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The Determinants of Non-Oil Exports Competitiveness in the Kingdom of Saudi Arabia

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Abstract

This study examines the determinants of non-oil export competitiveness in Saudi Arabia, with a particular focus on the long-term and short-term dynamics from 2000 to 2023. Using a Vector Error Correction Model (VECM), the research identifies trade openness, the real effective exchange rate (REER), and control of corruption as significant long-term drivers of non-oil export performance, aligning with the objectives of Saudi Vision 2030. The findings emphasize the importance of open trade policies, exchange rate stability, and institutional reforms in fostering export competitiveness. In the short run, the impact of these variables is limited, suggesting that immediate policy interventions may not yield quick results without comprehensive structural changes. The study concludes that long-term strategies targeting economic diversification, improved governance, and stable exchange rate policies are crucial for sustaining non-oil export growth. Policy recommendations include further integration into global value chains, enhancing all factors of export competitiveness, and expanding Saudi Arabia's participation in regional trade agreements

Keywords: *Exports, non-oil exports, Logistics Services, Competitiveness.*

JEL: *F14; L67; O53; R11.*

Introduction

The global economy is characterized by intense competition, where countries vie to enhance their export performance as a means of driving economic growth and development. In this context, export competitiveness becomes a critical determinant of a nation's ability to integrate into the global economy and achieve sustainable growth. For Saudi Arabia, a country traditionally reliant on oil exports, the diversification of its export base is a central pillar of Vision 2030 (Saudi Vision 2030, 2020), a strategic initiative aimed at reducing the economy's dependence on oil and fostering a more diversified and resilient economic structure.

The importance of non-oil export competitiveness lies in its potential to create new revenue streams, generate employment, and promote technological innovation. As Saudi Arabia seeks to establish itself as a leading player in global markets, understanding the determinants of its non-oil export competitiveness is crucial. This study is significant because it provides insights into the factors that influence the country's ability to compete in international markets, offering valuable guidance for policymakers and business leaders working to enhance Saudi Arabia's export performance.

The study problem centers on the need to identify and analyze the key determinants of Saudi

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Arabia's non-oil export competitiveness. While much research has been conducted on export competitiveness in general, there is a lack of focused studies examining the specific factors that influence non-oil exports in Saudi Arabia. This gap in the literature presents a challenge for policymakers who require a clear understanding of these factors to formulate effective strategies.

The objective of this study is to analyze the determinants of non-oil export competitiveness in Saudi Arabia, focusing on variables such as labor productivity, labor cost, capital productivity, logistic services, trade openness, institutions and corruption, exchange rate, and commercial policy and tariffs. By examining these factors, the study aims to provide a comprehensive understanding of what drives Saudi Arabia's non-oil export competitiveness and how these determinants can be optimized to enhance the country's position in global markets.

The structure of the study is as follows: The next section provides a detailed literature review, incorporating various economic theories related to export competitiveness. Then, a detailed analysis of exports sector in Saudi Arabia. This is followed by the methodology and data analysis section, which outlines the research design, and analytical methods used to assess the determinants of non-oil export competitiveness in Saudi Arabia. The results and findings section presents the empirical results of the study, while the discussion section interprets these findings in the context of broader literature, alongside policy implications, limitations, and suggestions for future research. The study concludes with a summary of the key findings.

Theoretical Background and Literature Review

The study of export competitiveness is deeply rooted in various economic theories, each offering a distinct perspective on the factors that determine a country's ability to compete in international markets. This section explores the contributions of classical and neo-classical economics, Heckscher–Ohlin (HO) theory, Diamond theory, internalization theory, international production theory, the product life cycle theory, and human capital theory to the understanding of export competitiveness.

The classical school of economics, led by Adam Smith and David Ricardo, emphasizes the role of absolute and comparative advantage in determining export competitiveness. According to Ricardo's theory of comparative advantage, a country should specialize in producing and exporting goods that it can produce more efficiently than other countries (Ricardo, 1817). This theory suggests that differences in labor productivity and resource endowments between countries drive export competitiveness.

The neo-classical school builds on the ideas of the classical school but introduces the concept of factor endowments, which plays a crucial role in determining export competitiveness. Neo-classical economists argue that countries will export goods that utilize their abundant factors of production (Samuelson, 1948; EGBUNIKE et al., 2023). This approach highlights the importance of labor productivity and capital productivity as determinants of export competitiveness, aligning with the broader neo-classical focus on efficiency and optimal resource allocation.

The Heckscher–Ohlin (HO) theory, developed by Eli Heckscher and Bertil Ohlin, expands on the neo-classical model by explicitly considering the role of factor endowments in trade. According to the HO theory, a country will export goods that intensively use its abundant factors of production and import goods that require factors in which it is relatively scarce (Heckscher & Ohlin, 1933). This theory underscores the significance of labor and capital productivity in export competitiveness, suggesting that countries with abundant labor or capital will have a competitive

edge in industries that rely heavily on these factors.

Michael Porter's Diamond theory offers a more comprehensive framework for understanding export competitiveness by considering four interrelated determinants: factor conditions, demand conditions, related and supporting industries, and firm strategy, structure, and rivalry (Porter, 1990). Porter argues that these determinants create a "national diamond" that influences a nation's ability to compete in international markets. Factor conditions, including labor productivity and capital productivity, play a critical role, as do the quality of institutions and infrastructure, such as logistics services.

