International Journal of Sustainable Development and Planning
Vol. 20, No. 11, November, 2025, pp. 4805-4817
Journal homepage: http://iieta.org/journals/ijsdp

Economy Beyond Oil: Measuring Saudi Arabia's Non-Oil Economic Growth

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https://doi.org/10.18280/ijsdp.201121

Received: 16 October 2025
Revised: 17 November 2025
Accepted: 22 November 2025
Available online: 30 November 2025

Keywords:
oil sector, non-oil sector, economic growth, Weighted Average Trend Growth Rate, GDP, Saudi Arabia

ABSTRACT

The Saudi Arabian economy has been based on the exports of petroleum products for the last years. External environment factors affect demand and the revenue of exports of the petroleum products of Saudi Arabia. There is a need to develop other sources of economic contribution to hedge against the revenue fluctuations of petroleum exports due to the external business environment or uncontrollable factors. This research aims to focus on measuring the non-oil economic contribution to the GDP of Saudi Arabia, rather than the oil revenue contribution, comparatively. The secondary data used in the study were obtained from the Saudi Arabian Monetary Authority (SAMA) for the years 2010–2024. FBI (Fixed base index numbers), CBI (chain base index numbers), CV (Coefficient of Variation), and ATGR (Average Trend Growth Rate) are applied to get the trend and abnormality of variability of data. FBI measures the change in the value of a variable in the context of one fixed base year, while CBI measures it in the context of the previous year. ANOVA (Analysis of Variance), EWATGR (Effective Weighted Average Trend Growth Rate), and PEWATGR (Proportional Effective Weighted Average Trend Growth Rate) are applied to get the significant differences among the growth trends, growth rate of unequal components of a variable, and proportional contribution. In this study, data from a few categories are compared using a clustered column chart. It is inevitable to focus on agriculture, forestry, and fishing; other mining and quarrying; electricity, gas, and water by the Ministry of Environment, Water and Agriculture; and the Ministry of Energy of Saudi Arabia to enhance the quantitative proportional contribution for non-oil GDP to shift the oil economy to a non-oil economy. The Saudi government may apply lower rates of taxes on the goods and services identified as zero-rated, to enhance the proportional contribution of the net taxes on products.

1. INTRODUCTION

The economy of Saudi Arabia has been identified as an oil-based economy in the world for years. In contrast, the pattern of the Saudi economy is in a shifting pattern, switching from an oil-based economy to a non-oil-based economy due to development, modernization, and liberalization, and fluctuation in oil prices internationally. Renewable energy and sustainable development directed diversification of the Saudi Arabian economy by exploring the non-oil avenues. In order to achieve the goals of Vision 2030, the Saudi Arabian government is focusing on sustainable development growth, private sector participation, and promoting non-oil sectors like tourism, manufacturing, finance, and information technology. These endeavors are intended to shift the economic pattern from oil to a non-oil economy to make a knowledge-based and sustainable economy. Measuring the non-economic growth is essential to get the results of efforts applied to shift the economic pattern of Saudi Arabia. There is a spiral trend growth seen in the oil sector, non-oil sector, net taxes on products, and total GDP of Saudi Arabia (year 2010 to 2024).

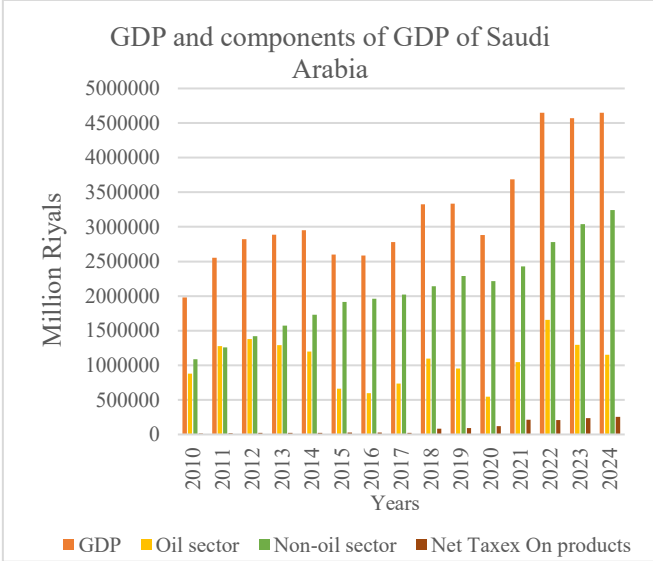

Figure 1. GDP and components of GDP of Saudi Arabia
Source: https://www.sama.gov.sa/en-US/EconomicReports/Pages/report.aspx?cid=123

There are abnormal fluctuations seen in the oil sector's contribution to GDP, while the net taxes contribution is negligible, but in a progressive growth trend in recent years (Figure 1). The aggregate growth of GDP indicates only the overall growth of the economy, while segregation and comparison between the sectoral contribution to GDP and non-oil components to non-oil GDP explore the major contributors and their trend of contribution to non-oil GDP. The growth trend of contributors to oil and non-oil GDP reveals diversification or a shifting pattern. Internal trend or sensitivity of the oil and non-oil contributors explains the inter-sectoral pattern of contribution. It is necessary to measure and analyze the growth pattern of the non-oil economy in the context of the oil economy to explain the growth trend of components of non-oil GDP and to frame the strategies to achieve the goals of Vision 2030 in Saudi Arabia.

