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Article

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The non-oil institutional sectors and economic growth in Saudi Arabia

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ABSTRACT

This study explores the role of non-oil institutional sectors in the economic growth of the Saudi economy during the years 1970–2020, using vector auto regression, impulse response function, and variance decomposition. The results of study support the impact of the oil and non-oil sectors (private and public) on the economic growth in Saudi Arabia. The results show that the growth of the oil sector is more vulnerable to shocks, negatively reflecting economic growth for long periods. However, growth in the non-oil sector is stable and reduces the negative shocks on economic growth. Both the private and public sectors contribute to economic stability. The study recommends continuing efforts to diversify the economy and enhance the cooperation and mutual linkages among different sectors, especially the public and private sectors, to contribute in the economic growth coherent with Vision 2030.

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1. Introduction

Saudi Arabia's economy is one of the twenty largest economies in the world and the largest in the Middle East and Arab world. Globally, it ranks second in terms of natural resources, with a total value of \$35 trillion. It produces 1.2 million barrels of oil daily and ranks second in the world, with the second-largest oil reserve of approximately 16.2% of the world's total oil reserves. It also has the fifth-largest natural gas reserves and ranks sixth in the world in terms of oil consumption: about 3.4% of total global consumption. Therefore, the Saudi economy has largely relied on oil revenue. Oil prices, as crude commodities, fluctuate in the same way as most the primary exports. This is in contrast to manufactured or high-tech exports, which are characterized by the stability of their prices (Elghawry, 2020).

Moreover, the 'shale oil revolution' and the rapid spread of renewable energy lay the foundations for a 'new oil order' that threatens oil-exporting economies (Bradshaw et al., 2019). Therefore, fossil-fuel exporters should prepare for a low-carbon transition to counteract climate change (Bradshaw et al. (2019). While policies to target climate change while swapping oil pose a threat, it is accepted that oil will remain an important player in the global energy mix and that Saudi oil will be able to compete in a carbon-constrained world. However, in the face of climate change, diversification of the economy and sources of income remain viable long-term responses (Fattouh & Sen, 2015).

Gelb (1988) estimates the Dutch disease from the effect of windfall on oil exporting countries in oil boom 1973. To avoid it, a structural change has occurred in the Saudi economy, where the non-oil sector has grown enormously. The private sector plays a greater role in the economy, as the percentage of

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the private sector's contribution to GDP increased from 11% in 1970 to nearly 40% in 2020, compared to 17% of the public sector's contribution to GDP and 33% of non-oil GDP. The increase in private sector activities led to an increase in the share of non-oil economic activities in the GDP. The estimation results and IRFs demonstrate the positive and direct impact of the non-oil sector on GDP. The results of the historical variance analysis also confirm that the non-oil sector has a greater share in the variance of GDP forecast errors than the oil sector. The stability of growth rates in the non-oil sectors contributed to reducing the exposure of the Saudi economy to negative shocks resulting from fluctuations in the oil sector during the study period. Further, Karamelikli et al. (2017) examine the relationship among oil exports, imports, non-oil exports and economic growth in the (OPEC) countries for the period 1972–2013 to explain the Dutch diseases issue. The results of study explain that increase in oil exports has a positive impact on the growth of these countries. However, in case of some countries, oil exports have a negative impact on the non-oil exports.

During the seventies, oil sales increased rapidly owing to the rise in oil prices in the global market and the increase in Saudi production. This has led to the supremacy of the oil sector in the Saudi economy. Saudi Arabia has faced the dangers of total dependence on the oil sector. Therefore, all successive development plans target economic diversification, growing the impact of other productive sectors on GDP and promoting sustainable growth of private GDP (Banafea & Ibnrubbian, 2018). However, diversification of the Saudi economy is challenging. Transformation efforts have encountered difficulties that have slowed the implementation of diversification plans compared with smaller GCC countries (Banafea & Ibnrubbian, 2018). To overcome these obstacles, the government has attached great importance to diversity in the 10th development plan and vision 2030 (Abdulhamid, 2018). The recent significant drop in global oil prices has re-examined the economic future of Saudi Arabia. In response, Saudi Arabia announced Vision 2030, which can generate alternative sources for government revenues and promote an economy free of severe fluctuations in the oil prices (Moshashai et al., 2020).

The number of days in the Saudi economy after Vision 2030 is different from that before. This vision linked the economy's future to the performance of the private sector. It aims to increase the share of private sector in GDP up to 65% in 2030 and increase the non-oil exports share in the non-oil GDP from 16% to 50% (Saudi Vision 2030). To support the ambitions of this vision, Saudi Arabia has adopted the National Transformation Plan (NTP) and Fiscal Balance Program (FBP) for more efficient government finance. Consequently, the government has adopted managerial reforms and international best practices to manage public finance (Moshashai et al., 2020).