Internalization theory, often associated with the work of Buckley and Casson, explains export competitiveness through the lens of firm behavior, particularly multinational enterprises (MNEs). The theory posits that firms internalize operations when external market transactions are too costly or inefficient (Buckley & Casson, 1976; Tarish et al., 2020). This internalization can lead to enhanced export competitiveness by allowing firms to exploit their proprietary advantages more effectively across borders. This theory highlights the importance of institutional quality and governance in shaping the environment in which firms operate and compete internationally.

The international production theory, also known as the eclectic paradigm or OLI framework, developed by John Dunning, integrates three factors: ownership advantages, location advantages, and internalization advantages (Dunning, 1988). According to this theory, a firm's export competitiveness is influenced by its ability to leverage these advantages in foreign markets. Location advantages, such as favorable trade policies and logistic services, are particularly relevant in determining a country's export competitiveness.

The product life cycle theory, introduced by Raymond Vernon, suggests that the competitiveness of exports evolves over the product's life cycle (Vernon, 1966; Rahman et al., 2024). In the early stages, new products are typically produced and exported by the innovating country. As the product matures, production may shift to other countries where production costs are lower, reducing the original country’s export competitiveness. This theory underscores the dynamic nature of export competitiveness and the importance of innovation, technology adoption, and production efficiency.

Human capital theory, as proposed by economists like Gary Becker, emphasizes the role of education, skills, and training in enhancing labor productivity, which in turn boosts export competitiveness (Becker, 1964; Hanh et al., 2017). Countries that invest in human capital development are better positioned to compete in global markets, as higher labor productivity leads to more competitive pricing and higher-quality exports. This theory aligns with the broader emphasis on labor productivity in the classical, neo-classical, and HO models.

Export competitiveness has not only attracted economic schools, but interest in export competitiveness has extended to empirical studies that are interested in describing and analyzing the determinants of export competitiveness. The competitiveness of a country’s exports is shaped by several economic, institutional, and policy-related factors. Key determinants of export competitiveness include labor productivity, labor cost, capital productivity, logistic services, trade openness, institutions and corruption, exchange rate, and commercial policy and tariffs.

Labor productivity is a crucial determinant of export competitiveness, directly influencing the cost structure and production efficiency. Higher labor productivity enables firms to produce goods at lower costs, making their exports more competitive in the global market. Melitz (2003)

argues that firms with higher productivity levels are better positioned to absorb the costs of internationalization, resulting in enhanced export performance.

When dealing with labor productivity as a determinant of export competitiveness, the problem does not arise in productivity itself as an output, but rather in dealing with labor as an input to production process and the mechanism for calculating the value of labor as an input, as some literature deals with labor as the number of workers, or as the sum of working hours, knowing that the number of workers is considered a misleading element regarding labor productivity, and the sum of actual working hours is an indicator that is difficult to obtain accurately, and therefore the results of this indicator face problems regarding the reliability of those results, in addition to neglecting individual differences when considering the number of working hours. Hung; Salomon; Sowerby, 2004)

As for measuring labor productivity, there are various approaches to measuring labor productivity as a determinant of export competitiveness. One such method, proposed by Stigler (1947), involves dividing the total output by the number of workers. Although this is a simple and straightforward concept, it remains widely used, particularly at the firm or industry level. (Stigler, 1947)

While high labor productivity enhances competitiveness, excessive labor costs can negate these benefits. Lower labor costs can make exports more price-competitive, particularly in labor-intensive sectors. Balassa (1965) emphasizes that countries with lower labor costs can achieve a comparative advantage in international markets, if labor productivity is not affected as a consequence.

Although labor cost factor is crucial, studies must avoid depending on labor cost indices without considering their relationship to productivity. For instance, although labor costs in India are 30% lower than in China, the productivity of an Indian worker is 50% lower than that of a Chinese worker. This disparity diminishes India's previous advantage of lower labor costs (Joshi; Singh, 2009). Therefore, it is essential for countries, particularly developing ones, to focus on enhancing labor productivity alongside efforts to reduce labor costs.

Capital productivity, or the efficiency with which capital is utilized in production, is another vital determinant. Higher capital productivity leads to more efficient production processes, reducing the cost per unit and enhancing export competitiveness. Benkovskis and Wörz (2013) found that improvements in capital productivity significantly contribute to the competitiveness of exports in emerging economies.

Efficient logistic services are essential for maintaining export competitiveness by reducing transportation costs, improving delivery times, and ensuring that goods reach their destination in optimal condition. Hummels (2007) highlights that advancements in logistics can significantly lower trade costs and enhance export competitiveness.

As commercial transactions have evolved, logistical costs have become a significant portion of the total cost of these transactions. This cost can be simply represented as the difference between the product's price at the seller’s premises (EXW) and its price upon arrival in the importing country. Samuelson's iceberg theory (1954) illustrates this concept, suggesting that a substantial part of traded goods is consumed in covering logistics costs, including handling, shipping, insurance, and customs clearance. The longer the distance and duration, the lower the profits (Samuelson, 1954). Thus, a country's ability to minimize these costs enhances its export competitiveness, a point emphasized by Krugman (1991) study, "Increasing Returns and

Economic Geography." Krugman highlighted that a country's position in global trade is a key factor in determining whether it is a core or peripheral nation, a concept explored in economic development theories focusing on geographical location as a determinant of economic progress. (Krugman, 1991)

Trade openness, or the degree to which a country engages in international trade, is positively associated with export competitiveness. Countries with higher trade openness benefit from greater access to foreign markets, increased competition, and exposure to new technologies and practices. Edwards (1998) notes that economies with higher trade openness tend to have more competitive exports due to the innovation and efficiency incentives provided by international competition.

