“The export-economic growth nexus: The case of Saudi Arabia”

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THE EXPORT-ECONOMIC GROWTH NEXUS: THE CASE OF SAUDI ARABIA

Abstract

Export strategies are the means by which the country can dispose of its domestic production surpluses to bridge successive deficits in national balances of payments and achieve economic growth. These strategies are of particular importance to the economy of Saudi Arabia, as it has opted in the last decade to diversify its economy and migrate gradually away from an economy heavily reliant on oil exports. Given the importance of diversifying the economy, this study aims to examine the relationship between exports and economic growth in the Saudi Arabian economy. The multivariate Granger Causality Test and cointegration, which is the most common model, was used in examining the short-term and long-term patterns of exports, non-oil exports, GDP, GDP per capita, and government spending from 1991 to 2016. The findings support a long-standing connection involving Saudi exports and the country's rate of economic expansion. Unidirectional causality exists between exports, non-oil exports, and economic growth expansion, which means the growth rate rises as exports grow. In addition, the findings revealed the presence of bidirectional causality between the variables. Indeed, export promotion strategies are imperative to fulfill Saudi Arabia's aspiration of robust and long-term economic growth.

Keywords non-oil exports, economic diversification, export promotion, Saudi 2030 vision, export development authority, oil-based economies

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INTRODUCTION

Export-led economic growth is one of the strategies many economies adopt, especially emerging ones. Recognizing this reality, relevant economic policies require measures to ensure the proper allocation of resources, technological transformation, accumulation of foreign exchange, generation of government revenues, capital formation, and employment. Developing non-oil exports is a vital requirement often underscored by most countries producing and exporting primary oil-based materials. The importance of this strategy comes from providing the foreign reserves necessary to finance the development of many programs (e.g., paying the costs of needed imports of products and services, increasing investments, and reducing unemployment), especially when there is a decline in the revenue of raw materials. Furthermore, this strategy represents a tool by which the countries can utilize the surpluses in their domestic production, which will lead to the expansion of the market, achieving the economic production level.

Regarding oil resources, outputs, exports, and refining capabilities, Saudi Arabia is regarded as the most powerful petroleum-producing nation in the world. It accounts for above 20% of international oil sales, 12% of international oil production, 19% of international oil reserves, and more than five million barrels per day of internal and external refining capability (SM Energy, 2021). The blueprint of Saudi Vision 2030

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(Government of Saudi Arabia, 2016) highlights and demands a national strategy for developing non-oil exports in various sectors and segments (e.g., investment sector, employment, and foreign franchises) to enable Saudi enterprises to enter foreign markets and contributes to its economic growth. Thus, it is necessary to conduct a study that analyzes the causal relationship between the increase in non-oil exports and the improvement of some macroeconomic variables. With the succession of global economic crises, diversification from an oil-driven economy is vital for economic growth and sustainability.

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The Saudi economy has survived a number of transformations throughout the last two decades. The last is the Saudi Vision 2030, representing a major economic transformation phase and a new launch of tomorrow's economy (Government of Saudi Arabia, 2016). During the last five years, the Saudi government has implemented many structural reforms and programs in several sectors to diversify the Saudi economy's production base. These reforms are in consonant with one of the main objectives of the Saudi Vision 2030: enhancing the Saudi economy to be among the top 15 largest economies in the world after being ranked 19th and increasing the localization of oil and gas sectors from 40% to 75%. The vision also aims to diversify the Saudi economy by expanding investment in the non-oil sector, enhancing the potential of promising economic sectors, and privatizing several government services. The Saudi Vision 2030 embraces a number of economic and social strategic goals, most relevant to this study are:

- raising the contribution of foreign direct investment in GDP from 3.5% to 5.7%;
- increasing the contribution of the private sector to GDP from 40% to 65%, and
- increasing the government's non-oil revenues from USD 45 billion to USD 270 billion.

There are specific initiatives of the Saudi government, such as the Saudi Fund for Development, which has contributed to enhancing, financing, and ensuring exports, along with diversifying sources of national income, primarily through the advancement of non-oil exports and improving their competitiveness in line with Vision 2030. Another initiative is the Saudi Export Development Authority, which plays a pivotal role in conducting studies and developing plans that reduce the exporters' challenges. In addition, the Authority participates in international events and commercial missions to market Saudi national products. It provides support by organizing workshops to improve Saudi organizations' abilities and their experiences in the field of export. Lastly, the National Policy for the Advancement of Non-oil Exports is conducting development programs in collaboration with the relevant authorities. As a result of these initiatives in the past five years, the percentage of non-oil exports exceeded 20% of the total exports (SAMA, 2020). The Saudi Vision 2030, through its various programs, works toward increasing non-oil exports to 50% of non-oil GDP (Government of Saudi Arabia, 2016).