The privatization program launched in 2018 is described by the government as the key to empower the business and corporate sectors in the largest economies in the North Africa and the Middle East (Akoum, 2009). The target was to augment the private sector to provide services and government assets. The program seeks to attract foreign direct investment and increase its share of the GDP from 3.8% to 5.7% (Vision 2030). Therefore, the government has developed regulations and laws to stimulate foreign investment. This creates a positive competitive environment, making Saudi Arabia an attractive environment for foreign investment. Growth and productivity are important for the sustainable development of a country's economy. To achieve this, development goals explain decent work and growth. Many research articles have been devoted to explore the multi-dimensional and complex nature of growth. Ahmad et al. (2016) and Ahmad et al. (2018) explain the impact of taxes on growth. Banafea and Ibnrubbian (2018) explain oil price and private GDP growth patterns and their directions. Iqbal et al. (2012) find an impact of savings and credit on growth. Ahmad et al. (2013) show that Islam is a world-wide faith that brings economic prosperity to the world.

Despite the fact that the nature of growth is explained in many articles, this study is unique as it explores the growth outlooks of the Saudi economy. Previous literature on the Saudi economy has focused on exploring the relationship between oil price shocks and economic growth. Recently, with the trend towards diversifying the economy, there has been a need to study other non-oil sectors. This study sheds light on the role of non-oil institutional sectors in the Saudi economy. Both descriptive and quantitative analytical approaches were used to analyze the contribution of the institutional sectors to the Saudi economy during the period (1970–2020). This study uses the vector auto regression (VAR), which allows the evaluation of the interaction between sectors without presuppositions about causality

and time over which the variables affect each other. Furthermore, the results were augmented with the impulse response function and variance decomposition.

1.1. Saudi Arabia's economic growth

The Saudi economy witnessed historical growth in the seventies. The GDP growth rate reached approximately 40% on average due to the doubling of oil production and revenues, and oil production grew at a rate of 280% in 1974 due to the oil boom. The quantity of crude oil produced increased from 3.8 million barrels per day in 1970 (Saudi Central Bank, Annual Report, 1971) to 7.8 million barrels in the first nine months of 1973. This rate decreased to 6.9 million barrels in the remaining three months, in line with the Arab decision to reduce production and ban exports to the USA and the Netherlands (Saudi Central Bank, Annual Report, 1973). However, the rise in oil prices in 1973 led to an increase in exports of 68.9% and oil revenues recorded a growth of 58.4% compared to the previous year. The peak of daily production reached 9.45 million barrels per day in 1979 (Saudi Central Bank, Annual Report, 1980). Then, the GDP fluctuated downward in the eighties and reached a growth rate of less than 1% as a result of the decline in the oil production growth rate by 2.5% on average.

The Saudi economy continued to grow in the nineties. The GDP growth rates increased by an average of 5.8% for that period, despite the decline in the oil sector at the beginning and middle of the decade, as a result of the decline in the average of world oil prices during 1993 to reach the lowest level since 1988. The price of a barrel of Dubai Crude oil was recorded at \$14.9, compared to \$17.2 in 1992 (Saudi Central Bank, Annual Report, 1992). This decline is due to a surplus in global crude oil production. The average global crude oil price decline continued during 1994, and the average annual price of Dubai crude oil was \$14.75 (Saudi Central Bank, Annual Report, 1996).

The Saudi economy continued its growth in 2010, as it achieved a growth rate of 23% of the GDP at current prices because of the oil sector growth rate of 35% in 2010, despite the unfavorable global conditions represented by the global financial crisis and the resulting decline in oil prices in 2009. The global economy was affected by the financial crisis, as the growth rate of the world economy in real prices recorded a deflation during 2009, reaching 0.6%, compared to 3% in 2008. Global oil demand also declined by 1.4% in 2009 (Saudi Central Bank, Annual Report, 2010). This was reflected in the Saudi economy, with a GDP declining at current prices by 17.45% due to the decline in oil GDP growth by 39% in 2009. The Saudi economy also continued to grow in the subsequent period, despite some declines in 2013, 2014, 2015, and 2016 due to changes in oil prices. The severe fluctuations in GDP growth rates during 1970–2020 are closely related to fluctuations in the growth rates of the oil sector. Therefore, Saudi Arabia has adopted a new development path represented by 2030 vision.

