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Productive Capacities as a Catalyst for Regional Trade Integration: Evidence from Arab Oil and Non-Oil Economies

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Abstract

The intra-Arab trade remains low, compared to other trade blocs, despite geographical approximation, language resemblance, and cultural ties. This paper explores the potential impact of production capacities on the intra-regional trade intensity. Driscoll-Kraay standard errors random effects Generalized Least Squares model was employed on 13 oil and non-oil exporting Arab states from 2000 to 2022. The findings posited that the productive capacities negatively impact the intra-regional trade intensity, potentially due to weak production structure, high costs of trade, low commitments to regional integration, favoring the developed countries over the Arab ones, poor institutions and governance measures, the skill mismatch and the emigration of skilled, and the weakness of manufacturing and private investment in productive sectors. GAFTA agreement was shown to be less effective in fostering the trade integration due to the high tariff measures and the non-tariff barriers, and the similarity in their export and import structures. It is suggested to enhance the integration along regional value chains for products that are currently heavily imported from outside the region. The value chains of these products should be distributed across Arab countries according to their corresponding productive capacities and be exempted from all tariff and non-tariff measures.

Keywords: Intra-Arab trade, Productive Capacity Index, GAFTA

الملخص

لا يزال حجم التجارة البينية العربية منخفضًا مقارنة بالتكتلات التجارية الأخرى وذلك على الرغم من التقارب الجغرافي، وتشابه اللغة، والروابط الثقافية. وتستكشف هذه الورقة الأثر المحتمل للقدرات الإنتاجية - باستخدام مؤشر القدرات الإنتاجية - على كثافة التجارة الإقليمية البينية، والتي تم حساب مؤشرها. وقد تم توظيف نموذج المربعات الصغرى المعمم ذو التأثيرات العشوائية مع أخطاء Driscoll-Kraay القياسية على عينة من ١٣ دولة عربية مصدّرة للنفط وغير مصدّرة للنفط خلال الفترة (٢٠٠٠–٢٠٢٢). وأشارت النتائج إلى أن القدرات الإنتاجية تؤثر سلبًا على كثافة التجارة البينية، ويُعزى ذلك على الأرجح إلى ضعف البنية الإنتاجية، وارتفاع تكاليف التجارة، وضعف الالتزام بالتكامل الإقليمي، وتفضيل الدول المتقدمة على حساب الدول العربية، وضعف المؤسسات وإجراءات الحوكمة، وعدم التوافق بين المهارات واحتياجات السوق، وهجرة الكفاءات، فضلًا عن ضعف التصنيع والاستثمار الخاص في القطاعات الإنتاجية. كما أظهرت النتائج أن اتفاقية التجارة الحرة العربية الكبرى (GAFTA) كانت أقل فاعلية في تعزيز التكامل التجاري، بسبب ارتفاع الرسوم

Introduction

Regional trade is one of the key drivers of sustainable economic development among the traders' economies. Trade Integration has been a priority for the Arab states and has been viewed as the foundation for cooperation and economic integration within the League of Arab States, especially when the Arab states have relatively a lot of success elements such as the geographical approximation, language resemblance, and cultural ties.

The data on exports and imports reveals some significant insights regarding the potential trade integration in the Arab region. The Arab states, in total, imported 1,043,979,925 USD thousand in 2024. This accounts for 4% of the global imports. Nuclear reactors, boilers, machinery and mechanical appliances was the highest imported commodity in that year. Yet, food related imports account for approximately 13% of total Arab imports which highlights the food security challenge that some countries face. Additionally, the Arab countries contributed by 5.8% in the global exports. The Arab region is an important exporter of energy products, mainly crude oil and natural gas. It's noted that 67% of the Arab exports are concentrated in the Mineral fuels (UN, n.d.).

There are 28 active regional trade agreements among Arab states (ESCWA, n.d.). While these vehicles were supposed to assist in expanding the value and the volume of Arab regional trade, the intra-Arab trade remains low, compared to other trade blocs. The share of intra-regional trade in the Arab region recorded only 14% of their total exports in 2022–2023 (ESCWA, 2024a). This raises a question on whether the trade agreements are, alone, sufficient or if structural and productive capacity matters more in fostering more trade integration.