Studies investigating the relationship between trade openness and economic growth were conducted specifically along the nexus between exports and growth, the nexus between imports and growth, and the nexus between trade and growth (Agrawal, 2015; Didier & Pinat, 2017; Islam, 2022; Konstantakopoulou & Tsionas, 2017; Ouassaf, 2004; Raghutla & Chittedi, 2020). Further relevant research on the relationship between exports and economic growth has also gained prominence, particularly in developing countries, such as the studies of Lafuente et al. (2018), Malik (2021), Maniraguha and Ndemezo (2022), and Raza et al. (2018). These studies show a significant relationship between export growth and economic improvement. The multiplier impact of output generates economic growth as the export rate rises. This has been evidenced in both developed and developing countries (Awokuse, 2003; Bakari, 2017; Falk, 2009; Lee & Yu, 2022; Marjit & Ray, 2017; Tsitouras & Nikas, 2016). Conversely, previous studies on international trade, exports, and economic growth revealed mixed results (Jawaid et al., 2020; Pan & Nguyen, 2018). However, it is acknowledged that the rise of exports affects economic growth, of-

ten known as export-led growth (ELG) (Kalaitzi & Chamberlain, 2020).

Sultanuzzaman et al. (2019) investigated the influence of exports and technology on the economic performance of emerging Asian countries using the Generalized Method of Moments (GMM) model. Accordingly, the result revealed a significant and positive relationship between the study's variables. Comparably, Furuoka (2018) confirmed a significant association between exports and economic growth in several sub-Saharan African nations. However, in these nations, the causal links of the constructs were shown to be weak and unstable.

Jawaid et al. (2020) emphasized the positive long-term correlation between economic development and terms of trade (TOT). The findings specifically indicate that TOT with countries like the US, Hong Kong, Bangladesh, Kuwait, Canada, Singapore, Japan, Malaysia, the UK, Sri Lanka, and Australia accelerates economic growth, while TOT with countries like China and the UAE slows it down. Conversely, the TOT with Switzerland, Saudi Arabia, Norway, and India has little influence on economic expansion.

Munir and Javed (2018) examined how the diversification of exports affected the economic development of South Asian nations using the COP Douglas function. In this study, the diversification of exports is classified into horizontal and vertical diversification. Accordingly, the Hervindal Index demonstrated an inverted U-shaped link between economic growth and inflation. Although export diversification has a significant influence on economic growth above a certain threshold, export diversification initially resulted in stronger economic growth. The initial economic growth benefits of horizontal export diversification are minimal. Nevertheless, once the threshold level has been reached, adding a new industry boosts economic growth in South Asian nations.

The trade-led growth hypothesis was extensively studied (Çoban et al., 2020; Rahman & Mamun, 2016). The BRICS economies could be seen as the world's first commercial bloc in one sense and as the strongest developing economies in another. Due to this, Raghutla and Chittedi (2020) investigated the trade-led growth, exports-led growth, growth-led imports, and the import-led growth hypotheses employing the Granger Causality Assessment for causality direction and the Johansen cointegration methodology for causality in the long term among BRICS economies. Accordingly, the output revealed that the export-led growth hypothesis was relevant for Brazil and Russia. In contrast, the growth-led exports hypothesis applies to China, India, and South Africa. As for South Africa, Brazil, China, and India, the growth-led imports hypothesis seems more relevant, whereas the import-led growth hypothesis is more applicable in the context of Russia.

In the same context, Oyelade (2019) investigated the trade-led growth and the export-led growth hypotheses in selected African countries (Nigeria, Gambia, Ghana, Guinea, Liberia and Sierra Leone). The estimated findings supported the import-led growth hypothesis for Nigeria, Guinea, and Liberia, the trade-led growth hypothesis for Gambia and Sierra Leone, and the export-led growth hypothesis for Ghana. The study emphasized imports as the most important factor influencing economic growth over exports.

Studies investigating the export-growth nexus in Saudi Arabia are scarce. Among them, Islam (2021) used time-series annual data for 1985–2019 to assess the trade-led growth theory in the Saudi Arabia context. The ARDL technique and Toda-Yamamoto Granger Causality Test have been used to analyze the data. The trade-led growth hypothesis is confirmed for Saudi Arabia based on the results of the ARDL estimation, which show that trade openness fosters productivity development in both the long and the short term. Trade openness is a cause of gross fixed capital formation.

