IRJEMS International Research Journal of Economics and Management Studies
ISSN: 2583 – 5238 / Volume 5 Issue 6 May 2026 / Pg. No: 7-22
Paper Id: IRJEMS-V5I6P102, Doi: 10.56472/25835238/IRJEMS-V5I6P102

Original Article

The Economic Consequences of Returned Checks in Jordan An Econometric Analysis for 2000 - 2025

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Received Date: 11 May 2026 Revised Date: 25 May 2026 Accepted Date: 28 May 2026 Published Date: 02 June 2026

Abstract: *This study aims to analyze the relationship between returned checks and economic growth within the broader context of financial and macroeconomic dynamics. Specifically, the study seeks to examine the role of returned checks as an indicator of the volume of commercial transactions and financial activity in the economy, as well as to investigate their impact on economic growth alongside several key macroeconomic variables, including bank credit, interest rates, inflation, investment, and government expenditure. To achieve the objectives of the study, the Autoregressive Distributed Lag (ARDL) model was employed, as it allows for examining both short-run and long-run relationships among the variables. The empirical results indicate that most of the variables under investigation do not exhibit statistically significant effects on economic growth in the short run, suggesting that their impacts require time to be transmitted to the real economic sector. In contrast, the long-run results reveal more stable relationships between the economic variables and economic growth. The findings indicate a positive long-run relationship between returned checks and economic growth, which may be explained by the association between returned checks and the expansion of commercial transactions and the increased use of banking payment instruments within the economy. This, in turn, reflects a higher level of commercial and economic activity. Additionally, the results reveal positive relationships between economic growth and variables such as bank credit and investment, while government expenditure shows a negative relationship with economic growth in the long run. Overall, the findings suggest that returned checks can serve as an economic indicator associated with the level of commercial and financial activity in the economy. Understanding their impact on economic growth, therefore, requires a dynamic analytical framework that accounts for the differences between short-run fluctuations and long-run economic relationships.*

Keywords: *Returned Checks, Economic Growth, Fiscal Policy, Monetary Policy, Jordan.*

I. INTRODUCTION

Sustainable economic growth is one of the most important goals macroeconomic policy seeks to achieve closeness, as it has a grand impact in advancing living standards, increasing social stability, and national management (Calomiris & Joseph, 2006). From the period Schumpeter was writing in to modern-day endogenous growth literature, economists have been concerned with what factors drive growth stock (Basak & Wulf, 2015). In this particular context, there is one school of thought, which has become more pronounced over the last few years: while the role of the financial sector in mobilizing savings, allocating resources, reducing transaction costs, and managing risk is often seen as crucial for stimulating economic growth (King & Levine 1993; Levine 1997). As a result, the financial system is crucial for macroeconomic performance, as it contains the capacity to support transactions and liquidity flow in the market (World Bank, 2022).

Payment instruments, especially checks, are critical to the economy as they help meet commercial commitments and simplify financial dealings amongst individuals and organizations (Claessens & Kose, 2018). Nevertheless, the increasing rate of "returned checks" (which can be defined as checks that cannot be cashed because they have insufficient funds or clear legal/procedural errors) has created serious questions about their impact on macroeconomic performance (Azar, Elfakhani & Abdallah, 2017). This is usually explained by risk-off economic forces, including weak growth conditions, liquidity crunches, or debt overhang (IMF 2023). In this context, more recent studies increasingly consider different indicators of household and corporate financial distress as important explanatory variables in the study of business cycles, as they are generally seen to reflect hidden deficits in the real economy (BIS, 2022).

The efficiency of payment systems is widely recognized in the economic literature as a key determinant of economic growth (Levine, 2005). While strong payment systems lower transaction costs, increase money velocity, and foster commerce (Bech & Hobijn, 2007), high default rates in payment instruments like rejected checks suggest weak solvency, higher credit risk, and a deterioration in market confidence, impeding investment and consumption (World Bank, 2022). Under the financial intermediation theory paradigm, returned checks and growth have a link via the need for productive investment (Levine, 2005), where a sound financial system allows for reduced transaction risks to engender confidence necessary for investment. So, an increase in checks that are returned can serve to generate greater uncertainty, larger risk premiums, and less credit, slowing

private investment and GDP (Moodhi et al., 2024). This dynamic could be analysed using asymmetric information theory, which suggests that lowered trust in the market results in higher barriers to credit and less commercial activity (Stiglitz & Weiss, 1981).

At the national level, the banking system is a cornerstone of the Jordanian economy, where checks are still an important means of payment. While the number of checks issued reached over 6.29 million with a value exceeding 40.9 billion Jordanian Dinars (JoPACC,2025), representing 102.6% of GDP in 2025 (Central Bank of Jordan,2025). Returned checks, after another period of structural difficulties and geopolitical shocks, have become a solipsicin of financial volatility in the local market, with 1.23 billion JOD, more than 3% of 4800, added value (Amman Chamber of Industry, 2025). This situation poses a serious dilemma on its effect on economic growth in a small, open economy that depends heavily on credit trust and financial stability.

This excessive trust in checks, where a simple form of payment or credit has turned so threatening that they are now rejected from more and more places by banks and merchants, as such, turning their back on them is both noticeable and losing their role as belonging to the business sphere. Notwithstanding the importance of this issue, empirical literature explicitly relating returned checks to economic growth is low, especially in developing economies. Although many of the studies have targeted banking sector distress or NPLs, traditional payment instruments are often ignored as potential early warning signals to other types of economic imbalances. Therefore, in this regard, the current study aims to examine the effect of returned checks on economic growth in Jordan using an econometric approach that represents a theoretical and empirical gap amongst research studies.

II. RESEARCH STATEMENT

In the last decades, a great deal of the economic literature has centered on the relationship between the development of the financial sector and economic growth, with large theories and empirical studies providing strong evidence supporting that an efficient financial system is critical to sustained long-run economic growth (King & Levine, 1993; Levine, 1997). Most of the research focused on traditional indicators that consist of the volume of bank credit, efficiency in financial intermediation, and spray financial liberalization. In contrast, micro-level measures of financial stability, so-called "returned checks," have been understudied in macroeconomic empirical analysis and local settings (Moodhi et al.2024). There is no greater test of bone, marrow, and blood than the returned check, the ultimate sign of financial discipline, liquidity conditions, and market confidence. A rise in their incidence may point to deficiencies in credit risk management, institutional weakness, or cyclical economic pressures that hamper households and firms from servicing their debts.

