



Effect of Trade Openness on Economic Growth: Evidence from Arab Countries

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Abstract: This study dealt with the impact of trade openness on economic growth in the Arab countries, using the panel data analysis approach, trade openness was expressed by the sum of exports and imports as a percentage of GDP, while economic growth was expressed as per capita GDP. The results of the estimation proved the existence of a positive impact of trade openness on economic growth for the Arab countries in all the estimated models, which means that trade openness is one of the most important determinants of economic growth in Arab countries, this is due to the dependence of many of its economies on commercial revenues from oil.

Keywords: Panel Data Analysis; Economic growth; Economic openness

JEL Classification: C23; F43; O40

1. Introduction

With the emergence of economic globalization and the increase in economic interdependence between the countries of the world, through trade, investment, labor movement and others, it was necessary for the developing countries, including the Arab countries, to adapt to these developments. Especially with regard to trade openness, as some countries in the region adopted a policy of trade openness and achieved good results. For example, the trade openness index, measured by the volume of trade as a percentage of the gross domestic product for the year 2021, shows that its value reached 223%, 168% and 140% in Djibouti, the United Arab Emirates and Bahrain, respectively. In contrast to a group of other Arab countries, it is less open according to this indicator, for example, its value for Sudan reached 4%

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and Egypt 31% in 2021, while the indicator of trade openness recorded 52% globally, and 74% in the Arab world in 2020 (world bank WDI 2022).

Trade in the Arab region is greatly affected by the oil market, with oil exports accounting for an average of 45% of total merchandise exports compared to the world average of 12%. This is what causes volatility and instability surrounding merchandise trade in the Arab region. In addition, trade in services especially tourism, is a major economic activity in the region. It is a major source of foreign exchange and employment for a large number of Arab countries, including Saudi Arabia (the Hajj and Umrah season); Morocco, Tunisia, Egypt, United Arab Emirates and Lebanon (different types of tourism). According to the available data, tourism in 2019 represented between 5% and 16% of the GDP in the Arab region. These percentages are small compared to the latent and untapped potential in the region in the field of services, especially in tourism and transportation.

Arab countries are not heavily involved in global value chains. The limited integration of Arab economies into the global value chain, which is mainly measured by trade exchange in intermediate goods, and the relative absence of an Arab regional value chain, calls for the need to reconsider the economic structure in order to enable its integration into regional and global value chains.

Arab countries are members of many preferential trade agreements (PTAs), whether among themselves such as the Greater Arab Free Trade Area, the Agadir Agreement, the Gulf Cooperation Council, the Arab Maghreb Union, or with developed and developing countries and regional groups such as the European Union, the United States, Canada and the Common Market for Eastern and Southern Africa (COMESA). What distinguishes this affiliation to the membership of trade agreements: i) There is a large disparity between the Arab countries, for example, Jordan is a member in a large number of these agreements compared to Comoros and Yemen, which participate in a very small number of them, ii) The majority of such PTAs have remained confined to removal of tariffs, and have not dealt with behind the border issues, illustrating the limited impact of PTAs in enhancing trade among Arab countries.

The World Bank believes that trade is among the most important drivers of economic growth, through its contribution to creating new jobs, in addition to reducing poverty and increasing economic opportunities. According to it, some recent research has shown that trade liberalization increases economic growth by an average of 1 to 1.5%, This increases income by 10-20% in a decade, and as a result, since 1990, more than a billion people have moved out of poverty due to economic growth backed by better open trade practices and policies. This made the World Bank set among its main tasks to help developing countries improve their access to global markets and enhance their participation in the global trading system. Of course, these advantages of trade openness are not available automatically according to the World

Bank, but rather require the availability of conditions and favorable economic and institutional infrastructure, and the lack of these conditions may lead to negative results.

