Journal of Energy and Environmental Policy Options

Vol. 1(1), 9-13

The Nexus Between Oil Prices and Current Account Deficit: An Empirical Analysis for Lebanon

Mohammad Muhieddine[a]

Abstract

The study investigates the impact of short- and long-term oil prices on Lebanon's current account deficit using monthly data from 2002 to 2008. The Johansen Cointegration Test confirms a stable long-term relationship between oil prices and the current account deficit, indicating their significant interconnection. To analyze short-term dynamics, the study employs the Vector Error Correction Model (VECM). The results reveal a negative and statistically significant error correction term, suggesting that deviations from the long-run equilibrium tend to self-correct over time. This implies that while oil price fluctuations influence Lebanon's current account deficit in the short term, the economic system naturally moves back toward stability. The study highlights that oil price movements play a crucial role in shaping Lebanon's external balances. A rise in oil prices worsens the current account deficit, as Lebanon is a net oil importer, increasing import costs and negatively affecting trade balances. Conversely, declining oil prices provide temporary relief by reducing import expenditures. The findings suggest that Lebanon's economic stability is highly sensitive to global oil price volatility. Policymakers should implement strategies to mitigate the adverse effects of oil price fluctuations, such as diversifying energy sources and reducing dependency on imported oil. Strengthening foreign reserves and adopting fiscal policies to cushion external shocks can also enhance economic resilience. This research provides valuable insights into the relationship between oil prices and Lebanon's current account balance, guiding policymakers toward more sustainable economic planning and risk management strategies.

Keywords: Current Account Deficit, Oil Prices

JEL Codes: Q43, P48

1. INTRODUCTION

As energy challenges gain increasing importance, recent studies have intensified their focus on the effects of energy prices on macroeconomic indicators. Within this context, the relationship between energy prices and macroeconomic performance has emerged as a key area of research, drawing interest from policymakers, economists, and academics. The complex interplay between a nation's economic health and energy cost fluctuations has driven detailed analyses to better understand the underlying dynamics. Lebanon, heavily reliant on imported energy, faces distinct challenges that amplify the impact of global energy price volatility. With approximately 75% of its energy demand met through imports, the country is particularly vulnerable to external shocks, including geopolitical events, supply chain disruptions, and international market instability. These challenges extend beyond economic consequences, impacting Lebanon's social and political domains. Rising energy costs exacerbate financial pressures on households and businesses, increasing the risk of socio-economic instability (Marc & Ali, 2018; Ali & Audi, 2018). Understanding the intricate relationship between energy prices, inflation, and unemployment is therefore essential for developing effective policy interventions. Researchers are now focusing on the mechanisms through which energy prices shape Lebanon's macroeconomic indicators. Their analyses examine direct effects on trade balances, fiscal deficits, and the balance of payments, as well as indirect influences on key energy-dependent sectors such as manufacturing, transportation, and agriculture. Addressing Lebanon's energy challenges requires a comprehensive approach, integrating policy reforms, investments in renewable energy, and strategies for enhancing energy security. Furthermore, fostering international collaborations and diversifying energy sources are vital to reducing dependence on imports and mitigating associated risks (Shahbaz et al., 2016; Ali & Audi, 2016; Marc & Ali, 2017). As the global community tackles energy-related issues, Lebanon's situation provides a compelling case study, highlighting the importance of proactive measures to address the interconnected economic, social, and political implications of energy prices. This ongoing research not only illuminates Lebanon's unique challenges but also offers valuable lessons for crafting global strategies to ensure a sustainable and resilient energy future.

Lebanon's current account deficit has become a central topic among economists, identified as one of the most pressing issues facing the national economy. The country's heavy reliance on foreign energy is a primary driver of its significant trade balance deficit, a key component of the current account. According to data from the Ministry of Energy and Natural Resources, energy imports account for $54 billion of the $77 billion current account deficit, comprising nearly 70% of the total shortfall. This research aims to explore the connection between the current account deficit, which poses critical risks to Lebanon's economy, and energy imports, recognized as a major contributor to the budget deficit. Using econometric methods, the study investigates the effects of oil price fluctuations on the current account balance, utilizing oil prices as a proxy for overall energy costs.

