

An Initial Empirical Analysis of the Determinants of Lebanese Imports and Exports



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Introduction

Lebanon's trade sector has been significantly affected by the country's prolonged economic crisis, particularly following the sharp depreciation of the Lebanese pound and resulting changes in purchasing power and domestic economic activity. Lebanon has historically been characterized by a persistent trade deficit and a highly import-dependent economic structure. Changes in the real exchange rate may influence the competitiveness of Lebanese exports through changes in the relative price of domestic goods in international markets. Understanding these relationships is critical for assessing how real exchange rate fluctuations have affected Lebanon's trade during a period of significant economic instability.

This study examines the relationship between Lebanon's real exchange rate and its trade performance, with an emphasis on imports while also incorporating the Lebanese Purchasing Managers' Index (PMI) as a proxy for income and aggregate demand. Exports are examined separately to provide a wider picture of Lebanon's trade activity. The analysis uses monthly data and regression analysis to examine the relationship between the relevant variables. For the import analysis, several econometric tests were conducted to check for multicollinearity, autocorrelation and heteroscedasticity. By scrutinizing trade patterns and regression results, the study aims to assess how changes in the real exchange rate and economic conditions are associated with changes in Lebanon's trade performance during the period studied, and to provide a preliminary look at the determinants of Lebanese exports and imports.

Theoretical Background

Lebanon has maintained a structural trade deficit, with the imbalance widening notably since 2011. For instance, during the 2019 crisis, Lebanon recorded approximately \$18.2 billion in imported goods compared with around \$4.8 billion in exports, resulting in a deficit of around \$13.4 billion (BDL). This imbalance illustrates the importance of imports within Lebanon's economic structure and provides important context for examining how import demand responds to changes in relative prices and domestic economic conditions.

The relationship between the real exchange rate and trade flows is generally explained by changes in the relative prices of domestic and foreign goods. A real depreciation makes domestic goods relatively cheaper compared with foreign goods, which may increase exports and reduce imports, depending on the responsiveness of trade to price changes.

A depreciation of the real exchange rate should improve the trade balance when export and import demand are sufficiently price elastic¹. However, in an economy such as Lebanon, the response of imports may be weaker because many imported goods have limited domestic substitutes. Therefore, the effect of real exchange rate changes on Lebanon's trade may depend on the structure of domestic production.

Domestic economic activity may also influence import demand, which is why the Lebanese PMI is included in the analysis. The PMI provides a monthly indicator of business activity, with values above 50 indicating an expansion or strengthening of business activity, while values below 50 indicate a contraction or weakening of business activity. Including the PMI alongside the real exchange rate therefore allows the analysis to determine whether changes in imports are associated with domestic conditions in addition to real exchange rate fluctuations.

¹ In the economic literature, depreciation of the real exchange rate should improve the trade balance if and only if the sum of the elasticities of import and exports with respect to the real exchange rate exceeds 1 – known as the Marshall-Lerner condition.

Methodology

- Import analysis

The import analysis uses monthly data from (August/2019) to (December/2025), resulting in (76) monthly observations. The dependent variable being total imports of goods and services, measured in millions and obtained from (BDL). The main explanatory variables are the Real Exchange Rate (RE) and the Lebanese Purchasing Managers Index (PMI).

The real exchange rate is identified as follows:

- (1) $RE = eP^*/P$
- $RE = RE_{t-1} + RE_{t-1} (\Delta e/e - \Delta p/p + p^*/p^*)$

Meanwhile, the Lebanese PMI was obtained from S&P Global and BLOMInvest.

To examine the relationship between imports, the real exchange rate and Lebanon PMI, a multiple regression model was estimated. Total imports are specified as the dependent variable, while RE and PMI are used as explanatory variables.

- (2) $M = f(RE, PMI_{leb})$
- $\ln(m) = \beta_0 + \beta_1 \ln(RE) + \beta_2 \ln(PMI_{leb})$

We expect the relationship between imports and RE to be negative (higher or depreciating RE should reduce imports), while the relation between imports and PMI_{leb} to be positive (higher PMI should increase imports). To account for the scale and distribution of the variables, the total imports, real exchange rate and PMI variables were transformed into their natural logarithms, and were used in the regression analysis. This allows the coefficients to be interpreted as elasticities measuring the percentage change in the respective variable in terms of the other variable.

Several econometric diagnostic tests were undertaken to assess the reliability of the regression model. First the variance inflation factor (VIF) was used to test for potential multicollinearity between variables (RE & PMI). Then the Lagrange Multiplier (LM) test was used to assess the presence of serial correlation in the residuals. Finally, the Breusch- Pagan (BP) test was conducted to assess the presence of heteroscedasticity in the regression residuals.