In this context, this study selected Arab countries as an applied case for several key characteristics. This is to include: i) abundance wealth of energy resources reserves of mainly oil and gas; ii) latent great potential in services field iii) young population that can enrich the labor market; and iv) excellent places for investment opportunities in different industrial and services sectors, especially in the financial, real estate, and technology sectors. These characteristics qualify Arab countries to enhance their position in the global trading system if they use their qualifications efficiently. Therefore, the purpose of this study is to examine the effect of trade openness on economic growth in the Arab countries utilizing a panel data analysis approach.

The research structure was divided into five sections, the first of which is an introduction in which the importance of the topic and its objectives are mentioned, and the research problem is raised; The second section included theoretical and applied literature on the topic of trade openness and its relationship to economic growth; The third section dealt with the econometric methods used, represented in the panel models and related tests, in addition to presenting the applied data; The experimental study and the discussion of estimation results took place in the fourth section; And finally the conclusion was presented, including the important results reached.

2. Literature Review

Economic theory has been concerned with foreign trade since ancient times, and explanations of its motives and advantages have evolved over time, it has been the subject of international competition in terms of winning foreign markets, and localizing industrial technology in less developed countries to ensure economic dependency. Where the Mercantilists saw that the application of an economic policy based on increasing the volume of exports and reducing imports leads to more gathering of gold and silver as a source of wealth and power, and maintaining them by ensuring a surplus in the trade balance (Coleman, 1957). The classic strived to explain the reasons for the establishment of foreign trade; David Ricardo concluded that providing comparative advantages in terms of reducing costs or increasing profits make trade profitable for both parties (Terzea, 2016). The Heckscher-Ohlin-Samuelson model was also developed, whose idea involves the comparative advantage in the availability of factors of production as a basis for specialization in foreign trade (Yoshihara & Kurose, 2016), (Neary, 1978).

The theory of endogenous growth (Frankel 1962, Uzawa 1965, Romer 1986, Lucas 1988, Romer 1990, Aghion & Howitt 1992, Stokey 1995, Barro 1990, Barro & Sala-

i-Martin 1992) succeeded in explaining what previous theories failed to do in term of increasing returns of capital, This theory is based on investment in human capital, innovation and technology, which in turn leads to an increase in capital returns in the long term, rather than a decrease according to the previews theories. Applied studies related to the Endogenous growth theory were expanded by researchers and academics, and included research in all determinants of economic growth in terms of impact on growth, and were represented in human capital (Rangongo & Ngwakwe 2019, Sunde & Vischer 2015), public expenditures (Nuta, et al. 2015; Balaj & Lani 2017), foreign direct investment (Sarbu & Carp, 2015; Koojaroenprasit, 2012), and others including commercial openness. The effect of trade openness on economic growth is done through several channels: Trade openness leads to the dedication of specialization according to traditional comparative advantages (Heckscher-Ohlin-Samuelson). New technologies are transferred and localized through trade openness. Trade openness prevents wastage the same research, development and innovation efforts in two different countries at the same time. Openness to trade allows expansion of the size of the market available to economic enterprises (Grossman & Helpman, 1991). It also contributes to encouraging foreign direct investment, which is important to increase long-term economic growth (Levine & Renelt, 1992).

On the empirical level, the hypothesis of the positive impact of trade openness on economic growth was subjected to many tests, and it differed in terms of time domain, spatial domain, approved model, measures of trade openness, estimation techniques, and others.

Razmi & Refaei (2013) studied the impact of trade openness and economic liberalization on economic growth in 17 countries, in the Middle East and East Asia between the years 2000 and 2009, they used panel data analysis. The results showed a positive impact of trade openness as a determinant of economic growth.

Squalli & Wilson (2007) dealt with trade openness in the Arab countries in terms of closing on the benefits of foreign trade, they used the measure of trade openness which they reached in 2006, called the composite trade intensity (CTI) measure, as it differs in essence from traditional measures related to exports, imports, or their sum as a percentage of GDP, the study included 15 Arab countries. They concluded that the traditional belief that Arab countries are closed to the benefits of international trade is incorrect for the majority of countries in the region.

