



Export and Economic Growth Nexus in the GCC Countries: A panel Data Approach

SazanTaher Saeed¹, Prof. Dr. Hatem HatefAbdulkadhimAltaee²

ABSTRACT

The export and economic growth nexus, which is called Balassa's Export-Led Growth Hypothesis (ELGH) in the literature, is still an unresolved issue in both the theoretical and empirical literature. In the present study, the effect of export on economic growth in oil exporting developing countries, namely, Bahrain, Saudi Arabia, Qatar, Kuwait, UAE, and Oman in the 1990–2014 period was tested based on three models, pooled ordinary least squares (POLS), fixed effects model (FEM), and random effects model (REM) via panel data analysis. The findings revealed strong support for the “export-led growth” hypothesis. In addition, our results show that apart from growth in the labor force, investments in capital formation are necessary for economic growth. According to the obtained results, the ability to adopt technological changes in order to increase efficiency, and sustain economic development is also important.

Keywords: Economic Growth, Export, GCC Countries, Panel Data Analysis.

JEL Codes: B23, C23, F43, N15.

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1.0 Introduction

The issue of accelerating and sustaining economic growth has been the main agenda in economic policy formulation for most of developing countries. The importance of economic growth comes from the fact that the country's population is increasing and therefore a certain amount of GDP growth must be achieved to ensure an acceptable standard of living. The GCC countries have given special attention to this issue, given their reliance on its economic development on exhausted resources. Recognizing this fact, it is important to develop other sectors to replace the declining oil and gas sector.

Determining the most effective factors in achieving rapid economic growth is of great importance in quantitative and theoretical economic literature. In the 1950s and 1960s, neoclassical growth theories influenced by (Solow, 1956) and (Swan, 1956) identified three main causes of growth: labor, capital, and technological change (Stern, 1991). However, despite the ability of the neoclassical theories to predict how to achieve high rates of economic growth, but it could not find an explanation for the difference in the rates of growth achieved between the nations.

¹ College of Administration and Economics, Department of Economics, University of Sulaimani, Kurdistan Region Government/Iraq. E-mail: sazan.saeed@univsul.edu.iq, Sazan.saeed@gmail.com. Tel: +964-7701493064.

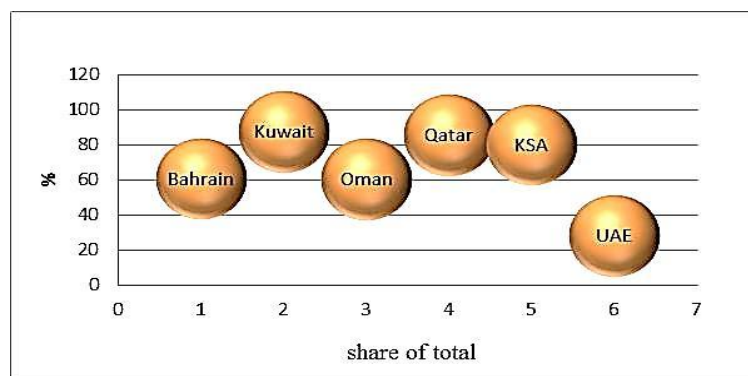
² Head of Accounting Department, College of Administration and Financial Sciences, Cihan University, Slemani Camp, Sulaimaniyah–Kurdistan Region, Iraq. Email: Hatm.Hatf@sulicihan.edu.krd, drhatemaltaee@gmail.com. Tel: +964-7714231853.

Recently, the endogenous growth theory, developed by Romer in his 1986 paper in the journal of political economy. The endogenous growth theory focused on trying to explain the differences in GDP growth rates and GDP per capita among nations. According to this theory, different levels of accumulated human capital and human development lead to various levels of efficiency and technological advancement, and this may result in different growth rates across nations (Zipfel, 2004).

The basic idea on which the theory of endogenous growth is based is to abandon the assumption of constant return to scale by Robert Solow. So as to justify this fundamental departure from this assumption, Romer and those who shared his convictions extended their definition of capital to include human capital and/or knowledge capital. As universe turn out to be increasingly globalized, the economic growth path of any one particular country depends on more and more on the success or failure of other countries, mostly that of trading partners.