Furthermore, the labor force increases commerce volume and economic growth. Similarly, Alshahrani and Alsadiq (2014) confirmed that government spending stimulates growth in the long run in Saudi Arabia. In addition, it was noted that openness to trade and spending in the housing sector can also boost short-run production. Waheed et al. (2020) found that non-oil exports positively affect the economic growth of Saudi Arabia. They proposed that increasing non-petroleum exports may be a sound plan for long-term expansion and as a substitute for petroleum-based products. This result was previously proposed by Ouassaf and Kouidri (2007).

In the same context, a panel geographic autoregressive model for 77 trade partners through the period

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of 2000–2016 is employed by Gouider et al. (2020) to investigate the possible regional diversity of industrial goods exports in Saudi Arabia. Observationally, the findings showed a geographical association between the exports of Saudi manufactured goods and those external factors, which include GDP, per capita GDP, freedom of trade, a trade intensity indicator, and the bilateral exchange ratio. Based on that, Cherikh and Karagiannis (2019), Karamelikli et al. (2017), and Okechukwu et al. (2018) proposed development plans that place a specific emphasis on product line diversification in order to lessen the state's dependency on oil exports.

To summarize, many empirical models have been utilized. These models include several explanatory variables, in addition to exports, that are believed to influence the economic growth level, such as imports, technology, human capital, and physical capital.

Therefore, the purpose of this study is to investigate the existing relationship between exports and economic growth in the Saudi economy. The paper first tests the unidirectional causality between exports, non-oil exports, and economic growth expansion (GDP, GDPC, and GS), which means the growth rate rises as exports grow. Second, it assesses the bidirectional causality between the variables using the multivariate Granger causality test and cointegration to examine the long-term and short-term patterns of exports (EXP), non-oil exports (NoEXP), GDP, GDP per capita (GDPC), and government spending (GS) from 1991 to 2016.

Based on the literature review, the following are hypothesized:

H1: There is a causal association between the development of exports and the growth of Saudi economics.

H1.1: A long-term causal relationship is directed from the improvement of exports to the Saudi economic growth.

H1.2: There is a short-term causal relationship between GDP and the total exports to GDP and non-oil exports to total exports.

H1.3: There is a short-term causal association between GDP per capita and the total exports to GDP and non-oil exports to overall exports.

H1.4: There is a short-term causal association between government spending and the total exports to GDP and non-oil exports to overall exports.

2. METHODOLOGY

This study used the export-led growth model to choose the best variables. Table 1 shows the variables utilized in this study, their description, and their operationalization.

Table 1. Description and operationalization of the variables

Variables	Description	Operationalization
Dependent variables		
Gross Domestic Product (GDP)	GDP is the total monetary or market value of all the finished goods and services produced within a country's borders in a specific time period. As a broad measure of overall domestic production, it functions as a comprehensive scorecard of a given country's economic health.	LN GDP
Gross Domestic Product Per Capita (GDPC)	The GDPC is the Gross domestic product divided by population.	LN GDPC
Government Spending (GS)	Government spending refers to the money that the government spends on buying goods and provision of services such as education, healthcare, social protection, ...	GS
Independent variables		
Total Exports to GDP (Exp)	Input of total exports to GDP	Exp/GDP
Non-oil Exports to Overall Exports (NoExp)	Input of non-oil exports to total exports	NoExp/Exp

3. RESULTS

3.1. Descriptive and correlation analysis

The empirical analysis started with displaying the descriptive values of all the variables. Based on Table 2, the study noted that EXP normally varies from 26.41 to 60.3, with a mean value of 41.92 and a standard deviation of 9.92. NoExp ranges from 6.6 to 25.81, with a mean of 13.56 and a standard deviation of 4.76. The GDP score varies from 11.8 to 13.54, with a mean value of 12.62 and a standard deviation of 0.65. GDPC varies from 8.93 to 10.14, with a mean value of 9.47 and a standard deviation of 0.45. The GS score varies between 10.69 and 12.63, with a mean value of 11.54 and a standard deviation of 0.66.

Table 2. Variables descriptive values

Variable	Min	Max	Mean	Std. deviation
exp	26.41	60.3	41.9227	9.92292
NoExp	6.6	25.81	13.5611	4.76621
GDP	11.8	13.54	12.6291	0.65777
GDPC	8.93	10.14	9.4791	0.45808
GS	10.69	12.63	11.5411	0.66647

Table 3 shows the correlation coefficient matrix among variables. It is observed that the dependent variables (GDP, GDPC, and GS) are at most positively correlated and also statistically significant with the independent variables (EXP and NoEXP).

