An Empirical Investigation of the Twin Deficit Problem and the Feldstein-Horeka Hypothesis: A Case Study of Jordan

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Abstract: - This study explores the correlation between budget deficits and current account deficits, as stated by the twin deficit hypothesis, in the specific setting of Jordan's economy. The Keynesian view proposes that budget deficits lead to current account deficits, whereas the Ricardian equivalence theory disputes this idea. Additionally, the research examines the Feldstein-Horioka hypothesis from 1980 about the connection between saving and investment. By using cointegration analysis, this study demonstrates a lasting connection between budget deficits and current account deficits, providing evidence for the Keynesian perspective. The findings support the twin deficit theory's applicability to Jordan's economic situation and strengthen the Keynesian view on the relationship between the current account, budget deficit, and investment. Moreover, the existence of a negative correlation coefficient of less than 1 linking investment and saving supports the Feldstein-Horioka hypothesis, pointing to Jordan's inclusion in international capital markets.

Key-Words: - Twin Deficit, Budget Deficits, Current Account Deficit, Feldstein-Horioka Hypothesis, Keynesian absorption theory, Ricardian equivalence hypothesis, Jordan.

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1 Introduction

The term "twin deficit" was coined in the early 1980s to depict the phenomenon of transitioning between budget deficits and current account deficits in the United States. This literature review reveals that the causal connections between budget deficits and current account deficits are not confined solely to the United States but extend to other regions as well. During the 1990s, certain European nations, including Germany and Sweden, confronted analogous scenarios. The escalation of budget deficits coincided with a depreciation in the real value of their domestic currencies, exerting adverse effects on current accounts. Emerging economies exhibited parallels to these nations in the expansion of both budget and current account deficits. However, the dynamics of transitioning from equilibrium to disequilibrium states within a specified timeframe vary between advanced and developing economies.

The relationship between the budget deficit and the current account deficit, known as the "twin deficit," has prompted academic discussion and research since the 1980s and early 1990s. According to traditional Keynesian absorption theory, a budget deficit increase at full employment levels can lead to a strain on the balance of payments due to the rise in demand for goods and services, including imports. This traditional perspective believes that the size and longevity of budget deficits have significant effects on savings, capital accumulation, price levels, income distribution, exchange rates, and international trade dynamics. The ongoing discussion and disagreement revolve around the possible effects of budget deficits on the current account deficit. Even with progress in using complex time series techniques, the understanding of research findings on this issue is still unclear. Although there is a possible link between the two shortcomings, this connection is especially noticeable within the Jordanian economy, which is suffering from ongoing budget and current account deficits. Therefore, it is necessary to examine the connection between fiscal policy and the current account balance in Jordan.

Since the current account deficit is a barrier to enhancing external solvency in the event of a

decline in capital flows (foreign direct investment) owing to a potential economic recession, this paper seeks to investigate the effects of budget deficits on current account imbalances, independent of other factors that influence the current account. The sustainability of the external situation is considerably worsened by further budgetary increases.

Conversely, studies on the relationship between the current account deficit and the budget deficit are based on the theories of Keynesian and Ricardian equivalence. Based on the twin deficit theory, fluctuations in the fiscal balance lead to fluctuations in the current account balance, but further research will determine whether these fluctuations are pro-cyclical or counter-cyclical. Therefore, this study aims to elucidate the impact of fiscal policy on Jordan's management of its external balance.

2 Theoretical Foundations of the Twin Deficit Hypothesis

The Theoretical Underpinnings of the Twin Deficit Hypothesis: The relationship between budget deficits and current account deficits can be elucidated through various theoretical lenses:

