

## Financial deepening and equity investment in emerging markets



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### ABSTRACT

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The aim of this study is to examine the effect of financial deepening on stock market development using equity investment. There is an increasing need for financial service expansion to improve equity investment, which will lead to better stock market operations. We identify the key financial deepening mechanisms in this study, such as broad money supply, credit to the private sector, and economic progress, and we use inflation as a moderating tool. The study spans the years 1981 through 2021. Because of the unit root result, we believe that the autoregressive distributed lag (ARDL) model and error correction model (ECM) are the most appropriate techniques for producing the most reliable results. The study's findings show that, in both the long and short runs, GDP has a positive impact on equity investment, implying that an improvement in the general economic situation can have a positive impact on equity investment. Similarly, in the short run, broad money supply has a positive and significant influence on equity investment, but not in the long run. Credit to the private sector, on the other hand, has a material negative effect on stock market development in the short run and becomes insignificant in the long run. These findings suggest that the government should pay closer attention to financial deepening indicators in order to improve equity investment, which is a major component of stock market capitalization. In line with the results, the government should make more funds available for private sector activities while also maintaining a stable money supply to meet economic demands.

**Contribution/Originality:** This study's uniqueness is embedded in its use of equity investment as a proxy for stock market development, which has not been used in previous studies. Given that equity is a major component of market capitalization, the financial deepening effect on equity investment determines the stock market's level of development.

## 1. INTRODUCTION

Financial deepening has many implications for investment in equity in emerging economies. The growth in equity investment is usually defined by the indicators of financial deepening, such as money supply, credit availability

to private sectors, the flourishing level of the economy, and the level of price changes or inflation. There are numerous major benefits to a country's economy through financial broadening. It is contended that monetary strengthening provides significant economic stabilization advantages, but also has some constraints. For example, increasing sales volumes can improve the capacity to form movement of capital without causing huge changes in asset exchange rates and costs. However, it can also attract highly unstable capital inflows and impede the functioning of the economy (International Monetary Fund, 2011). Financial deepening can also reduce dependence on foreign cash reserves and alleviate balance sheet disparities by expanding the capacity to raise capital in the home currency and at long-term maturity dates (World Bank Group, 2011). In the context of emerging normalcy, Yuliia and Oleksii (2021) argue that financial deepening is shifting from indicators of economic expansion to elements associated with financial destabilization as a result of the COVID-19 pandemic, which has had a significant impact on key macroeconomic indicators. However, Udoh et al. (2021) maintain that financial deepening reduces world economic complexities through market dynamics and protective factors. The existence of a modernized financial market system increases portfolio balance quality, saving, and funding (Samuel, Akpan, Abner, Idogen, & Ndubuaku, 2019). In accordance with the finance-leading assumption, the finance industry pushes economic boom without any input because economic success necessitates financial sector inventiveness (Udoh et al., 2021).

A country's macroeconomic situation can be impacted by financial deepening. In a broad sense, financial intensity can raise the money supply-to-GDP ratio or perhaps some stock index. It may also increase the money supply, and funds can create additional possibilities for business development and investment. A strong financial system deepens access to finances, i.e., a poorly developed monetary system restricts funding availability and forces individuals to rely on high-cost sources, such as lending institutions. Lower provision of finances with greater charges will result in less support for economic operations, thus economic expansion will be lower. Encouraging well-managed monetary broadening in low-income states can improve resilience and the ability to deal with disruptions, optimize monetary policy efficacy, and endorse robust and long-term social inclusion.

Financial deepening is greatly aided by stock market operations that are frequently administered by central bankers, notably a nation's monetary authority (Okeya & Dare, 2020). An economic system with a poor financial intermediary is likely to have suboptimal equity markets with a shortfall in financial complexity. A rising stock value is among the key metrics of a flourishing share market, and this is the result of successful financial widening techniques employed in economic management (Okeya & Dare, 2020). Reserves provide a different system for the creation of diverse financial products, resulting in an abundance of credit intermediaries in the economy to provide such cash reserves where they are considered necessary. The roles and responsibilities of stock markets and the growth of monetary devices are critical to the progress of all contemporary societies. This seems to be consistent with present growth models that emphasize the importance of equity trading and financial expansion in achieving economic targets, despite the fact that the combined scientific and theoretical research remains unclear with conflicting results. More importantly, because of the extensive record of their stock markets, high reliability, and information quality, the bulk of the empirical research centers on the largest developed economies of North America and Europe, as well as some developing markets in Asia (Michael, Effah, Joel, & Nkwantabisa, 2021). The equity market serves multiple purposes, including splitting large exchanges, investment strategy, and widespread data distribution to stockholders (Michael et al., 2021).

Bakang (2014); Chima, Babajide, Adegboye, Kehinde, and Fasheyitan (2021); Karimo and Ogbonna (2017); Lawrence (2018); Nwosu, Itodo, and Ogbonnaya-Orji (2021) and Olawumi, Lateef, and Oladeji (2017) used panel data from 69 countries to demonstrate the positive impact of financial deepening on innovation. While the majority of previous studies found a beneficial effect of financial deepening on stock market development (Attah-Botchwey, Awadzie, & Agbenyezi, 2022; He & Pardy, 1993; Michael et al., 2021; Nyasetia, 2012; Omar, Ali, Mouneer, Kouser, & AlFaryan, 2022; Rahman & Mustafa, 2017), others (Kehinde, Taiwo, & Adekunle, 2022; Wang, 2017) confirmed the opposite. We used equity investment to proxy stock market development in this study, which was not used in previous

studies. We used the ARDL and ECM techniques to assess the short- and long-term relationships and impacts of selected financial deepening indicators, while controlling for the effect of inflation.

This article is arranged as follows: the first section deals with the background of the study, the second section covers the underlying theories and a review of related literature, Section 3 highlight the methodology for this research, Section 4 presents the results from the data analysis, and Section 5 comprises the strategic options and a summary of the findings.

## 2. LITERATURE REVIEW

### 2.1. Conceptual Framework

#### 2.1.1. Conceptual Model

The functional variables used in this study are depicted in Figure 1. The dependent variable is equity investment, which represents stock market development. Broad money supply, credit to the private sector, and gross domestic product are the independent variables used as proxies for financial deepening indicators. Because the study uses time series data from 1981 to 2021, it also accounts for inflation.

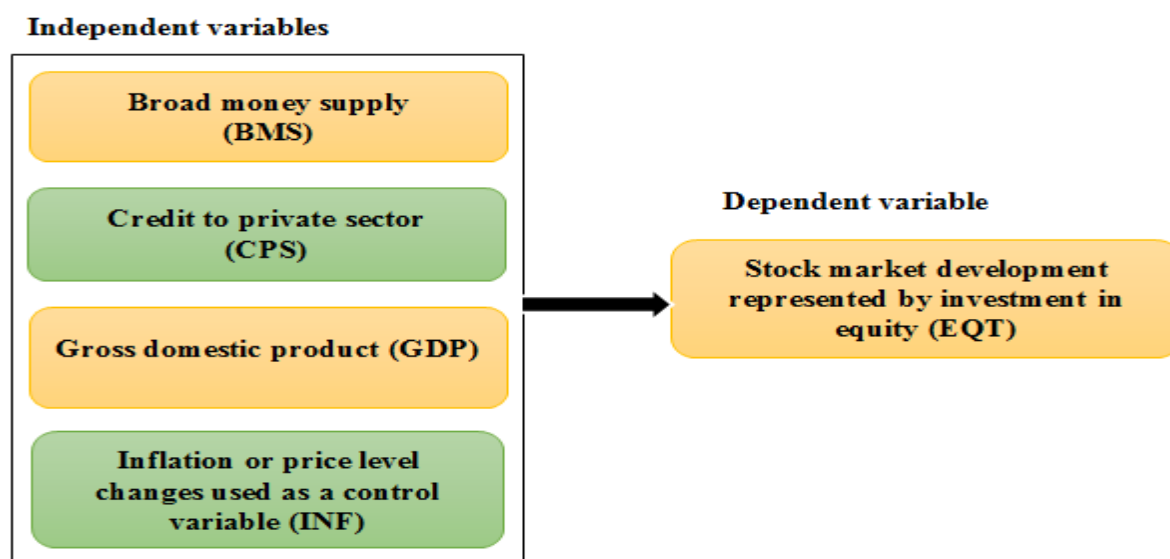


Figure 1. Authors' conceptual model formulated for this research, 2023.