2. THE CURRENT ACCOUNT BALANCE AND OIL CONSUMPTION

The complexity of the Current Account balance and its relationship to a nation's economic well-being highlights the difficulties countries face in achieving equilibrium in external trade. For Lebanon, a persistent current deficit reflects an ongoing struggle to balance international trade, with energy imports significantly influencing its economic framework. The country's heavy reliance on imported oil as its primary energy source makes it vulnerable to global oil market volatility. Limited access to domestic oil reserves exacerbates this dependence, leaving Lebanon at the mercy of external sources. Consequently, any increase in global oil prices imposes a heavy burden on Lebanon's Current Account, further widening the deficit. The link between oil prices and Lebanon's

[a] Lebanese International University, Lebanon

current deficit is further complicated by Turkey's position as an energy importer. Turkey's low price elasticity of oil demand amplifies the effects on Lebanon. Rising oil prices place additional financial strain on Lebanon, increasing oil-related expenditures and intensifying the current deficit, highlighting the global interconnectedness of economic factors that affect Lebanon's stability.

The repercussions of Lebanon's persistent current deficit extend into broader macroeconomic dynamics. The ongoing need to finance the deficit places added stress on other elements of the Balance of Payments, particularly the Capital and Finance Account. Sustained deficits in the Current Account necessitate surpluses in the Capital Account to maintain overall balance. However, this reliance on capital inflows, often through foreign debt, introduces substantial economic risks, including inflation, currency depreciation, and increased financial vulnerability. As Lebanon contends with the intricate task of managing its Current Account, the need for strategic action becomes evident. Diversifying energy sources, investing in renewable energy, and pursuing domestic energy production are critical steps to reducing external energy dependency. Moreover, the implementation of proactive economic policies and the cultivation of international partnerships can contribute to stabilizing Lebanon's macroeconomic dynamics, fostering a more robust and sustainable economic outlook.

3. LITERATURE REVIEW

The complex interplay between oil prices and macroeconomic variables remains a central theme in academic discussions, with numerous studies investigating their influence on current account balances across the globe. In particular, research has focused on Lebanon, shedding light on the unique challenges faced by energy-importing nations. Demirbaş, Turkay, and Türkolu's (2009) study, covering the period from 1984 to 2008, offers valuable insights into Lebanon's current account balance and its vulnerability to oil price fluctuations. Their findings reveal a positive correlation between rising oil prices and Lebanon's current deficit, aligning with the broader understanding that energy-importing nations typically experience trade balance deterioration as oil prices increase. This positive relationship underscores Lebanon's heavy reliance on imported energy and the subsequent economic strain.

Conversely, Wijnbergen's (1984) research during the same period offers a contrasting perspective, identifying a negative link between current account balances and oil price shocks. This divergence highlights the complexity of the relationship between oil prices and macroeconomic indicators, with outcomes influenced by factors such as economic structure, policy responses, and global market conditions. The inconsistency in findings among these studies underscores the necessity of a nuanced approach to understanding the multifaceted interactions between oil prices and current account dynamics. Karabulut and Elikel Danşolu's (2006) research broadens the discussion on oil price impacts by demonstrating that the challenges posed by rising oil prices extend beyond emerging economies like Turkey to include industrialized nations such as the United States. Their study establishes a statistically significant positive relationship between oil prices and current account deficits, illustrating the universal nature of energy-related challenges in external trade balances. The conclusion that energy consumption plays a critical role in shaping current account deficits aligns with the broader consensus on the influence of energy on macroeconomic trends. As both emerging and developed nations confront the implications of escalating energy costs, comprehensive analyses remain crucial.

