Review MECAS V° 22/ N°1 / June 2026

The Dynamics of the Algerian Balance of Payments and Net Demand: An Empirical Analysis (1990–2024)

OKBI Lakhdar [1]
Laboratory for the Development of Algerian Economic Enterprises
Professor / Ibn Khaldoun University of Tiaret (Algeria)
E-mail : lakhdar.okbi@univ-tiaret.dz

CHEDAD Mohamed
Laboratory for the Development of Algerian Economic Enterprises MCA
/ Ibn Khaldoun University of Tiaret (Algeria)
E-mail : chedad.mohamed@univ-tiaret.dz

Received date: 30.03.2026, Accepted date : 02.05.2026, Publication date: 02.06.2026

Abstract :

This article examines how net demand (FD) affects Algeria's balance of payments (BOP) from 1990 to 2024, testing the empirical relevance of Keynesian theory in a developing-country. Employing an Error Correction Model (ECM), it identifies both long-run and short-run dynamics between the variables and measures the velocity at which the system reverts to equilibrium following exogenous shocks. The empirical findings point to a significant long-run equilibrium, with FD accounting for about 94% of long-term fluctuations and 93 % of short-term variation in the BOP.

The estimated error correction term (ECT) implies a convergence speed of 59.164 % per year, which suggests that deviations from equilibrium tend to be corrected in roughly 1.69 years. Standard diagnostic checks and stability tests support the reliability of these estimates. On this basis, the study recommends incorporating demand-side factors into macroeconomic policy design and implementing high-frequency monitoring of external balances using dynamic modelling techniques

Keywords: Net Demand, Balance of Payments, Error Correction Model (ECM), Algeria, Cointegration.

Jel Classification Codes: F32, E12, F41, C32, O55

Introduction :

Understanding the nexus between aggregate demand (AD) and the BOP remains a central imperative in macroeconomics, particularly for developing nations grappling with multifaceted challenges related to financial stability and

[1]Corresponding Author.

sustainable growth. Keynesian theory has demonstrated that effective AD plays a pivotal role in determining levels of national output and income. Consequently, it exerts a profound influence on the BOP by modulating import volumes, export performance, and domestic investment patterns.

In the context of the Algeria, the examination of this nexus assumes particular significance given the macroeconomic volatility characterizing the national economy over recent decades. These fluctuations are primarily driven by exogenous shocks to oil prices, inflationary pressures, and the evolving trajectories of fiscal and monetary policy. Thus, comprehending the dynamics governing the nexus between FD and the BOP facilitates a more efficacious orientation of economic policy. Furthermore, it empowers policymakers to rigorously evaluate the repercussions of AD fluctuations on the nation's external and financial stability.

This study aims to quantify the responsiveness of the Algeria s BOP to fluctuations in FD over the period 1990 2024. Employing annual time-series data sourced from official statistics, it constructs a rigorous and empirically robust depiction of Algeria s macroeconomic performance. To analyse these data, the study applies an ECM, enabling the simultaneous estimation of both long-run cointegrating relationships and short-run dynamics. This methodology clarifies the precise mechanism through which the Algerian economy adjusts to deviations from its long-term equilibrium trajectory. The study also aims to examine the applicability of Keynesian theory on full employment and economic equilibrium within the context of a developing economy, specifically Algeria, and to provide practical policy recommendations that may enhance economic stability, improve AD policies, thereby supporting the BOP and mitigating the impact of economic shocks in both the short and long term.

Within this framework, the study addresses several key areas, including: identifying the primary economic variables; examining the stability of the time series; testing for cointegration; estimating both long- and short-run relationships using an ECM; and analysing the model results to provide economic recommendations based on the derived findings.

1. The Theoretical Underpinnings of the Nexus Between FD and the BOP :

Keynesian theory is one of the foundational pillars of macroeconomics, emphasizing the crucial role of AD in determining the levels of output, national income, and employment (Keynes, 1936, p. 72) According to Keynes, the economy does not always automatically attain full employment, and it may experience short- and long-term imbalances resulting from fluctuations in AD or economic shocks (Blinder, 1998, pp. 45-46; Mankiw, 2019, p. 334). Effective AD represents the total volume of demand for goods and services and constitutes a key indicator for understanding the dynamics of the economy. It can be expressed by the following relationship:

$$FD = C + I - Y \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(Erreur ! Signet non défini.)}$$

Given that:

- FD: Effective Net Demand ;

- C: Consumer demand;
- I : Investment demand;
- Y: Gross Domestic Product (GDP).

