

The Impact of Export Instability on Economic Growth: Evidence from Jordan

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Abstract

To provide empirical evidence on the impact of export instability on economic growth in developing countries, this study estimated the neoclassical production function using data of the Jordanian economy for the period 1995–2019. Real exports, real capital, and export instability were the independent variables in the production function. To determine the appropriate methodology for estimating the production function, the study conducted some preliminary tests, including the Augmented-Dickey Fuller (ADF), on the study data. The results of this test indicated that all study variables were stationary at first difference. Therefore, the Johanson cointegration test was applied to determine that there was cointegration between the study variables since the results of the former test indicated that there was one cointegration vector between these variables. The cointegration equation revealed a positive and statistically significant impact of real capital, real exports, and an indicator of export instability on economic growth. The most important policy implications for these results would be reducing the geographical concentration of exports through the expansion of free trade agreements (FTA) to enhance the positive impact of the instability of exports on economic growth. Moreover, the study recommends strengthening export-oriented actions to achieve higher levels of economic growth.

Keywords: Export Instability, Economic Growth, Jordan, Time Series, Cointegration

JEL Classification Code: F14, F17, F43, O24, P45

1. Introduction

The relationship between exports and economic growth has been widely discussed in the literature on economic development. Some development economists have regarded export growth as one of the main determinants of economic growth, due to the role of exports in providing foreign reserves that are needed to import technology and factors of production, especially in countries that are scarce in

some of these inputs. Moreover, exports raise the level of technical and skilled production processes and increase the specialization of economic resources.

Lee and Huang (2002) summarized the impact of exports on economic growth through three points: First, the growth of exports has a stimulating effect on total factor productivity growth through its positive impact on higher rates of capital formation. Second, the growth of exports helps reduce foreign exchange constraints, thereby facilitating the import of capital goods needed for economic growth. Third, overseas competition from overseas ensures an efficient price mechanism that fosters optimum resource allocation and increases the pressure on industries that export goods to keep costs relatively low and to improve technological change, thereby promoting economic growth.

This important and predictable role of exports in stimulating economic growth requires clear and certain growth rates in export earnings. In addition, it requires the ability to predict future earning under the circumstances of the exporting or importing country to build credible and applicable development plans. Therefore, export earnings instability influences the relationship between exports and economic growth as well as the implementation of

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development plans in exporting countries. However, the essence of export instability is that export earnings like other economic variables do not follow a smooth or certain path over time. Such earning behavior generates costs for the domestic economy (Love, 1987; Coppock, 1977).

Many recent studies based on statistical evidence have concluded that the instability index of exports is positively correlated with the degree of commodity concentration of exports and with the proportions of exports receipts obtained from the sales of primary goods, and negatively correlated with per capita income and with the concentration of exports by geographical area of destination (Okonkwo & Douglas, 2016).

Economic performance may be constrained by changes in export earnings and in such a way that the high fluctuation of foreign exchange earnings could become a constraint on the development of developing countries because it generates unexpected signals that negatively affect investment decisions and entrepreneurs' expectations for the future and increases the risk of new investment opportunities. This leads to limited growth prospects. In addition, the fluctuation of foreign exchange earnings decreases funds for the import of essential goods and machinery required for development (Chaudhary & Qaisrani, 2002). Others consider that export instability positively affects economic growth through uncertainty and fear of the future, thereby increasing savings and hence investment. The unclear relationship between export stability and economic growth remains a subject of discussion in the economic literature, especially in less developing countries.

In Jordan, export earnings fluctuated visibly during the study period, particularly after 2008 (the financial crisis and the so-called Arab Spring) due to a combination of economic and non-economic factors surrounding Jordan and its trading partners, which affected the volume of Jordanian exports. The highest value for Jordanian exports during the study period was 5163.03 million Jordanian dinars in 2014, whereas the lowest value was in 1995. It amounted to 1005.53 million Jordanian dinars and a standard deviation of exports is 1611.15 million Jordanian dinars during the study period. These figures indicate the fluctuation of Jordanian export earnings. It is worth mentioning that the current period is also witnessing a decline in Jordanian exports due to the repercussions of COVID-19 and the closures imposed by this pandemic.