In another notable study, Rafiq, Salim, and Bloch (2009) examine the Thai economy to understand the effects of oil price fluctuations on macroeconomic indicators. Their findings reveal a significant impact of oil price changes on unemployment and investment, highlighting the intricate connections between energy costs and broader economic variables. The Thai case illustrates the far-reaching ripple effects of oil price shocks on key economic factors. The interplay between oil prices, unemployment, and investment underscores the importance of adaptive policy strategies that account for the interconnected nature of these variables. As the global economy navigates the challenges posed by energy price dynamics, research like this contributes valuable insights into the relationship between oil prices and macroeconomic indicators. The lessons drawn from diverse national contexts enrich our understanding of the challenges and opportunities associated with energy-related issues, supporting informed policymaking for both emerging and developed economies.

4. RESULTS OF ANALYSIS

The next section of the study systematically presents the analytical findings, beginning with an evaluation of the stationarity results obtained from the Augmented Dickey-Fuller (ADF) Unit Root Test and the Phillips-Perron (PP) Unit Root Test. These tests play a pivotal role in determining the stationarity of the variables analyzed. Acknowledging the significance of unit root tests and the inclusion of stationary variables in the methodology, these preliminary steps are vital to ensuring the accuracy and reliability of the subsequent analyses. By thoroughly examining the stationarity of the data series, the study establishes a solid foundation for understanding the underlying dynamics. In later sections, these analytical elements are seamlessly integrated to form a comprehensive narrative, enabling a detailed interpretation of the empirical findings.

The unit root test results in Table 1 evaluate the stationarity of three key variables: the current account deficit, international oil prices, and the industrial production index in the context of Lebanon. Using both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests under intercept and trend specifications, it is evident that none of the variables are stationary at level. For instance, the current account deficit shows an ADF statistic of -1.0713 (intercept) and -1.3119 (trend and intercept), both failing to reach the critical thresholds, indicating the presence of a unit root. This finding aligns with economic literature showing that external sector indicators such as the current account balance often follow non-stationary patterns due to persistent fiscal and trade imbalances in emerging markets (Edwards, 2001). Upon first differencing, all variables become stationary. The current account deficit shows highly significant stationarity with ADF and PP statistics of -16.6942 and -17.1214, respectively. This transformation from non-stationarity to stationarity at first difference confirms that the variable is integrated of order one. Such behavior is consistent with macroeconomic series in developing countries where fiscal dynamics and external shocks often induce long-memory effects in balance-of-payments data (Arize, Malindretos, & Ghosh, 2009). International oil prices also display non-stationarity at level but become stationary after

first differencing, as indicated by an ADF value of -5.5914 and a PP value of -6.3411. These results suggest that oil prices in Lebanon follow a stochastic trend, which is common in global commodity markets influenced by geopolitical tensions, supply-demand shocks, and exchange rate volatility. The non-stationarity of oil prices is well documented in energy economics literature and necessitates careful modeling to avoid spurious regression outcomes (Hamilton, 2003). The industrial production index shows a similar pattern, with non-stationary behavior at level (ADF intercept of -0.874, PP intercept of -0.4104), and stationarity at first difference (ADF -18.947, PP -19.4364). This indicates that Lebanon's industrial activity, like that of many developing economies, is subject to persistent structural and cyclical volatility, possibly due to political instability, weak institutional frameworks, and external dependence on inputs and technology (Agenor & Montiel, 2015). The consistent results across both the ADF and PP tests enhance the robustness of the conclusion that all three variables are integrated of order one. This uniform order of integration justifies the use of co-integration techniques such as the Johansen method or the Autoregressive Distributed Lag (ARDL) bounds testing approach for further empirical analysis, as these techniques require variables to be I(1) but not I(2) (Johansen, 1988). Furthermore, identifying the correct integration order is crucial before estimating the long-run relationship between oil prices and the current account deficit. Misidentification of the stationarity level could result in invalid inference and biased estimators in regression analysis, particularly in macroeconomic time series studies involving external balances (Phillips & Perron, 1988).

