCH model.

According to the mean equation findings, liquidity risk variables (LR) have a significant adverse effect at the 1% level in Kenya and the 10% level in Nigeria. In South Africa and Egypt, the LR is also negative but statistically insignificant. This means that LR has a negative impact on bank RoE. Specifically, a 1% increase in LR leads to a decline in bank RoE. The results suggest that liquidity risk has a stronger impact on bank RoE during negative shocks than during positive shocks. This supports the expectation that LR negatively affects bank RoE. It indicates that banks with higher liquidity risks are likely to have lower returns on equity. These findings align with the general belief that higher liquidity risk can hinder a bank's profitability and overall financial performance. Therefore, it is crucial for banks in Kenya and Nigeria, where the impact of liquidity risk on RoE is significant, to effectively manage their liquidity to mitigate the negative effects on profitability. The negative effect of LR on bank RoE is consistent with the EGARCH results.

The results of the mean equation show that the size of the bank has a positive and statistically significant impact on bank RoE in South Africa at a 1% significance level. However, in the case of Nigeria and Egypt, the relationship between bank size and bank RoE is statistically insignificant. This suggests that in South Africa, Nigeria, and Egypt, an increase in bank size by 1% leads to a corresponding increase in bank RoE.

Therefore, it is crucial for banks to prioritise expanding their capital bases and liquidity ratios to maximise profitability. In contrast, Kenya's bank size has a negative and statistically significant impact on bank RoE, at about 1%. In Kenya, banks should focus on increasing their capital bases and liquidity ratios to achieve greater profitability. These findings are consistent with those of EGARCH.

The findings indicate that exchange rate risk variables, specifically EXR, are asymmetrically positive but relatively insignificant in South Africa and Nigeria. In Kenya, the asymmetry is positively and statistically significant at a 1% level, meaning that a 1% increase in EXR results in an increase in bank RoE. There is evidence of asymmetry, suggesting that positive exchange rate shocks may have a slightly stronger impact than negative shocks in these three countries. This asymmetry implies that banks in Kenya are more susceptible to positive changes in the exchange rate and may benefit from a favourable exchange rate environment. However, the relatively insignificant effect of exchange rate risk variables in South Africa and Nigeria suggests that fluctuations in the exchange rate have minimal influence on bank profitability in these countries. In contrast, EXR in Egypt has an asymmetric negative value and is statistically insignificant; a 1% increase in EXR leads to a decrease in bank RoE. Overall, these findings emphasise the importance of managing exchange rate risk for Egyptian banks to maintain profitability.

The findings suggest that inflation risk variables, specifically INF, have a negative and significant impact at 1 percent in Nigeria. South Africa and Egypt, the impact was negative but not statistically significant. Inflation negatively affects the bank RoE in South Africa, Nigeria, and Egypt, with a more pronounced decrease in Nigeria, where it is highly significant, compared to South Africa and Egypt, where it is not statistically significant. These findings indicate that inflation risk poses a significant threat to the profitability of banks in Nigeria, South Africa, and Egypt, with Nigeria being the most vulnerable. Monitoring and managing inflation risk is crucial for banks operating in these countries to ensure sustainable profitability and financial stability. In Kenya, the INF is asymmetrically positive and statistically significant at 1%. Inflation positively affects bank RoE in Kenya, as a 1% increase in inflation risk results in an increase in bank RoE. This suggests that banks in Kenya can mitigate the negative effects of

inflation on their profitability and maintain a positive return on equity. These results align with the EGARCH(1,1) findings, except for Egypt.

Estimation of Variance Equation: The estimation results for the South African bank's RoE are presented in Table 4.12. The variance equation is presented as follows:

$$\delta^2 = 0.507424 \times 10^{-6} + 0.448930 \mu^2_{t-1} + 0.869467 \mu^2_{t-1} d_{t-1} + 0.278430 \delta^2_{t-1} \quad (4.12)$$

The equation below represents the variance for the RoE of Nigerian banks.

$$\delta^2 = 0.608708 \times 10^{-6} + 0.628433 \mu^2_{t-1} + 1.785696 \mu^2_{t-1} d_{t-1} + 0.113471 \delta^2_{t-1} \quad (4.13)$$

An equation expressing the variance of an Egyptian bank's RoE is provided.

$$\delta^2 = 0.038227 \times 10^{-6} + 1.280483 \mu^2_{t-1} + (-0.164632) \mu^2_{t-1} d_{t-1} + (-0.023610) \delta^2_{t-1} \quad (4.14)$$

The equation for the Kenya Bank RoE variance is provided.

$$\delta^2 = 0.256966 \times 10^{-6} + 0.743976 \mu^2_{t-1} + 2.560571 \mu^2_{t-1} d_{t-1} + (-0.183494) \delta^2_{t-1} \quad (4.15)$$

It is necessary for the null hypothesis of no leverage effect in TGARCH models to be supported by a negative γ coefficient. In the absence of a negative ($\gamma \neq 0$), γ coefficient, the shock's impact is asymmetric. In Table 4.12, the ARCH-LM test confirms that the TGARCH (1,1) model is applicable, as the F-statistic and Observed R-squared statistic both have p-values greater than 0.05. Thus, the "leverage effect" was evident in South Africa with a coefficient of the asymmetric parameter of 0.869467; in Nigeria, it is 1.785696; in Kenya, it is 1.271307; and in Egypt, it is -0.164632. These coefficients indicate that in South Africa, an increase in market volatility is associated with a decrease in RoE. Nigeria, however, experiences a greater decline in RoE when volatility increases compared to South Africa. Kenya shows a similar pattern to Nigeria, but on a smaller scale. A rise in volatility in Egypt is related to a slight increase in RoE, showing different market behaviour compared to other nations.

A model parameter analysis of the South African bank RoE shows that positive shocks have an impact of 0.448930 times on bank RoE. In contrast, negative shocks result in an impact of $\gamma + \alpha = 0.448930 + 0.869467 = 1.318397$ times. The Nigerian bank's RoE is impacted by 0.628433 times due to a positive shock, while negative

shocks have an impact of $\gamma + \alpha = 0.628433 + 1.785696 = 2.414129$ times. In the case of the Egypt series, positive shocks have an impact of 1.280483 times, while negative shocks have an impact of $\gamma + \alpha = 1.280483 + (-0.164632) = 1.115851$ times. For the Kenyan bank RoE, positive shocks have an impact of 0.637876 times, while negative shocks produce an impact of $\gamma + \alpha = 0.637876 + 1.271307 = 1.909183$ times. This indicates that in South Africa, Nigeria, and Kenya, negative shocks have a greater effect than positive shocks, whereas in Egypt, positive shocks have a greater impact than negative shocks. This is a novel and potentially critical contribution to the literature.

The Durbin-Watson scores for the model were found to be 2.254311 in South Africa, 2.079560 in Nigeria, 2.243750 in Egypt, and 2.976712 in Kenya, indicating no autocorrelations in the model. These data points confirm that bank RoE in SANEK is significantly more sensitive to negative shocks than to positive shocks.

Table 4.13: Diagnostic Test

Description	South Africa	Nigeria	Egypt	Kenya
F-statistics	0.090211	0.403503	0.374665	0.051652
Probability F-statistics	0.7647	0.5270	0.5421	0.8208
Observed R-squared	0.092260	0.411135	0.381883	0.052849
Pro. Chi-square (1)	0.7613	0.5214	0.5366	0.8182

Source: Authors' Estimation using EViews 12.

The null hypothesis that the ARCH effect is present in each model is not rejected at a significance level of 5 percent based on the Chi-squared test. Additionally, the residuals of the estimated models indicate homoscedasticity, which is a measure of goodness of fit.

EGARCH and TGARCH results indicate that negative shocks have a more significant impact than positive shocks in South Africa, Nigeria, and Kenya. In contrast, positive shocks have a greater influence than negative shocks on Egypt. This suggests that the financial markets in South Africa, Nigeria, and Kenya are more responsive to negative events or downturns, while in Egypt, positive shocks and market events have a stronger influence. These findings emphasise the distinct dynamics and market behaviour observed in each country when faced with financial shocks.

4.3.6.5 Discussion of the results

In this section, we discuss regression results and compare them with existing studies on bank profitability. The literature overlooks the connection between cross-border bank lending volatility and bank RoE. To address this gap, this study models the impact of cross-border bank lending volatility on bank profitability, with a specific focus on RoE.

In South Africa and Egypt, the results from the GARCH, EGARCH, and TGARCH models suggest that positive shocks to cross-border lending volatility have a positive but insignificant impact on bank RoE. In Nigeria and Kenya, negative shocks in cross-border bank lending volatility have a significant adverse effect on bank RoE. The findings indicate that cross-border bank lending volatility affects bank RoE differently across SANEK. Nigeria and Kenya may encounter challenges compared to South Africa and Egypt due to heightened volatility in cross-border bank lending. The positive impact of increased volatility in cross-border bank lending in South Africa and Egypt may be attributed to their more stable and developed financial systems, enabling them to better absorb and benefit from such shocks. Conversely, Nigeria and Kenya may be more vulnerable to negative shocks at cross-border bank lending due to their less developed financial systems and greater reliance on external funding. This study is the first to model the effects of cross-border bank lending volatility on bank RoE, making an important contribution to the literature by highlighting the varying effects of cross-border bank lending on SANEK.

GARCH, EGARCH, and TGARCH results indicate that credit risk has a negative impact on bank profitability in SANEK, except for Kenya under GARCH. These findings align with previous studies conducted by El-Ansary and Megahed (2016) in Egypt, Macharia (2016) in Kenya, and Saleh and Malik (2020) in emerging markets, which also found a negative relationship between credit risk and bank profitability. In Kenya, credit risk positively influences bank profitability. In contrast to El-Ansary and Megahed (2016) and Macharia (2016), this study investigates the impact of credit risk on bank profitability through an asymmetric model. The EGARCH and TGARCH results suggest that banks in South Africa, Nigeria, Egypt, and Kenya are more vulnerable to credit risk shocks, which could affect their overall profitability. These findings underscore the significance of effective credit risk management for banks in emerging

markets such as South Africa, Nigeria, Egypt, and Kenya. By understanding how negative credit risk shocks can impact profitability, banks can better prepare for and mitigate potential losses. These asymmetric models provide insights into the relationship between credit risk and bank profitability, offering valuable guidance for policymakers and banks in these countries. This study contributes to the existing literature by shedding light on the unique challenges faced by banks in emerging markets.

The GARCH, EGARCH, and TGARCH models indicate that negative shocks to liquidity risk have a more significant impact on bank profitability than positive shocks. These results align with Saleh, Abu, and Murray's (2020) and Yahaya, Mahat, and Matemilola's (2022) findings that liquidity risk negatively affects bank profitability. Therefore, SANEK banks tend to struggle with fluctuations in liquidity risks, which can result in lower profits. The study emphasises the importance of effectively managing liquidity risk for banks to ensure stable operations, profitability, and resilience in the banking sector.

Based on the GARCH, EGARCH, and TGARCH models, it has been found that South Africa, Nigeria, and Egypt have a positive impact on bank profitability. These findings align with Gaber's (2018) research, which also indicated that bank size has a positive effect on Palestinian banks. Conversely, in Kenya, bank profitability is negatively affected by bank size. This aligns with the findings of Gumbo et al. (2022), who discovered a significant negative relationship between bank size and bank profitability in Zimbabwe. Overall, the incorporation of asymmetry and leverage effects through models such as EGARCH and TGARCH has offered valuable insights into the relationship between bank size and profitability in SANEK. The study suggests that larger banks generally have higher profitability due to their ability to manage risk and navigate market fluctuations, thus contributing to a new understanding of the link between bank size and profitability.

The study found that exchange rate risk significantly influences bank profitability in SANEK. Positive exchange rate risk shocks have a greater impact on bank profitability in South Africa, Nigeria, and Kenya, as their banking sectors are more resilient to exchange rate fluctuations. In contrast, Egypt's banking sector may be more vulnerable to currency swings, as adverse exchange rate shocks have a greater

impact on profitability. This finding is consistent with previous studies conducted by Funso and Lawal (2020) and Gumbo et al. (2022), which also found a negative relationship between exchange rate risk and bank profitability in Nigeria and Zimbabwe, respectively. These findings indicate that bank profitability varies across SANEK countries due to exchange rate variations. This study contributes to the existing literature by examining the effects of asymmetric exchange rates on bank profitability, in contrast to previous studies that mainly focused on symmetric exchange rates.

The results from GARCH, EGARCH, and TGARCH models indicate that negative inflation shocks have a greater impact on bank profitability than positive shocks. During periods of high inflation risk, banks may struggle to maintain profitability because negative shocks to inflation risk can have a more profound impact on their financial performance. These results are consistent with Horobet et al. (2021) and Isayas (2022), who used GMM to find that the inflation rate negatively impacts bank profitability. For banks to minimise potential negative impacts on their profitability, it is crucial to carefully monitor inflation rates and adjust their strategies accordingly. Overall, these findings emphasise the importance of managing asymmetric and leverage effects to sustain profitability and growth in the banking sector. By staying vigilant and adaptable in their approach to inflation, banks can better position themselves to weather economic fluctuations and maintain financial stability. This could be a novel contribution to the literature.

The results of the variance equation indicate that negative shocks have a more significant impact on bank RoE in South Africa, Nigeria, and Kenya. In Egypt, positive shocks had a larger effect, indicating different economic dynamics. These findings suggest that the banking sectors in South Africa, Nigeria, and Kenya may be more vulnerable to external economic shocks compared to Egypt. Policymakers and stakeholders in these countries should be aware of this vulnerability and develop strategies to mitigate the impact of negative shocks. This study contributes to the risk literature in the banking sector.

4.4 Summary and Conclusion

This essay examines the effects of cross-border bank lending volatility on bank RoE in SANEK countries using data from 2000Q1 to 2021Q4. GARCH-type models

(GARCH, EGARCH, and TGARCH) were used to analyse the relationship between lending activities and bank RoE. These models consider both the symmetric and asymmetric effects of lending volatility, providing a comprehensive understanding of the relationship between these variables. This helps banks recognise and consider the various impacts of lending volatility on their return on equity. The results of GARCH, EGARCH, and TGARCH models suggest that the impact of cross-border bank lending volatility on bank profitability varies depending on the specific economic context. Cross-border bank lending is profitable in South Africa and Egypt, while caution should be exercised in Nigeria and Kenya, where cross-border bank lending volatility negatively affects bank RoE. Credit risk significantly affects bank RoE in SANEK countries, particularly during negative shocks, emphasising the importance of robust risk management practices. Liquidity risk has a more pronounced negative impact in Nigeria and Kenya compared to South Africa and Egypt. This indicates that banks in these countries may need to improve their risk management strategies to protect their profitability. The size has a positive impact on bank RoE in South Africa, Nigeria, and Egypt, but a negative impact in Kenya. The findings of GARCH, EGARCH, and TGARCH models indicate that the impact of exchange rate risk on bank RoE varies across different countries. South Africa, Nigeria, and Kenya exhibit a positive connection, while Egypt shows a negative connection. Inflation risk has a negative impact on bank RoE in South Africa, Nigeria, and Egypt, while it has a positive impact in Kenya (except for GARCH in Kenya), emphasising the need for customised strategies. Negative shocks have a greater impact on bank RoE in South Africa, Nigeria, and Kenya, except in Egypt, where positive shocks have a greater impact, indicating distinct economic dynamics.

4.5 Contribution, Originality, and Implications

Originality/value: To the best of the author's knowledge, this study is the first to investigate the impact of cross-border bank lending volatility on bank RoE using both symmetric and asymmetric GARCH models. By employing these advanced econometric techniques, this research offers a more comprehensive analysis than traditional linear models, particularly concerning emerging markets in Africa. The findings indicate that cross-border bank lending volatility significantly affects bank RoE, with negative shocks having a greater impact than positive shocks in both symmetric and asymmetric GARCH models, except in the case of Egypt. These results

underscore the increased vulnerability of SANEK banks to adverse fluctuations in cross-border lending, which poses a risk to their profitability. Overall, this study makes a significant contribution to the literature by providing deeper insights into the dynamic relationship between cross-border bank lending volatility and bank profitability in emerging African markets. **Policy Recommendations:** South Africa must enhance the resilience of its financial markets by improving liquidity management frameworks and capital adequacy requirements. Additionally, it should implement policies that attract long-term capital inflows to reduce dependence on short-term, volatile bank lending. Nigeria needs to promote financial inclusion policies to diversify its capital sources and reduce its reliance on external capital inflows. Furthermore, the country should introduce regulatory measures to stabilise cross-border bank lending and mitigate its negative impact on bank RoE. Egypt must develop strategies to address external push factors, such as strengthening trade agreements and fostering regional financial cooperation. It should also encourage stable capital inflows by providing incentives for long-term investment in key economic sectors. Kenya must strengthen financial market oversight to reduce speculative activities that contribute to volatility. It should also implement regulatory frameworks to mitigate the negative impact of cross-border bank lending volatility on bank RoE. **Practical Recommendations for Investors:** South African investors must monitor global financial trends and central bank policies that impact capital flows into the country. They should also take advantage of profitable cross-border lending opportunities by investing in well-regulated financial institutions. Nigerian investors need to conduct thorough risk assessments before engaging in cross-border bank lending and equity investments. They should approach cross-border bank lending with caution, as it can adversely affect bank profitability. Egyptian investors must maintain flexibility in their investment strategies to effectively respond to external economic shifts affecting capital flows. Additionally, they should consider cross-border bank lending as a viable investment opportunity due to its profitability in Egypt. Kenyan investors should develop adaptive investment strategies that account for both push and pull factors affecting market dynamics. They must also exercise caution when engaging in cross-border bank lending, given its potential negative impact on profitability.

4.6 Limitations of the Study

The study on cross-border bank lending volatility and bank RoE in SANEK countries has limitations. These include its focus on a specific period and its failure to evaluate additional factors such as regulatory changes and competitive dynamics. Moreover, the findings may not be applicable to nations outside SANEK due to differences in banking systems and economic conditions. Additionally, the study solely examines the influence of cross-border bank lending volatility on bank RoE and does not incorporate other financial indicators or performance measures. Therefore, further research is necessary to enhance the validity and reliability of the findings.

4.7 Areas of Future Research

A future study on cross-border bank lending volatility and profitability in SANEK should measure profitability using RoA and net interest margin. Investigating regulatory frameworks and the impact of supervision on profitability could offer valuable insights. Comparing cost efficiency and revenue creation could reveal NIM drivers across countries. Studying the relationship between capital adequacy levels and profitability could unveil risk-taking behaviour. Examining technological advancements such as digital banking and the adoption of fintech can help us understand the dynamics of the banking sector.

4.8 Ethical Consideration

This essay adhered to ethical guidelines for research that did not involve direct interaction with human or animal participants.

Chapter 5

The Asymmetric Effects of Cross-Border Equity Flow Volatility on Equity Market Returns in SANEK Countries

5.0 Introduction

This study investigates the impact of cross-border equity flow volatility on equity market returns using the NARDL model. Unlike traditional linear approaches, the NARDL model captures potential asymmetries in the relationship between volatility and market returns, acknowledging that positive and negative shocks may have different effects. Jiang and Wang (2023) demonstrated the effectiveness of the NARDL framework in identifying these asymmetric relationships, making it a valuable tool for analysing financial market dynamics. Several key financial theories underpin this examination. First, the Flow Theory of Capital Markets (Stulz, 1999) posits that cross-border capital flows influence investor psychology, risk premiums, and liquidity, all of which affect stock market performance. Price fluctuations may arise from heightened market uncertainty due to erratic capital flows. Second, according to Market Microstructure Theory (O'Hara, 1995), order flow imbalances driven by foreign investors can impact price discovery and market efficiency, leading to nonlinear responses to equity returns. Behavioural Finance Theory (Shiller, 2003) further explains how investor psychology influences market reactions to capital flow volatility, with investors potentially overreacting to foreign capital inflows and outflows, resulting in asymmetric effects on market returns. By highlighting the unequal consequences of capital flow volatility, the findings contribute to the body of knowledge in international finance.

Following the introduction section, Section 5.1 presents the literature review, Section 5.2 presents the research methodology, Section 5.3 presents data analysis and results, and Section 5.4 presents the conclusion and summary of the study.

5.1 Literature Review

5.1.1 Theoretical Literature Review on Equity Market Returns

There is a significant gap in the theoretical literature that directly connects cross-border equity flow volatility with equity market returns. Traditional finance theories, such as the Efficient Market Hypothesis (EMH) and the Capital Asset Pricing Model (CAPM), typically assume frictionless markets and rational expectations, often neglecting the destabilising effects that volatile capital movements can exert on market returns.

5.1.1.1 Efficient Market Hypothesis (EMH)

Despite the Sharpe (1964) model, equity returns remained a subject of debate. EMH (Efficient Market Hypothesis) was developed to investigate the predictability of stock returns. Fama (1965) first proposed the concept, and the debate continued in subsequent decades. Fama analysed financial theory and the potential for forecasting stock returns. The hypothesis suggests that a market is efficient if share prices quickly reflect the most recent information (Teall, 2018). It asserts that a stock's current price accurately incorporates all relevant information about its past, present, and projected profits. What makes it possible? When data about a company or the economy changes, stock prices also adjust. Fama (1970) was an early supporter of EMH.

Fama (1970) distinguished three forms of EMH: (a) weak, (b) semi-strong, and (c) strong. However, the semi-strong form of EMH has been the foundation for most scientific studies.

The strong form suggests that stock prices incorporate all information, including confidential data. Seyhun (1998) has shown that insiders profit from trading on non-public information. Therefore, on an asymmetric playing field, the strong form does not hold.

According to the semi-strong form of EMH, stock prices accurately reflect all publicly available information. Trading strategies cannot generate higher returns because there are no undervalued or overvalued stocks. New information is quickly and completely incorporated into prices due to the availability of real-time data. Tests

have been conducted to demonstrate how readily accessible data affects equity prices within minutes (Gosnell et al., 1996).

Based on the weak form of the hypothesis, future prices or returns can be predicted based on past results. Its validity is supported by the inconsistent results of technical analysis. However, Fama (1991) expanded the weak form by considering accounting or macroeconomic indicators for forecasting future returns.

In empirical research, the Efficient Market Hypothesis (EMH) has traditionally focused on the semi-strong form, but recent studies have also included the weak form. The debate surrounding the full extent of market efficiency remains unresolved. The issue of joint hypotheses further complicates matters. Asset pricing models should serve as the foundation for testing market efficiency. If the data contradict market efficiency, it suggests either an ineffective market or a flawed model. The referenced body of work includes examples of inconsistencies found in current models and recent research findings that raise doubts about these models.

The initially exhilarating and later dissatisfaction

A significant portion of the financial market studies conducted in the 1970s and 1980s were supported by the EMH. Historically, most data have supported the EMH, with observations indicating statistically insignificant returns on equity and prices following random walk behaviour. Studies in the 1980s explored the possibility of forecasting prices using factors such as dividend yield, while studies in the 1970s focused on predicting prices based on historical data (e.g., Fama and French, 1988). Research from the 1990s examined the limitations of existing asset pricing models.

Critics of the Efficient Market Hypothesis (EMH).

The data suggests that equity prices can be accurately forecasted, with two opposing hypotheses: rational pricing in an efficient market can produce time-varying equilibrium expected returns, accounting for risk and enabling predictability (see Fama and French, 1995). Equity return predictability is attributed to psychological factors, societal trends, market noise, and speculative investor trends, according to opponents of EMH (such as La Porta et al., 1997). Academic debates have been sparked over whether this predictability is due to irrational or hypothetical deviations from theoretical

principles or rational changes in expected returns. It is hypothesised that irrational behaviour and market inefficiency are the main factors, whereas others suggest that rational adjustments are responsible. Lo (2004, 2005) challenges EMH and behavioural finance theories, arguing that investors are neither completely rational nor irrational but exhibit periods of rationality and irrationality. He suggests that investors' behaviour is influenced by a combination of irrational and rational factors, such as emotions, cognitive biases, market information, and economic fundamentals, rather than a clear distinction between rational and irrational behaviour. When analysing investor behaviour and market outcomes, it is essential to consider both rational and irrational factors. Lo (2005) suggests that investors can shift from irrationality to rationality and vice versa to adapt to different situations. An adaptive investor responds dynamically to changing conditions, such as fear and panic during economic uncertainty. A stabilising economy may lead to more rational investment decisions, highlighting the significance of understanding the variables that influence investor behaviour.