Furthermore, Jordanian exports are characterized by a combination of characteristics that increase the instability of export earnings. These characteristics are generally regarded as a feature of trade in most less developed countries as the foreign trade of less developed countries is characterized by the concentration of exports in specific groups of goods and for certain countries. However, annual statistics from the Central Bank of Jordan indicate the concentration of Jordanian exports in three main groups of goods. They are food and live animals, raw materials, and chemicals. These

groups account for 58.5% of Jordanian exports during the study period. Moreover, data on the geographical distribution of Jordanian exports indicate that 74.2% of Jordanian exports go to the Arab countries, the United States, and Indian markets. In general, Jordanian exports are undervalued compared to Jordanian imports, resulting in a chronic deficit in the Jordanian trade balance.

Given the fluctuation of Jordanian export earnings and the thorny debate among economists about the impact of export instability on economic growth in less developed countries, this study aimed at analyzing the impact of export instability on Jordan's economic growth during the period 1995–2019. Therefore, this study provides empirical evidence of the impact of the instability of exports on economic growth in less developed countries, especially in light of the lack of studies that dealt with this issue in Jordan. What makes this study important is its attempt to reach a set of conclusions and recommendations that could serve the economic policymakers in Jordan and help enhance the positive impact of Jordanian exports on economic growth.

Finally, the study consists of five sections, the first section of which presents an introduction to the topic of the study and the main features of Jordanian exports. The second section deals with the literature review that explains the relationship between export instability and economic growth in addition to some previous studies on the subject. The third section presents the methodology and econometric model used to achieve the objective of the study, while the fourth section discusses the results and concludes with the fifth section, which presents the main findings and recommendations reached.

2. Literature Review

The investigation into the factors that increase or hinder economic growth has been one of the central tenets amongst theoretical and empirical growth researchers (Chirwa & Odhiambo, 2016). Economic growth is considered as one of the most important ultimate goals of all economies in the world. Lots of research found economic growth is closely consistent with the development of trade and viewed it as the main engine to enhance the quality of humans (Nguyen & Do, 2020). Some of these studies focused on export-oriented strategy also called "export-led growth" which was suggested by Ricardo and Smith in the 19th century based on the theory of comparative advantage of the country (Vo, 2019), to investigate the role of exports and international trade in enhancing economic growth. But this role is influenced by the export earnings instability, especially in less developed countries. Therefore, most studies on the impact of export instability on economic growth have focused on less developed countries, since economists believe that export instability is more severe for such countries than for developed countries.

The importance of the instability of exports in less developed countries is due to three factors: First, less

developed countries specialize in the production and export of primary commodities. Second, less developed countries' exports are concentrated in a small group of goods. Third, less developed countries' exports concentrate on a small group of markets, which are often traditional markets (Hock, 1977). These points and their impact on export instability can be explained by the concept of elasticity, where demand for primary exports is considered inelastic because developed countries' expenditure on these commodities constitutes a small proportion of their income. Moreover, there are limited alternatives to these commodities. Consequently, the price change of these commodities does not significantly change the quantity demanded of these commodities.

On the supply side, the expansion of the production of these commodities is limited by time, weather conditions, and pests, especially agricultural products, as well as the lack of alternatives to production methods. Thus, the supply of these commodities is also inelastic. In general, the lower price elasticity of demand leads to lower returns and spending on these commodities as prices fall.

Mullor-Sebastian (1988) provided another explanation for the increasing instability of exports in less developed countries, relying on the life-cycle theory of comparative advantage. In general, manufacturing processes tend to be in the country that developed and invented the product. Because developed countries spend more on research and development compared to less developed countries, the manufacture of products is initially in developed countries. Furthermore, these countries naturally monopolize the production and export of these products. Thus, by the time the manufacture of such products moves to less developed countries, the process of entering the products of less developed countries into the world market is difficult, as developed countries' products are firmly established in these markets, making the process of entering new arrivals very difficult. Thus, the role of less developed countries is represented by the role of residual suppliers if they are not able to displace the original exporters and seize a larger share of the market.

The residual suppliers absorb a larger part of demand fluctuation because they produce a small share of the world

markets in times of economic recession, where most of the market demand from developed countries is satisfied because of their well-established global markets, their marketing and credit capacity, and the quality of the goods they produce, making their products more attractive to consumers. On the other hand, less developed countries have an opportunity to expand production and exports in years of economic expansion, especially when developed countries are unable to satisfy increased market demand. Accordingly, the significant decline in less developed countries' exports in years of recession and growth and years of expansion explains why less developed countries' exports are more unstable than those of developed countries.

