

The Effect of Exports and Imports on Economic Growth in the Arab Countries: A Panel Data Approach

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Abstract. The study focused on the effect exports and imports on economic growth in the Arab countries during the period 1995 to 2013. The study used panel data approach in 17 countries: (Jordan, United Arab Emirates, Bahrain, Tunisia, Algeria, Saudi Arabia, Sudan, Oman, Qatar, Kuwait, Lebanon, Egypt, Djibouti, Mauritania, Morocco, Yemen and Palestine). The study used panel data approach by E views program. The study found that the effect exports and imports have positive effect of economic growth in the Arab countries during the period 1995 to 2013. The study recommended it is important indicator for measuring the efficiency and effectiveness of the work element in achieving a certain level of the output in the production process. There is need to increase the imports of technology for increasing labor productivity which can directly promote economic growth, and thus improve the standards of living in the Arab countries.

Keywords. Panel Data Approach, Housman, Exports, Imports.

JEL. E62, H54, O40.

1. Introduction

The exports and imports play important role on economic growth in the developed and developing countries, economic growth is one of the most important determinants of economic welfare. The relationship between exports and economic growth is a frequent topic of discussion, when economists try to explain the different levels of economic growth between countries. Exports of goods and services represent one of the most important sources of foreign exchange income that ease the pressure on the balance of payments and create employment opportunities. According to Feder (1982), exports contribute to economic growth in a variety of ways - greater capacity utilization, economies of scale, incentives for technological improvement and pressure of foreign competition, leading to more efficient management. Thus, marginal factor productivities are expected to be higher in export industries than in non-export industries. The cross-sectional analysis by Feder (1982) and Ram (1987) confirm this productivity differential for developing countries, although the differential coefficients in Feder (1982) for developed countries are insignificant. The exports growth in the Arab countries was 14.78 percent per annum during the period 1995-2013. The average export was USD 667.55 billion (47.87 percent of GDP) during the period 1995 to 2013. The exports in Arab countries increased from USD 178.58 billion (34.34 percent of GDP) in 1995 to USD 216.26 billion (35.49 percent of GDP) in 1997, then the exports in Arab countries decreased to USD 172.18 billion

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(29.30 percent of GDP) in 1998. The exports in Arab countries decreased to 877.91 billion (48.94 percent of GDP) in 2009. The exports in Arab countries was constantly rising during the period 2010 to 2013, where the exports in Arab countries increased from 1077.15 billion (51.34 percent of GDP) in 2010 to 1558.60 billion (54.81 percent of GDP) in 2013.

The imports growth in the Arab countries was 13.38 percent per annum during 1995-2013. The average imports were USD 508.06 billion (35.76 percent of GDP) during period 1955 to 2013. The imports in Arab countries increased from USD 173.92 billion (33.44 percent of GDP) in 1995 to USD 187.86 billion (31.97 percent of GDP) in 1998 and then decreased to USD 180.57 billion (28.21 percent of GDP) in 1999. During the period 2003 to 2008 the imports in Arab countries increased from USD 270.28 billion (33.04 percent of GDP) in 2003 to USD 880.82 billion (42.47 percent of GDP) in 2008, then to USD 1130.94 billion (41.19 percent of GDP) in 2012. The Arab countries recorded imports of USD 1226.76 billion (43.14 percent of GDP) in 2013.

This paper focused to estimate the effect exports and imports on economic growth in the Arab countries during the period 1995 to 2013, by panel data method.

2. Literature Review

Several studies address the importance of exports and imports on economic growth. The findings of these studies indicate that exports and imports have a statistically significant positive impact on economic growth. We can summarize some of these studies that have addressed the issue of effect exports and imports on economic growth as follows:

Afaf, (2015) investigated the impact of exports and imports on the economic growth of Tunisia over the period 1977-2012. The study used Granger Causality and Johansen Cointegration approach for long run relationship using Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) stationarity test, the variable proved to be integrated of the order one (1) at first difference. Johansen and Juselius Cointegration test was used to determine the presence or otherwise of a cointegrating vector in the variables. The study found finding is clarified that export, import and GDP are found of order one (t) stationary at the first differences. Therefore, the variables were found to be integrated of order one. The cointegration test confirmed that GDP, export and import are cointegrated, indicating an existence of long run equilibrium relationship between all the variables. Abugamea, (2015) Examined the both the long run and short run relationships between economic growth, exports and imports of Palestine for the time period 1968-2012, The study used the cointegration and Granger causality tests. The study found results based on vector error correction models (VECM) confirm the existence of a long run relation between imports and economic growth and show that both exports and imports are the main determinants of economic growth in the Palestinian case. Causality tests confirm VECM results that imports cause changes in economic growth in the long run but not in the short run. Kalaitzi (2013) examined the relationship between exports and economic growth in the United Arab Emirates over the period 1980-2010. The study applied the two-step Engle-Granger cointegration test and the Johansen cointegration technique in order to confirm or not the existence of a long-run relationship between the variables. Moreover, this study applied a Vector Autoregression Model in order to construct the Impulse Response Function and the Granger causality test to examine the causality between exports and economic growth. The findings of this study confirmed the existence of a long-run relationship between manufactured exports, primary exports and economic growth. In addition, the Granger causality test