- **Export analysis**

The export analysis uses the same monthly study period as the import analysis, covering August 2019 to December 2025. The dependent variable is total exports of goods and services, measured in millions and obtained from (BDL). In addition to the real exchange rate, global output is included as an explanatory variable to account for changes in external economic conditions that may influence demand for Lebanese exports, proxied by the sub-index output of global PMI.

A multiple regression model was estimated using the variables mentioned, all three variables were expressed in their natural logarithmic form. The export model is specified as follows:

- (4) $X = f(\text{RE}, \text{output}_{\text{global}})$
- $\ln(X) = \beta_0 + \beta_1 \ln(\text{RE}) + \beta_2 \ln(\text{output}_{\text{global}})$

In this case, we expect the relation between exports and RE to be positive, and the relation between exports and $\text{output}_{\text{global}}$ to be positive as well. The estimated coefficients can be interpreted as elasticities, indicating the percentage change in total exports associated with a one-percent change in RE or global output, holding the other variable constant.

Empirical Evidence

- Export empirical evidence

The export regression results are reported in the tables below.

Regression Statistics	
Multiple R	0.233404397
R Square	0.054477613
Adjusted R Square	0.02857289
Standard Error	0.184837973
Observations	76

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	0.14369826	0.07184913	2.102999243	0.129425929
Residual	73	2.494050579	0.034165076		
Total	75	2.637748838			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.004191294	0.021950155	0.190945967	0.849097988	-0.039555302	0.047937889
log re	0.167546238	0.158779636	1.05521238	0.294808079	-0.148901121	0.483993596
log output	-0.936346632	0.500493136	-1.8708481	0.065374138	-1.933828013	0.061134749

The model produces an R^2 of 0.054478, meaning that approximately 5.45% of the variation in total exports is explained by RE and global output.

The F-statistic is 2.103 with a significance of 0.129, indicating that the model is not jointly statistically significant at 5% significance level.

The coefficient of Log RE is 0.1675, implying that a 1% increase in the real exchange rate is associated with an estimated 0.168% increase in total exports, holding global output constant. However, the P-value of 0.2948 indicates that the relationship is statistically insignificant. Thus, the results do not provide sufficient evidence that changes in the real exchange rate systematically affected Lebanon's exports during the crisis.

The coefficient of log output is -0.9363, meaning that a 1% increase in global output is associated with an estimated 0.936% decrease in total exports, holding RE constant. Its P-value of 0.0654 makes it insignificant at 5%. The negative relationship is contrary to the conventional expectation that stronger global output would increase demand for Lebanese exports, suggesting that other factors influenced export performance that we will be discussing thereafter.

Overall, the results provide limited evidence that RE and global output explains Lebanon's export performance. The low R^2 and lack of 5%-level significance indicate that other factors played a role in determining total exports.

Import empirical evidence

The import regression results are presented below.

<i>Regression Statistics</i>	
Multiple R	0.24253661
R Square	0.058824007
Adjusted R Square	0.033038364
Standard Error	0.149488669
Observations	76

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-0.004422587	0.017191681	-0.257251602	0.797708	-0.0386856	0.02984038
Log RE	0.092940934	0.127673302	0.72795904	0.468967	-0.1615116	0.34739346
log PMI leb	0.532706208	0.270479857	1.969485691	0.052692	-0.0063594	1.07177179

The model has an R^2 of 0.0588, meaning that log RE and log PMI jointly explain approximately 5.88% of the variation in total imports.

The coefficient on log RE is 0.0929, holding PMI constant. However, the coefficient has a P-value of 0.468 and is therefore statistically insignificant at the 5% significance level. Consequently, although the estimated coefficient is positive (should be negative), the results do not provide sufficient empirical evidence of a systematic relationship between the real exchange rate and Lebanon's total imports. It also suggests that within this specification, changes in the real exchange rate are associated with hardly any change in import volumes.

The coefficient on log PMI is 0.05327, indicating that a 1% increase in PMI is associated with an estimated 0.533% increase in total imports, holding the real exchange rate constant. This positive relationship is consistent with the idea that stronger domestic business activity and improving economic conditions can increase demand for imported goods. However, the P-value of 0.0527 is slightly above the 5% significance level, therefore the relationship is not statistically significant at 5% although it is very close to the threshold and would be considered significant at the 10% level.

Furthermore, the regression suggests that domestic business activity has a stronger estimated association with imports than the real exchange rate, although the relatively low R^2 indicates that most of the variations in imports remain unexplained by the two variables included.

We present an (optional) section on the tests performed on the imports regression.

1. Multicollinearity Test- (VIF)

The Variance Inflation Factor (VIF) test was conducted to determine whether the explanatory variables are highly correlated with one another in a way that could distort the estimated coefficients.