1. Embedded within the Mundell-Fleming framework: In scenarios characterized by a flexible exchange rate regime and optimal capital mobility between a nation and other global entities, the emergence of a budget deficit triggers upward pressure on interest rates, fostering capital inflows and consequent appreciation of the exchange rate. The adjustment in exchange rates serves to reinstate external equilibrium. Conversely, under a fixed exchange rate system accompanied by exchange rate controls, the restoration of external equilibrium does not occur automatically. Financing a current account deficit entails international reserve outflows, indicative of governmental intervention, with persistent budget deficits resulting in enduring current account deficits. Empirical analyses reveal that financing mechanisms for the current account deficit involve financial portfolio inflows and direct investments, thereby augmenting tangible resources. Financing methods encompass the utilization of international reserves and foreign borrowing, both of which fail to stabilize the current account.
2. The second perspective emanates from the monetary approach to the balance of payments in the context of a small nation operating under a fixed exchange rate system. Drawing upon Keynesian absorption theory and the monetary approach, any augmentation in the budget deficit engenders an expansion in aggregate demand, leading to a shift in demand towards foreign goods and services, thereby amplifying imports and exacerbating the current account deficit.
3. The third viewpoint hinges upon the Ricardian equivalence hypothesis, positing an absence of correlation between budget deficits and current account deficits due to the negligible impact of transitions from taxation to budget deficits on real interest rates, investment levels, or the current account deficit.

The twin deficit hypothesis has been empirically tested to assess the connection between budget deficit and current account deficit in advanced economies like the United States. Evidence has consistently shown that budget deficit causes current account deficit in one direction. Still, there is no agreement among scholars about the interdependent connection between the current account deficit and the budget deficit. Multiple studies have suggested that these factors are cointegrated, showing a propensity to move together in the long run. Research conducted by [1] and [2] on the economies of the United States and Canada found no clear link between the budget deficit and the external deficit. These researchers suggested the possible use of the "Ricardian equivalence hypothesis," indicating that financing the budget shortfall through tax increases changes spending habits to maximize long-term welfare by increasing current savings instead of present consumption. As a result, this method is said to have no noticeable impact on interest rates, savings, investments, prices, or income in the area.

[3], examined the association between the budget deficit and the current account deficit in the United States, assessing whether this relationship is unidirectional, bidirectional, or independent. Employing the Granger causality methodology, quarterly data spanning from 1971:1 to 1989:4 were analyzed. The findings revealed a correlation between the budget deficit and the trade deficit, thus corroborating the conventional assertion that "an increase in the budget deficit leads to an increase in the trade deficit."

In the context of emerging and developing nations, [4] undertook an investigation into the twin deficits of the Greek economy. Annual data covering the period 1948-1993 for the budget deficit and the trade balance were utilized. Utilizing the cointegration test, error correction modeling, and

Granger causality, Vamvoukas concluded that the causal linkage from the budget deficit to the trade deficit aligns with Keynes's proposition in both the short and long term.

The results [5] highlight that the twin deficits hypothesis is present in the MENA region in the medium-term and diminishes slowly over time, backing the traditional Keynesian belief that fiscal deficits negatively impact the current account balance. Splitting the entire sample reveals that increasing fiscal deficits only result in a decrease in the Current Account Balance in oil-producing countries. The findings support the common belief that government spending growth reduces private investment, also refuting the presence of the FeldsteinHorioka hypothesis in the MENA region. Crucially, MENA governments need to lower internal interest rates promptly to enhance the CAB. Increasing the interest rate for private savings is crucial to prevent negative impacts on their economies from chronic fiscal deficits and current account downturns. This assertion is additionally supported by the research of [6] and [7].

Various results have been found in previous research on the relationship between the budget deficit and the trade deficit, showing differences among various countries. Some research supports the Ricardian equivalence theory, indicating that the budget deficit does not impact the trade deficit, while other studies agree with the Keynesian view, proposing a link between these deficits, where the budget deficit causes the trade deficit. The current study aims to clarify the fundamental dynamics controlling the interaction of deficits in the Jordanian economy and to explain the theoretical framework relevant to this situation.

In addition, [8] analyzed annual time series data from 1970 to 2012 to investigate the twin deficit theory, the Ricardian equivalence hypothesis, and Feldstein-Horioka puzzle in India. The empirical findings from vector autoregressive modeling and ARDL have refuted the twin deficit theory and the Feldstein-Horioka dilemma. It proved that the Ricardian equivalence hypothesis, stating that the budget deficit does not affect the current account deficit, is accurate.