2. LITERATURE REVIEW

Oil and non-oil exports affect the revenue and enhance the growth of the economy. Alabdulwahab [1] found the impact of the oil GDP on the non-oil GDP in Saudi Arabia. The oil economy affects the non-oil economy symmetrically and indicates the challenges in diversifying the economy. Aljebrin [2] discovered that non-oil exports and non-oil economic growth were positively and significantly correlated. Additionally, he discovered a strong and favorable correlation between capital and non-oil economic growth over the long and short terms. Aljebrin [3] established the contribution of non-oil exports to economic development in Saudi Arabia. He suggested diversifying its exports to develop the new infrastructure and capital to support the production of exports and domestic use items for a symmetric relationship between oil and non-oil sectors in the Saudi Arabian economy. Khayat [4] found that the non-oil exports have a significant impact on the economic growth in Saudi Arabia in the long run. Surprisingly, oil exports negatively affect economic growth in the long run. He recommended supporting the production of non-oil exports by providing low-interest-rate loans and setting favorable legislation to promote the non-oil exports and develop non-oil production in Saudi Arabia. The economic development of Saudi Arabia is the composition of the contributions of the oil and non-oil sectors. Abdulrahman [5] investigated how Saudi Arabia's economic growth is supported by both oil and non-oil exports. In order to boost Saudi Arabia's economic growth, Hasanov et al. [6] promoted an increase in exports. According to their estimates, manufacturing contributes three times as much to the growth of non-oil exports as agriculture does. Saudi non-oil exports are also influenced by transportation, communication, insurance, and other commercial services. Short-term causal correlations between GDP, oil exports, and non-oil exports were discovered by Mohsen [7]. Oil revenue or oil exports, and the non-oil sector, enhance the revenue and contribute to the progressive growth of the economy. Al Rasasi et al. [8] found a strong relationship between government oil revenue and non-oil private activity. They suggested investing in infrastructure development and setting favorable rules and regulations to develop the private sector of Saudi Arabia. Raid et al. [9] explain that the non-oil sector hedges against oil price shocks in Saudi Arabia. They recommend that cooperation between the public and private sectors will enhance the economy and align with the objectives of Vision 2030 in Saudi Arabia. Hasanov et al. [10] explored the positive impacts of non-oil capital and labor on the non-oil GDP in the long run. They suggested improving the business environment, economic and social infrastructure, and business regulatory framework to attract more foreign investments. The government should support the non-oil economy by providing financial and technical assistance in the short and long run. Hemrit and Benlagha [11] found a positive relationship between government expenditure and the non-oil GDP of Saudi Arabia. Oil exports had a greater impact on GDP, and recommended to increase non-oil exports to diversify the economy. The shifting of the Saudi Arabian economy is necessary to hedge against the volatility of oil prices, as the Saudi Arabian economy is based on the export of oil revenue. Nurunnabi [12] proposed six elements—innovation, economy, education and employment, information and communications technology, and human capital—to make Saudi Arabia a knowledge economy. Numerous issues pertaining to human capital have been discovered, including research and unemployment among Saudi Arabia's university-educated female population. The contribution of the private sector enhances the diversification of the Saudi Arabian economy. Llanos-Antczak [13] identified the four main areas to shift oil-based economies to knowledge-based economies. Development of and changes in the private sector, government assistance in the field of research and education, innovations, and new technologies, especially communications, and human resource development will shift the oil-based economy to a knowledge-based economy. Al Naimi [14] found that the Saudi Arabian government must consider investment in human capital and the non-oil sector, like tourism. He suggested improving the quality of education and enhancing the level of research in the nation. Guendouz and Ouassaf [15] found a positive correlation between economic diversification and GDP in Saudi Arabia. But there is a negative correlation found between non-oil GDP to GDP, non-oil government revenue to government revenue, and contribution to the private sector to diversification in Saudi Arabia. Sultan and Haque [16] found a positive long-term relationship between the economic growth, oil exports, and consumption expenditures of the government in Saudi Arabia. While imports and economic growth are negatively associated in Saudi Arabia. They recommended the diversification of the economy by considering the import-substituting industries in Saudi Arabia. The consumption of the domestic production must be enhanced which will align with the goals of Vision 2030 and be favorable for economic development. Hasanov and Razek [17] advocated that the consideration of driving forces is necessary to enhance the contribution of the non-oil sector up to 50% to achieve the goals of Vision 2030. They suggested locally manufactured products in place of imported products to diversify the economy in Saudi Arabia. To attract foreign investment, technological development is necessary in the fields of business environment, social infrastructure, and economy. The petroleum sources are the terminative in nature and are depleted absolutely. In their study of Saudi Arabia's long-term economic growth, Alodadi and Benhin [18] discovered that petroleum was a significant source of income. But petroleum is a delectable source and cannot rely on a long for sustainable development. They found that religious tourism affects economic growth to a greater extent, while non-oil exports insignificantly contribute GDP of Saudi Arabia. Also, government expenditure reflects a positive impact on the economic growth in Saudi Arabia. According to

Shili and Panjwani [19], tax revenue has a greater impact on economic growth in Saudi Arabia than non-oil, non-tax revenue from other sources, such as non-tax revenue from gas, water, electricity, construction, wholesale and retail trade, transportation and communication, home ownership, finance, insurance, and business, community and social services, and government service providers. They suggested promoting and enhancing the domestic production to enhance tax revenue, and self-reliance, and diversifying the economy through different sectors like tourism, agriculture, and FDI in Saudi Arabia. Medhioub [20] investigated how FDI helps Saudi Arabia, the United Arab Emirates, and Qatar diversify their economies. Euchi et al. [21] found the highest contribution of oil production, followed by tourism and entrepreneurship activity in Saudi Arabia. According to Alam et al. [22], there is a long-term positive correlation between Saudi Arabia's GDP, exports, public spending on education, and investment. Saudi Arabia's economy is adversely affected by imports, government health spending, and other government expenditures. They suggested enhancing expenditures on education and lowering health care expenditures to contribute Saudi Arabian GDP in the long run. The diversification from oil to non-oil sources affects the economy and economic growth of Saudi Arabia. Al-Roubaie and Al Mubarak [23] established that economic diversification increases sectoral production and mitigates the oil price volatility. SMEs are the means of diversification, but the development of SMEs in the Arab world is not satisfactory for diversification. The participation of private sector SMEs must be enhanced by providing technical, financial, and managerial assistance and creating a suitable business environment for the development of the Private SMEs in the Arab world. Samman and Shahnawaz [24] advocated for diversifying the economy to face the challenges of dependency on hydrocarbons in Saudi Arabia. Diversification enhances productivity and strengthens the economy. Adoption of an open trade policy and flexibility to adjust to the shocks of oil prices is necessary. According to Jolo et al. [25], diversity is enhanced by financial development, labor force participation, education, gross capital formation, and business regulations. Additionally, diversification is adversely affected by real GDP growth, foreign direct investment, and the self-employment rate. because knowledge-based achievements are in opposition to the resource-based approach. According to Houfi [26], economic diversification has a long-term favorable effect on Saudi Arabia's economic development. The diversification symmetrically and positively responds to positive and negative fluctuations in economic growth. Saudi Arabia is attaining the success of economic growth through economic diversification. In Saudi Arabia, Naseem [27] discovered a favorable correlation between tourism and economic expansion. Arrivals of tourists positively and strongly affect the GDP of Saudi Arabia, other than factors associated with tourism. There are some obstacles in the path of the diversification of the economy. Banafea and Ibnrubbian [28] concluded that the last two development plans of Saudi Arabia were effective enough towards diversification of the economy. Due to the poor performance of the private sector, the Saudi Arabian economy needs a supportive regulatory environment to draw in large international corporations and reduce its reliance on oil. The fluctuations of the oil prices negatively affect the growth of the Saudi Arabian economy. Jawadi and Ftiti [29] confirmed the role of oil in the economic growth of the Saudi Arabian economy. But the effect of the oil revenue on the economy varies with the market price of the oil. The diversification will mitigate the impact of the oil price shocks on the economy. So, the shifting from the oil-based economy to non-oil revenue sources is necessary for the sustainable growth and development of the economy. As Ahmed [30] explained that the UAE government realized that shifting from an oil to a non-oil economy is necessary to lower the negative impacts of fluctuations in oil prices. He suggested making investments in agriculture, livestock, and fishing to enhance the contribution to the UAE economy. The available studies regarding the impact of the oil and non-oil sectors on the Saudi Arabian economy reveal the progressive growth of the non-oil sector and advocate diversification or shifting the pattern of the economy from the oil to the non-oil sector. But there are no specific studies available to explore the growth trend or the symmetry of the absolute and proportional growth trend among the GDP and oil and non-oil components of GDP of Saudi Arabia. In order to achieve the objectives of Saudi Arabia's Vision 2030, the sector must be prioritized following an analysis of the growth pattern of the non-oil components of GDP and an investigation of the underutilized non-oil industries to accelerate economic growth. The following research framework was applied to measure the non-oil economic growth in the context of the oil economy and its impact on the aggregate growth of GDP of Saudi Arabia.

To analyze the growth trend of oil and non-oil components of Saudi Arabian GDP, the following hypotheses are framed to determine the significant differences between the oil and non-oil sectors and within components of the oil and non-oil sectors. The GDP of Saudi Arabia consists of the oil, non-oil sector, and taxes on products. While non-oil sector is the aggregation of the Agriculture, Forestry, and fishing; Other mining and Quarrying (other than oil); Manufacturing Excluding petroleum; Electricity, Gas, and Water; Construction; Wholesale retail trade, restaurants, and hotels; Transport, storage and communication; real estate; Finance, Insurance, and Business Services; Community Social and personal services; Government Activities; and Net Taxes on products. The following research design was applied to measure the economic growth of Saudi Arabia (Figure 2).