The global economy declined in 2020 by 3.3% compared to a growth rate of 8.2% in the previous year because of the effects of the Covid-19 pandemic. Saudi economic growth declined by 1.4% as part of the global economic system in 2020. This is mainly due to the decline in the oil sector due to the decrease in global demand for energy and the decline in the non-oil sector due to the instructions to limit the spread of the coronavirus. Therefore, most economic activities are affected to varying degrees, including the impact on the Saudi stock market (Alzyadat & Asfoura, 2021; Alzyadat et al., 2021). Despite this, the Saudi economy has shown flexibility in absorbing the economic repercussions. The Kingdom managed to mitigate the effects of the pandemic, and many initiatives have been launched to support and reform the economy and overcome the health and social effects of the Covid-19 pandemic. On March 14, 2020, the Saudi Central Bank announced a financing program for the private sector with a total value of 50 billion riyals to help the private sector promote economic growth (Alzyadat & Asfoura, 2021).

From 1970 to 2020, the Saudi economy was exposed to many global factors mainly related to fluctuations in the oil market, which affected economic growth (Aloui et al., 2018). This finding confirms that economic growth in Saudi Arabia depends on oil prices (Mahmood, 2021). Therefore, an increase in oil prices has a strong positive direct impact on GDP growth rates (Foudeh, 2017). However, the growth rate is less affected by the decline in oil revenue (Haque, 2020a). In other words, an increase in oil prices has a greater impact than a decrease in prices (Mahmood & Murshed, 2020). Both large negative and positive oil shocks affect economic growth in Saudi Arabia. Although only large negative shocks have a

Table 1. Average annual growth rates of GDP by institutional sectors.

Period	At current prices				
	OGDP	PGDP	GGDP	NOGDP	GDP
1970–1979	50.68	34.23	24.71	31.29	39.57
1980–1989	−2.54	2.71	8.91	4.35	0.87
1990–1999	9.96	4.35	5.72	4.75	5.82
2000–2009	15.91	10.01	7.44	9.11	11.06
2010–2020	3.34	6.76	8.09	7.16	5.25

Period	At constant prices (2010 = 100)				
	OGDP	PGDP	GGDP	NOGDP	GDP
1970–1979	12.39	15.83	9.31	12.91	12.14
1980–1989	−3.07	1.44	3.98	2.40	−2.07
1990–1999	4.34	3.31	2.48	2.96	3.65
2000–2009	1.40	7.72	3.60	6.22	3.52
2010–2020	1.47	4.02	3.50	3.85	2.77

strong impact, large positive oil shocks have a greater positive impact on economic growth than do normal oil shocks (Banafea & Ali, 2022). The average annual growth rates of GDP by institutional sector are shown in Table 1.

1.2. Saudi Arabia's non-oil economic growth

The Saudi government has adopted five-year development plans since 1970, focusing on diversifying tributaries of the non-oil economy. In its economic policies announced in Vision 2030, Saudi Arabia also seeks to reduce its dependence on oil to avoid its impact on the economy. The Saudi economy has made significant leaps in Non-oil GDP from 1970–2020. Non-oil GDP increased at constant rates from 103733 million riyals in 1970 to 1491735 million riyals in 2020. This is an important step, indicating the extent of Saudi economic growth. The contribution of the non-oil sector increased from 21% in 1970 to nearly 60% in 2020. However, this contribution is affected by fluctuations in oil prices.

The contribution of oil sector to GDP declined from 77% in 1970 to nearly 40% in 2020. In addition, the stability of growth rates in the non-oil sectors contributed to reducing the exposure of the Saudi economy to negative shocks resulting from fluctuations in oil prices during the study period. Balanced development requires reducing the government's role and increasing the private sector's participation in economic growth. The 2030 vision aims to improve the private sector activities to a gross domestic product of 65%. The percentage of the private sector's contribution to GDP increased from 11% in 1970 to nearly 40% in 2020, compared with 17% of the government sector's contribution to GDP and 33% of non-oil GDP. Saudi Arabia's non-oil sector has grown enormously. The increase in private sector activities led to an increase in the share of non-oil economic activities in the GDP. However, a complete transition from an oil economy to a non-oil economy is not an easy task. The percentages of the oil, private, and government sectors in the GDP are given in Table 2.

2. Literature review

Since the seventies of the last century, the key contributions of oil sector in economy attracted its attention to the escalation of oil price volatility, where the impact varies with the volatility of oil prices that depend on the global market (Hathroubi & Aloui, 2020). Thus, in response to oil price fluctuations, the Saudi government sought economic diversification, which attracted researchers and economic policy-makers to understand the relationship between the oil and non-oil sectors, and the total impact on economic growth. Studies have confirmed the oil sector's contribution to the Saudi economy's growth (Alkhathlan, 2013; Gorus, 2017; Sultan & Haque, 2018; Jawadi & Ftiti, 2019; Sweidan & Elbargathi, 2022). Islam et al. (2022) found that the positive components of oil rents remained neutral, whereas negative shocks negatively affected economic growth. Al-Amin (2019) concludes that the oil sector still dominates the Saudi economy. This domination will remain until its revenues are effectively used to encourage investment in other productive sectors.