VIF RE	1.002475
VIF PMI	1.002475

The VIF for log RE and log PMI are both at 1.002475. These values are extremely close to 1, providing evidence that the two variables do not exhibit problematic multicollinearity.

2. Correlation test

The correlation test provides further evidence regarding the relationship between the variables.

Correlation	0.049688
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The correlation coefficient between log RE and log PMI is 0.0497, indicating an extremely weak positive linear relationship. This suggests that movements in the real exchange rate and in business activity do not generally move closely together.

3. Autocorrelation test- Durbin Watson (DW)

The Durbin Watson test was used to assess whether regression residuals display first-order serial correlation over time.

Durbin Watson	2.43524974
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The calculated DW statistic is 2.43525. Since a value around 2 is generally linked with the absence of first-order correlation, the result does not indicate a strong serial correlation problem in the residuals.

4. Heteroscedasticity test- LM test

The Lagrange Multiplier (LM) test was conducted to determine whether the variance of the regression residuals is constant across observations.

R ² =	0.014998
N=	76
LM=	1.139848

The auxiliary regression produces an R^2 of 0.014998 using 76 observations, resulting in an LM statistic of 1.1398. With two variables, the 5% chi-square critical value is 5.991. Since the LM statistic is less than the critical value ($1.1398 < 5.991$), the null hypothesis of homoscedasticity is not rejected. This means there is no evidence of heteroscedasticity, and the variance of the regression errors can be considered constant.

- Interpretation of Findings

The findings show that the real exchange rate did not have a statistically significant effect on either Lebanon's exports or imports during August of 2019 till December of 2025 contrary to expectations especially given the large depreciation of the Lebanese pound during the economic crisis. Ordinarily, depreciation would be anticipated to make exports more competitive and imports more expensive. However, our results do not show a significant relationship between the real exchange rate and either trade variables.

One reason for this could be the economic conditions in Lebanon during the crisis. The depreciation happened alongside hyperinflation, lower purchasing power, economic uncertainty, and difficulties for businesses in accessing finances. These factors may have influenced trade, making it more difficult for changes in the real exchange rate alone to affect exports and imports.

In the case of exports especially, higher production costs, difficulties obtaining imported inputs, and a limited production capacity could have reduced the ability of Lebanese businesses to increase exports even when the exchange rate became more favorable.

The export results also showed a negative relationship between global output and Lebanon's total exports. The result was insignificant at the 5% significance level, which was unexpected, as higher global output would generally be a reason to increase demand for exports. Nonetheless, as said Lebanon's exports may have been affected by other factors, such as production constraints, financing difficulties, changes in exports markets, and the overall economic crisis. The low R^2 values for both models support the idea that many other variables affected Lebanon's exports that were not included in the models.

The import outcomes are particularly important because Lebanon is highly dependent on imported goods. Although the real exchange rate had a positive coefficient of 0.093, the relationship was statistically insignificant. This means the depreciation of the Lebanese pound did not lead to the expected significant reduction in imports in the model. One possible explanation is that many of Lebanon's imports are essential goods that cannot be easily replaced by domestic production, such as pharmaceuticals. Therefore, even when imports become more expensive because of exchange rate movements, demand for them may remain relatively high. Another reason is the local production dependence on imported raw materials, which limits the decline in domestic product prices. This could reduce the effect that the real exchange rate would normally have on import demand.

The positive relationship between Lebanese PMI and imports provides another possible explanation for the behavior of imports. The coefficient of 0.533 suggests that higher business activity was associated with higher imports, and the P-value of 0.053 is very close to the 5% significance level. This is consistent with Lebanon's economic structure, as businesses rely heavily on imported goods and inputs for their operations. When business activity improves, demand for these imports can increase. Hence, this relationship may be more relevant for explaining import movements during economic instability rather than the exchange rate. To summarize, the results suggest the relationship between the real exchange rate and Lebanon's trade was not straightforward during the studied period.

Conclusion

This paper examined the relationship between real exchange rate and Lebanon's imports and exports, while also looking at the Lebanese PMI and global output as proxies for local and global economic conditions. All things considered, the results did not show a statistically significant relationship between the real exchange rate and either imports or exports. This means that despite the large changes in exchange rate during the crisis, we cannot conclude from our result that the exchange rate was a significant driver or determinant of Lebanon's trade.

Moreover, what these results show is that Lebanon's best lever to increase competitiveness is to improve productivity and fundamentals, including good governance. These would make domestic goods and services viable substitutes to imports and would turn our exports more attractive in global markets.

Lastly, in terms of policy implications, though the choice of exchange rate regime should be a priority, perhaps even more important is reforms to the real economy and business climate, as well as securing reliable trade routes and agreements. Most of all, an environment of political stability, sovereignty, and security should be the first order of business.

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