Although returned checks are empirically and theoretically significant in their ability to explain fluctuations in economic growth, their relevance is still ambiguous. The problem reaches a crescendo in banking-dependent economies. When return checks go beyond being just a synoptic micro-financial metric, an indicator of the early warning sign for macro instability, their significance on the real economy takes center stage. The financial crisis literature indicates that measures of default and credit imbalances frequently herald economic slumps (Bernanke, 1983; Reinhart & Rogoff, 2000).

Hence, the main research problem is summarized in the following question: Is there a statistically significant correlation between the number of returned checks and the economic growth rate in Jordan? Providing an answer to this question is critical as it helps us formulate our fiscal and monetary policies to mitigate the impact on economic stability. For the purpose of designing "early warning indicators," it is important to understand how payment instruments in distress relate to economic growth, thus helping policymakers avert and reduce macroeconomic imbalances before they degenerate. As such, the goal of this study is to provide a substantial original contribution to what we know by performing a robust econometric analysis that properly assesses the return checks and their impact on economic growth in Jordan, taking into full account the overall key macroeconomic variables associated with monetary and fiscal policy.

III. LITERATURE REVIEW

A) The Concept and Significance of Returned Checks

Traditionally, a check embodies the very essence of a payment instrument and was crucial in managing monetary transactions and promoting economic activity. It is formally defined as a stand which is an undated (or unconditional) written order from the drawer to the drawee, generally, a bank to pay a specific sum of money to the payee, an order or to the bearer on demand (Moodhi et al., 2024). The check is primarily defined as an instrument of payment (as opposed to credit), because it should be payable on presentation, and from this property derives its principal function as a means of discharging commercial obligations and facilitating exchange: (Goode, 2016). Although in recent times, the emergence of digital payment systems has been a challenge to traditional cheques as commercial transactions are primarily built around lifecycle events that transfer ownership, such as delivery note signing and bank check issuance, certain aspects globally are considered a need for cheques, especially in relation to legal protection provided by reliance on historical business exchanges (Al-Shammari 2012). However, there are several reasons for the checks to lose their legal force, such as insufficient funds, different signatures, mistakes, and

errors in the document (date or amount of money), closure of the underlying account that was being overdrafted (Şendeniz-Yüncü et al., 2008).

Economically and legally, the check serves as the ” bridge between banking and the real sphere. It is a measure of market confidence and the level of financial discipline among economic agents (Badwan, Saleh & Hamdan, 2024). Check usage historically has been closely associated with both the development of the banking system and growth in trade; by minimizing cash handling risks and lowering transaction costs, checks have greatly improved on money velocity (Humphrey et al. 2003; Calomiris & Joseph 2006).

The check is a building block of financial stability (and thus economic growth) in the infrastructure of national payment systems (Parashar et al. 2026). The economic literature posits that the cost efficiency of payment systems directly affects economic performance by reducing the cost of exchange, maximizing resource allocation, and leading to an increase in aggregate investment and consumption (Prakash & Stella, 2024). The competitive and simple payment environment builds trust and expands a wider base of commercial activity, which has an overall positive impact on GDP (Anifowose & Ekperiware, 2026). In contrast, a high rate of "dishonored checks" indicates insufficient liquidity, lower solvency, and decreasing market confidence, which definitely limits economic activity and lowers the growth potential (Peykani et al., 2025; Erdem & Tugcu, 2015).

Even with the rapid expansion of options in the electronic payment space, checks remain very useful, especially for large commercial transactions, and are only replaced as a standard form (if it is ever displaced [46]) by paper-based instruments at least. Moreover, data on check volume, value, and return rates provide a high-frequency commercial economic indicator of the health of commerce, market liquidity, and financial commitment (BIS, 2022). Thus, the check evolves beyond simply a financial or banking instrument; it becomes a macroeconomic barometer of systemic health and trust. Therefore, examining checks is critical to exploring the triangulation between payment infrastructure, financial stability, and overall economic activity (Fengju & Wubishet, 2024; Magbondé & Konté, 2022), especially for developing economies.

B) The Landscape of Returned Checks in the Jordanian Economy

The phenomenon of returned checks is essential in the Jordanian economy as a sensitive indicator of liquidity conditions, credit trust, and the efficiency of the national payment system. Such a phenomenon can be connected to the changes in macroeconomic and microeconomic performance (Fengju & Wubishet, 2024). In its most rudimentary sense, a check, mainly as an instrument for payment replacing the role of cash, depends directly on public perception regarding the solvency of both drawer and drawee at maturity. Erosion of this trust, in turn, breaks the engagement with the larger business environment (Dionysopoulos et al., 2023). An increase in bounced checks is one of the primary reasons for causing supply chain disruptions, especially for SMEs, which have a major dependence on short-term commercial credit. It can potentially transmit financial stress through a "financial contagion" channel in the local market (Choudhury et al., 2022). In addition, continuing high rates of returns place systemic pressure on banks and the banking system by increasing the costs and requirements associated with legal enforcement and risk management (Ahmed et al., 2024). This might lead to an increase in checkbook provision and credit, but the private sector liquidity may also be constrained (likely by banks' certainty of creditworthiness), which reduces overall investment and therefore economic growth(Abuka et al., 2019).

According to statistical evidence, return checks volume and values are recognized as pro-cyclical variables that respond to short economic downturns or liquidity-tightening periods (Central Bank of Jordan, 2026). As economic literature has long pointed out, declining confidence in traditional payment instruments compels market participants to seek either less commercial credit or migrate towards alternative payment solutions, mapping the structural dynamics of subsequent behaviours surrounding transactions in the markets (Mishkin 2019). While from the other hand, the Jordanian legislature has been working to a better balance between protecting and limitation of financial rights by legislating some amendments on the Execution Law No. 25 for the year; 2007, in their endeavor to limit of social costs caused by “checks without sufficient coverage”, as an objective that is most important associated with finally establishing of solid ground of financial stability and ensuring a healthier climate in business (Al-Nsour,2023). Because of the merging, returned checks are not simply seen as random occurrences of isolated personal default anymore; they are more and more interpreted as a macro-indicator of system fragility and market confidence, realizing this requires integrated fiscal-monetary-regulatory actions aimed at reinforcing payment system efficiency (Salim & Daly, 2021).

