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The Effect of Export Diversification on the Economic Growth of West-Asian Arab Countries

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Abstract:

This paper examined the relationship between the patterns of export diversification and economic growth in west Asian Arab countries during the period (2000-2017) using World Bank, UNCTAD, and Pen World data. The study used the DX Diversification Index (UNCTAD). This index measures the country's export divergence from the world's diversification patterns. The OLS and FMOLS methods were used to estimate the study model coefficients. The study found that the exports diversification structures in this group diverged clearly from the world diversification pattern since the exports of group countries driven by a high degree of primary exports concentration. Moreover, the economic growth was influenced positively by human capital, primary products export growth, and the adoption of efficient anti-corruption policies, but, it negatively influenced by trade openness and population growth. The study disclosed a long-term relationship between economic growth and the interactions of explanatory variables in the model, while in the short run the relationship was weak and insignificant. Moreover, there was a reciprocal causality relationship between economic growth and the degree of exports diversification using (DX-index). The study recommends that Arab countries should reduce the reliance on the exports of primary products, enhancing the share of industrial-based exports to

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achieve sustainable growth and to reduce the impacts of primary export's prices instability on their economies.

Keywords:

export diversification, GDP, economic growth, west Asia

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Introduction

Based on the theory of economic growth stages (Rostow, 1959), export diversification is regarded as an interim stage associated with the transmission mechanisms by which the economy moves from the production of primary goods to produce more advanced consumption goods and durables. The main challenge of this proposition, is to what extent the developing countries own the ability and willingness to override the primary stage towards advanced stages of high and sustainable growth? According to Cherney (1979), the ability requires bulk investments (human and physical capital) in major production sectors to realize steady growth rates and achieve comparative advantages at local and international levels. Meanwhile, the willingness may be achieved by smooth transmission mechanisms in all social, political, and economic fields, where the values of justice and transparency prevail, in addition to strengthening the rule of law and combat corruption in all its forms (Cabral and Veiga, 2017).

Theoretically, exports diversification strategies are assumed to lower the exposure to instability risk (from price and quantity sides) by expanding the number of products in exports basket in analogous to Markowitz investment portfolio theory (1952). Export diversification may take different patterns, where countries can diversify their exports using extensive or intensive margins by exporting existing products to new or existing markets, or exporting new or imitated products in new or existing markets (Pacheco and Pierola, 2007), (Ekman and Erlat, 2014). Furthermore, vertical diversification can be achieved by technical advancements, adding more value to products (Herzer and Lehmann, 2006). At the global level, the divergence of any country's exports from world pattern of diversification may constitute an indicator of the nature of country exports structure and its economic stability. This indicator can be estimated by UNCTAD-DX diversification index (Finger and Kreinin, 1979).

The recent drop in oil prices led to export instability and a decline in economic growth, particularly, on developing countries (Baffes et al, 2015). Therefore, heavy reliance on exporting this crude resource exposed these countries to more

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economic instability aroused from the volatility of global demand and deteriorations in terms of trade, and this prompted growing deficits and indebtedness in their budgets (Alekhine and Yoshino, 2018). According to Prebisch (1950), concerning developing countries, the main reasons for terms of trade deterioration is the low-price elasticity of demand of primary products in global markets, and the low diversification's degrees in most exports' patterns of these countries (Caldara et al, 2018). Also, political regimes and tensions in the environment of exporting and importing countries play an important role in influencing the ability of countries with low comparative advantages to export or diversify their exports. Where some large importers exert variant pressures, via trade wars and restrictions, on small exporting countries such as the penalties imposed by the United States on Japan and East Asian countries during the period 1950s -1970s, limiting their exporting capacities (Ito, 1992), and the recently, the nuclear crisis between USA and Iran and its effects on trade in Middle East region.

However, even though most Arab countries owning the capacities and natural endowments necessary for growth, most of these countries have not yet taken perceptible steps to support the development process (Sadie, 2002). First, in most Arab countries, the exports of primary resources, especially oil, constituted a large percentage of total exports, where it accounts for 90% of the exports of the Gulf States and Algeria (Dogruel and Tekce, 2010). Second, the exports of mining and low value-added goods constitute a large proportion of the export's structures in other Arab countries like Jordan (Mdanat et al, 2018).

This study aims at determining the role of export diversification in enhancing economic growth in West Asia Arab countries taking into account the world diversification patterns, their reliance on the export of primary resources, and the impact of specific and general characteristics of these countries during the period of 2000-2017. The countries sample includes Jordan, Syria, Iraq, Lebanon, Palestine, Kuwait, Bahrain, Qatar, UAE, Oman, and KSA. Yemen is not included because of missing data for this country.

The paper is organized as follows: the following section presents the theoretical framework of export diversification. Section three reviews the prior related literature. The fourth Section presents the study model and data used in the analysis, while in section five we discuss the reality of exports and the economic growth environment of the Arab countries within the sample. Section six presents econometric estimates and interpreting empirical results. Conclusions and recommendations are presented in section seven.