#### 2.1.2. Conceptual Understanding of the Study Variables

Investment in equity is characterized by funds applied in the acquisition of listed firms' stocks issued on the stock exchange of any nation. Equity in Nigeria has the highest number of shareholders and depicts the growth of the Nigerian Stock Exchange. Financial deepening is described as the enhanced accessibility of financial products and services to people, with a wider range of services available. In broad sense, it refers to a rise in the supply of cash to output growth (Ogbebor & Okungbowa, 2018). That is, the greater the quantity of cash in a society, the more likely it is to experience economic expansion (Shaw, 1973). Thus, financial deepening promotes capital investments, wealth creation, and improved living conditions (Alrabadi & Kharabsheh, 2016). According to the definition by Shaw (1973), financial broadening is the improvement of customized financial solutions for all levels of the society, thereby expanding the availability and affordability of financial products in an economic system. Monetary deepening is also characterized by an increase in the money supply-to-price benchmark percentage, which clearly shows that capital adequacy is substantial, meaning that more funds are available in the economic system. As a result, more options are available within the economy, resulting in a high rate of growth and economic viability. For this reason, one could argue that the expansion of financial institutions stimulates the economy. In accordance with Ndege (2012), financial deepening among financial firms improves the accumulation, utilization and channeling of cash reserves into a capital

investment stream, which boosts productivity expansion. Gertler and Kiyotaki (2015) stated that financial deepening also pertains to the advancement of the overall financial system, which is closely linked to economic innovation. Financial deepening is primarily regarded as a natural occurrence in the framework of financial expansion and a prerequisite for interactive wealth creation. Pecuniary outspreading relates to the greater availability of financial amenities by banking firms to all citizens in a community.

According to Kromtit and Tsenkwo (2014), financial intensifying entails expanding undertakings through organized exchanges. It broadens the dimensions of financial institutions and integrates the informal economy into the official economic framework with the goal of boosting financial intermediaries' potency and fiscal policy reliability. Ndebbio (2004) defines financial deepening as a rise in the number of fiscal assets within the economic system. As a result, the total amount of all financial instrument metrics represents the dimensions of financial broadening. This means that the broadest range of resources, such as broad money, obligations of non-bank financial intermediation, treasury securities, the value of stocks, and funds in the money market, has to make up the gauge of monetary expansion. Financial intensity is also interpreted as industries and intermediaries using a wide range of banking market segments for investing and savings choices, including those with long maturity periods. Banking institutions and sectors of the economy can utilize larger quantities of funds and manage higher output without requiring large commensurate mobility in stock prices, and the finance system can provide a variety of resources for risk-sharing reasons.

Ndebbio (2004) defines financial deepening as widening the availability of monetary resources, which leads to business expansion. The primary goal of broadening the banking markets is to increase household resources, enhance the volume of the national currency, and strengthen the process of saving. Raising and separating funds and investment exhibitions boost savings flows and also allow the placement of cash reserves. As a result, stockholders have a greater variety of financial instruments to choose from. In principle, depth markets enable depositors to buy shares in a variety of superior investment and risk-sharing instruments, while also enabling mortgage holders to obtain a range of funding and risk-management instruments (Goswami & Sharma, 2011).

Capital systems are extensive if they offer investors a broad range of financial assets with varying returns, risks, and maturity. It includes a variety of sub-markets (e.g., the equity market), as well as variety of financial resources that are successfully integrated in the international markets and are linked to a financial institution (Popiel, 1990). The provision of investment capital is an important component in any country's economic growth cycle. Despite not being in a satisfactory condition, the right resources are required for manufacturing and job expansion. There is abundant proof that nations that have experienced or are experiencing economic success have accurate methods for mobilizing monetary backing and assigning them for wealth creation (Ogbebor & Okungbowa, 2018). Improved capital lending results in greater yields and more work opportunities and earnings, which in turn raises the citizenry's quality of life (Sanusi, 2012). In emerging regions, superficial and thinly traded banking systems restrict economic and financial policy options, hinder strategy transfer and execution, and constrain chances for profitable endeavors.

## *2.2. Theoretical Underpinnings of the Study*

The demand to strengthen the cash flow and broaden the banking industry services in emerging regions has resulted in various reform measures implemented by governments worldwide. Financial liberalization is a policy prescription that includes a set of initiatives aimed at removing any inappropriate state-imposed barriers on the operation of financial markets (Alenoghena, Enakali-Osoba, & Mesagan, 2014). It entails removing the rate of interest ceiling, relaxing lending and deposit controls, privatizing public businesses, and a variety of other activities directed at widening the monetary system (Killick & Martin, 1990). The financial liberalization theory originally developed by McKinnon (1973) and Shaw (1973) promotes financial services sector liberalization as an appropriate method to improve the economy. According to the theory, capital market liberalization allows for financial deepening, which takes into account an increased use of banking services by investors and savers, in addition to the commercialization

of the economic system. In other words, reducing capital market divergences increases domestic resources and attracts overseas investment. The theory assumes that the larger the actual price of interest and the bigger the level of financial deepening, the more saving will occur, and financial savings will be apportioned and invested more productively than if savings are invested actively in the industry in which it occurs, without financial intermediaries (Thirlwall, 2005).

Conferring to the McKinnon–Shaw theory of financial liberalization, the buildup of financial assets and tangible wealth concentration in emerging regions results in economic expansion. There is an overall agreement among researchers on the measurable contribution of a nation's actual economic earnings on the expansion of its financial market, which involves the growth of equity markets (Boyd & Smith, 1998; King & Levine, 1993; McKinnon, 1973; Shaw, 1973). Commercial factors grow and shrink during economic booms and downturns, respectively. Hypothetical investigations have shown that fast expansion in the free market occurs when an economy is flourishing (Boyd & Smith, 1998). Once an economy improves and remains stable, the threshold of earnings and cash reserves rises. In contrast, the stock exchange invests these cash reserves, increasing the capital base of the equity market. As a result, the formulation of theories indicates a beneficial connection between the expansion of the stock market and economic growth. According to models established by Azariadis and Smith (1996); Boyd, Levine, and Smith (2001); Choi, Smith, and Boyd (1996); Huybens and Smith (1998) and Huybens and Smith (1999), rising inflation levels are linked to insignificant, and perhaps less liquid, equity markets. According to Boyd et al. (2001), an upward trend in inflation diminishes the loaning opportunity of intermediaries, lowering the real rate of return on capital instruments, especially the finances. As a direct consequence, the chances of borrowing are harmed, and prospective borrowers will choose not to seek credit (Omar et al., 2022). The rising inflation rate reduces a country's economic earnings level, preventing the incentive to invest in equities available in the stock market, resulting in a decrease in the stock market capitalization since equity is a major component.