Table 2. The percentage of the oil, private, and government sectors in the GDP.

Year	At current prices			At constant prices (2010 = 100)		
	OGDP	PGDP	GGDP	OGDP	PGDP	GGDP
1970–1974	58.0	27.7	13.4	80.0	10.3	9.0
1975–1979	56.6	34.2	8.7	73.6	15.8	10.1
1980–1984	48.4	38.1	12.9	61.8	24.0	13.7
1985–1989	25.1	49.7	23.7	53.7	26.4	18.9
1990–1994	35.8	40.0	22.6	63.6	20.7	14.7
1995–1999	34.1	41.1	23.2	61.4	22.2	15.4
2000–2004	39.5	38.9	20.5	57.7	25.6	16.1
2005–2009	49.1	34.5	15.6	52.2	31.7	15.4
2010–2015	46.7	36.8	15.7	44.2	38.2	16.8
2015–2020	28.0	48.1	23.0	42.5	39.8	17.0

The oil sector has also played a vital role in the non-oil sector economic growth in Saudi Arabia, as the accumulation of private GDP is directly and indirectly dependent on oil revenues. (Al Rasasi, et al., 2019; Hussien, 2019) confirm the effect of oil revenue on non-oil GDP. On the other hand, Alabdulwahab (2021) showed that the impact of oil rents is negative on non-oil GDP, while it is positive for GDP. The non-oil GDP is also affected by oil prices. Oil prices in turn affect production and GDP, resulting in an intrinsic correlation between non-oil GDP and oil prices. Hathroubi and Aloui (2020) revealed a negative relationship between oil prices and the non-oil GDP growth rate. In contrast, Abid and Alotaibi (2020) show a positive impact of crude oil prices on private investment in Saudi Arabia. Elghawy (2020) indicated that exports of the manufacturing sector are the most affected by fluctuations in oil prices, while the agricultural export sectors or high-tech products are not affected.

The non-oil sector also played a role in raising the economic growth rates in the Saudi economy, especially during periods of low oil prices, and contributed to alleviating the effects of fluctuations in oil prices. Numerous studies have demonstrated this. For example, Choudhury and Al-Sahlawi (2000) revealed that the transformation of the Saudi economy into a non-oil sector has encouraging effects on growth productivity, efficiency, and social welfare. The study also finds comprehensive links between the sectors of the economy that help economic change and achieve economic development.

Alodadi and Benhin (2015) confirm the importance of private and public investments in economic growth. On the other hand, Aljebri (2017) finds a positive relationship between non-oil economic growth and non-oil exports. Other researchers have also pointed out the positive impact of non-oil exports on the growth of the Saudi economy, noting that promoting non-oil exports may be a good strategy for sustainable growth and as an alternative to petroleum products (Fadol, 2020; Alfakih & Tabassum, 2020; Waheed et al. 2020; Abdulrahman, 2020; Elneel, 2022).

The public sector contributes to the economic growth of non-oil sector. Hemrit and Benlagha (2018) indicate that differences in government expenditure are associated with the same directional deviations in non-oil GDP growth. According to Haque (2020b), private sector growth has a positive relationship with government spending, investment, and trade openness. Hasanov et al. (2021) argue that government expenditure positively affects the non-oil GDP. Almarzoqi and El Mahmah (2020) revealed that an increase in non-oil revenue leads to an increase in government expenditure.

Some studies have documented the significant role of diversification in the economy. It enhances the sectoral economic contribution and promote the economic growth of non-oil GDP: manufacturing production (Almosabbeh & Almoree, 2018); the service sector (Alhowaish 2014); construction sector (Alhowaish, 2015; Alzyadat et al. 2020); religious tourism (Triki, 2019); the insurance sector (Alzyadat, 2020; Alzyadat & Alwahibi, 2021); Wholesale and Retail Trade Sector (Alzyadat & Almuslamani, 2021); financial development (Samargandi et al., 2014; Masih et al., 2009). Belloumi and Alshehry (2018) showed that financial development and trade openness positively affect non-oil GDP growth. In addition, Al Mahish (2016) demonstrated the positive impact of financing on economic growth. Similarly, Alzyadat (2021) revealed that sectoral bank credit has a positive impact on non-oil economic growth. Akinwale et al. (2020) reveal that entrepreneurship positively affects economic growth. Mohammed et al. (2021) suggested that the petrochemical sector ranked first in contributing to non-oil transformation and economic diversification. Sarwar et al. (2021) concluded that there was a major transformation in the structure of the Saudi economy, such as a high dependence on capital instead of labor. Since the

introduction of the value-added tax, financial development and trade openness have been considered more reliable factors for achieving economic growth.