The Theoretical Background of Export Diversification and Economic Growth

What theories supporting the assumption that export diversification contributes to economic growth? To answer this question, we will illustrate two distinct aspects in foreign trade. The first relies on the assumption that economic growth is positively associated with export diversification patterns, while the second relies on the premise that export instability has a mixed effect on economic growth.

Contrary to classical theories of trade that relates economic growth to comparative advantages under perfect competition markets (the principle of specialization of work and production), the structural change theories assume that developing countries should diversify their exports at all possible patterns to achieve sustainable economic growth and to support their development process (Cherney, 1979). In specific, Prebisch (1950) assumed that vertical diversification by adding more value to exported products contributes to reducing the deterioration of terms of trade.

Also, diversification by imitation or inside-frontiers innovations is considered an important growth engine in many developing countries, particularly in East Asian countries (Klinger and Lederman, 2006). According to the product life-cycle theory, Vernon (1966) assumed that developed countries import the standardized products (or by outsourcing) that they earlier produced from less developed countries at later time of product's life. In another shape of diversification, the trade theory of south to north linkages assumes that the flow of exports comes from the less developed countries (south), characterized by resource abundance, to developed countries (north) which permit transfers of technology to produce imitative goods (Dennis and Shepherd, 2011; Dinopoulos and Segerstrom, 2004).

The second aspect of theoretical debate includes the concept of export instability and its impact on the volumes and the prices of traded goods. Export instability can be measured using different statistical and econometric models, but the important issue is to what extent this instability affects economic growth and how countries (especially developing countries) can manage the risks that are associated with it if any, (Macbeen and Maizels, 1968).

The classical theory adopted the idea that export instability is harmful, where the affected trade sectors will suffer from capital reallocations (local and foreign) toward more stable but non-traded industries (Wilson, 1977). In contrary, the permanent income hypothesis assumes that export instability promotes more saving from the temporary income resulted of sudden increase in export income (Campbell & Mankiw ,1990), which in turn positively affects growth in the

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presence of efficient monetary policy transmission mechanism (Twinoburyo & Odhiambo, 2017).

But, what factors lie behind exports instability?. First, Prebisch (1950) assumed that primary products, by nature, have low price elasticity of demand, where the exports income may decline sharply as their prices decrease without enough increase in exports volumes to offset this price decline. Second, another source of instability comes from the supply' side, which also characterized by low price elasticity of supply, and influenced by several endogenous and exogenous factors in foreign trade environment.

In general, it's assumed that export diversification can minimize export instability. Analogous to Markowitz (1954) portfolio theory, the diversification principle could be used to minimize non-systematic risks associated with exporting a narrow range of products either by adding new products to exports' basket, or changing the weights of existing items, or changing both, therefore, the risks of individual price fluctuations can be minimized, (Love, 1992).

Moreover, diversification may be achieved using intensive and extensive exports margins. The intensive margins are intended to expand the share of existing products in the same exports markets, while the extensive margins include several channels of exporting: exporting current products to new markets, adding new products in existing markets, and new products in new markets. Concerning developing countries, the use of extensive margins is more efficient than the intensive margins to lower exports instability, since their exports baskets consist mainly of primary or low value-added products, or traditional goods traded in saturated markets (Pacheco and Pierola, 2007; Besedes and Prusa, 2008).

Literature review

The relationship between export diversification and economic growth received substantial attention from economic literature as it has been addressed from several aspects, (Cadot et al. 2011,2013; Parteka and Tamberi, 2013 ;Imbs and Wacziarg, 2003; Koren and Tenreyro, 2007; Klinger and Lederman, 2006; Minondo, 2011). Some studies investigate the direction of the causality while others focused on whether this relationship is in the short or long run.

Behar(2011) denoted that the economic growth in the Middle East and North Africa (MENA countries) is relatively low due to inadequate trade integration and the reliance on petroleum exports, while Bhattacharya and Wolde (2010) revealed that non-oil exports to GDP ratio for MENA is below the world averages during the period 1999-2008, which confirm of weak export diversification in these countries.

Dogrueel and Tekce (2010) pointed out that the fluctuations of raw materials prices (mainly oil) led many Arab countries to adopt policies to reduce reliance on it a major source of income and to adopt efficient strategies of diversification. These strategies have contributed to increase the number of commodities production lines in some countries, the number of production lines in Jordan grown by 12%, while the share of the four major exported goods decreased to 38% in total exports, while in Egypt, the ratios were 26% and 24% respectively during the period 1991-2009.

In oil-exporting countries, the concentration of oil exports remained high, especially in Saudi Arabia (89%) and Algeria (98%), unlike Oman where oil dependence declined from 87% to 67 %. In general, the study showed that countries of Jordan, Egypt, Morocco and Tunisia were the most with diversified exports patterns (Saidai, 2002).