[9], analyzed Turkey's fiscal balance and current account with quarterly data from 2006:1 to 2020:2, finding that the two variables are cointegrated even when there are discontinuities in the series. The twin deficit theory is backed by the fact that enhancing fiscal balance also enhances current account balance. To ensure strength, a causality analysis was conducted. It was found that fiscal balance influences external balance in a one-way direction.

Even with [10] resistance, he carried out research using non-linear time series analysis to investigate the connection between the budget balance and the current account in the Turkish economy. Also, annual data from 1994 to 2021 was subjected to non-linear unit root and cointegration tests. During the period analyzed in the Turkish economy, it was determined that the negative reverse causality hypothesis is more probable than the twin deficit theory. In other words, a negative correlation exists between the budget balance and the current account balance in both the long term and short term.

[11], investigated if a greater budget deficit in Serbia has a negative effect on the country's current account balance, as proposed by the twin deficit theory. Contrary to the Ricardian equivalence theory, the budget deficit does not impact the current account balance. This research confirms the twin deficit theory in Serbia by analyzing quarterly data from 2005 to 2020, using a multivariate autoregressive (VAR) model, and a short-term structural autoregressive model. To be more precise, raising the budget deficit by one percentage point (as a percentage of GDP) leads to a 0.31 percentage point increase in the current account deficit (as a percentage of GDP).

The basis for analysis in this research is rooted in the national income identity, where the Gross Domestic Product (GDP) in an open economy is expressed as the sum of consumption (C), investment (I), government expenditure (G), and net exports (X-M), as shown in equation (1).

$$Y = C + I + G + (X - M) \quad (1)$$

without taking into account income balance and government expenditure balance, the current account can be described in the following way:

$$CA = (X - M) \quad (2)$$

If a country's imports exceed its exports, causing a deficit in its current account, it will need to borrow externally for financial support. The increase in the current account deficit leads to a proportional rise in the country's net foreign debt, matching the deficit. A country with a current account deficit is essentially using imported capital goods to fund current consumption and/or investments while sacrificing future consumption and/or investment expenditures through exports. In a global economy, local savings can be described as the following:

$$S = Y - C - G + CA \quad (3)$$

The equation depicted above can be expressed as follows, where S represents savings.

$$S = I + CA \quad (4)$$

The expression of investment, denoted as 'I,' may be formulated as follows:

$$I = Y - C - G \quad (5)$$

Hence, the delineation of the current account balance can be articulated as follows:

$$CA = S - I - (G + R - T) \quad (6)$$

In the context of government transfers, represented as R, and taxes, represented as T, there is an interesting connection that can be made regarding the relationship between savings and investment. Although more international capital is flowing in, the close relationship between domestic savings and investment indicates that changes in the budget deficit and current account deficit are happening at the same time. The research conducted by [12] emphasizes the connection between fiscal and economic dynamics about savings and investment behavior.

$$CA = S - I + B \quad (7)$$

The phenomenon denoted as Ricardian equivalence manifests when alterations in the budget deficit do not engender augmented consumption expenditure or a shortfall in the current account, owing to the absence of correlation between savings and investment. Should private savings equate to private investment, Equation (7) elucidates a straightforward association between foreign trade and the public budget. Consequently, twin deficits materialize, evolving concurrently and incongruence in terms of magnitude and direction. [13] delineated a theoretical framework to elucidate the twin deficits, positing the following model:

$$(X - M) = \beta_1 + \beta_2 (T - G) - \beta_3 I \quad (8)$$

In the current analysis, denoting (X-M) as the current account, (T-G) as the budget balance, and I as the investment rate, it is anticipated that a positive sign characterises the budget balance, while a negative sign typifies investment. Consequently, a rise in both budget deficit and investment rates is posited to exacerbate the current account. Under complete integration of the state into the global economy, with budget and investment expenditures being financed from the global financial market, the combined coefficients are anticipated to sum to unity. Deviation from this expectation, wherein one coefficient falls below unity, is indicative of the Feldstein–Horioka puzzle. Moreover, a negative budget coefficient entails the rejection of the twin deficit hypothesis. [8], explicated that the correlation between investment and savings gauges the extent of international capital mobility, whereby investment can be underwritten by foreign savings in the presence of accessible capital markets, denoted by a low correlation. Their empirical inquiry, conducted on cross-sectional data spanning the period 1960-1974 across 16 OECD countries, operationalized the model as delineated below:

$$(I/Y) = \alpha + \beta (S/Y) + u \quad (9)$$

The variables (I/Y) and (S/Y) denote investment and savings rates as a percentage of income, respectively. The coefficient β is assigned to savings, while ε represents the error term. A noteworthy observation emerges when examining the estimated savings coefficient: its magnitude is notably elevated in instances devoid of international capital flow, suggesting that local savings predominantly finance domestic investment. Conversely, when capital mobility is unhindered, the coefficient approaches zero, indicative of local investment being predominantly funded by foreign savings. Hence, any statistically significant deviation of the savings coefficient from zero implies a state of complete capital mobility, wherein an upsurge in savings within one nation triggers a corresponding increase in investment across all nations, thereby rendering local savings independent of local investment. This inference denotes a lack of capital movement. Notably, [12] substantiated this deduction by uncovering a coefficient value of 0.887, thereby laying the groundwork for their theory elucidating the relationship between investment and savings, positing a scenario where capital remains largely stationary among OECD countries. In a closed economic system, investments necessarily draw from local savings, while the possibility of leveraging foreign savings for certain investments fosters an environment where investment and savings diverge autonomously. However, subsequent empirical observations, influenced by factors such as the integration of financial markets, absence of capital restrictions, dissemination of information, liberalization of financial markets, and disparities in interest rates among nations, have yielded results contrary to those postulated by Feldstein–Horioka, commonly referred to as the Feldstein–Horioka puzzle. Consequently, the standard model, as proposed by [12], is longitudinally estimated as follows:

$$CA = \beta_0 + \beta_1 I + \beta_2 BD + \varepsilon \quad (10)$$

Where ε is the error term.

3 Econometrics Analysis

The analysis employed in this study utilizes annual data made available by the Central Bank of Jordan through its official website (www.cbj.gov.jo), supplemented by data sourced from the World Bank (www.worldbank.org), with the natural logarithm (Ln) applied to all variables. Given that the trade balance entails the disparity between exports and imports, and often encompasses negative values unsuitable for logarithmic transformation, the logarithm of the export-to-import ratio was adopted, following the methodology outlined by [14], to infer its elasticity. Similarly, for negative figures, the budget deficit was calculated by dividing revenues by expenditures and then applying the natural logarithmic transformation to obtain the budget deficit's natural logarithm.

3.1 Stationarity Test

The first step of this investigation involves assessing the stationarity level of all variables through the application of the Dickey-Fuller test [15] to ascertain their stationary status. The findings presented in Table 1 demonstrate that the budget deficit, current account deficit, and investment exhibit a stationary behavior, denoted as I(0).

Table 1. Unit Root Test Results

Unit Root test (Dickey-Fuller)		
Variables	***Augmented Dickey-Fuller test statistic***	***model***
log	***Level***	
bd	-6.028464	trend and intercept
ca	-5.121123	trend and intercept
i	-5.182697	trend and intercept

3.2 Cointegration Methodology

Given that the variables under investigation in this research exhibit an integrated series of order zero (I(0)), and considering the assertion made by [16] and [17] regarding the necessity for all variables to possess congruent degrees of integration for cointegration methodologies, cointegration analysis was employed in this investigation. The outcomes obtained are detailed as follows:

Table 2. Cointegration Test Results

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	***Eigenvalue***	***Trace Statistic***	***0.05 Critical Value***	***Prob.***
None *	0.407134	30.21693	29.79707	0.0447
At most 1	0.170794	9.305469	15.49471	0.3379
At most 2	0.044338	1.814025	3.841465	0.1780

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
***[18] p-values*

The test results show the presence of cointegration among the study variables.