Also Altaee & Al-Jafari (2018) used Panel Data Analysis to re-examine the relationship between trade openness and Gross domestic product per capita, in the GCC countries, in the period 1992 to 2014. They found that exports positively affect economic growth in the GCC countries, while imports affect it negatively.

In their study J. Idris et al (2018) investigated the ability of trade openness to promote economic growth, they took a sample of 86 developing and OECD countries from 1977 to 2011, estimated using the Generalized Method of Moments (GMM). Their

obtained results are consistent with endogenous growth theory, which states that growth increases with trade openness.

Alam & Sumon (2020) also studied the long-term causal relationship between trade openness and per capita real GDP as an estimate of economic growth, in 15 Asian countries in the period 1990-2017, the panel cointegration and causality methodology was applied. The results confirmed the existence of a causal positive effect in both directions, between trade openness and economic growth.

O. Yeboah et al (2012) studied the relationship between trade openness and productivity in 38 African countries from 1980 to 2008, the Cobb-Douglas function was estimated using alternative panel models. The results showed that trade openness had a positive relationship with GDP.

L. Burange et al (2019) studied the causality between trade openness and per capita GDP for the group of BRICS countries between 1981 and 2013, using time series analysis technique and causality approach. The results generally showed a causal relationship between trade and economic growth in India, China and South Africa, with some differences in the direction of causation, there is no causation between them in the case of Brazil and Russia.

2. Econometric Methods and Data

2.1. Panel Data Analysis

Panel data refers to a type of data that contains observations of multiple phenomena collected over different time period for the same group of individuals, units or entities. In short, in econometrics panel data refers to a multidimensional data collected over a period of time.

Panel data analysis on the other hand refers to a statistical method widely used in different disciplines such as social sciences, econometrics to analyze data that are collected for multiple periods and over the same individuals or entities.

Panel data regression analysis can be done in mainly three ways:

2.1.1. Pooled OLS Regression Model

This type of panel data model assumes homogeneity of all sections of data in a panel data study that is it does not treat each section differently. Alternatively, it treats all section as just a single section of data. In short, there are no unique characteristics of individuals within the measurement set and no universal effects over time.

The form of panel data regression equation is similar to ordinary least square, ie:

$$Y_{it} = \alpha + \beta'X_{it} + \varepsilon_{it} \quad (1)$$

$$i = 1, \dots, N \text{ and } t = 1, \dots, T.$$

Where N = Number of individuals or cross section and T is the number of time periods.

2.1.2. Fixed Effect Model

This type of model allows for heterogeneity or individuality among different cross-sections allowing each cross-section to have its own intercept. In short, the intercept may be different for the cross sections but it is time invariant that is the intercept remains the same over time. The error term in a fixed effects model is assumed to vary non-stochastically over each entity and time. There are unique attributes of individuals which do not vary across time and is correlated with independent variables.

Summarily, we can conclude that in a fixed effect model, the parameters of the model are fixed alternatively, the group means are fixed. The fixed effect model can be estimated with the aid of dummy variables.

The regression equation of fixed effect model panel data is as follows:

$$Y_{it} = \alpha_i + \beta'X_{it} + \varepsilon_{it} \quad i = 1, \dots, N \text{ and } t = 1, \dots, T \quad (2)$$

Where N = Number of individuals or cross section and T= Number of time periods.

2.1.3. Random Effect Model

This model is also known as the variance components model. Random effect model also allows for heterogeneity and is also time invariant but the individual specific effect is uncorrelated with the independent variables. It can also refer to as a kind of hierarchical linear model which adopts the assumption of data being drawn from a hierarchy of different populations whose differences relates to that hierarchy.

The regression equation of panel data of random effect model is as follows:

$$Y_{it} = \alpha + \beta'X_{it} + u_i + \varepsilon_{it} \quad (3)$$

$i = 1, \dots, N$. Where N = Number of individuals or cross section.

$t = 1, \dots, T$. Where T= Number of time periods.

u_i = is the individual residual which is the random characteristic of unit observation, the i-thand remains at all times.