In GCC countries except for the UAE, (see figure 1), oil is the main export good. Oil accounts for above 80 percent of total exports in the Kuwait, KSA and Qatar, and above 60 percent in Bahrain and Oman. In the UAE the share is as low as 28.5 percent, IMF (2016).

Figure 1: Oil and gas exports (share of total)



According to new growth theory, favorable sectors inhibit technological spill-over effects of the non-tradable sector (Plümper and Graff, 2001). Furthermore, there are potential positive externalities created by exporting in both low- and high-income countries (Hessels and Stel 2011). Emery (1967) outlines three general means these spillovers are gripped: an increase in economies of scale, an improvement in the balance of payment of the country by increasing the available foreign exchange, and an increase in the total factor productivity.

Grossman and Helpman (1991) argue that an emphasis on exports will lead to positive externalities for the traditional sectors in the form of knowledge spillovers.

Edwards (1993) demonstrates that these spill-overs could take the form of more efficient management and improved production practices, for both export as well as non-export sectors. This, in turn, may lead to innovation and production expansions in each sector, which can raise total factor productivity and then rate of economic growth

Moreover, Crespo-Cuaresma & Wörz (2005) claim that positive externalities would be gained by exporter country from international competition, including increasing returns to scale, increased innovation, learning spill-overs and other efficiency improvements, consequently raising incomes and driving economic growth.

Thirlwall, (2000) The strength of exports has a large role in determining the national amount of foreign exchange required to purchase productive inputs, which will be realized in economic growth.

The main objective of the study is to examine if there is no statistical significant relationship between exports and economic growth of GCC countries.

This study is organized in the following manner. Section two of the paper discusses relevant literature. Data Sources and Methodology are explained in section three. In the penultimate section empirical results and discussion. The last section concludes the paper along with policy recommendations

This study contributes to the literature in the following ways. First, previous studies focus mainly on the interactions between exports and economic growth in a sole country. Recognizing the role of exports on economic growth of a country, this study will also provide an empirical exploration to an

important research question: 'Does export affect the economic growth process of the GCC countries'. Second, this study uses panel data while previous studies use either time series or cross section data.

2.0 Literature review

Empirical evidence from different countries confirms the impact of export on economic growth. It reviews previous studies in the field of the impact of export on economic growth, called the Export-led Growth Hypothesis, high export raises economic growth. This positive effect has been confirmed by a number of studies, for instance, [Ekanayake\(1999\)](#) analyzes the causal relationship between export growth and economic growth in eight Asian developing countries during the period 1960 to 1997. The results show that bi-directional causality exists between export growth and economic growth in India, Indonesia, Pakistan, Korea, Sri Lanka, Philippines, and Thailand. There is also evidence for export-led growth in Malaysia. In addition, there is evidence for short-run Granger causality from economic growth to export growth in all countries except Sri Lanka. Moreover, [Taghavi, et.al \(2012\)](#) investigated VAR method between import, export and economic growth in Iran during the period 1962- 2011. The outcome shows a long run relationship between the variables considered. Based on the results, export had direct and positive impact on economic growth in the long run. Also import had a significant and negative impact on economic growth, then import had a negative relationship with economic growth in the long term.

Hence, [Parida and Sahoo \(2007\)](#) examines the effect of export on both total GDP and non- export GDP in four South Asian Countries India, Pakistan, Bangladesh, Sri Lanka. Annual data for 1980-2002. The result shows that the export-led growth hypothesis. This result is similar to that of [Ram\(1985\)](#), states the impact of export on economic growth in 73 medium and Low-Income Less Developed Countries for the period 1960-1970 and 1970-1977. Annual data were used. The outcome Confirmed that Export-led Growth Hypothesis.