3.3 Long-Run Coefficient Estimation

The study analyzed the lasting relationship between the current account deficit and specific macroeconomic factors outlined in Table 3, finding a consistent link between the current account deficit and investment. The results were obtained by using the Ordinary Least Squares (OLS) technique to estimate outcomes.

Table 3. Twin Deficits Results

Dependent Variable: CA	***Coefficient***	***Std. Error***	***t-Statistic***	***Prob.***
BD	2.497792	0.537428	4.647679	0.0000
I	-0.805392	0.269665	-2.986639	0.0047
C	-1.754736	0.358613	-4.893114	0.0000

R-squared	0.438015	Mean dependent var	-1.088364
Adjusted R-squared	0.410601	S.D. dependent var	0.501420
S.E. of regression	0.384951	Akaike info criterion	0.994347
Sum squared resid	6.075694	Schwarz criterion	1.115997
Log likelihood	-18.87564	Hannan-Quinn criter.	1.039461
F-statistic	15.97782	Durbin-Watson stat	0.384426
Prob(F-statistic)	0.000007		

The model's estimation results indicate that variables BD and I met expectations (BD = 2.5 and I = -0.80) and showed statistical significance. Moreover, proof of the twin deficit phenomenon was discovered, as well as the inefficacy of the Ricardian equivalence hypothesis in the Jordanian economic setting. These results support the traditional Keynesian view, which suggests a correlation between the budget deficit and the current account deficit, with the budget deficit causing the current account deficit, as indicated in [5] study. The worsening of the budget deficit and the current account deficit is emphasized by the trade deficit caused by the budget deficit. This situation plays out in the following way: a budget deficit leads to a trade deficit, causing an increase in income which results in increased demand for

imports, worsening the trade imbalance and ultimately leading to a deficit. Moreover, an increase in the budget deficit boosts overall demand and raises the real interest rate, attracting more foreign capital, which could lead to a strengthening of the currency, higher imports, and a worsened trade balance.

Furthermore, the investment coefficient seen in Table 3 displays a negative value and is found to be less than one, as expected. This finding confirms the Feldstein-Horioka hypothesis, showing that Jordan's economy is not fully integrated into global markets (with a coefficient of one indicating complete integration and 100% dependence on foreign funding). During the investigation, around 80% of investment activities in the Jordanian economy relied on foreign savings. As a result, an increase of 1% in investment in the long run leads to a corresponding rise of 0.80% in the current account deficit. Additionally, a 1% increase in the budget shortfall results in a 2.5% growth in the current account shortfall, as funds for both spending and investments are obtained from the international financial market. This discovery shows that the budget deficit and investment impact the current account deficit as expected, with the budget deficit having a stronger effect on the balance of the current account.

Table 4. Estimation of the Feldstein-Horioka Equation for the Relationship between Savings and Investment

Dependent Variable: I/Y				
Variable	***Coefficient***	***Std. Error***	***t-Statistic***	***Prob.***
S/Y	0.335812	0.096549	3.478165	0.0012
C	-0.760038	0.154180	-4.929542	0.0000

According to the findings presented in Table 4, the value of β deviates significantly from unity, registering at 0.33. This departure implies an implicit lack of close association between domestic investment and domestic savings. Such a disparity can be attributed to the pronounced degree of international capital mobility. A β value approximating unity would suggest a stronger connection between domestic investment and domestic savings, indicative of diminished international capital mobility. A heightened estimated coefficient for savings emerges in scenarios devoid of international capital flow, signifying the reliance of domestic investment on domestic savings. Under such circumstances, a coefficient of unity denotes complete integration, whereby investment is supported by foreign savings.

4 Conclusion

The purpose of this study was to investigate the twin deficit theory, which includes the current account deficit and budget deficit, as well as to analyze the Feldstein-Horioka hypothesis, using yearly data from 1976 to 2019 focused on the Jordanian economy. After finding evidence of no integration (I(0)) through unit root testing, the model was then estimated using the Ordinary Least Squares (OLS) methodology.