ε_{it} = is the residual as a whole where the residual is a combination of cross section and time series.

2.2. Data

This study examined the impact of trade openness on economic growth in the Arab countries, using annual time series data, covering the period 1990 to 2020. The

countries were selected according to the availability of their data, their number is 18, and they are: Algeria, Bahrain, Comoros, Egypt, Iraq, Jordan, Kuwait, Libya, Lebanon, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, United Arab Emirates.

The data were taken in constant US dollars (2015) from the World Development Indicators (WDI), employed with their natural logarithms and were as follows:

GDPC = Gross domestic product per capita, is the dependent variable.

The independent variables are:

KLR = Capital-labour ratio.

OSS = Trade openness index, which is the sum of exports and imports as a percentage of GDP.

ER = Exchange rate.

FDIC = Foreign direct investment per capita.

3. Empirical Results

The aforementioned models were estimated, and the important statistics for them are shown in the following table:

Table 1. Estimation Results

Variable	Pooled OLS	Fixed Effect	Random effect
Constant	0.171443 (0.0018)	4.354951 (0.0000)	2.150577 (0.0000)
Log(ER)	-0.008709 (0.0054)	-0.023117 (0.1551)*	-0.069104 (0.0000)
Log(FDIC)	-0.010033 (0.0002)	-0.047732 (0.0025)	-0.065888 (0.0000)
Log(KLR)	1.018906 (0.0000)	0.573740 (0.0000)	0.881633 (0.0000)
Log(OSS)	0.976718 (0.0000)	0.574874 (0.0000)	0.849333 (0.0000)
R2	0.980159	0.990135	0.826996
F-stat	34394.41	2561.699	660.8654
Prob (F-stat)	0.000000	0.000000	0.000000

* Not significant at 5% level

It appears from the pooled OLS model that all of its parameters are statistically significant at the 5% level, where a change in the exchange rate by 1% leads to a change in per capita GDP by -0.0087%, and this reversal between the trend in the change between the explanatory variable and the dependent variable is economically

significant, because the rise in the exchange rate makes local commodities less competitive, which has a negative impact on the GDP and its values decrease, while the depreciation of the local currency makes the local commodities more competitive in terms of price, thus increasing the demand for them, which leads to an increase in the values of the GDP. As for the parameter of Per capita foreign direct investment, despite its statistical significance, its negative sign indicates the negative impact of foreign direct investment on per capita GDP values, which is contrary to economic theory, where the Per capita foreign direct investment change by 1% leads to a change in the per capita GDP by 0.01% in the opposite direction. The capital-labor ratio parameter was statistically and economically significant, its impact was positive on economic growth, as an increase in the capital-labor ratio by 1% leads to an increase in per capita GDP by 1.02%. Also, with regard to the trade openness parameter, it was positive which indicates the positive impact of trade openness on economic growth, a change in trade openness by 1% leads to a change in per capita GDP by approximately 1%.

For the fixed effects model, the exchange rate parameter was not statistically significant despite its agreement with the economic theory, while the rest of the parameters were statistically significant at the 5% level. The parameter of per capita foreign direct investment was contrary to economic theory because its sign is negative, which indicates its negative impact on economic growth, increasing it by 1% leads to a decrease in per capita GDP by about 0.05%. The capital-labor ratio parameter is also economically significant in this model, increasing the capital-labor ratio by 1% leads to an increase in per capita GDP by 0.57%. This model also proved the positive and strong impact of trade openness on economic growth, through the value of its parameter indicating that an increase in trade openness by 1% leads to an increase in per capita gross domestic product by 0.57%.

For the random effects model, all its parameters were statistically significant at the 5% level. The exchange rate parameter had a negative sign and was economically significant as we indicated earlier in the pooled OLS model, a change in the exchange rate by 1% leads to a change in per capita GDP inversely by about 0.07%. The parameter of per capita foreign direct investment, similar to the previous two models, it is also not significant in this model, because of its negative sign, which is contrary to economic theory. While the parameter of the capital-labor ratio was economically significant, and increasing it by 1% increases per capita GDP by 0.88%. The trade openness parameter also in this model was positive and significant, indicating that an increase in trade openness by 1% leads to an increase in per capita GDP by 0.85%.