According to Keynesian theory, an increase in net demand leads to higher output and income, whereas a decline may induce a temporary economic recession (Keynes, 1936, p. 90; Mankiw, 2019, pp. 335-336). Changes in AD also directly affect the BOP, by influencing imports and exports (Paul Robin & Maurice, 2018, pp. 212-214). This analysis enables a deeper understanding of the relationship between fiscal and monetary policies and the stability of both the domestic and external economy.

From an analytical perspective, the impact of FD on the BOP can be studied through:

- **Long run:** Identifying the equilibrium relationship between the variables in the absence of temporary shocks, i.e., when the economy achieves full equilibrium;
- **Short run:** Measuring the dynamic response of economic variables to temporary shocks or rapid changes in AD.

In modern economic studies, tools such as ECM are employed to link short-run and long-run relationships and to verify the existence of co-integration among economic variables. This ensures a comprehensive understanding of how the economic system returns to equilibrium following any deviation. (Gujarati & Porter, 2009, pp. 621-623; Johansen, 1991, pp. 231-233; Engle & Granger, 1987, pp. 255-256)

2. Applying Keynesian Theory to the Algerian Economy

The study of the relationship between FD and the BOP acquires particular significance when applied to the Algerian economy, given the characteristics of a developing country heavily dependent on natural resources and oil price fluctuations (World Bank, 2021, pp. 45-46; International Monetary Fund [IMF], 2020, pp. 12-13) in addition to the structural and fiscal challenges the economy has faced since the early 1990s.

In Algeria, the BOP serves as a key indicator of economic health and external stability, acting as a mirror of the economy under study by reflecting the equilibrium between imports, exports, and capital flows. In this context:

- A decline in domestic FD may reduce local production and increase the BOP deficit ;
- An increase in investment and consumer demand can enhance domestic output and improve external financial stability.

This theoretical framework provides an understanding of how Keynesian theory can be applied to a low-growth Algerian economy and clarifies the role of economic policies in managing AD and achieving balance in the BOP. It also establishes the rationale for employing an ECM model in the empirical section of the study.

3. METHODOLOGY

3.1. The ECM

The ECM is one of the most important tools in econometrics for analysing dynamic relationships among economic variables, particularly when time series are non-stationary but integrated of the same order (I(1)) and exhibit long-run co-

integration. (Gujarati & Porter, 2009, pp. 621-623; Johansen, 1991, pp. 231-233; Engle & Granger, 1987, pp. 255-257). The ECM allows for the linkage between long-run relationships and short-run dynamics, describing how the economy adjusts to deviations from long-term equilibrium through the adjustment coefficient, which must be negative and statistically significant to ensure the system returns to equilibrium. The general formula of the model is:

$$\Delta Y_t = \alpha + \beta \Delta X_t + \gamma ECT_{t-1} + \varepsilon_t \dots\dots\dots\dots\dots (2)$$

Given that :

- ΔY_t and ΔX_t represent the short-run changes in the variables;
- ECT_{t-1} is the error correction term, usually calculated as the deviation from the long-run equilibrium relationship:

$$ECT_{t-1} = Y_{t-1} - \theta X_{t-1} \dots\dots\dots\dots\dots\dots\dots\dots (3)$$

Given that :

- γ represents the speed of adjustment of deviations from the long-run equilibrium, and its value must be negative to ensure the system returns to equilibrium;
- ε_t denotes the stochastic error term.

Using this model, it is possible to examine:

- The long-run impact of FD on the BOP (captured by the coefficient θ) ;
- The short-run effects of shocks or changes in the variables (captured by the coefficients β).

The ECM thus allows for the interpretation of the dynamics between Algeria s BOP and FD, providing the theoretical foundation for the empirical application conducted in the practical part of this study.