Table 3. Correlation matrix

Variable	expt	NoExp	GDP	GDPC	GS
expt	1	–	–	–	–
NoExp	–.334	1	–	–	–
GDP	.485*	.573**	1	–	–
GDPC	.537**	.504**	.995**	1	–
GS	.380	.613**	.982**	.976**	1

Note: * indicates the significant level at 0.05 (2-tailed); ** indicates the significant level at 0.01 (2-tailed).

3.2. Tests for the stationarity and autocorrelations

3.2.1. Augmented Dickey-Fuller test

This test proposes a modification to the test with some extra mutations so that the dependent variable cancels out the autocorrelation. How long the decomposition is in all three conditions is marked by the Schwartz Bayesian Criterion (SBC), the Akaika Information Criterion (AIC), or Lagrange Multiplier. These three possible conditions have the equations below:

- Test for a unit root:

$$\Delta y_t = \gamma y_{t-1} + \sum_{i=1}^{p} \beta_i \Delta y_{t-1} + u_t, \quad (1)$$

- Test for a unit root with constant:

$$\Delta y_t = \alpha_0 + \gamma y_{t-1} + \sum_{i=1}^{p} \beta_i \Delta y_{t-1} + u_t, \quad (2)$$

- Test for a unit root with constant and deterministic time trend:

$$\Delta y_t = \alpha_0 + a_2 t + \gamma y_{t-1} + \sum_{i=1}^{p} \beta_i \Delta y_{t-1} + u_t. \quad (3)$$

where y_t – is the variable, t – is the time index, Δ – is the first factor of difference (change), u_t – is the error term, α – is the constant, β – is the Marginal propensity.

3.3. Phillips-Perron test

The suggestion given by the Augmented Dicky-Fuller Test is that the mistakes possibility is independent and has a constant variation. So, by relating to the Augmented Dicky-Fuller, it is necessary to ensure that the possibility of the mistakes is unrelated and has a constant variation. However, the Philips-Perron strategy permits autocorrelation at the error limit. The strategy of Philip Peron is to adjust the t-Dicky-Fuller statistics to contemplate how limited the errors are.

Table 4. Unit root tests using ADF and PP tests

Variable		ADF		PP	
		Level	1st difference	Level	1st difference
EXP	t-stat	–1.475	–4.371	–1.589	–4.3458
	prob	0.5295	0.0023	0.4733	0.0025
NoEXP	t-stat	–1.42	–5.207	–1.283	–7.6507
	prob	0.5561	0.0004	0.6209	0.000
GDP	t-stat	–0.406	–4.385	–0.406	–4.3213
	prob	0.8937	0.0022	0.8937	0.0023
GDPC	t-stat	–0.596	–4.466	–0.62	–4.4549
	prob	0.8545	0.0019	0.849	0.0019
GS	t-stat	0.1537	–3.967	0.0102	–4.1965
	prob	0.9636	0.0059	0.951	0.0035

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As shown in Table 4, the ADF and PP tests reveal that the variables are non-stationary. After the first difference, they were made stationary.

3.3.1. Pairwise Granger causality test

The pairwise Granger causality is used to test a causal relationship in the short term between two variables. It depends on the vector auto-regression (VAR) model for the first difference between the two variables, which was needed to test their causality. In the case of the two variables, EXP and GDP, the following equations are given:

$$d\left(EXP_t\right) = c + \sum_{i=0}^{n} \beta_{n,1} d(EXP_{t-i}) + \\ + \sum_{i=0}^{n} a_{n,1} d(GDP_{t-i}) + \in_{1t}, \quad (4)$$

$$d\left(GDP_t\right) = c + \sum_{i=0}^{m} \beta_{m,2} d(EXP_{t-i}) + \\ + \sum_{i=0}^{m} a_{m,2} d(GDP_{t-i}) + \in_{2t}, \quad (5)$$

where $d(EXP_t)$ – Change in total exports by time, $d(GDP_t)$ – Change in Gross Domestic Product by time, β – Marginal propensity change for total exports, α – Marginal propensity change for Gross Domestic Product, n – the number of lags in equation (4), m – the number of lags in equation (5), ε – the random change.

The null hypothesis in Granger causality test is: (H_0) there is no causality between two variables; therefore, the rejection of (H_0) implies the causality between the two variables. The results reject the null hypothesis that exports do no Granger cause economic growth at a 1% significance level.

