
| RESEARCH ARTICLE

Inflation, Financial Deepening, and Investment Performance in Jordan: Evidence from the ARDL Approach

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| ABSTRACT

While inflationary pressures, weaknesses in the financial system, and macroeconomic instability both affect the performance of investments in developing economies, only little empirical evidence on their combined effects was available for Jordan. The present study aimed to explore the correlation between different variables; inflation, financial deepening, and investment performance in Jordan in the short and long run period between 2000 and 2024. The analysis uses the ARDL (Autoregressive Distributed Lag) bounds testing method using time-series data from WDI for an annual rate and introduces interest rates, rate of GDP growth and foreign direct investment as control variables. The results showed strong long-run relationships; that is, inflation was found to have a negative relationship with gross capital formation whereas financial deepening was found to have a positive relationship with investment performance. While growth in GDP had a positive effect on investment in the short-term, interest rates and FDI had the opposite effects. The stability tests indicated the stability of the parameters while the diagnostic tests also verified the robustness of the models since the serial correlation, heteroskedasticity and specification errors were not present. The findings suggest that Jordan's policy makers need to pay more attention to stabilizing inflation and deepening the financial sector, as well as keeping interest rates competitive to boost productive investments. The novelty of the study is the ARDL model that is used in the study to analyze the effects of inflation and financial deepening on investment performance in Jordan in a comprehensive manner and to provide new empirical findings on developing economies in the same macroeconomic context.

| KEYWORDS

Inflation, Financial Deepening, Investment Performance, ARDL, Jordan

| ARTICLE INFORMATION

ACCEPTED: May 13, 2026

PUBLISHED: June 30, 2026

DOI: <https://doi.org/10.61424/rjbe.v4i2.912>

1. Introduction

Performance of investment continues to be essential in ensuring sustainable economic growth, productive capacity building and job creation in developing economies. Capital formation is a key component in the development of industrialization, infrastructure and long-term macro-economic stability in many emerging countries. But investment activities are limited due to the inflationary pressure, poor financial systems, and untidy state of macro-economic conditions. Therefore, the relation between two variables, inflammation and financial deepening, has been of great interest to the economists and economists policymakers due to the enlightenment of economy and economic efficiency for making investment decision. Growth of the financial sector affects the allocation of credit availability and liquidity, and inflation could diminish investors' confidence due to uncertainty and the desire to hold assets, maybe adversely affecting the production process price. Ahmad et al. (2024); Ahmadu et al. (2018); Atiku et

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al. (2021) highlighted that macroeconomic stability and efficiency of financial system are crucial factors influencing sustainable economic performance in developing economies.

It is significant to analyze the performance of Jordan's investments, given that the country has faced structural economic issues for years, such as the fluctuations in inflation rates, its dependence on foreign input sources, its fiscal pressure, unemployment, and its alternating development trends. Even after executing series of economic changes and liberal open policies of financial sector, investment performance in Jordan is still not completely satisfactory, remaining rather volatile among the emerging economies. The ratio of gross capital formation to GDP shows fluctuations linked to internal and external economic environment, e.g. developments in financial markets, monetary policy changes, etc. The governments' policies appear to be ineffective in managing inflation and keeping it under control, and there is still considerable uncertainty over the cost of producing goods and services, which makes investment in new productive capacity deceptive. AlKhawaldeh et al. (2024); Almarshad et al. (2024); and Ismail et al. (2024) suggested that macroeconomic stability and institutional efficiency play an important role in affecting both the sustainability of investments and economic outcomes in Jordan and other developing nations.

One of the most important indicators of the economy that has an impact on investment decisions is inflation. An inflation rate that persists over time lowers real returns on investment and makes the expected profitability of an investment uncertain. Due to high inflation, increase in production costs, and unpredictable market conditions, it weakens up the mobilization of savings, it influences physical prices, and it deters investment by the private sector. If properly managed, however, stable inflation might be a sign of economic growth and a healthy aggregate demand. The level of financial development, and creation of money, in an economy is designated as financial deepening and measured in terms of money supply growth (in a broad sense) relative to GDP. A deeper financial system is conducive to investment, in terms of better access to credit, better mobilization of savings and better financial intermediation between them. However, inadequate investment results can result from financial deepening if the financial resources are allocated for non-productive sectors and/or speculations. Ahmad et al. (2020), Atiku et al. (2022) and Ahmad et al. (2025b) emphasised that financial systems and macroeconomic policies play important roles in determining investment choices and economic sustainability in the long run.

While a large body of literature has studied the nature of the link between macro-economic parameters and economic growth, few studies have specifically studied the interplay between inflation and financial deepening with respect to investment performance in Jordan. Most previous studies have focused on the performance of economic growth, environmental sustainability, energy or performance of trade, but not on gross capital formation as an actual measure of the investment performance. In addition, a large number of the previous research failed to be mindful of the effect of the control variables at the same time, including interest rate changes, GDP growth and foreign direct investment flows. This means that there was a significant empirical gap on the relationship between the short and long term effects of inflation and the performance of financial development and investment in Jordan. However, Alkhawaldeh et al. (2025), Ismaeel et al. (2023) and Alwaely et al. (2024) found that macro-financial determinants have a significant impact on organizational and economic performance, reinforcing the importance of analyzing the influences on investment behavior.

The present study aimed to investigate the performance of investment in Jordan in the light of the effect of inflation and financial deepening by applying the ARDL method. In particular, the study aims at how the policies of inflation, broad money supply, interest rates, GDP growth, and foreign direct investment inflows affect gross capital formation. The study evaluated a number of pertinent research questions regarding whether inflation had a significant impact on investment performance, the role of financial deepening in capital formation and the possibility of long run relationship among these variables. The importance of the study arose from the theoretical, methodological and policy contributions. The study contributed to the existing body of literature by combining the macroeconomic stability and financial development variables in a common framework to study their performance. In terms of the methodology, the ARDL technique offered stable estimates of both the short-run and long-run relationships between the variables considered both in their integral and differential forms. The results have provided valuable recommendations for policymakers on inflation management, monetary policy, financial sector

reform and investment promotion measures in Jordan. The rest of the paper featured literature review, methodology, empirical results, discussion, conclusion and policy suggestions.