3.2. Estimating the Dynamic Relationship between FD and Algeria's BOP over the Period 1990–2024

Following the review of the theoretical framework and the relationship between FD and the BOP under Keynesian theory, this section applies the analysis to the Algerian economy over the period 1990 2024. The empirical investigation aims to quantify the impact of FD on the BOP using established econometric techniques, with particular emphasis on both short-run dynamics and long-run equilibrium relationships between the variables. This section will adresse the following:

- Presentation of the data and variables used in the study, including their sources and annual nature;
- Examination of time series stability to ensure the validity of the applied economic models;
- Determination of the optimal lag length and analysis of co-integration between the variables;
- Estimation of the ECM to study the dynamic relationship between FD and the BOP in both the short and long run;

- Verification of model validity and residual stability using appropriate statistical tests.

This empirical analysis aims to provide a precise and coherent economic assessment, linking theory with practice, and supporting the formulation of practical recommendations to enhance economic stability in Algeria.

3.2.1. Data and Variables

This study utilizes annual data from 1990 to 2024 to examine the nexus between FD and Algeria s BOP. To ensure the accuracy and reliability of the analysis, the data were obtained from official and authoritative sources, including the World Bank (Bank, 2025) and the Bank of Algeria (Algeria, 2025). The empirical model consists of two main variables:

3.2.1.1. *BOP*: This serves as the dependent variable in the study, reflecting Algeria s external economic position by measuring the difference between exports and imports, as well as capital flows;

3.2.1.2. FD*:* This serves as the independent variable and is calculated according to the previously defined relationship (**Erreur ! Signet non défini.**):$FD = C + I - Y$

These variables form the basis for the ECM used to analyse the relationship between the BOP and FD in both the long and short run. Prior to estimation, the data were checked for homogeneity and temporal consistency to ensure the validity of the results and the reliability of the economic conclusions.

3.2.2. Stationarity Analysis

Before estimating any economic model, it is imperative to ensure the stationarity of the original time series for the variables used, as employing a non-stationary variable may lead to misleading results or what is known as spurious regression. Accordingly, a stationarity analysis was conducted separately for the BOP and FD using standard econometric unit root tests, such as the Augmented Dickey-Fuller (ADF) test, to verify the absence of a unit root.

Table 1. Output of Augmented Dickey-Fuller (ADF) Test

	Model	Variable	*t*-statistic	Critical Value	*p*-value
At Level	Model (1)	BOP	-2.24	-3.55	0.4504*
		FD	-2.97	-3.55	0.1552*
	Model (2)	BOP	-2.18	-2.95	0.2144*
		FD	-2.41	-2.95	0.1464*
	Model (3)	BOP	-2.22	-1.95	0.0273**
		FD	-2.39	-1.95	0.0183**
1st Differencing	Model (1)	DBOP	-5.16	-3.55	0.0011***
		DFD	-5.17	-3.55	0.0011***
	Model (2)	DBOP	-5.25	-2.95	0.0001***
		DFD	-5.30	-2.96	0.0001***
	Model (3)	DBOP	-5.34	-1.95	0.0000***
		DFD	-5.39	-1.95	0.0000***

(*), (**), (***) denote significance at the 10%, 5%, and 1% levels, respectively

Source: Compiled by authors

The results presented in Table 1 indicate that the original series for both variables were non-stationary, as the unit root null hypothesis could not be rejected. This necessitated the application of first differencing to achieve stationarity. Following this transformation, both BP and FD became stationary, confirming their suitability for the estimation of the ECM and for examining the dynamic relationship between the variables over both the short and long run. These findings highlight the essential role of stationarity analysis as a preliminary step in empirical research, ensuring the validity of economic inferences and the robustness of ECM estimates, which provide a powerful framework for assessing the response of the BOP to fluctuations in effective net demand.

3.2.3. Determining the Optimal Lag Length

To correctly estimate the ECM, it is first essential to determine the optimal lag length, that is, the number of previous periods (lags) to include in the analysis. Selecting the appropriate lag length ensures that the model captures the dynamic relationship between variables without losing important information or introducing noise. The optimal lag length was determined using standard econometric selection criteria, such as the Akaike Information Criterion (AIC) and the Schwarz Criterion (SC), as demonstrated in the following table:

Table 2. Output of the Optimal Lag Length Selection

Lag	Log L	LR	FPE	AIC	SC
0	**-216.45**	**NA***	**123746.7***	**14.56***	**14.65***
1	-216.44	0.015	132263.7	14.62	14.76
2	-216.00	0.767	137396.7	14.66	14.85
3	-215.89	0.18	146016.6	14.72	14.95
4	-215.64	0.39	153892.7	14.77	15.05