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showed unidirectional causality between manufactured exports and economic growth. Thus, further increase in the degree of export diversification from oil could accelerate economic growth in UAE. Elbeydi (2010) investigated the relationships between export and economic growth in Libya. An econometric model has been developed and estimated in order to determine the direction of causality in both, short and long run. The annual time series used for the estimation cover the time period 1980 – 2007. The findings indicate that the income, exports and relative prices are cointegrated. The long run bidirectional causality between the exports and income growth has been also proved. The study result indicates that the export promotion policy contributes to the economic growth in Libya. Al-Swaee (2008) estimated the role exports in economic growth in the west Asia region (oil and non-oil countries) during the period 1993 to 2003. This study used a panel data, the study found that the productivity of exports is positive effect on economic growth in oil countries and negative in the non- oil countries. The study recommended the adoption the policy of export- oriented to benefit from the comparative advantage in export of goods that the local resources a variable in all states of the region.

3. Methodology and Data

Based on the foregoing explained in the previous chapters, using a variety of applied studies for different models in estimating the determinants of economic growth in addition to the use of different methodologies, accordingly, the standard model in this study, the general equation is the following:

$$GDP = (EX, IM, GCF, LO)$$

Thus, our growth function becomes;

$$GDP_t = C + \beta_1 EX_t + \beta_2 IM_t + \beta_3 GCF_t + \beta_4 LO_t + \varepsilon_t$$

Where:

GDP_t : Economic growth (proxy for Gross domestic product in period t, (current price USD)

EX_t : Export of goods and services in period t, (current price USD)

IM_t : Import of goods and services in period t, (current price USD)

GCF_t : Gross capital formation in period t, (current price USD)

LO_t : Labor force

C: Constant

ε_t : The standard error

By taking the log of both sides of the equation becomes:

$$LOGGDP_t = C + \beta_2 \log EX_t + \beta_3 \log IM_t + \beta_4 \log GCF_t + \beta_5 \log LO_t + \varepsilon_t$$

Data have been collected during the period 1995 to 2013, for 17 countries in Arab countries :(Jordan, united Arab Emirates, Bahrain, Tunisia, Algeria, Saudi Arabia, Sudan, Oman, Qatar, Kuwait, Lebanon, Egypt, Djibouti, Mauritania, Morocco, Yemen and Palestine). Number of countries which could have been part of the sample were omitted due to lack of sufficient data on some of the variables under investigation because of the unstable political the situation. The sample under study the required secondary Data was collected from official sources like World Bank data.

4. Method

The study used the panel data method, through the use of three models is: Pool regression model (PRM), fixed effect model (FEM) and random effect model (REM). To know any better models to be used in the analysis will be applied tow test: the first test (test LM) Lagrange multiplier proposal from Preusch and Pagan in (1980). This test is used to choose between (PRM), (FEM) or (REM), the second test, Housman test (1978), for choose between (FEM), (REM).

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4.1. The Pooled Effect Model

It can clarify the compound regression model as follows:

$$Y_{it} = \alpha_i + \beta_{ki} + \varepsilon_{it} \quad (1)$$

Suppose pooled regression model homogeneity of variances random error between the countries under study limits ($\sigma_i^2 = \sigma_\varepsilon^2$), together with zero covariances between countries $\text{Cov}(\varepsilon_{it}, \varepsilon_{js}) = 0$ for $i \neq j$. (Alexiou, 2001: p.6). The model also assumes forming Fixed limit transactions ($\alpha_{i,s}$) and slope coefficients (β, s) for all countries.