The relationship between export diversification and economic growth is also influenced by the structure of exports patterns and the nature of diversification index used in estimation. Spetan and Saqfalhait (2013) study employed two different indicators, HHI (Herfindahl-Hirschman Index) and DX (UNCTAD diversification index) to measure the export concentration (HHI) and the divergence degree of exports from the world pattern (DX) for Jordan and selected Arab countries (Egypt, Saudi Arabia, Morocco, Algeria, Qatar, Kuwait, Oman, and Tunisia). The study showed that despite that some countries tried to diversify their exports, the economic growth in these countries still relied on export concentration. According to HHI-index, countries of Jordan, Egypt, Tunisia, and Morocco, has relatively low HHI index (more diversified exports) compared with oil abundant countries like Algeria, Kuwait, Qatar, Saudi Arabia and Oman. For Jordan, the study showed a decline in the share of raw material in total exports, while the exports of manufactured goods, (mainly of textile, clothing and pharmaceutical industries) did increase significantly. The study indicated that the impact of export's diversification on growth using the HHI index was positive but insignificant, while the relationship was not significant using the DX index. Besides, the contribution of capital formation to economic growth were positive using the (two indexes), while trade openness impact on growth held varied within sample countries.

In another study concerning Jordan, Alkhatib (2006) tested the assumption that exports lead to income growth applying ARIMA model using monthly data, the study adopted the view that the relationship between exports and growth is multi-dimensional relation. The first assumes that trade openness leads to greater access to investment goods, which in turn increases the production and growth of exports and income. The second sees that the reduction of trade

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barriers lead to an increase in foreign direct investment (FDI) which in turn supports economic growth in the long-run. According to the study, the increase in foreign direct investment (FDI) led to a decline in domestic investments and thus reducing growth and exports. Therefore, the trade protection regime could achieve long-term growth if it led to an increase in domestic investment. Thirdly, the study found that export growth has a positive impact on income and production with a lag of eight months of the change in export value. This result is consistent with the fundamental assumption that the effect of exports on growth is only a short one.

In another analysis of the relationship between economic growth and exports, Abu Shihab et al. (2014) employed a different econometrical model (Granger causality test) using annual data of Jordan. The study was based on the classical view that indicates the positive contribution of foreign trade in stimulating economic growth. The study pointed out that openness and trade partnerships agreements led to an increase in the volume of Jordanian exports, but these exports remained concentrated in the Arab countries' markets. Additionally, the study indicated a causality relationship between exports and economic growth in the short-run, where economic growth leads to an increase in exports and not vice versa.

In Syria, Shaaban and Habib (2016) tested the impact of trade reforms adopted by the Syrian government to stimulate and diversify exports and reduce dependence on exports of primary commodities. The statistics indicated that Syrian exports have become more diversified during the period following the adoption of these reforms(2000-2011), but the study explained that the reason for the increase in the diversification of Syrian exports is due to the decline in oil exports share in total exports, by evidence that manufactured and semi-manufactured exports have not changed much during this period. Also, the study showed that the trade openness policy led to increased foreign competition in the Syrian markets, which led to an increase in the trade balance deficit, while the financial reforms did not succeed in attracting investments to finance projects in which Syria has comparative advantages.

At the international level, Kurihara and Fukushima (2016) examined the impact of economic development on the relationship between growth and export diversification. Additionally, the role of trade openness in stimulating export diversification or concentration (specialization) was examined, and whether this contributed to economic growth. The study used data representing three groups: developed economies, emerging and developing economies, during the period of 1991-2010. The study showed that economic openness led to more specialization in production at developed and developing countries, but it didn't stimulate economic growth significantly. While the impact of trade openness on

exports diversification was negative in advanced and less developed countries level. However, for the whole data, trade openness coefficient was close to zero. On the other hand, a study by Agosin (2005), using data of emerging economies for the period (1980-2003), assumed that export diversification has a positive impact on economic growth. The study indicated that export diversification reduces export and income volatility. The study deemed that countries that possess export structures similar to those in developed countries is an indicator toward more accelerated economic growth, while countries with conventional comparative advantages in production must adopt structural changes in their exports patterns through increasing diversification to keep up their growth.

Data and methodology

The study sample represents all West Asian Arab countries during the period (2000-2017). Yemen was excluded because of data shortage. This group includes eleven countries (Jordan, Syria, Iraq, Lebanon, Palestine, Kuwait, Bahrain, Qatar, UAE, Oman, and KSA). The data is obtained from three main sources: the world bank (WB), United Nation Conference on Trade and Development (UNCTAD), and Pen World Tables (version 9.1). The study model was designed using Yokohama and Almeu model (2009) with some modifications. The model is expressed by the following econometrics model:

$$RGDP_{it} = \beta_1DX_{it} + \beta_2HR_{it} + \beta_3K_{it} + \beta_4CRI_{it} + \beta_5PRM_{it} + \beta_6TO_{it} + \beta_7URB_{it} + \beta_8POP_{it} + \beta_9NPR_{it} + \varepsilon_{it} \quad \dots(1)$$

Real Gross domestic product is used as a dependent variable. The GDP is regarded as the main indicator of economic growth in most empirical studies reviewed. The values of (RGDP) are expressed using constant dollar (US\$ 2010). The explanatory variables are:

1. DX: exports diversification index values obtained from UNCTAD, the diversification index was estimated by calculating the absolute deviations of exports' diversification of a country from the world pattern:

$$DX_i = 1/2 \sum_{p=1}^n ABS(Hp_i - Hp) \quad \dots(2)$$

Where:

DX_i = country DX index value

H_p_i = share of product (p) in total exports of country (i)

H_p = share of product(p) in total world exports.