(*) denotes the minimum values of the selection criteria

Source: Compiled by authors

Table 2 summarizes the results of the optimal lag length selection for the ECM, based on various information criteria, for the dependent variable ΔBP and the independent variable ΔFD over the period 1990 2024, comprising 30 observations. Lag lengths were evaluated using the indicators LogL, LR, FPE, AIC, and SC. In accordance with standard econometric practice, the optimal lag length is identified as the one that minimizes these criteria, with particular emphasis on AIC and FPE due to their high sensitivity in detecting the most suitable model. As shown in Table 2, the minimum values of the selection criteria occur at a lag length of 0, where both AIC and FPE reach their lowest points relative to higher lag orders. Consequently, the optimal lag length for the model is 0, indicating that short-run interactions between the variables do not require additional lags. This finding simplifies the estimation of dynamic relationships and ensures that the model is appropriately specified for the available data.

3.2.4. Test for Co-integration

After determining the optimal lag length using information criteria, which was found to be 0, a cointegration test between the two variables is conducted using the Johansen Juselius framework at the selected lag order. This test aims to identify the number of long-run equilibrium relationships (cointegrating vectors) between the variables at a 5% significance level (with 95% confidence level). The Johansen test relies on two main statistics:

3.2.4.1. The Trace test, which evaluates whether the number of cointegrating relationships is less than or equal to a given value;

3.2.4.2. The Maximum Eigenvalue (Max Eigenvalue) test, which determines the number of cointegrating relationships based on the largest eigenvalue in the system.

This procedure allows for the verification of cointegration between the study variables; that is, whether the time series move together in the long run according to an equilibrium relationship. Establishing cointegration provides a foundation for estimating the ECM and analysing the relationship between net demand and the BOP over both the short and long run.

Table 3. Results of the Cointegration Test

Test	Test Statistic (Calculated)	5% Critical Tabular Value	*p*-value
Trace Test	20.41	15.4947	0.0068***
Max-Eigen Test	17.42	14.2646	0.015**

(***) ,(**) denote significance at the1% and 5% levels, respectively

Source: Compiled by authors

The results of the Johansen–Juselius cointegration test between the BOP and FD, presented in Table 3, are as follows:

- **Trace Test:** The calculated statistic of 20.41 is greater than the 5 % critical value of 15.4947, with a p-value of 0.0068 ($p < 0.05$). This leads to the rejection of the null hypothesis of no cointegration ($r = 0$), indicating the presence of *at least one cointegrating relationship (r is at least 1)*;

- **Maximum Eigenvalue (Max-Eigen) Test**: The calculated statistic of 17.42 exceeds the 5 % critical value of 14.2646, with a p-value of 0.0154 ($p < 0.05$). This confirms the Trace test result and provides robust evidence for the existence of a stable, long-run equilibrium relationship between the two variables.

Based on these results, it can be concluded that a cointegrating relationship exists between the BOP and the FD over the study period. Given that the time series are of DS type, and are integrated of the same order I(1), the most appropriate model for estimating the relationship between the variables is the ECM. This model enables the analysis of both short-run and long-run dynamics between the variables while maintaining the theoretical constraints of long-term equilibrium. (Regis, 2021, pp. 301-302)

3.2.5. Long-Run Model Estimation

This estimation aims to clarify the long-run relationship between the dependent variable, namely the BOP, and the independent variable, namely FD. The model enables an understanding of how persistent changes in net demand influence the BOP over the long term, while maintaining the theoretical conditions of economic equilibrium.

The estimation of the long-run relationship, as presented in Table 4, is as follows:

Table 4. Long-Run Model Estimation Results

Variable	Coefficient	T-statistic (calculated)	Std. Error	p-value
C	-249.3997	-04.73	52.62	0.0000***
FD	-1.005176	-24.96	00.04	0.0000***
R-squared	0.9497			
Adjusted R-Squared	0.9481			
F-Statistic	5623.09	p-value (0.0000)		

(***) denote significance at the1% level.