To select the best model among the estimated models, we need to perform both the Breusch-Pagan LM test to choose between POLS model and FEM/REM, and the Hausman test for choosing between the Fixed Effect Model and the Random Effect Model. The results are shown below:

Breusch-Pagan LM test:

Null Hypothesis: "POLS is appropriate than FEM/REM".

Alternative hypothesis: "FEM/REM is appropriate than POLS"

If p-value is greater than 0.05 then accept null hypothesis, and if p-value is less than 0.05 we reject null hypothesis.

Table 2. Breusch-Pagan LM test

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	1001.234	153	0.0000

We note that the P-value is zero, and therefore we reject the null hypothesis, and accept the alternative hypothesis that POLS model is not appropriate.

Hausman test:

Null Hypothesis: "REM is appropriate than FEM".

Alternative hypothesis: "FEM is appropriate than REM"

If p-value is greater than 0.05 then accept null hypothesis, and if p-value is less than 0.05 we reject null hypothesis.

Table 3. Hausman test

Test	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	197.376434	4	0.0000

From the table we note that the P-value is less than 0.05, from which we reject the null hypothesis, and accept the alternative hypothesis that Fixed Effect Model is preferred.

The empirical results indicated the validity of the hypothesis that trade openness has a positive impact on economic growth rates, through the parameters of trade openness that were strong and significant in all estimated models including the selected model, which indicates that trade openness is important and beneficial to the Arab countries region. Of course, the degrees of commercial openness differ from one country to another in the region, for example, according to the classification in terms of the abundance of hydrocarbons, we find that the oil-producing countries are more dense in terms of foreign trade, because they export hydrocarbons and its derivatives, so they obtain considerable reserves of hard currencies, which they use to import what they need, such as industrial goods, electronic devices, foodstuffs, services, etc., which increases the activity of its foreign trade and thus increases its connection with the outside world, while this advantage is not available to the group of non-oil Arab countries, thus making it less open to foreign trade. We recall that

dependence on hydrocarbons as the only sector in the field of export involves dangers that economists and experts have pointed out, and perhaps the most important of them is the negative effects resulting from fluctuations in oil prices or their collapse at times, and the solution lies in adopting a policy of economic diversification, by moving towards establishing an export commodity base that can disengage the trade structure of the region from natural resources, especially in oil-producing countries that can exploit oil revenues in the process of economic diversification.

4. Conclusion

This study dealt with the impact of trade openness on economic growth in the Arab countries in the period between 1990 and 2020, and the analysis was done using panel data, by estimating POLS, FEM and REM models, and by conducting differential tests for each of Breusch-Pagan and Hausman, the results concluded to choose the Fixed Effect Model as the best model out of the three models.

The results proved the existence of a positive impact of trade openness on economic growth in all the estimated models, according to the fixed effects model chosen as the best model. Increasing trade openness by 1% leads to an increase in economic growth by 0.57%, and this is realistically supported by the open nature of the economies of most Arab countries, especially petroleum ones, its international trade is active as a result of the developed countries' need to import oil and natural gas in addition to some primary economic resources from the Arab countries on the one hand, and the Arab countries' need for manufactured goods, high-tech commodities and some basic food commodities such as rice, wheat and others on the other hand.

These positive results of the relationship between foreign trade and economic growth in the Arab countries, give an encouraging optimistic view of more trade openness by engaging in regional and international trade organizations such as the World Trade Organization, to benefit from the advantages it provides, but the Arab countries requires double efforts to reform their trade structure that characterizes with narrow commodity base destined for export, and for that, it must work on diversifying exports to prevent the risks of fluctuations in oil prices, especially for oil-producing countries, as well as to expand the base of export-targeted markets.

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