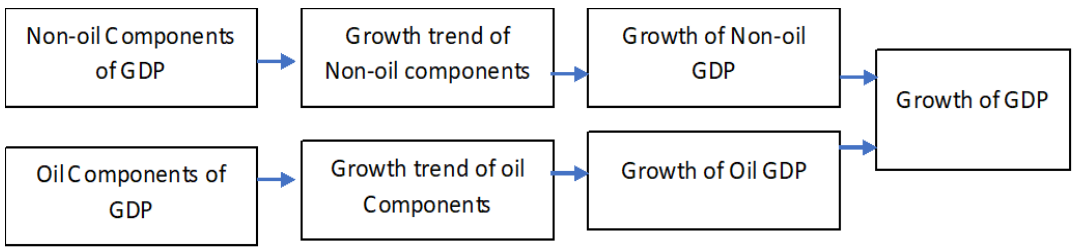

Figure 2. Research design to measure non-oil economic growth in the context of oil economic growth

$H_0$1: There is no significant difference between the growth trends of GDP and the components of GDP.

$H_0$2: There is no significant difference among the proportional growth trends of all components of GDP.

$H_0$3: There is no significant difference among the growth trends of all components of the Non-oil GDP of Saudi Arabia.

$H_0$4: There is no significant difference among the proportional growth trends of all components of the non-oil GDP of Saudi Arabia.

The testing of the above hypotheses identifies the contribution trend of the oil and non-oil sectors, as well as the contribution of the components of the non-oil sectors to the GDP, and highlights the significance of their contributions to the Saudi Arabian economy.

3. RESEARCH METHODOLOGY

The study is based on the secondary data extracted from the website of the Saudi Central Bank (SAMA- Saudi Arabian Monetary Authority). Fixed Base Index Numbers (FBI) and Average Trend Growth Rate (ATGR) are applied to determine the growth trend of the variables. Chain-Based Index Numbers (CBI) and Coefficient of Variation (CV) are applied to get the sensitivity and the abnormality of the variability of variables. FBI measures the change in the value of a variable in the context of one fixed base year, while CBI measures it in the context of the previous year. ANOVA was applied to get the significant mean difference among the growth trends of GDP and its components, and the mean difference of the proportional growth trend of the components of non-oil GDP of Saudi Arabia. Clustered column charts are used to compare the variables [31]. EWATGR (Effective Weighted Average Trend Growth Rate) and PEWATGR (Proportional Effective Weighted Average Trend Growth Rate) are applied to get the effective growth rate of unequal components of a variable and proportional contribution. A clustered column chart is used to compare variables of a few categories.

$$\text{Average Trend Growth Rate } (\text{ATGR}_i) = \frac{Average\ of\ \text{FBI} - 100}{Average\ of\ \text{FBI}} 100 \quad (1)$$

$$\text{Fixed Base Index Numbers (FBI)} = \frac{VCY}{VBY} 100 \quad (2)$$

$$\text{Chain-based Index Numbers (CBI)} = \frac{VCY}{VPY} 100 \quad (3)$$

$$\text{Coefficient of Variation (CV)} = \frac{\sigma}{Mean} \quad (4)$$

$$\text{ANOVA } (F) = \frac{\text{Sum of Sqaure between } \frac{\text{Samples}}{k-1}}{\text{Sum of Sqares within } \frac{\text{Samples}}{N-k}}; \text{ if F} * > F\alpha ** \text{, Reject } H_0 \quad (5)$$

$$\text{Effective Weighted Average Trend Growth rate } (\text{EWATGR}_i) = \text{AGTR}_i \times \text{Proportional Contribution}_i \quad (6)$$

$$\text{Proportional Effective Weighted Average Trend Growth rate } (\text{PEWATGR}_i) = \frac{\mathbf{EWATGRi}}{\sum \mathbf{EWATGR}} 100 \quad (7)$$

where,

VCY = Variables in current years;

VBY = Variables in base years;

VPY = Variables in previous years;

σ = Standard deviation of the population;

k = No. of groups;

N = Total no. of variables;

Proportional Contribution$_i$ = Average absolute amount contribution of Ith Component / Average total absolute amount of all Components.

The coefficient of variation is explained based on the given parameters (Table 1).

Table 1. Interpretations of CV

Range of CV	Degree of CV	Interpretations
Less than 10% (0.10)	Very Low Variability	There is consistency in the data.
10% (0.10) to 20% (0.20)	Low Variability	The normal variability in the data.
20% (0.20) to 30% (0.30)	Moderate Variability	The acceptable variability in the data.
30% (0.30) and above	High Variability	The variability is abnormal and unacceptable.

4. ANALYSIS AND INTERPRETATIONS

The analysis of measuring non-oil economic growth can be divided into two broad categories.

4.1 Oil and non-oil sectors of Saudi Arabia

The Saudi Arabian GDP comprises oil and non-oil sectors and gradually contributes to the country's economy. To assess the non-oil economic growth, it is necessary to measure both oil sector growth and growth in other sectors. The components of Saudi Arabia's economy can be divided into three categories: the oil sector, the non-oil sector, and net taxes on products.

4.1.1 Status, growth trend, and sensitivity of the institutional sectors of Saudi Arabia

The absolute amount of GDP, the oil sector, the non-oil sector, and the net taxes on products explain the status of the economy, while the growth trend and sensitivity reveal the growth pattern in the long run, as well as the abnormality of the variables.

From Table 2, it is obvious that the average contribution of the non-oil sector (2073710 Million SAR) is higher than that of the oil sector (1050543 Million SAR) and taxes on products (92044 Million SAR). The average growth rate of the non-oil sector (47.64%) is higher than the oil sector growth rate (15.97%). The growth rate of the net taxes on products is highest (84.06%), but the absolute contribution is negligible. So, the growth rate of the non-oil sector is effective than the oil sector growth, and the non-oil sector growth, as its contribution is highest and the growth rate is higher than the growth rate of the GDP, oil sector, and net taxes on products. The relative consistency of the variability of the GDP (CV = 0.13) and the non-oil sector (CV = 0.05) is good, while the oil sector (CV = 0.36) and taxes on products (0.52) reflect the volatility of variables due to some abnormal factors.

Table 3 establishes that the growth rate of the GDP, the oil sector, the non-oil sector, and net taxes on profit are different.

Overall, there is consistency in the non-oil sector growth rate (CV = 0.05), and trend growth rate (47.64%) is effective than the oil sector (15.97%) due to the higher rate and absolutely higher contribution to GDP. Also, the growth rate of non-oil is more effective than the growth rate of net taxes on products due to its higher absolute amount (Table 2).