Despite the importance of the trade openness index, it must be dealt with extreme caution, especially in developing economies, for several reasons, the most important of which are: The increase in the value of the index may be a result of an increase in the value of imports only, not exports. In countries such as Jordan and Morocco, imports exceed exports by a double rate, and in countries such as Egypt, the rate is more than double. Therefore, the increase in the value of the trade openness index may be due to an increase in imports and has nothing to do with the competitiveness of exports. In addition, the value of the index is very high in oil exporting countries, such as the Gulf countries, in which the index rises significantly, but this increase is due only to the huge oil exports that range between 70% and 80% of total exports. Therefore, linking the value of this index to the competitiveness of exports in those countries may be misleading. The value of the index may also be very low, not because there is no strong export capacity, but because the value of the gross domestic product is high, which may not reflect the country's true export capacity. (Bernard; et al, 2007; Bernard; Redding; Schott, 2007; Dhiman; Sharma, 2017; Jam et al., 2011)

The quality of institutions, including governance, legal frameworks, and corruption levels, significantly impacts export competitiveness. Strong institutions create a stable and predictable business environment, lowering risks and costs associated with exporting. Conversely, high levels of corruption can increase transaction costs and deter foreign buyers. Rodrik, Subramanian, and Trebbi (2004) argue that institutions are a critical determinant of economic performance, including export competitiveness, as they influence resource allocation efficiency and contract enforcement.

The exchange rate affects export competitiveness by determining the price of goods in foreign markets. A stable and competitive exchange rate can make exports cheaper for international buyers, boosting demand. However, exchange rate volatility can introduce uncertainty, making it challenging for exporters to set competitive prices. Dornbusch (1988) underscores the importance of exchange rate stability in maintaining a competitive edge in global markets.

Although there is consensus on the general impact of various determinants of export competitiveness on export performance across most countries, the exchange rate remains the most unpredictable variable in terms of its effect. Studies by Kenen & Rodrik (1986), Cushman (1988), and Bahmani & Panthamit (1996) have found that currency devaluation negatively impacts export performance. This adverse effect is attributed to the resulting loss of confidence among investors and suppliers in the country's economic stability, potentially leading to investor withdrawal and reluctance from suppliers to engage with the country, thereby harming its exports. Additionally, the presence of a parallel currency market within the country may cause delays in transactions until the exchange market stabilizes. Conversely, other studies, such as

those by Hooper & Kohlhagen (1978) and Koray & Lastrapes (1989), have concluded that the exchange rate has no significant impact on export performance at the macro level, because of hedging by firms at the micro level to cover expected exchange risks.

Some empirical studies have fallen into a fallacy in analyzing the exchange rate's impact on exports, particularly regarding the application of the Marshall-Lerner condition. The problem lies in applying the Marshall-Lerner condition broadly to a country's total exports and imports without distinguishing between labor-intensive exports, like agricultural products, which rely heavily on local inputs, and non-traditional or industrial exports, such as electronics, electrical appliances, and automobiles, which involve a significant portion of foreign inputs., the Marshall-Lerner condition is logically applicable because a depreciation of the local currency makes domestically produced goods, which rely heavily on local inputs, relatively cheaper, thereby boosting exports. However, for non-traditional exports like automobiles, the Marshall-Lerner condition does not hold because these products contain substantial foreign components. As a result, the cost of these components increases due to the need to import them from abroad, which negates the advantage of a weaker local currency. Consequently, the price of such products may rise, potentially halting imports and production altogether, which leads to a decrease in exports.

Commercial policies, including tariffs, play a significant role in export competitiveness. Tariffs on imported inputs can increase production costs, reducing export competitiveness. Conversely, export subsidies and favorable trade agreements can enhance competitiveness by lowering barriers to market entry. Krugman (1991) suggests that commercial policies that reduce tariffs and trade barriers improve export performance by enabling firms to compete more effectively in international markets.

One of the important issues of trade policy is the tendency of countries to use trade policy as an obstacle to trade instead of facilitating trade, especially in developing countries, by using technical barriers trade (TBT) or non-tariff barriers (NTB) to limit the imports of these countries, which in fact represents a protectionist policy, but in a disguised way away from price restrictions, quotas and tariffs, as the World Trade Organization declared that about 70% of global trade in 2020 was affected by these measures. There is also an overlap between trade policy and other economic policies that makes trade policy an ineffective policy in international trade, with customs being subordinate to fiscal policy, the exchange rate to monetary policy, and ports being subordinated to independent or sovereign entities in developing countries. Trade policy has become without real tools that can be used to enhance the competitiveness of exports. Therefore, trade policy may be somewhat effective in restricting imports, but it has a slight effect in stimulating exports that are no more than raw materials or agricultural commodities in many developing countries, which may not be greatly affected by the country's trade policy measures.

Export Sector in Saudi Arabia

Saudi Arabia's export sector has long been dominated by crude oil and petroleum products, which have traditionally accounted for most of the country's export revenues. However, in recent years, there has been a strategic shift towards diversifying the economy and reducing dependence on oil, a central component of the Vision 2030. This vision aims to transform the Saudi economy by fostering growth in non-oil sectors, enhancing competitiveness, and increasing the contribution of non-oil exports to the country's GDP (Saudi Vision 2030, 2016).

Historically, Saudi Arabi's economy has been highly dependent on the oil sector, with petroleum exports constituting over 80% of total export revenues for much of the past few decades (OPEC,

2021). This reliance on a single commodity has exposed the economy to significant vulnerabilities, particularly in the face of volatile global oil prices. The need to diversify the export base has therefore become a national priority (International Monetary Fund, 2021).