Table 5. Pairwise Granger causality tests among GDP, GDPC, GS, EXP, and NoEXP

Pairwise Hypothesis	obs.	F-statistics	P-value
GDP→ EXP	24	0.20263	0.8183
EXP→ GDP	24	0.09936	0.9059
GDPC→ EXP	24	0.40858	0.6703
EXP→ GDPC	24	0.19802	0.822
GS→ EXP	24	0.68931	0.514
EXP → GS	24	5.00419***	0.018
NoEXP→ EXP	24	0.29384	0.7487
EXP→ NoEXP	24	0.69889	0.5095
GDPC→ GDP	24	2.39009*	0.1186
GDP→ GDPC	24	2.18251	0.1402
GS→ GDP	24	0.97860	0.394
GDP→ GS	24	10.3325***	0.0009
NoEXP → GDP	24	0.56154	0.5795
GDP→ NOEXP	24	2.54121*	0.1052
GS→GDPC	24	0.00478	0.9952
GDPC → GS	24	4.78127***	0.0208
NoEXP → GDPC	24	0.59160	0.5633
GDPC → NOEXP	24	2.48915	0.1096
NoEXP→ GS	24	8.19417***	0.0027
GS→ NOEXP	24	3.18090	0.0643

Note: The symbols *** and * reject the null hypothesis that one series does not Granger cause another at 1% and 10% levels of significance, respectively. Values in brackets are lower and upper degrees of freedom (df), respectively. For all models, DW statistics ranged between 1.81 and 2.24.

Table 5 shows a causality association between the two variables as the p-value of the F-statistic is less than 0.05. Therefore, there is a positive and statistically significant association between EXP → GS (Unidirectional Causality), GDP→ GS (Unidirectional Causality), GDPC → GS (Unidirectional Causality), and NoEXP→ GS (Unidirectional Causality).

3.3.2. Long-term association between the variables

Two methods are used to test the causality relationship in the long term: the cointegration test and the Toda and Yamamoto causality test. For both tests, there is a need to establish the appropriate number of lags for the VAR model. Table 6 reveals the results of the optimum lags selection.

According to the different methods used to select VAR lag, as shown in Table 6, the suitable number of lags to the VAR model can be obtained by depending on the lag which attains most of the selection criteria; therefore, the appropriate number of lags is 3 (three).

3.3.3. The cointegration test

Table 7 shows the results of the Johansen cointegration test for the EXP and NoEXP (independent variables) and GDP (dependent variable).

Table 6. VAR lag order selection standards

Lag	LogL	LR	FPE	AIC	SC	HQ
0	–68.59023	NA	0.000414	6.399150	6.645997	6.461231
1	82.84737	223.8643*	7.39e–09	–4.595423	–3.114344*	–4.222936
2	101.2559	19.20893	1.88e–08	–4.022254	–1.306942	–3.339361
3	157.4643	34.21381	4.18e–09*	–6.736028*	–2.786483	–5.742729*

Note: * implies lag order chosen by the standard.

Table 7. Johansen cointegration test (EXP, NoEXP, and GDP)

Hypothesized	Trace statistic	p-value	Max-Eigen statistic	p-value
None *	51.03495	0.0001	29.48847	0.0027
At most 1 *	21.54648	0.0054	17.39417	0.0155
At most 2 *	4.152314	0.0416	4.152314	0.0416

Note: *All p-values are less than 0.05, indicating a cointegration between the variables used in the model.

The results of the Johansen cointegration test for independent variables EXP and NoEXP and the dependent variable GDPC are shown in Table 8.

Table 8. Johansen cointegration test (EXP, NoEXP, and GDPC)

Hypothesized	Trace statistic	p-value	Max-Eigen statistic	p-value
None *	46.4012	0.0003	24.7718	0.0147
At most 1 *	21.6294	0.0052	16.3610	0.0230
At most 2 *	5.2683	0.0217	5.2683	0.0217

Note: *All p-values are less than 0.05, indicating a cointegration between the variables used in the model.

Finally, Table 9 shows the results of the Johansen cointegration test for independent variables EXP and NoEXP and the dependent variable GS.

Table 9. Johansen cointegration test (EXP, NoEXP, and GS)

Hypothesized	Trace statistic	p-value	Max-Eigen Statistic	p-value
None *	40.6914	0.0019	33.1517	0.0007
At most 1	7.5396	0.5159	5.8163	0.6369
At most 2	1.7232	0.1893	1.7232	0.1893

Note: * All p-values are less than 0.05, indicating a cointegration between the variables used in the model.