The findings revealed the existence of a protracted interrelationship among the variables, as evidenced by the affirmative coefficient associated with the budget deficit, signifying the presence of the twin deficit dilemma within the Jordanian economy. Consistent with expectations, the coefficient of investment, which remained below 1, substantiated the validity of the Feldstein-Horioka hypothesis. The model elucidated that a substantial proportion, amounting to 80%, of Jordanian investments is underwritten by foreign savings, thereby positioning Jordan within the framework of international capital markets owing to its pronounced dependence on external savings. The outcomes lent credence to the Keynesian perspective, affirming a robust and affirmative correlation between the current account deficit and savings investment, alongside the budget deficit, throughout the period spanning from 1976 to 2019 within the Jordanian context. A surge in the disparity between savings-investment or the budget deficit precipitates a commensurate escalation in the current account deficit. Hence, ameliorating the budget deficit and/or narrowing the savings-investment gap in Jordan may serve to alleviate the current account deficit. Nonetheless, the realization of such objectives necessitates the implementation of sweeping reforms across the trade and financial sectors to engender market efficiency. The enhancement of external competitiveness mandates policy interventions aimed at bolstering production and augmenting exports, thereby capitalizing on the benefits accrued from trade liberalization policies through production specialization. This inquiry advocates for financial reforms geared towards curtailing government expenditure and galvanizing domestic production and foreign direct investment. Additionally, it underscores the imperative of enhancing the investment climate by streamlining and consolidating investment protocols through the establishment of a unified investment platform, curtailing customs declaration timelines, and expanding the utilization of customs facilitation mechanisms to expedite the exportation and market access of goods to foreign jurisdictions. The

findings of this research aligned with [19], [20] and [21].

References:

[1] Evans, P., and I. Hasan, Are Consumers Ricardian? Evidence for Canada, *Quarterly Review of Economics and Finance*, 34, 1994, 25–40. https://doi.org/10.1016/1062-9769(94)90051-5.

[2] Evans, P., Is the Dollar High Because of Large Budget Deficits?, *Journal of Monetary Economics*, 18(3), 1986, 227-249. https://doi.org/10.1016/0304-3932(86)90038-3.

[3] Nazma Latif – Zaman and Maria N. DaCosta, The Budget Deficit and the Trade Deficit: Insight into this Relationship, *Eastern Economic Journal*, 16(4), 1990, 349-354, [Online]. https://www.jstor.org/stable/40325309 (Accessed Date: October 15, 2024).

[4] Vamvoukas, G., The Twin Deficits Phenomenon: Evidence from Greece, *Applied Economics*, 31, 1999, 1093-1100. https://doi.org/10.1080/000368499323571.

[5] ALShammary, M. D, Khalid, N., Abdul Karim, Z., Ahmad, R. Twin Deficits and the Feldstein-Horioka Hypothesis in the MENA Region: New Evidence Using Panel VAR Analysis, *Int. Journal of Economics and Management*, 14(3), (2020), 311-329. https://doi.org/10.3390/economies8040102.

[6] Al-Sawaie, K. M., Jubran, A.M., Abbas, N.A., Al-Momani, M. M., Abu-Saleem, TH. A., Khrais , I. M., AlBasha, M.H., AlHunaity, M. (2023), Jordanian Imports: Income and Price Elasticity of Demand. In: Alareeni, B.A.M., Elgedawy, I. (eds) *Artificial Intelligence (AI) and Finance. Studies in Systems, Decision and Control*, vol 488. Springer, Cham. https://doi.org/10.1007/978-3-031-39158-3_69.

[7] Saleem, T.A.A., Abbas, N.A., Al-Sawaie, K.M., Jubran, A.-H.M. (2021), The impact of digital trade on Jordan's economic growth, 2021 22nd *International Arab Conference on Information Technology, ACIT* 2021. https://doi.org/10.1109/acit53391.2021.9677278.