Source: Compiled by authors

The results of the long-run model estimation, as reported in Table 4, indicate the existence of a negative and statistically significant relationship between the BOP and FD at the 1% and 5 % significance levels. The estimated coefficient is approximately (−1.005), which is consistent with economic theory, suggesting that an increase in FD typically leads to a deterioration in the external balance. Furthermore, the results show that the constant term (C) is highly statistically significant ($p < 0.01$) with an estimated value of (−249.40), reflecting an underlying structural deficit in the economic system in the absence of changes in FD. Moreover, the value of the coefficient of determination ($R - squared = 0.9497$) indicates that the independent variable (FD) has a high explanatory power, accounting for approximately 94.97 % of the variation in the BOP. Taking degrees of freedom into account, the adjusted coefficient of determination ($adj.R - squared = 0.9481$) confirms that 94.81% of the changes in the BOP are effectively explained by FD, while the remaining 5.19 % is attributable to other factors not included in the model (random disturbances). Finally, the calculated F-

statistic, with a value of 623.09 and a significance level of 0.0000 (<1 % significance level), confirms the overall explanatory power of the model and its strong ability to capture the relationship between the variables under study.

These findings demonstrate that the independent variable (FD) possesses strong explanatory power and jointly contributes to explaining variations in the BOP in the long run, thereby reinforcing the statistical reliability and robustness of the obtained results. Accordingly, the long-run model can be specified as follows:

$$BOP = -249.3997 - 1.005176 * FD + \varepsilon_t \dots\dots\dots\dots\dots (4)$$

3.2.6. Residual Stationarity Analysis

To assess the stability of the residuals obtained from the estimation of the long-run relationship between the BOP and FD, the residual series was analysed using several standard tests, including:

- The Augmented Dickey-Fuller (ADF) test ;
- The Phillips-Perron (PP) test ;
- The KPSS test.

The aim of these tests is to confirm the stationarity of the residuals, a fundamental prerequisite for the structural integrity of the ECM. Specifically, the stationarity of the stochastic error term (εt) implies that any short-term deviations from the long-run equilibrium are transitory and are systematically corrected over time. This reversion to the mean constitutes a necessary condition for the validity and consistency of the ECM estimates. Consequently, the empirical evidence of stationary residuals reinforces the reliability of the model's conclusions, ensuring that the estimated dynamic relationships between the BOP and FD are statistically robust in both the short and long run.

Table 5. Results of Residual Unit Root Tests

Model(p-value)	ADF	PP	KPSS
Intercept and Trend	0.0158**	0.0258**	0.061*
Intercept	0.0073***	0.0079***	0.352
None	0.0004***	0.0004***	-------

(***) ,(**) ,(*)denote significance at the 10%, 5%, and 1% levels, respectively

Source: Compiled by authors

The results of the three stationarity tests (ADF, PP, KPSS), presented in Table 5, indicate that the estimated residual series is stationary at level (0) across all significance levels (1%, 5%, and 10%). This leads to the rejection of the null hypothesis of a unit root and the confirmation of residual stationarity. Such stationarity provides strong evidence that the long-run relationship between the BOP and FD is not spurious, but rather represents a genuine equilibrium relationship, whereby the variables automatically revert to equilibrium following any temporary shock. These results thus align with the theoretical predictions of

economic models and justify proceeding with the estimation of the ECM to analyse the short-run dynamics and the speed of adjustment.

3.2.7. Short-Run Dynamics Estimation

This stage examines the short-run dynamics between the BOP and FD. The model captures the immediate effects of fluctuations in FD on the BOP while accounting for the deviations from the long-run equilibrium, thus integrating the dynamic adjustment process into the analysis.

Table 6. Short-Run ECM Estimation Results

Variable	Coefficient	T-statistic (calculated)	p-value
C	-7.35	-0.16	0.8730
DFD	-0.91	-20.28	0.0000***
Ect(−1)	-0.5916	-3.89	0.0005***
R-squared	0.9314		
Adjusted R-Squared	0.9270		
F-Statistic	210.75	p-value(0.0000)***	