### *2.3. Review of Existing Studies*

#### *2.3.1. Existing Studies Establishing the Effect of Financial Deepening on Economic Growth*

##### *2.3.1.1. Studies Conducted in Nigeria*

Onwumere, Ibe, Ozoh, and Mounanu (2012) examined the implications of financial intensification on the prosperity of Nigeria from 1992 to 2008 using the supply-leading presumption and settings such as the broad acceleration of money, cash-based variety, unpredictability of the economy, quantity of trading, and reserve assets as gauges of liquidity expansion, and growth in GDP as a substitute for revenue advancement. According to the findings, broad acceleration of liquidity and financial assets aided Nigerian growth in the economy, whereas monetary aggregate diversity, financial instability, and volume of trade restricted broadening. Okafor, Onwumere, and Chijindu (2016) carried out a cause-and-effect study on Nigerian financial consolidation and economic expansion from 1981 to 2013. The study found a long-run relationship between the expansion of the economy, broad money supply and demand, and financing to the business community, with an elevated rate of change in long-run equilibrium. The findings also revealed that, while broad money had a positive but non-significant effect on growth, financing to entrepreneurs had a negative but non-significant impact. According to the findings of the Granger causality examination, neither the broad money supply nor credit to the private sector Granger-caused productivity growth, and vice versa. Karimo and Ogbonna (2017) investigated the relationship between financial consolidation and economic expansion in Nigeria from 1970 to 2013 using the Toda–Yamamoto augmented Granger causality test. According to the findings, the link between Nigeria's growth and financial deepening follows the supply-leading presumption, indicating that financial strengthening leads to promotion rather than advancement, which results in increased monetary intensity. Olawumi et al. (2017) investigated the degree of influence of financial widening on the revenue and profits of selected Nigerian commercial banks. The results showed that each element of the

financial broadening measures had a powerful connection and was statistically relevant. Thus, the study proved that financial deepening contributed positively to the earnings of the randomly chosen commercial banks in the country.

Samuel-Hope, Ehimare, and Osuma (2020) explored the impact of banking institutions' excess reserves, supply of money, and lending to the private sector on productivity expansion. The data was gathered from various issues of the CBN publications and evaluated using the autoregressive distributed lag (ARDL) model. The findings showed a long-term connection, but no regressor was identified as being significant. The ratio of private sector credit to GDP was negatively proportionate to productivity growth, because although supply of money to economic output was significantly linked to economic expansion, time and cash reserve accumulations in financial institutions were inversely significant to accelerating progress. Nwosu et al. (2021) assessed the connection between monetary widening, risk assessments, and fiscal expansion in Nigeria using quarterly time series data from 2007Q1 to 2018Q4 and a non-linear cointegrating ARDL approach. The results of the study showed a beneficial connection between finance broadening and advancement, but a nonlinear association between banking system brittleness and income development.

### 2.3.1.2. Studies from Other Economies

Sackey and Nkrumah (2012) investigated the consequences of monetary broadening on the Ghanaian economy using the Johansen cointegration examination. Using data from 2000 to 2009, the study discovered an important positive relationship between financial stability and growth in Ghana's economy. Bakang (2014) examined the implications of monetary broadening on economic growth in the Kenyan banking system using quarterly time series data from 2000 to 2013. The evidence-based conclusion revealed that circulating commitments, financing to private companies, commercial operations, central bank assets, and business account deposits all had positive and statistically significant effects on GDP. Lawrence (2018) used quarterly data from 2007Q1 to 2017Q4 to investigate the effects of monetary expansion on Kenya's GDP growth. The results demonstrated that monetary reserves had a statistically insignificant impact on growth, financial market valuation had a numerically substantial effect on GDP growth, and electronic financial transactions and investments made directly had a statistically important effect on the economy's expansion. As a result, the study concluded that monetary enhancement had a significant impact on Kenya's income growth.

Utilizing data from 69 countries from 1970 to 2010, Ho, Huang, Shi, and Wu (2017) explored the impact of financial deepening on technology performance at numerous democracy levels of government institutions. The findings revealed that only when political structures were adequately free and fair was financing market widening linked to higher invention quality. The elevated level of equity market depth on technology reliability, on the other hand, necessitated a fairly low amount of political democratic governance. Further to that, the outcomes were more powerful in low-income countries than in high-income countries. The dynamic panel method and options for financial deepening, a representative government, and input advancement produced robust results. From 1995 to 2017, Chima et al. (2021) examined the impact of integrated financing availability on productivity expansion in Sub-Saharan Africa. The study discovered a positive relationship between the current amount of monetary inclusion and the general prosperity of the economy. Sanga and Aziakpono (2022) demonstrated that legal framework, quality of institutions, good governance, voice and transparency, regulation of corrupt practices, and social stability all had a major effect on financial deepening in Africa. Nevertheless, good governance had a bigger influence on middle-income as well as high-income nations, whereas the other metrics had a greater effect in economically disadvantaged states. Most systemic indexes had nearly twice the overall impact at a greater financial depth than at lower tiers. Good governance and institutional quality have a greater effect on financial deepening in nations that have solid establishments than in those with weak governance.

### 2.3.2. Existing Studies on the Link and Impact of Financial Depth on Stock Market Growth

He and Pardy (1993) assessed the progression of stock markets and financial depth in 32 emerging regions. The correlation test on cross-sectional statistics from 1978 to 1990 revealed a strongly favorable relationship between the growth index in the stock market, market capitalization as a share of GDP, and measures of financial depth. The correlation coefficients were particularly strong during the late 1980s, which could be attributed to the fact that there was a significant rise in international capital invested in the equity markets of economies with a highly developed finance system during that timeframe. In a more elaborate study, Rahman and Mustafa (2017) looked at the implications of equity market attrition rate and cash flow, as indicators of financial deepening, on the return on stock markets in 19 established and 21 emerging economies from 1988 to 2014. According to the findings, stock market revenue made contributions more often to the return on investment than stock market liquidity in both technologically advanced and unindustrialized economies. Michael et al. (2021) used yearly time series data from 1996 to 2019 to evaluate the both long- and short-term interrelationships between financial depth, the rise of the stock market, and productivity expansion in eight African nations. A favorable connection between stock market growth and monetary deepening was discovered through the econometric analysis. With the exception of Eswatini and Mauritius, all the economies showed a beneficial connection between economic expansion and financial deepening. Further examination of the interrelatedness with productivity expansion as the response variable revealed considerable and differing outcomes across nations. Nevertheless, the panel regression analysis results did not reveal a significant impact of financial deepening or stock market development in Africa.

Omar et al. (2022) systematically examined the broader economic factors driving Pakistan's equity market growth from 1980 to 2019. The findings revealed cointegration among the parameters and demonstrated the substantial productive effects of economic expansion and the growth of the banking sector on equity market growth over time, as well as an adverse effect of rising prices, foreign investment, and trade openness. Simultaneously, the short-run results revealed a significant connection between growth in the economy, inflation, and overseas investment and the growth of stock markets. Attah-Botchwey et al. (2022) examined the impact of financial deepening on stock market returns in selected Sub-Saharan African countries from 2001 to 2019. The study found that broad money supply had a beneficial and statistically significant effect on stock market outcomes in each of the four countries studied.

Looking at studies in Nigeria, Okeya and Dare (2020) investigated both short- and long-term relationships between financial broadening and equity market growth in the Nigerian economy from 1981 to 2019. The outcome revealed that financial deepening had a strong positive impact on financial market growth over the long term but a weak negative correlation effect in the short run. Ogbonna and Ejem (2020) investigated the effect of financial deepening on capital market returns in Nigeria using the error correction model. The study discovered that the amount of money in circulation had a beneficial and substantial effect on Nigeria's securities market earnings. It was also discovered that the lending to the private industry to GDP ratio had a major and adverse effect on the recompense of the Nigerian capital market. Alenoghena et al. (2014) looked at the effect of financial widening on Nigerian stock exchange effectiveness from 1981 to 2012. The observations established that financial intensifying factors influenced the outcome of the Nigerian stock market constructively. According to research, broad money diversity and savings improvement had a major effect on the outcome of the Nigerian stock market. Other indicators of economic strengthening, such as gross domestic product and private sector credit, displayed positive coefficient values but were unimportant in clarifying stock exchange achievement.