2. Literature Review

2.1 Concept of Investment Performance

The efficiency and effectiveness of the allocation of investment capital in an economy is known as its investment performance and is typically gauged by gross capital formation as a proportion of GDP. It is indicative of capacity building in the area of productive assets in both the public and private sector for industrialization, jobs, infrastructure and long-term economic growth. Generating good investment returns improves productive capacity, technology development, and macro-economic competitiveness, especially in developing economies where less capital leads to less sustainable investment. The link between investment and financial resources and productive economic activity is seen by most economists as of critical importance. A number of emerging economies rely on macroeconomic stability, institutional strength, financial market development and investor confidence for performance of their investment. According to Ahmad et al. (2025a), Levine (2005) and McKinnon (1973), allocation of investments efficiently is still important today to enhance economic productivity and sustainable growth.

Domestic and foreign macroeconomic environment (level of inflation, financial development, changes in interest rates, openness of trade, foreign direct investment) also play a role in investment performance. A country with a well-established macroeconomic structure and efficient financial institutions is expected to have higher levels of capital formation as such countries offer financial resources that are available to the investors with lower levels of uncertainty. In contrast, lack of institutions and poor inflation performance and financial intermediation decrease productive investments. Gross capital formation is used as a proxy measure as it accounts for the investments (as additions to fixed assets, infrastructure, machinery, productive equipment) to the economy. Ahmad et al. (2024), Romer (1990) and Barro (1991) suggested that investment is still one of the fundamental factors that account for withstanding the growth and transformation of economic systems in the long-term.

2.2 Inflation and Investment Performance

Inflation is seen as one of the most important macro-economic variables which effect the investment process as it directly impacts on the buying power, production costs and past expectations of profits. Slowly rising prices cause people to have fears about the rising prices in the future, deters people from planning for long term, and reduces investor's confidence. Inflation has a dampening effect on firm incentives for capital accumulation through two channels: a decrease in the real return on capital, and an increase in operating costs. The effects of inflation also produce other effects on the financial markets, such as the lowering of the efficiency of credit allocation and savings mobilization. This implies that when there is macroeconomic instability or price volatility, among developing economies, investment performance is diminished. Many studies, such as those by Fischer (1993), Ahmad et al. (2020), and Khan and Senhadji (2001), have provided evidence that excessive inflation adversely impacts investment and long-term productivity of the economy.

However, theoretically and empirically all relationships of inflation and investment performance may be complicated, as under certain macroeconomic conditions moderate inflation could stimulate aggregate demand and economic activity. Some economists suggested that the weak and benign inflation was a sign of robust economic growth and rising consumption that might be a catalyst for economic investment in productive capacity. But, any above-sustainable level of inflation creates financial markets uncertainty, which is, of course, harmful. In the developing countries the interaction of inflation with exchange rate volatility, weak monetary policy institutions and budget deficits magnifies investment risks. Ahmad et al. (2018), Bruno and Easterly (1998) and Boyd et al. (2001) highlighted that instability faced by the economy with high inflation affects financial sector efficiency and diminishes the opportunities for long term investment.

2.3 Financial Deepening and Investment Performance

Financial deepening is the increase in the number, availability and effectiveness of financial markets and institutions in an economy. Broad money supply relative to GDP is considered as a broad indicator because it shows that the financial system was able to mobilize the savings and channel credit to the productive sectors. Financial deepening benefits investment performance through greater availability of funds in the economy, lowering transaction costs,

enabling more access to credit, and ensuring it is used effectively. A robust financial system helps to build investor confidence and promote private sector engagement in productive activities. Financial deepening is especially important for developing economies since the ability to borrow is still a key component of industrialization and entrepreneurship. According to Shaw (1973), Ahmad et al (2024), King and Levine (1993), financial development is a crucial factor which greatly positively influences investment efficiency and long-run economic stability.

While these benefits are good, that does not mean there are automatic linkages between financial deepening and investment performance. In some developing nations, the financial growth has been related to unsustainable economic activity, speculative activities, and over lending to consumers for their consumption needs. Regulatory frameworks and banking efficacy/quality may be limited and diminish the effectiveness of financial intermediation. Therefore, financial deepening can further be subject to the quality of financial governance and macroeconomic stability. Such financial systems are inefficient in allocating resources to non-productive sectors, which result in non-sustainable investments performance. The link between financial development and business performance is sensitive to the efficiency of financial institutions and policy coordination as stressed by Beck et al. (2000), Ahmad et al. (2025b) and Greenwood and Jovanovic (1990).

2.4 Interest Rate and Investment Performance

The interest rate is a cost of borrowing money, it has been one of the most important factors affecting the behavior of investment and interest rate. An increase in the interest rate makes investment spending costs more for firms and households and thus decreases investment spending and capital formation. When the costs of financing these long-term projects increases appreciatively, businesses become less keen to undertake such projects. Delay or anticipation of interest rate movements has a significant effect on the performance of investment in a highly bank dependent economy like the developing economies. The summary reaction is that although monetary authorities can and do change interest rates in order to maintain inflation in check and provide a leveling-off of the macroeconomic situation, they can also have the effect of contracting productive investment activities as well. An increase in interest rates generally makes economic growth and private-sector investment less encouraging, according to Keynes (1936), Mishkin (2007) and Atiku et al. (2022).

Investor expectations and monetary policy credibility, as well as the framework of financial markets, could also influence the relationship between interest rates and investment outcome. Normal and predictable interest rates facilitate business planning and bolster financial markets' confidence. Rising interest rates, on the other hand, make it more difficult to predict returns on future investments and investing for the long-term. Poor ITM prevents interest rate policy from having much impact on investment in many emerging economies. Hence, financial liberalization and banking sector reforms to this point are also vital in enhancing the responsiveness of investment activities to monetary policy changes. Taylor (1999), Bernanke and Gertler (1995), and Ahmad et al. (2024) stressed that sound monetary management is vital in ensuring stability of the macroeconomy and investment growth.

2.5 GDP Growth and Investment Performance

GDP growth is measuring of aggregate growth of all the economy's activities and it has a significant impact on investment performance on expectations of demand and confidence. The increased economic growth leads to larger profits, more market opportunities and investor confidence, which results in expansion of productive capacity. The GDP growth also provides for macroeconomic stability and increase in the economic conditions which further enhance incentive of the investment of investors whether local or foreign. Capital formation and economic expansion reinforce each other: An increase in capital ones leads to production increases; and an increase in production leads to increases in available investment opportunities. Solow (1956), Ahmad et al. (2025c) and Romer (1986) argued that in an economy that is growing, sustainable investment activities and structural transformation are more favorable.