(***) denotes significance at the 1% level

Source: Compiled by authors

The results of the ECM estimation in Table 6 indicate that the error correction coefficient (Ect(−1)) is *negative* and *statistically significant* at the 5% level, confirming the presence of a long-run equilibrium relationship. The model thus functions as an adjustment mechanism, gradually returning the system to equilibrium following any temporary shock in FD. Based on the estimates, the speed of adjustment coefficient is approximately 59.16 %, implying that about 59.16 % of the deviation from long-run equilibrium is corrected in the one year. Consequently, the economy requires roughly 1.69 years —equivalent to 1 year, 8 months, and 9 days—to fully converge back to its long-run equilibrium after a temporary shock caused by changes in FD. Furthermore, the results indicate a high explanatory power of the estimated model. The coefficient of determination, R-squared=0.9314, suggests that variations in FD explain approximately 93.14 % of the short-term fluctuations in the BOP. Whereas the adjusted R-squared (a=0.9270) confirms an excellent goodness of fit, further reinforcing the structural reliability of the model, and underscores the potent dynamic linkage between the two variables. Additionally, the calculated F-statistic (F=210.75; Prob.=0.0000), far exceeds the critical tabular value at the 5 % significance level, thus, the overall model is statistically significant, thereby validating the methodological framework and confirming the reliability of the short-run dynamic estimates.

Based on the econometric estimates presented in Table 6, the short-run functional specification of the model is formulated as follows:

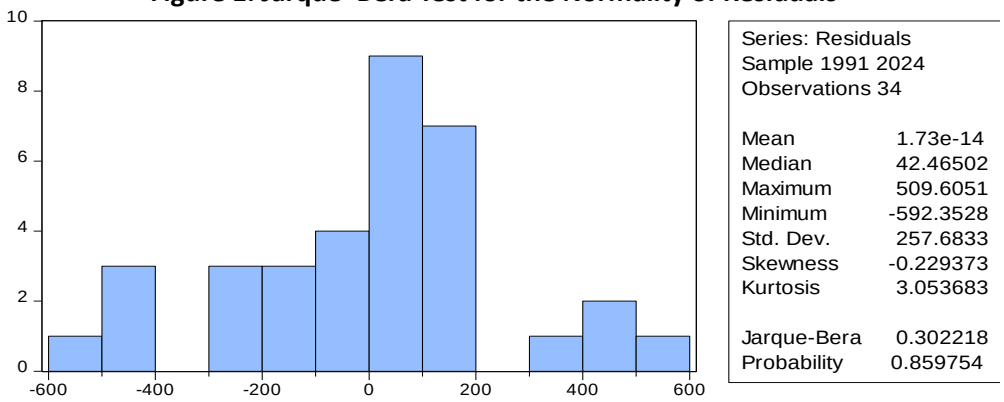
$$DBOP = -7.35 - 0.91 * DFD - 0.59 * \text{Ect}(-1) \dots\dots\dots\dots\dots (5)$$

3.2.8. Normality Test of Residuals

The Jarque-Bera test is employed to assess whether the residuals of the ECM conform to a normal distribution, a prerequisite for ensuring the efficiency of estimated parameters and the validity of statistical tests. The test results presented in Figure 1 indicate that the Jarque-Bera statistic equals 0.3022, with a corresponding p-value of 0.8597, which is substantially higher than the

conventional significance level of 0.05. Consequently, one fail to reject the null hypothesis (H0) and conclude that the residuals are normally distributed, which enhances the reliability of the model.

Figure 1. Jarque–Bera Test for the Normality of Residuals



Source: Compiled by authors

The results presented in Figure 1 indicate that the residuals of the model exhibit characteristics closely approximating a standard normal distribution. The Skewness coefficient is approximately (-0.229), a value very near zero, suggesting a slight negative skew and indicating relative symmetry in the distribution of errors around the conditional mean. This reduces the likelihood of substantial structural bias in the data over the study period. The Kurtosis coefficient is 3.05, which is very close to the theoretical value for a normal distribution (3), ruling out the presence of heavy tails or abnormal dispersion in the residuals. These statistical properties are further corroborated by the Jarque-Bera test (p-value>0.05), which confirms the normality of the residuals, thereby reinforcing the statistical significance of the tests and supporting the validity of the model's estimated coefficients in both the short and long run.