UNCTAD publishes the PCI annually. It assesses the ability of a country to produce goods and services. Three main pillars are included in this index, namely, productive resources, entrepreneurial capabilities, and production linkages (UNCTAD, n.d.).

According to data, the GCC countries maintained higher PCI values compared to non-oil exporting countries and the world average during the period of (2000-2022). Thriving revenues from oil exports enabled large scaled investment in health, education, sanitation, and physical infrastructure. This has largely contributed to improving the PCI sub-indicators (Cherif, 2016).

On the contrary, non-oil producers suffer from lower PCI baselines, compared to the oil-producers, but steadily demonstrated a progress over time. Their progress can be attributed to improving productivity rather than capital investment (UNCTAD, n.d.). To date, literature either uses gravity models to identify the trade determinates between two countries or address the individual impact of certain factors on regional trade. But there is limited evidence on investigating the PCI impact on intra-regional Arab trade. Therefore, the contribution of this paper is threefold. It calculates the intra-regional trade intensity index for selected Arab countries. In addition, it models the impact of the PCI on the effectiveness of the Arab trade flows, exploring by this another dimension of the lower-than-potential Arab regional trade. Finally, it employs the panel analysis, which helps in controlling for unobserved differences between countries. This is ought to increase accuracy, apprehend dynamics, and introduce more robust, generalizable policy insights.

The rest of this paper is organized as follows; section 1 reviews the literature the determinants of Arab intra-regional trade. Section 2 introduces some stylized facts on the statistics of Arab states' economic performance and bilateral and regional trade. Then, section 3 depicts the empirical analysis and portrays the discussion and policy implications. Finally, the conclusion and recommendations are presented in the last section.

1. Literature review

Theoretically, it can be noted that since the emerging of the Mercantilism theory on international trade, there has been a vast body of work published to explain the driving factors of international trade. Mercantilists advocated the export promotion policies to increase the wealth of a nation from gold and silver.

Smith promoted the absolute advantage concept and claimed that a country should produce and export the goods that it can produce more efficiently. Ricardo recommended the production and exportation of goods with higher comparative advantage, even if the country has an absolute advantage in producing all goods.

Later, Heckscher and Ohlin proposed the factor proportions theory, supporting the countries to be specialized in producing and exporting the goods that can be produced using their relatively abundant factor.

Modern international trade theories include (1) country similarity, (2) product life cycle theory, and (3) Porter's national competitive advantage Theory. This Theory of Porter is of much interest in this context, as Porter identified 4 determinants of a

nation's competitiveness in certain industries. The first is the local market resources which refers to the domestic production factors, similar to the Heckscher - Ohlin theory, but he expanded those factors to include the skilled labor, technology, and investment in education. The second enabling factor is the sophisticated local market that drives the innovation. The third posits that rivalry the firm face, alongside with its structure and strategy can impact its ability to compete internationally (Malkus, 2018).

Empirical studies identified many trade-enabling factors. The gravity model is one of the mostly used empirical evidence on trade analysis. It states that economic size and distance play significant roles in determining the trade flows between countries' pairs.

several other factors are considered vital determinants of the trade, such as GDP and population which reflect market size and exchange rate regime. For example, (Boughanmi, 2008; Ebaidalla & Mustafa, 2018) found that the increase in the population size and the GDP of exporters and importers improves the trade flows. On the contrary, Lee & Gohar (2009) found that higher GDP per capita weakens the intra-Arab trade.

The literature also added other factors such as the exchange rate regime of the trade partners is important in shaping the bilateral and regional trade flows. However, the literature on this relationship is indecisive. Former studies such as Nabli & Veganzones-Varoudakis (2004) illustrated that domestic currencies overvaluation has a negative effect on exports in MENA countries. However, states with more diversified economies benefited more from devaluation-based reforms. Likewise, Rey (2006) confirmed the negative relationship between exchange rate volatility and exports for Tunisia and Egypt. The empirical analysis by Sokolova (2016) showed that the depreciation against non-RTA partners improves the aggregate trade balance, while the same depreciation against RTA partners leads to deterioration.