The implications of EMH in SANEK.

EMH implications for SANEK countries with unstable equity market returns include the idea that market prices already reflect all available information, making it difficult for investors to consistently outperform the market. In such countries, this situation may lead to a lack of confidence in market efficiency and a decrease in investor participation. Additionally, the EMH suggests that it is not possible to predict future market movements based on past returns. This can further discourage investors from entering the market.

5.1.1.2 The Adaptive Market Hypothesis (AMH).

Andrew Lo's (2004) economic hypothesis, AMH, offers a unique framework for understanding financial markets by integrating behavioural finance and EMH. The AMH emphasises the importance of market actors adapting to changing economic situations for market success. Markets are competitive and adaptable, with efficiency shifting over time due to environmental changes and shifts in the investor population. The AMH argues that equity markets can exhibit both efficiency and inefficiency due to future-focused, knowledgeable investors who learn from mistakes. This is unlike EMH, where market efficiency fluctuates over time. Investor preferences change over

time due to adoption, contradicting EMH as current prices are influenced by past price movements. Technological advancements, macroeconomic structures, and market regulations contribute to predictable returns with cyclical patterns, indicating AMH. Lo's (2004) analysis of time-varying efficiency suggests that AMH is more reliable than EMH due to the potential for arbitrage opportunities resulting from human errors. COVID-19 has significantly impacted SANEK financial markets, leading to high levels of cross-border equity withdrawals and exacerbating equity flow volatility in the SANEK equities market. These withdrawals may impact EMR, prompting the selection of SANEK equity markets for AMH validation due to the shocks induced by volatility. Market conditions lead to market phases of varying predictability, as demonstrated in the incubation phase of COVID-19 (Wagner, 2020). Only cautious and informed investors can partially predict stock market and investment trends, emphasising the significance of market conditions.

Equity returns are volatile and can be forecasted under various stock market conditions, including bullish and bear markets, equity market bubbles, and crashes, as demonstrated in empirical studies by Ito, Noda, and Wada (2016) and Lin, Yang, and Chou (2021).

Critics of the Adaptive Market Hypothesis (AMH).

Pal (2016) criticises AMH as a philosophical qualitative model, lacking the rigidity and precision of a quantitative model. AMH is considered a more individualised method, relying on interpretation and presumptions, which makes it challenging to test and validate its assertions. While AMH asserts that market efficiency is context-dependent and dynamic, it relies on information inefficiency. AMH employs subjective discourse to elucidate information inefficiency, underscoring the importance of acknowledging individual subjectivity and perceptions of information in the marketplace. The Efficient Market Hypothesis (EMH) assumes that asset prices accurately reflect all available information, thereby eliminating informational inefficiencies. Both models contribute to market behaviour knowledge and offer valuable insights for scholars and investors.

The implications of AMH in SANEK.

The AMH advises SANEK market participants to adjust their investment strategies according to changing market conditions. They should focus on minimising losses during downturns and actively seek opportunities during upswings, considering volatile and predominantly negative equity market returns. The AMH emphasises the significance of flexibility, diversification, and active management in SANEK countries in navigating volatile and negative equity market returns. Investors should adjust their positions and allocations to align with evolving market conditions. This can be achieved by reallocating assets, rebalancing portfolios, or shifting investments to safe havens during market uncertainty. Diversifying across asset classes and regions minimises potential downturns on domestic equity markets. Actively managing investments and monitoring market trends enhances the chances of success in SANEK countries.

5.1.1.3 Capital Asset Pricing Model (CAPM).

Harry Markowitz's (1952) work on mean-variance portfolio theory led to the development of the Capital Asset Pricing Model. In 1964 and 1965, Sharpe and Lintner respectively presented the first models explaining equity returns. They argued that previous research did not adequately account for systematic risk and proposed that risk and time value should be considered when compensating investors. The Capital Asset Pricing Model (CAPM) was developed to determine a stock's value by comparing its risk and monetary value to its expected return. For risk-averse investors who aim to maximise utility by selecting assets with minimal risk and high returns, equity market preferences are similar. These assets provide a constant return rate, and investors receive the same interest rate regardless of borrowing or lending money. Stock market prices adjust based on demand, with higher demand for stocks indicating either lower or higher future returns and less interest. The investment return can be calculated by dividing the investment beta by the market risk premium, considering the time value of money and the market risk component. The beta is calculated based on the risk that an investment will add to a portfolio that mirrors the market.

There is still debate over whether Sharpe's model can predict stock returns even after it was developed. Black et al. (1972) focused on testing and validating the CAPM and making some improvements. Their study differs from earlier ones in that it

evaluates the model's effectiveness using time-series regressions and aggregated portfolios. They evaluated ten portfolios of bundled equities, selecting them based on the beta of the equities from the prior period to avoid selection bias. The premise was then validated by conducting a time-series regression on the average returns of the market portfolio and the excess returns of the portfolio. They also attempted to provide accurate estimates of beta component returns. This method provided estimates of the mean and variance of the excess return on the beta factor. They assumed that the residual variances for each portfolio were equivalent, as this information was necessary for the most effective estimation. While they suggested a two-factor CAPM model, it was not adequately tested in this article. The excess return from the two-factor approach is determined by the product of an asset's beta and the market's excess return.

Findings suggest that the initial model should be rejected due to the lack of discovered and predicted relationships. The beta factor increased over the study period and had better values than the risk-free rate, ranging from 1.0% to 1.3% monthly. The model predicts lower expected returns for portfolios with a low beta, but portfolios with a high beta display the opposite trend. It seems that the excess returns of the assets are not proportional to their betas, as originally suggested by the model.

Merton (1973) modified the CAPM the following year. The CAPM was extended to an intertemporal in the study. The first version of the CAPM, presented by Sharpe in 1964, aimed at making predictions using just one period. Hence, there was a rationale for making this model interim. Investors took future expectations into account, which affected current prices. Merton (1973) upheld the fundamental principles of CAPM, including a linear equilibrium model, utility maximisation, and constrained asset liability. Instead of the initial model's single-period structure, he expanded it to maximise utility over a lifetime. The major additions to the model were the state variables, which recognised that investors are insured against consumption deficiencies or changes in the pool of potential future investments.

In the late 1970s, Lucas (1978) proposed a version of the CAPM that focused on consumption risks. His goal was to examine the relationship between changes in output and variations in asset prices. The model starts with an economy with only one good, cautious investor, pure exchange, and similar customers. The analysis in this

study examines Fama's earlier hypotheses about market efficiency. One key difference from the CAPM is that Lucas' model, like Merton's (1973) approach, was developed in a multi-period setting, as opposed to the static state of the CAPM. Anticipated returns were correlated with consumption risk beta instead of market risk beta. This implies that the correlation between the expected return and consumption during the return period is directly associated with the anticipated risk premium. The equation used generalises the martingale characteristic of stochastic price sequences. If a price series does not exhibit this characteristic, it can be seen as evidence of irrational behaviour.

Critics of the Capital Asset Pricing Model (CAPM)

Opponents argue that the CAPM oversimplifies financial market complexity by overlooking the real dynamics of risk and return. They argue that the CAPM assumes a linear relationship and overlooks the potential for nonlinearities and asymmetry in the market. Reilly and Brown (2000) question the stability of beta and the linear relationship between asset returns and return rates. They revealed volatility over time and the non-linearity of asset returns and return rates, suggesting that the CAPM may not accurately represent market dynamics of return and risk. Critics are calling for more advanced models that consider the intricacies of the financial markets. Fama and French's (1992) research examined the relationship between book value, financial leverage, beta variables, and the expected stock return price ratio on the US capital market. They found that systematic risk (beta) was significant in identifying stock return variations between 1963 and 1990, but it cannot explain all variations on the U.S. capital market. This suggests that the beta-based approach used by the CAPM may not accurately represent market risk and return dynamics. Critics argue that the CAPM, based on historical data, may not accurately predict future market conditions. They also pointed out that the CAPM assumes that risk-averse investors are, which may not always be the case due to human behaviour and irrational decision-making. As a result, other models such as Arbitrage Pricing Theory (APT) and the Fama-French three-factor model have gained popularity for thorough market analysis. While CAPM provides a framework for understanding systematic risk, further research is needed to develop more robust models that consider market complexities.

The Implications of the Capital Asset Pricing Model (CAPM) for SANEK

The CAPM has significant implications for SANEK countries, where equity market returns are mostly negative. A negative beta indicates that the expected return on assets in these countries is likely to be negative, making investments less attractive due to decreased profitability potential. Additionally, the risk associated with investing in SANEK countries is higher, as negative market conditions indicate a greater likelihood of potential losses. Therefore, investors must carefully analyse and assess the risks before making investment decisions in these countries. Poor market conditions in SANEK may result in lower consumer purchasing power and a weaker economy, stifling economic growth and undermining business confidence. Therefore, firms operating in these nations may experience difficulties, such as lower profitability and sales. Investors must monitor market trends, government regulations, and economic indicators to reduce risks and make informed investment decisions.

5.1.1.4 Arbitrage Pricing Theory (APT)

Stephen Ross introduced Arbitrage Pricing Theory (APT) in 1976 to address the limitations of Sharpe and Lintner's asset pricing model. Ross argued that a multifactor model, where each factor represents a different source of risk, provides a more realistic understanding of the relationship between asset returns and risk factors. Rahman et al. (2013) argue that the theory assumes a competitive market, uniform investor expectations, short sales, and a preference for wealth, while Koch (2009) identifies idiosyncratic and systematic risk as asset-related factors. Investors should only be concerned about systematic risk because unsystematic risk can be diversified (Sharifzadeh, 2010). In the context of the APT model, idiosyncratic risk refers to risks that are specific to a particular asset and can be mitigated through portfolio diversification. On the other hand, systematic risks impact the entire market and cannot be diversified. Therefore, since systematic risk is the primary factor influencing asset returns, investors should carefully consider it when making decisions. The APT model, unlike the Capital Asset Pricing Model (CAPM), offers a more comprehensive and accurate framework for understanding and predicting asset prices by considering various factors that affect asset returns. In addition to market risk, the APT also considers risk factors in both the macro and microenvironments. Furthermore, variations in macro risk factors are linked to variability in equity returns (Sabetfar, Fah,

Mohamad, and Noordin, 2011). Elton, Gruber, and Blake (1995) argue that the APT explains returns more convincingly than other market proxies. The theoretical models of asset pricing explain how to price assets based on the risks associated with them. Sharpe (1964) expands on the CAPM by using multiple risk factors to assess asset value or market performance.

A fundamental formula for arbitrage pricing theory can be expressed as follows for a well-diversified portfolio:

$$E(R_p) = R_f + \beta_1 f_1 + \beta_2 f_2 + \dots + \beta_n f_n$$

where

$E(R_p)$ = Expected return

R_f = Risk-free return

β_n = Sensitivity to the factors of n

f_n = n^{th} factor price

In other words, R_f is the return if the asset had no risk factors, i.e., no exposure to anything.

$$\beta_n = 0$$

According to Rasiah (2011), APT does not provide a theoretical basis for selecting risk factors underlying stock prices, unlike the Capital Asset Pricing Model (CAPM). Instead, APT assumes that risk factors are selected based on their ability to account for variations in equity returns. This approach allows for a more dynamic and adaptable model that can capture the complexities of the market. APT offers a robust framework for understanding and predicting equity returns by considering various factors that influence asset prices, instead of solely depending on a risk-free rate. Empirical research guides the selection of relevant macro-risk factors. Several factors are believed to impact equity returns, including stock price volatility, market capitalisation, interest rates, exchange rates, and inflation. As noted by Pratt and Grabowski (2010), macroeconomic risk factors can have unpredictable effects on equity market performance. Changes in stock price volatility can make investors more cautious, leading to lower stock prices. Fluctuations in interest rates can impact

borrowing costs, which, in turn, affect profitability and stock prices. Variations in exchange rates and inflation can have ripple effects across industries and sectors, further influencing equity returns. Therefore, it is crucial for investors and financial analysts to comprehend and closely monitor these macroeconomic risk factors to make well-informed investment decisions.

Critics of the Arbitrage Pricing Theory

The criticism of the multifactor APT model is its failure to identify systemic risk factors. As a result, there have been multiple attempts in the financial literature to assess these elements using factor analysis (Roll and Ross, 1980; Dhrymes, Friend, and Gultekin, 1984). The model's limited capacity to accurately represent and forecast systemic risk and its impact on asset returns is due to its inability to consider general market conditions and systemic risk factors. If the multifactor APT model ignores the general state of the market, it might not provide a comprehensive picture of the actual risk exposure of assets in different market environments (Dhrymes et al., 1984). To enhance the model's capacity to assess and manage investment risks, it is essential to incorporate systemic risk factors. By integrating systemic risk factors into the multifactor APT model, investors can gain a more comprehensive understanding of how overall market conditions affect returns on all assets. This understanding enables investors to make more informed decisions and adjust their portfolio allocations accordingly.

The Implications of Arbitrage Pricing Theory in SANEK.

APT is a valuable tool for understanding negative equity market returns in SANEK countries. It suggests that these returns can be attributed to specific risk factors that affect market performance. Understanding these risk factors can lead to profitable arbitrage opportunities, enabling investors to capitalise on mispricing and stimulating demand for undervalued assets. However, market volatility and uncertainties can affect investor sentiment, hindering the stabilisation and improvement process. Fluctuations in prices and unpredictable market conditions can undermine investor sentiment and impede the stabilisation process. Unanticipated events such as political unrest or economic downturns can also exacerbate these risks. Therefore, while

arbitrage opportunities can stabilise and improve equity prices, investors should exercise caution and be prepared for potential challenges.

5.1.1.5 Bear and Bull Markets.

The stock market exhibits both bullish and bearish trends. Bull markets are characterised by a positive trend, while bear markets indicate a negative trend (Schultz, 2002). Cohen et al. (1987) define these markets as fluctuations of at least 20% from trough to peak in the S&P 500 index. Gonzalez et al (2005) establish bull and bear market regimes by using a regime-switching model. While there are no universally agreed-upon definitions, these terms are frequently used by researchers to describe market trends and investor behaviour. Some analysts argue that bear markets are characterised by pessimism and fear, while bull markets are marked by optimism and confidence. St-Amour and Gordon (2000) have provided theoretical support for the existence of these regimes, but the more intricate dynamics of conditional mean returns are often overlooked. Chauvet (1999), Stock and Watson (2003), and Rigobon and Sack (2003) emphasise the importance of understanding conditional moments for empirical analysis, predicting financial variables, and forecasting macroeconomic variance. Understanding market conditions is crucial to risk management and portfolio decisions. Investors can anticipate the bull and bear markets and profit from long or short positions. Bull and bear markets exhibit different behaviours. Bull markets encourage risk-taking and lead to an increase in asset value, whereas downturns result in asset sales and lower prices due to heightened risk apprehension. Investors can make informed decisions about asset purchases and sales by analysing market conditions and conditional moments. Research by Kim and Nofsinger (2007) and Guidolin and Timmerman (2004) has demonstrated that investors in the Japanese and British stock markets make distinct investment choices based on market sentiment. Hamilton (1989) used a first-order Markov chain to elucidate regime switching in economic cycles. He demonstrated that US GDP could be divided into expansionary and recessionary states. This insight can be applied to the stock market to understand market participants' behaviour under various economic conditions. By using techniques such as regime switching, investors can navigate market complexities with confidence.

The implications of bear and bull markets in SANEK.

To safeguard investments, investors must be cautious and flexible. Investors should closely monitor economic data and market developments to minimise losses in bear markets and take advantage of opportunities in bull markets. SANEK nations' investors should also diversify their portfolios globally to spread risk and capitalise on more stable markets. Understanding how bear and bull markets work in SANEK nations is essential for investors seeking success in the volatile global economic environment.

5.1.1.6 The Theoretical Gap in Literature.

The literature lacks a theoretical understanding of the relationship between cross-border equity flow volatility and equity market returns. Policymakers and investors need to understand this gap to make informed decisions about international investments. Researchers can address this gap by investigating how cross-border equity flows influence market stability and performance. This would help develop better risk management strategies for the global financial system. Policymakers can establish regulations and policies to reduce risks related to fluctuations in cross-border equity flows, thereby enhancing the stability and resilience of the financial system. Investors can assess the risks and returns of investing in foreign markets more accurately, leading to more profitable investment decisions. Bridging this gap would enhance global financial market efficiency and contribute to a country's economic growth and stability. Cross-border equity flow volatility introduces market uncertainty and systemic risk, especially in emerging markets. Understanding this relationship can help investors anticipate and manage risks more effectively. Reducing cross-border equity flow volatility can attract cross-border capital and foster financial development in emerging markets. Therefore, policymakers should implement measures to monitor and regulate cross-border equity flows to ensure a stable and resilient financial system that benefits both domestic and international investors.

5.1.2 Empirical Literature Review on Equity Market Returns

There is a lack of literature on equity market returns, with few studies examining the relationship between cross-border equity flow levels while neglecting volatility in equity flows and its impact on stock returns. This review includes studies on equity

market volatility, which help us understand market dynamics, even though they do not specifically focus on equity returns.

Review studies on the relationship between foreign equity flows and stock returns.

Rizal et al. (2020) conducted a study on the link between stock performance, foreign equity inflows, and investor sentiment in Indonesian Islamic equity. Using 9,156 monthly data points from 2012 to 2018, the study found a negative impact of investor sentiment on stock returns, as well as a positive correlation between stock returns and investor sentiment. A bidirectional relationship was also observed between stock returns and foreign investor inflows. However, due to the limited timeframe of the data, long-term trends in investor sentiment and equity inflows may not have been fully captured. Future research could use a longer timeframe and consider variables such as market volatility and company-specific news.

Prabheesh (2020) used daily data and the Toda and Yamamoto Granger causality test to examine the correlation between FPI flows and stock market returns in India during the COVID-19 pandemic. The study found a one-way causal relationship between FPI and stock market returns during this period. This implies that changes in FPI flows significantly impact the returns on the Indian stock market. However, the study does not consider other factors such as domestic economic conditions or global market trends that could also influence stock market returns. Additionally, it does not address the possibility of reverse causality. Future research should incorporate these factors to gain a more comprehensive understanding of the relationship between FPI flows and stock market returns in India.

A study examined the link between foreign portfolio equity and stock returns. Sopian and Auzairy (2015) used a bivariate vector autoregressive model and the Granger causality test to analyse the connection between cross-border equity flows and equity market returns in Bursa Malaysia. The results indicated that foreign institutional investors engaged in momentum trading, while international retail investors pursued contrarian trading strategies. It was observed that equity returns influence retail investor fund flows, and vice versa. The study revealed a positive causal relationship between foreign institutional fund flows and equity returns.

The study mentioned above is similar to the current study as both examine how foreign equity flows affect stock market returns. However, the current study focuses on the volatility of foreign equity flows rather than their levels. The impact of volatility in foreign equity flows on stock market returns differs from that of actual levels. Unlike Sapian and Auzairy (2015), this study examines how the volatility of foreign investors influences market movements, identifying potential risks and opportunities that may not be evident from overall investment levels. This study utilises asymmetric models to analyse equity flows and reveal hidden patterns. Consequently, these models provide a more accurate understanding of how foreign equity flows influence market changes by considering asymmetric reactions to positive and negative news.

Reviews studies on cross-border equity flows and the performance of equity markets.

Makoni and Marozva (2018) used Granger causality, a vector error correction model, and ARDL to analyse the relationship between foreign portfolio investments and the growth of Mauritius' capital market. The study found a significant link between FPI, FDI, economic expansion, and stock-index measures of financial market development. Additionally, there was evidence of two-way causality between these variables. However, the study did not determine the direction of causality between FPI investment and financial market growth. While Makoni and Marozva's (2018) study provides valuable insights into the interconnectedness of variables in Mauritius, its accuracy may be impacted by its limitations, such as not accounting for asymmetric effects and non-linear relationships.

Akosah (2016) used time series models to examine the macroeconomic factors influencing Ghana's stock market performance from 2000Q2 to 2014Q1. The results indicated that election cycles, FDI, real GDP growth, financial deepening, and inflation contribute to both the long and short-term development of stock markets. However, country risk premiums, government spending, and the Treasury bill rate negatively impacted the stock market's development in both the short and long term. The depreciation of the nominal exchange rate had a negative impact in the short term but a positive effect in the long term. The impact of openness to international trade on the stock market's development was mixed in the short term and negative in the long term. The study's limitations include a focus solely on macroeconomic factors, a lack of

consideration of the influence of microeconomic variables on stock market development, and the omission of investor sentiment and market psychology.

Review studies on the effect of foreign equity flows on equity market volatility.

Indonesia's exchange rate and aggregate equity index volatility were analysed by Muntasir (2015) in relation to cross-border equity investment. The aim of the study was to determine how foreign equity gross sales affect the Jakarta Equity Index (JKSI) volatility and the Rupiah exchange rate. The investigation utilised the Vector Autoregressive (VAR) model and the VECM. The findings indicate that the JKSI is more volatile when foreign equity gross sales increase. The study reveals that cross-border equity purchases directly impact stock index volatility in the Jakarta market, as foreign investors are buying more stocks than selling their equity holdings. The study also emphasises the importance of considering foreign equity flows and exchange rates. Although the study provides valuable insight into the impact of foreign equity purchases on market volatility, it does not address the asymmetric effects of foreign equity flows. Further research is needed to fully understand this link.

Review studies on the macroeconomic determinants of stock market returns.

EI-Diftar (2023) examines the relationship between exchange rates and stock market returns in emerging countries. The study employs ordinary least squares, autoregressive distributed lag error correction regression, and GARCH (1,1) regression models. The findings indicate a significant positive long-term relationship between exchange rates and stock market returns, except for Indonesia, which shows a significant negative impact. Furthermore, the GARCH (1,1) model indicates that exchange rates have a restricted effect on stock returns' volatility. It is important to note that this study focuses solely on one aspect of the link between exchange rates and stock market returns, which could be considered a limitation.

Using a panel of data and various tests, including unit roots, cointegration, and an error correction model (ECM), Alshihab (2021) assessed the impact of macroeconomic factors on stock returns in the Gulf Cooperation Council (GCC). The study considers interest rates, currency exchange rates, the money supply, and oil prices as macroeconomic variables. Empirical data show that equity markets and governments in the GCC heavily rely on macroeconomic factors, particularly oil prices.

It was found that factors other than oil prices had a small impact on equity market returns. The study's conclusions can assist investors and stakeholders in making better investment decisions, while legislators can enhance the effectiveness and regulation of equity markets. Although the study focuses only on the GCC region and does not consider global macroeconomic trends, it still provides valuable insights for investors and policymakers in the region.

Fang and Bessler (2017) investigate the predictive power of interest rates for stock returns in China using univariate autoregressive and bivariate VAR models. The study analyses three-month interest rates and the log of daily stock returns from the Shanghai Stock Exchange Composite Index from 2013 to 2015. The findings indicate that interest rates significantly impact stock returns in the Chinese market. However, the study's only limitation is its narrow time frame, which may not account for long-term trends or market fluctuations.

Empirical studies on SANEK countries

Between 2007 and 2015, Gachanja and Kosimbei (2018) conducted a study using various statistical methods such as VAR models, vector decomposition, impulse response functions, and Granger causality tests. The objective was to analyse the impact of foreign equity flows on NSE equity returns. The study concluded that there is a causal relationship between foreign equity flows and gains on the NSE. It is found that foreign equity flows have a significant and positive impact on equity market performance. Overall, Gachanja and Kosimbei's (2018) study highlights the significant impact of foreign equity flows on NSE equity returns, underscoring the importance of external factors like foreign investment in understanding equity market dynamics. It should be noted that the study solely focuses on the impact of foreign equity flows and does not consider other factors affecting market performance. Despite this limitation, the study underscores the importance of foreign capital in stimulating equity market growth and stresses the necessity for policymakers to consider these external effects.

This study explores the asymmetric effects of cross-border equity flow volatility on market returns, which differ from those in Gachanja and Kosimbei's (2018) study. This approach provides a detailed analysis, offering insights for investors and legislators. It enriches the literature on equity market dynamics, assists in portfolio assessment, aids

policymakers in designing regulations, and contributes to ongoing discussions on external factors influencing equity market behaviour.