This is backed up by new figures released from the Jordan Payments and Clearing Company (JoPACC). During 2024, a total of 6.51 million checks with an overall value of 40.3 billion JOD were distributed. From these, 220000 were returned in 2025, for a total of (1.51 Billion JOD) - 3%of the volume and +10 percent vs. year-on-year value (Amman Chamber of Industry, Amman Chamber of industry_4). Of these various reasons, primarily financial (like lack of funds) was the cause for at least 51% of such defaults. This trend, however, remains erratic; the first month of 2026 witnessed 11,400 rejections (worth JD65.9 million),

and data for June 2025 indicated a temporary rise with returned checks accounting for 8.2% of the monthly total value of cleared checks.

In contrast, on an annual basis and according to JoPACC data, the overall value of returned checks decreased by 17% for the first eleven months of 2025, falling to 1.129 billion JOD compared with the same period in 2024, i.e., from 1.356 billion JOD. Although this decline suggests a developing trend in transaction patterns, the continued prevalence of financial motives for check returns highlights that liquidity pressures, especially among smaller firms and an underlying lack of credit trust, remain entrenched. Therefore, returned checks continue to be a real early warning signal of the risk of a new economic contraction and liquidity imbalance in Jordan that requires further analysis and attention (Al-Nsour 2023).

C) Economic Implications of Returned Checks

Finally, bounced checks constitute an important financial dimension that reflects credit discipline and institutional quality as well as the efficiency of payment systems. They are more than just an accounting; they play a fundamental role as a diagnostic variable in the financial architecture that mirrors systemic risks from the financial sector (Schinasi 2004). For the financial intermediation theory, the role of the financial sector in economic growth depends on how efficiently the financial sector mobilizes savings, allocates resources, and reduces information asymmetries (Levine, 1997). However, the efficiency of this mechanism is threatened by rising default rates (Levine, 2005), as large amounts of returned checks increase credit risk and lead to more stringent lending conditions that push up funding costs, reducing the effectiveness of the credit channel and inhibiting productive investment (Cafiso et al., 2025). In addition, under the financial accelerator framework, even small shocks act through lower external financing and higher risk premiums to force output/employment down because weak balance sheets mean a lesser ability of economic agents to bear those shocks (Bernanke et al., 1999).

We show that the effect of returned checks on growth is not a trivial one-dimensional measure but at least three-dimensional, representing a deep interlinkage to macroeconomic determinants (or macroeconomic shaping) such as monetary and financial landscape [8], also proposed as an antecedent for various socio-economic indicators ranging from eliminating deprivation to improvement of citizenry-based health, retirement planning, and risk aversion indexes [6]. Although bank credit is usually the main channel of investment, its theoretical positive relationship with growth is conditioned by the efficiency of allocation (Al Khatib, 2025). Credit expansion then is a two-edged sword, unless the financial sector responds prudentially to rising defaults, as expected corporate lending will negatively covariate with defaults, creating the conditions necessary for systemic risk to accumulate and resource misallocation (Ji, 2025). In particular, increased loan defaults cause banks to switch to more prudent lending classes when funding becomes less available to the private sector and, in turn, constrains productive capacity (Bhowmik & Sarker, 2021; Stewart & Chowdhury, 2021).

Capital accumulation models (Solow, 1956) emphasise the centrality of investment to growth. The presence of high returned check rates acts as a signal of liquidity constraints and higher credit risks, limiting the funding for new or expanding projects (Kwashie et al., 2022). This circumstance creates hesitation among investors and reduces the confidence of market players, which can cause delays or even cancellation of the investment through capital expenditure (Arnone et al., 2024). Thus, in any given medium-to-long-term time frame, the link between expenditure on returned checks and investment is typically inverse (Shehata et al., 2021). Additionally, through their evident role as a predictor of banking asset quality, sustained defaults increase non-performing loans (NPL) and transmissive financial systemic risks (Pancotto et al., 2024; Athari et al., 2023), resembling the contours of the credit-fueled booms-sudden busting-boom-bust process in distress periods (Reinhart & Rogoff, 2009).

On the macroeconomic level, widespread default will break up working capital cycles between companies, convincing those who have to pay to restrict payment flow and therefore influencing money velocity (Mwakalila et al., 2024). Liquidity theory implies that these "payment bottlenecks" hinder commercial activity through endogenous constraints, rather than direct productivity shocks (Pichler et al., 2022). Additionally, the rise in defaults contains transaction costs and pauses market interactions (Mwakalila et al., 2024; Bernanke, 1983). Finally, the relationship between returned checks, inflation, and monetary policy is context-dependent; for instance, while central banks have tightened to counteract financial instability suggested by increasing defaults (Khoury & Pal, 2020), in a recession environment with weak demand, they should be more expansionary (Majeed et al., 2025; Jiang, 2024).

IV. RESEARCH MATERIALS

A) Research Methodology

This study is classified as an applied quantitative study that relies on time series data analysis to examine the impact of oil price volatility on government expenditure using econometric models. It adopts a descriptive-analytical approach to trace and explain the economic consequences of returned checks for 200-2025. In addition, an econometric approach is employed to analyze the relationship between the variables and to test its consequences in the short run and the long run.

B) Data Sources

The study is based on secondary data collected from reliable official sources, including reports from the Department of Statistics (DOS), the Ministry of Finance (MOF), Jordanian Payment and Clearing Systems Company (JoPACC), and the Central Bank of Jordan (CBJ). It also utilizes international databases such as the World Bank (WB) and the Bank for International Settlements (BIS).

C) Econometric Model

The objective of this study is to analyze the dynamic relationship between returned checks and economic growth, while controlling for a suite of macroeconomic variables. Given the time-series nature of the data, we employ a Vector Auto Regression (VAR) model, which is well-suited for capturing the endogenous interactions between multiple time-series variables. The general form of the model is specified as follows:

$$\mathrm{GDPG_t} = \alpha \pm \beta 1\, BOUNCE_t + \beta 2\, CREDIT_t + \beta 3\, INT_t + \beta 4\, INV_t + \beta 5\, GOV_t + \epsilon$$

D) Variable Definition and Hypotheses

The study employs the real GDP growth rate (GDPG_t) as the dependent variable to represent macroeconomic performance. The primary independent variable is the volume of returned checks (BOUNCE_t), which serves as a proxy for financial distress. To mitigate omitted variable bias and isolate the impact of returned checks, a vector of control variables (X_t) is integrated into the econometric model.