3.2.9. Model Validity Testing

After estimating the ECM and analysing the relationships between variables in both the short and long run, it becomes essential to assess the validity of the model and its compliance with the fundamental assumptions of econometrics. The reliability of the estimation results does not rely solely on the statistical significance of the parameters; it also requires verifying the soundness of the statistical properties of the model's residuals. To this end, a set of diagnostic tests is employed to ensure that the model meets standard assumptions. Key tests include: the autocorrelation test to confirm the independence of residuals, the heteroscedasticity test to check for constant variance and the absence of heteroscedasticity, and the structural stability test, which verifies that the model's coefficients remain stable over time and are not affected by structural changes during the study period. These tests constitute a crucial step in guaranteeing the reliability of the model and the validity of its results, thereby allowing the estimates

to be confidently used in interpreting the relationship between the BOP and FD, and in drawing related economic conclusions.

3.2.9.1. Autocorrelation Test of Residuals. The Breusch-Godfrey test for residual autocorrelation is employed to verify the absence of correlation among the residuals from the model estimation. This is a fundamental requirement for ensuring the validity of the model's statistical inferences.

Table 7. Results of the Godfrey test for Residual Autocorrelation

p-value	LM statistic
0.3385	0.946211

Source: Compiled by authors

The results of the test, presented in Table 7 above, indicate that the LM statistic = 0.9462 with a corresponding p-value = 0.3385, which is greater than the 5% significance level. Accordingly, the null hypothesis of autocorrelation is rejected, indicating that the model's residuals do not exhibit autocorrelation. This finding reinforces the validity of the model and confirms the reliability of the estimated short- and long-term relationships between the BOP and FD.

3.2.9.2. *Test for Homoscedasticity of Residuals.* To assess the validity of the ECM, the White test is applied to verify the constancy of the residual variance across different levels of the independent variables. This test aims to ensure the absence of heteroscedasticity, which is also a fundamental requirement for the validity of the model's statistical inferences.

Table 8. Results of the White Test for Residual Homoscedasticity

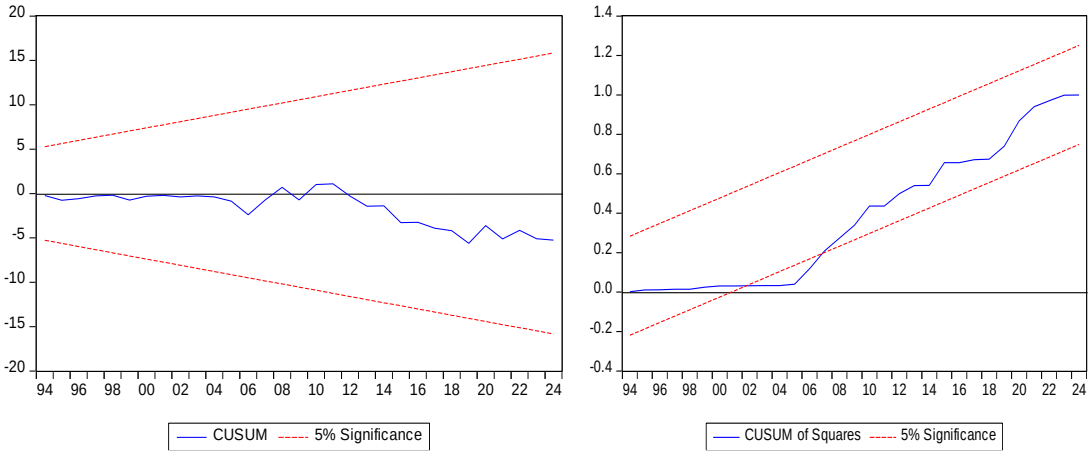
p-value	Calculated F-Statistic
0.1282	1.8883

Source: Compiled by authors

The results of the test, presented in the previous Table, indicate a p-value = 0.1282, which is greater than the 5% significance level. Accordingly, there is no evidence of heteroscedasticity among the model's residuals, meaning that the variance is constant and there is no autocorrelation in the errors. This finding further reinforces the reliability of the model's estimates and the validity of the inferred relationships between the BOP and net FD.

3.2.9.3. Structural Stability Test of the Model. To assess the stability of the coefficients of the ECM over the study period, the CUSUM and CUSUM of Squares tests were employed at a 5 % significance level. The accompanying graphs, presented in Figure 2 below, indicate that the CUSUM and the CUSUM of Squares curves remain within the critical bounds,

Figure2. CUSUM and CUSUM of Squares Tests for Structural Stability of ECM Coefficients



Source: Compiled by authors

This indicates the stability of the coefficients and the absence of structural breaks during the study period, reflecting the model's validity in the estimation process. In other words, the results of the ECM can be relied upon to infer the dynamic relationship between the BOP and FD, both in the short and long term, without concern for the impact of unexpected shocks or structural changes on the coefficients during the analysis period.