Koskei (2017) studied the impact of cross-border portfolio equity outflows on the equity market returns of 21 Kenyan financial firms. The study used a panel data regression, incorporating both time series and cross-sectional data. The findings indicate that cross-border equity outflows do not affect the equity market returns of listed financial companies in Kenya. Koskei's study provides insight into the resilience of Kenya's financial firms to managing cross-border portfolio equity outflows.

The current study analyses the volatility of net equity flows as a dependent variable, differing from Koskei's (2017) analysis of cross-border portfolio equity outflows. It offers a deeper understanding of the factors influencing equity market returns by considering fluctuations in capital flows. This dynamic perspective sheds light on the relationship between stock market returns and external financial variables, assisting investors and policymakers in making informed decisions in the global economy. Additionally, the study aims to reveal hidden patterns and dynamics by incorporating nonlinearity into the analysis.

The study by Ochienga et al. (2019) examined the impact of foreign equity flows on the volatility of Kenya's equity market from 2008 to 2015 using the Vector Error Correction Model (VECM). It considered sales, foreign equity gross purchases, inflows, and outflows as independent variables and equity market volatility as the dependent variable. The findings reveal that foreign equity flows have a limited influence on the current volatility of the Nairobi Stock Exchange (NSE). During the study period, local factors such as sales and inflows had a more significant influence on Kenya's equity market volatility. This suggests that internal dynamics play a greater role in driving market volatility than external factors such as international equity movements. To maintain stability and reduce volatility in Kenya's equity market, authorities may benefit from focusing on improving local market fundamentals.

The study by Ochienga et al. (2019) examine foreign equity flows and their impact on equity market returns. The current study focuses on the volatility of cross-border equity flows and equity market returns in SANЕК. It emphasises the importance of considering both the level and volatility of foreign equity flows to understand their

impact on equity market movements. The study offers valuable insights for investors and legislators in SANEK countries.

The study by Onyeisi, Odo, and Anoke (2016) found that cross-border portfolio investment inflows positively impacted the growth of the Nigerian equity market from 1986 to 2014. This invalidates any causal link between foreign investment and domestic stock market growth. The findings suggest that a favourable foreign investment climate is essential for cross-border portfolio inflows to positively influence equity market growth. This emphasises the significance of developing policies and regulations that attract foreign investors and promote cross-border portfolio investments. However, the study's weakness lies in its focus on a specific time frame and lack of consideration of the potential risks and downsides associated with attracting foreign investment. These aspects are crucial for policymakers to consider.

Using monthly time series data from 2007 to 2017, Iriobe, Obamuyi, and Abayomi (2018) investigated the link between foreign investments in portfolios and bond stocks on the Nigerian equity exchange. This study applies the autoregressive distributed lag (ARDL) model. The study discovered that foreign investments in portfolios had a significant and positive impact on Nigeria's stock market performance. The rise in foreign investments in Nigerian portfolios has resulted in higher stock market returns and improved liquidity. Strategies aimed at attracting foreign investors could enhance market growth and stability in the long run. However, the study has a weakness in failing to explore the potential risks associated with increased foreign investments in Nigerian portfolios. Understanding these risks is crucial for policymakers and investors to make informed decisions and develop strategies to mitigate any negative consequences. In contrast to Iriobe et al. (2018), the current study examines cross-border volatility and equity market returns in SANEK using an asymmetric model. This approach allows for a more comprehensive analysis of foreign investments.

Ahmed (2017) utilised GMM estimation to examine the impact of foreign capital flows on the volatility of the Egyptian equity market. The findings indicate that transactions by foreign institutional investors have a greater influence on market volatility compared to those by foreign individual investors. Furthermore, trades by institutional and overseas investors significantly impact market volatility. When the trading volume is divided into expected and unexpected components, the results

reveal that surprises in trading activity by either group tend to exacerbate volatility during both calm and turbulent periods. Overall, the study concludes that foreign capital flows significantly impact the volatility of the Egyptian equity market. The findings suggest that both foreign individual and institutional investors play a crucial role in driving market fluctuations. However, the study lacks specific explanations for why foreign investors behave in this manner on the Egyptian equity market, which is its main weakness. Gaining insight into the reasons behind these investors' actions and their strategies would help in understanding how they contribute to market volatility.

Aduda et al. (2012) examined the factors that influence the growth of the Nairobi Stock Exchange. They found that macroeconomic variables such as liquidity, institutional quality, per capita income, domestic savings, and bank development are significant predictors of the stock market's development. However, the study did not find a strong relationship between macroeconomic stability and stock market growth, private capital flows, or inflation. The research suggests that while macroeconomic factors influence the growth of the Nairobi Stock Exchange, not all factors have a significant impact. The absence of a significant link between macroeconomic stability and market growth emphasises the complexity of market dynamics.

Based on a panel econometric approach, Olowoniyi and Ojenike (2012) analysed data from 70 Nigerian listed firms from 2000 to 2009 to examine the factors influencing stock returns. The study used fixed effect (FE), random effect (RE), and Hausman test estimators to differentiate between various effects. The results show that tangibility had a negative impact on listed firms' stock returns, while predicting growth and size had a positive impact. To enhance a company's financial status through stock returns, it is recommended to increase its size and improve its tangibility. However, the study's weakness is that it did not consider external factors such as global risk or market volatility that could affect stock returns. Furthermore, investigating how industry-specific variables interact with the tangibility, size, and growth impacts of stock returns could offer valuable insights for companies aiming to enhance their financial performance. In conclusion, this study emphasises the importance of considering multiple factors when assessing the determinants of stock returns for listed firms.

The study uses stock market returns to analyse the impact of cross-border bank lending volatility in SANEK countries, similar to the research conducted by Olowoniyi and Ojenike (2012). However, it also considers external variables such as cross-border equity flow volatility, providing a more comprehensive analysis. This approach reveals the various effects of cross-border bank lending volatility on equity market returns, encompassing both positive and negative influences. By addressing the potential asymmetric effects that Olowoniyi and Ojenike overlooked, this research offers a more nuanced and accurate analysis of the relationship between cross-border bank lending volatility and stock market returns in SANEK countries.

5.1.2.1 Synthesis of the Reviewed Studies

In Mauritius, Makoni and Marozva (2018) established a significant link between FPI, FDI, and capital market growth, using VECM and Granger causality analysis. Additionally, Muntasir (2015) found that foreign equity gross sales increased the volatility of Indonesia's stock market, utilising VAR and VECM models. El-Diftar (2023) investigated the relationship between exchange rates and stock market returns using GARCH (1,1) and ARDL models, identifying a positive long-term relationship, except in Indonesia. Based on time series models, Akosah (2016) identified macroeconomic factors affecting Ghana's stock market. Alshihab (2021) demonstrated that oil prices significantly impacted stock returns in the GCC using panel data models. Research on SANEK countries by Gachanja & Kosimbei (2018), Iriobe et al. (2018), and Onyeisi et al. (2016) confirmed the positive effect of foreign equity flows on stock market growth in Kenya and Nigeria. However, Koskei (2017) concluded that cross-border portfolio equity outflows had no significant effect on Kenyan financial firms. Ochienga et al. (2019) noted that foreign equity flows had a limited impact on Kenya's market volatility, emphasising the importance of local factors. Conversely, Ahmed (2017) found that foreign institutional investors significantly influenced volatility in Egypt. Aduda et al. (2012) and Olowoniyi & Ojenike (2012) highlighted macroeconomic variables such as liquidity, domestic savings, and institutional quality as key determinants of stock market growth. The research models employed in these studies include VAR and Granger causality (Gachanja & Kosimbei, 2018), panel data regression (Koskei, 2017), VECM (Ochienga et al., 2019), ARDL (Iriobe et al., 2018), GMM (Ahmed, 2017), and fixed and random effects models (Olowoniyi & Ojenike, 2012). These studies underscore the need for further investigation into the asymmetric effects of

cross-border equity flow volatility on equity market returns, a gap that the current study aims to address, particularly in the context of SANEK countries.

5.1.2.2 Research Gap in Equity Market Returns

Based on the reviewed studies, there is no literature on the relationship between cross-border equity flow volatility and equity market returns. The current study diverges from these past studies by focusing on the asymmetric effects of cross-border equity flow volatility on equity market returns in SANEK countries. Most prior studies, both international and SANEK (Rizal et al., 2020; Sapian & Auzairy, 2015; Koskei, 2017; Ochienga et al., 2019, among others), analyse the impact of foreign equity inflow levels rather than their volatility. However, market reactions to stable inflows versus volatile inflows can differ significantly, requiring further exploration using models such as asymmetric models. While studies like El-Diftar (2023) and Muntasir (2015) explore volatility in financial markets, they focus primarily on exchange rates rather than foreign equity flow volatility. While some studies utilise ARDL and VAR models, they often fail to capture non-linear effects. The current study will address this gap by employing NADRL models, which can capture such complex dynamics and provide a more accurate understanding of market behaviour, examining the long-term and short-term effects of explanatory factors. This research is a novel contribution to the finance literature, providing valuable insights for investors and policymakers.

5.2 Methodology

5.2.1 Data sources

This empirical study is based exclusively on secondary data, comprising a time series of quarterly observations from 2000Q1 to 2021Q4. The data were sourced from globally recognised databases such as the World Bank, IMF, and the central banks and stock exchanges of the respective countries included in the analysis. Where data were not originally available in quarterly frequency, the frequency conversion tool in EViews was employed, consistent with the methodology outlined by Mamvura and Sibanda (2020). Specifically, the QMA method was used to convert annual data to quarterly format. This method interpolates missing observations by fitting a quadratic polynomial to the available annual data, ensuring a smooth transition across time intervals and preserving long-term trends (EViews, 2023).

Transformed Variables (Originally Annual):

- *Interest Rates* – Sourced from the World Bank's World Development Indicators. Since the data were available only annually, they were converted to quarterly format using the QMA method in EViews to ensure compatibility with other quarterly macro-financial variables.

Non-Transformed Variables (Available in Quarterly Format):

- *Cross-border Equity Flows* – Derived from IMF Balance of Payments (BOP) statistics; already published on a quarterly basis.
- *Equity Market Return* – Measured quarterly and retrieved from the data sourced from national stock exchanges.
- *Stock Price Volatility* – Measured using quarterly standard deviation of returns on major stock indices; data sourced from national stock exchanges.
- *Market Capitalisation* – Captures the total value of listed equities; quarterly data obtained from stock exchange reports and the World Bank Global Financial Development Database.
- *Exchange Rate Risk* – Calculated from quarterly exchange rate data, particularly the standard deviation of nominal exchange rates or trade-weighted exchange rate indices; sourced from central banks and IMF IFS.
- *Inflation Risk* – Measured using quarter-on-quarter changes in the Consumer Price Index (CPI); data sourced from national central bank databases.

5.2.2 Research Design

Objective two models the asymmetric effects of cross-border equity flow volatility on equity market returns in SANEK countries. The research design used ensures clear and successful answers to the research problem. A quantitative technique was the most appropriate for this study (e.g., objective measurement, statistical analysis, large sample sizes, replicability).

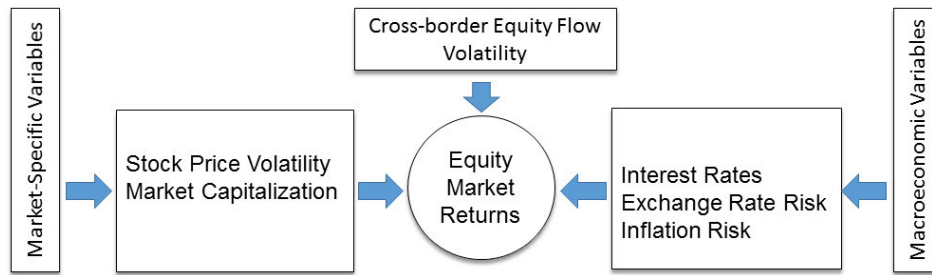


Figure 5.1 Conceptual Framework on cross-border equity flow volatility on Equity Market Returns.

Source: Author's own compilation

Figure 5.1 presents the research model for this study, illustrating the relationship between the dependent variable (equity market returns) and the independent variable (cross-border equity flow volatility). The model also includes control variables such as internal and external equity market variables, stock price volatility, market capitalisation, interest rates, exchange rate risk, and inflation risk. These control variables are important to consider as they help account for potential confounding factors that could influence returns.

5.2.3 Theoretical development of variables

This section outlines the theoretical foundation for the variables used in the research. It focuses on equity market returns as the dependent variable and cross-border equity flow volatility as the independent variable. It also addresses control variables for internal validity.

Dependent Variable: Equity market returns (EMR) is a dependent variable and a function of the remaining six variables.

Equity Market Returns (EMR): Equity returns, as defined by Natarajan, Sivakavitha, and Vasani (2020), are a measure of a firm's performance influenced by various financial theories. One widely used financial theory is CAPM, developed by Sharpe (1964) and Lintner (1965). CAPM assesses the value of risky securities according to their expected return and level of risk, helping determine the risk associated with a security and the relationship between predicted return and risk. The financial objective of a firm is to enhance investment returns (Ross, 1977), considering factors such as stock price fluctuations, market valuations, and shareholder knowledge, while also accounting for potential future events. The World Bank (2022) has observed that historically, SANEK's equity market returns have underperformed.

The stagnation in SANEK's equity market suggests a discrepancy between predicted returns and risk, emphasising the importance of identifying contributing factors for informed decision-making, risk mitigation, and enhanced investment returns.

Explanatory Variable: In the regression analysis, the study included the variable cross-border equity flow volatility associated with EMR.

Cross-border equity flow volatility (EFV): Cross-border equity flows refer to international transactions and holdings involving debt or equity instruments that are not part of direct investments or assets. The volatility in equity flows lacks a theoretical explanation, leading to the use of numerous models and variables to measure it (Lee et al., 2013). Equity flow volatility is influenced by foreign investors who invest in short-term gains but quickly withdraw when uncertainty arises. Consequently, this study suggests that cross-border equity flow volatility impacts EMR in SANEK.

Control Variables: The study includes several control variables in the regression analysis to investigate their relationship with EMR in SANEK. Ruhani and Mat (2022) argue that financial market variables impact EMR. Investors and policymakers closely monitor the interaction between equity markets and macroeconomic variables. Therefore, this study incorporated five control variables: stock price volatility (SPV), market capitalisation (MC), interest rates (IR), exchange rate risk (EXR), and inflation risk (INF).

Stock Price Volatility (SPV): Volatility refers to the degree to which a stock's price rises or falls over a specific period. Investors can predict future swings more accurately by examining stock price volatility, which indicates heightened risk. A stock is considered volatile if its price fluctuates significantly in a short period, reaching historic highs and lows. A stock is considered low volatility if its price rises or falls gradually or remains constant. Investors in SANEK must assess the risks associated with high stock price volatility to forecast future swings. This study explores whether low volatility results in a negative return on the equity market, while high volatility leads to a positive return. Stock price volatility is expected to significantly impact SANEK's EMR.

Market capitalisation (MC): One of the key factors determining equity returns is market capitalization (Reinganum, 1999). Market capitalisation is crucial for stock investors as it helps analyse and compare a company's performance. It provides

insight into its historical success and future forecasts, enabling informed investment decisions and the achievement of desired returns. Market capitalisation is expected to have a positive effect on EMR.

Interest Rates (IR): Fluctuations in interest rates impact equity markets. Low interest rates attract more capital to equity markets with higher returns, while high interest rates encourage more savings in banks (Eldomiaty, Saeed, & Hammam, 2020). Understanding the relationship between interest rates and equity market returns can help investors predict how changes will impact their assets. Therefore, in the context of SANЕК, countries with high interest rates are expected to have negative effects on EMR, while those with low interest rates are expected to have positive effects.

Exchange Rate Risk (EXR): By utilising asset pricing, it is possible to establish a link between exchange rates and equity returns. Recent theories suggest that portfolio rebalancing creates an inverse relationship between foreign exchange and equity market returns. When exchange rates appreciate, foreign assets become more expensive, prompting investors to rebalance their portfolios, which could impact equity market returns. Exchange rates are expected to significantly affect the SANЕК EMR.

Inflation Risk (INF): Studies have examined how inflation impacts equity returns. Fisher (1930) believes that higher inflation should increase nominal dividend payouts. This idea posits that nominal stock returns serve as an inflation hedge. In his 1959 analysis, Gordon argued that investors should set the discount rate based on the dividend yields or capital yields of the company to determine the return rate. Rising inflation expectations and actual rates are expected to lead to increased dividend payments for equities, resulting in upward revisions in stock prices. There is insufficient evidence to support the idea that nominal equity returns effectively hedge against inflation, which contradicts classical economic theory (Fama and Schwert, 1977), resulting in the "inflation-stock return paradox." In countries with high or low inflation rates, inflation is expected to have a negative or positive impact on EMR.

5.2.4 Estimation Techniques

5.2.4.1 Unit root tests for stationarity

The research utilised the ADF test (Dickey and Fuller, 1981) and the Phillips-Perron (PP) test (Phillips and Perron, 1988) to assess the stationarity of the variables and determine their order of integration. According to Brooks (2008), these tests are important because they provide a better understanding of structural breakdowns, trends, and stationarity in the data. The tests assess long-term equilibrium relationships between research variables, ensuring stationarity in time series data. They evaluate data behaviour, draw meaningful conclusions about the relationships between variables, and enhance the reliability and accuracy of research findings.

5.2.4.2 Nonlinear Autoregressive and Distributed Lag Model (NARDL Model)

This study applies the NARDL model to analyse the asymmetric impact of cross-border equity flows on equity market returns in SANEK. Unlike the ADRL model, which assumes a symmetric relationship between explanatory and dependent variables (see Pesaran et al., 2001), the NARDL model allows for differentiation between positive and negative changes (see Shin et al., 2014) in cross-border equity flow volatility (EFV). Behavioural finance theory suggests that investors may react asymmetrically to shocks in market conditions. Capital inflows (positive shocks) might be seen as a sign of optimism, leading to increased returns, whereas capital outflows (negative shocks) may induce panic or uncertainty, leading to larger negative market reactions. The effect of cross-border equity flow volatility on equity market returns is considered by including positive EFV_t^+ and negative, EFV_t^- changes in cross-border equity flow volatility as explanatory variables in the aggregate production function. Positive changes in EFV and negative changes in EFV represent an increase and decrease in EFV, respectively. Understanding these changes is crucial for assessing the impact of cross-border equity flow volatility on the aggregate production function.

$$EFV_t^+ = \sum_{i=1}^t \Delta EFV_t^+ = \sum_{i=1}^t \max(EFV_i, 0) \quad (5.1)$$

$$EFV_t^- = \sum_{i=1}^t \Delta EFV_t^- = \sum_{i=1}^t \min(EFV_i, 0) \quad (5.2)$$

In this essay, the study applies the NARDL technique (Shin et al., 2014) to investigate the presence of an asymmetric long-run equilibrium connection

(cointegration) between cross-border stock flow volatility and equity market returns. Equation (5.3) demonstrates this approach.

$$\begin{aligned} \Delta EMR_t = & \gamma_1 + \sum_{i=1}^p \theta_{1i} \Delta EMR_{t-i} + \sum_{i=0}^q \theta_{2i} \Delta EFV_{t-i}^+ + \sum_{i=0}^r \theta_{3i} \Delta EFV_{t-i}^- + \\ & \sum_{i=0}^s \theta_{4i} \Delta SPV_{t-i} + \sum_{i=0}^t \theta_{5i} \Delta MC_{t-i} + \sum_{i=0}^u \theta_{6i} \Delta IR_{t-i} + \sum_{i=0}^x \theta_{7i} \Delta EXR_{t-i} + \sum_{i=0}^y \theta_{8i} \Delta INF_{t-i} + \\ & \tau_1 EMR_{t-0} + \tau_2 EFV_{t-0}^+ + \tau_3 EFV_{t-0}^- + \tau_4 SPV_{t-0} + \tau_5 MC_{t-0} + \tau_6 IR_{t-0} + \tau_7 EXR_{t-0} + \tau_8 INF_{t-0} \\ & + \varepsilon_t \end{aligned} \quad (5.3)$$

In which Δ is a first difference operator, EMR_t refers to equity market returns, EFV_{t-i}^+ and EFV_{t-i}^- are the positive and negative shocks in cross-border equity flow volatility, SPV_t is the stock price volatility, MC_t is the market capitalization, IR_t is the interest rate, EXR_t is the exchange rate risk, INF_t is the inflation risk. The optimal lag order, denoted by $p, q, r, s, t, u, x,$ and $y,$ is estimated using either the Akaike or the Schwarz information criterion.

Testing for EFV and EMR's long-run link using F-tests for joint significance of the lagged level variables' coefficients ($H_0: \tau_1, \tau_2, \tau_3, \tau_4, \tau_5, \tau_6, \tau_7, \tau_8 = 0$). Pesaran et al. (2001) provide lower and upper bounds for critical values due to the nonstandard distribution of F-statistics. If the F-statistic exceeds the upper bound of the critical values provided by Pesaran et al. (2001), it implies that cointegration exists between EFV and EMR. This finding suggests a long-run relationship between the two variables, meaning that changes in EFV can be explained by changes in EMR over time. On the other hand, if the F-statistic does not exceed the upper bound of critical values, it fails to establish a cointegration between EFV and EMR, indicating no long-run link between the variables.

Equation 5.4 shows the error-correction term (ECT) form of the NARDL model given in Equation 5.3.

$$\begin{aligned} \Delta EMR_t = & \gamma_1 + \sum_{i=1}^p \theta_{1i} \Delta EMR_{t-i} + \sum_{i=0}^q \theta_{2i} \Delta EFV_{t-i}^+ + \sum_{i=0}^r \theta_{3i} \Delta EFV_{t-i}^- + \\ & \sum_{i=0}^s \theta_{4i} \Delta SPV_{t-i} + \sum_{i=0}^t \theta_{5i} \Delta MC_{t-1} + \sum_{i=0}^u \theta_{6i} \Delta IR_{t-i} + \sum_{i=0}^x \theta_{7i} \Delta EXR_{t-i} + \\ & \sum_{i=0}^y \theta_{8i} \Delta INF_{t-i} + \tau_1 EMR_{t-1} + \tau_2 EFV_{t-0}^+ + \tau_3 EFV_{t-0}^- + \tau_4 SPV_{t-0} + \tau_5 MC_{t-0} + \\ & \tau_6 IR_{t-0} + \tau_7 EXR_{t-0} + \tau_8 INF_{t-0} + \phi ECT_{t-0} + \varepsilon_t \end{aligned} \quad (5.4)$$

This coefficient of the error-correction term ϕ reflects how quickly the long-run equilibrium of EMR, EFV, SPV, MC, IR, EXR, and INF is adjusted after a shock. It quantifies the extent to which the previous period's disequilibrium is corrected in the current period. It is important for this coefficient to be negative to achieve dynamic stability.

5.2.4.3 Diagnostic Tests

Diagnostic tests check for autocorrelation, heteroscedasticity, and normality issues in the model. The Lagrange Multiplier (LM) test detects autocorrelation by examining the residuals for patterns or correlations. The Breusch-Pagan-Godfrey test identifies violations of the constant variance assumption, while the Jarque-Bera test assesses normality in the residuals (Seddighi, 2013). These tests are crucial for ensuring the validity and reliability of the model by identifying and addressing issues such as autocorrelation, variance violations, and normality deviations.

5.2.4.4 Stability Test

Cumulative sum (CUSUM) tests are used to assess the quality and stability of variables in both the short and long term. These tests help evaluate the consistency of coefficients in a multiple-linear regression model. When the CUSUM statistics plot stays within the 5% significance level range, it implies that the model's coefficients are stable (Bekhet and Matar, 2013). If the plot exceeds the 5% range, it suggests structural changes or fractures, requiring further analysis and revisions to ensure the reliability and validity of the regression model (Bekhet and Matar, 2013).

5.3 Analysis and Results

This section presents a summary and analysis of the data analysis results, starting with summary statistics, followed by tests for stationarity and cointegration. The EFV-EMR analysis results are discussed, and the findings are considered in terms of their implications, leading to relevant conclusions.