E) Definition and Expected Signs

- BOUNCE_t (Returned Checks): Represents the value of returned checks. We hypothesize a negative relationship with economic growth, as increased defaults signal diminished credit trust, heightened uncertainty, and stalled commercial activity.
- CREDIT_t (Domestic Credit): Measures total credit facilities provided to the private sector. It is expected to exhibit a positive correlation with economic growth, assuming efficient resource allocation.
- INT_t (Real Interest Rate): Reflects the cost of borrowing. A negative relationship with economic growth is theoretically expected, as higher interest rates increase the cost of capital and suppress investment.
- INF_t (Inflation Rate): Measured by the consumer price index. We anticipate a negative impact on growth, particularly if inflation exceeds stable, low-level thresholds.
- INV_t (Investment): Represented by gross fixed capital formation. It is expected to share a strong positive relationship with economic growth.
- GOV_t (Government Expenditure): Captures total government spending. A positive relationship is expected, particularly in the short term.

The stochastic disturbance term is denoted by ϵ. The study utilizes annual time-series data sourced from the Central Bank of Jordan for the period 2000–2025. Based on the theoretical framework and the variables defined above, this study tests the following hypotheses:

- H_1: Returned checks have a statistically significant negative impact on economic growth.
- H_2: Private sector credit and investment exert a positive influence on economic growth.
- H_3: Real interest rates and inflation exert a negative impact on economic growth.
- H_4: Financial sector variables significantly influence economic growth, either directly or indirectly.

F) Data Diagnostics and Testing Descriptive Statistics

Table 1 below presents the descriptive statistics for the variables employed in this study, including the mean, standard deviation, minimum, and maximum values. These statistics provide an initial overview of the data distribution, volatility, and the central tendencies of each variable. Analyzing these indicators is essential to ensure the data quality and to identify potential outliers before conducting formal econometric modeling.

Table 1: Descriptive Statistics of Research Variables

Variable	Count	Mean	STDIV	Min	25%	50%	75%	Max
GDPG	24.0	3.8583	2.5271	-1.1	2.475	2.7	5.2	8.6
BOUNCE	24.0	1372.0292	491.0665	466.3	1198.7	1460.0	1708.7	2128.4
CREDIT	24.0	18121.1257	8597.2126	4847.9	12150.95	17537.65	25139.65	31600.0
INT	24.0	4.4937	4.2481	-11.8	3.875	5.625	6.55	9.2
INF	24.0	2.9625	3.0362	-0.9	1.5625	2.45	4.275	14.0
INV	24.0	1107.6958	579.4113	169.0	647.6	1101.0	1462.125	2512.0
GOV	24.0	7135.9583	2995.5111	2200.0	5175.0	7400.0	8900.0	12511.0

Figure 1 illustrates the time-series evolution of the economic growth rate (GDPG_t) and the primary independent variable (BOUNCE_t) over the study period. The plots reveal periodic fluctuations, capturing the sensitivity of the Jordanian economy to both internal structural factors and external geopolitical shocks. The observed variance across the series and the presence of underlying trends suggest non-stationarity, a common characteristic in macroeconomic time series that necessitates rigorous pre-estimation testing. These preliminary visual insights underscore the necessity of conducting unit root tests (e.g., Augmented Dickey-Fuller) to confirm the stationarity of the variables before proceeding to advanced econometric modeling. The observed dynamics strongly support the use of time-series frameworks—such as Vector Auto regression (VAR) or Vector Error Correction Models (VECM)—to adequately capture the complex interdependencies and long-run equilibrium relationships between the variables under study.

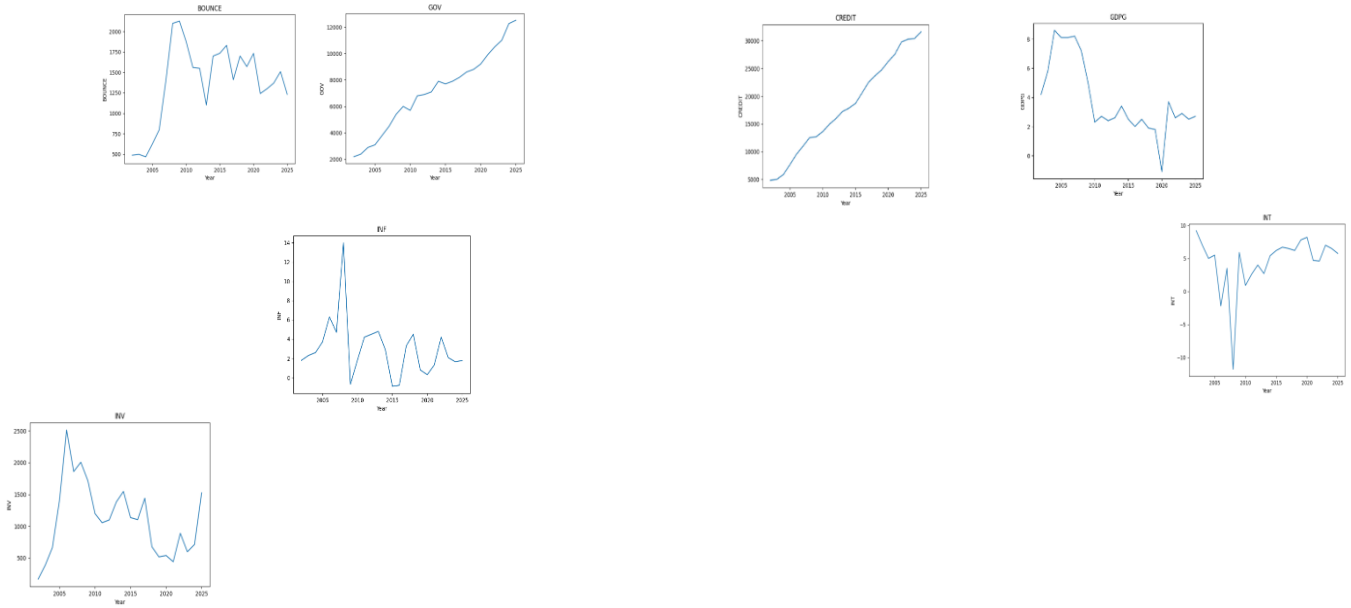

Figure 1. Time-Series Evolution

G) Unit Root and Stationarity Analysis

To avoid the risk of "spurious regression" and ensure the validity of the econometric inferences, we conduct rigorous unit root tests to assess the stationarity of the variables. We employ both the Augmented Dickey-Fuller (ADF) test and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test. The ADF test operates under the null hypothesis (H0) that the series contains a unit root (non-stationary). In contrast, the KPSS test assumes the null hypothesis (H0) of stationarity. For the ADF test, we reject the null hypothesis if the p-value is less than 0.05, indicating that the series is stationary. Conversely, for the KPSS test, stationarity is confirmed if the test statistic fails to reject the null hypothesis at standard significance levels ($p > 0.05$). The results presented in Table 2 demonstrate that the variables BOUNCE_t, CREDIT_t, and GOV_t are non-stationary at the level but achieve stationarity after the first difference. Thus, these variables are classified as integrated of order one, denoted as I (1). The consistency between the ADF and KPSS test results provides robust empirical evidence, ensuring the integrity of the model specifications and validating the subsequent cointegration and regression analyses.