But depressed or weak growth rates deter investment, as does the demand failure and uncertainty about returns, because economic growth lowers the demand for investment. Macroeconomic conditions, such as external shocks, fiscal instability, and price fluctuations of commodities, vary during the growth of developing economies, and this results in the failure of investment activity performance. The economy of developing countries often suffers from fluctuations in growth, largely because of external shocks, fiscal instability, and volatility in commodity prices, which

in turn dampens investment performance. Thus, to ensure sustainable growth, it is necessary to have policy coordination, institutional quality, and economic stability. Low investment growth in a number of developing nations may be attributed to poor infrastructure and low productive capacity of the GDP growth. Lucas (1988), Ismail et al (2024) and Barro and Sala-i-Martin (2004) contended that even in spite of high expectations of economic growth, it is necessary to have stable growth to attract productive investments and to boost national competitiveness.

2.6 FDI Inflows and Investment Performance

Foreign direct investment is an important source of external financing, technology transfer, managerial know-how and industrial progress. FDI contributes to the improvement of investment performance in two ways: it complements domestic savings and it boosts the productive capacity of the host economies. The developing countries are especially expected to use FDI to conquer the financial constraints and also to enhance the technological advance and diversification of industries. Foreign investment also creates jobs, widens trade and enhances productivity. Borensztein et al. (1998), Ahmad et al. (2024) and Alfaro et al. (2004) highlighted the positive impacts of FDI on the capital formation and the long-run economic development.

However, the effect of FDI on investment results is influenced by a high degree of institutional quality, human resource development and macroeconomic stability. At other times, foreign investment displaces domestic companies or focuses on extractive industries, which only have a small production spillover. FDI inflows could have negative development impacts on the country due to weak governance and economies with irregularities. Thus, foreign investment in the form of productive and sustainable investment needs good financial systems and stable macroeconomic policies. According to Carkovic and Levine (2005), Jeevan et al. (2025) and Hermes and Lensink (2003), success of FDI in stimulating investment performance is dependent on the level of financial market development and institutional capacity.

2.7 Theoretical Literature

According to Accelerator Theory of Investment, investment is primarily dependent upon the change in the output and aggregate demand. As economic growth and consumer demand grow, firms spend more on capital investment, as their need for additional capital stock and productive capacity in production is growing. The theory assumes that investment expansion is directly related to GDP growth; thus, a strong performance of the economy would create greater capital. Clark (1917), Samuelson (1939) and Jorgenson (1963) suggested that firms make investment decisions based on anticipated conditions of demand and on output growth. The theory of Financial Intermediation focuses on the function of financial intermediaries in channelling financial savings and resource allocation efficiently in the economy. Financial markets and financial institutions lower the cost of transactions, increase the versatility of money (liquidity), and guide investment toward productive activity. Financial deepening as a result, increases investment performance such as efficient allocation of credit and risk diversification. Gurley and Shaw (1960), Diamond (1984), and Levine (1997, 1998, 1999) theorized that developed financial systems foster economic growth and investment productivity by increasing financial efficiency. Neoclassical Investment Theory is a theory that attributes the action of the firm to determining the cost of capital and its relationship to expected profitability. With higher than borrowable interest rates, investments improve and lower otherwise. When the expected return is greater than the borrowing rate, investment rises but drops when interest rates drop significantly. Emphasis was put on the theory regarding the importance of macro-economic stability, monetary policy and financial market efficiency in impacting investment behavior. Tobin (1969), Hall and Jorgenson (1967), and Modigliani and Miller (1958) pointed out that the capital costs and the expectations of profits are significant factors in investment performance. An economic theory is inflation uncertainty theory, which indicates that inflation creates uncertainty about prices in the future and uncertain profits for the productive activity and thus it creates a reduction in productive activity investment. A high inflation rate makes the market more volatile and causes businesses to lose investor confidence because it's more challenging to anticipate future inflows and outflows. The theory is that continuous inflation provides conditions for economic planning and for sustainability of long-term investment. Friedman (1977), Ball (1992) and Cukierman and Meltzer (1986) argued that inflation uncertainty hurts investment efficiency and macroeconomic stability.

2.8 Empirical Literature Review

Empirical studies were consistently showing that inflation negatively impacts investment performance, especially in economies where macroeconomic stability is lacking such as in the developing economies. The studies confirmed that high inflation would cut down private sector investment, due to its negative effects of diminishing purchasing power and increased production costs, and the effect would be magnified by inflation's impact on uncertainty. Ahmad et al. (2024), Khan et al. (2006) and Fischer et al. (2002) noted that the volatility of inflation has adverse effects on long run investment sustainability and financial sector efficiency. Empirical studies conducted up to now basically supported the theory that financial deepening could improve financial performance of the investments by enhancing the supply of credit and liquidity in the investment market. Financial sector development facilitates increased capital mobilization and builds up capital productive investment activities. Empirical findings, however, suggested that poor governance and the failure to provide credit efficiently weakens the benefits of financial deepening. Financial development's role in investment growth and economic growth has been confirmed by Ahmad et al. 2025a, Rioja and Valev, 2004 and Beck and Levine, 2004.

Research undertaken in developing countries pointed to the role of macroeconomic stability, institutions and financial development in raising the performance of investments. In emerging countries, capital formation was often hampered by instability in the real GDP market, poor-policymaking coordination and lack of financial markets. The study also revealed positive effects of GDP growth and FDI inflows on productive investment if it is accompanied by effective governance structures. Ahmad et al. (2025b) and Hermes and Lensink (2003) have shown that the sustainability of investment in developing-world economies is crucially influenced by financial efficiency and macro-economic control. The studies undertaken in Jordan confirmed that there existed statistical evidence showing that macro-economic variables had significant effects on economic performance, productivity and activities related to investment. The traditional literature on Jordan underlined that the development of the financial sector, the efficiency in organization functioning, and macro-economic stability constitute important pillars that enable sustainable economic growth. Imprudent levels of inflation, low productivity growth and financial difficulties continued to pose significant policy challenges for the Jordanian economy. AlKhalwaldeh et al. (2024), Alwaely et al. (2024), and Ismaeel et al. (2023) pointed out that financial and institutional constraints significantly impact the economic efficiency and sustainable development of the country of Jordan.