Bradshaw et al. (2019) reviewed uncertainty scenarios regarding the dynamics of the global oil demand in Saudi Arabia and Russia. The study found that Saudi Arabia is keen to preserve oil revenues by funding Vision 2030 to diversify its economy. Banafea and Ibnrubbian (2018) and Alkhathlan et al. (2020) concluded that Saudi Arabia has succeeded in economic diversification, but has been slow and is still below the target level. Similarly, Houfi (2021) showed that Saudi Arabia has achieved relative success in achieving economic diversification and promoting economic growth.

3. Methodology

A Vector Autoregression (VAR) model was employed in this study to obtain robust results. The VAR model is widely accepted in the literature and is used for time-series data (Scott Hacker & Hatemi-J, 2008). This model allows for dynamic interaction among variables, particularly in the case of data-generating process characterization by unit roots. VAR is an alternative technique for estimating simultaneous equations. All the variables were kept endogenous in the VAR model. Consequently, it permits the assessment of the interaction among variables without assuming causality. However, it is assumed in VAR to find variables that can interact with each other over time on prior knowledge. This allows us to find long-term relationships among variables in combination with short-term dynamic adjustments. It is the requirement of the VAR to find the number of time-lag periods for each variable. The lagged values of the variables and error term were included in the model.

The VAR (p) form is written as $X_t = C + AX_{t-1} + U_t$ and $X_t = [GDP_t, OGDP_t, NOGDP_t, PGDP_t, GGDP_t]$; where X_t is a vector of variables, and these variables are gross domestic product (GDP), oil sector gross domestic product (OGDP), non-oil sector gross domestic product (NOGDP), private sector GDP (PGDP), and GGDP is the public sector GDP. X_{t-i} : is the value of variable with i time lag, C is a vector of constants, and U_t is also a vector of error terms. Secondary data were obtained from the Saudi Central Bank for 1970–2020.

4. Results and discussion

4.1. Descriptive Statistics

The descriptive statistics indicate that the mean and standard deviation of the oil sector growth rates were the largest compared to the non-oil sector and the private and public sectors. This reflects the volume of fluctuations in the oil sector, which is reflected in the GDP; that is, most of the fluctuations in the GDP growth rate result from fluctuations in the oil sector. Table 3 provides the descriptive statistics of institutional GDP in Saudi Arabia.

4.2. VAR results

This study tests the correlation among the variables. The high correlation among variables may cause the issue of multi collinearity. The correlation results are given in Table 4.

Table 3. Descriptive statistics.

	GDP	OGDP	NOGDP	PGDP	GGDP
Mean	12.371	15.230	11.248	11.518	10.917
Median	8.031	10.780	8.563	5.579	7.365
Maximum	190.98	280.287	71.651	83.063	41.252
Minimum	−17.44	−44.908	−8.153	−11.366	−12.051
Std. Dev.	29.722	47.528	14.528	17.040	11.009
Skewness	4.332	3.3858	2.374	2.707	0.984
Kurtosis	26.786	20.061	9.460	11.212	3.864
Jarque-Bera	1361.879	716.009	136.63	205.632	9.832
Probability	0.000	0.000	0.000	0.0000	0.007
Observations	51	51	51	51	51

Table 4. Correlation matrix.

	GDP	GGDP	OGDP	PGDP
GDP	1			
GGDP	0.324	1		
OGDP	0.737	0.210	1	
PGDP	0.643	0.681	0.531	1

Table 5. The augmented dickey-fuller test.

	Level			1 st difference		
	Intercept	Trend and Intercept	The result	Intercept	Trend and Intercept	The result
GDP	−0.439	−1.350	Non	−5.272	−5.214	I (1)
OGDP	−2.220	−2.887	Non	−5.908	−5.868	I (1)
PGDP	−0.655	−1.725	Non	−2.399	−2.145	I (1)
GGDP	−0.048	−1.621	Non	−3.074	−3.005	I (1)

The correlation matrix results indicate that the highest correlation coefficient is 0.737; which is less than 0.90. It is concluded that model fit good with criteria and having no issue of multi collinearity. Therefore, VAR model is suitable to test the relationships among the variables of the study.

The time series behavior for most economic variables is likely to be nonstationary. Usually, in practice, a time series can be classified as stationary or non-stationary based on available tests in the literature, including unit root tests. Dickey Fuller (DF) and augmented Dickey-Fuller test (ADF) tests are used for the unit root. The co integration rank test determines the application of a VAR in differences for estimation when no co integration is found or the Vector Error-Correction model (VECM). Table 5 explains the ADF results and concludes that all variables are nonstationary at level I(0). However, they are stationary at their first difference I(1).