The diversification index (DX) takes the values between 0 and 1, where values closer to one indicate greater divergence from the world diversification pattern.

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2. HR: the yearly number of labors engaged in production expressed in millions of workers.
3. K: capital formation as percentage of GDP. Capital formation (formally named domestic investment) consists of the additions to the fixed assets of the economy plus the net changes in the level of inventories (world bank definition).
4. CRI: the corruption perceptions index. It was created by Transparency International organization in 1993 and used to rate countries based on their perceived level of corruption (-2.5 to + 2.5, higher positive values mean lower corruption and high commitment of laws and regulation).
5. PRM: the annual value of primary exports including oil, gas, minerals, fruit and vegetables, primitive or traditional products.
6. TO: trade openness measured by the ratio export and imports to GDP. Studies indicate that the associated benefits of trade openness include transfer of technology and skills between countries which enhance input factors productivity besides the benefits of transferring productive goods and services.
7. URB: urbanization is usually measured by the percentage of the population living in urban areas. The role of urbanization on economic growth depends on the specific characteristics of countries and the level of industrialization, where Rostow (1950) considered urbanization as a vital requirement of achieving economic development due to its role on improving inputs productivity.
8. POP: annual population growth rate. The classical theory argues that population growth is harmful to economic growth if there is a growing gap between population growth rates and production growth rates. While Baker et. al, (2005) believed that, in high-income countries, the slowness of economic growth is partially due to low population growth.
9. NPR: Number of products exported at the three-digit SITC, revision three level. In this classification, all commodities are grouped into headings suitable for economic analysis. SITC is recommended by the United Nations to be used in all countries for their external trade data and thus promotes international comparability of trade statistics.

Export diversification and economic growth in west Asian Arab countries

Although most Arab countries enjoy the abundance and diversity of human and natural resources, these resources have not been utilized efficiently to the achievement of comprehensive and sustainable development. This due to weak production and trade policies and the absence of inter-coordination resulting in misallocation of these resources and prevent the access to Arabic economic integration (Jumaili, 2015). In West Asian Arab countries, the oil, gas, and minerals products constitute a high percentage of GDP. And despite these countries possess most of the world's reserves of oil and gas, their economic growth comparatively low and unstable because of instability in the prices of these materials, consequently, these countries forced to expand these exports to reduce budget deficit during periods of prices decline.

However, during the Arab Summit held in Amman in 1997, it was agreed on several measures to establish an Arab economic alliance through the signing of GAFTA (Great Arab Free Trade Area) agreement involving seventeen Arab countries. Besides, many Arab countries have entered into regional and international trade agreements and conglomerates to increase trade openness to stimulate the growth and diversification of their exports (MENA countries as an example). Moreover, some Arab countries adopted policies of trade liberalization (joining WTO), reducing trade protection, and facilitating export and import procedures (Abedini and Péridy, 2008).

Figure one points out that the period (2000-2017) showed a decline in the GDP growth rate for the entire sample, while the general trend of primary export increased during the period (2000-2011). But during the period (2011-2017) OPEC-oil prices dropped sharply (by 50%) which contributed to more decline in the GDP growth of exporting countries (Commodity Market Outlook / WB, 2018). Moreover, this period experienced a political and military conflicts in Iraq, Syria, and some other Arab countries which cast a shadow on all areas especially the on economic side, where the economic growth was negatively affected at regional or country level. On the other hand, export diversification index (DX) falls during the period (2000-2009) as the number of exported products increased in this period, Nevertheless, the DX index still high, this means that exports' structure in these countries diverges from the world pattern of exports diversification.

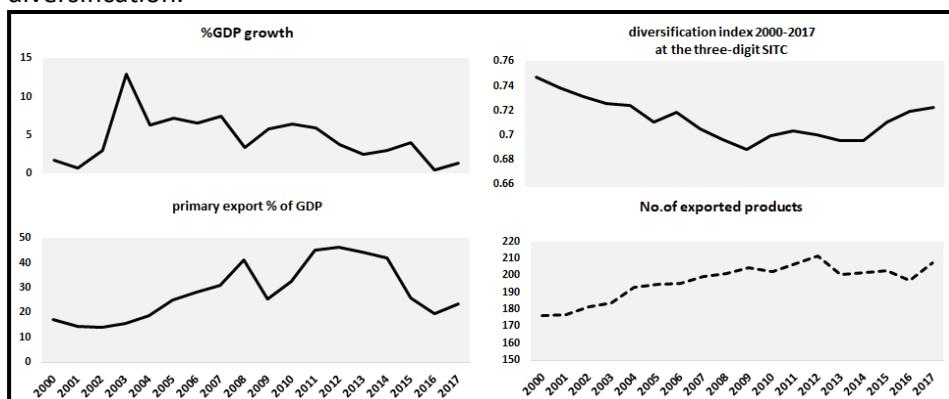


Figure 1: GDP growth / primary export % of GDP / DX diversification index /and number of exported products for sample countries (2000-2017) averages.