Another study was carried out by [Cuaresma and Wörz \(2005\)](#) tested the hypothesis of qualitative differences between high and low-tech manufacturing industry export with respect to output growth. Panel data were used in 45 developed and developing countries for the period 1981-1997. The outcome indicates that high tech manufacturing industry export has a significant and positive impact on GDP, while low-tech manufacturing industry export has a meaningless impact. Furthermore, [Kilavuz and Topcu\(2012\)](#) investigated the impact of different classifications of export and import on economic growth in 22 developing countries for the period 1998–2006. It was tested depending on two models, through panel data analysis. According to the outcomes of the first model, the analysis of which included variables such as high and low-tech manufacturing industry exports, investment, and population, it was investigated that only two variables, high-tech manufacturing industry export and investment, have a positive and significant impact on the growth of the economy. The second model found the impact of high and low-tech manufacturing industry imports on economic growth. The result exposed that only high-tech manufacturing industry export, investment and low-tech manufacturing industry import have a positive and significant impact on the growth of the economy.

[Uddin and Khanam,\(2017\)](#) investigated the relationship between Export and GDP growth in Bangladesh for the period 1981-2012. The result finds that export is less than import that means always there is a trade deficit. And from the analysis the paper finds that the relationship between import and GDP growth is negative and insignificant. [Kundu\(2013\)](#) examined the relationship between export and economic growth in seven countries, members of SAARC (India, Nepal, Sri Lanka, Pakistan, Bangladesh, Bhutan, and Maldives). Fixed effects model leads to the conclusion that the relationship between GDP and Export for these countries is no significant. In contrast Random effects model leads to conclusion that the relationship between GDP and Export for these countries is no significant. At the end, the export could be seen as the engine of growth in these countries. In another word, the empirical results did provide sufficient evidence to support the: export-led hypothesis" in the area.

[Ugwuegbe, et al.\(2013\)](#) found the effect of oil and non-oil export on economic growth In Nigeria over the period 1986 to 2011. The outcome indicated that all the variables are highly correlated. The research reveals that oil export has a positive and significant effect on economic growth. Non-oil export was also investigated to be positively and significantly impacting to economic growth.

[Elheddad \(2016\)](#), examines that natural resources discourage FDI in GCC countries using panel data analysis during the period 1980 to 2013. The main findings is that natural resources measured by oil

rents have a negative association with FDI inflows; this negative impact is robust even when other FDI determinates of FDI are included.

Keho(2017) finds the relationship between export and economic growth in Cote d'Ivoire during the period 1965 to 2014. It applied the ARDL bounds test to Cointegration and Granger causality test. The outcomes indicate that export-led growth hypothesis existed in the long run when total Gross Domestic production is used. On the contrary, when non- export gross domestic product is considered, export leads to economic growth both in the short run and long run.

To sum up, the major objective of these studies reviewed here is to investigate the empirical evidence regarding the dynamic relationship between export and economic growth. Overall, the majority of the studies came up with a conclusion that high export raises economic growth; with only a few studies that did not find conclusive evidence supporting these hypotheses.

3.0 Datasources and methodology

3.1 Datasources

This research carried out a panel data analysis of export-led growth hypothesis for GCC countries, namely; Kingdom of Bahrain, State of Kuwait, Sultanate of Oman, State of Qatar, Kingdom of Saudi Arabia, and United Arab Emirates, over the period of 1990 to 2014. The data were taken from World Development Indicator (WDI) 2016, and International Financial Statistics (IFS) of the International Monetary Fund (IMF).

Table 1: Data definitions and sources

Variable		Measure	Indicator	Source
GDP	Real GDP	GDP at market prices (constant 2010 US \$)	WDI	World Bank
Export	Share of export in GDP	Ratio	WDI	World Bank
Import	Share of import in GDP	Ratio	WDI	World Bank
Capital	Real Gross Capital Formation	Gross capital formation (constant 2010 US\$)	WDI	World Bank
Electricity consumption	Electric power consumption	(KWh per capita)	WDI	World Bank
Financial Development	Domestic credit to private sector (% of GDP)	Ratio	WDI	World Bank

3.2 Methodology

This section enlightens the methods and approaches that will be used for the empirical analysis. A panel data set is employed, since earlier growth studies reveal that panel data, by blending the inter-individual differences and intra-individual dynamics have several advantages over a cross-sectional or time-series [e.g. Klevmarken 1989; Hsiao et al., 2003; and Baltagi, 2005].