3.3.4. Toda and Yamamoto causality test

When using the Toda and Yamamoto Causality with a VAR Model with lags = 3 and stationarity at 1st difference, the Vector Autoregression (VAR) estimates are as shown in Table 10.

3.3.5. VAR Granger Causality/Block Exogeneity Wald tests

According to the data shown in Table 11, the value of the probability of the Chi-square test (p-value) is lower than 0.05, indicating a Bi-directional causality between all variables in the study included in sub-hypothesis H1.1 to H1.4, Therefore, all sub-hypothesis are accepted and consequently, the main hypothesis is accepted.

Table 10. Toda and Yamamoto causality test

	EXPT	GDP	GDPC	GS	NOEXP
EXPT(–1)	4.302730	0.67453	0.065547	0.002385	–0.667685
	(0.58819)	(0.02120)	(0.02388)	(0.01816)	(0.39144)
	[7.31518]	[3.18120]	[2.74511]	[0.13132]	[–1.70570]
EXPT(–2)	–4.134749	–0.072560	–0.070478	–0.037065	2.098124
	(0.50467)	(0.01819)	(0.02049)	(0.01558)	(0.33586)
	[–8.19305]	[–3.98841]	[–3.44013]	[–2.37830]	[6.24710]
EXPT(–3)	–0.806297	0.008110	0.006702	0.040911	0.153931
	(0.50359)	(0.01815)	(0.02044)	(0.01555)	(0.33514)
	[–1.60111]	[0.44675]	[0.32785]	[2.63075]	[0.45931]
GDP(–1)	–695.2120	–14.04060	–14.59207	–5.166526	174.4312
	(94.9238)	(3.42191)	(3.85343)	(2.93132)	(63.1719)
	[–7.32389]	[–4.10315]	[–3.78677]	[–1.76253]	[2.76121]
GDP(–2)	1058.253	20.48624	20.36007	11.64658	–428.2248
	(96.9212)	(3.49391)	(3.93451)	(2.99300)	(64.5012)
	[10.9187]	[5.86342]	[5.17474]	[3.89127]	[–6.63902]
GDP(–3)	–200.0892	–2.668517	–2.879210	0.606355	47.72024
	(118.561)	(4.27401)	(4.81299)	(3.66126)	(78.9026)
	[–1.68764]	[–0.62436]	[–0.59822]	[0.16561]	[0.60480]

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Table 10 (cont.). Toda and Yamamoto causality test