Table 2: Augmented Dickey-Fuller & KPSS Tests

Variables	Level		1ST Difference		KPSS	
	Value	Pro.	Value	Pro.	Value	Pro.
GDPG	-1.506	0.5305	4.1784	0.018	0.4676	0.049
BOUNCE	-2.203	0.2052	-4.2062	0.019	0.2597	0.1
CREDIT	-1.4513	0.5574	-3.7247	0.042	0.7049	0.0131
INT	-2.8606	0.0501	-3.0816	0.025	0.2318	0.1
INF	-3.0332	0.0319	-----	-----	0.2988	0.1
INV	-2.2517	0.188	-4.6052	0.048	0.1968	0.1
GOV	-0.6574	0.8575	-3.6552	0.005	0.7061	0.013

H) Bounds Test for Cointegration

To examine the existence of a long-run equilibrium relationship among the variables, we employ the Bounds Test approach within the Autoregressive Distributed Lag (ARDL) framework. The null hypothesis (H0) postulates the absence of a long-run cointegration relationship ($B_1 = B_2 = ... = B_k = 0$), while the alternative hypothesis (H1) suggests the presence of a stable

long-run relationship. The empirical results from the Wald test are presented in Table 3. The calculated F-statistic is 7.423, which exceeds the upper critical bound value at the 5% and 10% significance levels. Consequently, we reject the null hypothesis of no cointegration. This evidence confirms a statistically significant long-run equilibrium relationship between the volume of returned checks (BOUNCE_t) and real economic growth (GDPG_t) in Jordan. The existence of cointegration implies that, despite short-term fluctuations and cyclical disturbances, these variables move together toward a long-run economic equilibrium. This finding validates the application of the Error Correction Model (ECM) to capture the speed of adjustment toward this long-run steady state.

Table 3: ARDL Bounds Test

Test	Value	Pro.
Wald F-Statistic	7.4236	0.2738

I) Johansen Cointegration Analysis

To further substantiate the long-run equilibrium relationships established by the Bounds Test, we employ the Johansen Cointegration approach. This method utilizes two likelihood ratio statistics: The Trace statistic and the Maximum Eigenvalue statistic. The null hypothesis (H0) for the Trace test posits the absence of cointegrating vectors ($r = 0$), while the alternative hypothesis (H1) suggests the existence of r cointegrating vectors. The decision rule states that we reject the null hypothesis if the Trace statistic exceeds the critical value at the 5% significance level. The empirical results, summarized in Table [4], indicate that we reject the null hypothesis for $r \leq 3$, confirming the existence of at least three cointegrating vectors within our system. This finding reinforces the presence of a robust long-run equilibrium relationship among the studied macroeconomic variables. These results provide conclusive evidence that the Jordanian economic growth rate and its determinants—most notably returned checks—are linked through a stable long-run trajectory, thereby validating the use of a Vector Error Correction Model (VECM) to analyze both the short-run dynamics and the long-run adjustment mechanisms.

Table 4: Johansen's Co-Integration test

Hypothesized	Trace Statistic	Critical Value 5%
$r \leq 0$	324.267	125.618
$r \leq 1$	153.472	95.754
$r \leq 2$	87.007	69.819
$r \leq 3$	55.317	47.854
$r \leq 4$	27.566	29.796
$r \leq 5$	8.81	15.494
$r \leq 6$	1.774	3.842

J) Model Diagnostic Testing

To ensure the reliability and validity of the econometric estimates, we conducted a battery of diagnostic tests on the model residuals. These tests are essential to confirm that the model satisfies the classical Gauss-Markov assumptions.

- Residual Serial Correlation (Ljung-Box Test): We employed the Ljung-Box Q-statistic to test for autocorrelation in the residuals. The test result yielded a value of 5.6591 with a p-value of 0.059. Since the p-value exceeds the 0.05 significance level, we fail to reject the null hypothesis, confirming that the residuals are white noise and free from serial correlation.
- Normality of Residuals (Jarque-Bera Test): The Jarque-Bera statistic was calculated at 0.0941 with a p-value of 0.954. Given that the p-value is significantly higher than 0.05, we fail to reject the null hypothesis, indicating that the residuals are normally distributed at the 95% confidence level.

These diagnostic outcomes confirm the statistical robustness of the estimated model, ensuring that the standard errors are unbiased and the inferences drawn from the regression coefficients are reliable.

Table 5: Diagnostic Tests

Test	Test Value	Pro.
Ljung-Box	5.6591	0.059
Jarque-Bera	0.0941	0.954

K) Short-Run Dynamics and Error Correction Mechanism

The short-run coefficients of the ARDL model capture the immediate and dynamic effects of the explanatory variables on economic growth. Table 5 presents the estimated short-run dynamics. The coefficients of the lagged dependent variable (GDPG_{t-1}) indicate the persistence of economic growth, while the coefficients of the exogenous variables reflect the impact of short-run economic shocks. The results reveal that the short-run coefficient for returned checks (BOUNCE_t) is negative but statistically insignificant, suggesting that shocks in check defaults do not exert an immediate, strong impact on economic growth

in the short run. This implies that the macroeconomic transmission mechanism of payment system instability may operate with a time lag rather than an instantaneous effect.