While a lot of literature exists on macro-economic performance and financial development, few studies focused specifically on the separate and combined effects of inflation and financial deepening on investment performance in the Jordan regarding investment as measured by gross capital formation. This, though, was not the focus of existing studies, which tended to be on economic growth, environmental sustainability, or energy dynamics, but not on productive investment behavior. Moreover, the previous studies generally ignored the problem of the multiobjective effects of inflation, financial deepening, interest rate, GDP growth and FDI inflows in the same ARDL framework. Additionally, there were some empirical inconsistencies about the direction and size of these relations, especially relating to developing economies with structural problems. Thus, the present study attempted to bridge the hitherto noted empirical and methodological gap by examining the short and long run empirical patterns of the relationship between inflation, financial deepening and investment performance in Jordan.

3. Methodology

3.1 Research Design

The study used a time-series econometric analysis to study the relationship between inflation and financial deepening and investment performance for the Jordanian context and to adopt the quantitative research design. The use of quantitative approaches is dominant in macroeconomic studies due to the availability of good statistical data that can support evidence of the behavior of economic variables, and can yield short run and long run estimates. Among the three models used, the ARDL models were used due to its flexibility in dealing with variables that are integrated with different order especially $I(0)$, $I(1)$. Adopted quantitative design for the estimation objective and a reliable interpretation of the macroeconomic interactions of variables selected. Econometric methodologies have been highlighted by Ahmad et al. (2024), Pesaran et al. (2001) and Gujarati and Porter (2009) as being useful processes for evaluating macro economy relationships and policy dynamics.

3.2 Study Area: Jordan

Jordan was used as a proxy country, as the country was facing persistent macroeconomic problems related to the volatility of inflation, fiscal stress, unemployment, dependence on foreign resources and shifts in the economy. The Jordanian economy continued to be very sensitive towards economic volatility in the region, external shocks and stock market fluctuations and thus became an appropriate sample for investment performance analysis. The country also made several financial and economic reforms that sought to enhance development of the financial sector and promote domestic and foreign investment. Despite these reforms, there were some spillages in gross capital formation and in productive investment over time. AlKhawaldeh et al. (2024), Almarshad et al. (2024), and World Bank (2023) underscored the critical role of macroeconomic stability, financial growth, and investment expansion for Jordan's economic sustainability.

3.3 Data Source

Secondary, yearly time-series data were used and were mainly sourced from the World Bank (WB) database known as the World Development Indicators (WDI) produced by the WB. Other macroeconomic data was gathered from the International Monetary Fund and the Central Bank of Jordan to guarantee the reliability of data and consistency of information. It has been judged as suitable sources for use because they offer internationally standardized macroeconomic indicators that are associated with the empirical economic studies. Official databases were also used to improve data comparability, reliability and methodological transparency. Ahmad et al. (2025a), Ismail et al. (2024) and Beck et al. (2000) suggested that the acceptance of databases with worldwide recognition increases the credibility and validity of empirical macroeconomic studies. The study time period was chosen between 1980 and 2024 as they represented various phases of macroeconomic and financial development in Jordan. Major economic reforms, inflationary outbursts, financial liberalization, regional crises and external economic shocks affected investment performance during the period. Taking a long time horizon increased the reliability of the econometric estimate, and it allowed the full analysis of short-run fluctuations as well as long-run equilibrium relationships between the variables. The idea of performing long-term time-series analysis improves the robustness of the macroeconomic estimations and policy interpretations were noted by Ahmad et al (2020), Pesaran and Shin (1999) and Narayan (2005).

3.4 Variable Measurement

3.4.1 Dependent Variable

Investment performance was measured as a dependent variable, using gross capital formation as percentage of GDP as measured proxy. Gross capital formation shows an economy's increase in its assets, buildings, household construction, infrastructure, machinery and equipment, and production investments. Not only is it widely used in the macroeconomic literature, but this proxy is effective in explaining different levels of productive investment and capital accumulation. A higher gross capital formation indicates higher investment activities and improvement in the productive capacities. Solow (1956), Ahmad et al. (2025c) and Levine (2005) acknowledged that the formation of capital is among the main elements of investment sustainability and economic productivity.

3.4.2 Independent Variables

The first independent variable was inflation, which was updated based on the Consumer Price Index (CPI) figure. The first independent variable was inflation which was updated according to the Consumer Price Index (CPI) figure. CPI measures the variation in general price levels and thus indicates the inflationary pressure in the economy. Long periods of high inflation can make people more uncertain about the economy and the stock market, because the real return and input costs are both impaired. Financial deepening was the second independent variable which was captured as broad money supply (M2) expressed as a percentage of GDP. M2/GDP represents the depth and development of intermediaries and the capacity of the financial sector in the mobilization of savings and the use of credit efficiently. According to Ahmad et al. (2018), King and Levine (1993) and Khan and Senhadji (2001) inflation along with financial deepening plays a role in investment and macroeconomic performance.

3.4.3 Control Variables

The indicators that are considered have been used in the study as control variables because they play a significant role in affecting investment behavior, such as interest rate, growth of the Gross Domestic Product (GDP), and foreign direct investment inflow. Interest rate was the expense of borrowing and really influenced companies'

investment choices. GDP indicated the amount of expansion of the economy and magnitude of demand, while FDI inflows measured external FDI and technology transfers. Again, these control variables had offered omitted variable bias reduction and better specification of the model. Borensztein et al. (1998), Ahmad et al. (2024), and Barro, (1991) contended that investment returns rely a lot on the macroeconomic stability, economic expansion and productivity, and foreign capital inflows.

3.5 Model Specification

The functional relationship of the study was expressed as:

$$INV = f(INF, FD, INT, GDPG, FDI)$$
$$INV_{it} = \beta_0 + \beta_1 INF_{it} + \beta_2 FD_{it} + \beta_3 INT_{it} + \beta_4 GDPG_{it} + \beta_5 FDI_{it} + \varepsilon_{it}$$

The model examined the influence of inflation and financial deepening on investment performance while controlling for macroeconomic factors affecting capital formation. Gujarati and Porter (2009), Ahmad et al. (2024), and Wooldridge (2013) maintained that appropriate model specification improves econometric accuracy and policy relevance.