Many empirical studies have been conducted on less developed countries, where it has been proven that the instability of exports has a positive impact on economic growth, and some of them have indicated a negative impact. Rashid et al. (2012) presented the mechanism that explains the positive or negative impact of export instability on economic growth based on a series of studies. They explained the negative impact of export instability through a lack of inputs during the production process, as increasing export instability leads to a reduction in foreign reserves, thereby reducing the country's ability to import capital goods needed in production processes. Moreover, a decline in capital goods and capital accumulation leads to a reduction in the size of investment and hence in the size of production.

The negative impact of export instability can be illustrated as follows (Figure 1).

The positive relationship between export instability and economic growth can be explained by the impact of export instability on consumption and savings. When exports become more unstable, uncertainty about individuals' income increases, causing them to increase their savings in a precautionary manner through reducing their consumption, resulting in a lower marginal propensity to consume and an increased marginal propensity to save. Increased saving in the economy leads to increased investment and hence production.

The positive impact of export instability can be illustrated as follows (Figure 2).

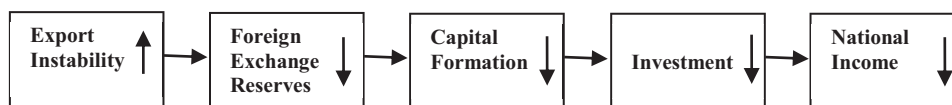


Figure 1: Negative Effects of Exports Instability on Economic Growth

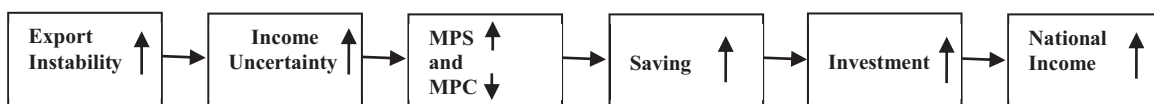


Figure 2: Positive Effects of Exports Instability on Economic Growth

These expected effects of export instability on economic variables have led many studies to focus on this variable and to include it as a determinant in many econometric models of economic growth. One such study was the study of Fosu (1992) who examined the role of economic instability in the economic growth of African less developed countries by analyzing 1970–86 data for a sample of 35 less developed countries and subsample of 30 sub-Saharan African less developed countries. The results of this study indicated a negative and statistically insignificant impact of export instability on economic growth in African less developed countries. On the other hand, export instability was negative and statistically important for economic growth in non-African less developed countries.

Moreover, Chaudhary and Qaisrani (2002) designed a set of econometric models to test the impact of export instability on macroeconomic variables and apply them to data from the Pakistani economy for the period 1972–1994. The results indicated that export instability did not affect economic growth in Pakistan, nor did export instability have an effect on the import of capital goods and domestic investment in Pakistan. The study of Kaushik et al. (2008) used the cointegration and error correction model to study the relationship between economic growth, export growth, export instability, and total fixed capital composition in India during the period 1971–2005. The results indicated that there was a long-term relationship between these variables, and the Granger causality test indicated a one-way causal relationship from real exports to real gross domestic income.

However, the study of Kweka and Rutasitara (2012) examined the impact of export earnings instability on Tanzania's economic growth using annual data for 1968–2008. The most important finding of this study was the long-term negative relationship between aggregate export instability and economic growth. This negative relationship was stronger when examining the impact of traditional export instability on economic growth which dominates the total exports in Tanzania. Moreover, Rashid et al. (2012) tested the hypothesis that export instability affects economic growth for a group of South Asian Association Regional Cooperation Region Countries, namely Pakistan, India, Sri Lanka, and Nepal. The cointegration test was used to examine the impact of export instability on economic growth, and the results indicated a negative impact of export instability on economic growth in these countries.

3. Methodology

3.1. Model

To achieve the objective of this study and to analyze the impact of export instability on economic growth, the study relied on employing the neoclassical aggregate production function with the use of exports and export instability as

independent variables. The development theories have pointed to the importance of exports for economic growth through their role in providing foreign reserves that is needed for import capital goods and raw materials, as well as in increasing the specialization of economic resources. Additionally, the role of export instability on economic growth depends on the response of economic units to uncertainty in export earnings. It cannot be predetermined.