Diversification index (DX)

The (DX) diversification index is created by Finger and Kreinin (1979) to measure export similarities between countries. The (UNCTAD) modified this index to measure the deviation of a country's trade structure from world structure. For a

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country, a large divergence of export from world pattern means a few exported products accounts for a large share in total country's exports, and consequently, the exports become less diversified. Referring to the study appendix, the rise in the number of exported products positively contributed to minimize the divergence of exports from world pattern in most countries except Iraq. While in Jordan, the divergence increased regardless of the rise or drop in the number of products exported. Nonetheless, countries that experienced a decrease in (DX) index suffered from economic instability, especially during the periods of oil prices decline. Therefore, we can conclude that the decline in exports diversification index (DX) is mainly because of the reduction of oil exports share more than the increase in numbers or shares of other exported products.

Table 1: diversification index (DX-index) for individual counties in the sample¹.

country year	Bahrain	Iraq	Jordan	Kuwait	Lebanon	Oman	Qatar	KAS	PNA	Syria	UAE
2000	0.790	0.850	0.612	0.844	0.634	0.785	0.841	0.807	0.609	0.787	0.656
2001	0.767	0.857	0.535	0.848	0.630	0.787	0.843	0.802	0.619	0.792	0.639
2002	0.774	0.810	0.620	0.844	0.618	0.764	0.846	0.792	0.594	0.776	0.607
2003	0.752	0.843	0.597	0.784	0.647	0.791	0.823	0.791	0.586	0.775	0.597
2004	0.733	0.864	0.599	0.824	0.632	0.783	0.806	0.789	0.622	0.742	0.577
2005	0.762	0.832	0.598	0.804	0.630	0.773	0.783	0.774	0.592	0.714	0.574
2006	0.744	0.822	0.653	0.815	0.631	0.781	0.790	0.769	0.619	0.696	0.582
2007	0.722	0.825	0.586	0.815	0.628	0.752	0.802	0.762	0.614	0.675	0.582
2008	0.714	0.817	0.631	0.788	0.636	0.727	0.789	0.738	0.624	0.634	0.582
2009	0.702	0.841	0.611	0.797	0.625	0.698	0.768	0.756	0.609	0.634	0.539
2010	0.734	0.846	0.643	0.798	0.621	0.715	0.770	0.756	0.626	0.642	0.547
2011	0.744	0.870	0.649	0.778	0.668	0.702	0.754	0.753	0.641	0.625	0.551
2012	0.726	0.863	0.643	0.774	0.657	0.693	0.768	0.745	0.656	0.616	0.514
2013	0.674	0.864	0.673	0.782	0.590	0.691	0.762	0.763	0.659	0.611	0.497
2014	0.669	0.872	0.655	0.796	0.628	0.724	0.776	0.755	0.666	0.597	0.491
2015	0.645	0.897	0.655	0.816	0.591	0.744	0.803	0.771	0.677	0.621	0.522
2016	0.686	0.906	0.649	0.826	0.624	0.749	0.830	0.770	0.659	0.646	0.541
2017	0.691	0.898	0.659	0.772	0.630	0.693	0.827	0.763	0.674	0.635	0.529
Average	0.724	0.854	0.626	0.806	0.629	0.742	0.799	0.770	0.630	0.679	0.563

Table one shows that, on average values of DX, the UAE exports has the lowest divergence degree form world export pattern while Iraqi exports has the highest degrees of divergence. In general, the exports structures in all countries of the group remained diverged from the world pattern of diversification and supports the idea that the divergence from world pattern will lead to lower export

¹ These series obtained from UNCTAD databases.

diversification, although some countries have witnessed a remarkable decline in the value of this divergence, such as the UAE, Oman and Bahrain.

Empirical results

In this part of the study, we will review the important aspects of statistical and econometric analysis using panel data approach. Specifically, the analysis includes descriptive statistics, ordinary least squares OLS, FM-OLS (fully modified OLS). The fully modified least-squares was designed by Phillips and Hansen (1990) to provide optimal estimates of cointegrating regressions, this method modifies OLS to account for serial correlation and endogeneity that results from the existence of cointegrated relationships.

The study will test the stationarity of the time series via unit root tests. Hence, the absence of unit root is a precondition for testing cointegration relationships and error correction mechanism (ECM). Otherwise, if the data series are of stationary in levels and differences, Autoregressive Distributed Lag (ARDL) model is used to estimate the parameters of the model. These tests are designed to discover if there are long or short-run relations between the actual and estimated values of the dependent variable. Besides, the existence of a causality relationship between diversification and economic growth will be checked in terms of direction and efficiency.