Ighoroje and Ujuju (2021) examined Nigeria's financial depth and manufacturing industry outcome from 1987 to 2019. The study's quantitative inquiry found that the connection over time was not statically important. The study revealed that the liquidity of cash had no short-run impact on the Nigerian manufacturing sector. Loans to corporations, on the other hand, had a short-term impact on the Nigerian manufacturing industry. It went on to say that, in the short run, stock value had no effect on the manufacturing industry capacity in Nigeria. Babarinde and

Enoruwa (2021) looked at the causal link and consequences of three financial strengthening measures on Nigerian stock exchange returns and cash flow from 1985 to 2018. The results showed that financial broadening indexes' percentage of currency supply to GDP and trading volume as a share of GDP exhibited a substantial productive impact on trading volume in Nigeria, whereas the proportion of private sector credit to GDP, while beneficial, was not noticeably associated with stock market liquid assets. Kehinde et al. (2022) looked into the correlation between financial deepening and growth in the stock market between 1981 and 2019. Based on the findings, there was a significant negative correlation between broad money expansion and the performance of stock markets.

Following the studies in Kenya, Nyasetia (2012) examined the effects of financial deepening on savings as well as investments in Kenya between 2006 and 2011. To determine the connection between financial intensifying and savings and investments in Kenya, the investigation used a cause-and-effect research strategy. In order to establish a relationship, a regression analysis was performed. Money saved and investment opportunities were discovered to have a significant beneficial relationship. According to the regression analysis, when there was sound fiscal strengthening, the threshold of money saved and invested in Kenya improved. Nyasetia (2012) claims that if borrowing costs are not advantageous, the stock market is not performing well, and if reserves in financial institutions are not growing, savings and investments will improve gradually. Wanga (2017) extended the study by investigating Kenya's cash flow deepening and stock exchange advancement from 1990 to 2015. The research discovered that financial intensity and equity markets had a substantial beneficial effect on the growth of capital markets. As a result, financial integration, as evaluated by remittance inflows and approachability, had a negative but significant effect on the expansion of Kenya's equity market. The meditational analysis indicated that domestic savings in general did not facilitate the connection between economic deepening and capital formation. The researcher discovered an important genuine connection between financial deepening and market expansion.

### 3. MATERIALS AND METHODS

This paper aims to determine the impact of the financial intensity procedures on the growth of the market for stocks, as measured by equity investment. The growth of stocks and financial depth are multidimensional notions that can be measured using a variety of metrics. He and Pardy (1993) used the market valuation to GDP ratio as an indicator of the equity market's expansion.

Table 1. Variable type and description.

Variable	Abbreviation	Data measurement	Transformation type	Source of data
Equity investment	EQY	Collected in billions of Naira	Logarithm form	CBN statistical bulletins (1981–2021). <a href="https://www.cbn.gov.ng/documents/Statbulletin.asp">https://www.cbn.gov.ng/documents/Statbulletin.asp</a>
Broad money supply	BMS	Collected in billions of Naira	Logarithm form	CBN statistical bulletins (1981–2021). <a href="https://www.cbn.gov.ng/documents/Statbulletin.asp">https://www.cbn.gov.ng/documents/Statbulletin.asp</a>
Credit to private sector	CPS	Collected in billions of Naira	Logarithm form	CBN statistical bulletins (1981–2021). <a href="https://www.cbn.gov.ng/documents/Statbulletin.asp">https://www.cbn.gov.ng/documents/Statbulletin.asp</a>
Gross domestic product	GDP	Collected in billions of Naira	Logarithm form	CBN statistical bulletins <a href="https://www.cbn.gov.ng/documents/Statbulletin.asp">https://www.cbn.gov.ng/documents/Statbulletin.asp</a>
Inflation	INF	Percentage	Logarithm form	International Monetary Fund (IMF), the World Bank and the OECD inflation CPI indicator (doi:10.1787/eee82e6e-en). <a href="https://www.worlddata.info/africa/nigeria/inflation-rates.php">https://www.worlddata.info/africa/nigeria/inflation-rates.php</a>

However, in this study, we used equity investment to establish the extent to which financial deepening indicators can affect stock market growth. The study used equity investment as the dependent variable and as a proxy for stock market development. The financial deepening indicators applied in this study are broad money supply (BMS), credit



to private sector (CPS) and gross domestic product (GDP), while our control variable is inflation (INF). The study spans from 1981 to 2021 and employs the autoregressive distributed lag (ARDL) model for short- and long-run estimations as well as the error correction model. The data for this study on BMS, CPS and GDP was extracted from the Central Bank's statistical bulletins, while the data on inflation was sourced from the World Development Indicators. Table 1 provides additional information on the data sources and measurement.

### 3.1. Model Specification

The model provided for this investigation is highlighted in Equation 1:

$$Y = \beta_0 + \beta X_1 + \beta X_2 + \beta X_3 + \beta X_4 + \mu_{it} \quad (1)$$

Where:

$Y$  = Equity investment (proxy for stock market development).

$X_1$  = Broad money supply.

$X_2$  = Credit to private sector.

$X_3$  = Gross domestic product.

$X_4$  = Inflation or price level changes.

$\beta$  = Coefficient.

$\mu_{it}$  = Error term.

The econometric transformation of the above model is shown as follows:

$$\text{LOGEQY} = \beta_0 + \beta_1 \text{LOGBMS} + \beta_2 \text{LNCPS} + \beta_3 \text{LOGGDP} + \beta_4 \text{LOGINF} + \mu_{it} \quad (2)$$

Where:

LOG = Logarithm form of variables.

EQY = Equity investment.

CPS = Credit to private sector.

GDP = Gross domestic product.

INF = Inflation.

$\beta_0$  = Capacity of the factor estimate.

$\beta_1$ - $\beta_4$  = Cut-off.

$\mu_{it}$  = Error term.

The universal ARDL (p,q) model is written as follows:

$$Y_t = \gamma_{0i} + \sum_{i=1}^p \delta_i Y_{t-i} + \sum_{i=1}^q \beta_i X_{t-i} + \varepsilon_{it} \quad (3)$$

In Equation 3,  $Y_t$  constitutes the vector-based factor, and the parameters in  $X_t$  have the freedom to be  $I(0)$ ,  $I(1)$  or are cointegrated;  $Y$  is the fixed factor;  $I = 1, \dots, k$ ;  $p, q$  are most effective slide directives. The vector representation of the terms is associated with the error in an indistinguishable meaningless white noise vector data procedure (serially unrelated or self-determining). The factor that is dependent is represented by a  $p$  lag, whereas the exogenous/independent variables are represented by  $q$  lags.

To determine the possibility that cointegration exists among different factors, the combined importance of the long-term coefficients is reviewed by assessing the null hypothesis of no correlation:  $H_0: b_{1i} = b_{2i} + b_{3i} + b_{4i} = 0$ . Pesaran, Shin, and Smith (2001) calculated two sets of critical bounds: the lower limit and the upper limit. Both the upper and lower bound parameter estimates are determined by presuming that the factors in a model are  $I(0)$  and  $I(1)$ , respectively. The F-statistics must be compared to the upper and lower critical limits. If the F-statistics are higher than the highest critical bound, the null hypothesis is invalidated.

$H_0: b_{1i} = b_{2i} = b_{3i} = b_{4i} = 0$  (cointegration does not exist).

$H_1: b_{1i} \neq b_{2i} \neq b_{3i} \neq b_{4i} = 0$  ( $H_0$  is not correct).

(Where  $i = 1, 2, 3, 4$ ).