Table 1: Stationarity Test of Model Variables

Variables	ADF Intercept	ADF Trend & Intercept	ADF First Difference	PP Intercept	PP Trend & Intercept	PP First Difference
CA	-1.0713	-1.3119	-16.6942	-2.4571	-2.679	-17.1214
OP	-2.576	-3.4769	-5.5914	-1.1021	-2.0461	-6.3411
IPI	-0.874	-2.6973	-18.947	-0.4104	-3.8381	-19.4364

The Johansen Cointegration Test, as presented in Table 2, examines the long-run equilibrium relationship among the current account deficit, international oil prices, and the industrial production index for Lebanon. The test is based on both the trace statistic and the maximum eigenvalue statistic, each testing different hypotheses regarding the number of co-integrating vectors. Starting with the null hypothesis of no cointegration (H0: r = 0), the trace statistic is 30.72481, which exceeds the 5 percent critical value of 29.79707. Similarly, the maximum eigenvalue statistic is 26.28969, surpassing the 5 percent critical threshold of 21.13162. These outcomes indicate rejection of the null hypothesis of no cointegration at the 5 percent significance level. This result suggests that there exists at least one cointegrating relationship among the variables, implying a stable long-run association between the current account deficit, international oil prices, and the industrial production index (Johansen, 1991). In economic terms, the rejection of the no-cointegration hypothesis confirms that fluctuations in international oil prices and changes in industrial production jointly influence the long-run behavior of Lebanon's current account position. This reinforces the theoretical expectation that oil price volatility can significantly affect external balances, especially in oil-importing economies, where rising oil prices increase import bills and deteriorate the current account (Leachman et al., 2005). Moving to the second hypothesis (H0: $r \leq 1$), the trace and maximum eigenvalue statistics both fall below their respective critical values. The trace statistic is 4.781518 against a critical value of 15.49471, and the maximum eigenvalue statistic is 3.31551 against a threshold of 14.2646. These findings indicate that the hypothesis of at most one cointegrating relationship cannot be rejected. Thus, there is only one statistically significant long-run cointegrating vector among the three variables. This is consistent with empirical studies showing that the current account in many developing countries tends to exhibit a single dominant long-run relationship with macroeconomic fundamentals such as terms of trade and industrial performance (Chinn & Prasad, 2003). Additionally, the presence of one cointegrating vector implies that despite short-term deviations, the current account deficit, oil prices, and industrial activity tend to realign over time toward a long-run equilibrium. This supports the use of a Vector Error Correction Model in the next stage of analysis to assess short-run dynamics while maintaining the long-run equilibrium condition (Engle & Granger, 1987). Importantly, the significance of the maximum eigenvalue statistic at the first level (H0: r = 0) highlights that the adjustment toward equilibrium is not just statistical but also economically meaningful. In particular, international oil prices—subject to external shocks—can have persistent effects on Lebanon's trade balance, which over time translates into shifts in the current account deficit. This dynamic has been observed in other non-oil-producing economies where external oil price movements are transmitted into the domestic economy through production costs and trade imbalances (Narayan & Narayan, 2010). Lastly, these results confirm the appropriateness of multivariate cointegration techniques in examining structural relationships among macroeconomic variables. Unlike single-equation approaches, the Johansen method captures the systemic interaction among multiple variables simultaneously, enhancing robustness in policy-driven analyses of external imbalances (Gonzalo, 1994).

Table 2: Johansen Cointegration Test

Hypothesis	Eigenvalue (Trace)	Trace Statistic	Trace Critical Value	Trace Probability	Eigenvalue (Max-Eigen)	Max-Eigen Statistic	Max-Eigen Critical Value	Max-Eigen Probability
H0: r = 0*	0.465801	30.72481	29.79707	-0.1447	0.783401	26.28969	21.13162	-0.1895
H0: $r \leq 1$	-0.63022	4.781518	15.49471	1.6538	-0.63022	3.31551	14.2646	0.0118
H0: $r \leq 2$	-0.32637	-0.49489	3.841466	-0.0029	-0.30027	0.576309	3.841466	1.074