The former model has been used in many studies, such as Kaushik et al. (2008), Rashid et al. (2012), and other studies. Thus, the production function can be specified as follows:

$$RGDP = f(RK, RX, EI)$$

The previous production function can be written in an econometric form as follows:

$$RGDP_t = \beta_0 + \beta_1 RK_t + \beta_2 RX_t + \beta_3 EI_t + u_t \quad (1)$$

Where,

$RGDP_t$: Real gross domestic product in period t

RK_t : Real gross fixed capital formation in period t

RX_t : Real exports of goods and services in period t

EI_t : Export instability index in period t

$\beta_0, \beta_1, \beta_2$ and β_3 : Parameters to be estimated

u_t : error term

The expected signs for parameters β_1 and β_2 based on economic theories are positive, whereas the expected sign for β_3 could be positive or negative, for it depends on the response of economic units to export instability, as indicated in the theoretical framework of this study.

To obtain the growth rates of the study variables and to achieve smoothing between the values of these variables, the econometric model (1) was estimated using the logarithm formula, so the logarithmic transformation of the model can be specified as follows:

$$\log(RGDP_t) = \alpha_0 + \alpha_1 \log(RK_t) + \alpha_2 \log(RX_t) + \alpha_3 \log(EI_t) + u_t \quad (2)$$

Where,

log: logarithm

$\alpha_0, \alpha_1, \alpha_2$ and α_3 : Parameters to be estimated

3.2. Data

To estimate equation (2) and to analyze the impact of export instability on economic growth, the study used annual data of the Jordanian economy for the period 1995–2019, obtained from the website of the Central Bank of Jordan.

The study used the real gross domestic product as a dependent variable, while it used real exports, real gross fixed capital formation, and export instability index as independent variables. Furthermore, the GDP deflator was used as a price index to obtain the real values of these variables and assuming the base year 2006.

To calculate the export instability index, the previous literature presented several methods, including coefficient of variation, moving average method, the absolute difference between actual export earnings and the trend values of export earnings, and ARCH approaches. This study will depend on the difference between the actual and estimated values obtained by fitting the linear and exponential trend lines since this method measures the fluctuations of exports around its trend. Moreover, this method was used in many studies such as Massell (1970), Kingston (1976), Fosu (1992), and others, where the calculation of the export index depended on the following formula:

$$EI_t = \left[\frac{\sum_{i=1}^T (X_t - \hat{X}_{it})^2}{df} \right]^{\frac{1}{2}}$$

Where:

- X_t : The value of exports of goods and services in period t
- \hat{X}_{it} : The estimated value of exports based on the linear formula ($i = 1$) or the exponential formula ($i = 2$)
- T : Sample size
- df : Degrees of Freedom

The linear and exponential form of the formula used to estimate exports can be formulated as follows, respectively:

$$X_t = a_1 + a_2t \text{ and } X_t = A_1 + \iota$$

Where,

- X_t : The value of exports of goods and services in period t
- t : The trend variable

a_1, a_2, A_1 and A_2 : Parameters estimated using the least-squares method

After estimating the linear and exponential form of the export estimation equation, the results indicated that the exponential equation had the best fitting of export data. Therefore, they were relied upon to calculate the export instability index used in this study.

4. Results and Discussion

4.1. Unit Root Test

Estimating equations based on time series could give rise to the problem of spurious regression, which may arise due to estimating equations using time series containing unit root (nonstationary) (Gujarati, 2003). Therefore, to avoid the problem of spurious regression, it is necessary first to test the stationarity of the data and to determine the appropriate methodology for estimating the equation (2). The previous literature presented several tests used to test the unit root. The most famous one is the Augmented Dicky Fuller Test (ADF).

The null hypothesis of the ADF test states that the time series contains a unit root, meaning that it is nonstationary, whereas the alternative hypothesis states that the series is stationary (Gujarati, 2003). If the null hypothesis is accepted, the series is nonstationary, and the test must be repeated at the first or second difference to determine the level of stationary. In this study, the ADF test was applied to the study variables to determine their level of stationary. Table 1 indicates the results of this test.

Based on the results of the ADF test, the null hypothesis was accepted for all variables at the level, at a significant level of 5%, which means that the variables were non-stationary at the level. Therefore, the test was repeated at the first difference where the null hypothesis was rejected at a significant level of 5%, which means that all variables became stationary at the first difference. Moreover, the optimal lag length was determined based on the minimum value of Akaike's information criterion (AIC) to ensure that the ADF equation was free from the autocorrelation problem.