Referring to table two, first; it seems that the pattern of export diversification of the sample diverges a lot from world pattern (average DX= 0.716 with relatively low standard deviation =0.096), the low value means that the individual values of this index did not vary much during the study period.. Moreover, the sample's exports concentration index deviates clearly from world index (world average =0.075, while sample average = 0.47²).

² These statistics are obtained from UNCTAD data base 2018 for comparison with DX-values.

**Table 2: Descriptive Statistics
(2000-2017)**

Variable	GDP*	DX	HR**	K%	CRI	PRM*	TO%	URB%	POP%	NPR
Mean	128	0.72	2.79	24.34	0.02	46.8	1.009	0.829	0.042	196
Median	53	0.74	1.63	23.24	0.14	15.3	0.922	0.834	0.03	211
Maximum	690	0.91	12.42	48.87	1.57	320.8	1.919	1	0.175	259
Minimum	5	0.49	0.27	9.34	-1.50	0.1	0.501	0.519	-0.001	69
Std. Dev.	158	0.10	2.82	6.68	0.73	67.0	0.292	0.114	0.031	46
Skewness	1.895	-0.22	1.59	0.86	-0.35	2.0	0.01	-0.45	2.13	-0.80
Probability	0	0.02	0	0	0.036	0	0	0.04	0	0
Observations	187	187	187	187	187	187	187	187	187	187

* in billions constant 2010(US\$)

** in millions of persons engaged in production

Second; the statistics demonstrated a clear variation in the GDP values in sample countries (ST. D =158), the highest value of GDP was in Saudi Arabia (the exports of primary good constitutes 45% of GDP), while the lowest GDP value in Palestine. The sample's capital formation ratio was close to world ratio while trade openness and population growth rate was higher than the world averages³. Third; by reference to World Bank Control of corruption index (CRI), the sample index value was (0.022) near the lowest positive value of index, where Iraq and Syria were the most corrupt while Qatar was the least within the study sample.

The study model coefficients were estimated using two types of least squares methods; panel OLS (fixed and random) and fully modified least squares (FMOLS). In table three, using the Hausman test, the null hypothesis was rejected, so, the fixed effect OLS method was used to estimate variables coefficients. However, the fixed effect results suffer from serial correlation (Durbin-Watson coefficient is 0.816). Consequently, FMOLS model is used to overcome this problem. Nevertheless, the results of the two models were approximately the same except the DX coefficient value and some other variations on the significance levels.

The positive value of DX's coefficient indicates that the divergence of exports diversification in this group from the world pattern contributed positively to GDP growth. Or in other words, GDP growth is a positive function in exports concentration since the exports were less diversified recalling that primary exports constitute a high ratio of the sample's exports structures. Nevertheless, the effect of the number of exported products on growth was positive which is

³ World bank statistics

regarded as an inverse outcome to DX-index effect, while by using (FMOLS)model, the effect was positive but insignificant.

The value of HR coefficient (0.5) indicates that GDP largely depends on the number of labors engaged in production in comparison with capital formation (0.004). Concerning primary exports, their effect was positive on GDP (0.17) taking into account that these exports constituted on average one-fourth of GDP for the sample, so one unit increase of primary export will lead to GDP increase by 17%.

Table 3 : Panel OLS estimation(2000-2017)-coefficients and standard error

Variable	Fixed effect [^]	FMOLS
DX	0.732** (0.220)	1.407** (0.308)
HR**	0.504** (0.034)	0.568** (0.048)
K	0.004** (0.001)	0.004** (0.002)
CRI	0.105** (0.257)	0.162** (0.304)
PRM*	0.176** (0.018)	0.173** (0.023)
TO	-0.0014** (0.000)	-0.0114** (0.000)
URB	0.0043 (0.003)	0.026 (0.004)
POP	-0.966** (0.237)	-0.985** (0.304)
NPR	0.194** (0.065)	0.154 (0.089)

Dependent Variable: LOG(GDP)

****sig0.01 *0.05**

[^]Correlated Random Effects - Hausman Test

Test Summary(chi-sq) Statistic Prob.

Cross-section random 279.641 0.000

Durbin-Watson 0.816

Another important result, which relates to corruption index (CRI), any improvement in index value will positively affect GDP growth since this

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improvement contribute to increase the efficiency of allocation and using of human and non-human resources in production. Moreover, the effect of trade openness was negative since imports to GDP ratio was relatively high (45% of GDP in 2015⁴) in these countries. The effect of population growth on GDP growth was also negative, taking into account that the world population growth rate equals one-third of the sample's growth rate, while the increase in urbanization levels did not contribute to stimulate economic growth.

Cross-Section Dependence and Unit root tests

According to table four, the hypothesis that the model's residuals has a cross-sectional dependence was accepted, and therefore, we can use Levin, Lin, and Chu test to examine if the panel data series has a unit root.