In the literature, the electricity consumption and economic growth nexus based on a panel of countries can schematically be described as follows:

$$EG_{it} = f(EX_{it}, CV_{it}, \varepsilon_{it}) \dots \dots \dots (1)$$

Where EG_{it} is real GDP of country i in period t ; EX_{it} represents the export of country i in period t ; CV_{it} is the set of other independent variables of country i in period t ; and ε_{it} is the idiosyncratic error term. The dependent variable can be operationalized in different ways.

There are three models typically used for estimating panel data the pooled OLS, fixed effects and random effects. In case of the cross-sectional units (countries in our case) are homogenous, the common constant method, which is also called the pooled OLS method, is used. In case of the existence of unit-specific or time-specific effects, in the case of assuming these effects to be fixed parameters to be estimated, fixed effects model is used. If the subject specific effects are assumed random and not

correlated with the regressors. These effects are included in the random effects model as a component of the error term, then the model used is the random effects model (Baltagi, 2010).

Pooled OLS (POLS)

Panel data models with no lagged values of the dependent and/ or regressor in the model are called static panel data models. Static pooled OLS model can be shown as follow:

$$\text{Economic Growth}_{it} = \beta_1 + \beta_2 \text{Export}_{it} + \beta_3 \text{Capital}_{it} + \beta_4 \text{Electricity}_{it} + \beta_5 \text{Fin. Development}_{it} + \beta_6 \text{Import}_{it} + u_{it} \dots \dots \dots (2)$$

*i = 1,... 6, stands for the six GCC countries
 t = 1,... 25, stands for the period 1990-2014*

The constant intercept assumption means that all GCC countries is considered to be same and there are no substantial country specific and temporal effects. It is assumed that the explanatory variables are nonstochastic. If they are stochastic, they are uncorrelated with the error term u_{it} . It is also assumed that the error term is $u_{it} \sim \text{iid}(0, \sigma_u^2)$ (Gujarati and porter, 2009).

However, it should be used, when the fixed effect is not appropriate. If it is used when the fixed effects should have been, then the estimates of the POLS worthless and inconsistent (Hsiao, 1986).

To account for possible heterogeneity among countries, fixed effects models and random effects models are considered to be more applicable for controlling panel data.

Fixed Effects Model within Group (WG) Estimator

There is no constant term in the fixed effects model. Instead of the constant term β_1 in pooled model (2), now we have an individual-specific component α_i that determine a unique intercept for each individual. However, the slopes (the β parameters) are the same for all individuals.

$$\text{Economic Growth}_{it} = \alpha_i + \beta_1 \text{Export}_{it} + \beta_2 \text{Capital}_{it} + \beta_3 \text{Electricity}_{it} + \beta_4 \text{Fin. Development}_{it} + \beta_5 \text{Import}_{it} + \varepsilon_{it} \dots \dots \dots (3)$$

There is no constant term in the fixed effects model. Instead of the constant term β_0 in POLS model (2), now we have an individual-specific component α_i that determines a unique intercept for each country. However, the slopes are the same for all countries.

Two methods for estimating of the fixed effects model parameters: within-groups method and least squares dummy variable method (LSDV). In this study, the first method is used.

Random Effects Model

The random effects model, which is sometimes also known as the error components model (ECM).

In the random effects model the individual-specific component α is not treated as a parameter and it is not being estimated. Instead, it is considered as a random variable with mean μ and variance σ_α^2 . We can write the random effects panel model as:

$$\text{Economic Growth}_{it} = \mu + \beta_2 \text{Export}_{it} + \beta_3 \text{Capital}_{it} + \beta_4 \text{Electricity}_{it} + \beta_5 \text{Fin. Development}_{it} + \beta_6 \text{Import}_{it} + (\alpha_i - \mu) + \varepsilon_{it} \dots \dots \dots (4)$$

where μ is the average individual effect. Let $u_{it} = (\alpha_i - \mu) + \varepsilon_{it}$ and (4) can be rewritten as:

$$\text{Economic Growth}_{it} = \mu + \beta_2 \text{Export}_{it} + \beta_3 \text{Capital}_{it} + \beta_4 \text{Electricity}_{it} + \beta_5 \text{Fin. Development}_{it} + \beta_6 \text{Import}_{it} + u_{it} \dots \dots \dots (5)$$

4.0 Empirical results and discussion

The empirical outcomes and explanations are reported in this section. Unit root tests, cointegration tests, and the panel data models.