Table 1: ADF Results

Variables	At Level		At First Difference	
	ADF Statistic	Critical Value at 5% Level	ADF Statistic	Critical Value at 5% Level
Log(RGDP)	-1.747	-2.998	-4.05*	-3.73
Log(RK)	-1.03	-3.612	-3.535*	-1.956
Log(RX)	-2.817	-3.658	-4.439*	-3.622
Log(EI)	-2.812	-3.612	-5.79*	-1.956

*Denotes the null hypothesis is rejected at 5% level.

Table 2: The Results of Johanson Cointegration Test

Hypothesized No. of CE (S)	Eigen-value	Trace Statistics	Critical Value at 5% Level	Max-Eigen Statistics	Critical Value at 5% Level
None*	0.862	70.132	63.876	47.562	32.118
At most 1	0.379	22.54	42.915	11.423	25.823
At most 2	0.258	11.147	25.872	7.157	19.387
At most 3	0.153	3.99	12.518	3.99	12.518

*Denotes the null hypothesis is rejected at 5% level.

4.2. Cointegration Test

The identification of long-run connections among the variables is essential before estimating the econometric model. It can be of importance to determine any strong association among the variables after estimating the econometric model when there are no long-run associations among the variables (Marimuthu et al., 2021). Therefore, the Johanson cointegration method was applied to determine whether there was a vector of cointegration between the study variables. Table 2 presents the results of Trace and Max-eigen value tests for cointegration, where they indicated the rejection of the null hypothesis, which indicated that there was no cointegration equation at the 5% level of significance. This meant that there was one vector of cointegration among the study variables.

After adjusting the signs of independent variables, the cointegration equation could be presented as follows:

$$\log(\text{RGDP}_t) = 6.38 + 0.103 \log(\text{RK}_t) + 0.255 \log(\text{RX}_t) + 0.023 \log(\text{EI}_t) + 0.033 \text{trend}$$

(3.592)* (7.553)*
(4.689)* (40.019)*

Note: the value in parentheses is *t*-statistic and * denotes variable is significance at 5% level.

The results of equation (3) indicated that there was a positive and statistically significant effect of real gross fixed capital formation on the real gross domestic product, as an increase in real gross fixed capital formation by 1% led to an increase in the real gross domestic product by 0.103%, and this is consistent with economic theories that indicated the importance of capital for economic growth. In addition, there was a positive and statistically significant effect of real exports on the real gross domestic product, where an increase in exports by 1% led to an increase in the real gross domestic product by 0.225%, and this result is consistent with many studies that confirmed the export-led-growth hypothesis.

Furthermore, the results indicated a positive and statistically significant effect of the instability of exports

on the real gross domestic product, as the increase in the instability index of exports by 1% led to an increase in the real gross domestic product by 0.023%. This means that increased export instability increases uncertainty about individuals' income, leading them to increase their savings in a precautionary manner by reducing their consumption. This results in a lower marginal propensity to consume and an increased marginal propensity to save. This behavior leads to an increase in saving in the economy, which in turn leads to an increase in investment and hence production.

5. Conclusion

This study aimed at analyzing the impact of export instability on economic growth using data of the Jordanian economy during the period 1995–2019, where the neoclassical aggregate production function was used and real exports, real capital, and export instability were included as independent variables in the production function. The ADF and Johanson cointegration tests were applied to determine the level of stationary and cointegration between these variables.

The results of these tests indicated the nonstationary of the study variables at the level, while they became stationary at the first difference. The cointegration test also indicated that there was a single vector for cointegration between the study variables. Furthermore, the cointegration equation revealed a set of results. The most important of which was is the positive and statistically significant impact of real gross fixed capital formation on the real gross domestic product, where increasing real gross fixed capital formation by 1% increased real gross domestic product by 0.103%. In addition, there was a positive and statistically significant impact of real exports on the real gross domestic product, as an increase in real exports by 1% increased real gross domestic product by 0.225%. The results also indicated that export instability had a positive impact on real gross domestic product as increasing the export instability index by 1% increased real gross domestic product by 0.023%. This implies that increased export instability increases income uncertainty,

which in turn stimulates increased savings, investment, and economic growth.

The most important policy implications for these results would be reducing the geographical concentration of exports through the expansion of free trade agreements to enhance the positive impact of the instability of exports on economic growth, as previous studies indicated a negative impact of geographical concentration on the stability of exports. Moreover, the study recommends strengthening export-oriented actions to achieve higher levels of economic growth.

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