Table 2. Status, growth trend, and sensitivity of GDP and its institutional sectors in Saudi Arabia

Years	GDP	FBI	CBI	Oil Sector	FBI	CBI	Non-oil Sector	FBI	CBI	Net Taxes on Products	FBI	CBI
2010	1980777	100	100	880393	100	100	1085716	100	100	14669	100	100
2011	2552477	129	129	1276603	145	145	1258589	116	116	17285	118	118
2012	2819705	142	110	1376968	156	108	1421243	131	113	21494	147	124
2013	2886583	146	102	1291352	147	94	1574057	145	111	21174	144	99
2014	2951824	149	102	1198072	136	93	1730232	159	110	23520	160	111
2015	2600305	131	88	660412	75	55	1913899	176	111	25995	177	111
2016	2584798	130	99	596291	68	90	1962645	181	103	25862	176	99
2017	2779748	140	108	736292	84	123	2020078	186	103	23378	159	90
2018	3324619	168	120	1096717	125	149	2143158	197	106	84744	578	362
2019	3333338	168	100	951460	108	87	2289925	211	107	91953	627	109
2020	2879817	145	86	544261	62	57	2215855	204	97	119700	816	130
2021	3684979	186	128	1044545	119	192	2426975	224	110	213458	1455	178
2022	4646532	235	126	1657274	188	159	2782268	256	115	206990	1411	97
2023	4569693	231	98	1293707	147	78	3039183	280	109	236804	1614	114
2024	4649267	235	102	1153802	131	89	3241833	299	107	253632	1729	107
Mean	3216297	162	107	1050543	119	108	2073710	191	108	92044	627	130
CV			0.13			0.36			0.05			0.52
ATGR (%)		38.27			15.97			47.64			84.05	

Source: FBI and CBI of GDP, oil sector, non-oil sector, and net taxes on products are based on variables available on https://www.sama.gov.sa/en-US/EconomicReports/Pages/report.aspx?cid=123

* = Million Riyals

Table 3. ANOVA of growth trends of GDP, the oil sector, the non-oil sector, and net taxes on products of Saudi Arabia

H.No.	Hypothesis	F*	Fα**	Decision If F*≥ Fα**, Reject H_0
$H_0$1	There is no significant difference among the growth trends of GDP and the components of GDP of Saudi Arabia.	8.6263	2.7694	Reject H_0

Source: Calculations based on the fixed base index numbers given in Table 2.

Table 4. Proportional growth of the institutional sectors of GDP of Saudi Arabia

Years	Oil Sector % to GDP	FBI	CBI	Non-oil Sector % to GDP	FBI	CBI	Net Taxes on Products % to GDP	FBI	CBI
2010	44.45	100	100	54.81	100	100	0.74	100	100
2011	50.01	112.52	112.53	49.31	89.96	89.96	0.68	91.51	91.44
2012	48.83	109.86	97.64	50.40	91.96	102.22	0.76	103.01	112.57
2013	44.74	100.64	91.61	54.53	99.49	108.19	0.73	99.13	96.23
2014	40.59	91.31	90.73	58.62	106.94	107.49	0.80	107.68	108.62
2015	25.40	57.14	62.57	73.60	134.29	125.57	1.00	135.09	125.46
2016	23.07	51.90	90.83	75.93	138.53	103.16	1.00	135.21	100.09
2017	26.49	59.59	114.82	72.67	132.59	95.71	0.84	113.65	84.06
2018	32.99	74.21	124.54	64.46	117.61	88.71	2.55	344.46	303.09
2019	28.54	64.22	86.53	68.70	125.34	106.57	2.76	372.78	108.22
2020	18.90	42.52	66.21	76.94	140.38	112.00	4.16	561.69	150.68
2021	28.35	63.77	149.99	65.86	120.16	85.60	5.79	782.79	139.36
2022	35.67	80.24	125.83	59.88	109.25	90.92	4.45	601.99	76.90
2023	28.31	63.69	79.37	66.51	121.34	111.07	5.18	700.28	116.33
2024	24.82	55.83	87.66	69.73	127.22	104.84	5.46	737.20	105.27
Mean	33.41	75.16	98.72	64.13	117.00	102.13	2.46	332.43	121.22
CV			0.24			0.10			0.45
ATGR (%)		-33.05			14.53			69.92	

Source: Calculations are based on the variables given in Table 2.

4.1.2 Proportional growth of institutional sectors of GDP

The proportional growth rate of components of GDP reveals the variability in the composition of GDP and explains the growth status of the components.

Table 4 explores the negativity of the oil sector's proportional growth to the GDP of Saudi Arabia. The Average Trend Growth Rate (ATGR) of the oil sector contribution to GDP is negative (-33.05%). Net taxes on products have been growing heavily since 2018, and the proportional growth rate of the net taxes on products (69.92%) is higher than the non-oil sector growth rate (14.53%). But, the growth trend of Net taxes on products is not effective in comparison to the non-oil sector, as its average absolute contribution (92044 million SAR) is lower than the average absolute contribution of the

non-oil sector (2073710 million SAR) to the GDP of Saudi Arabia during the period from 2010 to 2024. The relative consistency of variability of the oil sector (CV = 0.24) and the non-oil sector (CV = 0.10) is normal, while Net taxes on products reflect abnormally positive variability (CV = 0.45) and indicate the increase in the rates of taxes and consideration of more products and services for tax levying.

Table 5 explains the significant difference among the proportional growth trends of the components of GDP (oil sector, non-oil sector, and net taxes on products) of Saudi Arabia. Reading Tables 2 and 3, it can be concluded that the growth trend and proportional growth trend of the non-oil sector are effective due to its higher absolute amount of contribution to the GDP. From the above analysis, it is obvious that the contribution of the non-oil sector is weighted than other contributors to the GDP of Saudi Arabia.

4.1.3 Status, growth trend, and sensitivity of non-oil GDP and its components

In the Saudi Arabian economy, the non-oil contribution is higher than the oil contribution, and the contribution is in a progressive trend.

Figure 3 explains the progressive growth of non-oil GDP and its components. The absolute amount Growth of the industry (non-oil) sector is higher than the other sectors, like agriculture, forestry, and fishing, the service industry, wholesale retail trade, restaurants and hotels, and government activities and net taxes on products.

4.1.4 Growth trend and abnormality of the variability of the non-oil components of GDP of Saudi Arabia

The individual components of non-oil GDP of Saudi Arabia constitute Agriculture, Forestry, and fishing; Other mining and Quarrying (other than oil); Manufacturing Excluding petroleum; Electricity, Gas, and Water; Construction; Wholesale retail trade, restaurants, and hotels; Transport, storage and communication; real estate; Finance, Insurance, and Business Services; Community Social and personal services; Government Activities; and Net Taxes on products. Average Growth Trend Rate and the coefficient of variation explain the growth pattern and consistency in variability in the variables.

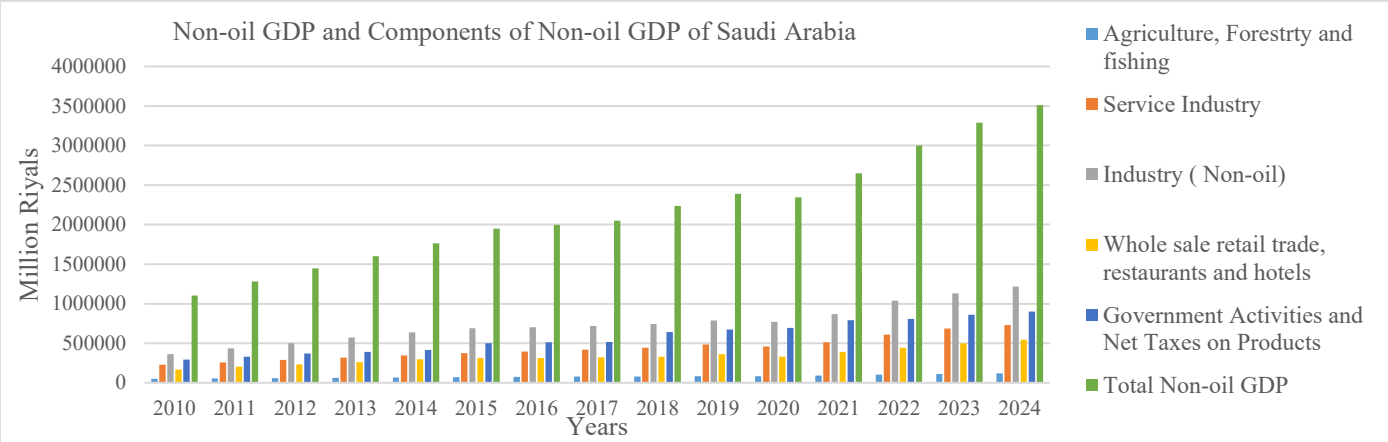

Figure 3. Growth trend of non-oil GDP and components of non-oil GDP
Source: https://www.sama.gov.sa/en-US/EconomicReports/Pages/report.aspx?cid=123