	EXPT	GDP	GDPC	GS	NOEXP
GDPC(–1)	491.0414	10.62447	11.22747	4.929185	–155.1906
	(79.3801)	(2.86157)	(3.22243)	(2.45132)	(52.8276)
	[6.18595]	[3.71281]	[3.48416]	[2.01083]	[–2.93768]
GDPC(–2)	–847.5655	–16.76243	–16.77761	–9.867208	317.8127
	(97.0151)	(3.49729)	(3.93832)	(2.99590)	(64.5636)
	[–8.73643]	[–4.79297]	[–4.26009]	[–3.29357]	[4.92247]
GDPC(–3)	259.7908	2.806208	3.029232	–2.277582	–50.77812
	(120.751)	(4.35294)	(4.90188)	(3.72888)	(80.3598)
	[2.15146]	[0.64467]	[0.61797]	[–0.61080]	[–0.63188]
GS(–1)	148.3757	3.341491	3.312851	0.915336	–31.32545
	(11.8745)	(0.42806)	(0.48204)	(0.36669)	(7.90248)
	[12.4954]	[7.80608]	[6.87251]	[2.49619]	[–3.96401]
GS(–2)	21.39822	0.641203	0.686172	–0.232799	33.68542
	(19.9854)	(0.72045)	(0.81131)	(0.61717)	(13.3003)
	[1.07069]	[0.89000]	[0.84576]	[–0.37721]	[2.53267]
GS(–3)	–125.2113	–2.095393	–1.984575	–0.786570	53.63379
	(18.0679)	(0.65133)	(0.73347)	(0.55795)	(12.0242)
	[–6.93003]	[–3.21710]	[–2.70575]	[–1.40975]	[4.46048]
NOEXP(–1)	4.618260	0.082009	0.078614	–0.012043	–1.535370
	(0.57369)	(0.02068)	(0.02329)	(0.01772)	(0.38179)
	[8.05010]	[3.96544]	[3.37560]	[–0.67976]	[–4.02149]
NOEXP(–2)	4.266371	0.096170	0.094115	0.016904	–0.385191
	(0.51325)	(0.01850)	(0.02084)	(0.01585)	(0.34157)
	[8.31246]	[5.19779]	[4.51709]	[1.06652]	[–1.12771]
NOEXP(–3)	–1.195355	–0.003270	–0.003054	–0.007190	1.914028
	(0.50210)	(0.01810)	(0.02038)	(0.01551)	(0.33415)
	[–2.38071]	[–0.18065]	[–0.14981]	[–0.46369]	[5.72807]
C	623.0153	15.72123	15.76367	1.111512	4.770365
	(90.6964)	(3.26951)	(3.68182)	(2.80077)	(60.3586)
	[6.86924]	[4.80843]	[4.28149]	[0.39686]	[0.07903]
EXPT(–4)	2.732650	0.047954	0.048557	–0.005716	–0.538336
	(0.38594)	(0.01391)	(0.01567)	(0.01192)	(0.25685)
	[7.08042]	[3.44675]	[3.09922]	[–0.47962]	[–2.09594]
GDP(–4)	–169.2533	–5.034477	–5.188785	–4.603527	92.42584
	(79.7413)	(2.87459)	(3.23710)	(2.46247)	(53.0679)
	[–2.12253]	[–1.75137]	[–1.60291]	[–1.86947]	[1.74165]
GDPC(–4)	–45.35485	1.384363	1.460427	4.285031	–26.67763
	(77.9098)	(2.80857)	(3.16275)	(2.40591)	(51.8491)
	[–0.58215]	[0.49291]	[0.46176]	[1.78104]	[–0.51452]
GS(–4)	14.25351	0.464442	0.476624	0.715164	–5.420408
	(5.50939)	(0.19861)	(0.22365)	(0.17013)	(3.66651)
	[2.58713]	[2.33849]	[2.13108]	[4.20353]	[–1.47836]
NOEXP(–4)	–4.005202	–0.061256	–0.060201	–0.021609	2.008730
	(0.51958)	(0.01873)	(0.02109)	(0.01604)	(0.34578)
	[–7.70857]	[–3.27045]	[–2.85419]	[–1.34680]	[5.80927]
R2	0.999599	0.999857	0.999649	0.999906	0.999227
Adj. R2	0.991575	0.997007	0.992622	0.998019	0.983760
Sum sq. resids	0.853525	0.001109	0.001407	0.000814	0.378019
S.E. equation	0.923864	0.033304	0.037504	0.028530	0.614833
F-statistic	124.5807	350.7681	142.2730	530.0531	64.60442
Log-likelihood	4.526999	77.63029	75.01744	81.03468	13.48572
Akaike AIC	1.497546	–5.148208	–4.910677	–5.457698	0.683116
Schwarz SC	2.538995	–4.106759	–3.869227	–4.416248	1.724566
Mean dependent	43.40854	12.77472	9.572208	11.67050	14.22218
S.D. dependent	10.06528	0.608762	0.436640	0.641035	4.824603
Factors resid covariance (dof adj.)			0.000000		
Factors resid covariance			0.000000		
Number of coefficients			105		

Table 11. VAR Granger Causality/Block Exogeneity Wald tests

Excluded	Chi-sq	df	Prob.
GDP	129.7860	3	0.0000
GDPC	90.93344	3	0.0000
GS	170.9633	3	0.0000
NOEXP	141.2087	3	0.0000
All	389.2152	12	0.0000
Dependent variable: GDP			
Excluded	Chi-sq	df	Prob.
EXPT	16.36484	3	0.0010
GDPC	29.83582	3	0.0000
GS	66.29866	3	0.0000
NOEXP	45.25703	3	0.0000
All	139.8784	12	0.0000
Dependent variable: GDPC			
Excluded	Chi-sq	df	Prob.
EXPT	12.10322	3	0.0070
GDP	28.63517	3	0.0000
GS	51.44973	3	0.0000
NOEXP	34.73367	3	0.0000
All	108.2874	12	0.0000
Dependent variable: GS			
Excluded	Chi-sq	df	Prob.
EXPT	14.77109	3	0.0020
GDP	32.31294	3	0.0000
GDPC	29.95360	3	0.0000
NOEXP	17.99698	3	0.0004
All	155.4711	12	0.0000
Dependent variable: NOEXP			
Excluded	Chi-sq	df	Prob.
EXPT	77.34584	3	0.0000
GDP	82.23376	3	0.0000
GDPC	40.13825	3	0.0000
GS	47.36492	3	0.0000
All	242.9343	12	0.0000

4. DISCUSSION

Based on the descriptive and correlation analysis, it can be observed that the variables in the study exhibit significant variation. The total exports to GDP (EXP) variable range from 26.41 to 60.3, with a mean value of 41.92, indicating a substantial contribution of exports to the Saudi economy. Non-oil exports to overall exports (NoEXP) range from 6.6 to 25.81, highlighting the importance of diversifying the export base beyond oil. The GDP and GDP per capita variables show moderate variation, indicating a relatively stable economic growth rate. Government spending (GS) also exhibits a moderate range, suggesting a consistent level of financial policy support.