In response to these challenges, Saudi Arabia has been actively promoting non-oil exports, with a focus on sectors such as petrochemicals, plastics, metals, machinery, and food products (Saudi Export Development Authority, 2022). The government has introduced a range of policies and initiatives designed to support non-oil industries, including the development of industrial zones, investment in infrastructure, and the establishment of export credit agencies. These efforts have begun to yield results, with non-oil exports showing steady growth in recent years (Saudi Central Bank. 2022).

According to the General Authority for Statistics, non-oil exports accounted for approximately 20% of total exports by 2021, compared to less than 10% a decade earlier (General Authority for Statistics, 2022). This growth has been driven by increased demand for Saudi products in key markets, particularly in Asia, Africa, and Europe. Petrochemical products, in particular, have emerged as a major non-oil export, leveraging the country's abundant natural gas reserves and advanced industrial capabilities (Alshahrani & Alsadiq, 2014). The next table shows the top 10 products groups in terms of value and percentage of total exports.

Code	Product label	2016	2017	2018	2019	2020	2021	2022
		178874	220068	294535	261516	185699	276204	411184
TOTAL	All products	%100	%100	%100	%100	%100	%100	%100
	Mineral fuels, mineral	134986	170245	231587	212639	132022	202216	327009
'27	oils	%75.46	%77.36	%78.63	%81.31	%71.09	%73.21	%79.53
	Plastics and articles	14430	16991	20905	19040	16318	23750	23147
'39	thereof	%8.07	%7.72	%7.1	%7.28	%8.79	%8.6	%5.63
		7606	9762	14302	12676	9706	14358	16209
'29	Organic chemicals	%4.25	%4.44	%4.86	%4.85	%5.23	%5.2	%3.94
		882	924	1258	1132	1248	3593	7318
'31	Fertilisers	%0.49	%0.42	%0.43	%0.43	%0.67	%1.3	%1.78
	Ships, boats and floating	2365	2222	2637	2650	3552	3847	3735
'89	structures	%1.32	%1.01	%0.9	%1.01	%1.91	%1.39	%0.91
		854	709	2290	2394	2311	2043	3223
'28	Inorganic chemicals	%0.48	%0.32	%0.78	%0.92	%1.24	%0.74	%0.78
	Aluminium and articles	1902	2143	2258	2151	2114	2454	2951
'76	thereof	%1.06	%0.97	%0.77	%0.82	%1.14	%0.89	%0.72
	Electrical machinery and	1064	1057	1200	1339	1284	1895	2670
'85	equipment	%0.6	%0.48	%0.41	%0.51	%0.69	%0.69	%0.65
	Nuclear reactors, boilers,	1564	1626	1941	1849	1589	2075	2392
'84	machinery, mechanical appliances	%0.87	%0.74	%0.66	%0.71	%0.86	%0.75	%0.58
	Copper and articles	405	568	572	501	519	1007	2079
'74	thereof	%0.23	%0.26	%0.19	%0.19	%0.28	%0.36	%0.51
		504	497	695	626	659	990	1767
'38	Miscellaneous chemical	%0.28	%0.23	%0.24	%0.24	%0.36	%0.36	%0.43
	Natural or cultured pearls,	1018	934	878	1503	2263	2046	1524
'71	precious or semi-precious stones	%0.57	%0.42	%0.3	%0.57	%1.22	%0.74	%0.37
	Vehicles other than	1101	1640	1293	1066	919	1630	1518
'87	railway or tramway rolling stock,	%0.62	%0.75	%0.44	%0.41	%0.5	%0.59	%0.37
	Dairy produce; birds'	1197	1120	1093	1128	1104	1062	1097
'04	eggs; natural honey; edible products of animal	%0.67	%0.51	%0.37	%0.43	%0.59	%0.38	%0.27
'73	Articles of iron or steel	769	730	940	838	789	718	1048

		%0.43	%0.33	%0.32	%0.32	%0.43	%0.26	%0.25

Table 1. KSA Exports (2016-2022) for top 10 Products groups – Millions of USD & % of total Exports
Source: ITC calculations based on UN COMTRADE statistics - 2023.