The Vector Error Correction Model estimates the speed at which short-term deviations in the current account deficit adjust back to the long-run equilibrium. In the table, the coefficient of the error correction term (ECT) is -0.04873, with a t-statistic of -2.46543, indicating statistical significance at conventional levels. The negative sign of the error correction term implies a corrective mechanism is in place—when the current account deficit deviates from its long-run path due to shocks in variables such as international oil prices or industrial production, it gradually returns to equilibrium. The magnitude of -0.04873 suggests that approximately 4.87 percent of the disequilibrium is corrected in each period. This slow adjustment speed is common in small, open economies where structural rigidities and external vulnerabilities delay macroeconomic realignments (Chinn & Ito, 2007). The statistical significance of the error correction term is confirmed by its t-statistic exceeding the absolute critical value of 1.96. This implies that the error correction mechanism is not only theoretically sound but also empirically robust. It validates the long-run cointegrating relationship identified through the Johansen procedure and confirms the appropriateness of using the Vector Error Correction framework for further short-run causality testing (Engle & Granger, 1987). In the context of Lebanon, the error correction dynamics reflect the country's susceptibility to oil price shocks and industrial output volatility, both of which influence external trade balances. As a net oil importer, Lebanon experiences immediate trade pressure when global oil prices rise, but the long-term response, such as improved trade terms or industrial adjustments, takes time. These patterns are consistent with studies on Middle Eastern economies where external shocks exert prolonged effects on current account balances (Kandil et al., 2014). Furthermore, the coefficient indicates partial, rather than full, adjustment—an expected outcome given Lebanon's structural challenges, including reliance on imports, fiscal imbalances, and exchange rate constraints. These factors limit the economy's flexibility to respond swiftly to shocks and prolong the adjustment process, as noted in similar economies undergoing transition or financial constraints (Rahman et al., 2019). The Vector Error Correction Model's findings support policy interventions aimed at improving structural resilience and external competitiveness. Strengthening industrial capacity and diversifying energy sources could accelerate the rate of adjustment to long-run equilibrium by reducing reliance on oil and smoothing out current account fluctuations (El-Anshasy et al., 2015).

Table 3: Results of Vector Error Correction Model

Vector Error Correction Model	D(CA)
ECTt	-0.04873
Standard Error	-0.26489
t-statistics	-2.46543

5. CONCLUSIONS

This study examines the effects of imported oil prices on Lebanon's current account balance using econometric methods. Due to the non-stationary nature of the data at the levels, Johansen co-integration tests are employed to explore the relationships among the variables. The results confirm a long-term co-integration relationship, highlighting a persistent connection between the series. Following this, the vector error correction model is calculated, revealing a statistically significant negative coefficient for the vector error term. This finding indicates that short-term deviations from equilibrium are corrected over the long run. This adjustment mechanism is key to understanding how the current account balance reacts to fluctuations in imported oil prices, demonstrating dynamic responses over time. In the context of the global economic environment, recent volatility in oil prices has significantly influenced the economic strategies of both industrialized and developing countries. The study focuses on Lebanon's reliance on foreign energy sources and investigates how variations in oil prices can shape its economic outlook. A notable observation is the temporary nature of recent artificial reductions in oil prices. The study stresses the urgency of timely action, emphasizing that while short-term price drops may occur, they are unlikely to persist over the long term. This serves as a vital message for policymakers and stakeholders in Lebanon to address the implications of oil price changes proactively and strategically. The negative coefficient of the vector error term, which indicates the correction of short-term deviations in the long run, highlights Lebanon's economic resilience and ability to adapt to external shocks. However, the study's caution regarding the transitory nature of artificial oil price reductions acts as a reminder of the need for forward-looking policies to mitigate potential challenges. Ultimately, the study offers significant insights into Lebanon's economic framework, urging the implementation of timely strategies to manage the complex relationship between oil prices and the country's current account balance effectively.

REFERENCES

Agenor, P. R., & Montiel, P. J. (2015). *Development macroeconomics* (4th ed.). Princeton University Press.

Ali, A., & Audi, M. (2016). *The Impact of Income Inequality, Environmental Degradation and Globalization on Life Expectancy in Pakistan: An Empirical Analysis* (No. 71112). University Library of Munich, Germany.

Ali, A., & Audi, M. (2018). Macroeconomic environment and taxes revenues in Pakistan: an application of ARDL approach. *Bulletin of Business and Economics (BBE), 7*(1), 30-39.