Moreover, recent work added the institutional, cultural, and dynamic variables and trade agreements to this model to shed light on the reason why developing countries may underperform in international trade.

For example, Wani and Mir (2023) and Sohail et al., (2021) showed that institutional weaknesses, weak institutional capacity, and fragile regional trade agreements implementation hinder the potential impact of bilateral and regional trade agreements on trade in Pakistan and Egypt, respectively.

In MENA region, linguistic proximity played a significant role as trade facilitator in the analysis of Rahimzadeh and Ebrahimi (2021). On a different context, FTA was suggested by Alam and Ahmed (2018) to enhance India's trade deficit with GCC. They pointed out to other trade-enabling factors such as GDP, population, colonial history, and diaspora networks and distance and tariffs as obstacles. Bun and Klaassen (2002), in their study on OECD countries, added past trade flows and income levels as other factors that influence trade current trade flows, presenting by that a dynamic gravity model.

GAFTA received considerable attention to examine why the intra-Arab trade remains far below potential. El-Sahli (2023) concluded that deferred effects of tariff reductions, weak institutional coordination, and non-tariff barriers limited the desired impact of GAFTA. Abu Hatab (2015) identified many NTBs in the agrifood trade, such as inconsistent hygienic standards, underdeveloped infrastructure, and inefficient customs measures.

Ebaidalla and Ali (2022) shifted the focus to the structural barriers behind the limited performance of GAFTA. Using a Stochastic Frontier Gravity Model, their findings emphasized substantial "behind-the-border" and "beyond-the-border" inefficiencies such as weak governance, poor institutional capacity, and instable socio-political context. The study argued that targeted and enforceable agreements may lead to better results than broader blocs like the GCC. In a complimentary context, Fath-Allah (2015) concluded that countries that are members of overlapping RTAs benefit more from broader market access, while non-overlapping RTAs may lead to a lower coherence in trade policy and a diversion in trade. Thus, the strategic alignment is vital to trade enhancement.

Similarly, Kpodar and Imam (2015) emphasized on the role of strong institutions and coordinated policy frameworks to better promote the regional trade and, as well, economic resilience. These studies' findings argue that the effectiveness of regional trade agreements (RTAs) depends much on NTBs, institutional factors and domestic capacities. Among these, financial development (FD), human capital (HC), digitalization, effective transport infrastructure, and governance stand as critical enablers to effective beneficial regional and bilateral trade.

Firstly, FD strongly found to support the trade by enhancing access to credit and reducing the costs of transactions (Manova, 2013). In addition, FD promotes export growth in the industries that heavily depend on external finance and others that face high fixed costs to penetrate international markets (Hur et al., 2006; Becker et al.,

2013). However, literature provides some inconsistent findings for example Sare et al. (2019) highlighted that FD has limited impact on trade in short and long runs in some African countries.

Recent literature identifies a bidirectional relationship between FD and trade (Bayar et al., 2017; Wajda-Lichy et al., 2020). However, country-specific context controls the strength and direction. Caporale et al. (2022), analyzing six CEECs, and Islam et al. (2024), examining 169 countries, confirmed that FD would significantly boost trade in developing countries.

As for the Human Capital (HC), the literature is increasing recognizing its role in boosting trade openness, enhancing countries' participation in global value chains, and driving intra-industry trade. Gharsallah and Trabelsi (2024) concluded that trade only boosts economic growth when a country possesses sufficient human capital, measured by education level.

Choi et al. (2024) explored the casual dynamics between HC, trade, FDI, and GDP in BRICS countries, using VAR-based panel and country-specific analyses. It has been revealed that FDI often drives HC, while the later boosts GDP and exports.

However, the relationships were not proved to be uniformly positive. For instance, in South Africa the HC negatively impacted the imports and exports and, in Russia and India were negatively associated with GDP. Policy, labor markets, and industrial structure play significant role on the direction and the strength of HC impact on trade variables. Moreover, the type of education, as a proxy of HC, was differently impacting the trade and Zeng (2022) proved that skilled labor force might alter the intra-industry trade (IIT) between EU and the countries of Central and Eastern European.