5.3.1 Descriptive Analysis

South Africa

Table 5.1 shows that the average return on the equity market is 11.92%, indicating relatively positive performance over the sample period. The high standard deviation of 12.67 suggests significant variability in equity market returns, indicating periods of high volatility. In contrast, the average EFV is relatively low at 4.09, though this may vary depending on the context, potentially indicating moderate fluctuations. The standard deviation of 6.68, relative to the mean, suggests considerable variation in the volatility of cross-border equity flows. The average volatility of stock prices is 18.99, which may indicate significant price fluctuations. The standard deviation of 4.57 is moderate compared to the mean, implying a certain level of volatility in stock prices. The average market capitalisation is 242.96 billion (in US currency), reflecting the general size of the companies in the sample. The standard deviation of 62.62 in market capitalisation indicates moderate variability across companies, suggesting that the sample includes both large and small firms. The average interest rate stands at 11.01%, suggesting a relatively high rate that may reflect macroeconomic conditions or monetary policy. The standard deviation of 2.53 indicates moderate variation in interest rates. On average, exchange rate risk is 86.98, signifying a considerable level of risk related to currency fluctuations. The large standard deviation of 11.69 relative to the mean indicates significant variation in exchange rate risk. Lastly, the average inflation risk is 108.05, indicating considerable exposure to inflationary pressures. The standard deviation of 35.07 suggests high variability in inflation risk, possibly due to fluctuations in inflation rates.

Table 5.1: South Africa Summary of EMR Descriptive Statistics

Description	EMR	EFV	SPV	MC	IR	EXR	INF
Mean*	11.92361	4.087075	18.98572	242.9649	11.01114	86.97864	108.0484
Median*	11.49041	1.818266	18.20090	249.2295	10.41500	84.40000	101.7150
Maximum*	38.90451	54.88010	34.10648	352.1564	17.00000	108.9900	174.9900
Minimum*	-13.60202	0.000000	12.98573	121.3611	7.000000	64.68000	58.14000
Standard Deviation	12.66639	6.675018	4.567341	62.62426	2.532576	11.68720	35.06533
Skewness	0.260682	5.445048	1.058680	-0.057574	0.602128	0.174620	0.336017
Kurtosis	2.525287	39.68198	4.070404	2.183124	2.561479	1.843576	1.789708
Jarque-Bera (JB)		5368.594	20.63960	2.495336	6.022631	5.350715	7.026933
Probability	1.822966	0.000000	0.000033	0.287174	0.049227	0.068882	0.029793
Observations	0.401928	88	88	88	88	88	88

Source: Authors' Estimation using EViews 13

A positive skewness of 0.26 indicates a slight tendency for the distribution of equity market returns to experience more frequent small losses along with occasional large gains. Conversely, an EFV skewness of 5.45 represents a highly skewed distribution, suggesting a greater frequency of extreme positive volatility observations compared to negative ones. A positive skewness of 1.06 in stock price volatility indicates a distribution with a long right tail, implying occasional extreme spikes in volatility. A market capitalisation skewness of -0.06 suggests a nearly symmetric distribution with a slight negative skew, indicating a marginally higher frequency of smaller firms compared to larger ones. A positive skew of 0.60 for interest rates reflects more frequent smaller increases, with occasional larger hikes. The skewness of 0.17 in exchange rate risk is close to zero, implying a nearly symmetric distribution. Finally, the positive skew of 0.34 in inflation risk indicates more frequent small increases in inflation, with occasional large jumps.

The kurtosis of equity market returns is 2.53, indicating a slightly platykurtic distribution, which means the data is somewhat flatter than a normal distribution and contains fewer extreme outliers. In contrast, EFV has a very high kurtosis of 39.68, reflecting a highly leptokurtic distribution with significantly more extreme outliers than would be expected in a normal distribution. Stock price volatility shows a kurtosis of 4.07, indicating a leptokurtic distribution with a higher concentration of extreme outliers. MC has a kurtosis of 2.18, suggesting a slightly flatter distribution with fewer extreme values than normal. The kurtosis of interest rates is 2.56, indicating a distribution that is slightly less peaked than normal. EXR has a kurtosis of 1.84, indicating a relatively flat distribution with fewer extreme values. Finally, INF has a kurtosis of 1.79, suggesting a similarly flat distribution with fewer extreme outliers than a normal distribution.

Nigeria

Table 5.2 presents the mean equity market return of 12.92, indicating positive market growth. However, the high standard deviation of 25.90 suggests significant fluctuations, implying considerable volatility in market returns. Cross-border equity flow volatility averages 1.22, reflecting relatively low volatility, but the high standard deviation of 2.78 indicates substantial fluctuations in these flows. SPV averages 15.57, implying significant price fluctuations, which is confirmed by a standard deviation of

4.10, indicating large variations in stock prices. The mean of market capitalisation is 11.22, with a standard deviation of 5.12, highlighting considerable diversity in company sizes. Interest rates average 17.62, which is relatively high, with moderate variability indicated by a standard deviation of 2.99, suggesting periodic fluctuations in rates. EXR averages 232.80, accompanied by a massive standard deviation of 1253.96, indicating extreme volatility and uncertainty in exchange rates. Finally, inflation risk is relatively high, with an average of 87.35, though it is not as extreme as exchange rate risk.

Table 5.2: Nigeria Summary of EMR Descriptive Statistics

Description	EMR	EFV	SPV	MC	IR	EXR	INF
Mean*	12.92062	1.216648	15.57343	11.22025	17.61955	232.7952	87.35409
Median*	11.31008	0.101780	14.84547	11.55728	17.02500	99.81000	97.66000
Maximum*	72.00127	13.98811	28.64032	30.80067	26.25000	11861.00	136.1300
Minimum*	-54.94028	0.000000	8.336350	2.488780	11.20000	64.03000	27.29000
Standard Deviation	25.90219	2.776006	4.098438	5.122896	2.986985	1253.957	31.95586
Skewness	-0.025693	2.919997	1.232635	1.056840	0.642491	9.217049	-0.411008
Kurtosis	2.419544	11.05860	4.404783	5.857113	4.085471	85.97360	1.806496
Jarque-Bera (JB)		363.1709	29.52023	46.31271	10.37456	26489.60	7.700595
Probability	1.245090	0.000000	0.000000	0.000000	0.005587	0.000000	0.021273
Observations	0.536577	88	88	88	88	88	88

Source: Authors' Estimation using EViews 13

The skewness values for key economic variables highlight different tendencies in their distributions. EMR (0.03) exhibits skewness close to zero, indicating that the data is nearly symmetric, with a slight negative skew suggesting a mild inclination towards larger negative returns. EFV (2.92) displays a high positive skew, signifying that the data is heavily tilted towards higher values, with few extreme positive observations. SPV (1.23) also shows a positive skew, indicating the presence of several unusually high volatility periods within the data. Similarly, MC (1.06) exhibits a positive skew, suggesting that a handful of companies with very high market capitalisation are influencing the distribution. IR shows a slight positive skew (0.64), indicating that higher interest rates occur slightly more frequently than lower ones. EXR has an extremely positive skew (9.22), indicating that extreme values of exchange rate risk are much more prevalent than smaller values. Lastly, INF shows a negative skew (-0.41), suggesting that the distribution leans slightly towards lower inflation risk.

The kurtosis values for key economic variables reveal distinct distribution characteristics. EMR has a kurtosis of 2.42, indicating a relatively low level that suggests the distribution of equity market returns is close to normal, with fewer

extreme values or outliers. EFV, with a kurtosis of 11.06, demonstrates extremely high kurtosis, suggesting a leptokurtic distribution with many extreme outliers. SPV's kurtosis of 4.40 also exceeds 3, indicating a leptokurtic distribution that includes outliers or extreme events in stock price volatility. MC displays a high kurtosis of 5.86, pointing to a distribution with frequent extreme values, likely influenced by large corporations. IR has a kurtosis of 4.09, suggesting that the distribution features higher peaks than normal, accompanied by some extreme observations. EXR exhibits an exceptionally high kurtosis of 85.97, reflecting significant volatility and uncertainty, with numerous extreme outliers within the distribution. Finally, INF has a kurtosis of 1.81, indicating a normal distribution with few extreme outliers.

Egypt

Table 5.3 presents key statistics regarding the equity market in Egypt. The average return in the equity market is 19.92%, indicating that the market experienced positive returns during the analysis period. However, the high standard deviation of 44.90 suggests these returns are highly volatile, with significant fluctuations over time. In terms of cross-border equity flow volatility, the average is 0.11, indicating relatively stable fluctuations. The standard deviation of 0.17 for this metric signifies some variability, but nothing excessive. Conversely, stock price volatility is notably high, averaging 25.87%. The standard deviation of 4.54 reinforces the notion of a volatile stock market environment. The mean market capitalisation stands at 34.77 billion, suggesting that the companies in the market are generally of moderate size. The standard deviation of 23.90 indicates moderate variation in company sizes, with a mix of large and small firms. The mean interest rate is 13.02%, reflecting a relatively high rate in Egypt's economy. The lower standard deviation of 2.19 for interest rates suggests stable monetary policy. Regarding exchange rate risk, the mean is 12.18, indicating moderate currency risk, while the standard deviation of 6.60 suggests notable fluctuations in currency risk during the period analysed. Lastly, inflation is significantly high, averaging 133.63%, which points to substantial inflation in Egypt. The large standard deviation of 89.80 in inflation rates indicates that inflation has varied widely over this time, likely due to economic instability.

Table 5.3: Egypt Summary of EMR Descriptive Statistics

Description	EMR	EFV	SPV	MC	IR	EXR	INF
Mean*	19.91879	0.108895	25.86740	34.77369	13.01920	12.18375	133.6288
Median*	6.099678	0.037128	26.10108	24.03989	12.61500	9.205000	105.5450
Maximum*	169.8130	0.958947	39.48174	106.7741	19.70000	26.18000	328.6700
Minimum*	-36.27894	0.000000	16.97506	10.02372	9.370000	4.540000	41.95000
Standard Deviation	44.89926	0.169593	4.537800	23.89620	2.188267	6.603176	89.80290
Skewness	1.568807	3.302392	0.366060	1.312016	1.258751	1.048229	0.889039
Kurtosis	5.080803	14.48741	3.459605	3.985643	4.693371	2.544646	2.420815
Jarque-Bera (JB)		643.8070	2.739868	28.80913	33.75285	16.87578	12.82239
Probability	51.97266	0.000000	0.254124	0.000001	0.000000	0.000217	0.001643
Observations	0.000000	88	88	88	88	88	88

Source: Authors' Estimation using EViews 13

The skewness values for key economic variables indicate distinct distribution patterns. EMR (1.57) has positive skewness, reflecting a right-skewed distribution with more frequent smaller negative returns and fewer, larger positive returns. EFV (3.30) exhibits highly positive skewness, suggesting that the distribution is primarily concentrated on lower values with occasional extreme volatility. SPV (0.37) shows a slight positive skew, indicating that stock price volatility has a small right tail but is generally symmetrical. MC has a moderately positive skew (1.31), implying that while most companies are small, a few very large firms significantly influence the distribution. IR displays positive skewness (1.26), indicating a tendency towards lower rates, with only a few instances of very high rates. Likewise, exchange rate risk (1.05) shows positive skewness, suggesting that risks are typically low, with occasional spikes. Finally, INF (0.89) also reveals positive skewness, indicating that inflation has generally been moderate, with infrequent occurrences of very high inflation.

The kurtosis values for various economic variables reveal distinct distribution characteristics. EMR, with a kurtosis of 5.08, indicates high kurtosis, suggesting that equity market returns exhibit fat tails, meaning there are more extreme returns than expected in a normal distribution. Cross-border equity flow volatility shows an exceptionally high kurtosis of 14.49, indicating that the data is highly concentrated around the mean with significant outliers. SPV has a kurtosis value of 3.46, which is greater than 3, suggesting that stock price volatility has slightly heavier tails compared to a normal distribution. MC has a kurtosis of 3.99, indicating a distribution with slightly heavier tails than normal. IR kurtosis is high at 4.69, suggesting that extreme spikes in interest rates occur more frequently than in a normal distribution. EXR has a kurtosis of 2.54, which is below 3, indicating a relatively normal distribution with fewer extreme

values. Lastly, INF has a kurtosis of 2.42, implying a distribution that is relatively normal, with fewer extreme inflation events.

Kenya

Table 5.4 presents various statistics regarding market returns and risks. The mean return is 5.49, indicating an average positive return in the equity market. However, the standard deviation of 14.67 reveals a high level of variability in these returns. For cross-border equity flows, the mean is 0.0231, suggesting low volatility, with a standard deviation of 0.0798 indicating relatively low fluctuation in these flows. In relation to stock prices, the mean is 21.96, which signifies a relatively high level of volatility, while the standard deviation of 11.73 points to significant variability in stock price volatility. Regarding market capitalisation, the mean is 27.64, suggesting a moderate market size, with a standard deviation of 8.69 indicating moderate variation in this area. The average interest rate is 15.32, reflecting a high tendency, while the standard deviation of 2.90 shows moderate variability in interest rates. Additionally, the mean exchange rate risk is 124.94, indicating a relatively high level of risk, with a standard deviation of 18.00 suggesting significant variability. Lastly, the mean inflation risk is 131.53, reflecting a high level of risk in the economy, with a substantial standard deviation of 90.41 indicating considerable variation in inflation risk.

Table 5.4: Kenya Summary of EMR Descriptive Statistics

Description	EMR	EFV	SPV	MC	IR	EXR	INF
Mean*	5.488911	0.023102	21.95841	27.63647	15.32284	124.9417	131.5256
Median*	4.001684	9.89E-05	17.01050	27.18430	14.13000	126.5450	105.6200
Maximum*	50.01639	0.470181	46.09012	44.05734	24.77000	158.3500	371.9800
Minimum*	-30.14827	0.000000	10.11700	8.049443	11.88000	97.33000	27.90000
Standard Deviation	14.67380	0.079783	11.72666	8.689700	2.904751	18.00002	90.41382
Skewness	0.629339	4.441673	0.762182	-0.466166	0.942440	0.077404	0.928707
Kurtosis	3.708763	21.89899	2.242209	3.047918	3.241488	1.725704	2.873866
Jarque-Bera (JB)		1598.980	10.62576	3.195676	13.24065	6.041919	12.70829
Probability	7.650919	0.000000	0.004928	0.202337	0.001333	0.048754	0.001740
Observations	0.021808	88	88	88	88	88	88

Source: Authors' Estimation using EViews 13

The skewness of 0.6293 indicates a slight positive skew, suggesting that returns are more frequently above the mean. In contrast, the EFV skewness of 4.4417 is very high, indicating a highly right-skewed distribution, characterised by infrequent but extreme values on the higher end. A skewness of 0.7622 implies a slight positive skew in stock price volatility. Conversely, the skewness of -0.4662 reveals a negative skew, indicating that lower values for market capitalisation occur more frequently than higher

ones. The skewness of 0.9424 suggests a moderately positive skew, indicating that higher interest rates are observed more frequently. The EXR skewness of 0.0774 is very close to zero, signifying that the distribution is nearly symmetrical. Lastly, the skewness of 0.9287 denotes a positive skew, implying that inflation risk tends to lean towards higher values.

The kurtosis of the EMR is 3.71, slightly above 3, indicating that the distribution is close to normal but has a more pronounced peak. In contrast, the kurtosis of cross-border equity flow volatility is extremely high at 21.90, suggesting a very heavy tail and the presence of many extreme values. The SPV has a kurtosis of 2.24, indicating a distribution with a lighter tail than a normal distribution. The MC kurtosis is 3.05, pointing to a relatively normal distribution. The EXR shows a kurtosis of 1.73, indicating a platykurtic distribution with lighter tails compared to a normal distribution. Lastly, the INF has a kurtosis of 2.87, suggesting a distribution with a moderate peak and lighter tails than normal.

5.3.2 Test for stationarity

The ADF test is used to assess the stationarity of a time series, as shown in Table 5.5. If the t-statistic is less than the critical value (specifically, -3.465548 at a 5% significance level), we reject the null hypothesis of a unit root, indicating that the variable is stationary. Conversely, if the t-statistic exceeds the critical value, the variable is deemed non-stationary and requires differencing to achieve stationarity.

The ADF results in Table 5.5 show that, in South Africa, at level $I(0)$, $\ln EMR$ and $\ln IIR$ are stationary at the 1% significance level, while $\ln EFV$ is stationary at the 5% significance level. In contrast, $\ln SPV$, $\ln MC$, $\ln EXR$, and $\ln INF$ are non-stationary. After first differencing $I(1)$, all variables ($\ln EMR$, $\ln EFV$, $\ln SPV$, $\ln MC$, $\ln IIR$, $\ln EXR$, $\ln INF$) become stationary at either the 1% or 5% significance level. These findings have significant implications. The stationarity of $\ln EMR$ and $\ln IIR$ at $I(0)$ suggests that equity market returns and interest rates respond quickly to shocks, which supports the Efficient Market Hypothesis (Fama, 1970), positing that financial markets adjust rapidly to new information. Conversely, the non-stationarity of $\ln EFV$ indicates persistent shocks to market volatility, aligning with Minsky's Financial Instability Hypothesis (Minsky, 1986), which suggests long-term effects of financial instability.

Table 5.5: ADF Unit Root Test Results.

Variables	South Africa		Nigeria		Egypt		Kenya	
	ADF Test		ADF Test		ADF Test		ADF Test	
	t-statistic	Critical Value (5%)	t-statistic	Critical Value (5%)	t-statistic	Critical Value (5%)	t-statistic	Critical Value (5%)
Status I(0)								
LnEMR	-3.748650***	-3.465548	-2.296805	-3.468459	-3.655161**	3.465548	-3.013654	-3.468459
LnEFV	-2.50463	-3.464865	-2.793891	-3.462292	-3.974557***	-3.462292	-3.672514***	-3.462292
LnSPV	-2.758593	-3.462912	-3.359871	-3.462912	-2.260545	-3.468459	-2.317757	-3.462912
LnMC	-2.693256	-3.468459	-3.081125	-3.468459	-2.799960	-3.462912	-2.761694	-3.462912
LnIR	-3.114924	-3.462912	-2.335361	-3.462912	-2.888777	-3.463547	-3.044314	-3.462912
LnEXR	-2.988932	-3.462912	-9.445921	-3.462292	-1.632641	-3.462912	-3.411262**	-3.462292
LnINF	-0.964134	-3.462912	-1.942253	-3.462292	-0.706709	-3.462292	-3.591219*	-3.465548
Status I(1)								
LnEMR	-3.845937**	-3.462912	-2.361840	-3.468459	-3.044989	-3.465548	-3.672514***	-3.462292
LnEFV	-3.988192**	-3.465548	-10.55007***	-3.157836	-10.61254***	-3.462912	-9.519190***	-3.462912
LnSPV	-3.654040**	-3.462912	-3.562002*	-3.462912	-2.659479	-3.468459	-2.268019	-3.462912
LnMC	-3.663081**	-3.468459	-3.3471000*	-3.468459	-3.584410**	-3.462912	-2.636899	-3.468459
LnIR	-5.676767***	-3.462912	-7.573653***	-3.462912	-4.424394***	-3.462912	-5.682093***	-3.462912
LnEXR	-7.415463***	-3.462912	-8.885426***	-3.464198	-12.84575***	-3.462912	-8.920269***	-3.462912
LnINF	-6.675498***	-3.462912	-9.735655***	-3.462912	-5.169796***	3.463547	-0.869540	-3.464865

Note. (***), (**), (*), indicate significant at 1%, 5%, 10%. All the variables are log linearized.

In Nigeria, at level I(0), *lnEFV* is stationary at 1% significance, *lnSPV* at 10% significance, *lnEXR* at 1% significance, and *lnINF* at 1% significance. *lnEMR*, *lnMC*, and *lnIR* are non-stationary. After first differencing I(1), all variables (*lnEMR*, *lnEFV*, *lnSPV*, *lnMC*, *lnIR*, *lnEXR*, *lnINF*) become stationary at 1% or 5% significance. The implications are that the stationarity of *lnEFV* and *lnSPV* at I(0) indicates that stock price volatility and cross-border equity flow volatility in Nigeria respond quickly to external shocks, consistent with the Efficient Market Hypothesis (Fama, 1970). The non-stationary nature of *lnEMR*, *lnMC*, and *lnIR* suggests that shocks to equity market returns, market capitalisation, and interest rates have long-lasting effects, supporting the Financial Accelerator Model (Bernanke et al., 1999), which explains how financial conditions amplify economic cycles.

In Egypt, at level I(0), the variables *lnEFV*, *lnIR*, *lnEXR*, and *lnINF* are stationary at the 1% significance level, while *lnEMR*, *lnSPV*, and *lnMC* are non-stationary. However, after first differencing to achieve I(1), all variables (*lnEMR*, *lnEFV*, *lnSPV*, *lnMC*, *lnIR*, *lnEXR*, *lnINF*) become stationary at either the 1% or 5% significance level. The implications of these findings are significant: the stationarity of *lnEFV*, *lnIR*, and

lnEXR at $I(0)$ suggests that volatility in equity flows, interest rates, and exchange rates in Egypt responds quickly to market shocks, supporting the Efficient Market Hypothesis (Fama, 1970). In contrast, the non-stationarity of *lnEMR* and *lnMC* at $I(0)$ indicates that long-term shocks influence equity market returns and market capitalisation, which signals potential financial instability, consistent with Minsky's Financial Instability Hypothesis (Minsky, 1986).

In Kenya, at level $I(0)$, the variables *lnEMR*, *lnEFV*, and *lnEXR* are stationary at a 1% significance level, while *lnSPV*, *lnMC*, *lnIR*, and *lnINF* are non-stationary. After applying first differencing $I(1)$, all variables (*lnEMR*, *lnEFV*, *lnSPV*, *lnMC*, *lnIR*, *lnEXR*, *lnINF*) become stationary at either the 1% or 5% significance levels. The implications are that the stationarity of *lnEMR*, *lnEFV*, and *lnEXR* at $I(0)$ suggests that equity market returns, cross-border equity flow volatility, and exchange rate volatility in Kenya respond quickly to shocks, supporting the Efficient Market Hypothesis (Fama, 1970). Conversely, the non-stationary nature of *lnSPV*, *lnMC*, and *lnIR* at $I(0)$ indicates that stock price volatility, market capitalisation, and interest rates are affected by persistent shocks, which aligns with Minsky's Financial Instability Hypothesis (Minsky, 1986).

Table 5.6: PP Unit Root Test Results.

Variables	South Africa		Nigeria		Egypt		Kenya	
	PP Test		PP Test		PP Test		PP Test	
	t-statistic	Critical Value (5%)	t-statistic	Critical Value (5%)	t-statistic	Critical Value (5%)	t-statistic	Critical Value (5%)
Status I(0)								
LnEMR	-2.550965	-3.462292	-2.821882	-3.462292	-2.318199	-3.462292	-3.413297*	-3.462292
LnEFV	-7.201798***	-3.462292	-2.775286	-3.462292	-4.036003**	-3.462292	-3.857754**	-3.462292
LnSPV	-1.872822	-3.462292	-2.188372	-3.462292	-2.825805	-3.462292	-1.538510	-3.462292
LnMC	-3.056241	-3.462292	-2.202610	-3.462292	-1.990400	-3.462292	-1.895856	-3.462292
LnIR	-2.608187	-3.462292	-2.340558	-3.462292	-1.814532	-3.462292	-2.997351	-3.462292
LnEXR	-2.795478	-3.462292	-9.448205	-3.462292	-2.170562	-3.462292	-3.457189	-3.462292
LnINF	-1.130289	-3.462292	-1.816280	-3.462292	-0.665014	-3.462292	6.236644	-3.462292
Status I(1)								
LnEMR	-4.118712***	-3.462912	-4.319941	-3.462912	-3.992454**	-3.462912	-4.500616***	-3.462912
LnEFV	-17.44278***	-3.462912	-10.78699***	-3.462912	10.92578***	-3.462912	-9.537246**	-3.462912
LnSPV	-3.900467**	-3.462912	-3.548434**	-3.462912	-4.451521***	-3.462912	-2.331393	-3.462912
LnMC	-4.598894**	-3.462912	-4.485517***	-3.462912	-3.828977**	-3.462912	-4.151871***	-3.462912
lnIR	-5.704900***	-3.462912	-7.648986***	-3.462912	-4.377228***	-3.462912	-5.462823***	-3.462912
lnEXR	-7.430374***	-3.462912	-84.98290**	-3.462912	-12.44263***	-3.462912	-9.556700***	-3.462912
lnINF	-6.644513***	-3.462912	-11.73514***	-3.462912	-10.39118**	-3.462912	-6.378973***	-3.462912

Note. (***) , (**),(*) , indicate significant at 1%, 5%, 10%. All the variables are log linearized.