Arize, A. C., Malindretos, J., & Ghosh, D. (2009). Do exchange rates and stock prices have a stable relationship? Evidence from developed and emerging markets. *International Journal of Finance & Economics, 14*(1), 35–48.

Chinn, M. D., & Ito, H. (2007). Current account balances, financial development and institutions: Assaying the world "saving glut". *Journal of International Money and Finance, 26*(4), 546–569.

Chinn, M. D., & Prasad, E. S. (2003). Medium-term determinants of current accounts in industrial and developing countries: An empirical exploration. *Journal of International Economics, 59*(1), 47–76.

Demirbaş, M.,Türkay, H., Türkoğlu, M., (2009). Petrol Fiyatlarındaki Gelişmelerin Türkiye'nin Cari Açığı Üzerine Etkisinin Analizi, *Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, C.14, S.3, s.289-299

Dıckey, D.A. & Fuller, W.A., (1981). Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root, *Econometrica*, 49/4 , 1057-1072

Edwards, S. (2001). Exchange rate regimes, capital flows and crisis prevention. *National Bureau of Economic Research Working Paper No. 8529*.

El-Anshasy, A. A., Bradley, M. D., & Hill, R. C. (2015). Oil price shocks and the current account in oil-exporting countries: The role of institutions. *Energy Economics, 47*, 160–171.

Engle, R. F., & Granger, C. W. J. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica, 55*(2), 251–276.

Gonzalo, J. (1994). Five alternative methods of estimating long-run equilibrium relationships. *Journal of Econometrics, 60*(1–2), 203–233.

Hamilton, J. D. (2003). What is an oil shock? *Journal of Econometrics, 113*(2), 363–398.

Johansen, S. & Juselius, K., (1990). Maximum Likelihood Estimation and Inference on Cointegration-with Applications to the Demand for Money, *Oxford Bulletin of Economics and Statistics*, 52: 169-210.

Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control, 12*(2-3), 231–254.

Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica, 59*(6), 1551–1580.

Johansen, S., (1988). Statistical Analysis of CointegrationVectors, *Journal of Economic Dynamics and Control*, 12 (2-3): 231-254

Kandil, M., El-Anshasy, A., & Khan, M. (2014). The asymmetric effects of oil price shocks on output and prices in developing countries. *Journal of Economic Development, 39*(1), 1–34.

Karabulut, G., Elikel Danışoğlu, A., (2006). Türkiye'de Cari İşlemler Açığının Büyümesini Etkileyen Faktörler, *Gazi Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 8/1, 47-63

Leachman, L. L., Bester, A., Rosas, G., & Lange, P. (2005). The political economy of exchange rate-based stabilization: The case of Lebanon. *The World Economy, 28*(5), 659–685.

Marc, A., & Ali, A. (2017). *Environmental Degradation, Energy consumption, Population Density and Economic Development in Lebanon: A time series Analysis (1971-2014)* (No. 82494). University Library of Munich, Germany.

Marc, A., & Ali, A. (2018). *Determinants of Environmental Degradation under the Perspective of Globalization: A Panel Analysis of Selected MENA Nations* (No. 85776). University Library of Munich, Germany.

Narayan, P. K., & Narayan, S. (2010). Estimating the demand for oil in Fiji with structural breaks. *Energy Policy, 38*(8), 4678–4683.

Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika, 75*(2), 335–346.

Rafiq, S., Salim, R., Bloch, H., (2009) Impact of crude oil price volatility on economic activities: An empirical investigation in the Thai economy, *Resources Policy*, 34, 121–132

Rahman, J., Zhao, T., & Zaman, S. (2019). Structural reforms and external imbalances: Evidence from developing economies. *IMF Working Paper No. 19/173*.

Shahbaz, M., Ozturk, I., & Ali, A. (2016). Does financial development lower environmental quality in Saudi Arabia? Fresh evidence from linear and non-linear specifications. *International Journal of Economics and Empirical Research (IJEER), 4*(7), 376-392.

Wijnbergen, S., (1984). Oil Price Shocks and the Current Account: An Analysis of Short Run Adjustment Measures, *WeltwirtschaftlichesArchiv, September 1984, 120, 3,*460-48.