Overall, the results of various diagnostic tests show that the estimated model satisfies the fundamental statistical assumptions. The autocorrelation test of residuals revealed no correlation among the residuals, while the homoscedasticity test indicated constant variance of the residuals and no heteroscedasticity issues. Furthermore, structural stability tests confirmed the stability of the model's coefficients throughout the study period and their immunity to structural changes. Accordingly, it can be concluded that the outcomes of these tests were positive and convincing, indicating that the model possesses a high degree of statistical validity and can be relied upon to interpret the relationship between the studied variables and derive the economic conclusions presented in the final section.

CONCLUSION

The current study aimed to assess the validity of Keynes's theory of full employment when applied to the economies of less developed countries, by analysing the response of Algeria's balance of payments to changes in net effective demand over the period 1990–2024. An ECM was employed to estimate the dynamic relationship between the two variables in both the long and short term.

Key Findings:

- The BOP and net FD exhibit a long-term equilibrium relationship, with the model showing that fluctuations in FD exert a significant impact on the BOP;
- In the short term, the relationship between the two variables is dynamic and statistically significant. The model indicates that the economic system adjusts deviations from the long-term equilibrium at an annual rate of approximately

59.16 %, suggesting that equilibrium is typically restored within about 1.69 years;

- Residuals from the model are stable, follow a normal distribution, and exhibit no autocorrelation or heteroscedasticity, thereby reinforcing the validity of the results, and the statistical significance of the model;
- Model coefficients are stable and structurally consistent over the study period, supporting the reliability of the study's conclusions in both the short and long term.

Detailed Empirical Insights

- The independent variable (FD) explains approximately 94 % of the long-term variations in the BOP and about 93 % in the short term, indicating a strong reciprocal influence between the two variables;
- The adjustment coefficient of the ECM is negative and significant, confirming the economy's ability to return to equilibrium after any short-term shock;
- The cointegration test confirmed a synchronous long-term relationship between the variables, a fundamental requirement for the proper application of the ECM ;

Policy Implications and Recommendations

- Policymakers should account for the impact of FD on the BOP, particularly in formulating policies related to investment and government expenditure;
- Stability of the BOP should be reinforced through aggregate demand management to reduce short-term economic fluctuations and achieve long-term equilibrium;
- Regular monitoring mechanisms should be implemented to track deviations from economic equilibrium and correct them promptly, thereby mitigating risks from demand or supply shocks;
- Economic analyses should rely on dynamic models such as the ECM to examine long- and short-term relationships, providing an accurate depiction of economic performance and responsiveness to shocks.

References :

- **Algeria, B. o**. (2025). *Statistical publications.* . Récupéré sur https://www.bank-of-algeria.dz/.
- **Bank, W.** (2025). *World Development Indicators*. Retrieved from https://databank.worldbank.org/source/world-development-indicators.
- **Blinder, A. S.** (1998). Keynesian economics and the modern macroeconomic perspective. *Journal of Economic Perspectives , 12* (03), 45-46.
- **Engle, R. F., & Granger, C. W.** (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica , 55* (02).
- **Gujarati, D. N., & Porter, D. C.** (2009). *Basic Econometrics* (05th ed.). New York: McGraw-Hill Education.
- **International Monetary Fund [IMF]**. (2020). *International Monetary Fund [IMF]*. International Monetary Fund [IMF].
- **Johansen, S.** (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica , 59* (06), 231-233.
- **Keynes, J. M.** (1936). *The general theory of employment, interest and money*. London: Macmillan and Co.
- **Keynes, J. M.** (1936). *The General Theory of Employment, Interest and Money*. London: Macmillan and Co.
- **Mankiw, N. G.** (2019). *Macroeconomics.* (10th, Ed.) New York: Worth Publishers.
- **Paul Robin, K., & Maurice, O.** (2018). *International Economics: Theory and Policy.* (11th, Ed.) Boston: Pearson.
- **Regis, B.** (2021). *Econometrie* (éd. 11). Paris, France: Dunod.
- **World Bank.** (2021). *World Bank.* World Bank.