4.1 Results of unit root test

Two dissimilar types of panel unit root tests are applied. First test the Levin, Lin and Chu (LLC) is assumed common unit root process, across cross sections. While the other test Im, Pesaran and Shin is assumed individual unit root process, across cross sections. In these two tests null hypothesis is that data are non-stationary or have a unit root and alternative hypothesis is that data are stationary or have a no unit root. The results are reported in Table 02, all variables are non-stationary at level and stationary at first difference.

Table 2: Panel unit root test

variable	LLC Test				IPS Test			
	Level		First Difference		Level		First Difference	
	T-Statistics	P-Value	T-Statistics	P-Value	T-Statistics	P-Value	T-Statistics	P-Value
RGDP	-0.9039	0.1830	-6.5409***	0.0000	-1.8053	0.0355	-6.1400***	0.0000
Import	-1.8583	0.0316**	-10.445***	0.0000	-1.4969	0.0672*	-9.9694***	0.0000
Capital	-0.2591	0.3978	-10.061***	0.0000	-0.1298	0.4483	-9.2279***	0.0000
Export	-1.7884	0.0369	-8.9224***	0.0000	-0.7587	0.224	-8.9530***	0.0000
Electricity	0.3876	0.6508	-4.5008***	0.0000	-1.2474	0.1061	-4.2755***	0.0000
Fin.Developm ent	-1.1071	0.1341	-7.6311***	0.0000	-1.6317	0.0514	-6.7051***	0.0000

Notes: All panel unit root tests were performed with restricted intercept and trend for all variables. In addition, *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

4.2 Panel co-integration test results

The Pedroni cointegration test is applied to verify the long run relationship between variables. Basically, it employs four panel statistics and three group panel statistics to test the null hypothesis of no cointegration against the alternative hypothesis of cointegration. The results of cointegration are presented in Table 03. According to Pedroni test the majority statistics verify long run relationship between variables: GDP growth, capital, electricity consumption, financial development, export, and import.

Table 3: Results of Pedronico-integration test(Dependent variable: Real GDP)

Panel Statistics	No deterministic trend		Deterministic intercept and trend	
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	0.176299	0.4300	0.077201	0.4692
Panel rho-Statistic	0.921241	0.8215	1.246902	0.8938
Panel PP-Statistic	-2.574596	0.0050***	-2.275458	0.0114**
Panel ADF-Statistic	-2.566780	0.0051***	-2.289715	0.0110**
Group Statistics				
	Statistic	Prob.		
Group rho-Statistic	2.244804	0.9876		
Group PP-Statistic	-4.600869***	0.0000		
Group ADF-Statistic	-4.051075***	0.0000		

Notes: The null hypothesis is that the variables are not cointegrated. Under the null hypothesis, all the statistics are distributed as normal distributions. ***, ** and * indicate that the test statistic is significant at 1%, 5% and 10% level respectively.

4.3 Model form determination

In this study three panel regression techniques are employed, namely, pooled OLS model, fixed effect model and Random effect model in order to check the consistency of results. Though, our results and interpretation is based on the most appropriate model which is determined on basis of result of F test, Chi-square test. The result reported in table 04 counts against the null hypothesis that the pooled OLS model is adequate, in favor of the fixed effects model.

Table 4: Testing for the country specific effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	83.777240	(5,129)	0.0000
Cross-section Chi-square	202.475727	5	0.0000

To choice between fixed effects and random effects tested through Hausman's specification test. The null hypothesis is framed as fixed effect is more appropriate and consistent with random effects model. The result of Hausman test is reported in table 05. Therefore the results and interpretation for economic growth model is based on the fixed effects model.

Table 5: Hausman specification test result

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	418.886198	5	0.0000

4.4 Data analysis and results

The estimated results of panel data analysis: OLS, cross-section random effects and period fixed effects) Dependent variable: period average per capita growth (1985-2005), is listed in Table 06.