Table 5. ANOVA of the proportional growth trend of components of GDP (oil sector, non-oil sector, and net taxes on products) of Saudi Arabia

H.No.	Hypothesis	F*	Fα**	Decision If F*≥ Fα**, Reject H_0
$H_0$2	There is no significant difference among the proportional growth trends of the components of GDP.	11.5973	3.2199	Reject H_0

Source: Calculation is based on the fixed base index numbers given in Table 4.

Table 6. Growth trend and variability consistency of components of non-oil GDP of Saudi Arabia (2010 to 2024)

Non-oil GDP Components	Agriculture, Forestry, and Fishing	Other Mining and Quarrying	Manufacturing Excl. Petroleum	Electricity, Gas, and Water	Construction	Wholesale Retail Trade, Restaurants, and Hotels	Total Non-oil GDP
CV	0.03	0.04	0.07	0.05	0.11	0.07	0.05
ATGR (%)	34	39	50	46	55	50	49
Non-oil GDP components	**Transport, storage and communication**	**Real state**	**Finance, Insurance, and Business Services**	**Community Social and personal services**	**Government Activities**	**Net Taxes on products**	
CV	0.07	0.08	0.05	0.3	0.05	0.52	
ATGR (%)	43	52	44	62	43	84	

Source: Based on variables given in Appendix 2.

There is consistency in the variability seen in all components of non-oil GDP except net taxes on products (CV = 0.52). The individual average growth rate of all non-oil components is higher than 34%. The highest average growth rate of net taxes on products, while the lowest growth is in agriculture, forestry, and fishing in Saudi Arabia. Manufacturing excluding petroleum, construction, Wholesale retail trade, restaurants, and hotels, real estate, Community, Social, and personal services, Net Taxes on products are higher than the total non-oil GDP growth rate. Agriculture, Forestry, and fishing; Other mining and Quarrying; Electricity, Gas, and Water; Transport, storage and communication; Finance, Insurance, and Business Services; and Government Activities average trend growth rate is lower than the average growth rate of non-oil GDP in Saudi Arabia. There is potential available to the non-oil components whose average growth rate is lower than the growth rate of non-oil GDP (Table 6).

There is a significant difference in the growth trend of components of the non-oil GDP of Saudi Arabia (Table 7). The growth trend of the net taxes on products (84%), Community Social and personal services (62%), construction (55%), and real estate (52%) is higher than Agriculture, Forestry, and fishing (34%), Other mining and Quarrying (39%), Transport, storage and communication (43%), and Government Activities (43%) (Table 6).

4.1.5 Proportional growth of components of non-oil GDP

The proportional growth rate of components of non-oil GDP reveals the variability in the composition of non-oil GDP and explains the growth status of the components.

The consistency of proportional growth of all components of non-oil GDP is normal except net taxes on products (CV = 0.76). The proportional growth trend of Agriculture, Forestry and fishing (-25%); Other mining and Quarrying (-17%); Electricity, Gas and water (-15%); Transport, storage and communication (-10%); and government activities (-11%) are in negative trend while Net Taxes On products (62%); Community Social and personal services (22%); Finance, Insurance and Business Services (11%); Construction (9%); Real state (7%); and Manufacturing Excluding Petroleum (3%) is reflecting positive proportional growth (Table 8). It is essential to focus on components whose proportional growth is negative or low positive, and the potential for growth and development is available.

There is a significant difference in the growth trend of components of the Non-oil GDP of Saudi Arabia (Table 9).

Table 7. ANOVA of significant differences among the growth trends of components of non-oil GDP of Saudi Arabia (2010 to 2024)

H.No.	Hypothesis	F*	Fα**	Decision If F*≥ Fα**, Reject H_0
$H_0$3	There is no significant difference in the growth trend of the components of the Non-oil GDP of Saudi Arabia.	11.5973	3.2199	Reject H_0

Source: Calculation is based on the Fixed Base Index Numbers given in Appendix 2.

Table 8. Proportional growth trend and abnormality of the variability of non-oil components of GDP of Saudi Arabia (2010-2024)

Non-oil GDP Components	Agriculture, Forestry, and Fishing	Other Mining and Quarrying	Manufacturing Excl. Petroleum	Electricity, Gas, and Water	Construction	Wholesale Retail Trade, Restaurants, and Hotels
CV	0.09	0.08	0.03	0.07	0.1	0.05
ATGR (%)	-25	-17	3	-15	9	2
Non-oil GDP components	**Transport, storage, and communication**	**Real state**	**Finance, Insurance, and Business Services**	**Community Social and personal services**	**Government Activities**	**Net Taxes on products**
CV	0.08	0.11	0.06	0.14	0.1	0.76
ATGR (%)	-10	7	11	22	-11	62

Sources: Calculations based on the variables given in Appendices 4 and 5.

Table 9. ANOVA of significant differences among the proportional growth trend of components of Non-oil GDP of Saudi Arabia (2010 to 2024)

H.No.	Hypothesis	F*	Fα**	Decision If F* ≥ Fα**, Reject H_0
$H_0$4	There is no significant difference in the proportional growth trend of the components of the Non-oil GDP of Saudi Arabia.	33.1836	1.89265	Reject H_0

Source: Calculation is based on the Fixed Base Index Numbers given in Appendix 4.

4.2 Status, growth trend, and sensitivity of oil GDP and its components

There are two components, crude petroleum and natural gas, and the petroleum refining of the oil GDP of Saudi Arabia.

Figure 4 explains the spiral growth of the oil GDP and its components. The absolute contribution of Crude petroleum and natural gas is higher than the petroleum refining to the oil GDP of Saudi Arabia. In recent years, a remarkable growth has been seen in the absolute amount of petroleum refining. Still, the contribution of Crude petroleum and natural gas is higher than that of petroleum refining, absolutely.

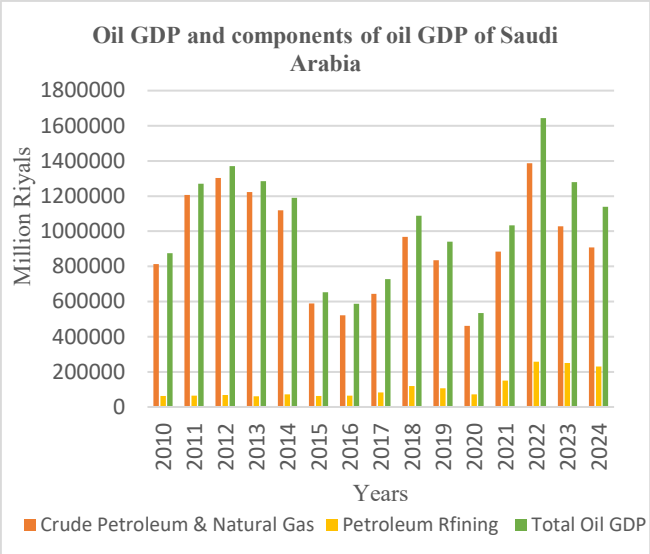

Figure 4. Oil GDP and components of oil GDP of Saudi Arabia
Source: Based on the absolute amount given in Table 10.