Table 5.6 is the interpretation of the PP test results for South Africa, Nigeria, Egypt, and Kenya, based on the variables of interest. If the t-statistic is less than the critical value (in this case, -3.462292 at the 5% significance level), we reject the null hypothesis, indicating that the series is stationary. If the t-statistic is greater than the critical value, the series is non-stationary and needs to be differenced to achieve stationarity.

Table 5.6 shows that in South Africa, *lnEFV*, *lnEMR*, *lnEXR*, and *lnIR* are stationary at a 1% significance level at $I(0)$, indicating a quick adjustment to market shocks. In contrast, *lnSPV*, *lnMC*, and *lnINF* are non-stationary at $I(0)$, suggesting that these variables respond to changes over the long term. This pattern aligns with Minsky's Financial Instability Hypothesis, which posits that external shocks can have prolonged effects on financial markets. At the first difference ($I(1)$), all variables achieve stationarity at a 1% or 5% significance level, confirming the presence of long-term trends in the non-stationary variables.

Similarly, in Nigeria, *lnEMR*, *lnEFV*, and *lnEXR* are stationary at a 1% significance level at $I(0)$, reflecting their responsiveness to external shocks. However, stock price volatility *lnSPV*, *lnMC*, *lnIR*, and *lnINF* remain non-stationary at $I(0)$, implying that shocks to these variables have lasting effects. These findings highlight the financial vulnerabilities present in Nigeria's market, consistent with Minsky's Financial Instability Hypothesis, which suggests that financial systems are prone to instability due to persistent market fluctuations. At $I(1)$, all variables become stationary at a 1% or 5% significance level, reinforcing the idea that non-stationary financial variables follow long-term trends before adjusting.

Egypt exhibits a similar pattern, with *lnEMR*, *lnEFV*, *lnIR*, and *lnEXR* being stationary at $I(0)$ at a 1% significance level, demonstrating immediate responsiveness to market shocks. Conversely, *lnSPV*, *lnMC*, and *lnINF* are non-stationary at $I(0)$, suggesting susceptibility to long-term economic shocks. This behaviour reflects vulnerabilities in Egypt's financial system, aligning with Minsky's perspective on financial instability. At $I(1)$, all variables achieve stationarity, indicating that while short-term market movements are responsive, deeper financial trends persist over time before stabilising.

In Kenya, *lnEMR*, *lnEFV*, and *lnEXR* are likewise stationary at a 1% significance level at $I(0)$, indicating a swift reaction to external shocks. However, *lnSPV*, *lnMC*, *lnIR*, and *lnINF* remain non-stationary at $I(0)$, suggesting long-term fluctuations in response to economic changes. These persistent vulnerabilities in Kenya’s financial system align with Minsky’s theory of financial instability, which emphasises the prolonged impact of market volatility. At $I(1)$, all variables become stationary at a 1% or 5% significance level, confirming that financial variables eventually adjust to market conditions, despite initial long-term effects.

5.3.3 NARDL Findings and Discussion

Estimation algorithms were used to examine the impact of cross-border equity flow volatility on equity market returns in individual countries of SANEK. The analysis was conducted using the EViews 13 software package. The dataset used included quarterly data from 2000Q1 to 2021Q4 for the following SANEK countries: South Africa, Nigeria, Egypt, and Kenya.

5.3.3.1 Bounds Tests for Asymmetric Cointegration

It was important to determine if there was a cointegration nexus between the variables before testing the short- and long-run asymmetric relationships between them. A NARDL bound test was used to identify cointegration. The results are displayed in Table 5.7.

Table 5.7: Bounds Test for SANEK.

Description	South Africa	Nigeria	Egypt	Kenya
Bounds F Test	<...I(0).....I(1)...>	<...I(0).....I(1)...>	<...I(0).....I(1)...>	<...I(0).....I(1)...>
1% Critical Value	2.860..... 4.100	2.860..... 4.100	2.860..... 4.100	2.860..... 4.100
F-statistics	5.532830	5.533019	4.539238	5.593120

Source: Authors’ Estimation using EViews 13.

Based on the F-test results, Egypt has the lowest value of 4.539238, followed by South Africa with 5.532830. Nigeria falls in the middle with a value of 5.533019, while Kenya has the highest value of 5.593120. These values indicate that all countries exhibit statistically significant differences when compared to the critical value range of 2.860–4.100, confirming substantial variation among the countries. This suggests a long-term relationship between the variables in each country. Further, the results indicate that there is a long-term relationship between the variables that is not random.

5.3.3.2 Long-run and Short-run NARDL Results

South Africa

Table 5.8 shows that the negative coefficient of $EMR(-1)$ in the long run, alongside the positive coefficient of $EMR(-1)$ in the short run, suggests that long-term EMR in South Africa negatively affects future returns, whereas short-term returns positively influence current returns. Thus, both long-run and short-run dynamics must be considered.

Table 5.8: South Africa Long Run and Short Run Results for EMR from the NARDL (2,2,2,2,1,2,0) model. The model was selected based on Akaike information criteria (AIC).

Long run			Short run		
Variables	Coefficient	Pro.	Variables	Coefficient	Pro.
$EMR(-1)$	-0.646309	0.0000***	$EMR(-1)$	0.437985	0.0018***
$lnEFV_P(-1)$	0.451926	0.0268**	$lnEFV_P$	0.039862	0.5438
$lnEFV_N(-1)$	-0.513982	0.2008	$lnEFV_N$	0.300568	0.0040***
$lnSPV_P(-1)$	-1.361392	0.0327**	$lnEFV_P(-1)$	-0.547072	0.7629
$lnSPV_N(-1)$	0.662113	0.0800*	$lnEFV_N(-1)$	0.365454	0.2262
$lnMC_P(-1)$	0.125439	0.0061***	$lnSPV_P$	-2.370201	0.0038***
$lnMC_N(-1)$	0.061127	0.0174**	$lnSPV_N$	-0.433938	0.6208
$lnIR_P(-1)$	-4.610574	0.0009***	$lnSPV_P(-1)$	2.403465	0.0425**
$lnIR_N(-1)$	-2.303165	0.0438**	$lnSPV_N(-1)$	0.204719	0.7706
$lnEXR_P(-1)$	0.376187	0.0208**	$lnMC_P$	0.083174	0.2470
$lnEXR_N(-1)$	0.035392	0.8405	$lnMC_N$	0.164839	0.0152**
$lnINF_P$	-0.317059	0.0714*	$lnMC_P(-1)$	-0.281644	0.0084***
$lnINF_N$	1.656366	0.4705	$lnMC_N(-1)$	-0.055807	0.3909
			$lnIR_P$	-0.643842	0.6384
			$lnIR_N$	-1.629566	0.1426
			$lnEXR_P$	-0.013167	0.9522
			$lnEXR_N$	0.069609	0.5913
			$lnEXR_P(-1)$	-0.181999	0.1850
			$lnEXR_N(-1)$	-0.090887	0.4126
			ECT_{t-1}	-0.646309	0.0000***
			@QUARTER=1	0.373213	0.5243
			@QUARTER=2	0.964965	0.0671*
			@QUARTER=3	0.971516	0.0569*
			C	10.19346	0.0004***
			@TREND	-0.128329	0.7919
R-squared	0.911993		F-statistic	13.81691	
Adjusted R-squared	0.845987		Pro(F-statistic)	0.000000	
Durbin-Watson stat	2.275902				

Note. (***), (**), and (*) indicate significant at 1%, 5% and 10%. All the variables are log linearized.

Source: Authors' computation using EViews 13.

Table 5.8 confirms that $EFV_P(-1)$ has a significant coefficient of 0.451926, while $EFV_N(-1)$ has an insignificant coefficient of -0.513982. These findings suggest that positive shocks in EFV have a significant positive impact on EMR in South Africa, whereas negative shocks do not have a significant effect. Therefore, positive changes in volatility are more likely to drive returns in the South African equity market compared

to negative changes. Moving on to the short-run coefficients, EFV_P has an insignificant coefficient of 0.039862, EFV_N has a significant coefficient of 0.300568, EFV_P(-1) has an insignificant coefficient of -0.547072, and EFV_N(-1) has an insignificant coefficient of 0.365454. The insignificant coefficient of EFV_P indicates that positive shocks in EFV do not have a significant impact on EMR in the short run. However, the significant coefficient of EFV_N suggests that negative shocks have a positive and significant effect on equity market returns in South Africa. Despite this, the insignificant coefficients of EFV_P(-1) and EFV_N(-1) suggest that the lagged effects of EFV do not have a significant impact on EMR. This study suggests that the immediate effects of positive and negative shocks on cross-border equity flow volatility are more influential than the lagged effects. Therefore, South African investors should closely monitor and respond to negative shocks. This finding is a novel and potentially significant contribution to the literature.

The SPV coefficient SPV_P(-1) is significant at -1.361392, and SPV_N(-1) is significant at 0.662113 in South Africa. The negative coefficient for SPV_P(-1) suggests that positive changes in stock price volatility negatively impact equity market returns in South Africa. Conversely, the positive coefficient for SPV_N(-1) implies that negative changes in stock price volatility have a positive impact on equity market returns. This indicates that South African equity market investors are more receptive to negative stock price volatility than to positive volatility, emphasising the importance of gaining a better understanding of the direction and magnitude of stock price volatility. This could be attributed to greater fear and uncertainty associated with downward market movements, which could affect investment strategies and risk management in the country. There is a significant SPV coefficient SPV_P at -2.370201, and an insignificant SPV_N at -0.433938 in the short run. Additionally, SPV_P(-1) is significant at 2.403465, while SPV_N(-1) is insignificant at 0.204719. These findings suggest that immediate reactions to negative shocks in the equity market are crucial for South African investors. The significant negative coefficient of -2.370201 for short-run stock price volatility (SPV_P) indicates that an increase in SPV_P leads to a decrease in equity market returns. Conversely, the significant positive coefficient of 2.403465 for SPV_P(-1) suggests that a decrease in SPV_P in the previous period led to an increase in equity market returns. Therefore, it is

important for investors to closely monitor and react to negative shocks to potentially benefit from significant returns in the short run.

In other results, the market capitalisation (MC) coefficients for $MC_P(-1)$ 0.125439 and $MC_N(-1)$ 0.061127 have significant positive asymmetric effects on EMR in South Africa in the long run. A positive increase in market capitalisation elicits a strong response from South African investors, while a negative decrease is viewed with caution and has a moderate impact. Understanding these asymmetric effects is crucial for investors and risk managers to inform investment strategies and mitigate potential losses during volatile periods. The short-run coefficient MC_P has an insignificantly positive value of 0.083174, MC_N is significantly positive at 0.164839, $MC_P(-1)$ has a significantly negative value of -0.281644, and $MC_N(-1)$ has an insignificantly negative value of -0.055807. These results reveal that positive shocks in MC have an insignificantly positive effect on EMR, while negative shocks have a significantly positive impact. Moreover, lagged MC variables also exhibit asymmetrical effects on EMR in South Africa.

The interest rate coefficients $IR_P(-1)$ and $IR_N(-1)$ are significant at -4.610574 and -2.303165, respectively. The negative coefficients indicate that changes in interest rates have a stronger impact on equity returns during market declines. Decreases in interest rates are viewed more favourably by investors and result in a stronger positive reaction in the equity market. Conversely, increases in interest rates are viewed cautiously and elicit a more moderate reaction. Understanding these coefficients can assist South African investors and risk managers in adapting their investment strategies to minimise losses in volatile markets. However, in the short run, the IR coefficients IR_P and IR_N are insignificant at -0.643842 and -1.629566, respectively. Therefore, interest rate fluctuations in South Africa do not significantly affect short-term equity market returns, making it unreliable for investors to use them as a short-term indicator. It is important to monitor and promptly react to SPV_P shocks, as they have a significant impact on EMR and can lead to short-term gains.

The significant EXR coefficient $EXR_P(-1)$ is 0.376187, while the $EXR_N(-1)$ coefficient is insignificant at 0.035392. These coefficients indicate that EXR variations have a significant impact on EMR in South Africa. Positive changes in the exchange rate (EXR_P) have a more pronounced effect on the equity market, prompting

investors to boost their investments. On the other hand, a negative change in the exchange rate (EXR_N) has a less significant effect, showing that investors are more cautious during periods of currency depreciation. Understanding the asymmetric effects of EXR on EMR helps investors anticipate and manage potential market losses more effectively. In the short run, the coefficient for EXR_P is insignificant at -0.013167, as is the coefficient for EXR_N at 0.069609. Additionally, EXR_P(-1) is insignificant at -0.181999, and EXR_N(-1) is insignificant at -0.090887. The results of this study suggest that fluctuations in the South African exchange rate have minimal short-term effects on equity market returns. This implies that EXR may not be a reliable predictor of short-term equity market returns.

The inflation risk (INF) coefficient INF_P is significant at -0.317059, while INF_N is insignificant at 1.656366. These findings suggest that inflation risk plays a crucial role in determining the response of the equity market in South Africa. A negative coefficient for INF_P indicates that as inflation increases, investors become more cautious and are less likely to reallocate their funds to the equity market. On the other hand, the insignificant coefficient for INF_N suggests that deflationary pressures do not significantly impact investor behaviour in the South African equity market. This information is valuable for investors and risk managers in understanding the dynamics of the market and making informed decisions to mitigate potential losses.

The results of the NARDL error correction term (ECT) multiplier demonstrate that short-run instability can be corrected through system convergence in the long run. The ECT_{t-1} value of -0.646309 is significant at the 1% level and implies a high rate of adjustment from disequilibrium to long-run equilibrium, implying a quick correction of disturbances or shocks. ECT_{t-1} values over 0 indicate self-correction, indicating that the system is in good long-term shape without external intervention.

The results suggest that there is a significant asymmetric relationship between cross-border equity flow volatility and equity market returns in South Africa. In the first quarter, the coefficient of 0.373213 indicated a positive but insignificant relationship. However, in the second and third quarters, the coefficients of 0.964965 and 0.971516, respectively, both had p-values below 0.1, indicating a significant positive relationship between EFV and EMR during those periods. This suggests that volatility in cross-border equity flows significantly affects South Africa's equity market returns, especially

during specific quarters. During those periods, foreign investors have a significant impact on South Africa's equity market performance, potentially leading to increased volatility in returns. Market players and policymakers should regularly monitor the volatility of equity flows to comprehend and predict its influence on the financial markets of the country. South Africa's equity market could be stabilized, and investor confidence could be boosted by managing and mitigating these fluctuations.

Based on the adjusted R-squared of 0.845987, the independent variables can explain 84.60% of the variability of the dependent variable in South Africa. F-statistics of 13.81691 indicate statistical significance of the regression model's ability to predict the dependent variable, and Durbin-Watson errors of 2.588633 indicate no significant serial correlation.

Nigeria

According to table 5.9, the negative coefficient of $EMR(-1)$ in the long run and the positive coefficient of $EMR(-1)$ in the short run indicate that long-term EMR in Nigeria negatively affects future returns, whereas short-term returns positively impact current returns. This emphasises the importance of considering both long-term and short-term dynamics.

The EFV coefficient results in Table 5.9 show that $EFV_P(-1)$ has a significant coefficient of 1.705241, while $EFV_N(-1)$ has an insignificant coefficient of 0.910098. These coefficients suggest that a positive shock in $EFV_P(-1)$ leads to a larger increase in EMR, indicating a strong positive effect. Conversely, a negative shock in $EFV_N(-1)$ has a smaller impact on EMR, indicating an insignificant effect. Therefore, it can be concluded that positive $EFV_P(-1)$ plays a more crucial role in influencing EMR compared to negative $EFV_N(-1)$ in the Nigerian context. The analysis indicates that increased EFV has a positive impact on Nigeria's EMR, as shown by the EMR and EFV coefficients. The short-run coefficient results indicate that EFV_P has an insignificant coefficient of 0.487410, whereas EFV_N has a significant coefficient of -1.194918. These findings suggest that positive shocks in EFV do not have a significant impact on equity market returns in Nigeria, as indicated by the insignificant coefficient results of EFV_P . On the other hand, negative shocks in EFV, represented by EFV_N , seem to have a significant negative effect on EMR, with a coefficient of -1.194918.

This suggests that investors may be more responsive to negative shocks in EFV, resulting in a decline in equity market returns. This finding is a novel and potentially significant contribution to the literature.

Table 5.9: Nigeria Long Run and Short Run Results for EMR from the NARDL (2,1,3,2,2,3,0) model . The model was selected based on Akaike information criteria (AIC).

Long run			Short run		
Variables	Coefficient	Pro.	Variables	Coefficient	Pro.
EMR(-1)	-0.213299	0.0008***	EMR(-1)	0.451552	0.0001***
<i>ln</i> EFV_P(-1)	1.705241	0.0211**	<i>ln</i> EFV_P	0.487410	0.6658
<i>ln</i> EFV_N(-1)	0.910098	0.1970	<i>ln</i> EFV_N	-1.194918	0.0078***
<i>ln</i> SPV_P(-1)	3.931266	0.0022***	<i>ln</i> SPV_P	1.401703	0.9314
<i>ln</i> SPV_N(-1)	0.239209	0.7550	<i>ln</i> SPV_N	4.953876	0.6513
<i>ln</i> MC_P(-1)	0.421217	0.3803	<i>ln</i> SPV_P(-1)	-0.271570	0.7626
<i>ln</i> MC_N(-1)	1.236924	0.0230**	<i>ln</i> SPV_N(-1)	1.007113	0.6513
<i>ln</i> IR_P(-1)	-2.323051	0.1943	<i>ln</i> SPV_P(-2)	-0.733397	0.7626
<i>ln</i> IR_N(-1)	1.466820	0.1215	<i>ln</i> SPV_N(-2)	-6.436208	0.0063***
<i>ln</i> EXR_P(-1)	-0.182576	0.4116	<i>ln</i> MC_P	5.713804	0.0000***
<i>ln</i> EXR_N(-1)	-0.184391	0.4072	<i>ln</i> MC_N	1.457804	0.3945
<i>ln</i> INF_P	-0.359502	0.3232	<i>ln</i> MC_P(-1)	-0.922595	0.5235
<i>ln</i> INF_N	-0.180669	0.3094	<i>ln</i> MC_N(-1)	-3.374161	0.0915*
			<i>ln</i> IR_P	-3.856177	0.0341**
			<i>ln</i> IR_N	-0.940212	0.4602
			<i>ln</i> IR_P(-1)	3.496924	0.0327**
			<i>ln</i> IR_N(-1)	-2.163378	0.0963*
			<i>ln</i> EXR_P	-8.74e-05	0.8779
			<i>ln</i> EXR_N	-0.098840	0.6044
			<i>ln</i> EXR_P(-1)	0.084292	0.5783
			<i>ln</i> EXR_N(-1)	0.164427	0.1969
			<i>ln</i> EXR_P(-2)	0.163270	0.2001
			<i>ln</i> EXR_N(-2)	0.000770	0.1273
			ECT _{t-1}	-0.213299	0.0000***
			@QUARTER=1	0.575132	0.7118
			@QUARTER=2	0.553358	0.7418
			@QUARTER=3	0.805809	0.6398
			C	12.34183	0.0441**
			@TREND	-0.083350	0.9403
R-squared	0.904733		F-statistic	10.20910	
Adjusted R-squared	0.816113		Pro(F-statistic)	0.000000	
Durbin-Watson stat	2.501929				

Note. (***), (**), and (*) indicate significant at 1%, 5% and 10%. All the variables are log linearized.

Source: Authors' computation using EViews 13.

Other results show that the SPV coefficient SPV_P(-1) has a significant effect of 3.931266, while SPV_N(-1) has an insignificant effect of 0.239209 on EMR in Nigeria. The study found that an increase in stock price volatility positively impacted equity market returns in Nigeria, while a decrease in volatility had no significant effect on returns. This suggests that an increase in stock price volatility tends to have a more significant impact on EMR compared to a decrease in volatility. Nigerian equity market investors should therefore monitor changes in stock price volatility. Volatility in the

Nigerian market can significantly enhance equity market returns. However, its influence diminishes as volatility decreases, underscoring the importance for investors to effectively manage risks. In the short run, the SPV coefficient, SPV_P , has a value of 1.401703, SPV_N has a value of 4.953876, $SPV_P(-1)$ has a value of -0.271570, $SPV_N(-1)$ has a value of 1.007113, and $SPV_P(-2)$ has a value of -0.733397. All these values are insignificant, except for $SPV_N(-2)$ which has a significant value of -6.436208. This suggests that stock price volatility in Nigeria does not significantly impact equity market returns in the short run. Negative SPV coefficients suggest potential declines, but these declines are not statistically significant.

The coefficient $MC_P(-1)$ is insignificant at 0.421217, while $MC_N(-1)$ is significant at 1.236924. This suggests that changes in MC do not significantly impact equity market returns in Nigeria. However, the coefficient for $MC_N(-1)$ indicates that negative changes in market capitalisation have a significant asymmetric effect on equity market returns. Investors in Nigeria should be cautious when market capitalisation declines, as it can negatively impact returns, and they should closely monitor stock price volatility to make informed investment decisions. Other results show that the short-run coefficient MC_P has a significantly positive value of 5.713804, MC_N has an insignificantly positive value of 1.457804, $MC_P(-1)$ is insignificantly negative and equal to -0.922595, and $MC_N(-1)$ has a significantly negative value of -3.374161 with asymmetric effects on EMR in Nigeria. These results indicate that an increase in MC has a significant positive effect on equity market returns in the short run, with a coefficient of 5.713804. On the other hand, the coefficient for negative market capitalisation is insignificant and only slightly positive at 1.457804. Additionally, the lagged market capitalisation variables also indicate mixed effects, with $MC_P(-1)$ having an insignificant negative coefficient of -0.922595, and $MC_N(-1)$ having a significantly negative coefficient of -3.374161. Overall, these results suggest that market capitalisation plays a significant role in determining equity market returns in Nigeria, both in the short run and over a lagged period.

Other findings suggest that the long-run coefficients for interest rate (IR) variables $IR_P(-1)$ and $IR_N(-1)$ are insignificant at -2.323051 and 1.466820, respectively. An increase in $IR_P(-1)$ leads to a decrease in equity market returns of 2.323051, while a decrease in interest rate $IR_N(-1)$ leads to an increase in equity market returns of

1.466820. However, these coefficients are not statistically significant, indicating that changes in interest rates do not have a significant impact on equity market returns in Nigeria. In the short run, the coefficient for the interest rate IR_P is significant at -3.856177, while IR_N is insignificant at -0.940212. Additionally, $IR_P(-1)$ is significant at 3.496924, and $IR_N(-1)$ is significant at -2.163378. The results also reveal that interest rates have significant asymmetrical effects on equity market returns in Nigeria. Specifically, the coefficient for positive interest rate shocks (IR_P) is significantly negative at -3.856177, indicating a strong inverse relationship between interest rates and equity market returns in the short run. On the other hand, the coefficient for negative interest rate shocks (IR_N) is insignificant at -0.940212, indicating a lack of consistent impact on market returns. Furthermore, lagged interest rates ($IR_P(-1)$ and $IR_N(-1)$) also exhibit significant effects on equity market returns. Positive shocks have a coefficient of 3.496924, while negative shocks have a coefficient of -2.163378. The study demonstrates that Nigerian interest rates have an impact on the performance of the equity market. Positive shocks lead to short-term increases in returns. Investors tend to reallocate capital from low-return securities to higher-yielding investments.

The coefficients for exchange rate risk (EXR) on equity market returns (EMR) in Nigeria, $EXR_P(-1)$ and $EXR_N(-1)$, are insignificant at 0.182576 and 0.184391, respectively. A 1% increase in $EXR_P(-1)$ results in a 0.182576% decrease in EMR, while a 1% increase in $EXR_N(-1)$ leads to a 0.184391% decrease in EMR. These findings suggest that fluctuations in the exchange rate have a minimal impact on equity market returns in Nigeria. In the short run, the coefficients for EXR are as follows: EXR_P is $-8.74e-05$, EXR_N is -0.098840, $EXR_P(-1)$ is 0.084292, $EXR_N(-1)$ is 0.164427, $EXR_P(-2)$ is 0.163270, and $EXR_N(-2)$ is 0.000770. These results indicate that exchange rate risk does not significantly impact equity market returns in the short run, as the coefficients for EXR_P and EXR_N are both statistically insignificant. Similarly, the lagged exchange rate coefficients also have insignificant effects, suggesting that past exchange rate movements do not affect market returns. Therefore, investors in the Nigerian equity market may not need to consider exchange rate risk in their short-term investment decisions, given the lack of significance for both current and lagged exchange rate coefficients.