The estimated results of the model show that, the long run linkage between exports and economic growth in the GCC countries indicates a positive and significant relationship with 1% increase in exports will increase 15% of real GDP estimated by the fixed effects model. This result is consistent with the findings of [Altaee et al. \(2016\)](#), [Ee \(2016\)](#), [Abdalla & Abdelbaki \(2014\)](#), [Ndambiri, H. K. et al. \(2012\)](#), and [Ullah et al. \(2009\)](#) who found that exports positively affect the economic growth.

When interpreting the coefficient estimates it is important to: first, since all the variables are in natural logarithms, the coefficients can be interpreted as elasticities. Second, consider that we assume that all other variables remain constant, so called *ceteris paribus*. Finally, our interpretation is based on the most appropriate model which is inconsistent chosen on the basis of a result of the above tests.

It is found that electricity consumption in all GCC countries makes the largest contribution to real GDP growth, followed by the real total investment in fixed assets. The obtained results supported by previous studies in relative to financial and trade globalization, such as: [Altaee \(2016\)](#), [Altaee and Adam \(2013\)](#). However, the big component of economic growth is how much output is raised by increasing the inputs (adding more capital or workers) this result suggests that economic growth in the GCC countries is largely capital intensive.

The elasticity of Import in the GCC countries is significant and negative. This result is in a conflict with the endogenous growth theory. According to the endogenous growth theory in an open economy's growth is realized through "learning by doing" which exhibits the flow of technology across countries. International trade, which diffuses knowledge internationally, could increase the absorptive capacity of trading countries by promoting technological.

Table 6: Estimation results

Variables	Pooled OLS	Fixed Effects Model	Random Effects Model
Intercept	-1.62384 (0.0000)	0.539483 (0.25510)	-1.62384 (0.0000)
Capital	0.295538 (0.0000)	0.375099 (0.00000)	0.295538 (0.0000)
Electricity.Cons.	0.609755 (0.0000)	0.38319 (0.00000)	0.609755 (0.0000)
Import	-0.14848 (0.0001)	-0.32197 (0.00000)	-0.14848 (0.0001)
Export	0.34359 (0.0000)	0.150377 (0.00980)	0.34359 (0.0000)
Fin.Development	-0.31164 (0.0000)	0.032871 (0.69820)	-0.34251 (0.0000)
R-squared	0.97460	0.99402	0.97460
Adjusted R-squared	0.97365	0.99355	0.97365
F-statistic	1028.23	2143.95	1028.23
Prob.(F-statistic)	0.0000	0.0000	0.0000

Notes: regressions are estimated with White cross-section standard errors correction. The figures in brackets denote the probabilities. The asterisks *, ** and *** denotes statistical significance at 10, 5 and 1 percent level respectively.

progress. This might find its justification in the fact that most of high income developing countries enjoy high consumption level which resulted in importing final goods rather than a factor of production. This result is similar to that obtained by Altaee et al. (2016), Taghavi (2012), Greenway and Hine (2003), and Raj & Chand (2017).

The relationship between financial development and economic growth in the GCC countries is found to be insignificant and positive. The results highlight the governing protagonist of the mineral sector in economic activities in GCC countries.

5.0 Conclusion

This study investigates the role of exports in the economic growth of the GCC countries, namely, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and UAE. Based on the nature of the data used, traditional panel estimation techniques encompassing fixed effects and random effects, as well as the pooled ordinary least squares are employed, in which the results of LM and Hausman's tests show that the fixed effects model is superior over both the pooled OLS and the random-effect estimator. Empirical findings show that export significantly contributes to the growth of the GCC countries over that period 1990 to 2014. The result is consistent with those in literature; current results indicate that export growth, employs a significant positive consequence on the GCC economic growth. Besides, the main determinants of economic growth are electricity consumption and fixed capital formation are found positive and significant in economic growth, while financial development is insignificant and found positive. These results of the fixed effect panel data model (control of the country and time) make the results applicable and appropriate for other countries also.

For sustaining growth of the GCC countries, it is recommended to keep expanding the use of capital as well as electricity. Likewise the authorities in the GCC countries should make export oriented policies to promote export. However, in the long run, the GCC countries in their growth practice should shift from inputs intensive strategy for raising the efficiency of production strategy.

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