The VAR model requires the selection of the optimal lag length of the variables. The theory proposes that the process is dynamic and does not assist in the selection of the lag length in dynamic processes. Several criteria provide the possibility of selecting an optimal lag length. The three most used criteria are the Akaike Information criteria (AIC), Schwarz Information criteria (SC), and Hannan-Quinn Information criteria (HQC) (Scott Hacker & Hatemi-J, 2008). Table 6 shows the use of four lag orders based on AIC, one lag in the case of SC, and two lags when HQC is used. Thus, the optimal lag length based on the results is one lag period. This is the lowest of the three criteria.

It is an important property of Co integration in time series to analyze whether the series have trends that may be deterministic or stochastic. Suppose the time series are integrated with order d and the linear combination has an order less than d , then it is concluded that the series are cointegrated. The cointegration rank test are presented in Table 7. The results show that, based on the values of Trace and Max-eigenvalue tests at the level of 0.05, no cointegration is found. In this case, the time series I (1) is not cointegrated. We conclude that the VAR model in the first differences is the most appropriate.

The VAR estimates are explained in Table 8.

The estimated coefficients of GDP indicate that 1% growth in the oil sector leads to 0.62% GDP growth, while 1% growth in the private and public sectors leads to GDP growth of 2.62 and 1.2 per cent growth of GDP. The results in Figure 1 confirm that the cumulative effect of such a shock in the oil sector leads to a 1.4% growth in GDP within two years; the effect becomes negative in subsequent periods. The impulse response functions also show that a shock to the non-oil sector (private and governmental) leads to GDP growth. However, the results are consistent with the fact that GDP is sensitive to the movement of the oil sector and that the non-oil sector in Saudi Arabia is a major driver of the economy.

The variance decomposition shows how the variance in the expected error of one variable in the system is related to the sudden shock of the other endogenous variables. The results also show that the non-oil sector variance has a greater share of the GDP forecast error variance than the oil sector variance. Additionally, the private sector has a higher share of GDP growth forecasts than the public sector does. The results of the historical decomposition of GDP also confirm that the non-oil sector has a greater share in the variance of GDP forecast errors than the variance of the expected error of the oil sector. The results confirm that the stability of growth rates in the non-oil sector contributed to reducing the exposure of the Saudi economy to negative shocks resulting from fluctuations in the oil sector

Table 6. VAR lag order selection criteria.

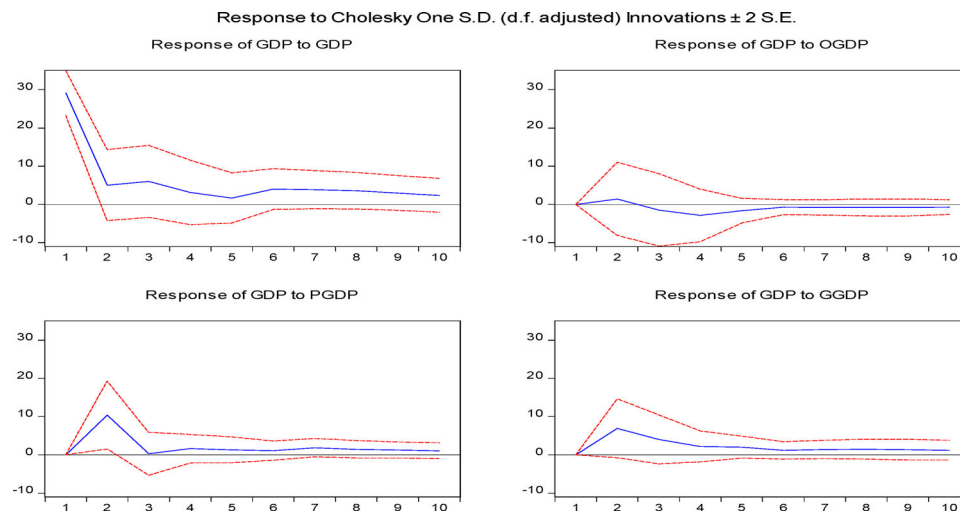
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2240.32	NA	3.52e + 36	95.503	95.660	95.562
1	-1997.77	433.4979	2.30e + 32	85.862	86.65*	86.159
2	-1976.17	34.93*	1.84e + 3*	85.624	87.041	86.15*
3	-1960.94	22.037	1.98e + 32	85.657	87.704	86.427
4	-1942.89	23.033	1.96e + 32	85.57*	88.246	86.577

Table 7. Co integration rank test.

Hypothesized No. of CE(s)	Trace Test			Max-Eigen Test		
	Statistic	Critical Value	Prob	Statistic	Critical Value	Prob
None *	50.691	47.856	0.026	26.717	27.584	0.064
At most 1	23.974	29.797	0.205	19.737	21.131	0.077
At most 2	4.237	15.494	0.883	3.687	14.264	0.890
At most 3	0.550	3.841	0.458	0.550	3.841	0.458

Table 8. Vector auto regression estimates.