In the long run, the inflation risk coefficients INF_P and INF_N in Nigeria have insignificant asymmetric effects on EMR of -0.359502 and -0.180668, respectively. Therefore, changes in inflation have little impact on equity market returns in Nigeria. Consequently, investors should not primarily base their investment decisions on inflation risks but should instead consider other factors, such as market capitalization and stock price volatility.

The coefficient of ECT_{t-1} , -0.213299 and significant at the 1% level, indicates a short run cointegration link among variables. This demonstrates a rapid adjustment to long-run equilibrium following a short-run shock, suggesting that deviations from equilibrium will be promptly corrected. These findings strongly support the presence of a short run cointegration relationship between the analysed variables.

The results suggest a positive link between EFV and EMR in Nigeria. The coefficient values for each quarter indicate a consistent impact of EFV on EMR over time. However, the high p-values for each quarter imply that the link is not statistically significant. This suggests that other factors may also influence equity market returns in Nigeria. The results also emphasize the importance of a comprehensive approach to studying the link between EFV and EMR, to account for all potential variables influencing market outcomes.

Using the fitted model for Nigeria, the adjusted R-squared is 0.816113, which indicates that the independent variables can account for 81.61% of the variation in the dependent variable. The higher adjusted R-squared suggests a good fit for Nigeria's data. The F-statistic of 10.20910 and Durbin-Watson statistic of 2.588633 indicate no evidence of serial correlation in the model's residuals.

Egypt

As indicated by the negative coefficient of EMR(-1) in the long run and the positive coefficient of EMR(-1) in the short run in Table 5.10, long-term EMR in Egypt has a negative impact on future returns. These outcomes highlight the importance of considering both long- and short-term dynamics.

The coefficient results indicate that EFV_P has a significant value of 32.82558, while EFV_N has an insignificant value of 9.367910. The positive coefficient of EFV_P

suggests that an increase in EFV has a significant positive impact on EMR in Egypt in the long run. Conversely, the insignificant coefficient of EFV_N implies that negative shocks in EFV do not have a significant effect on EMR. These findings highlight the asymmetric nature of the relationship between EFV and EMR in Egypt, with positive shocks playing a more influential role in driving equity market returns. This finding is a novel contribution to the literature and may be significant.

Table 5.10: Egypt Long Run and Short Run Results for EMR from the NARDL (2,0,0,2,0,0,1) model. The model was selected based on Akaike information criteria (AIC).

Long run			Short run		
Variables	Coefficient	Pro.	Variables	Coefficient	Pro.
EMR(-1)	-0.288953	0.0000***	EMR(-1)	0.752732	0.0000***
<i>ln</i> EFV_P	32.82558	0.0229***	<i>ln</i> MC_P	-3.353586	0.0529*
<i>ln</i> EFV_N	9.367910	0.4308	<i>ln</i> MC_N	1.284222	0.0685*
<i>ln</i> SPV_P	1.172463	0.0697*	<i>ln</i> MC_P(-1)	-0.500616	0.7643
<i>ln</i> SPV_N	-0.615140	0.3408	<i>ln</i> MC_N(-1)	-1.109228	0.0891*
<i>ln</i> MC_P(-1)	-0.276015	0.3317	<i>ln</i> INF_P	-0.121516	0.6876
<i>ln</i> MC_N(-1)	0.535512	0.1240	<i>ln</i> INF_N	-1.735352	0.0054***
<i>ln</i> IR_P	7.843238	0.0329**	ECT _{t-1}	-0.288953	0.0000***
<i>ln</i> IR_N	-2.314801	0.4369	@QUARTER=1	-0.393189	0.8351
<i>ln</i> EXR_P	0.806921	0.2334	@QUARTER=2	-0.631179	0.8056
<i>ln</i> EXR_N	-0.486525	0.5955	@QUARTER=3	0.399046	0.8033
<i>ln</i> INF_P(-1)	-1.098048	0.0020***	C	-20.30895	0.0018***
<i>ln</i> INF_N(-1)	-1.069685	0.0983**	@TREND	2.616331	0.0010***
R-squared	0.776866		F-statistic	8.704051	
Adjusted R-squared	0.687613		Pro(F-statistic)	0.000000	
Durbin-Watson stat	2.302301				

Note. (***), (**), and (*) indicate significant at 1%, 5% and 10%. All the variables are log linearized.

Source: Authors' computation using EViews 13.

In Egypt, the coefficient for long-term stock price volatility (SPV), SPV_P, is significant, while SPV_N is insignificant. These findings indicate that positive shocks in stock price volatility have a significant and positive impact on EMR in Egypt. This means that higher stock price volatility leads to higher long-term returns. However, the insignificant coefficient of SPV_N suggests that negative shocks in stock price volatility do not significantly affect equity market returns. Therefore, it is important for investors in Egypt to carefully analyse and monitor positive shocks in stock price volatility, as they can have a significant impact on EMR. Overall, this study highlights the asymmetric nature of the relationship between stock price volatility and equity market returns in Egypt, with positive shocks playing a more influential role.

Other results show that the coefficient for positive market capitalisation, MC_P(-1), is insignificantly -0.276015, and MC_N(-1) is insignificantly 0.535512 in Egypt in the long run. These findings suggest that a decrease in positive market capitalisation

has a small negative impact on EMR in Egypt, while an increase in negative market capitalisation has a small positive impact on EMR. However, these effects are not statistically significant, indicating that other factors may have a stronger influence on equity market returns in Egypt. These results indicate that market capitalisation is not the primary driver of equity market returns in Egypt in the long run. In the short run, the MC coefficient showed significant values: MC_P at -3.353586, MC_N at 1.284222, MC_P(-1) at -0.500616, and MC_N(-1) at -1.109228. These values indicate an asymmetric effect on EMR in Egypt. These coefficients indicate that in the short run, a decrease in MC has a greater negative impact on Egyptian equity market returns than an increase in MC. Additionally, the lagged effects of MC also significantly influence EMR, as a reduction in MC in the preceding period had a detrimental impact on EMR. Policymakers should focus on implementing measures to maintain and increase MC to enhance returns on the Egyptian equity market.

The interest rate (IR) coefficient, IR_P, has a significant effect of 7.843238 on EMR in Egypt in the long run. On the other hand, IR_N has an insignificant effect of -2.314801 on EMR. An increase in IR_P leads to an approximate 7.84-unit increase in equity market returns in Egypt. However, an increase in IR_N does not have a significant impact on equity market returns. This suggests that positive changes in interest rates have a greater influence on equity market returns in Egypt than negative changes. These findings indicate that investors in the Egyptian equity market may be more influenced by positive economic indicators and potential returns rather than negative market capitalization or interest rate changes.

EXR_P is 0.806921, and EXR_N is -0.486525. These coefficients do not have a significant asymmetric effect on equity market returns in Egypt. Positive shocks in EXR_P do not result in significant increases in equity market returns, suggesting that investors do not perceive a positive exchange rate change as beneficial for their investments. Similarly, negative shocks in EXR_N do not significantly impact equity market returns, suggesting that investors are not overly concerned about a depreciating exchange rate affecting their returns in Egypt. Hence, exchange rate risk, whether positive or negative, does not significantly impact equity market returns in Egypt. This indicates that investors in this market may be less worried about fluctuations in exchange rates and instead focus more on other economic indicators

and potential returns. This study highlights the significance of positive changes in interest rates and economic indicators as key factors influencing equity market returns in Egypt.

Inflation risk (INF) coefficient $INF_P(-1)$ has a significant effect of -1.098048, while $INF_N(-1)$ has a significant effect of -1.069685 on EMR in Egypt in the long run. These findings suggest that Egyptian equity investors are particularly sensitive to inflation risk. A decrease in inflation (INF_P) has a more pronounced negative impact on EMR compared to an increase in inflation (INF_N). This indicates that investors are more concerned about the potential erosion of purchasing power and the overall stability of the economy. Therefore, policymakers should prioritise controlling inflation and promoting economic stability to attract and retain investors in the Egyptian equity market in the long run. In the short run, the coefficient INF_P has an insignificant effect of -0.121516, while INF_N has a significant effect of -1.735352 on EMR in Egypt. The study indicates that an increase in inflation risk has a greater negative impact on Egyptian equity market returns than a decrease. This suggests that policymakers should focus on controlling and managing inflation to mitigate its adverse effects. It emphasizes the importance of reducing inflation and volatility for stability and positive returns.

The ECT_{t-1} coefficient, -0.288953, is significant at the 1% level and suggests a short run cointegration relationship among variables. This shows a rapid return to long-run equilibrium after a short-run shock, indicating that deviations from equilibrium will be quickly corrected. These data strongly suggest that the variables being studied have a short run cointegration connection. In addition, the negative ECT_{t-1} coefficient indicates the presence of a negative correction mechanism that will reverse any deviations from long-run equilibrium. This suggests a strong stabilising force that will quickly bring the variables back to their steady state relationship.

Further results indicate a negative relationship between EFV and EMR in Egypt during the first two quarters. This is supported by coefficients of -0.393189 and -0.631179, respectively. During the third quarter, there appears to be a positive relationship between EFV and EMR, as indicated by the coefficient of 0.399046. Despite the varying coefficients, the p-values for all three quarters are greater than 0.05, indicating that the results are not statistically significant. The results indicate that

cross-border equity flow volatility in Egypt does not have a strong asymmetrical effect on equity market returns. When analysing equity market returns in Egypt, stakeholders should consider global market conditions and the broader economic environment. These insights will help guide investment decisions. The adjusted R-squared value of 0.687613 in Egypt indicates that 68.76% of the dependent variable's variation can be explained by independent variables. The F-statistic of 8.704051 supports a significant link between variables, rejecting the null hypothesis. The Durbin-Watson statistic of 2.302301 confirms that there is no significant serial correlation between model errors.

Kenya

Table 5.11 shows that the negative coefficient of long-run EMR (-1) and the positive coefficient of short-run EMR (-1) indicate that long-term EMR has a negative impact on future returns, while short-term EMR has a positive influence on current returns, highlighting the importance of long-run and short-run dynamics.

Table 5.11: Kenya Long Run and Short Run Results for EMR from the NARDL (2,0,1,2,2,0,0) model. The model was selected based on Akaike information criteria (AIC).

Long run			Short run		
Variables	Coefficient	Pro.	Variables	Coefficient	Pro.
EMR(-1)	-0.403031	0.0000***	EMR(-1)	0.631272	0.0000***
lnEFV_P	-9.660373	0.0436**	lnSPV_P	-0.806810	0.3861
lnEFV_N	1.255421	0.8415	lnSPV_N	1.773058	0.0046***
lnSPV_P(-1)	0.166494	0.5206	lnMC_P	1.240660	0.0885*
lnSPV_N(-1)	-0.470297	0.0108**	lnMC_N	2.006566	0.0315**
lnMC_P(-1)	0.204758	0.4760	lnMC_P(-1)	-0.567381	0.4807
lnMC_N(-1)	1.098834	0.0053***	lnMC_N(-1)	-1.964890	0.0353**
lnIR_P(-1)	2.148278	0.0527*	lnIR_P	-0.482481	0.7663
lnIR_N(-1)	-0.040167	0.9484	lnIR_N	0.282898	0.6748
lnEXR_P	0.004202	0.9771	lnIR_P(-1)	-1.884502	0.0693*
lnEXR_N	0.052706	0.8141	lnIR_N(-1)	0.492009	0.4369
lnINF_P	0.189703	0.0037***	ECT _{t-1}	-0.403031	0.0000***
lnINF_N	-0.587799	0.5105	@QUARTER=1	-0.098345	0.9306
			@QUARTER=2	-0.622649	0.5981
			@QUARTER=3	-0.548149	0.5199
			C	10.19346	0.2636
			@TREND	-0.674612	0.3662
R-squared	0.830120		F-statistic	9.773007	
Adjusted R-squared	0.745180		Pro(F-statistic)	0.000000	
Durbin-Watson stat	2.588633				

Note. (***), (**), and (*) indicate significant at 1%, 5% and 10%. All the variables are log linearized.

Source: Authors' computation using EViews 13.

The long-run coefficient results indicate that EFV_P has a significant impact of -9.660373, while EFV_N has an insignificant impact of 1.255421. These findings

suggest that positive shocks to EFV have a significant negative effect on EMR in Kenya in the long run. However, negative shocks to EFV do not seem to have a significant impact on EMR. Therefore, investors should exercise caution when EFV increases, as it may result in a decrease in equity market returns. This finding is a novel and potentially important contribution to the existing literature.

The study reveals that in Kenya, the long-term effects of stock price volatility (SPV) coefficients $SPV_P(-1)$ and $SPV_N(-1)$ on equity market returns are asymmetric. The insignificant coefficient for $SPV_P(-1)$ suggests that positive shocks to stock price volatility do not significantly affect equity market returns over the long term. In contrast, the significant coefficient for $SPV_N(-1)$ indicates that negative shocks have a considerable negative impact on EMR. Therefore, investors should exercise caution when stock price volatility declines. In the short term, the SPV coefficient, SPV_P , has no significant impact on equity market returns in Kenya, while SPV_N has a significant asymmetric effect. The study demonstrated that stock price volatility significantly affects short-term equity market returns in Kenya. An increase in volatility leads to negative returns, while a decrease in volatility has a significant positive effect. Therefore, investors and policymakers should consider these factors when analysing market trends in Kenya.

The study finds that the long-run positive market capitalisation coefficient, $MC_P(-1)$, is not significant, while $MC_N(-1)$ has a significant positive effect on equity market returns in Kenya. It suggests that previous market capitalisation shocks have a small and insignificant impact on equity market returns, except for negative shocks, which have a significant positive effect. This indicates that Kenyan equity investors tend to overreact to negative shocks in market capitalisation. Furthermore, the study reveals that the short-run coefficient for positive market capitalisation in Kenya is significantly positive, with MC_P and MC_N values of 1.240660 and 2.006566, respectively. However, $MC_P(-1)$ has an insignificant negative coefficient, while $MC_N(-1)$ has a significant negative coefficient. These findings suggest that market capitalisation strongly influences returns in Kenya. Specifically, the positive coefficient for MC_P indicates that an increase in market capitalisation leads to a significant increase in returns. On the other hand, the negative coefficient for $MC_P(-1)$ suggests that a decrease in market capitalisation in the previous period has an insignificant effect on

returns. Similarly, the positive coefficient for MC_N indicates that negative market capitalisation has a significant impact on returns, while the negative coefficient for MC_N(-1) indicates that a decrease in negative market capitalisation during the previous period negatively affects returns. These asymmetric effects highlight the importance of considering past market trends when analysing investment decisions in Kenya.

In Kenya, the significance of the interest rate (IR) coefficient IR_P(-1) is observed in the long run, while IR_N(-1) is deemed insignificant. These results suggest that interest rate shocks can have a significant impact on EMR in Kenya. Specifically, a positive shock in interest rates (IR_P(-1)) is expected to result in a significant positive effect on EMR, indicating that higher interest rates may lead to increased returns over time. Conversely, a negative shock in interest rates (IR_N(-1)) shows no significant effect on EMR, suggesting that lower interest rates may not have a substantial impact on returns. In terms of short-term effects, the coefficients IR_P and IR_N are insignificant, while IR_P(-1) remains significant, and IR_N(-1) is insignificant. Consequently, changes in interest rates do not significantly impact Kenyan equity market returns in the short run. This implies that monetary policy decisions may not strongly influence market returns in the short term. However, the significant coefficient for IR_P(-1) highlights the importance of considering historical data when making investment decisions. Past changes in positive interest rates can strongly impact returns negatively. In summary, the asymmetric effects observed underscore the complex nature of the relationship between IR and EMR in Kenya.

In Kenya, the coefficients EXR_P and EXR_N are insignificant in the long run. This suggests that a 1% increase in EXR_P is not expected to have a significant impact on equity market returns in Kenya. Similarly, a 1% decrease in EXR_N is also not expected to have a significant effect on EMR. Therefore, it can be concluded that exchange rate risk does not play a significant role in determining long-term equity market returns in Kenya.

Inflation risk (INF) coefficient INF_P is significant, while INF_N is insignificant in Kenya in the long run. Inflation risk, as measured by INF_P, has a positive and significant impact on equity market returns in Kenya. This implies that a 1% rise in inflation is anticipated to have a substantial positive effect on EMR. The coefficient for

INF_N, however, is insignificant, indicating that a 1% decrease in inflation does not significantly affect equity market returns in Kenya. Therefore, it can be concluded that inflation risk plays a moderate role in determining long-term market returns in Kenya.

The ECT coefficient is statistically significant at 1% and negative, indicating short run cointegration among variables. The ECT_{t-1} coefficient is -0.403031, implying rapid long-run equilibrium changes after short-run shocks, with a 40.03 percent adjustment towards the long-run equilibrium in each period.

Further analysis indicated a significant negative relationship between EFV and EMR in Kenya during the first quarter, with a coefficient of -0.098345. In the second quarter, the negative relationship became stronger, indicated by a high coefficient of -0.622649, although the p-value remained relatively high at 0.5981. During the third quarter, the coefficient slightly decreased to -0.548149, indicating a continued negative impact of EFV on EMR, with a slightly lower p-value of 0.5199. Overall, these findings suggest that EFV consistently has an adverse effect on EMR in Kenya, especially in the second quarter. Given this trend, Kenyan investors should exercise caution regarding the impact of EFV on EMR.

The adjusted R-squared in Kenya is 0.745180, indicating that 74.52% of the dependent variable's variability can be explained by the independent variables. The F-statistic of 9.773007 indicates a significant link between the independent variables and the dependent variable, while the Durbin-Watson statistic of 2.588633 suggests no significant serial correlation in the model's errors.

5.3.3.3 Discussion of the results

Comparing symmetrical and asymmetrical studies is crucial for understanding the topic, although it can be challenging. Symmetrical studies offer a more straightforward and reliable set of data, while asymmetrical studies provide unique perspectives and insights. Symmetrical studies may reveal consistent patterns, while asymmetrical studies may uncover unexpected links or outliers that challenge conventional assumptions. Existing studies on equity market returns focus on equity flow levels rather than cross-border equity flow volatility. This distinction is crucial because volatility in cross-border equity flows can introduce additional risk and uncertainty, impacting market returns differently.

Previous studies by Rizal et al. (2020) have shown a relationship between stock returns and foreign inflows, while Prabheesh (2020) found a causal relationship between foreign capital inflows (FPI) and stock market returns. These studies did not consider asymmetric factors. Sopian and Auzairy (2015) found a positive correlation between foreign capital and equity market returns but did not explore the non-linear link between equity flows and market returns. Using the NARDL method, this study shows that positive changes in cross-border equity flow volatility drive returns in South Africa's equity market. In Nigeria, positive shocks increase the EMR, while in Egypt, positive shocks drive equity market returns. In Kenya, positive shocks resulting from cross-border equity flow volatility have a negative impact on equity market returns. These findings highlight the importance of considering both positive and negative shocks when assessing the link between equity market returns and equity flow volatility. Contrary to previous studies, this study focuses on the volatility of foreign capital flows, showing how sudden fluctuations and uncertainties affect equity market returns in emerging markets. This is a novel contribution.

Stock market investors in South Africa are more tolerant of negative volatility in the long run than of positive volatility. Short-run SPV coefficients indicate that immediate responses to negative shocks are critical for investors, possibly resulting in substantial short-term returns. Moreover, the study also reveals that stock price volatility in Nigeria positively impacts equity market returns, while a decrease in volatility has an insignificant effect. Despite this, short-run SPV coefficients suggest potential declines, emphasising the importance of managing risks. Other studies indicate that positive stock price volatility shocks have a significant impact on equity market returns in Egypt, whereas negative shocks do not. Investors should monitor these asymmetric relationships for higher returns. Furthermore, the study reveals that stock price volatility in Kenya significantly affects equity market returns in the long run. Negative shocks have a negative impact on returns, while increasing volatility has a positive effect, highlighting the need for caution among investors.

Acheampong et al. (2014) discovered a positive link between market size (measured by market capitalisation) and stock market returns in Ghana using OLS. Similarly, this study reveals that market capitalisation has long-term positive effects on EMR in South Africa, with strong investor responses to positive increases. Short-run

coefficients, however, show insignificant positive effects. The study also shows that market capitalisation significantly affects Nigerian equity market returns, with positive short-run effects but negative long-run effects. Negative changes can adversely affect returns, emphasising the importance of monitoring MC changes and stock price volatility for investors. In Egypt, market capitalisation has insignificant long-term effects on equity returns, suggesting that other factors may play a greater role. Short-run MC coefficients have asymmetric effects on Egyptian equity market returns, with a decrease in MC negatively impacting returns. Kenyan equity investors tend to overreact to negative market capitalisation shocks, impacting both long-term and short-term returns. Investing in Egypt and Kenya requires an understanding of market capitalisation dynamics, and participants should consider adopting new strategies to mitigate negative effects. Unlike Acheampong et al. (2014), who used OLS, this study employed the NARDL model to offer a more comprehensive understanding of how market capitalisation influences returns. This will be beneficial for investors looking to optimise their strategies.

Assefa et al. (2017) found a negative link between interest rates and stock market returns in developed nations using GMM. In Kenya, interest rate shocks have a significant impact on equity market returns. Positive shocks result in increased returns, while negative shocks do not have a significant effect, indicating potential long-term consequences. Interest rate changes do not significantly impact Kenyan equity market returns, suggesting that monetary policy decisions may not significantly affect short-term returns. In South Africa, equity returns are mostly influenced by long-term market declines, with short-term fluctuations playing a minor role. In Nigeria, changes in interest rates have immediate and lagged effects in the long run, showing a significant negative link in the short run. Positive interest rate changes have a greater impact on equity market returns in Egypt compared to negative changes. Making investment decisions requires an understanding of the unique economic factors and market dynamics of each nation. South African investors should avoid short-term market fluctuations, Nigerian investors should be cautious of interest rate changes, and Egypt's preference for positive interest rate changes indicates a more optimistic market outlook. In contrast to Assefa et al. (2017), who used GMM, this study applied the NARDL model to capture the non-linear link between interest rates and equity

returns. The findings suggest that the NARDL model is more suitable for capturing the intricate relationship between interest rates and equity returns in SANEK markets.

EI-Diftar (2023) found a significant long-run relationship between exchange rates and stock market returns in the Emerging 7 countries, except for Indonesia, where a notable negative impact was observed. The study suggests that changes in exchange rate risk significantly affect equity market returns in South Africa. Positive changes encourage investment, while negative changes prompt caution. However, short-term returns indicate that exchange rate risk may not have a significant impact on investors in South Africa. The study also reveals that in Nigeria, exchange rate risk and lagged exchange rate coefficients have a minimal long-term effect on equity market returns and do not significantly affect short-term returns. In Egypt, the coefficients EXR_P and EXR_N have an insignificant asymmetric effect on equity market returns, suggesting that investors should focus on other economic indicators. In Kenya, exchange rate risk does not significantly impact equity market returns, as the long-term exchange rate coefficients EXR_P and EXR_N are not significant. This study utilises the NARDL model instead of GARCH to analyse exchange rate risk and equity market returns, challenging previous research and offering a more nuanced perspective.

In India, Sreenu (2016) found a negative link between inflation rates and stock returns. Similarly, in South Africa, the equity market responds negatively to deflationary pressures, indicating cautious investor behaviour. In Nigeria, the inflation risk coefficients INF_P and INF_N have minimal asymmetric effects on EMR, indicating a minimal impact on equity market returns. Egyptian equity investors are sensitive to inflation risk, as decreased inflation negatively impacts EMR in the long run. Short-term INF coefficient results indicate that increased inflation risk has a significant negative effect on equity market returns. In Kenya, a 1% increase in inflation significantly impacts equity market returns, while a 1% decrease in inflation has no effect. Therefore, investors in Kenya may perceive inflation as a sign of economic growth and stability. Overall, the results from South Africa, Nigeria, Egypt, and Kenya highlight the varying effects of inflation on equity market returns in SANEK markets. Investors in these countries should carefully consider the link between inflation and EMR when making investment decisions.

5.3.3.4 Multiplier Impact

The multiplier impact graphs illustrate the dynamic changes in equity market returns (EMR) in each of the SANEK member countries in response to positive and negative shocks to cross-border equity flow volatility (EFV).