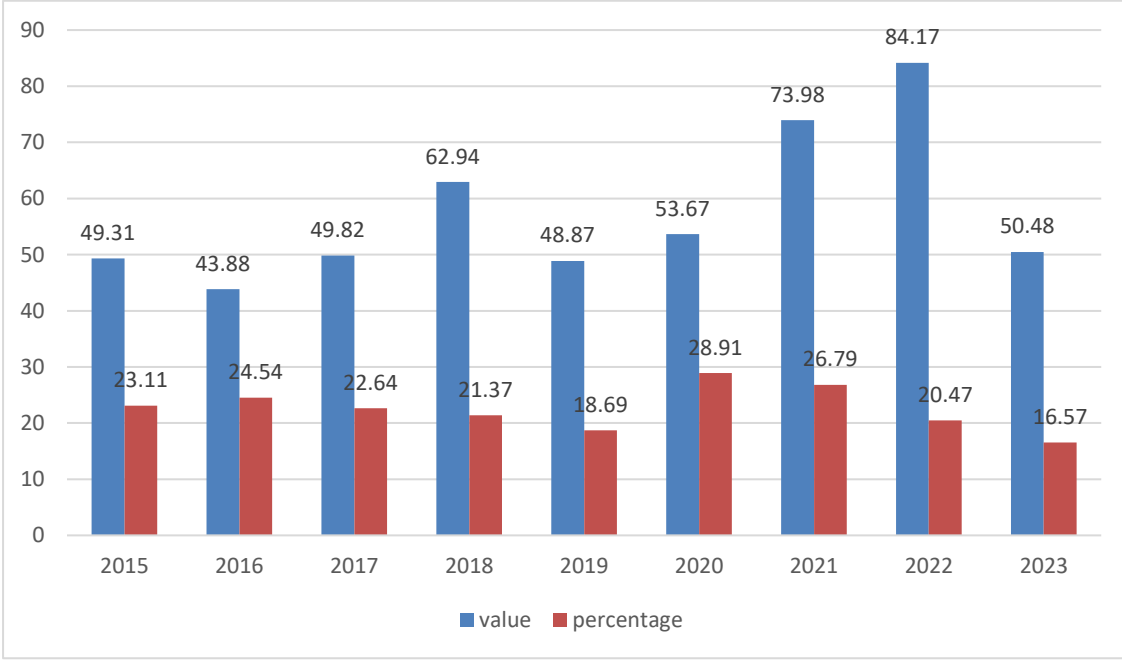

Figure 1. the value of KSA's non-oil exports (USD billions), and its percentage of total exports 2016-2022
Source: ITC calculations based on UN COMTRADE statistics - 2023.

The previous figure shows the fluctuations in Saudi's non-oil exports in terms of value and percentage of total exports. These fluctuations are due to several factors, the first of them is the fluctuations in oil prices which in turn reflect on the total Saudi exports. Also, due to the turmoil in global markets due to Covid-19 pandemic, which affected product prices globally, in addition to the trade disputes between China and USA in 2017.

Importers	2015	2016	2017	2018	2019	2020	2021	2022
World	213.376	178.874	220.068	294.535	261.516	185.699	276.204	411.184
China	5.608	4.135	5.970	9.724	9.645	8.181	50.909	66.646
India	3.003	2.458	2.607	3.564	3.880	3.096	26.657	41.916
Japan	0.633	0.721	0.980	0.971	0.809	0.665	2.735	40.770
South Korea	0.902	0.658	0.732	1.186	0.939	0.844	23.291	37.909
USA	1.483	1.287	1.337	1.837	1.837	1.847	1.433	23.238
UAE	6.773	6.566	7.686	8.131	7.903	8.917	15.086	17.809
Egypt	1.972	1.525	1.401	2.025	1.819	1.783	10.322	13.789
Taiwan	0.870	0.608	0.722	0	0.515	0.437	7.023	10.433
Singapore	2.355	2.218	3.067	4.020	3.558	2.872	7.046	9.956
Bahrain	1.534	1.550	1.576	1.839	1.661	1.853	7.024	9.870

Table 2. Top importing countries from KSA (2016-2022) – Billions of USD

Source: ITC calculations based on UN COMTRADE statistics - 2023.

Note: the previous table shows that Saudi Arabia's export market is heavily influenced by Asian economies, particularly China, India, and South Korea. Only Egypt which is a neighboring country of Saudi Arabia, and USA were from outside Asia. Which increases the inevitability of expanding Saudi Arabia's access to Latin American, European and African markets. Which requires a global marketing strategy to achieve this goal. The recovery from the pandemic in 2021 and 2022 shows a robust and resilient trade strategy. The consistent increase in exports to these countries indicates Saudi Arabia's strategic focus on strengthening its economic ties with key Asian markets, which are pivotal for its economic growth and diversification plans under Vision 2030.

Despite these successes, the non-oil export sector faces several challenges that need to be addressed to sustain and enhance competitiveness. One of the main challenges is the relatively high cost of production, which can undermine the price competitiveness of Saudi products in international markets (World Bank, 2020). Additionally, the logistics infrastructure, although significantly improved, still requires further development to match global standards (World Economic Forum, 2021). Trade barriers and tariffs in key markets also present hurdles for exporters.

Moreover, the regulatory environment and institutional framework play a crucial role in shaping the export sector. While there have been significant improvements in recent years, further reforms are needed to enhance transparency, reduce bureaucratic delays, and combat corruption, all of which are vital for boosting investor confidence and export performance (Transparency International, 2022).

To overcome these challenges, Saudi Arabia has launched several strategic initiatives aimed at bolstering the export sector. These include the National Industrial Development and Logistics Program (NIDLP), which aims to transform the Kingdom into a leading industrial powerhouse and global logistics hub (Saudi Vision 2030, 2016), and the Saudi Export Program, which provides financial support and market intelligence to exporters (Saudi Export Development Authority, 2022).

Another critical aspect of the strategy is the promotion of free trade agreements (FTAs) with key trading partners. These agreements are designed to reduce tariffs and other trade barriers, making Saudi products more competitive in international markets (Ministry of Commerce, 2022). Additionally, there is a strong emphasis on improving the skills and productivity of the labor force, recognizing that human capital is a vital component of export competitiveness (International Monetary Fund, 2021).

Looking forward, the future of Saudi Arabia's export sector appears promising, provided that the ongoing efforts to diversify the economy and enhance competitiveness are sustained. The government's commitment to Vision 2030, coupled with its strategic initiatives to support non-oil exports, is expected to yield positive results in the coming years (Saudi Export Development Authority, 2022). However, success will depend on the continued implementation of reforms,

investment in infrastructure, and the ability to navigate the challenges posed by the global economic environment (World Bank, 2020).