Moving on to the correlation analysis, it is observed that the dependent variables, namely GDP, GDPC, and GS, are positively correlated. This suggests that increased total exports, non-oil exports, and government spending are associated with higher GDP and GDPC. These findings are consistent with the main hypothesis of the study, which posits a causal relationship between export development and Saudi economic growth.

Furthermore, the correlation matrix reveals that the independent variables, EXP and NoEXP, positively correlate with GDP, GDPC, and GS. This supports the sub-hypotheses that propose short-term causal relationships between GDP, GDPC, and government spending with both total exports and non-oil exports. These results indicate that an increase in exports, particularly non-oil exports, contributes positively to economic growth, GDP per capita, and government spending.

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The findings of this study align with previous research on export-led growth and trade-led growth theories. The empirical findings revealed that the independent variables (EXP and NoEXP) are most positively correlated with the dependent variables (GDP, GDPC, and GS), confirming the long-term causal link (bidirectional) between export development and Saudi economic growth. This result confirms the export-led growth relationship in the Saudi context. These findings are in line with Bakari (2017), Falk (2009), Lee and Yu (2022), Marjit and Ray (2017), and Raghutla and Chittedi (2020).

The findings are also in line with Waheed et al. (2020) in the context of Saudi Arabia. Indeed, they can provide an effective measuring tool for decision-makers in Saudi Arabia to ensure a strong and sustainable economy. The result confirms a unidirectional causality between GDP, GDP per capita, and government spending, which means the growth of GDP and GDPC results in the expansion of GS. It is inverse to that of Alshahrani and Alsadiq (2014) in the context of Saudi Arabia. In other words, this result proves the output of Saudi's 2030 vision of diversifying exports outside the hydrocarbon sector. This leads to advancing development and providing greater sources of government spending, which contributes to increasing societal well-being and rehabilitation at all levels.

The positive relationship between exports and economic growth has been widely acknowledged in developed and developing countries. In Saudi Arabia's case, the export base's diversification and the emphasis on non-oil exports, as outlined in the Saudi Vision 2030, have the potential to enhance economic growth and reduce dependence on oil revenue.

To summarize, the data analysis results support all the study hypotheses, indicating a causal relationship between export development and Saudi economic growth. The positive correlations between total exports, non-oil exports, GDP, GDPC, and government spending highlight the significance of diversifying the export base and increasing non-oil export contributions to the economy. These findings provide valuable insights for policymakers and stakeholders in shaping economic strategies and promoting sustainable growth in Saudi Arabia.

CONCLUSION

This study aims to assess at the dynamic causal link between Saudi exports and economic development from 1991 to 2016. The empirical findings revealed the presence of a causal association between Saudi exports' development and its economic growth in the long term. There is unidirectional causality between exports, non-oil exports, and government spending. Also, the study revealed unidirectional causality between GDP, GDP per capita, and government spending. Therefore, decision-makers should focus more on reducing dependency on oil export revenues in financing development programs, emphasizing non-oil sector export revenues, strengthening the private sector, and encouraging foreign direct investment in non-oil sectors.

Planning to enhance and improve the non-oil exports needs to have goods and services that include high-added value, evolve the outcomes and competition of the economic base, and with the help of the private sectors, this can grow the openness to foreign investment and trade. Furthermore, these results can stretch out important information for the economic policymakers in Saudi Arabia regarding supporting and improving non-oil exports and their relationship to fulfill economic growth.

As in other studies, this study has some limitations. First, the period of this study included some issues like the 2008 financial crisis and the oil price decline in 2014 and 2015, which may impact the results of this study. Thus, future studies could employ a more extended period to better capture the situation. Second, this study focused only on the impact of total export on GDP and non-oil exports on overall exports. Future studies may examine further factors like national and foreign investments. Finally, a revisited examination of the topic could be useful for future decision-making related to the accomplishment of Saudi Vision 2030.

AUTHOR CONTRIBUTIONS

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Writing – original draft: Saidi Ouassaf, Abdelkrim Guendouz, Nourredine Khababa.
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