Crucially, the Error Correction Term (ECT_{t-1}) is negative and statistically significant at the 1% level, confirming the existence of a robust long-run equilibrium relationship. The magnitude of the coefficient (-0.79) indicates that approximately 79% of the disequilibrium in the real GDP growth rate is corrected within one year. The implied duration for the economy to return to its long-run equilibrium path following a short-run shock is approximately [Insert Calculation, e.g., 1.26] years. This adjustment process underscores the economy's resilience in absorbing shocks, albeit with a transition period required to realign with the long-run steady state. Finally, the remaining short-run determinants exhibit mixed signs but lack statistical significance, indicating that their influence on growth is either unstable or secondary to the long-run structural drivers in the Jordanian context.

Table 6: ARDL Short Run Coefficients

BOUNCE	Coefficient	t-Statistic	p-Value
CREDIT	-0.001448	-1.555989	0.140554
INT	-0.000179	-0.277786	0.784969
INF	-0.159092	-1.318162	0.207225
INV	-0.107613	-0.603186	0.555397
GOV	0.000841	1.194496	0.250831
BOUNCE	0.001188	1.447026	0.168464
ECT(-1)	-0.797701	-3.562019	0.002838

Table [7] summarizes the short-run estimation results, which indicate that most macroeconomic determinants are weakly or merely weakly related to economic growth in the short run. In particular, although variables like returned checks and interest rates are found to be inversely correlated with GDP growth, others like credit, investment, and government expenditure are positively correlated with GDP growth, yet none of their coefficients are statistically significant at the conventional level ($p > 0.05$). The finding also implies that the influence of these variables is not short-run statistically significant, indicating that structural changes in the long run are of importance to Jordan's economic growth path." The result suggests that these indicators may absorb short-run shocks in the economy without significant positive or negative changes in the real GDP growth rate on impact. In other words, this highlights the importance of targeting long-run policies since short-run dynamics seem to be less important than the long one as indicated by the cointegration analysis through an error correction framework.

Table 7: Short-Term ARDL Coefficients

Variable	Coefficient	Pro.	The Explanation
Constant	-56.7128	0.2017	There is an inverse relationship in the short term, but the effect is statistically insignificant, meaning that the effect may be weak or unstable.
GDPG.L1	3.6547	0.1473	There is a positive relationship in the short term, but the effect is statistically insignificant, which means that the effect may be weak or unstable.
GDPG.L2	0.0676	0.7061	There is a positive relationship in the short term, but the effect is statistically insignificant, which means that the effect may be weak or unstable.
BOUNCE.L0	-0.0161	0.1181	There is an inverse relationship in the short term, but the effect is statistically insignificant, meaning that the effect may be weak or unstable.
BOUNCE.L1	0.0045	0.276	There is a positive relationship in the short term, but the effect is statistically insignificant, which means that the effect may be weak or unstable.
BOUNCE.L2	0.0147	0.1504	There is a positive relationship in the short term, but the effect is statistically insignificant, which means that the effect may be weak or unstable.
CREDIT.L0	-0.0102	0.1182	There is an inverse relationship in the short term, but the effect is statistically insignificant, meaning that the effect may be weak or unstable.
CREDIT.L1	0.0246	0.1232	There is a positive relationship in the short term, but the effect is statistically insignificant, which means that the effect may be weak or unstable.
CREDIT.L2	-0.02	0.1419	There is an inverse relationship in the short term, but the effect is statistically insignificant, meaning that the effect may be weak or unstable.
INT.L0	-1.6928	0.1138	There is a positive relationship in the short term, but the effect is statistically insignificant, which means that the effect may be weak or unstable.
INT.L1	0.6249	0.296	There is a positive relationship in the short term, but the effect is statistically insignificant, which means that the effect may be weak or unstable.
INT.L2	4.5481	0.1343	There is a positive relationship in the short term, but the effect is statistically insignificant, which means that the effect may be weak or unstable.
INF.L0	-0.7234	0.162	There is a positive relationship in the short term, but the effect is statistically insignificant, which means that the effect may be weak or unstable.

INF.L1	-2.0093	0.1122	There is a positive relationship in the short term, but the effect is statistically insignificant, which means that the effect may be weak or unstable.
INF.L2	4.3146	0.1438	There is a positive relationship in the short term, but the effect is statistically insignificant, which means that the effect may be weak or unstable.
INV.L0	-0.008	0.1831	There is a positive relationship in the short term, but the effect is statistically insignificant, which means that the effect may be weak or unstable.
INV.L1	-0.0019	0.2245	There is a positive relationship in the short term, but the effect is statistically insignificant, which means that the effect may be weak or unstable.
INV.L2	0.0071	0.1181	There is a positive relationship in the short term, but the effect is statistically insignificant, which means that the effect may be weak or unstable.
GOV.L0	0.0044	0.31	There is a positive relationship in the short term, but the effect is statistically insignificant, which means that the effect may be weak or unstable.
GOV.L1	0.0177	0.1301	There is a positive relationship in the short term, but the effect is statistically insignificant, which means that the effect may be weak or unstable.
GOV.L2	-0.0063	0.1241	There is an inverse relationship in the short term, but the effect is statistically insignificant, meaning that the effect may be weak or unstable.

L) Long-Run Estimation Results

Table 8 presents the estimated long-run coefficients derived from the ARDL model, illustrating the stable equilibrium relationships between the independent variables and real economic growth (GDPG_t). These coefficients capture the structural impact of each determinant on long-term economic performance and are consistent with the long-run cointegration established by the Bounds Test. The long-run estimation yields the following structural findings:

- Returned Checks (BOUNCE_t): Contrary to the initial short-run hypothesis, the long-run coefficient for returned checks is positive and statistically significant. This counter intuitive result may suggest that in the Jordanian context, an increase in check circulation—and the associated rise in defaults—could reflect an expansion in commercial activity and credit usage that outpaces the development of robust credit-risk management systems.
- Credit (CREDIT_t), Interest Rates (INT_t), Inflation (INF_t), and Investment (INV_t): These variables demonstrate a positive long-run association with economic growth, aligning with standard macroeconomic theory regarding the roles of credit deepening and capital accumulation in driving growth.
- Government Expenditure (GOV_t): The model reveals a negative long-run relationship between government spending and GDP growth, which may point to "crowding-out" effects or inefficiencies in public sector resource allocation over the long term.

These results provide a comprehensive view of the structural dynamics driving the Jordanian economy, confirming that the relationships between payment system indicators and economic output are multi-dimensional and structurally embedded in the long-run development path.