3.6 Econometric Framework

The ARDL methodology was used because the approach proved to be effective technique used to estimate the dynamic relationship between the macroeconomic variables integrated at mixed order of stationarity. The long run and short run adjustment mechanisms are also included in the same estimation procedure, under the ARDL framework. In addition, ARDL is efficient in small-size samples of innovation studies and reduces the bias towards estimating the model in case of the endogeneity problem. The study pointed out that ARDL estimation is still one of the most preferred techniques in the time series macroeconomic analysis conducted by Pesaran et al. (2001), Ahmad et al. (2025b) and Narayan and Narayan (2005).

3.7 ARDL Estimation Technique

Using the Akaike Information Criterion, the optimal lag length was selected, and the relationship between the variables was estimated using the distributed lag structure for the ARDL estimation technique. Both coefficient and dynamic adjustment in the short run were estimated. ARDL further discussed the problems of autocorrelation and endogeneity in macroeconomic models. The method was found to be adequate as the variables do not have a uniform degree of integration and the order of integration was not greater than 2. Pesaran and Shin (1999) and Ahmad et al. (2024), and Nkoro and Uko (2016) recorded that the ARDL estimation process gives reliable and efficient macroeconomic results.

3.8 Unit Root Tests

The Augmented Dickey-Fuller test was used to investigate the stationarity of the variables and to see if there was any unit roots within each data series. Even though there was no debate about the value of conducting a test of stationarity, it remained important because of the problems of spurious regression and the lack of interpretation when the data are not stationary. The ADF test added lagged difference terms to remove any autocorrelations and ensure the reliability of the estimated results. Dickey and Fuller (1981), Ahmad et al (2020) and Enders (2015) highlighted the need for stationarity test in performing macroeconomic time series analysis. The Phillips-Perron test was used in conjunction with the ADF test to correct for serial correlation and heteroskedasticity in the errors (but did not involve the use of lagged difference terms). The PP test for further checks of integration characteristics of the variables was used for further robustness. Phillips and Perron (1988), Ahmad et al. (2025a) and Brooks (2014) discussed that the use of both ADF and PP test will be more reliable in performing the unit root detection test.

3.9 ARDL Bounds Cointegration Test

The ARDL bounds testing has been performed to test the existence of LR relationships for investment performance, inflation, financial deepening and control variables. To assess the degree of cointegration between the variables, a test for cointegration of the variables was done by comparing F-statistics derived from the mathematical models with the critical bound value anew. In situations that the computed F-statistic would be greater than the upper bound of the critical value, the variables were said to be cointegrated. Bounds testing continue to be important for

testing long-term relationships in macroeconomics as noted by Pesaran et al. (2001), Ahmad et al. (2024) and Narayan (2005).

The model suggests that the shocks considered were short-lived. The model implies that the shocks under consideration were transitory.

To observe how the inflation, financial deepening, interest rate, GDP growth and foreign direct investment inflows affect the investment performance over the period, the long-run effects were estimated. The coefficients for the long run reflected the long-term impact of the macroeconomic variables on gross capital formation. Investment enhancement: Positive coefficients show the adverse impacts of macroeconomic measures: Negative coefficients. Wooldridge (2013), Pesaran and Shin (1999) and Ahmad et al. (2018) suggested that long-run estimation is essential to get the important evidence about the structural economic relationships. The SR-ECM took into account short-run changes and deviations from the LR-equilibrium. The speed of adjustment of investment performance back to equilibrium aftershocks was captured by the ECM coefficient. The negative and statistically significant values for the ECM suggest a convergence to long-run stability. Estimation of the ECM is discussed as a satisfactory explanation of dynamic macroeconomic adjustment by Engle and Granger (1987), Ahmad et al. (2025c) and Banerjee et al. (1998).

3.10 Diagnostic Tests

The Breusch-Godfrey Serial correlation LM test was used to test the independence of residuals. The results suggested that there were no signs of serial correlation, which were representative of model reliability and correct specification. Since the econometric estimation requires residual independence, the authors of Ahmad et al. (2020), Gujarati and Porter (2009), and Wooldridge (2013) have all emphasized the importance of residual independence. The Breusch-Pagan-Godfrey test was used to check the homoscedasticity of residuals. Estimated coefficients were more efficient and reliable when using the Homoskedastic residuals. According to the signature of many trivocal points by Brooks (2014), Ahmad et al. (2024), and Greene (2012), the test for heteroskedasticity continues to be a fundamental step to valid econometric interpretation. A normality test called Jarque-Bera was used to check the normality of the residuals. When the residuals were normally distributed, this increased the reliability of statistical inference and reliability of hypothesis testing. Jarque and Bera (1987), Ahmad et al. (2025b) and Enders (2015) have pointed out that residual normality enhances the "econometric validity". The Ramsey RESET test checked the accuracy of model specification and checked for omitted variable bias or for possible function misspecification. The resulted model with correctly specified model with higher estimation consistency and predictive reliability. Many scholars also highlighted the importance of specification testing for the surety of macroeconomic analysis, such as Ramsey (1969), Ahmad et al (2025a) and Greene (2012).

3.11 Stability Tests

The CUSUM test evaluated the stability of the parameters over time and also if there was structural instability in the model estimated. Stable coefficients, reflecting the relative stability of the macroeconomic relationships, were obtained during the study period. Brown et al. (1975), Pesaran et al. (2001) and Ahmad et al. (2024) gave reasons to explain why stability testing enhances the credibility of the model. The CUSUMS test was also used to assess structural stability, by looking at cumulative recursive residuals. The variation of the estimated values of the coefficients inside critical bounds was confirmed by the stability of the models, during the study period. Ahmad et al. (2025c), Brown et al. (1975) and Brooks (2014) stressed that stability diagnostics continue to be important for the validation of the long run econometric models.

4. Results and Discussion

Table 1 shows significant differences between Jordan's macroeconomic variables over 44 years (1980-2024). The growth rate of investment, INV, remained at 27.63% of GDP on average but was hugely volatile (Std. The results obtained showed that the capital formation is unstable (Dev. = 6.15), which is in accordance with AlKhawaldeh et al. (2024). Jordan suffered from severe price instability, which was evident in the extreme volatility in the data recorded by inflation (INF) with an average of 77.17% and standard deviation of 36.06%. The means of the variables for the analysis of foreign investment showed that FD continued to increase consistently (mean = 113.74%), but the foreign investment showed high degree of skewness (2.02) and kurtosis (7.37), which indicated a tendency of foreign

investment in surges. Jordan's GDP grew at a high rate but also at a low rate (from negative 10.73% to positive 17.18%), echoing economic vulnerability to regional shocks as highlighted by Almarshad et al (2024).