Table 10 explains the growth trend of the components of oil GDP and the oil GDP of Saudi Arabia. The consistency of variability of components of oil GDP (CV = 0.37 and 0.32) and oil GDP (CV = 0.36) is moderately normal. The average growth rate of the petroleum refining (45%) is higher than the Crude Petroleum & Natural Gas (12%) and oil GDP (16%). The average growth rate of the Crude Petroleum & Natural Gas is effective, as the absolute average amount is eight times that of petroleum refining. So, the contribution of the oil GDP is lower to GDP due to a low average growth rate and a high absolute proportion of Crude Petroleum & Natural Gas in the non-oil GDP of Saudi Arabia.

4.3 Effective Weighted Average Trend Growth Rate ($EWATGR_i$) and Proportional Effective Weighted Average Trend Growth Rate ($PEWATGR_i$)

The EWATGR yields a comparable average trend growth rate for various components of a variable, each with an unequal absolute amount.

In the total GDP of Saudi Arabia, the EWATGR of non-oil GDP (30.72%) is higher than the oil GDP (5.22%) and net taxes on products (2.41%). The PEWATGR of non-oil GDP is 80, while the oil sector (14%) and net taxes on products (6%) are negligible due to their low growth rate and absolute low contribution of oil GDP and net taxes on products to the GDP (Table 11).

Table 10. Status, growth trend, and sensitivity of components of oil GDP of Saudi Arabia

Years	Crude Petroleum & Natural Gas	FBI	CBI	Petroleum Refining	FBI	CBI	Total Oil GDP	FBI	CBI
2010	812911	100	100	62694	100	100	875605	100	100
2011	1206751	148	148	64216	102	102	1270967	145	145
2012	1302081	160	108	68583	109	107	1370664	157	108
2013	1222898	150	94	61536	98	90	1284434	147	94
2014	1119489	138	92	71001	113	115	1190490	136	93
2015	589295	72	53	62920	100	89	652215	74	55
2016	522507	64	89	65333	104	104	587840	67	90
2017	643994	79	123	83471	133	128	727465	83	124
2018	967887	119	150	119340	190	143	1087227	124	149
2019	834516	103	86	106742	170	89	941258	107	87
2020	461895	57	55	72504	116	68	534399	61	57
2021	884412	109	191	149273	238	206	1033685	118	193
2022	1387459	171	157	256734	410	172	1644193	188	159
2023	1028626	127	74	250707	400	98	1279333	146	78
2024	908569	112	88	229860	367	92	1138429	130	89
Mean	926219	114	107	114994	183	113	1041214	119	108
CV			0.37			0.32			0.36
ATGR (%)		12.28			45.36			15.97	

Source: Calculations of the FBI and CBI based on the variables available at https://www.sama.gov.sa/en-US/EconomicReports/Pages/report.aspx?cid=123

Table 11. Effective Weighted Average Trend Growth Rate ($EWAGR_i$) of components of GDP (2010 to 2024)

Components of GDP	Oil GDP	Non-oil GDP	Net Taxes on Products	Total GDP
$ATGR_i$	15.97	47.64	**84.05**	38.27
Proportional $Contribution_i$	0.3266	0.6448	0.02862	**1**
$EWAGR_i$ (%)	**5.22**	**30.72**	**2.41**	**38.27**
$PEWAGR_i$ (%)	**14**	**80**	**6**	**100**

Source: Calculation based on mean values and ATGR given in Table 2.

Table 12. Effective weighted average Trend growth rate ($EWAGR_i$) of components of oil GDP (2010 to 2024)

Components of Oil GDP	Crude Petroleum & Natural Gas	Petroleum Refining	Total Oil GDP
$ATGR_i$	12.28	45.35	15.97
Proportional $Contribution_i$	0.8896	0.1104	1.00
$EWAGR_i$ (%)	10.92	5.01	15.97
$PEWAGR_i$ (%)	68	32	100

Source: Calculation based on mean values and ATGR given in Table 10.

Table 13. Effective weighted average Trend growth rate ($EWAGR_i$) of components of non-oil GDP (2010 to 2024)

Non-oil Components of GDP Components	Agriculture, Forestry, and Fishing	Other Mining and Quarrying	Manufacturing Excl. Petroleum	Electricity, Gas, and Water	Construction	Wholesale Retail Trade, Restaurants, and Hotels	Total Non-oil GDP
$ATGR_i$	34	39	50	46	55	50	49
Proportional $Contribution_i$	0.0365	0.0061	0.141	0.022	0.09	0.153	1
$EWAGR_i$	1.24	0.24	7.07	0.998	4.93	7.68	49
$PEWAGR_i$ (%)	3	0.5	14	2	10	15.5	100
Non-oil GDP components	**Transport, storage, and communication**	**Real state**	**Finance, Insurance, and Business Services**	**Community Social and personal services**	**Government Activities**	**Net Taxes on products**	
$ATGR_i$	43	52	44	62	43	84	
Proportional $Contribution_i$	0.081	0.084	0.08	0.044	0.225	0.0423	
$EWAGR_i$	3.462	4.348	3.373	2.706	9.654	3.555	
$PEWAGR_i$ (%)	7	9	7	6	20	7	

Source: The calculation is based on the ATGR given in Table 6 and the mean values provided in Appendix 1.

In the oil GDP of Saudi Arabia, the EWATGR of crude petroleum and natural gas (10.92%) is higher than that of petroleum refining (5.01%) due to its absolute proportional contribution. The average growth rate of petroleum refining is more than three times higher than that of crude petroleum and natural gas. The PEWATGR of crude petroleum and natural gas (68) is more than petroleum refining (32%) due to only a low absolute contribution to oil GDP (Table 12).

In the oil GDP of Saudi Arabia, the EWATGR of government activities (9.654%), Wholesale retail trade, restaurants, and hotels (7.68%), Manufacturing Excluding Petroleum (7.07%), is higher than the other mining and Quarrying (0.24%). Agriculture, Forestry, and fishing (1.24%), Electricity, Gas, and Water (0.998%), and other components of non-oil GDP. The PEWATGR of government activities (9.654%), Wholesale retail trade, restaurants, and hotels (7.68%), Manufacturing Excluding Petroleum (7.07%) is higher than other components of non-oil GDP due to its higher proportional contribution. The Average trend growth rate of the net taxes on products is the highest, but the EWATGR and PEWATGR are lower due to their low proportional contribution to the non-oil GDP of Saudi Arabia (Table 13).