### 3.2. ARDL Bounds Test Specification

We have used ARDL bounds cointegration test strategy formed by Pesaran et al. (2001) to assess the long-run interaction of the variables. Out of several options, this method is preferable to other routine cointegration techniques developed by Engle and Granger (1987) and Johansen and Juselius (1990). Customary cointegration methods demand that all factors be merged in an identical sequence. The ARDL bounds measurement technique, on the other hand, does not require the same level of integration and can be applied even when relevant factors of various combinations are interconnected, such as I(0), I(1), or sometimes both (Pesaran, 1997). In addition, other conventional cointegration checks are influenced by sample size, but the ARDL bounds approach is simple to use, even with small samples, and will still yield better results (Haug, 2002; Ho, 2019). The following is the linear configuration of the ARDL bounds testing framework used for the observed inquiry:

$$\begin{aligned} \Delta \log EQY_t &= \alpha_{01} + b_{11} \log EQY_{t-1} + b_{21} \log BMS_{t-1} + b_{31} \log CPS_{t-1} + b_{41} \log GDP_{t-1} + b_{51} \log INF_{t-1} + \\ \sum_i^p &= 1 \alpha_{1i} \Delta \log EQY_{t-i} + \sum_i^q = 1 \alpha_{2i} \Delta \log BMS_{t-i} + \sum_i^q = 1 \alpha_{3i} \Delta \log CPS_{t-i} + \sum_i^q = \\ 1 \alpha_{4i} \Delta \log GDP_{t-i} + \sum_i^q &= 1 \alpha_{5i} \Delta \log INF_{t-i} + e_t \quad (4) \end{aligned}$$

Equation 4 presents the linear form of the ARDL bounds test, where  $\Delta$  represents the difference parameter,  $\alpha_{01}$  signifies the constant,  $\log$  shows the log form of the variables (see Table 1) used in this study, and  $e_t$  is the error term.  $\sum_i^p$  and  $\sum_i^q$  indicate the sums of the dependent and independent variables, respectively.

For the purpose of this study, the ARDL long-run specification is provided below in Equation 5:

$$\Delta \log EQY_t + \alpha_{01} + \sum_i^p = 1 \alpha_{1i} \Delta \log EQY_{t-i} + \sum_i^q = 1 \alpha_{2i} \Delta \log BMS_{t-i} + \sum_i^q = 1 \alpha_{3i} \Delta \log CPS_{t-i} + \sum_i^q = 1 \alpha_{4i} \Delta \log GDP_{t-i} + \sum_i^q = 1 \alpha_{5i} \Delta \log INF_{t-i} + e_t \quad (5)$$

Ultimately, if the calculated F-statistics drop between the higher and lower critical limits, the cointegration result remains uncertain. If cointegration among the possible factors is validated, we can proceed to establish the parameters' short-term relationships by incorporating an error correction model ( $\lambda ECM_{t-1}$ ) into Equation 6, where  $\lambda ECM_{t-1}$  is the ECM multiplier. If  $\lambda ECM_{t-1}$  is substantial and adverse, it implies a natural inclination for the parameters to change to an optimal point after experiencing a distress in the shorter term. Thus, the error correction model to test for a short-run cointegration effect is as follows:

$$\Delta \log EQY_t = \alpha_0 + \sum_i^p = 1 \alpha_{1i} \Delta \log EQY_{t-i} + \sum_i^q = 1 \alpha_{2i} \Delta \log BMS_{t-i} + \sum_i^q = 1 \alpha_{3i} \Delta \log CPS_{t-i} + \sum_i^q = 1 \alpha_{4i} \Delta \log GDP_{t-i} + \sum_i^q = 1 \alpha_{5i} \Delta \log INF_{t-i} + \lambda ECM_{t-1} + e_t \quad (6)$$

Where  $\alpha$  indicates the short-run coefficients,  $\Delta$  denotes the first differenced operator,  $t$  represents time, and  $e_t$  is the white noise error term.

## 4. RESULTS

Table 1 contains a summary of the analysis for EQY as well as financial deepening indicators influencing its success. The small variance in the rate of inflation (INF) is 0.29, denoting that market price index volatility was low throughout the study period, with no probable beneficial or detrimental implications for the stock market.

With respective threshold levels of 1.16, 0.93, 2.14, and 0.73, highest amounts of 4.61, 4.52, 5.25, and 1.86, and mean values of 2.98, 2.83, 3.82, and 1.16 for BMS, CPS, GDP, and INF, respectively, financial deepening metrics have strongly affected the development of the stock market and should be widened for stable growth in equity investment.

The kurtosis and Jarque–Bera results (see Table 2) show that the dataset apportionment is normal. The kurtosis values for all variables are between 2 and 3, and the Jarque–Bera probability values for all parameters used in this study are greater than 0.05, implying that the datasets have an outright normal distribution.

Table 2. Descriptive statistics.

Test type	EQY	BMS	CPS	GDP	INF
Mean	2.574	2.984	2.834	3.820	1.164
Median	2.812	3.103	2.884	3.916	1.109
Maximum	4.348	4.605	4.517	5.246	1.862
Minimum	0.000	1.161	0.933	2.144	0.732
Std. dev.	1.433	1.176	1.219	1.058	0.293
Skewness	-0.397	-0.146	-0.112	-0.273	0.883
Kurtosis	1.681	1.593	1.578	1.638	2.997
Jarque–Bera	4.052	3.528	3.542	3.681	5.333
Probability	0.132	0.171	0.170	0.158	0.069
Sum	105.5	122.3	116.2	156.6	47.73
Sum sq. dev.	82.13	55.36	59.46	44.76	3.445
Observations	41	41	41	41	41

Table 3. Correlation matrix.

Correlation	EQY	BMS	CPS	GDP	INF
EQY	1.000				
BMS	0.988***	1.000			
CPS	0.986***	0.999***	1.000		
GDP	0.995***	0.997***	0.995***	1.000	
INF	-0.258	-0.254	-0.256	-0.253	1.000

Note: \*\*\* represents significance at the 1% level.

The correlation matrix for the variables in this study is shown in Table 3. According to the findings, BMS, CPS, and GDP have a very strong positive correlation with EQY, whereas inflation has a very weak negative relationship with EQY. The findings imply that financial deepening factors are strongly related to progress in equity investment, which leads to stock market improvement. However, inflation has little effect on the performance of equity, which means that regardless of the level of inflation, investors are still willing to purchase equity in publicly traded companies. The financial broadening metrics have a strong positive association among themselves, implying that their coexistence benefits the others. Thus, widening the scope of financial services will benefit the economy as a whole.

Table 4. Unit root clarification.

Variable	ADF T-statistic	Critical value @ 5%	P-value	PP T-statistic	Critical value @ 5%	P-value	Order of integration
logEQY	-6.785	-2.939	0.000	-6.750	-2.939	0.000	1(1)
logBMS	-4.089	-2.939	0.003	-4.059	-2.939	0.003	1(1)
logCPS	-4.523	-2.939	0.001	-4.461	-2.939	0.001	1(1)
logGDP	-3.459	-2.939	0.015	-3.385	-2.939	0.017	1(1)
logINF	-3.497	-2.937	0.013	-3.374	-2.937	0.018	1(0)

The stationarity characteristics of operating parameters must be confirmed before beginning ARDL bounds diagnostics. Table 4 presents the unit root tests that were used to check data order of integration in this study are the augmented Dickey and Fuller (1979) and Phillips and Perron (1988). The disparities in integrating order of factors therefore provide acceptable explanation to use the bounds testing method known as ARDL, as this strategy can only be used if the research factors are incorporated in the sequence of I(0) and I(1). Consequently, we established in this study that EQY, BMS, CPS, and GDP are fixed at the first difference or order I(1), whereas INF becomes stable at order I(0) or at level.