Table 1 Descriptive Statistics

	INV	INF	FD	FDI	INT	GDPG
Mean	27.63248	77.17445	113.7441	4.108082	9.818537	3.907241
Median	25.72947	69.68121	114.5752	2.486017	9.609167	3.308475
Maximum	46.03065	138.0112	138.8774	23.53729	12.60917	17.17872
Minimum	19.83486	23.59886	85.26089	-0.598397	7.015833	-10.72922
Std. Dev.	6.147295	36.05569	13.30933	4.937905	1.537251	4.359409
Skewness	0.789161	0.141130	-0.038940	2.021022	0.168436	0.095899
Kurtosis	3.049266	1.738565	2.426257	7.368185	1.910942	6.290065

Table 2 results show that the investment performance has the highest positive correlation with GDP growth ($r = 0.534$, $p < 0.01$) while confirming and verifying in this paper the relevance of the accelerator theory in Jordan's context, as reported by Clark (1917). As shown by significant correlation of negative relation ($r = -0.307$, $p < 0.05$) between inflation and investment, which corresponds to what Fischer (1993) found that inflation has a bad impact on capital formation. Rather, the findings suggested a negative association between financial deepening and investment ($r = -0.451$, $p < 0.01$), findings further supported by Ahmad et al. (2024) who noted that Jordan's financial expansion may have resulted in financial flows towards unproductive sectors instead of productive activities. The interest rates were significantly negatively correlated with inflation ($r = -0.658$) and FDI ($r = -0.396$), indicating Jordan's monetary policy measures in response to macroeconomic pressures.

Table 2 Correlation Matrix

Variables	INV	INF	FD	FDI	INT	GDPG
INV	1.000					
INF	-0.307** (0.039)	1.000				
FD	-0.451** (0.002)	0.221 (0.144)	1.000			
FDI	0.124 (0.416)	0.254 (0.091)	0.415** (0.004)	1.000		
INT	0.022 (0.882)	-0.658* (0.000)	-0.212 (0.160)	-0.396* (0.007)	1.000	
GDPG	0.534* (0.000)	-0.155 (0.308)	-0.213 (0.158)	0.312** (0.036)	-0.047 (0.755)	1.000

Table 3 shows that none of these variables are stationary at levels (ADF and PP are insignificant in this case) with the lowest stationarity being shown for INF (ADF = 0.505, $p = 0.985$). For all series, however, the stationarity condition was met at first difference at 1% level of significance indicating that the order of integration was I(1). This finding prompted the use of ARDL approach since Pesaran et al. (2001) highlighted that ARDL is suitable for combination of integration order. Jordan followed the same pattern for structural adjustment as its macroeconomic variables showed integration properties, matching the country's structural adjustment process and its sensitivity to economic

shocks as reported by Ahmad et al. (2020). The following cointegration analysis was validated by the consistent stationarity transformation of all variables.

Table 3 Unit root Test

Variables	ADF				PP			
	Level		1st Diff.		Level		1st Diff.	
	t stats	p values	t stats	p values	t stats	p values	t stats	p values
FD	-2.716450	0.079331	-7.116333	0.00000	-2.705317	0.081193	-7.116333	0.00000
FDI	-2.223461	0.201170	-6.876709	0.00000	-2.319706	0.170503	-6.876125	0.00000
GDPG	-4.584160	0.000593	-9.872664	0.00000	-4.464539	0.000847	-11.74649	0.00000
INF	0.505365	0.985059	-5.187081	0.00000	0.387397	0.980182	-5.124575	0.00000
INT	-0.902760	0.776832	-6.634103	0.00000	-1.106018	0.705216	-3.542421	0.00000
INV	-2.500232	0.122303	-7.091529	0.00000	-2.606900	0.099235	-7.033007	0.00000

Table 4 shows the bounds cointegration test results and an F-statistic of 7.957, well above the upper bound F-statistic at 1% level (4.15). This validated the existence of LRER between investment performance and inflation, financial deepening and interest rates, GDP growth and FDI inflows in Jordan. The lack of rejection of the null hypothesis (no cointegration) is consistent with Pesaran et al. (2001) who determined that those F statistics that lie above the upper bounds suggest long-run stability. The policy implication of this finding is important for Jordan because the linkages between the economy are stable even if there are short-term changes and external shocks. The strong cointegration result confirms Ahmad et al. (2024) finding, by which Jordan's investment performance cointegrates systematically and permanently with monetary and financial conditions over time, and coordinated policy can be implemented for sustainable economic development.

Table 4 F-bound Cointegration Test Results

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	7.957340	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

The results presented in Table 5 show once again the robustness of ARDL model and are the results of high diagnostic tests. The Breusch-Godfrey LM test (F-statistic = 1.547 and p = 0.329) showed that no serial correlation was present, while the Breusch-Pagan-Godfrey test (F-statistic = 1.249 and p = 0.305) found homoskedastic residuals. It was validated that the model was specified correctly by using the Ramsey RESET test value F-statistic = 1.494, p = 0.229. These results meet key econometric requirements as stated by Gujarati and Porter (2009). For Jordan, the diagnostic results corroborate the findings in this paper that the estimated relationships between investment performance and macroeconomic parameters are valid and non-biased, which is consistent with the paper's findings on the macroeconomic stability and consistency of the model for Jordan.