It is clear from examining Figure 5.2 of the multiplier impact of EFV on the EMR that in South Africa and Nigeria, positive shocks have a greater impact on the EMR than negative shocks. This suggests that these countries are more resilient to negative shocks in cross-border equity flow volatility and can recover quickly. Investors and policymakers should consider these dynamics when making decisions regarding equity investments in South Africa and Nigeria.

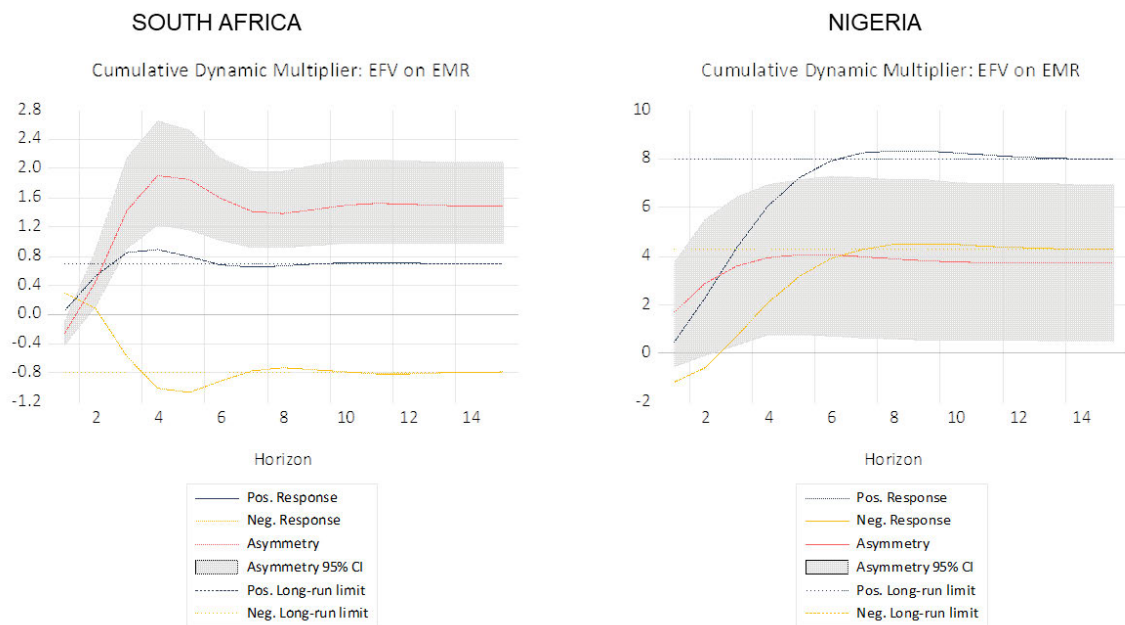


Figure 5.2. Cumulative Dynamic Multiplier for South Africa and Nigeria: EFV on EMR

Source: Authors' Estimation using EViews 13

In Figure 5.3, negative shocks have a stronger impact on EMR in other SANEK individual countries such as Egypt and Kenya. In light of this, it is important to implement effective risk management strategies to protect these economies from external shocks. Investors and policymakers should carefully evaluate the risks associated with equity investments in Egypt and Kenya due to their vulnerability to external shocks. Implementing effective risk management strategies is crucial for reducing the impact of negative shocks on these economies.

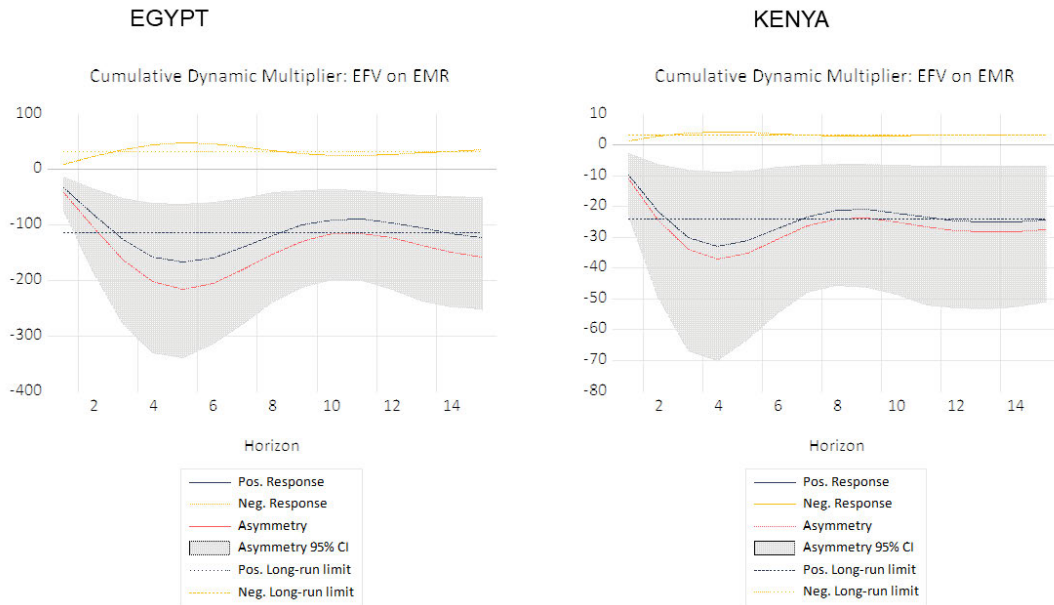


Figure 5.3. Cumulative Dynamic Multiplier for Egypt and Kenya: EFV on EMR

Source: Authors' Estimation using EViews 13

Overall, the analysis of the multiplier impact provides valuable insights into the dynamics of equity market returns in individual SANEK countries and the role of cross-border equity flow volatility in shaping their performance.

5.3.3.5 Diagnostic Test Results

The Breusch-Pagan-Godfrey test in Table 5.12 indicates that all the p-values are greater than 0.05. This suggests that there is no evidence of conditional heteroskedasticity in the data for any of the countries. The regression models reveal consistent error variance across independent variable levels, confirming homoskedasticity for these countries. This allows for further analysis using these models.

Table 5.12: Diagnostic Test.

Diagnostic Tests	South Africa F-Statistic	Nigeria F-Statistic	Egypt F-Statistic	Kenya F-Statistic
Serial Correlation	2.664965 (0.0803)	2.004770 (0.1436)	1.539855 (0.2230)	3.760607 (0.3102)
Breusch-Pagan-Godfrey test	1.218389 (0.2588)	1.265683 (0.2243)	3.418687 (0.3901)	2.759673 (0.2106)
Normality (Jarque-Bera) test	5.429675 (0.066216)	0.882344 (0.643282)	0.427714 (0.807464)	0.761589 (0.83318)

Source: Authors' Estimation using EViews 13.

Based on the normality test (Jarque-Bera), the p-values for all four countries are greater than the significance level of 0.05. This indicates that there is no significant evidence to reject the null hypothesis of normality in the error terms in the regression

models. Therefore, the assumption of normality is satisfied for the error terms in the regression models. The p-values for serial correlation in all four countries are also greater than the significance level of 0.05%, indicating that there is no significant evidence of serial correlation in the error terms in the regression models.

5.3.3.6 Structural Stability Tests

To verify the structural stability test results, recursive estimation was used. Brown, Durbin, and Evans (1975) employed cumulative sum recursive residual plots to assess the stability of regression associations over time. The CUSUM plots visually represent changes in the regression association. Cumulative sum of squares (CUSUMSQ) plots are also commonly used to assess the stability of the estimated regression coefficients (Brown et al., 1975). CUSUM and CUSUMSQ stability tests are shown in Figure 5.3.

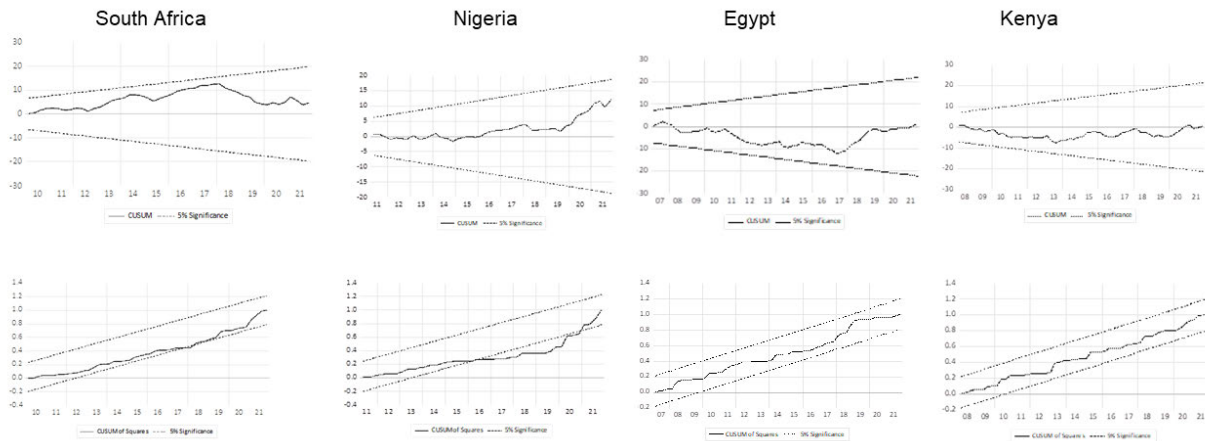


Figure 5.4: CUSUM and CUSUMSQ Structural Stability Tests.

Source: Authors' Estimation using EViews 13

This study evaluated the robustness and stability of the regression models by analysing the sum of squared residuals and the sum of residuals over time. The CUSUM and CUSUMSQ plots in Figure 5.4 demonstrate consistent and reliable regression relationships over time. Therefore, it can be concluded that the estimated regression coefficients remained stable throughout the study period.

The significance of the CUSUM and CUSUMSQ statistics at the 5% level provides evidence supporting the validity of the regression associations. The results of this study suggest that the regression models used were reliable and enduring, implying that these methods are valuable tools for detecting and monitoring changes in

regression associations over time. The CUSUMSQ lines in Nigeria, however, exhibit a slight excursion beyond the confidence bands before returning within them. This phenomenon usually signifies modest and transient parameter instability in a NARDL model (Lu, Maekawa, Lee, 2008). Although it is essential to monitor continuously, such fleeting movements often do not require model adjustment until they become permanent (Lu et al., 2008), which is not the case in this instance.

5.3.3.7 Wald Test Results

The Wald test assesses whether the coefficients of the independent variable (cross-border equity flow volatility) and the control variables (stock price volatility, market capitalisation, inflation, exchange rate, and interest rates) collectively have a significant impact on equity market returns.

Table 5.13: Wald Test

Description	South Africa	Nigeria	Egypt	Kenya
F-statistic	6.250462	2.904835	5.832381	3.492677
p-value (F-stat)	0.0001	0.0182	0.0001	0.0053
Chi-square	37.50277	17.42901	34.99428	20.95606
p-value (Chi-square)	0.0000	0.0078	0.0000	0.0019
Conclusion	Reject H_0	Reject H_0	Reject H_0	Reject H_0

Source: Authors' Estimation using EViews 13

A p-value of 0.0001 is highly significant for both the F-statistic and the Chi-square in South Africa. This suggests that EFV and control variables jointly affect EMR in South Africa. More developed markets (e.g., South Africa) exhibit stronger responses to capital flow volatility, aligning with financial market integration theory (Bekaert & Harvey, 1995). In Nigeria, the p-values (0.0182 for F-stat and 0.0078 for Chi-square) indicate statistical significance at the 5% level, but not as strong as in South Africa and Egypt. Compared to South Africa and Egypt, Nigeria's equity returns are less affected by cross-border equity flow volatility and control variables. In Egypt, similar to South Africa, the p-values (0.0001 for F-stat and 0.0000 for Chi-square) show strong statistical significance. EFV has a significant joint impact on EMR in Egypt. In Kenya, the results (F-stat: 3.4927, p-value: 0.0053) indicate significance at the 1% level, meaning cross-border flow volatility and control variables impact equity market returns in Kenya. Kenya's equity market, although smaller than South Africa's and Egypt's, is still influenced by global capital flow dynamics.

5.4 Summary and Conclusion

The study analysed the impact of EFV on EMR in SANEK countries from 2000Q1 to 2021Q4. It used the NARDL statistical model to examine short-run and long-run asymmetric effects. The NARDL results indicate that South African investors can benefit from increased returns by strategically adjusting their portfolios in response to changes in EFV. Positive shocks have a more significant long-term impact on Nigeria, while negative shocks have a more pronounced short-term effect. Egypt's equity market is vulnerable to external shocks, with positive shocks impacting market returns. Kenyan investors are more sensitive to cross-border equity flow volatility, which leads to decreased returns and higher risk aversion. Other findings emphasise the significance of understanding and controlling stock price volatility in Nigeria's equity market to maximise returns and leverage market opportunities. Conversely, stock price volatility in South Africa has a negative impact on equity market returns, highlighting the importance of efficient management and monitoring. Investors in Egypt can strategically position their portfolios by leveraging asymmetric relationships to maximize returns and minimize risks. In Kenya, extreme volatility is linked to a significant decline in returns, highlighting the importance of investors monitoring and managing their exposure to volatility.

Market capitalisation significantly influences equity market returns in South Africa, reflecting investor confidence in growth and profitability. Market capitalisation variations significantly impact Nigeria's equity market performance, with both positive and negative effects. The NARDL model indicates that market capitalisation has a significant impact on Egypt's short-term equity market returns, emphasising the importance for investors to track trends to make well-informed investment decisions. The study reveals that market capitalisation shocks impact Kenyan equity investors' behaviour, causing shifts in returns. Further, the model suggests that investors may be more willing to take risks during South Africa's economic downturn if interest rates decrease. Egyptian investors are more receptive to positive interest rate changes during a strong economy. Nigerian interest rate changes may have lasting effects on the market, necessitating both immediate and lag-in analyses. The model also offers insights into the relationship between interest rates and equity market returns in Kenya, revealing that interest rate shocks directly impact returns. Moreover, the model shows that exchange rate fluctuations significantly impact equity market returns in

South Africa. Positive changes stimulate investment, while negative changes prompt caution. In contrast, exchange rate risk coefficients have a minimal effect on Nigerian equity market returns. Exchange rate risk does not significantly impact the returns of the Egyptian equity market. The results indicate that Kenya's equity market is less impacted by exchange rate fluctuations, reducing investors' worries about exchange rate risk in comparison to other markets. Inflation risk significantly impacts investor behaviour and equity market returns in South Africa, leading to a decrease in the market and a reluctance to invest. The results also found that inflation risk in Nigeria has a minimally asymmetric effect. The model also emphasises inflation risk as a crucial factor in Egypt's investment decisions, advising investors to monitor and adjust their portfolios accordingly. The model suggests that Kenyan equity market investors may benefit from increased inflation risk, resulting in higher returns.

5.5 Contribution, Originality, and Implications

Originality/Value: To the best of the author's knowledge, this study is the first to model the impact of cross-border equity flow volatility on equity market returns. Using the NARDL model, the study reveals a significant and nonlinear relationship, where positive and negative volatility shocks affect market returns differently. This novel insight advances the existing literature by highlighting the asymmetric dynamics of cross-border equity flows in SANEK markets. **Policy Recommendations:** South Africa should strengthen financial market regulations to enhance investor confidence and stability. It should also encourage portfolio diversification to mitigate risks associated with equity flow volatility. Nigeria should implement measures to attract stable foreign investments, including improving regulatory frameworks and reducing restrictions on capital flows. Egypt should develop policies that enhance market resilience against external shocks, focusing on foreign exchange stability and liquidity buffers. Kenya should strengthen investor protection mechanisms and financial literacy programmes to reduce risk aversion while promoting policies that encourage stable foreign investments. **Practical recommendations for investors:** In South Africa, investors should adopt dynamic asset allocation strategies to capitalise on positive shocks and minimise losses from volatility. In Nigeria, investors ought to focus on long-term investment strategies to benefit from positive shocks and hedge against short-term uncertainties. In Egypt, investors should utilise risk management tools, such as hedge strategies, to protect themselves from volatility-driven losses. Investors

in Kenya are advised to diversify their portfolios across sectors and asset classes to reduce equity flow volatility risk.

5.6 Limitations of the Study

This study focused on SANEK countries only, which may not apply to other regions or economies. The analysis heavily relied on historical data and modelling techniques, which have limitations in predicting future outcomes. Other factors influencing EMR, such as political events, investor sentiment, and technological advancements, were not considered due to a lack of accurate data availability in some nations. These factors can also significantly impact equity market returns and should be considered in future research on this topic.

5.7 Areas of Future Research

Areas of future research could investigate the impact of specific political events, such as regulatory changes, and investor sentiments on EMR. Additionally, integrating macro-finance indicators, social media data, and trade turnover could improve our comprehension of the relationship between these factors and EMR. Furthermore, considering the potential influence of technological advancements, such as the rise of artificial intelligence or blockchain technology, could provide insights into how these innovations may shape the future of equity market returns.

5.8 Ethical Consideration

This essay adhered to all ethical guidelines for research that did not involve direct interaction with either human or animal participants.

Chapter 6

Summary, Conclusion and Policy Recommendations

6.0 Introduction

Cross-border capital flow volatility has significant implications for financial stability, investment decisions, and economic growth in emerging markets. In SANEK countries (South Africa, Nigeria, Egypt, and Kenya), the financial sector plays a crucial role in facilitating economic development, yet it remains vulnerable to volatility in cross-border equity flows and bank lending. Understanding the drivers and impact of these volatility is essential for policymakers, regulators, and investors seeking to manage financial risks effectively. This study provides critical insights into the factors influencing cross-border bank lending and equity flow volatility in SANEK countries. By quantifying these drivers, the research offers valuable knowledge for designing macroprudential policies that can mitigate the destabilising effects of volatile capital flows. Effective policy responses, such as capital flow management measures, banking sector regulations, and investor protection mechanisms, can enhance financial sector resilience and promote sustainable economic growth. In addition, the study illustrates the impact of cross-border capital flows on bank performance and equity market performance. Given the interconnectedness of global financial markets, understanding these dynamics is crucial for investment decision-making. The findings highlight both the risks and opportunities presented by cross-border capital flow volatility, allowing investors to adjust their strategies accordingly to maximise returns while managing risks. The research examines the resilience of banks to fluctuations in cross-border bank lending. Given that banks rely on foreign capital for funding and expansion, sudden shifts in cross-border bank lending can affect profitability, liquidity, and overall financial stability. Insights from this study help banks and financial institutions develop risk management strategies to navigate periods of financial uncertainty. Ultimately, this study underscores the importance of stabilising cross-border capital flows to ensure financial sector stability and economic growth in SANEK countries. The findings provide a foundation for evidence-based policymaking, improved regulatory frameworks, and informed investment strategies that contribute to a more resilient and well-functioning financial system in these key African economies.

Following the introduction in Section 6.0, Section 6.1 summarises the study's key findings. Section 6.2 discusses the study's contribution to the literature. Section 6.3 provides policy recommendations. Section 6.4 discusses the limitations of the study. Section 6.5 outlines areas for further research.

6.1 Summary of the findings

6.1.1 drivers cross-border bank lending and equity flow volatility in SANEK.

The study investigates the key drivers of cross-border bank lending and equity flow volatility in SANEK countries, quantifying their magnitude using the Markov Switching Means VAR (MSM-VAR) model over the period 2000Q1 to 2021Q4. It examines both push factors - such as the contagion effect (VIX), global GDP, and world interest rates - and pull factors, including financial openness, institutional quality, GDP growth, inflation, and current account balance. The findings reveal distinct country-specific dynamics. In South Africa, both push and pull factors influence cross-border bank lending and equity flow volatility. Nigeria experiences significant volatility in both areas, primarily driven by push factors. Similarly, in Egypt, push factors play a dominant role in capital flow volatility. In Kenya, both push and pull factors significantly affect cross-border bank lending and equity flows. These insights provide valuable guidance for policymakers and financial regulators in managing external shocks and enhancing financial stability in SANEK economies.

6.1.2 The dynamics effect of cross-border bank lending volatility on bank RoE

The study's second objective was to examine the impact of cross-border bank lending volatility on bank return on equity (RoE) in SANEK, using GARCH-type models (GARCH(1,1), EGARCH(1,1), and TGARCH(1,1)) over the period 2000Q1 to 2021Q4. These models assess volatility dynamics and asymmetries in financial variables, with EGARCH capturing asymmetric effects and TGARCH accounting for both lagged variance and asymmetric responses. The findings reveal country-specific effects. In South Africa and Egypt, positive shocks to cross-border bank lending volatility tend to enhance bank RoE, while in Nigeria and Kenya, negative shocks significantly reduce bank profitability. Additionally, the GARCH models confirm that credit risk negatively impacts bank profitability in South Africa, Nigeria, and Egypt, whereas in Kenya, it has a positive effect. The EGARCH and TGARCH models further highlight that negative

credit risk shocks are more detrimental to banks across SANEK, making them particularly vulnerable to financial instability. Moreover, the study finds that liquidity risk shocks negatively affect bank profitability, with negative shocks having a greater impact than positive ones. Exchange rate risk also plays a critical role, with positive shocks boosting bank profitability in South Africa, Nigeria, and Kenya, while negative shocks are more impactful in Egypt, suggesting heightened currency vulnerability in its banking sector. Lastly, inflation negatively affects bank profitability across SANEK, with negative inflation shocks having a more pronounced effect. This underscores the challenge banks face in maintaining profitability during periods of high inflation risk. These findings provide essential insights for policymakers, regulators, and financial institutions in managing risks and enhancing financial sector resilience in SANEK economies.

6.1.3 The effects of Cross-border Equity Flows Volatility on EMR

The study's third objective was to analyse the impact of cross-border equity flow volatility on equity market returns in SANEK using an asymmetric NARDL model with data from 2000Q1 to 2021Q4. The NARDL model captures both long-run and short-run effects, allowing for a detailed assessment of how positive and negative shocks influence equity markets asymmetrically. The findings reveal distinct country-specific dynamics. In South Africa, positive shocks have a more significant impact on equity market returns, while negative shocks also yield positive effects, suggesting market optimism. In Nigeria, positive shocks boost returns, whereas negative shocks have a limited impact, indicating investor resilience. Egypt's equity market is primarily driven by positive shocks, reflecting a strong preference for favourable economic conditions. In Kenya, however, positive shocks unexpectedly reduce equity returns, suggesting a more cautious investment environment. These results highlight the unique responses of SANEK equity markets to capital flow volatility, offering valuable insights for investors, policymakers, and regulators in managing financial stability and market confidence.

6.2 Contribution to the Literature

6.2.1 drivers cross-border bank lending and equity flow volatility in SANEK.

This study identified and quantified the magnitude of key drivers of volatility in cross-border bank lending and equity flows within the SANEK countries, employing a country-specific approach with the MSM-VAR model. This research contributes to the existing literature by providing a novel perspective on the volatility drivers of these two critical types of capital flows, an area that has not been explored through regime-switching models until now. The MSM-VAR model used in this study represents a significant methodological advancement, as it captures the non-linear and time-varying dynamics of cross-border capital flows, offering a more accurate and nuanced representation of their behaviour. A symmetric and linear approach provides limited insights into the complexity and asymmetries of capital flow volatility, in contrast to this approach. By utilising this sophisticated regime-switching framework, the study reveals the distinct volatility regimes governing cross-border bank lending and equity flows, shedding light on the varying factors that drive their fluctuations. This study makes several contributions. In addition to providing insight for policymakers and investors, it deepens our understanding of the specific factors affecting volatility in cross-border bank lending and equity flows. Emerging markets need these insights for managing capital flows associated with financial globalisation.

6.2.2 The dynamic effect of cross-border bank lending volatility on bank RoE

This study examines the dynamic effects of cross-border bank lending volatility on bank RoE, a relationship that has not been examined previously. The findings contribute to the literature on risk management, particularly in emerging markets. In contrast to previous studies analysing cross-border lending volatility using symmetric and linear models, this study uses asymmetric and nonlinear GARCH models, marking a methodological advancement. In most SANEK countries (except Egypt), negative shocks of bank lending volatility have a more profound effect on bank RoE than positive shocks, suggesting that external lending volatility affects bank performance in an asymmetric way. This research adds insights into international finance and financial risk management in emerging markets, particularly in Africa. The findings are crucial for policymakers, financial regulators, and bank executives in these countries as they seek to enhance financial stability and optimise bank performance. This study also

serves as a foundation for future research on the link between cross-border capital flows and domestic bank performance, with practical implications for risk management strategies in a volatile global financial environment.