Table 4 : Residual Cross-Section Dependence Test

Null hypothesis: No cross-section dependence (correlation) in residuals		
Test	Statistic	Prob.
Breusch-Pagan LM	132.403	0.000
Pesaran scaled LM	7.380	0.000
Bias-corrected scaled LM	7.057	0.000
Pesaran CD	1.799	0.072

Table four shows that all variables have a unit root at level (or non-stationary) like most economic data, while stationary at 1st difference, $I(1)$. This property permitted using panel cointegration test since residuals are stationary at level, $I(0)$, as shown in the last row of table five.

Table 5 :Unit root test Levin, Lin & Chu t*

	Stationarity statistics	
	<u>at level</u>	<u>at 1st difference</u>
GDP	6.604	-03.212**
DX	-1.412	-15.620**
HR	9.567	-03.359**
K	-0.242	-13.775**
CRI	-0.457	-12.980**
PRM	0.317	-11.885**
TO	0.488	-10.188**
URB	5.497	-04.710**
POP	4.453	-10.916**
NPR	1.561	-13.646**
Residuals	-3.551**	-

⁴ World bank data

Panel Cointegration test and causality test

In table five, since all variables are stationary at 1st difference, we can use cointegration test (Kao Residual Cointegration Test) where the null hypothesis of no cointegration was rejected (ADF t-statistic: -5.14 with probability 0.000). Therefore, (VECM) can be used to find out if there is an error correction mechanism exists between actual and estimated values of dependent variable. The results revealed that this ECM mechanism was weak and insignificant, where only (0.26%) of equilibrium errors are corrected each period only. But when we used (DX) index as the model’s dependent variable, the errors correction mechanism became robust and significant, where 13.2% of errors are corrected each period as shown in table six.

Table 6 : ECM -test results

Dependent variable	ECM coefficient	Std. Error	t-Statistic	Prob.
RGDP	-0.0026	0.0118	-0.2203	0.8260
DX-index	-0.0132	0.0042	-3.1539	0.0020

Finally, to assess the causality relation between export diversification index (DX) and GDP, we used (Pairwise Dumitrescu Hurlin Panel Causality Tests), the results showed that causality runs from GDP to DX, while the causality that runs from DX to GDP accepted only at a 10% significance level. This means that the values of GDP and DX - index can be used to predict each other.

Conclusion

On the light of the empirical results, the study found, first, that the GDP growth in Arab-Asian countries positively related with (DX) diversification index when their exports structure diverges from the world pattern. The exclusion of Jordan, Lebanon, and UAE countries of the sample led to further divergence from world pattern. On the contrary, the exclusion of Saudi Arabia, Kuwait, and Iraq contributed to reduce this divergence, since these countries rely mainly on crude oil exports. Furthermore, the improvement in the diversification index in some periods can be attributed to the impact of oil price decline more than the increase in the diversification of the export structure, or the decrease in dependence on exports of raw materials.

Second, the study demonstrated the important role of human resource engagements in the production process, since most countries of this group are characterized as labor-intensive, while the population growth effect was negative on economic growth which consistent with classical growth theories.

Third, this group of countries are suffering from corruption spread that is represented in rent-seeking especially oil and gas, undemocratic practices, and

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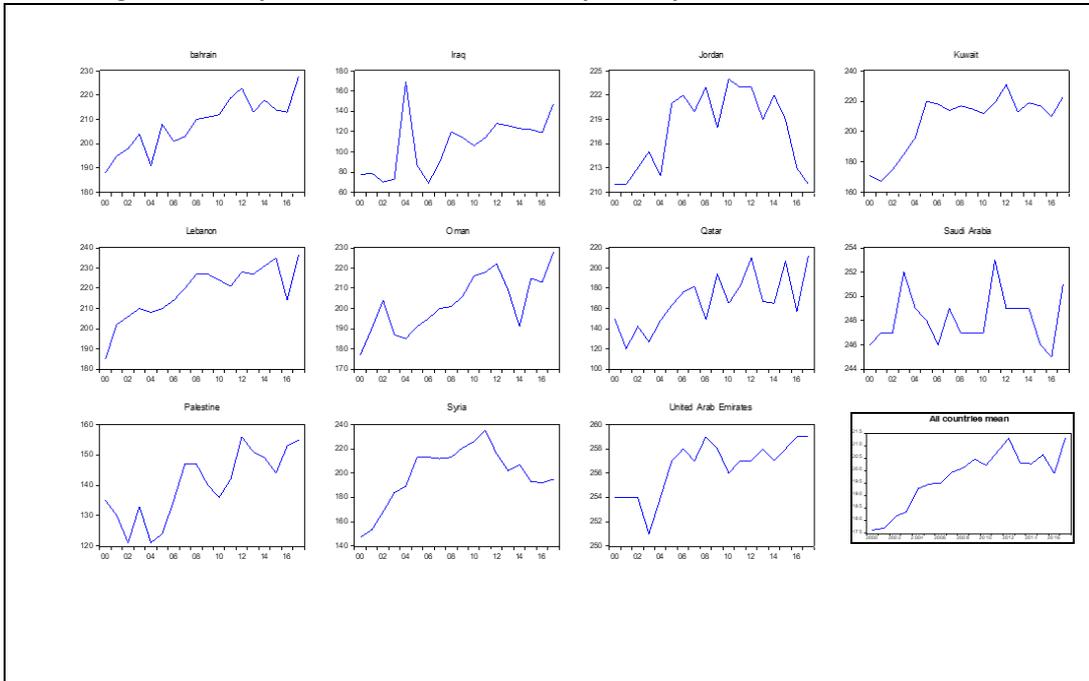
lack of transparency in government procedures in filling political and career positions. Thus, this phenomenon poses a real challenge to economic reform required to stimulate sustainable growth.