5. DISCUSSIONS

Growth trends and proportional growth trends of components of Saudi Arabian GDP, i.e. oil sector, the non-oil Sector, and taxes on products, are significantly different (Tables 3 and 5). The PEWATGR of the non-oil sector is higher than the oil sector growth rate due to its higher ATGR and proportional contribution in the Saudi Arabian economy. This refers that the non-oil sector is contributing four-fifths (80%) to the Saudi Arabian GDP from 2010 to 2024 (Table 11). The contribution of the oil sector to the GDP is expected to increase to enhance the economy of Saudi Arabia. While the contribution of refining oil products is only one-third of the oil GDP, as the PEWATGR is 32% (Table 12). To enhance the contribution of the oil sector to the economy, the level of refining petroleum products should be increased, as the crude petroleum oil reserves are depleting. The average trend growth rate of petroleum refining is higher, but the proportional contribution is very low compared to Crude Petroleum & Natural Gas. To increase the absolute proportional contribution of petroleum refining, the establishment of new petroleum refineries is necessary. Growth trends and proportional growth trends of components of non-oil GDP of Saudi Arabia are significantly different (Tables 7 and 9). In non-oil GDP, PEWAGR of the Government Activities (20%); Wholesale retail trade, restaurants, and hotels (15.5%); Manufacturing Excluding Petroleum (14%) is higher than the other components due to high ATGR and an absolute high contribution to the non-oil GDP. The ATGR of the net taxes on products is very high, while the EWAGR and PEWAGR are lower due to their low proportional contribution to the non-oil GDP. Ultimately, in the Saudi Arabian GDP, the contribution of the non-oil sector is higher than the oil sector contribution and other components. In Non-oil GDP, the contribution of Government Activities, Wholesale and retail trade, restaurants, and hotels, Manufacturing Excluding Petroleum is higher than other components of non-oil GDP. Agriculture, Forestry, and fishing; Other mining and Quarrying; Electricity, Gas, and Water contribute to the non-oil GDP negligibly.

6. CONCLUSIONS

It can be concluded that the growth trend of the non-oil sector is higher than the oil sector components of GDP of Saudi Arabia. The proportionate contribution and average growth trend rate jointly explain the weighted or proportionate effective growth rate of the non-oil sector, which four-fifths of the total GDP of Saudi Arabia. The average contribution of the non-oil sector is two times that of the oil sector from 2010 to 2024. The lower contribution of the oil sector is due to the low proportion of petroleum refining to the oil GDP. To enhance the contribution of the oil sector to the non-oil sector, it is necessary to enhance the refined oil production, as its contribution is negligible to the oil GDP. Wholesale retail trade, restaurants, and hotels; Government Activities; Manufacturing excluding Petroleum; and Construction are the major contributors to the non-oil GDP of Saudi Arabia. Also, there is a need to focus on Agriculture, Forestry, and fishing; Other mining and Quarrying; Electricity, Gas, and Water to enhance the absolute proportional contribution for non-oil GDP to shift the oil economy to a non-oil economy. The Saudi

Arabian government, the Ministry of Environment, Water and Agriculture, and the Ministry of Energy of Saudi Arabia have to focus on developing new policies and strategies to enhance the proportional contribution of non-oil to Saudi Arabia's GDP. The Saudi government may apply lower rates of taxes on the goods and services identified as zero-rated, to enhance the proportional contribution of the net taxes on products.

FUNDING

The author extends his appreciation to Prince Sattam bin Abdulaziz University for funding this research work through the project number (PSAU/2025/02/35257).

ACKNOWLEDGMENT

The author is grateful to the Deanship of Scientific Research, Prince Sattam Bin Abdulaziz University, Alkharj, Saudi Arabia, for providing funding to complete this project (Project No.: 2025/02/35257).

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APPENDIX

Appendix 1. Non-oil GDP components of Saudi Arabia

Years	Agriculture, Forestry and Fishing*	Other Mining and Quarrying *	Manufacturing Excl. Petroleum*	Electricity, Gas and Water*	Construction *	Whole sale Retail Trade, Restaurants and Hotels*	Transport, Storage and Communication*	Real State*	Finance, Insurance and Business Services*	Community Social and Personal Services*	Government Activities*	Net Taxes On Products*	Total Non-oil GDP*
2010	51878	8079	151792	25494	88504	167096	99446	87440	93601	36309	280863	14669	1105171
2011	54953	8958	189405	29956	110827	202853	116434	96708	97731	44093	312308	17285	1281511
2012	58144	9726	206478	33059	126680	231505	128525	124328	109435	50018	349649	21494	1449041
2013	61998	10527	227834	35099	144331	262652	139734	153409	120556	56765	368070	21174	1602149
2014	67284	11357	253422	37101	165531	295769	150635	168625	129824	66637	391626	23520	1761331
2015	71609	12209	277649	41084	176611	313742	161111	181277	136188	75549	475067	25995	1948091
2016	75424	11813	284483	43802	171392	312143	168003	189573	141820	85128	487515	25862	1996958
2017	78813	12627	289592	46952	171192	321478	178227	199333	148318	91295	491077	23378	2052282
2018	80256	13247	300282	53303	175494	329764	182635	199747	160072	98912	558938	84744	2237394
2019	81795	14775	322230	55934	189921	362943	198082	203914	178537	108701	583295	91953	2392080
2020	85116	15241	312993	55138	185211	332051	170169	203416	179273	110625	576484	119700	2345417
2021	90214	16261	371761	57741	214071	389104	192691	207549	197669	123680	577095	213458	2651294
2022	102912	16929	445616	61346	300330	445141	225972	213107	239283	142142	602572	206990	3002340
2023	112308	18501	475493	63815	338275	501614	250234	235731	272878	162934	621772	236804	3290359
2024	117893	19455	501094	68366	361777	544202	264583	264126	295793	171265	648652	253632	3510838
Mean	79373	13314	307342	47213	194676	334137	175099	181886	166732	94937	488332	92044	2175084

Source: https://www.sama.gov.sa/en-US/EconomicReports/Pages/report.aspx?cid=123
* = Million Riyals

Appendix 2. Trend and sensitivity of non-oil components of GDP of Saudi Arabia (Continued)

Years	Agriculture, Forestry and Fishing		Other mining and Quarrying		Manufacturing Excl. Petroleum		Electricity, Gas and Water		Construction		Whole Sale Retail Trade, Restaurants and Hotels		Transport, Storage and Communication	
	FBI	CBI	FBI	CBI	FBI	CBI	FBI	CBI	FBI	CBI	FBI	CBI	FBI	CBI
2010	100	100	100	100	100	100	100	100	100	100	100	100	100	100
2011	106	106	111	111	125	125	118	118	125	125	121	121	117	117
2012	112	106	120	109	136	109	130	110	143	114	139	114	129	110
2013	120	107	130	108	150	110	138	106	163	114	157	113	141	109
2014	130	109	141	108	167	111	146	106	187	115	177	113	151	108
2015	138	106	151	108	183	110	161	111	200	107	188	106	162	107
2016	145	105	146	97	187	102	172	107	194	97	187	99	169	104
2017	152	104	156	107	191	102	184	107	193	100	192	103	179	106
2018	155	102	164	105	198	104	209	114	198	103	197	103	184	102
2019	158	102	183	112	212	107	219	105	215	108	217	110	199	108
2020	164	104	189	103	206	97	216	99	209	98	199	91	171	86
2021	174	106	201	107	245	119	226	105	242	116	233	117	194	113
2022	198	114	210	104	294	120	241	106	339	140	266	114	227	117
2023	216	109	229	109	313	107	250	104	382	113	300	113	252	111

2024	227	105	241	105	330	105	268	107	409	107	326	108	266	106
Mean	153	106	165	106	202	109	185	107	220	110	200	108	176	107

Source: Based on variables given in Appendix 1.