Table 5 Diagnostic Test Results

Diagnostic Test	Test Statistic	Probability (p-value)	Decision
Breusch–Godfrey Serial Correlation LM Test (F-statistic)	1.5466	0.3291	No serial correlation
Breusch–Godfrey Serial Correlation LM Test (Obs*R ²)	4.3037	0.1968	No serial correlation
Breusch–Pagan–Godfrey Heteroskedasticity Test (F-statistic)	1.2493	0.3052	No heteroskedasticity
Breusch–Pagan–Godfrey Heteroskedasticity Test (Obs*R ²)	6.2123	0.2861	No heteroskedasticity
Breusch–Pagan–Godfrey Heteroskedasticity Test (Scaled Explained SS)	3.3155	0.6515	No heteroskedasticity
Ramsey RESET Test (t-statistic)	1.2223	0.2291	Model correctly specified
Ramsey RESET Test (F-statistic)	1.4941	0.2291	Model correctly specified
Ramsey RESET Test (Likelihood Ratio)	1.7354	0.1877	Model correctly specified

The Jarque-Bera normality test results were shown in figure 1 with the probability value being greater than 5% significance level (P-value > 0.05). The residual distribution was nearly normal indicating the model's validity. This corroborates Enders (2015) who concluded that the macroeconomic relationships estimated in Jordan were statistically stable and free from significant specification errors and distortion.

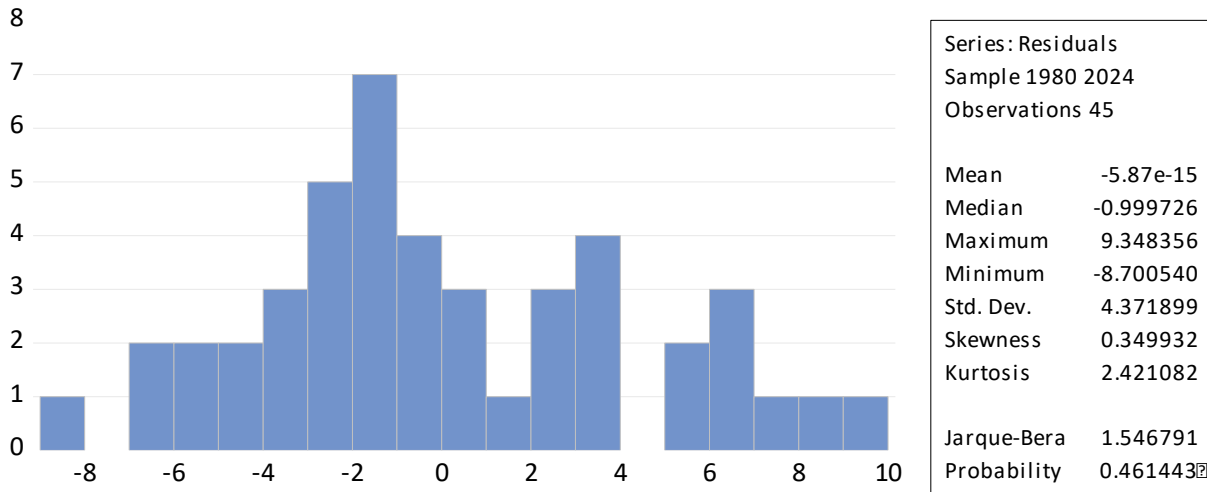


Figure 1 Normality Test

Table 6 shows the dynamics of short and long run investment performance in Jordan. The strongest positive impulse came from GDP growth ($D(\text{GDPG}) = 0.618$, $p < 0.01$) which was similar to the type of impulse predicted by the accelerator theory that was first stated by Clark (1917), who suggested that expansion in the economy would immediately induce capital formation. Interestingly, inflation ($D(\text{INF}) = 0.587$, $p < 0.01$) had positive short-run effects, implying that moderate increases in the price level enable temporary increases in investment, perhaps because of demand-side channels. But the coefficients of the short-run were negative for financial deepening ($D(\text{FD}) = -0.094$, significance level $p < 0.05$) and FDI inflows ($D(\text{FDI}) = -0.211$, same significance level), indicating that a significant increase in the depth of the financial sector and inflow of foreign direct investment in Jordan could have had an adverse impact on domestic investments or diverted them towards speculations. The error correction

term, (CointEq(-1) = -0.360, $p < 0.01$), showed that significant adjustment towards equilibrium occurred at 36% of annually. GDP growth (0.717, $p < 0.01$) and financial deepening (0.087, $p < 0.05$) had positive impact on the investment performance; this finding reaffirms what earlier studies from McKinnon (1973) suggested: that financial development promote capital accumulation. There were, however, negative long-run trends in inflation (-0.088), interest rates (-0.733) and inflows of FDI (-0.587), reflecting macroeconomic vulnerabilities that persist. The macroeconomic impact of FDI in Jordan was clearly negative, as reported in Fischer (1993); and inflation risk seemed to have prevailed as reflected by the high volatility in both nominal and real interest rates, as noted in Carkovic and Levine (2005); the results of the present study point in this direction.

Table 6 Short run and long run Estimates

Short Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF)	0.587**	0.194317	3.022052	0.0047
D(FD)	-0.094**	0.039356	-2.394231	0.0217
D(FDI)	-0.211**	0.087696	-2.414122	0.0205
D(INT)	-0.624**	0.247070	-2.526998	0.0158
D(GDPG)	0.618*	0.116878	5.292754	0.0000
CointEq(-1)	-0.360**	0.105769	-3.405116	0.0017
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF	-0.088**	0.034716	-2.561906	0.0145
FD	0.087**	0.041584	2.111251	0.0418
FDI	-0.587**	0.233301	-2.519979	0.0162
INT	-0.733**	0.697653	-2.484970	0.0175
GDPG	0.717**	0.618207	2.778369	0.0087

Figures 2 and 3 show the results of the CUSUM and CUSUMSQ stability tests, respectively, both of which have remained in the stability control windows of 5% in both cases during the study period. The results obtained in this study showed the stability of the parameters in Jordan's investment model, which supported the values of the long-run and short-run parameters. Brown et al. (1975) stressed the importance of such stability due to firm structural relationships and thus considerations of policy relevance.