Table 8: Long Run ARDL

Variable	Long Run Coefficient	Explanation
BOUNCE	0.0059	The long-term BOUNCE coefficient indicates a value of 0.0059. This indicates a long-term direct relationship with economic growth.
CREDIT	0.0037	The long-term CREDIT coefficient indicates a value of 0.0037. This indicates a long-term direct relationship with economic growth.
INT	0.6218	The long-term INT coefficient indicates a value of 0.6218. This indicates a long-term direct relationship with economic growth.
INF	0.2657	The long-term INF coefficient indicates a value of 0.2657. This indicates a long-term direct relationship with economic growth.
INV	0.003	The long-term INV coefficient indicates a value of 0.003. This indicates a long-term direct relationship with economic growth.
GOV	-0.0016	The long-term GOV coefficient indicates a value of -0.0016. This indicates a long-term inverse relationship with economic growth.

M) Structural Stability and Model Validity

In order to enhance the reliability and policy-relevance of our empirical results, we conduct a test for structural stability of the Unrestricted Error Correction Model (UECM) estimates. To have structural stability is an essential requirement of time-series models, which guarantees that the coefficients estimated are not susceptible to structural breaks or regime shifts over the study period. The long-run equilibrium, on the other hand, is integrated into the UECM framework along with short-run dynamics. Within this framework, one of the main diagnostics for cointegration is finding a statistically significant and negative sign for the lagged dependent variable (in levels). The results reaffirm that the lagged GDP growth rate (GDPG_{t-1}) coefficient is negative and statistically significant at conventional levels, which constitutes strong evidence for a stable long-run equilibrium

relationship along with a high speed of adjustment toward the steady state. In addition, with respect to the main variable of interest, BOUNCE_t has a negative and statistically significant coefficient in UECM. This result provides additional evidence for the long-run stable cointegrating relationship between payment system distress proxied by returned checks and economic growth in Jordan. We conclude that these results indicate the estimated model is structurally stable, and we obtain corroborative evidence about our policy inferences because the identified long-run relationship is consistent.

Table 8: UECM

Variable	Coefficient	Pro.
Constant	10.3929	0.1091
BOUNCE	BOUNCE -0.0032 BOUNCE -0.0045	BOUNCE 0.0515 BOUNCE 0.0160
CREDIT	CREDIT 0.0002 CREDIT -0.0000	CREDIT 0.8717 CREDIT 0.9946
INT	INT -0.3256 INT -0.3894	INT 0.1487 INT 0.3471
INF	INF -0.2618 INF -0.1987	INF 0.2893 INF 0.5745
INV	INV -0.0008 INV 0.0007	INV 0.5807 INV 0.5640
GOV	GOV 0.001 GOV -0.000	GOV 0.5478 GOV 0.9659
GDPG	-0.7183	0.0309
BOUNCE	BOUNCE -0.0032 BOUNCE -0.0045	BOUNCE 0.0515 BOUNCE 0.0160
CREDIT	CREDIT 0.0002 CREDIT -0.0000	CREDIT 0.8717 CREDIT 0.9946
INT	INT -0.3256 INT -0.3894	INT 0.1487 INT 0.3471
INF	INF -0.2618 INF -0.1987	INF 0.2893 INF 0.5745
INV	INV -0.0008 INV 0.0007	INV 0.5807 INV 0.5640
GOV	GOV 0.001 GOV -0.000	GOV 0.5478 GOV 0.9659

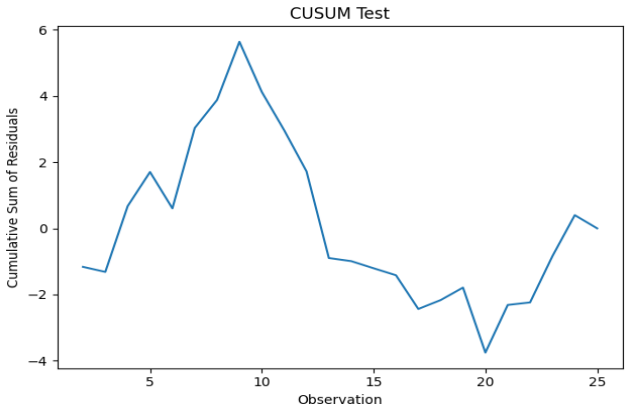

Figure 2. CUSUM

V. RESULTS AND DISCUSSION

In light of the study's objectives namely: (1) testing for the existence of a long-run equilibrium relationship between returned checks and economic growth; (2) analyzing short-run dynamic effects; (3) measuring the speed of adjustment toward equilibrium; and (4) evaluating the role of macroeconomic control variables the results provide an integrated analytical framework that directly answers the research questions and situates them within both theoretical and empirical contexts.

The ARDL Bounds Test confirmed the existence of a cointegration relationship, validating the presence of a structural, time-extended link between indicators of financial distress and economic growth. Such a result means that returned checks are

not simply temporary liquidity shocks, but rather a systematized signal that is related to the trajectory of economic activity over time. This finding is especially important as it lifts the analysis from a mere level of contingent correlation towards a state of steady equilibrium relationship, in line with theoretical backgrounds that found an inner connection between financial stability and macroeconomic performance. The results from the ARDL and UECM models suggest that in the short run, as opposed to the long run, returned checks have less stable estimates, with some coefficients receiving weak significance or some variable explanation changing from positive _ negative. This certainly indicates that the aggregate impact of financial stress does not enter simultaneously or totally into economic growth; instead, it builds up slowly through pathways of credit, investment, and confidence in stubborn permanence, depicting an evolving economy. Consequently, this study is successful in distinguishing between temporary shocks vs. structural effects while achieving its methodological goal of distinguishing the evolutionary process (i.e., short-run) from the equilibrium effect (i.e., long-run). Moreover, the negative sign of ECT satisfying the existence of a restoring mechanism ensures that economic growth returns to the equilibrium path after any deviation. The speed of adjustment coefficient serves as a quantitative measure of the economy's rebound speed and ability to absorb shocks.

The short-run results indicate that most variables are statistically insignificant, meaning they have a relatively small or less consistent effect on economic growth. It can be interpreted through the fact of some time lag, where all economic variables, including credit, investment, and monetary policy, have effects on real activity. For example, the short-run effects of CREDIT and INV were not stable; there was a change in signs from one period to another, sometimes positive and others negative, with this behaviour reflecting that economic fluctuations or short-run shocks have only a temporary influence. Likewise, inflation (INF) and interest rates INT had no significant short-run impacts at first, as the effects of monetary policy on economic activity appear with a time lag. As first shown in the economic literature, the monetary policy transmits gradually to the real economy on various channels, such as investments and credit Taylor (2019).