Appendix 2. (Continued) Trend and sensitivity of non-oil components of GDP of Saudi Arabia

Years	Real State		Finance, Insurance and Business Services		Community Social and Personal Services		Government Activities		Net Taxes On products		Total Non-oil GDP	
	FBI	CBI	FBI	CBI	FBI	CBI	FBI	CBI	FBI	CBI	FBI	CBI
2010	100	100	100	100	100	100	100	100	100	100	100	100
2011	111	111	104	104	121	121	111	111	118	118	116	116
2012	142	129	117	112	138	113	124	112	147	124	131	113
2013	175	123	129	110	156	113	131	105	144	99	145	111
2014	193	110	139	108	184	117	139	106	160	111	159	110
2015	207	108	145	105	208	113	169	121	177	111	176	111
2016	217	105	152	104	234	113	174	103	176	99	181	103
2017	228	105	158	105	251	107	175	101	159	90	186	103
2018	228	100	171	108	272	108	199	114	578	362	202	109
2019	233	102	191	112	299	110	208	104	627	109	216	107
2020	233	100	192	100	305	102	205	99	816	130	212	98
2021	237	102	211	110	341	112	205	100	1455	178	240	113
2022	244	103	256	121	391	115	215	104	1411	97	272	113
2023	270	111	292	114	449	115	221	103	1614	114	298	110
2024	302	112	316	108	472	105	231	104	1729	107	318	107
Mean	208	108	178	108	261	111	174	106	627	130	197	108

Source: Based on variables given in Appendix 1.

Appendix 3. Proportional status of components of non-oil components of Saudi Arabia

Years	Agriculture, Forestry and Fishing	Other Mining and Quarrying	Manufacturing Excl. Petroleum	Electricity, Gas and Water	Construction	Whole Sale Retail Trade, Restaurants and Hotels	Transport, Storage and Communication	Real State	Finance, Insurance and Business Services	Community Social and personal Services	Government Activities	Net Taxes On Products
2010	4.69	0.73	13.73	2.31	8.01	15.12	9.00	7.91	8.47	3.29	25.41	1.33
2011	4.29	0.70	14.78	2.34	8.65	15.83	9.09	7.55	7.63	3.44	24.37	1.35
2012	4.01	0.67	14.25	2.28	8.74	15.98	8.87	8.58	7.55	3.45	24.13	1.48
2013	3.87	0.66	14.22	2.19	9.01	16.39	8.72	9.58	7.52	3.54	22.97	1.32
2014	3.82	0.64	14.39	2.11	9.40	16.79	8.55	9.57	7.37	3.78	22.23	1.34
2015	3.68	0.63	14.25	2.11	9.07	16.11	8.27	9.31	6.99	3.88	24.39	1.33
2016	3.78	0.59	14.25	2.19	8.58	15.63	8.41	9.49	7.10	4.26	24.41	1.30
2017	3.84	0.62	14.11	2.29	8.34	15.66	8.68	9.71	7.23	4.45	23.93	1.14
2018	3.59	0.59	13.42	2.38	7.84	14.74	8.16	8.93	7.15	4.42	24.98	3.79
2019	3.42	0.62	13.47	2.34	7.94	15.17	8.28	8.52	7.46	4.54	24.38	3.84
2020	3.63	0.65	13.34	2.35	7.90	14.16	7.26	8.67	7.64	4.72	24.58	5.10
2021	3.40	0.61	14.02	2.18	8.07	14.68	7.27	7.83	7.46	4.66	21.77	8.05
2022	3.43	0.56	14.84	2.04	10.00	14.83	7.53	7.10	7.97	4.73	20.07	6.89
2023	3.41	0.56	14.45	1.94	10.28	15.24	7.61	7.16	8.29	4.95	18.90	7.20
2024	3.36	0.55	14.27	1.95	10.30	15.50	7.54	7.52	8.43	4.88	18.48	7.22
Mean	3.75	0.63	14.12	2.20	8.81	15.46	8.22	8.50	7.62	4.20	23.00	3.51

Source: Proportion calculations based on variables given in Appendix 1.

Appendix 4. Growth trend of the proportional components of non-oil of Saudi Arabia

Years	Agriculture, Forestry and Fishing	Other Mining and Quarrying	Manufacturing Excl. Petroleum	Electricity, Gas and Water	Construction	Whole Sale Retail Trade, Restaurants and Hotels	Transport, Storage and Communication	Real state	Finance, Insurance and Business Services	Community Social and personal Services	Government Activities	Net Taxes On Products
2010	100	100	100	100	100	100	100	100	100	100	100	100
2011	91	96	108	101	108	105	101	95	90	105	96	102
2012	85	92	104	99	109	106	99	108	89	105	95	112
2013	82	90	104	95	112	108	97	121	89	108	90	100
2014	81	88	105	91	117	111	95	121	87	115	87	101
2015	78	86	104	91	113	107	92	118	83	118	96	101
2016	80	81	104	95	107	103	93	120	84	130	96	98
2017	82	84	103	99	104	104	97	123	85	135	94	86

2018	76	81	98	103	98	97	91	113	84	135	98	285
2019	73	84	98	101	99	100	92	108	88	138	96	290
2020	77	89	97	102	99	94	81	110	90	144	97	385
2021	72	84	102	94	101	97	81	99	88	142	86	607
2022	73	77	108	89	125	98	84	90	94	144	79	520
2023	73	77	105	84	128	101	85	91	98	151	74	542
2024	72	76	104	84	129	103	84	95	99	148	73	544
Mean	80	86	103	95	110	102	91	107	90	128	91	265
CV	0.09	0.08	0.03	0.07	0.10	0.05	0.08	0.11	0.06	0.14	0.10	0.76
ATGR (%)	-25	-17	3	-15	9	2	-10	7	11	22	-11	62

Source: Based on the proportional status of components of non-oil components given in Appendix 3.

Appendix 5. Sensitivity of the proportional components of non-oil of Saudi Arabia

Years	Agriculture, Forestry and Fishing	Other Mining and Quarrying	Manufacturing Excl. Petroleum	Electricity, Gas and Water	Construction	Whole Sale Retail Trade, Restaurants and Hotels	Transport, Storage and Communication	Real State	Finance, Insurance and Business Services	Community Social and Personal Services	Government Activities	Net Taxes On Products
2010	100	100	100	100	100	100	100	100	100	100	100	100
2011	91	96	108	101	108	105	101	95	90	105	96	102
2012	94	96	96	98	101	101	98	114	99	100	99	110
2013	96	98	100	96	103	103	98	112	100	103	95	89
2014	99	98	101	96	104	102	98	100	98	107	97	101
2015	96	97	99	100	96	96	97	97	95	103	110	100
2016	103	94	100	104	95	97	102	102	102	110	100	97
2017	102	104	99	104	97	100	103	102	102	104	98	88
2018	93	96	95	104	94	94	94	92	99	99	104	333
2019	95	104	100	98	101	103	101	95	104	103	98	101
2020	106	105	99	101	99	93	88	102	102	104	101	133
2021	94	94	105	93	102	104	100	90	98	99	89	158
2022	101	92	106	94	124	101	104	91	107	101	92	86
2023	100	100	97	95	103	103	101	101	104	105	94	104
2024	98	99	99	100	100	102	99	105	102	99	98	100
Mean	98	98	100	99	102	100	99	100	100	103	98	120
CV	0.04	0.04	0.03	0.04	0.07	0.04	0.04	0.07	0.04	0.03	0.05	0.51
ATGR (%)	10.71	11.50	-1	12	18	0	8	12	11	16	19	17

Source: Based on variables given in Appendix 1.