	GDP	OGDP	PGDP	GGDP
GDP(-1)	-1.604 [-1.630]	-2.897 [-1.815]	0.188 [0.637]	-0.524 [-2.674]
OGDP(-1)	0.650 [1.265]	1.210 [1.451]	-0.044 [-0.291]	0.341 [3.335]
PGDP(-1)	2.621 [2.380]	4.207 [2.355]	0.969 [2.937]	0.378 [1.724]
GGDP(-1)	1.233 [1.822]	1.892 [1.722]	0.376 [1.855]	0.361 [2.678]
R-squared	0.204	0.171	0.784	0.771
Adj. R-squared	0.069	0.030	0.747	0.732
Sum sq. resids	34766.85	91527.41	3125.746	1383.071
S.E. equation	29.119	47.248	8.731	5.808
F-statistic	1.509	1.215	21.319	19.766
Log likelihood	-230.360	-254.076	-171.340	-151.363
Akaike AIC	9.729	10.696	7.320	6.504
Schwarz SC	10.037	11.005	7.628	6.813
Mean dependent	11.959	14.202	11.625	10.996
S.D. dependent	30.182	47.985	17.382	11.227

**Figure 1.** Impulse response function of GDP.

during the study period. This is in line with the expectations of the important role of the non-oil sector in the Saudi economy, especially in the private sector.

These results are consistent with the results of previous studies that the oil sector contributes to economic growth in Saudi Arabia (Alkhathlan, 2013; Gorus, 2017; Sultan & Haque, 2018; Jawadi & Ftiti, 2019; Sweidan & Elbargathi, 2022). The results also emphasize the most important role of the non-oil sector, both private and public. The results show that the oil sector growth is more vulnerable to shocks and

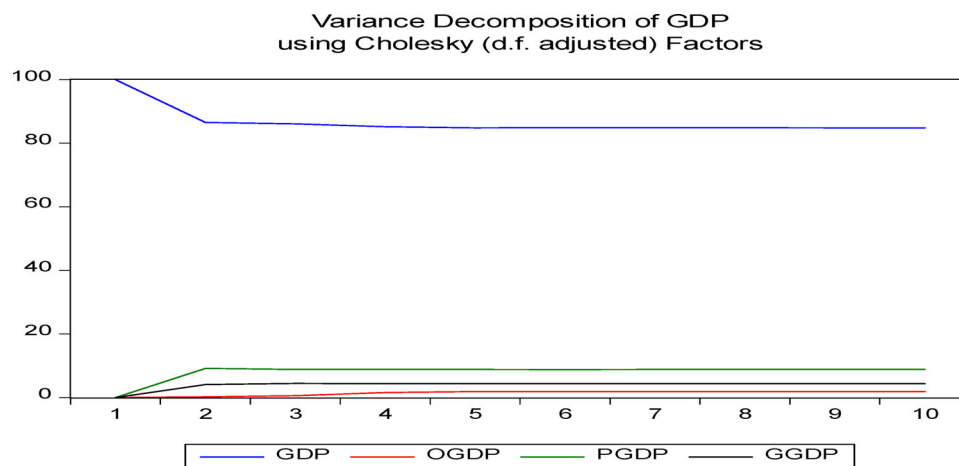


Figure 2. Variance decomposition.

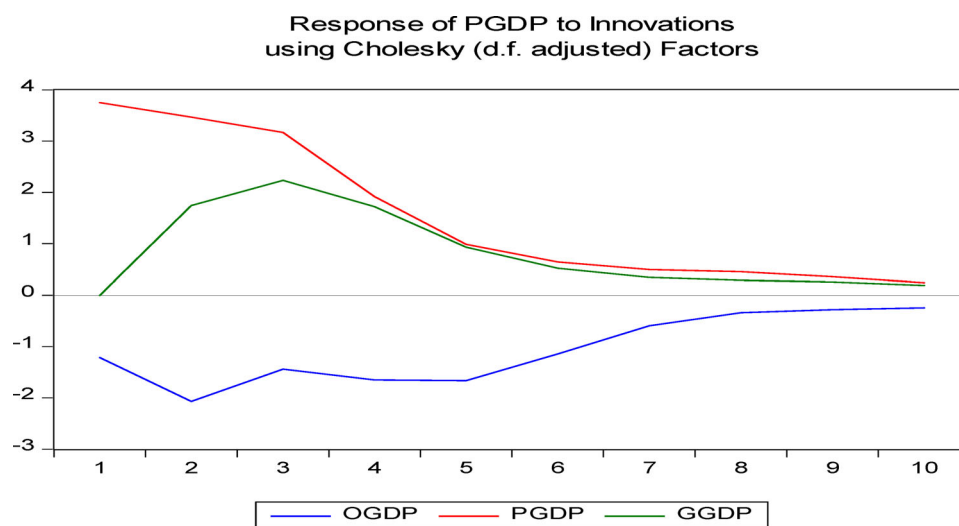


Figure 3. Impulse response function of private GDP.