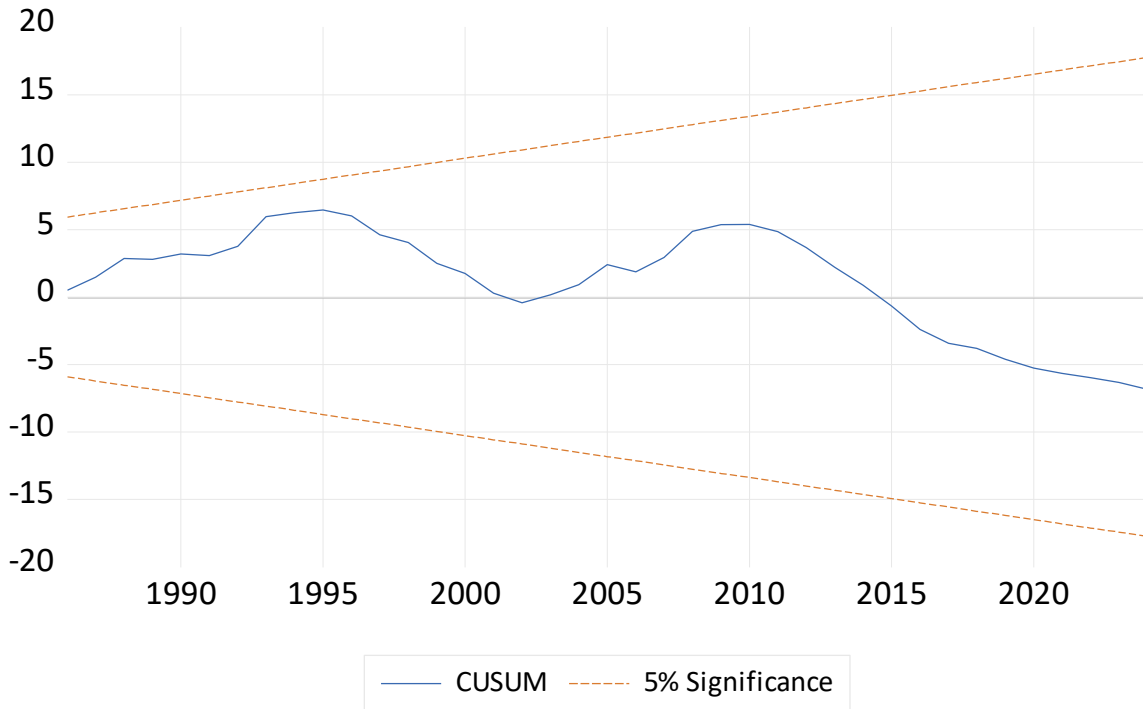


Figure 2 Cusum Test

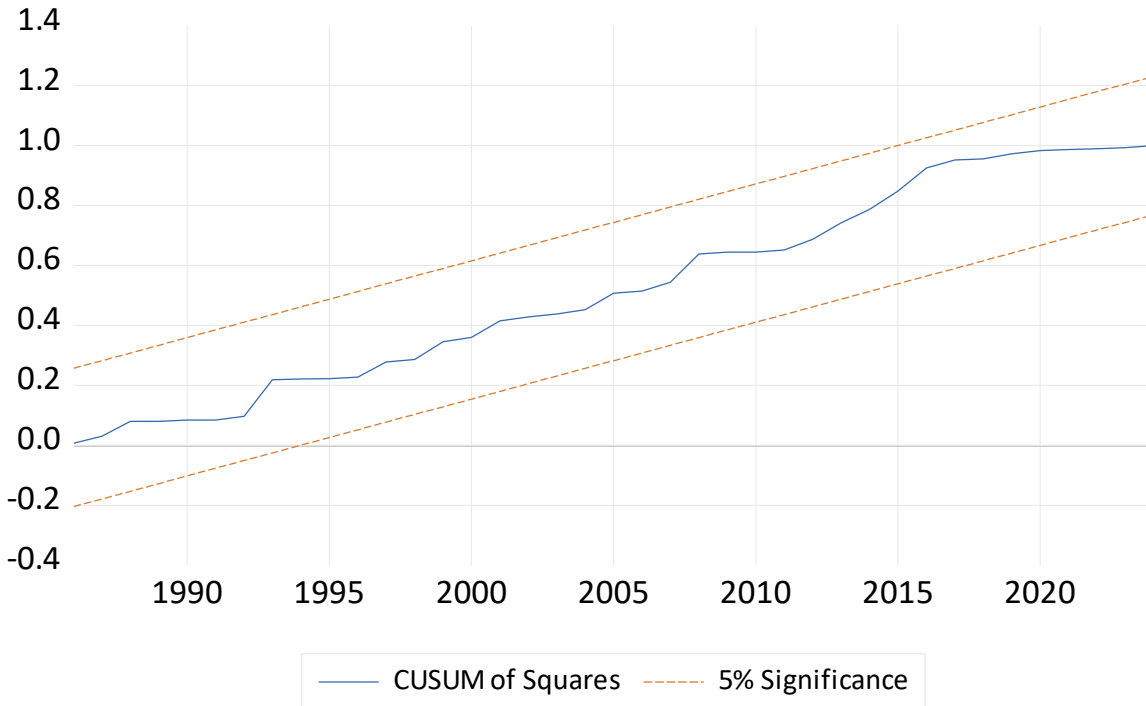


Figure 3 Cusum Square

5. Conclusion of the Study

The research foresaw significant influence between inflation and the performance of investment in Jordan as well as the financial deepening both in the short- and long-term periods. The results of the ARDL bounds testing confirmed that there was a strong cointegration relationship between the variables, thus validating the theoretical models supporting the investment behavior in the developing countries. The accelerator theory applied to Jordan's economic context proved to be a valid theory as GDP growth was the most powerful positive contributor to capital formation. But uncertain real investment prospects due to inflation and depressed real returns dealt a continuing knock to the investment process, while financial deepening was found to have positive long-term impacts, albeit with short-term adjustment costs. Negative impacts from FDI inflows indicated that FDI flow did not necessarily positively aid the domestic capacity to raise capital, could be due to sectoral concentration or lack of capacity of the institutions to absorb the investment. The cost of capital channel emphasized in neoclassical investment theory materialized in the interest rate stringency resulting in investment limitation both in the short and long run. In summary, the reliability of this finding regarding estimated relationships has been supported by diagnostic and stability testing. These findings highlighted the need for coordinated macroeconomic policies, which would have to be directed at controlling inflation while at the same time helping the development of financial institutions. Jordan needed comprehensive approaches to improve its financial quality, efficiency of financial intermediation, and institutional quality along with financial stability. The study laid empirical empirical bearings for the macro-financial determinants of investment performance in a structurally vulnerable economy. The sectoral heterogeneity and nonlinear thresholds in these relationships could be explored in future research.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

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Artificial Intelligence (AI) Use Disclosure: The authors declare that no artificial intelligence tools were used in the preparation of this manuscript.

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