Table 5 reveals that logEQY at lag 3 is substantially significant (t-stat = 1.98; p-value = 0.06) at the 10% threshold of relevance, establishing that, all other things considered, a steady rise in investment in stocks over an extended period will greatly enhance the stock market's activities. The findings further demonstrate that logBMS

has a major beneficial effect on equity investments, as proven by its t-statistic of 2.22 and p-value of 0.042, both of which are less than the 5% level of significance. LogBMS has an important impact on stakes at 1% and lag 4, whereas logCPS has an adverse effect on invested equity at 5% and lag 1. This means that, regardless of the amount of money in circulation, if sufficient credit is not available for private business operations, equity suffers. Similarly, logGDP has a positive and significant effect on equity at a 10% significant threshold, but the effect changes at lag 1 to 5% and is both positive and significant; at lag 4, it becomes negative. This demonstrates what happens to equity when the economy is unstable. When the economy is thriving, investors look for equity investment opportunities in the stock market. However, when there is an economic downturn, stocks listed on the stock exchange will not be patronized as expected. Even at lag 1, negative inflationary outcomes are considered normal because inflation has always shown a negative impact on all aspects of the economy.

Table 5. Unrestricted ARDL results.

Variable	Coefficient	Std. error	T-statistic	P-value
LOGEQY(-1)	-0.047	0.197	-0.239	0.814
LOGEQY(-2)	-0.182	0.165	-1.108	0.285
LOGEQY(-3)	0.304	0.153	1.988	0.065*
LOGEQY(-4)	0.157	0.150	1.044	0.313
LOGBMS	1.098	0.494	2.222	0.042**
LOGBMS(-1)	0.555	0.506	1.096	0.290
LOGBMS(-2)	-0.300	0.502	-0.598	0.559
LOGBMS(-3)	-0.371	0.633	-0.585	0.567
LOGBMS(-4)	1.824	0.574	3.174	0.006***
LOGCPS	-0.302	0.421	-0.717	0.484
LOGCPS(-1)	-0.129	0.459	-0.282	0.782
LOGCPS(-2)	-0.052	0.375	-0.139	0.891
LOGCPS(-3)	-0.427	0.359	-1.187	0.253
LOGCPS(-4)	-0.884	0.351	-2.515	0.024**
LOGGDP	1.134	0.593	1.913	0.075*
LOGGDP(-1)	1.323	0.617	2.145	0.049**
LOGGDP(-2)	-0.312	0.629	-0.495	0.627
LOGGDP(-3)	-1.066	0.623	-1.711	0.108
LOGGDP(-4)	-1.136	0.465	-2.442	0.027**
LOGINF	-0.296	0.088	-3.359	0.004***
LOGINF(-1)	-0.244	0.116	-2.108	0.052**
C	-0.806	0.948	-0.850	0.408

Note: R-squared = 0.99; Adjusted R-squared = 0.99; S.E. of regression = 0.06; F-statistic = 635.64; Prob. (F-statistic) = 0.000; Durbin-Watson = 2.02; AIC = -2.31; SC = -1.35.

\*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% levels, respectively.

The bounds test (see Table 6) is performed after the unstructured ARDL long-run test. The F-statistic of 6.73 is greater than both the lower (I0) and upper bounds (I1). As a direct consequence, there is substantiation of a long-term cointegration. To test this relationship, the appropriate lag length for each variable must be chosen. The lag length chosen by each lag length criterion (LR, FPE, AIC, SC, and HQ) in Table 7 is 1. That means, each parameter used in this study will be tested at lag 1 to confirm its effect on equity investment.

Table 6. ARDL bounds test results.

Significance	I(0) Bound	I(1) Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Note: F-statistic = 6.73.

Table 7. VAR lag order selection criteria.

Lag	LogL	LR (Likelihood ratio)	FPE (Final predictor error)	AIC (Akaike information criterion)	SC (Schwarz information criterion)	HQ (Hannan–Quinn information criterion)
0	28.92	NA	0.017	-1.259	-1.044	-1.182
1	36.39	12.58*	0.012*	-1.599*	-1.341*	-1.508*
2	36.45	0.088	0.012	-1.550	-1.248	-1.443
3	36.65	0.317	0.013	-1.508	-1.163	-1.385

Note: \* Specifies the interval direction designated by the benchmark.

We proceeded to test the long-run effects of financial deepening variables on equity investment after confirming that the lag length is 1, as shown in Table 7. The long-run examination results are shown in Table 8, and they show that among the variables, only GDP has a positive and significant impact on equity investment, confirming that the progress of the economy generally benefits the stock market development through equity investment. However, Alenoghena et al. (2014) and Onwumere et al. (2012) disagree with this result as both found that GDP did not impact stock market tangibly or favorably. Similarly, the lag of EQY is significantly positive, implying that when equity investment appreciates, the stock market performs optimally. All other variables were insignificant in explaining changes in equity investment over time. The dependent variable, on the other hand, has a strong positive relationship with all of the financial deepening indicators. The Durbin–Watson value (see Table 8) is approximately 2, confirming the absence of autocorrelation. The F-statistics also demonstrated that the independent variables affect equity investment jointly and statistically, and that the model used in this study is appropriate.

The standard error of regression value of 0.13 indicates that this study's predictions are 87% correct. Interestingly, the coefficient of determination confirms that only 1% of the variance can be attributed to factors that are not included in our model for this study but could potentially influence equity investment changes.

Table 8. Long-run results (dependent variable is LOGEQY).

Variable	Coefficient	Std. error	T-statistic	Prob.
LOGEQY(-1)	0.527	0.171	3.078	0.004***
LOGBMS(-1)	0.157	0.568	0.277	0.783
LOGCPS(-1)	-0.647	0.416	-1.558	0.128
LOGGDP(-1)	1.191	0.461	2.581	0.014***
LOGINF(-1)	0.086	0.075	1.148	0.259
C	-1.965	0.678	-2.898	0.006

Note: R-squared = 0.99; Adjusted R-squared = 0.99; S.E. of regression = 0.13; F-statistic = 856.24; Prob. (F-statistic) = 0.000; Durbin–Watson = 1.71; AIC = -1.054; SC = -0.80.  
\*\*\* denotes significance at the 1% level.

Table 9 shows that broad money supply has a significant and positive influence on equity investment, leading to stock market development. Among others, this finding is supported by Alenoghena et al. (2014); Attah-Boitchwey et al. (2022); He and Pardy (1993) and Nwosu et al. (2021). However, Kehinde et al. (2022) challenged this finding by demonstrating that broad money has a negative impact on stock market performance. Thus, the result implies that when there is a sufficient supply of money, investors are enticed to purchase more equity on the stock exchange. When money is scarce, investors tend to be more frugal with what little is available and use it for household expenses. According to Table 9, further investigation reveals that credit to the private sector has a significant negative impact on equity investment. This result confirms the findings of Ogbonna and Ejem (2020) and Okafor et al. (2016), whereas Omar et al. (2022) and Alenoghena et al. (2014) stated that credit to the private sector was insignificant in improving stock market development. However, based on the findings of this study, it is important to state that the more money available to the private sector, the more the equity market thrives; otherwise, the equity market suffers, as demonstrated in this study, when funds for private sector operations are scarce. Table 9 shows that GDP has a significant positive impact on equity investment. Previous authors (Bakang, 2014; Chima et al., 2021; Karimo &

Ogbonna, 2017; Lawrence, 2018; Nwosu et al., 2021; Olawumi et al., 2017) agreed on this outcome, but Onwumere et al. (2012) disproved this claim.

**Table 9.** Short-run results (dependent variable is D(LOGEQY)).

Variable	Coefficient	Std. error	t-statistic	Prob.
D(LOGEQY(-1))	0.270	0.217	1.244	0.222
D(LOGBMS(-1))	0.929	0.467	1.987	0.050**
D(LOGCPS(-1))	-0.879	0.301	-2.922	0.006***
D(LOGGDP(-1))	1.731	0.415	4.166	0.000***
D(LOGINF(-1))	0.007	0.066	0.099	0.921
ECM(-1)	-0.896	0.267	-3.360	0.002***
C	-0.051	0.043	-1.182	0.246

Note: R-squared = 0.52; Adjusted R-squared = 0.43; S.E. of regression = 0.10; F-statistic = 5.79; Prob. (F-statistic) = 0.000; Durbin-Watson = 2.01; AIC = -1.54; SC = -1.24.  
 \*\*\* and \*\* denote significance at the 1% and 5% levels, respectively.