thus reflects negatively on economic growth for several periods, according to the results of its impulse response functions and variance decomposition, as explained in Figures 1 and 2, respectively. However, the stability of growth in the non-oil sector reduced the impact of these shocks on economic growth, especially after 2010, as shown in Figure 1. Thus, the non-oil sector has encouraging effects on economic growth. This result is consistent with the study by Choudhury and Al-Sahlawi (2000) that the non-oil sector stimulated economic development, and Alodadi and Benhin (2015) on the importance of private and public investments for economic growth. On the other hand, Aljebrin (2017) supports the existence of a positive relationship between non-oil economic growth and exports. This also confirms the positive impact of non-oil exports on the economic growth of the Saudi economy (Fadol, 2020; Alfakih & Tabassum, 2020; Waheed et al., 2020; Abdulrahman, 2020; Elneel & AlMulhim, 2022).

The results of the estimation and impulse response functions in Figure 1 show the negative impact of the oil sector on the domestic product of the private sector. The results of this study agree with Alabdulwahab (2021), who explains that the private sector is indirectly affected by oil prices by increasing wages in the oil sector, stimulating wage increases in other sectors, and high prices of intermediate inputs. The results demonstrate the positive role of the oil sector in promoting the government's non-oil sector in Saudi Arabia. With Vision 2030, the government sector focuses on investing in infrastructure to develop the private sector, setting rules and regulations that will strengthen the private sector, providing government services, and transforming oil revenues into investments in financial revenues that would replace oil revenues. Therefore, links between institutional sectors help achieve sustainable economic growth.

5. Conclusion and recommendations

Economists believe that economies with abundant natural resources grow faster than other economies. Nevertheless, the 'resource curse' concept has dominated the debate on economic growth in oil-exporting countries. Some expect weak performance in countries rich in natural resources compared with those with poor natural resources. However, using public-sector revenues can improve the efficiency with which natural resource rents are transferred to alternative forms of capital to sustain economic growth (see Auty & Warhurst, 1993; Auty, 2007).

Saudi Arabia is an oil-dependent economy with rapid economic growth and extensive diversification. The economy during the period (1970–2020) was exposed to many global factors, mainly related to fluctuations in the oil market. To overcome these global factors, Saudi Arabia has now decided to proceed with a reform plan termed Vision 2030. The plan aims to increase the private sector's contribution to GDP from 40% to 65%. It also aims to raise the share of foreign direct investment in GDP from 3.8% to 5.7%, and the share of non-oil exports in non-oil GDP from 16% to 50%. To support the ambitions of this vision, Saudi Arabia has adopted the National Transformation Plan and Fiscal Balance Program for more efficient government finance. The oil sector plays a vital role in Saudi economic growth, as the accumulation of GDP is directly and indirectly dependent on oil revenue. The estimation results support a positive impact of the oil sector on GDP, while the IRF shows a direct positive impact on the oil sector, which later turns negative.

The private and public sectors have contributed to the achievement of economic stability. Thus, the transformation of the Saudi economy into a non-oil sector has encouraging effects on economic growth and helps economic diversification and sustainable growth. The study recommends keeping up efforts to diversify the economy and enhance the partnership between the public and private sectors to enhance economic growth, in line with the Kingdom's Vision 2030. Keeping in view the Dutch disease issue, it is emphasized that sustainable economic growth in oil exporting countries, including Saudi Arabia, is possible only by non-oil exports. The findings of this study are limited to sample period (1970–2020). However, the studies in future can include recent and large sample data to explore the other effects of Dutch disease.

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Authors' contributions

The Dr. Moodhi Raid is the corresponding author of this article. She plays a key role to structure the article and in data analysis. Dr. Nisar Ahmad & Dr. Salim A. Bagadeem were involved in drafting the article. Dr. Jumah Alzyadat & Dr. Hisham Alhawal contributed a lot to revise the article on critical bases. However, all authors have significant role to complete this research article.

Disclosure statement

The authors report there are no competing interests to declare.

Ethical approval

This study was not related to the human participants performed by any of the authors.

Informed consent

This study does not contain any studies with human participants performed by any of the authors.

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Data availability statement

Data used in this study are collected from the secondary sources and available at:

- (1) Saudi Central Bank, Annual Report, (1971, 1973, 1980, 1992, 1996, 2010) at: <https://www.sama.gov.sa/ar-sa/EconomicReports/Pages/AnnualReport.aspx>
- (2) Kingdom of Saudi Arabia Vision 2030 (2016). at: <https://www.vision2030.gov>

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