Methodology and Data Analysis

Data Description

This study employs a time-series dataset covering the period from 2000 to 2023. The dataset includes annual observations for Saudi Arabia, focusing on the determinants of non-oil export competitiveness. The dependent variable is the value of non-oil exports (USD billions), while the independent variables include:

Transport Services (as a proxy for logistics services) - Measured by the expenditure on transport services (% of commercial service exports), reflecting the quality and availability of logistics infrastructure and services.

Trade Openness - Calculated as the sum of exports and imports as a percentage of GDP, indicating the degree of economic integration with global markets.

Labor Force - Total number of labor force participants, representing the availability of human capital.

Real Effective Exchange Rate (REER) with base year 2010 - An index measuring the value of Saudi Arabia's currency relative to a basket of other major currencies, adjusted for inflation differentials, which influences the competitiveness of exports.

Gross Fixed Capital Formation (USD) - The total value of investment in physical assets such as machinery, infrastructure, and buildings, indicating capital availability and productivity.

Control of Corruption (as a proxy for institutional quality) - An index from the Worldwide Governance Indicators (WGI), where higher values indicate better control of corruption, reflecting the institutional environment's quality, it ranges between (-2.5 lowest, and 2.5 highest).

Model Specification

To assess the impact of these determinants on non-oil exports, the following econometric model is specified:

$$\text{Non-oil Exports}_t = \alpha + \beta 1\ \text{Logistic Services}_t + \beta 2\ \text{Trade Openness}_t + \beta 3\ \text{Labor Force}_t + \beta 4\ \text{Exchange Rate}_t + \beta 5\ \text{Gross Fixed Capital Formation}_t + \beta 6\ \text{Institutional Quality}_t + \epsilon t$$

Where:

α is the intercept,

$\beta 1, \beta 2, \beta 3, \beta 4, \beta 5, \beta 6$ are the coefficients for each independent variable,

ϵt is the error term capturing unobserved factors.

Estimation Method

Given the time-series nature of the data, several econometric techniques will be employed:

Unit Root Test: To ensure that the variables are stationary, the Augmented Dickey-Fuller (ADF) test will be used.

Cointegration Test: The Johansen cointegration test will be conducted to determine if there is a long-run equilibrium relationship between non-oil exports and the independent variables.

VECM: A Vector Error Correction Model (VECM) is appropriate when the data is non-stationary but co-integrated, meaning there is a long-run equilibrium relationship between the variables. VECM is used to capture both the short-term dynamics and long-run equilibrium.

Diagnostic Tests

To validate the robustness of the model, several diagnostic tests will be conducted:

Multicollinearity Test (Variance Inflation Factor – VIF): to check for multicollinearity.

Heteroskedasticity Test (Breusch-Pagan/Cook-Weisberg test): To assess whether the variance of the errors is constant.

Autocorrelation Test (Durbin-Watson test): To check for autocorrelation in the residuals.

Normality Test (Jarque-Bera test): To examine if the residuals are normally distributed.

Data Sources

The data for non-oil exports was obtained from Trade Map, transport services, gross fixed capital formation, trade openness, labor force, and exchange rate data were sourced from the World Bank's World Development Indicators (WDI). While the control of corruption index was obtained from the Worldwide Governance Indicators (WGI) by the World Bank.

Results and Findings

First: Descriptive Statistics

Variable	Mean	Std. Dev.	Min.	Max.
Non-Oil Exports	39.51	21.91	5.77	84.18
Logistics Services	19.54	4.61	13.23	27.51
Trade Openness	72.77	12.79	49.71	96.10
Labor Force	11,799,310	3,231,911	7,079,451	16,933,911
Exchange Rate	109.52	10.11	94.31	126.93
Gross Fixed Capital Formation	138.84 billion	74.54 billion	32.89 billion	297.79 billion
Institutional Quality	0.052	0.213	-0.313	0.368

Second: Diagnostic tests

Multicollinearity Test (Variance Inflation Factor – VIF)

Variable	VIF
Logistics Services	2.22
Trade Openness	13.55
Labor Force	40.47
Exchange Rate	9.65
Gross Fixed Capital Formation	25.70

Institutional Quality	3.90

The results suggest high multicollinearity, especially for Labor Force Total, Trade Openness, and Gross Fixed Capital Formation. To address this issue, the most problematic variables should be removed from the model. After removing the "**Labor Force**" variable, the multicollinearity has been significantly reduced. Here are the updated Variance Inflation Factor (VIF) values.

Variable	VIF
Logistics Services	1.98
Trade Openness	6.88
Exchange Rate	7.79
Gross Fixed Capital Formation	3.48
Institutional Quality	3.87

Heteroscedasticity Test (Breusch-Pagan test):

p-value = 0.00349

The low p-value suggests the presence of heteroscedasticity in the model. Yet, VECM is still applicable in this case as the variables are non-stationary in their level but cointegrated.

Autocorrelation Test (Durbin-Watson test):

Durbin-Watson statistic = 1.93

The value is close to 2, suggesting that there is no autocorrelation in the residuals.

Normality Test (Jarque-Bera test):

JB statistic = 4.75, p-value = 0.093

With a p-value greater than 0.05, suggesting that the residuals are normally distributed.

Third: Model Estimation

Unit root test (ADF test)

Variable	ADF
Non-oil Exports	-1.373052
Logistics Services	-2.198568
Trade Openness	-0.938920
Exchange Rate	-1.325881
Gross Fixed Capital Formation	-0.284565
Institutional Quality	0.448708

The results indicate that all the variables have p-values greater than 0.05, indicating that they are

non-stationary at levels.