Table 1. Results Pooled Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(EX)	-0.925845	0.432343	-2.141457	0.0330
LOG(IM)	2.215917	0.580230	3.819033	0.0002
LOG(GCF)	1.865242	0.514735	3.623696	0.0003
LOG(LO)	-0.090511	0.224829	-0.402577	0.6875
C	17.20529	3.181495	5.407926	0.0000

Note: R-Square = 0.641896 a adjusted R-Square = 0.637392

As shown table (1) the independent variable (export, import and gross capital formation) was significant at level of 1%, the labour was in significant at level of 1%. The exports and labour had negative effect, on economic growth in the Arab countries, import and gross capital formation was positive effect on the economic growth in the Arab countries. Also the R-Square reached 0.637 in the pooled effect model.

4.2. The Fixed Effect Model

The fixed effects model is simply a linear regression model in which the intercept terms vary over the individual units i , (Dinardo, Johnston, 1997:p.397).

$$Y_{it} = \alpha_1 \delta_{1it} + \alpha_2 \delta_{2it} + \dots + X_{it} \beta + \varepsilon_{it} \quad (2)$$

Where it is usually assumed that all x_{it} are independent of all ε_{it} , we can write this in the usual regression framework by including a dummy variable for each unit i in the model (Hsiao, 2003:p.96). That is,

$$y_{it} = \sum_{j=1}^N \alpha_j d_{ij} + x_{it} \beta + \varepsilon_{it} \quad (3)$$

Where $d_{ij} = 1$ if $i=j$ and 0 elsewhere. We thus have a set of N dummy variable in the model. The parameters $\alpha_1 \dots \dots \alpha_N$ and β can be estimated by ordinary least squares in (3). The implied estimator for β is referred to as the Least Squares Dummy Variable (LSDV) estimator. It may, however, be numerically unattractive to have a regression model with so many regressors.

Table 2. Results Fixed Effect Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(EX)	0.306909	0.042141	7.282905	0.0000
LOG(IM)	0.258478	0.053805	4.803968	0.0000
LOG(GCF)	0.123597	0.034310	3.602402	0.0004
LOG(LO)	0.373511	0.062443	5.981660	0.0000
C	15.31687	0.857984	17.85217	0.0000

Note: R-Square = 0.999/ a adjusted R-Square = 0.999

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As shown in table (2) the independent variables export, import, gross capital formation and labour was significant at level of 1%, also all the independent variables. Also the R-Square reached 0.999 in the pooled effect model.

4.3. The Lagrange Multiplier (LM) Test:

The Lagrange Multiplier model is as follows ([Greene, 2002:p.299](#))

$$LM = \frac{NT}{2(T-1)} \left[\frac{\sum_{i=1}^N (\sum_{t=1}^T \varepsilon_{it})^2}{\sum_{i=1}^N \sum_{t=1}^T \varepsilon_{it}} \right]^2 \sim \chi^2 \quad (4)$$

If the value of (p- value) statistical test (LM), is statistically significant for this test, it means that FEM, REM, would be better than PRM. If this value is not statistically significant for the same test, this means that PRM will be better than the FEM, REM.

Table 3. Result LM Test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	10742.605807	(16,302)	0.0000
Cross-section Chi-square	2049.722519	16	0.0000

As shown table (3) the effects models better than the pooled model.

4.4. The Random Effect Model

It is commonly assumed in regression analysis that all factors that affect the dependent variable but that have not been included as regressors can be appropriately summarized by a random error term. In our case, this leads to the assumption that the α_i are random factors, independently and identically distributed over individual distributed over individuals. Thus we write the Random Effects Model as,

$$y_{it} = \mu + x_{it}\beta + \alpha_i + \varepsilon_{it}, \varepsilon_{it} \sim \text{IID}(0, \sigma_\varepsilon^2); \alpha_i \sim \text{IID}(0, \sigma_\alpha^2) \quad (5)$$

where $\alpha_i + \varepsilon_{it}$ is treated as an error term consisting of two components: an individual specific component, that this not vary over time, and a remainder components, That is assumed to be uncorrelated over time, this is all correlation of the error terms over time is attributed to the individual effects α_i . It is assumed that α_i and ε_{it} are mutually independent and independent of x_{js} (for all j and s). This implies that the OLS estimator for μ and β from (5) is unbiased and consistent. The error components structure implies that the composite error term $\alpha_i + \varepsilon_{it}$ exhibits a particular form of autocorrelation (unless $\sigma_\alpha^2 = 0$) (Verbeek,2000).