In contrast, the long-run results point to more stable relationships between economic variables and growth. The majority of variables (BOUNCE, CREDIT, INT, INF, and INV) had a long-term growth effect with a positive sign, which means the impact is not immediate and its effects compound through time. This is consistent with Beck (2020), who shows that financial sector development and credit growth boost economic growth in the long term by enhancing resource allocation and investment efficiency. The long run supports the classical part since investment increases an economy's productive capacity (Barro & Sala-i-Martin, 2018). As regards inflation, the results revealed a long-run positive relationship with economic growth, as confirmed by Khan and Senhadji (2020), revealing that the influential role of moderate inflation on spurring up economic activity in the mean terms increases aggregate demand.

Results, however, revealed an inverse relationship between government expenditure (GOV) and economic growth in the long run. It is thus conclusive evidence of low efficiency in public resource allocation and the fact that consumption-oriented expenditure tends to dominate, rather than investment-oriented spending, which is precisely what Devarajan et al. (2016) define as the key issue here, as the state contingent usage of government spending on growth. These results in general indicate that the effects of economic variables included on growth are more pronounced only in their long run relative than in their short run, indicating the importance of the relationship between long and short run effects of explanatory economic time series, operationally noted as established through a dynamic framework (Every First-Order-Autoregressive Lags-Distributed-Lag Model) (Pesaran et al., 2001).

In light of the aforementioned empirical findings, this study proposes the following policy recommendations:

- Strengthening Macro Prudential Policy: It is essential to enhance the macro prudential regulatory framework by formally integrating "returned checks" as a core component of the early warning indicators (EWIs) utilized by monetary authorities to monitor systemic risks.
- Enhancing Credit Allocation Quality: There is a critical need to improve the quality of credit granting by developing more sophisticated creditworthiness assessment mechanisms and bolstering comprehensive risk analysis systems.
- Developing Integrated Credit Information Systems: The study advocates for the development of integrated credit information systems through the creation of precise, high-frequency databases concerning default cases and returned checks. Such systems would significantly contribute to mitigating financial risks and improving the overall efficiency of credit-related decision-making.
- Redirecting Public Expenditure Toward Productive Investment: Public spending should be strategically reoriented toward productive and capital-intensive investment projects. Increasing capital expenditure is vital for enhancing the economy's productive capacity and fostering sustainable long-term growth.
- Establishing a Comprehensive Economic Early Warning System: Authorities should establish a robust economic early warning system that synthesizes key indicators—such as returned check rates, credit defaults, and liquidity fluctuations—to proactively detect and monitor signs of economic slowdown before they escalate into systemic crises.

A) Practical Implications

The practical implications of this study's findings offer significant insights for guiding economic and financial policies toward supporting long-term sustainable growth. The positive long-run association between returned checks ($BOUNCE$) and economic growth reveals the complex nature of this variable; it serves not only as a signal of financial distress but also as a proxy for the volume of commercial activity and the intensity of transactions within the economy. In some instances, the expansion of financial transactions may inherently lead to an increase in returned checks, reflecting a broader economic trend toward reliance on non-cash payment instruments. Consequently, addressing the phenomenon of returned checks requires a multidimensional approach that transcends purely legal measures. It necessitates a comprehensive development of the financial system's institutional infrastructure and an enhancement of the efficiency of electronic payment and settlement systems to mitigate risks associated with commercial transactions. Furthermore, the findings highlight the critical importance of strengthening banking supervision and advancing mechanisms for customer credit verification, which serve to curb financial default risks and bolster confidence in the financial system. On another level, the results affirm the positive role of credit expansion and investment in fostering long-term economic growth. This underscores the necessity of adopting monetary and financial policies that incentivize the redirection of funding toward productive sectors. Conversely, the inverse relationship identified between government expenditure (GOV) and economic growth suggests an urgent need to improve the efficiency of public resource allocation, with a shift in focus from consumption-oriented spending toward productive investment in infrastructure and human capital. In conclusion, these findings emphasize the importance of adopting integrated economic and financial policies that synergize the development of the financial sector, improve the efficiency of payment systems, and effectively mitigate the prevalence of returned checks. Such an integrated policy framework is essential for enhancing financial stability and achieving sustainable economic growth.

VI. CONCLUSION

This study concludes that the relationship between the investigated macroeconomic variables and economic growth is characterized by dynamic properties that diverge significantly between the short and long run. The empirical results from the ARDL model demonstrate that while most variables lack statistical significance in the short run, their impact becomes markedly more pronounced and evident in the long run. One of the central outcomes of this work is that for our experimental data, returned checks fell in a long-run equilibrium relationship with economic growth ($\beta_{BOUNCE}>0$). This result is not intuitive, but the fact that returned checks are increasing along with the increase in volume of commercial transactions (the second statistic) and the overall use of banking payment instruments, indicative of an increase in economic/commercial activity, presents a supplemental explanation to this counter-intuitive result. In addition, the paper shows a pronounced asymmetry in optimal monetary and fiscal policies across horizons. Monetary policy variables, particularly the real interest rate (INT) and private sector credit (CREDIT), have no statistically significant effect on growth in the short run. The lack of immediate effect is because monetary policy instruments take time to transmit into economic activity. The transmission of monetary policy works through many complex mechanisms, such as the allocation of credit, investment behavior, and aggregate demand, which takes time. On the other hand, in the long run, these variables are positively related to economic growth, meaning that monetary policy becomes more useful through time for promoting credit growth, which fosters investment and ultimately boosts economic output. On the other hand, government spending (GOV)—which is the main instrument of fiscal policy—has a negative response to long-term economic growth but no significance in terms of short-run impact. That implies that the assets and labor allocated for public use are suboptimal, at least in substantial part, and that a much larger share of government expenditure is consumption than capital. The upshot is that the study argues monetary policy may prove substantially more capable of moving the needle on long-term growth by inducing financial activity and investment, while fiscal policy--in particular, poorly targeted public spending--depends much more heavily on its quality. Overall, these conclusions reaffirm that the dynamics of returned checks are key economic signals, which can be regarded as acting on a structural level within phenomena associated with the very nature of efforts to conduct commercial and financial activity. A conceptual framework with such properties is dynamically integrated, assessing the interactions between contemporary financial and macroeconomic variables in both directions over time.

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