[8] S. Badaik and P. K. Panda, "Ricardian equivalence, <scp>Feldstein–Horioka</scp> puzzle and twin deficit hypothesis in Indian context: An empirical study," *Journal of Public Affairs*, vol. 22, no. 1, Sep. 2020, https://doi: 10.1002/pa.2346.

[9] M. E. BİLMAN, Türkiye'de Bütçe ve Cari İşlemler Açıkları İkiz Mi? Kalıntı Temelli Fourier Eşbütünleşme ve Fourier Nedensellik Analizlerinden Kanıtlar, *Sosyoekonomi*, vol. 29, no. 49, pp. 199–215, Jul. 2021. https://doi: 10.17233/sosyoekonomi.2021.03.10.

[10] O. M. Telatar, The Twin Deficits or Negative Reverse Causality? A Nonlinear Approach to the Turkish Budget And Current Account Balances, *Uluslararası İktisadi ve İdari İncelemeler Dergisi*, no. 36, pp. 1–20, Aug. 2022. https://doi: 10.18092/ulikidince.1124266.

[11] J. Raskovic, Ricardian equivalence or twin deficits hypothesis? Evidence from Serbia, *Ekonomski anali*, vol. 68, no. 238, pp. 87–113, 2023, https://doi: 10.2298/eka2338087r.

[12] Feldstein, M., and Horioka, C., Domestic Saving And International Capital Flows, *Economic Journal*, 90(358), 1980, 314-329. https://doi.org/10.2307/2231790.

[13] Johansen, S. and K. Juselius, Maximum Likelihood Estimation and Inference on Cointegration with Applications for the Demand for Money, *Oxford Bulletin of Economics and Statistics*, 52 (2), 1990, 169-210. https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x.

[14] Fidrmuc, J., The Feldstein-Horioka Puzzle and the Twin Deficits in Selected Countries, *Economic Planning*, 36, 2003, 135-152. https://doi.org/10.1023/b:ecop.0000012256.88112.c2.

[15] Koray F and Mcmillin W., Monetary Shocks, the exchange rate and the trade balance, *Journal of International Money and Finance*, 18, 1999, 925-940. https://doi.org/10.1016/s0261-5606(99)00031-5.

[16] Dickey, D.A. and Fuller, W.A., Distribution of the estimators for autoregressive time series with a unit root, *Econometrica*, 49:, 1981, 1057-72. https://doi.org/10.2307/1912517.

[17] Johansen, S., Statistical Analysis of Cointegration Vectors, *Journal of Economic Dynamics and Control*,12, 1988, 231–254. https://doi.org/10.1016/0165-1889(88)90041-3.

[18] MacKinnon, J. G., Haug, A. A., and Michelis, L. Numerical distribution functions of likelihood ratio tests for cointegration, *Journal of Applied Econometrics*, 14(5), 563–577, 1999. doi: 10.1002/(sici)1099-

1255(199909/10)14:5<563::aid-jae530>3.3.co;2-i.

[19] Hussain, I., Hayat, U., Alam, Md Sh., Khan, U., A Dynamic Analysis of the Twin-Defcit Hypothesis: the Case of a Developing Country, *Asia-Pacifc Financial Markets*, 31, (2024), 25–52, https://doi.org/10.1007/s10690-023-09405-y.

[20] Ahmad, I., Hassan, M., Nawaz, M. A., Twin Deficit Hypothesis in Pakistan: A Non-Linear Approach With Structural Break, Ilkogretim Online - *Elementary Education Online*, 20(5), (2021), 5888-5900, https://doi: 10.17051/ilkonline.2021.05.662.

[21] Fouzdar, A. S., Saxena, S. P., Cogency of Twin and Triple Deficit in India, *Scholedge International Journal of Business Policy & Governance*, 10(7), (2023), 65-79, DOI: http://dx.doi.org/10.19085/sijbpg100701

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I, Khaled Al-Sawaie, contributed fully to the present research, at all stages from the formulation of the problem to the final findings and solution.

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The authors have no conflicts of interest to declare.