Table 4. Results Random Effect Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(EX)	0.306790	0.042116	7.284369	0.0000
LOG(IM)	0.257684	0.053786	4.790881	0.0000
LOG(GCF)	0.124280	0.034305	3.622762	0.0003
LOG(LO)	0.376878	0.062245	6.054760	0.0000
C	15.26865	1.209722	12.62163	0.0000
Effects Specification			S.D.	Rho
Cross-section random			3.527444	0.9982
Idiosyncratic random			0.150530	0.0018
R-Square				0.931195
A adjusted R-Square				0.930330

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As shown in table (4) the independent variable (export, import, gross capital formation and labour were significant at level of 1%.The exports, imports, gross capital formation and labour were positive effect on economic growth in the Arab countries. Also the R-Square reached 0.931 in the random effect model.

4.5. The Hausman Test

Hausman test is used decide between Fixed Effect model and Random Effects model. Null hypothesis is that the preferred model is Random Effects Model vs. the alternative is the Fixed Effects model. It basically tests whether the unique errors (ui) are correlated with the regresses; the null hypothesis is they are not, ([Chmelarova, 2007](#)).

Table 5.Result Hausman Test

Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random		19.148622	4	0.0007
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var(Diff.)	Prob.
LOG(EX)	0.306909	0.306790	0.000002	0.9343
LOG(IM)	0.258478	0.257684	0.000002	0.5758
LOG(GCF)	0.123597	0.124280	0.000000	0.2164
LOG(LO)	0.373511	0.376878	0.000025	0.4977

As shown in table (5) the fixed effects models better than the random effects model. So they study was analysed the results fixed effects models:

$$LOGGDP_t = 15.31687 + 0.306909Ex_t + 0.258478 Im_t + 0.123597 GCF_t + 0.373511 LO_t$$

5. Results and Discussion

The study found the all independent variable had significant at level 1%. The study also found that the exports, imports, gross capital formation and labor had positive effect on economic growth in the Arab countries during the period 1995 to 2013. The coefficient of determination R2 is 0.999 which means that the explanatory variables explained a total variation of 99 percent of the dependent variable (GDP). The exports were a significant at the level of 1% and positive effect on economic growth in the Arab countries. Also the elasticity of exports in the Arab countries during the study period reached 0.30%, if the exports increased by 100% in the Arab countries the economic growth increased by 30 percent. The imports were significant at the level 1% and positive effect on economic growth in the Arab countries. Also the elasticity of imports in the Arab countries during the study period recorded 0.29 %, if the imports increased by 100% in the Arab countries the economic growth increased by 29 per cent during the period 1995 to 2013. The gross capital formation also was significant at level of 1% and had positive effect on the economic growth in the Arab countries. Also the elasticity of gross capital formation in the Arab countries during study period recorded 0.12%. It means if gross capital formation increase by 100% the GDP in Arab countries increased by 12 percent during the period 1995 to 2013.

The labour was significant at the level 1%, and had positive on the economic growth in the Arab countries. Also the elasticity of labour in Arab countries was 0.37% during the period 1995 to 2013. It means the labour in Arab countries increased by 100% the GDP increased by 37per cent, during the study period.

6. Conclusion and Policy Recommendations

The study aimed to find estimated the effect exports and imports of the economic growth in the Arab countries during the period 1995 to 2013, through a form of panel data which includes economic growth measured by GDP as the dependent variable, and a number of independent variables, which included exports, imports, labor and Gross capital formation, in 17 Arab countries. The countries studied were Jordan, United Arab Emirates, Bahrain, Tunisia, Algeria, Saudi Arabia, Sudan, Oman, Qatar, Kuwait, Lebanon, Djibouti, Mauritania, Egypt, Morocco, Yemen and Palestine. Number of countries which could have been part of the sample was omitted due to lack of sufficient data on some of the variables under investigation. The study the exports, imports, labor and gross capital formation had a positive effect on economic growth in Arab countries during the period 1995 to 2013. The study recommends the following policy measures for the economic growth in Arab countries. As long as the gross capital formation plays a key role in economic growth in the Arab countries, Arab countries must encourage increase in gross capital formation, to increase its contribution to economic growth. Support for growth-led export in Arab countries Thus effort should be direct towards policies that will enhance economic growth such as industrialization, in order to impact more on exports, the need to approach the Arab countries, to economic openness to enhance the role of exports and imports in the economic growth policy. Also Arab countries need to focus on vocational education, through the holding of professional training courses, because of its important role in raising the productivity of the worker in Arab countries. It is important indicator for measuring the efficiency and effectiveness of the work element in achieving a certain level of the output in the production process.

There is need to increase the imports of technology for increasing labor productivity which can directly promote economic growth, and thus improve the standards of living in the Arab countries.

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