Table 9 reports that the immediate term linear velocity of financial widening indicators on EQY. ECM(-1) has a negative t-statistic of -3.360, a p-value of 0.002, and a statistically important coefficient of -0.896. It states that if the different factors deviate from the threshold of alignment by 1% in the near term, they will return to modification by 89.6% annually.

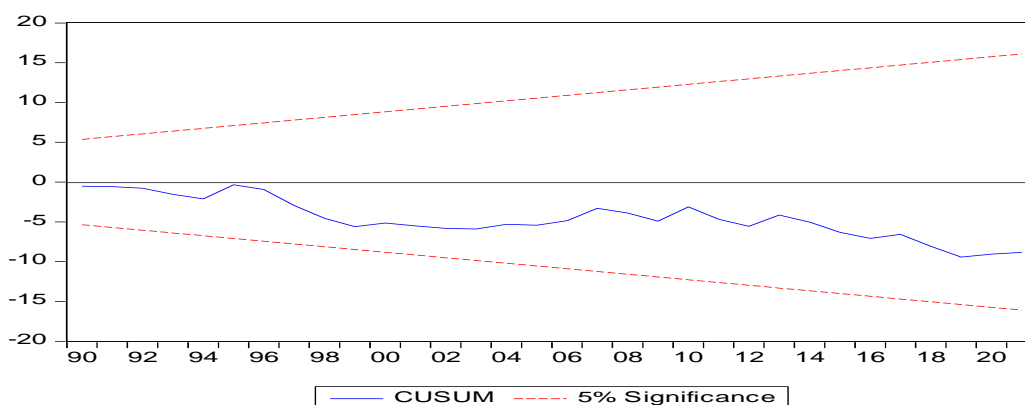


Figure 2. Cumulative sum of recursive graph.

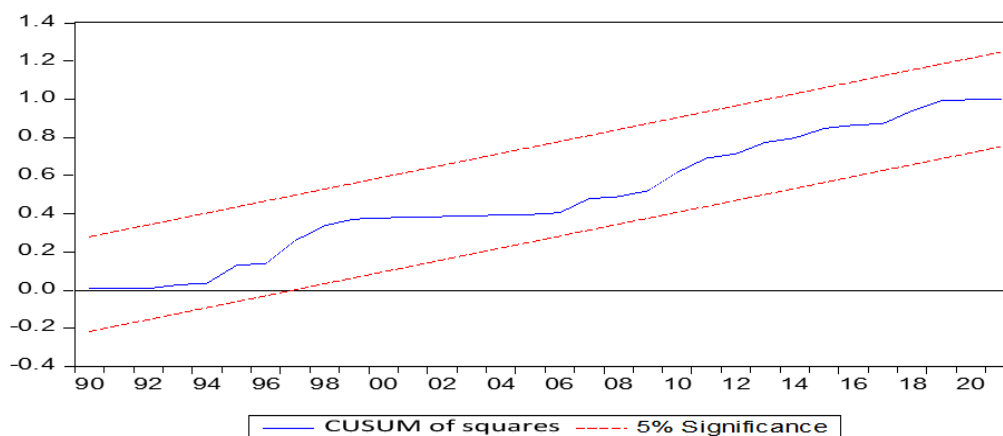


Figure 3. Cumulative sum of squares graph.

To verify the reliability of our approach, some screening procedures were carried out, the outcomes of which are shown in Table 10. According to our findings, the datasets in are normally distributed and free of serial correlation. Furthermore, there is no proof of heteroskedasticity or configuration-deficient areas in our framework. In addition, the consistency of the both short- and long-run multipliers is analyzed using CUSUM, CUSUMSQ, recursive coefficients tests graphs, and leverage plots, which are depicted in Figures 2, 3, 4, and 5, respectively. All figures

confirm the stability test for our model at 5% confidence intervals and demonstrate that the model has been correctly defined. Furthermore, the blue lines between the red dotted lines in Figures 2, 3, 4, and 5 confirm that the model for this study is robust. Figure 6 proves that the data is normally apporioned, as the kurtosis is 3 and the Jarque–Bera has a p-value that is above 0.05 threshold.

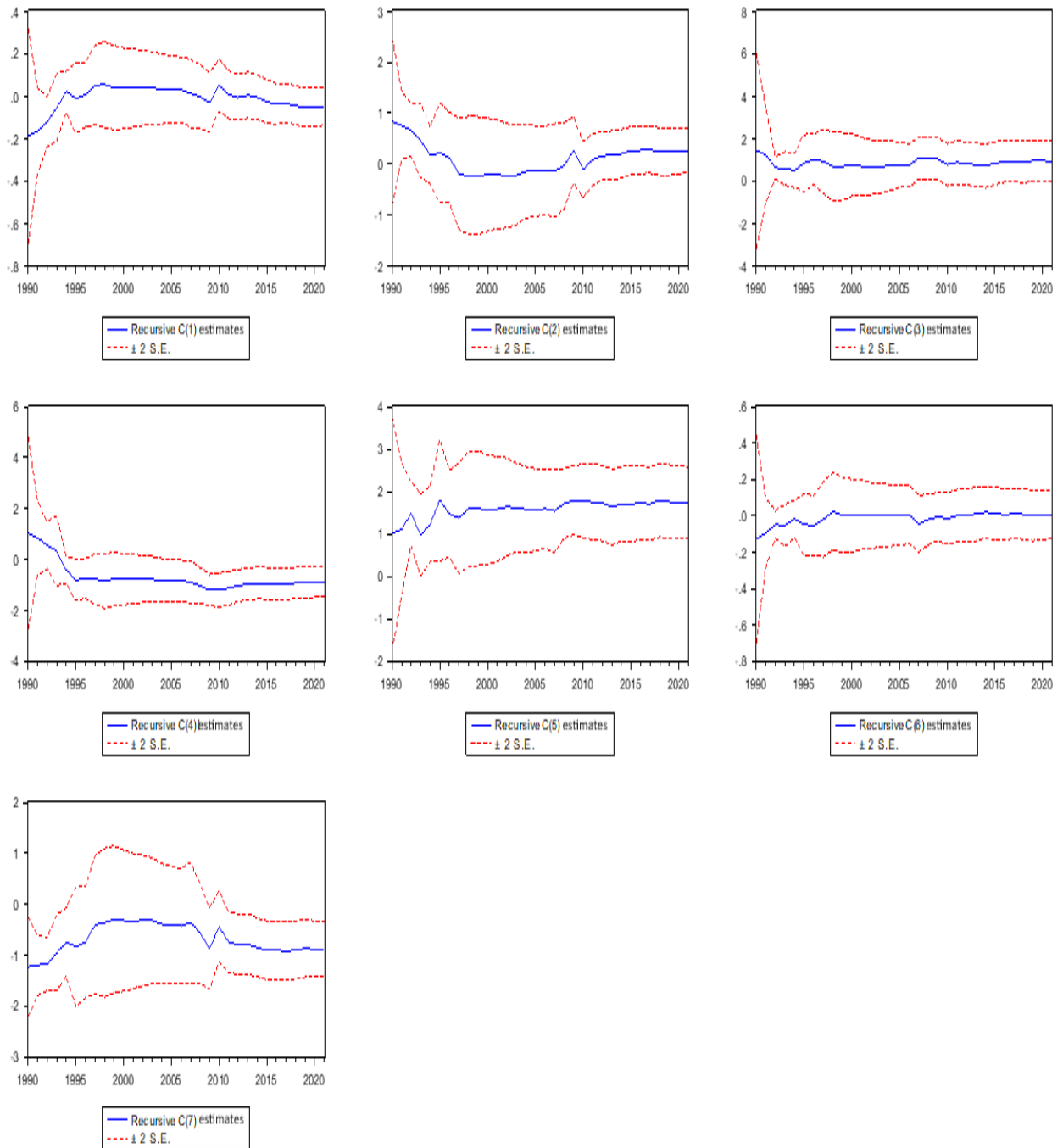


Figure 4. Recursive coefficients.