Cointegration Test (Johansen test):

Statistic	Test Statistic	Critical value 10%	Critical value 5%	Critical value 1%
1st	157.65	91.11	95.75	104.96
2nd	94.59	65.82	69.82	77.82
3rd	44.58	44.49	47.85	54.68
4th	21.61	27.07	29.80	35.46
5th	6.00	13.43	15.49	19.93
6th	1.39	2.71	3.84	6.63

1st Statistic: Indicates strong evidence of at least one cointegrating relationship.

2nd Statistic: Suggests a possible second cointegrating relationship.

3rd Statistic: No further cointegration detected.

There is evidence of cointegration among the variables, suggesting a long-term equilibrium relationship between non-oil exports and the selected independent variables.

Vector Error Correction Model (VECM)

Short-Run Coefficients

Variable	Coefficient	P-value
L1.nonoil_exports	0.7230	0.095
L1.transport_services	-0.0293	0.955
L1.trade_openness	0.1917	0.604
L1.real_effective_exchange_rate	0.1002	0.786
L1.gross_fixed_capital_formation	4.091e-11	0.799
L1.control_of_corruption	-10.5894	0.211

Results and Comments

L1.nonoil_exports: Shows a moderately significant short-run persistence effect (p = 0.095). A positive coefficient suggests that past non-oil exports influence current levels.

L1.transport_services: Insignificant (p = 0.955), indicating that changes in transport services have no short-term effect on non-oil exports.

L1.trade_openness: Positive but insignificant in the short run (p = 0.604), meaning short-term changes in trade openness do not have a significant impact on exports.

L1.real_effective_exchange_rate: Insignificant (p = 0.786), showing no immediate impact of exchange rate changes on non-oil exports.

L1.gross_fixed_capital_formation: Near zero and insignificant (p = 0.799), suggesting no short-term impact from capital investments.

L1.control_of_corruption: Large negative coefficient but insignificant (p = 0.211), implying no clear short-term relationship with non-oil exports.

Long-Run Cointegration Coefficients

Variable	Coefficient	P-value
Nonoil exports	1.0000	0.000

Transport services	-3.291e-17	0.000
Trade openness	0.9060	0.000
Real effective exchange rate	0.7799	0.000
Gross fixed capital formation	-2.172e-10	1.000
Control of corruption	3.6964	0.000

Results and Comments

nonoil_exports: The reference variable, with a coefficient of 1.

trade_openness: Significant positive effect (β = 0.9060, p = 0.000), indicating that higher trade openness leads to increased non-oil exports in the long run.

real_effective_exchange_rate: Significant positive effect (β = 0.7799, p = 0.000), showing that improvements in the real effective exchange rate (e.g., a favorable exchange rate) lead to higher non-oil exports in the long term.

transport_services: Statistically insignificant in the long run, despite a near-zero coefficient.

gross_fixed_capital_formation: Insignificant in the long run, suggesting that capital investments do not directly contribute to non-oil exports over time.

control_of_corruption: Positive long-run relationship (β = 3.6964, p = 0.000), indicating that improvements in corruption control lead to increased non-oil exports.

Error Correction Terms

Error Correction Term	Coefficient	P-value
ec1	-0.0042	0.622
ec2	-0.0265	0.120

Results and Comments

ec1: Insignificant error correction term (p = 0.622), indicating that short-term deviations from long-run equilibrium are not strongly corrected.

ec2: Also, insignificant (p = 0.120), suggesting that the system does not rapidly adjust to disequilibrium in the long run.

Discussion

The results from the Vector Error Correction Model (VECM) highlight the critical determinants of non-oil exports in Saudi Arabia, with significant findings in both the long-term and short-term dynamics. The VECM analysis provides valuable insights into how Saudi Arabia's non-oil export performance responds to different macroeconomic variables, aligning with the goals of Saudi Vision 2030, which aims to diversify the economy and reduce reliance on oil.

Long-Run Determinants of Non-Oil Exports

The results show that **trade openness** and the **real effective exchange rate (REER)** are statistically significant long-term determinants of non-oil exports. A positive long-term relationship between trade openness and non-oil exports underscores the importance of open trade policies in enhancing export competitiveness. As supported by Hasanov & Rezek (2023), trade openness is critical for driving growth in non-oil sectors by expanding access to

international markets and enhancing productivity through foreign investments and technologies. Moreover, the significant impact of REER suggests that exchange rate policies are vital in maintaining export competitiveness by influencing the relative pricing of Saudi goods in global markets.

Interestingly, the **control of corruption** also exhibits a positive long-run effect, indicating that improving governance and reducing corruption enhances export performance. This finding is consistent with the literature that emphasizes the role of institutional quality in promoting economic efficiency and competitiveness (Hasanov, Javid & Joutz, 2022). However, **gross fixed capital formation**, while typically a key driver of growth, is insignificant in the long run in this analysis. This suggests that capital investments may not immediately translate into export growth without accompanying structural reforms or that their effects may take longer to materialize (Malefa & Odhiambo, 2018).

Short-Run Dynamics

In contrast to the long-term results, the short-run dynamics show weaker and largely insignificant relationships for most variables, except for **nonoil_exports** itself, which exhibits a moderate persistence effect. This suggests that short-term policies or immediate shifts in trade openness, capital formation, or REER may not have an immediate impact on non-oil exports, as these sectors are more responsive to structural changes over time.