Finally, the study recommends that sample countries should restructure their exports to suit with the world diversification pattern, by reducing the reliance on the exports of primary products, the adoption of industrial-based exporting to achieve sustainable growth and to reduce the impact of exports prices instability on their economies. Additionally, Arab countries must exert actual steps to reduce corruption prevalence that hinders the efficient use of the country's resources.

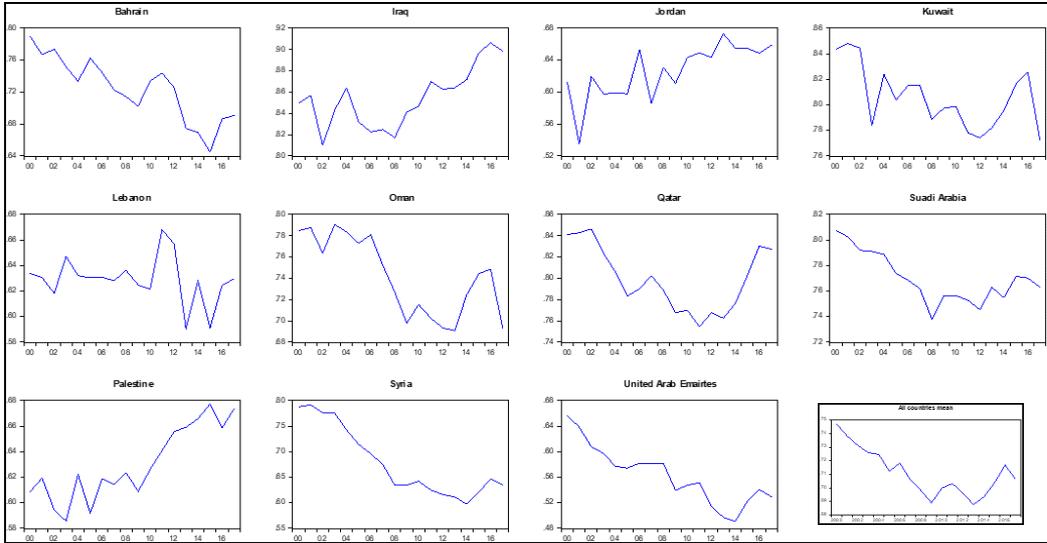
Appendix

In this appendix, we will present the graphical presentation of the main study variables for individual countries and the mean of the total sample in the sample:

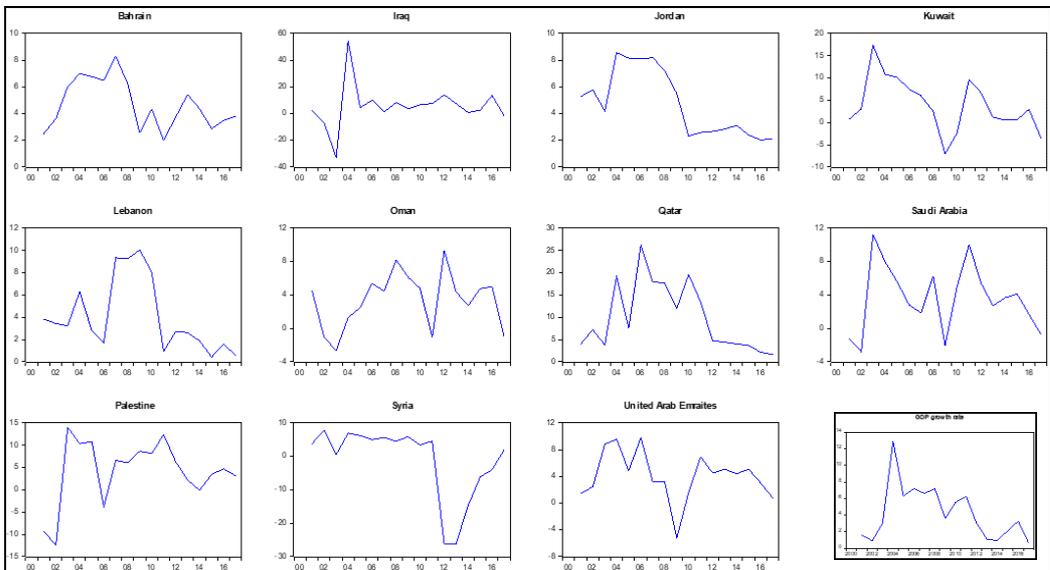
1- Figure A-1, represents the number of exported products:



2- Figure A-2 represents the diversification index (DX) :



3-



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