6.2.3 The effects of Cross-border Equity Flows Volatility on EMR

A novel contribution of this study is the examination of the link between cross-border equity flow volatility and equity market returns. Unlike previous research on equity market returns, which primarily employed symmetric and linear models, this study utilises the asymmetric NARDL model. This approach allows for a more nuanced understanding of how positive and negative volatility shocks affect market returns differently. The findings highlight the importance of considering both the magnitude and direction of volatility shocks for accurate risk assessment and market analysis. This research enhances financial modelling by demonstrating the advantages of asymmetric and nonlinear techniques over traditional linear methods. Conventional models often overlook the distinction between upward and downward volatility movements, resulting in an incomplete understanding of market fluctuations. By employing the NARDL model, this study provides a more precise framework for analysing market behaviour, particularly during periods of heightened uncertainty. In addition to its theoretical and methodological contributions, the study has practical implications for international finance, domestic markets, and risk management. It offers valuable insights for policymakers, investors, and financial regulators in emerging markets, especially in SANEK countries, which are experiencing evolving financial environments. The findings can inform better policy design, risk management strategies, and investment decisions. By linking cross-border capital flows with equity market performance, this research establishes a strong foundation for future studies and promotes more informed decision-making in volatile financial conditions.

6.3 Recommendations

6.3.1 Drivers cross-border bank lending and equity flow volatility in SANEK.

Policy Recommendations for Policymakers and Regulators

The South African Reserve Bank (SARB), Financial Sector Conduct Authority (FSCA), and Johannesburg Stock Exchange (JSE) should adopt policies to enhance monetary flexibility for managing capital inflows and outflows, including regular stress

tests of the banking sector. The FSCA must impose strict capital and liquidity requirements on banks involved in cross-border lending and ensure transparency regarding their foreign market exposure. Additionally, the JSE should improve market regulation by promoting long-term investments and requiring firms to disclose risks associated with cross-border equity flows.

In Nigeria, the Central Bank of Nigeria (CBN), the Securities and Exchange Commission (SEC), and the Nigerian Stock Exchange (NGX) should collaborate to enhance foreign exchange policies that stabilise the naira and manage capital outflows during market uncertainty. The SEC should implement stability measures by promoting diversified loan portfolios and enforcing macroprudential policies to reduce excessive risk-taking by banks. Meanwhile, the NGX should foster market liquidity through equity derivatives and strengthen investor protection laws to minimise speculative trading.

For Egypt, the Central Bank of Egypt (CBE), the Egyptian Financial Regulatory Authority (FRA), and the Egyptian Exchange (EGX) should implement targeted strategies for managing capital flows. This includes establishing stabilisation funds and capital control mechanisms to mitigate sudden investment reversals. The FRA should introduce stricter lending standards and standardised risk assessment guidelines for banks involved in cross-border lending. Moreover, the EGX should create frameworks to manage foreign investment flows and encourage institutional investors to engage in long-term investments, reducing dependence on short-term capital.

In Kenya, the Central Bank of Kenya (CBK), Capital Markets Authority (CMA), and Nairobi Securities Exchange (NSE) should collaborate to enhance financial stability through macroprudential policies. This includes implementing capital buffers for banks and controls to manage foreign credit exposure. The CMA should introduce circuit breakers and stabilisers to mitigate extreme market fluctuations and improve monitoring systems for speculative foreign capital movements. Furthermore, the NSE should increase market participation by developing risk-hedging financial products, such as options and index funds, and enforce strict reporting standards for companies with foreign investments.

By adopting these measures, each country can strengthen financial stability, manage cross-border capital flow volatility, and foster a resilient investment environment.

Practical Recommendations for Investors, Banks, and Stock Exchanges

The JSE, South African banks, and investors should prioritise diversification and risk management to reduce capital flow volatility. Investors can use hedge strategies, such as futures and options, while banks should strengthen local funding sources and conduct stress tests to evaluate external risks. Additionally, the JSE should introduce volatility index-based ETFs and improve market surveillance to identify manipulation of cross-border capital flows.

In Nigeria, the NGX, banks, and investors should prioritise long-term stability. Investors are encouraged to focus on government bonds and local equities to mitigate capital flow fluctuations. Banks must develop credit-risk models that account for external shocks and shift their focus toward domestic lending. The NGX should introduce policies that promote long-term foreign investments and create financial instruments such as cross-border investment-linked bonds.

For Egypt, the EGX, banks, and investors need to improve risk management practices. Investors should stay updated on global market trends and diversify their portfolios by including industries less vulnerable to external volatility. Banks ought to enhance their internal risk management systems and practice responsible cross-border lending. The EGX should create structured investment vehicles for risk-averse investors and focus on strengthening investor education regarding capital flow risks.

In Kenya, the NSE, banks, and investors need to prioritise financial stability. Investors should minimise exposure to volatile foreign investments by diversifying into local assets. Banks should improve liquidity management and form international partnerships to stabilize cross-border lending. Meanwhile, the NSE should develop financial instruments to hedge against volatility and strengthen global partnerships to attract stable foreign investments.

By implementing targeted policies and strategic investment approaches, SANEK countries can mitigate financial instability and foster resilient economic environments.

6.3.2 The dynamic effect of cross-border bank lending volatility on bank RoE

Policy Recommendations for Policymakers and Regulators

To stabilise cross-border lending in South Africa, policymakers should enhance bilateral financial agreements and promote mechanisms that encourage capital flows while upholding strong risk management practices. The SARB and FSCA should mandate improved disclosure of risk exposure to foreign lending institutions, including quarterly performance reports, to enhance risk assessment. Strengthening foreign exchange policies and currency risk management frameworks will help alleviate currency volatility, ensuring sustainable cross-border lending for South African banks.

The CBE should encourage local banks to adopt hedge strategies to safeguard against international market volatility. It should also regulate and monitor international capital flows to ensure that foreign lending supports Egypt's banks without exposing them to undue risks. Strengthening governance and risk management frameworks will equip banks to manage lending volatility, especially during economic instability.

In response to the volatility in cross-border lending in Nigeria, the CBN should implement regulations that limit the amount of cross-border lending by local banks during significant market instability to reduce risks. Additionally, the CBN should encourage banks to utilise currency-hedging instruments to manage foreign exchange risks that can adversely affect returns on equity. Furthermore, the CBN must enhance financial infrastructure to strengthen market confidence, prioritising capital adequacy and liquidity requirements to ensure the stability of the banking sector.

To manage lending volatility in Kenya, the CBK should implement measures to minimise its effects. This includes controlling credit growth and enhancing market liquidity through monetary policy. Encouraging banks to adopt stronger hedging and risk management practices will help mitigate risks associated with cross-border lending, particularly during periods of global financial instability. Additionally, the CBK should incentivize banks to focus on more stable domestic lending activities or diversify their loan portfolios into safer asset classes when cross-border lending volatility arises.

By implementing these recommendations, each country can enhance the stability of its banking sector, reduce risks associated with cross-border lending, and ensure sustainable financial practices amid global market fluctuations.

Practical Recommendations for Investors and Banks

Investors should focus on South African banks that have successfully managed international lending portfolios. Banks with strong risk management frameworks and a proven track record of handling cross-border lending volatility are likely to maintain profitability. To mitigate risks, South African banks should enhance their risk management systems. Additionally, forming strategic partnerships with international banks could help minimise exposure to foreign market fluctuations and improve financial stability.

Investors should focus on Egyptian banks with a proven history of managing cross-border lending, particularly those with effective risk-hedging strategies. Strong governance structures and solid capital management practices are crucial for minimising the risks associated with international lending. Egyptian banks should develop comprehensive risk-hedging products and diversify their lending portfolios to mitigate exposure to market volatility. Balancing domestic and international lending will help ensure overall stability.

Investors should exercise caution when considering Nigerian banks, especially those heavily involved in cross-border lending during economic instability. It is essential to prioritise banks that demonstrate strong liquidity and capital adequacy ratios while avoiding those with riskier asset structures. During periods of volatility, Nigerian banks need to adopt a more conservative stance on cross-border lending. Strengthening liquidity management and employing hedge strategies against foreign exchange risks will be vital for maintaining stability and profitability.

Investors should prioritise Kenyan banks that focus on stable domestic lending rather than those heavily engaged in cross-border lending. Banks with diversified portfolios and strong financial health are better positioned to withstand potential losses from volatility on international markets. Kenyan banks should enhance domestic lending activities, strengthen risk management frameworks, and diversify investments into safer asset classes. Additionally, forming strategic alliances with international

financial institutions could help mitigate risks associated with cross-border lending volatility.

6.3.3 The effects of Cross-border Equity Flows Volatility on EMR

Policy Recommendations for Policymakers and Regulators

The FSCA, JSE, and SARB should enhance market liquidity by encouraging institutional investors to commit to long-term equity investments, helping to stabilise market volatility. The JSE needs to implement strong risk management frameworks, including circuit breakers and improved market surveillance mechanisms. Furthermore, the FSCA and JSE should launch investor education programmes focused on cross-border equity flows to facilitate informed decision-making. Additionally, the SARB should promote the development of advanced hedging instruments, such as volatility index derivatives, to assist investors in managing risks related to the volatility of cross-border equity flows.

In Nigeria, the SEC, the NGX, and the CBN should prioritise market transparency by enforcing strict disclosure requirements for companies and foreign investors. The NGX should implement policies to mitigate volatility, such as trading halts and transaction taxes, to protect the market from negative equity flow shocks. To reduce dependence on foreign equity flows, the CBN should offer incentives for institutional investors to diversify their portfolios. Furthermore, the SEC should encourage the development of the financial derivatives market to provide investors with hedging tools against stock price volatility.

In Egypt, the FRA, EGX, and CBE should implement policies to ensure market stability. This can be achieved by requiring firms to conduct stress tests that evaluate their resilience to external equity flow shocks. The EGX should enhance regulatory oversight of foreign investments to mitigate the risk of market instability from sudden capital outflows. Meanwhile, the CBE should promote market diversification by supporting financial instruments that facilitate investment in industries less susceptible to external shocks. Additionally, the FRA should encourage the use of financial derivatives, such as options and futures contracts, to help investors hedge against stock price volatility.

In Kenya, the CMA, NSE, and CBK need to improve their risk monitoring systems by implementing real-time tools to assess and predict the effects of foreign equity flow volatility. The NSE should introduce circuit breakers to protect investors from severe price fluctuations. The CBK should promote increased domestic investments by pension funds and insurance companies to reduce reliance on foreign capital inflows. Furthermore, the CMA should develop clear and stable guidelines for foreign investors to ensure regulatory certainty and encourage sustainable cross-border equity investments.

Practical Recommendations for Investors and Stock Market Exchanges

The JSE and South African investors should focus on proactive market monitoring and diversification to reduce risks linked to cross-border equity flows. Investors need to stay informed about global equity flow trends, employ hedge strategies, and diversify their portfolios across various sectors and asset classes. The JSE should also introduce educational programmes to help investors manage volatility and promote the listing of financially stable companies. This would create alternative investment opportunities and lessen market concentration risks.

In Nigeria, the NGX and investors should prioritise long-term investment strategies to mitigate the volatility of short-term equity flows. To manage stock price fluctuations, investors ought to diversify their portfolios into fixed-income securities and commodities. Additionally, the NGX could enhance risk management by introducing index funds and ETFs and launching awareness campaigns to educate investors on capitalizing on market opportunities amid cross-border volatility.

EGX and its investors should implement active risk management strategies for Egypt. Investors should use stop-loss limits and adjust their portfolios according to market trends while capitalising on positive shocks to enhance returns. Additionally, the EGX should create new investment products, such as volatility-linked securities, and enforce continuous disclosure requirements to ensure timely access to information regarding external equity flow dynamics.

In Kenya, the NSE and its investors should prioritise stability over speculative investments. Investors should focus on sectors less vulnerable to external shocks and use technical analysis to inform market decisions. Additionally, the NSE should create

real-time risk monitoring tools and collaborate with financial institutions to introduce structured investment funds for risk-averse investors.

6.4 Limitation of the study

6.4.1 Drivers cross-border bank lending and equity flow volatility in SANEK.

The study is limited by only using one measure of volatility, which may not capture all aspects of market volatility. Future research could include multiple measures of volatility, analyse a broader range of economies, and explore alternative modelling techniques to capture non-linear relationships. Additionally, integrating qualitative data, such as investor sentiment, would enhance the accuracy of the analysis. Furthermore, conducting a longitudinal study over a longer period would allow scholars to examine long-term trends and patterns of market volatility.

6.4.2 The effects of cross-border bank lending volatility on bank RoE

The study on cross-border bank lending volatility and bank RoE in SANEK has limitations. It focuses on a specific period and cannot assess additional aspects such as regulatory changes and competitive dynamics due to a lack of data availability. The findings may not be applicable to countries outside SANEK due to differences in banking systems and economic conditions. Additionally, the study only examines the impact of cross-border bank lending volatility on bank RoE and does not consider other financial indicators or performance measures such as net interest margin (NIM) and return on assets (RoA). Therefore, further research is necessary to expand the scope of factors and increase the sample size to improve the validity and reliability of the findings.

6.4.3 The effects of Cross-border Equity Flows Volatility on EMR

This study has limitations concerning the effect of cross-border equity flow volatility on EMR in SANEK countries. It may not be applicable to other regions or economies as it focuses on a specific group of countries. The research primarily relies on historical data and modelling tools, which have limitations in predicting future outcomes. Factors such as political events, macroeconomic conditions, and investor behaviour, which can also influence EMR, were not included in the study. Additionally, the study does not consider the potential impact of technological advancements or changes in market dynamics. Therefore, caution is advised when interpreting the results and making

investment decisions based on them. Future studies should encompass a broader range of countries and scenarios.

6.5 Areas for further research

6.5.1 Cross-border bank lending and equity flow volatility in SANEK

A prospective study can examine the relationship between volatility and financial stability, providing policymakers with valuable insights. Including time-varying features and nonlinear relationships in the models can provide a more comprehensive understanding of volatility in banking and equity markets. Investigating how national cultural and institutional differences affect bank lending and equity flows can be beneficial for decision-makers in both the public and private sectors. Additionally, investigating the cross-country spillover effects of volatility can help us understand how financial markets are interconnected globally. Studying the behaviour of different financial models can assist researchers in comprehending the key variables that contribute to volatility in both banking and equity markets. Access to this knowledge is essential for market participants and policymakers to make informed decisions and develop effective risk management strategies.

6.5.2 Bank RoE

Future studies on cross-border bank lending volatility and bank profitability should focus on measuring profitability using net interest margin (NIM) and return on assets (RoA). Research into the effects of regulatory frameworks and supervision on bank profitability could provide valuable insights. A comparison of cost efficiency and revenue generation may reveal NIM drivers in different countries. Studying the link between capital adequacy levels and profitability may uncover risky behaviour. Examining the impact of technological advancements, such as digital banking and fintech adoption, on profitability will enable us to gain a deeper understanding of the changing dynamics in the banking sector.

6.5.3 Equity Market Returns

The impact of political developments on EMR may be studied in future research. Enhancing the understanding of the relationship between these variables and EMR could be achieved by incorporating macro-finance indicators such as GDP growth, investor sentiment, social media activity, and trade turnover. Additionally, assessing

the impact of technological innovations such as artificial intelligence or blockchain technology may offer insights into how these technologies could affect future equity market returns. Researchers can enhance their understanding of EMR by considering additional factors and providing insights for investors, policymakers, and financial analysts. This approach helps identify risks and opportunities, enabling strategic decision-making in the global economy.

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Appendices

Objective 1

A.1 -Table 3.5: Optimum Lag Selection Criteria Test Results for South Africa and Nigeria

South Africa

VAR Lag Order Selection Criteria
 Endogenous variables: BLV
 Exogenous variables: VIX W GDP WIR FO INS INF RGDP CAB
 Date: 03/12/24 Time: 13:58
 Sample: 2000Q1 2021Q4
 Included observations: 85

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-160.6170	NA	3.096091	3.967458	4.197355	4.059929
1	-152.2580	14.94780	2.604462	3.794306	4.052940	3.898336
2	-133.8899	32.41424	1.731284	3.385646	3.673017	3.501234
3	-118.7790	26.31076*	1.242601*	3.053625*	3.369732*	3.180772*

Nigeria

VAR Lag Order Selection Criteria
 Endogenous variables: BLV
 Exogenous variables: VIX W GDP WIR FO INS INF RGDP CAB
 Date: 03/12/24 Time: 13:30
 Sample: 2000Q1 2021Q4
 Included observations: 85

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-206.0591	NA	9.019290	5.036684	5.286580	5.129155
1	-172.4881	60.03275*	4.192211*	4.270309	4.528942*	4.374338*
2	-171.4817	1.776007	4.192828	4.270158*	4.557529	4.385747
3	-171.2943	0.326354	4.275323	4.289277	4.605385	4.416425

VAR Lag Order Selection Criteria
 Endogenous variables: EPV
 Exogenous variables: VIX W GDP WIR FO INS INF RGDP CAB
 Date: 03/12/24 Time: 13:52
 Sample: 2000Q1 2021Q4
 Included observations: 84

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-266.6375	NA	40.51568	6.538987	6.770494	6.632051
1	-266.6317	0.010265	41.49647	6.562660	6.823104	6.667356
2	-258.8089	13.78300*	35.28543	6.400213	6.689596*	6.516542*
3	-257.6983	1.930377	35.20592*	6.397579*	6.715900	6.525541

VAR Lag Order Selection Criteria
 Endogenous variables: EFV
 Exogenous variables: VIX W GDP WIR FO INS INF RGDP CAB
 Date: 03/12/24 Time: 13:29
 Sample: 2000Q1 2021Q4
 Included observations: 84

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-193.7697	NA	7.147364	4.804042	5.035548	4.897105
1	-154.8425	69.51293*	2.897826*	3.901012*	4.161457*	4.005709*
2	-154.4295	0.727606	2.939521	3.914989	4.204372	4.031319
3	-154.0256	0.702117	2.982662	3.929181	4.247502	4.057143

A.2 -Table 3.6: Optimum Lag Selection Criteria Test Results for Egypt and Kenya

Egypt

VAR Lag Order Selection Criteria
 Endogenous variables: BLV
 Exogenous variables: VIX W GDP WIR FO INS INF RGDP CAB
 Date: 03/12/24 Time: 13:44
 Sample: 2000Q1 2021Q4
 Included observations: 83

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-198.2080	NA	8.428256	4.968867	5.202008	5.062530
1	-155.8861	75.50125*	3.113212*	3.972676*	4.234960*	4.078047*
2	-155.4552	0.722632	3.158737	3.966873	4.278300	4.103952
3	-155.3361	0.206696	3.227766	4.008099	4.328668	4.136886
4	-154.4781	1.467863	3.240360	4.011521	4.361233	4.152016
5	-154.2242	0.428318	3.300987	4.029499	4.408353	4.181701

Kenya

VAR Lag Order Selection Criteria
 Endogenous variables: BLV
 Exogenous variables: VIX W GDP WIR FO INS INF RGDP CAB
 Date: 03/12/24 Time: 13:37
 Sample: 2000Q1 2021Q4
 Included observations: 83

Lag	LogL	LR	FPE	AIC	SC	HQ
0	50.21302	NA	0.021185	-1.017181	-0.784040	-0.923518
1	98.16345	85.50198	0.006836	-2.148517	-1.886233	-2.043146
2	106.1247	14.00406*	0.005782*	-2.316257*	-2.024830*	-2.199178*
3	106.4158	0.505090	0.005884	-2.299176	-1.978607	-2.170389
4	107.0267	1.045199	0.005942	-2.289800	-1.940089	-2.149306
5	107.0794	0.088820	0.006083	-2.266973	-1.888118	-2.114770

VAR Lag Order Selection Criteria
 Endogenous variables: EFV
 Exogenous variables: VIX W GDP WIR FO INS INF RGDP CAB
 Date: 03/12/24 Time: 13:49
 Sample: 2000Q1 2021Q4
 Included observations: 82

Lag	LogL	LR	FPE	AIC	SC	HQ
0	37.49420	NA	0.028535	-0.719371	-0.484569	-0.625101
1	56.38901	33.64198*	0.018448*	-1.155829*	-0.891677*	-1.049776*
2	56.45409	0.114296	0.018879	-1.133027	-0.839524	-1.015190
3	57.40589	1.648229	0.018909	-1.131851	-0.808998	-1.002231
4	59.01033	2.739287	0.018642	-1.146593	-0.794391	-1.005189
5	59.25665	0.414540	0.018999	-1.128211	-0.746658	-0.975023

VAR Lag Order Selection Criteria
 Endogenous variables: EFV
 Exogenous variables: VIX W GDP WIR FO INS INF PGDP CAB
 Date: 03/12/24 Time: 13:41
 Sample: 2000Q1 2021Q4
 Included observations: 85

Lag	LogL	LR	FPE	AIC	SC	HQ
0	39.97883	NA	0.027605	-0.752443	-0.522547	-0.659972
1	110.2948	125.7416	0.005405	-2.383408	-2.124775	-2.279379
2	139.0036	50.66242*	0.002817*	-3.035378*	-2.748007*	-2.919789*
3	139.1963	0.335592	0.002872	-3.016383	-2.700276	-2.889236

Objective 2

A.4 - Figure 4.2 Autocorrelation of results from Bank RoE for South Africa and Nigeria.

South Africa

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob*
		1 0.224	0.224	4.5254	0.033
		2 0.270	0.231	11.154	0.004
		3 0.337	0.265	21.597	0.000
		4 0.185	0.045	24.782	0.000
		5 0.097	-0.073	25.670	0.000
		6 0.149	0.016	27.802	0.000
		7 0.058	-0.031	28.133	0.000
		8 -0.060	-0.129	28.485	0.000
		9 0.004	-0.027	28.487	0.001
		10 -0.002	0.027	28.487	0.002

Nigeria

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob*
		1 0.453	0.453	18.682	0.000
		2 0.338	0.168	29.227	0.000
		3 0.137	-0.086	30.987	0.000
		4 0.096	0.017	31.852	0.000
		5 -0.004	-0.059	31.853	0.000
		6 0.015	0.030	31.876	0.000
		7 -0.027	-0.025	31.946	0.000
		8 0.096	0.140	32.856	0.000
		9 -0.068	-0.178	33.317	0.000
		10 -0.130	-0.144	35.031	0.000

A.4 - Figure 4.3 Autocorrelation of results from Bank RoE for Egypt and Kenya.

Egypt

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob*
		1 0.454	0.454	18.751	0.000
		2 0.293	0.110	26.675	0.000
		3 0.029	-0.178	26.752	0.000
		4 -0.139	-0.163	28.583	0.000
		5 -0.094	0.082	29.432	0.000
		6 -0.136	-0.058	31.212	0.000
		7 -0.049	0.012	31.448	0.000
		8 -0.052	-0.043	31.719	0.000
		9 0.001	0.032	31.719	0.000
		10 0.037	0.026	31.860	0.000

Kenya

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob*
		1 0.624	0.624	35.443	0.000
		2 0.424	0.057	52.008	0.000
		3 0.326	0.067	61.916	0.000
		4 0.251	0.017	67.837	0.000
		5 0.248	0.101	73.699	0.000
		6 0.160	-0.084	76.166	0.000
		7 0.099	-0.016	77.131	0.000
		8 0.065	-0.011	77.554	0.000
		9 -0.001	-0.072	77.555	0.000
		10 -0.014	0.002	77.574	0.000



22-02-2023
Mr Dumisani Pamba (217076475)
School Of Acc Economics&Fin
Westville

Dear Mr Dumisani Pamba,

Original application number: 00020730
Project title: Capital Flow Volatility, Bank RoE and Equity Market Returns in SANEK Countries

Exemption from Ethics Review

In response to your application received on 22 February 2023, your school has indicated that the protocol has been granted **EXEMPTION FROM ETHICS REVIEW**.

Any alteration/s to the exempted research protocol, e.g., Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through an amendment/modification prior to its implementation. The original exemption number must be cited.

For any changes that could result in potential risk, an ethics application including the proposed amendments must be submitted to the relevant UKZN Research Ethics Committee. The original exemption number must be cited.

In case you have further queries, please quote the above reference number.

PLEASE NOTE:

Research data should be securely stored in the discipline/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours sincerely,



Prof Josue Mbonigaba
Academic Leader Research
School Of Acc Economics&Fin

UKZN Research Ethics Office
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