The insignificance of **transport services** and **capital formation** in the short run is consistent with previous research. Studies show that infrastructure improvements, including transportation, often have delayed impacts on trade performance, requiring longer timelines to significantly influence exports (Hasanov, Javid & Joutz, 2022). Similarly, investments in capital formation do not yield quick results but are crucial for long-term productivity and competitiveness (Oseghale & Amonkhienan, 1987). Furthermore, while **control of corruption** is critical for economic stability, its immediate effects on trade performance are limited, as reforms typically take time to show results in sectors like exports (Philip & Silva, 2021).

The findings reflect the broader challenges faced by countries that heavily depend on oil exports, where diversifying the economy and growing non-oil sectors require sustained policy efforts rather than short-term adjustments (Hasanov, Javid & Joutz, 2022). Saudi Arabia's Vision 2030 has set ambitious targets for increasing non-oil exports, and these results align with the need for long-term structural reforms rather than relying on quick fixes.

Policy Implications

The significant long-term role of **trade openness** suggests that Saudi Arabia should continue pursuing policies that facilitate global trade and improve market access for non-oil sectors. Additionally, managing the **real effective exchange rate** carefully will help ensure that Saudi goods remain competitive internationally, a critical factor as the Kingdom seeks to expand its presence in non-oil global markets. Research has shown that exchange rate stability can have profound long-term effects on competitiveness and export performance, particularly in developing economies (Hasanov & Rezek, 2023).

Furthermore, the strong impact of **control of corruption** on non-oil exports highlights the

importance of institutional reforms. As noted by Hasanov & Rezek (2023), improving governance and reducing corruption can enhance economic competitiveness by creating a more stable and attractive environment for investors, thereby promoting sustainable export growth. Although capital investments are not immediately impactful in the short term, they remain essential for long-term growth and should be combined with other structural reforms (Malefa & Odhiambo, 2018).

Given these findings, it is essential for policymakers to focus on long-term strategies that promote economic diversification, institutional quality, and stable exchange rate policies to enhance Saudi Arabia's non-oil export performance.

Based on the foregoing, the study recommends the following

Saudi Arabia should seek to integrate further into global value chains by attracting industries that developed countries outsource, or MNEs seeking to establish foreign subsidiaries (maturity stage of the product life cycle), with a focus on industries that can be localized in Saudi Arabia such as petrochemicals and the automotive industry.

Enhancing export competitiveness requires improving all factors that influence it, rather than concentrating on just one indicator or determinant, as these factors do not function independently of one another, which require the implementation of a strategy that focuses on enhancing all export competitiveness factors.

The necessity of engaging in a number of RTAs that allow the accumulation of origin to enhance Saudi exports, as Saudi Arabia is one of the countries least engaged in trade agreements, as it is a member of four agreements, three of which are within the Gulf Cooperation Council.

Limitations and Future Studies

The study is limited by data availability, particularly concerning the impact of recent economic reforms in Saudi Arabia. Also, the absence of data on the value added of exports compelled us to use the total value of non-oil exports as the dependent variable. However, an increase in the value of non-oil exports might not strongly indicate the competitiveness of those exports, particularly if they have a low value added. This could occur if the exports rely heavily on high value imported inputs and only minimally on domestic inputs, just enough to qualify the product to get the domestic origin.

Future research could explore the effects of specific policy measures under Vision 2030 on non-oil export competitiveness. Additionally, further studies could investigate the role of technological innovation and digital transformation as emerging determinants of export competitiveness. Furthermore, while most research has focused on export competitiveness at the macro level, the findings have often been generalized across all sectors at the micro level, which may not accurately reflect the unique conditions of each sector or industry. Also, most studies focused on the competitiveness of goods exports, with a clear theoretical and practical neglect of service exports and the competitive capabilities associated with them, this highlights the need for future research to focus on the competitiveness of service exports, especially in Saudi Arabia, which aims to become a global tourist destination, in addition to the significant role religious

tourism plays in its service export revenues.

Conclusion

The findings of this study underscore the critical importance of long-term determinants such as trade openness, the real effective exchange rate (REER), and control of corruption in enhancing Saudi Arabia's non-oil export competitiveness. While these factors are significant in the long run, their short-term impacts are minimal, highlighting the necessity for sustained structural reforms to achieve the goals of Saudi Vision 2030.

The results reveal that trade openness plays a pivotal role in boosting non-oil exports, affirming the need for policies that support global trade and facilitate market access. Exchange rate stability is also a key factor, with the REER significantly influencing the competitiveness of Saudi goods in international markets. Additionally, the study highlights the positive role of institutional quality, particularly control of corruption, in promoting export performance.

In contrast, short-term variables such as capital formation and transport services show little immediate impact on export growth, reflecting the need for long-term investment in infrastructure and other productivity-enhancing reforms. The study also identifies the challenges associated with Saudi Arabia's heavy reliance on oil exports, emphasizing that diversifying the economy requires comprehensive, long-term efforts.

Policy implications suggest that Saudi Arabia should continue to enhance its trade openness, manage its exchange rate effectively, and prioritize institutional reforms to improve governance. Furthermore, the study recommends further integration into global value chains, particularly by attracting multinational enterprises (MNEs) and industries that can be localized, such as petrochemicals and the automotive sector. The study also advocates greater participation in regional trade agreements (RTAs) to boost export competitiveness.

Overall, the research concludes that a multi-faceted approach that includes economic diversification, institutional quality, and stable exchange rate policies is essential for Saudi Arabia to achieve sustainable growth in its non-oil export sectors.

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