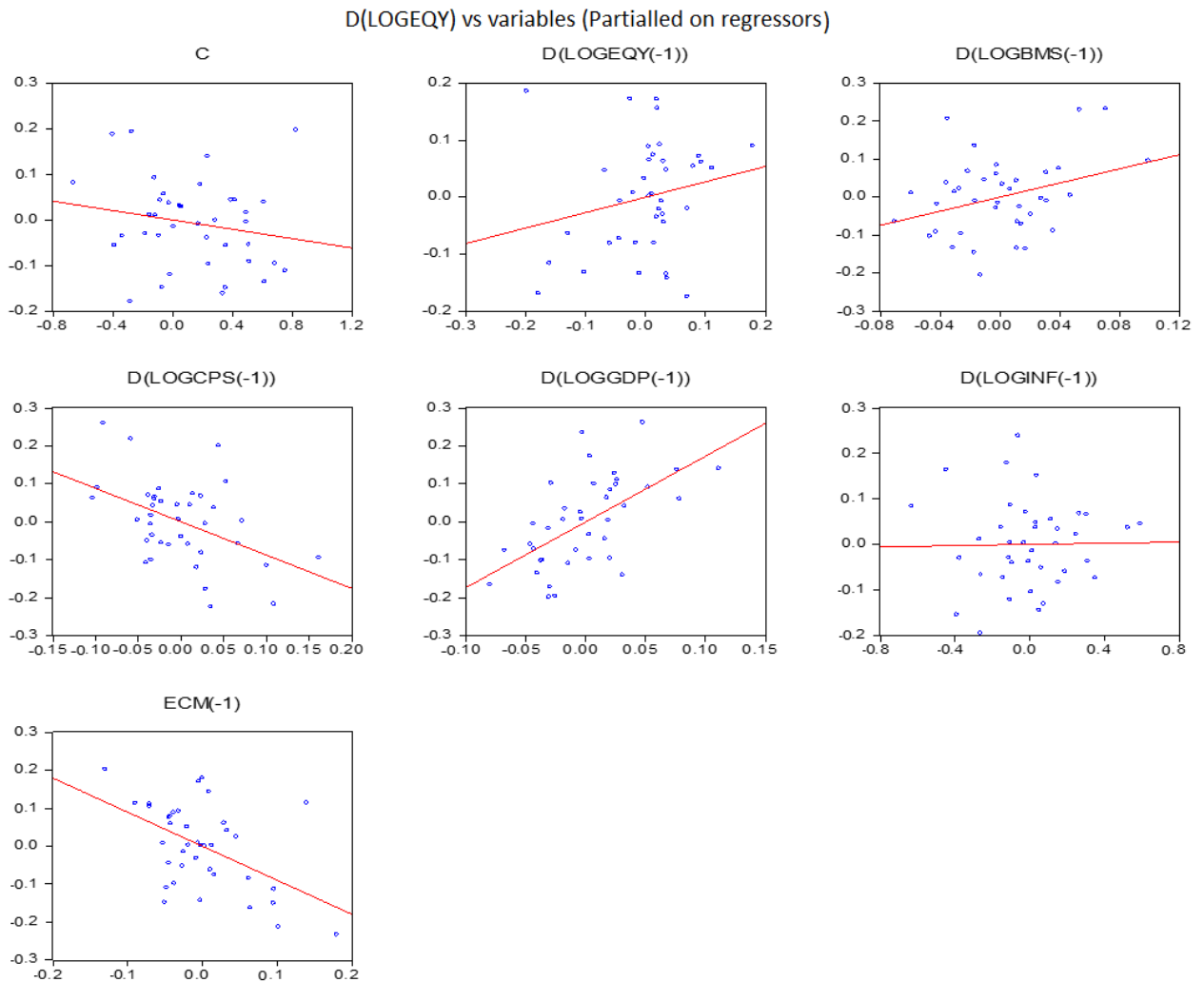


Figure 5. Robustness test of the model.

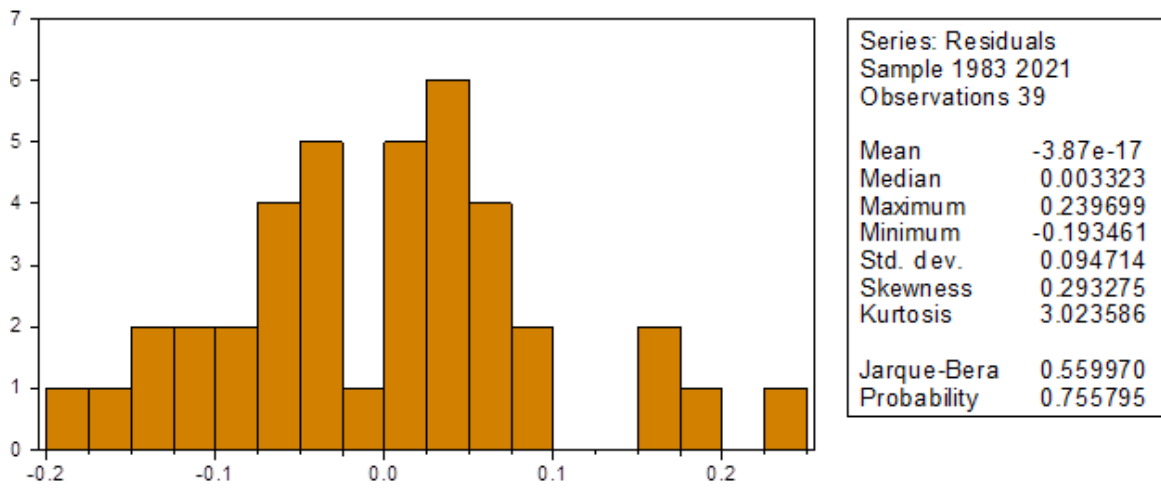


Figure 6. Normality test confirmation.

Table 10. Results of the diagnostic and robustness tests.

Test	Statistic	P-value
Serial correlation LM test	1.74	0.19
Jarque-Bera normality test	0.56	0.75
Ramsey RESET test	0.98	0.34
Heteroskedasticity test	1.04	0.42



## 5. CONCLUSION

The study employs financial deepening indicators to assess the performance of an emerging economy's stock market. The study spans the years 1981 to 2021, and it employs the ARDL and error correction models to confirm the effects of financial widening indicators on equity investment in both the long and short runs. In the long run, the study's findings show that when the economy is booming, the investing public attracts more equity investment. Other variables have no long-run effect on equity, but in the short run, both money supply and GDP improve equity investment, while credit to the private sector has a significant negative impact. The policy implication is that the government can aid the development of the stock market by enacting policies that progress the economy while keeping inflation under tight control and ensuring that the money supply meets economic demands. By meeting economic demands, there should be enough credit for private sector operations to avoid restricting its business functions. The finance system of every economy is a key growth driver, and as the finance industry broadens credit to the productive sectors at reasonable rates, the overall economy improves collectively. The research suggests, among several other things, that important policy changes should focus on eliminating barriers to the expansion of private sector credit, as well as restoring investor confidence in equity. An increase in equity holding sustains stock market productivity and speeds up the growth of industries, which, in turn, results in growth of the overall economic system.

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