Similarly, Wu et al. (2021) presented the most direct causal evidence on the impact of HC on global competitiveness in China. They found that the expansion of higher education in 1999 significantly improved the state-owned and foreign firms' positions in GVCs, specially in eastern and central regions. Private domestic firms also benefited but to a less extent. This highlights the importance of the complement of institutional and geographical factors with HC strategies for even gains.

Many gravity models have been extended to include governance, regulatory quality, and political stability in addition to their original focus on economic mass and geography, recognizing by that its critical role in boosting the trade. Karam and Zaki (2019) investigated a paradox in the MENA region; that is; despite the noteworthy efforts of trade liberation outside the oil sectors, countries struggled to diversify their

exports. Their findings pointed that institutional gaps were main drivers for this Delima. The institutional quality difference between exports in MENA and their trade partners was the key limitation.

Also, it has been argued that institutional upgrading should be key component of trade liberalization strategies. Beverelli et al. (2018) confirmed these findings further using fixed effects and general equilibrium models. They found, also, that institutional reforms benefit the international trade flows and better be pursed together with the trade liberalization efforts. Álvarez et al. (2018) also reinforced this argument on the sectoral-level. Trade flows of the agriculture and natural resources' sectors were found to benefit much from better institutions, such as government effectiveness, regulatory quality, and governance. They suggested that this may assist the developing countries to overcome structural disadvantages.

In the same context, effectivities governance, as a key driver of trade outcomes, has been extensively explored in recent literature. Kumari and Bharti (2021) confirmed this relationship under the World Trade Organization (WTO) Trade Facilitation Agreement, using panel analysis of 160 countries, with this effect being more pronounced in developing counties. Khan (2020) extended this line of research to explore the business regulation mediating role, using structural equation modeling (SEM). He suggested that governance reforms become strategic lever for better trade outcomes when improvements in the quality of regulatory serve as a key conduit.

In addition, Brugnoli et al. (2018) emphasized the enabling role of aviation in increasing the high-value exports. The study suggested that there's a need for regional policies to preserve and expand international air lines, especially in advanced manufacturing counties. In developing countries such as East African Community countries, poor basic infrastructure, unharmonized regulation, and weak ICT structures were hindered for these countries to realize their trade potential as proposed by Mwesigye (2021).

Apart from these usual drivers of trade, digital infrastructure has become increasingly important in facilitating the global trade and driving the competitiveness. Whether the inquiry is country- specific, as in Ozcan (2018), or country and time-specific, as in Özsoy et al. (2021), the targeted ICT investments, translated into better access, use, and skills of ICT, has significant impact on both exports and imports. That is, technological advancement is dynamic for trade boosting with asymmetric gains expected for ICT components. Also, Rodriguez-

Crespo et al. (2018) argued that exporter's digital readiness is important in shaping trade dynamics.

Although the literature provides extensive and vast evidence on the above-mentioned capacities' impact on trade flows, internationally and in country-specific contexts, limited effort was made to investigate their role in the Arab countries, while taking into consideration the divergent economic structures in those countries. Moreover, While each individual factor is considered important in shaping the trade dynamics, this paper is more interested in analyzing the index of PCI that combine these factors together to have a border picture on how the production capacities may impact the Arab countries' trade flows.

The literature seems to be fragmented and appears to focus on only isolated aspects of regional trade determinants. On the contrary, this research analyze how productive capacities may impact the trade integration among Arab countries with divergent economic structures. It examines whether oil and non-oil exporters experience different productive capacities and trade integration dynamics. It also examines the moderating role of regional trade agreements in this relationship, while controlling for the conventional determinants such as market size and exchange rate.

2. Trends of the Arab economic growth and intra-regional trade

2.1. Economic growth during the period of (2020-2024)

The Arab states economics is lagging behind the rest of the world. During the past 50 years, the annual growth rate of GDP per capita increased by just approximately 3.7% while during the period of 1975-2024, while it grew by 5.8% in the middle-income countries, 6.3% in upper middle, and 4.7% in the OECD countries (World Bank, 2025). Figure (1) shows the individual growth rates during the period of analysis.

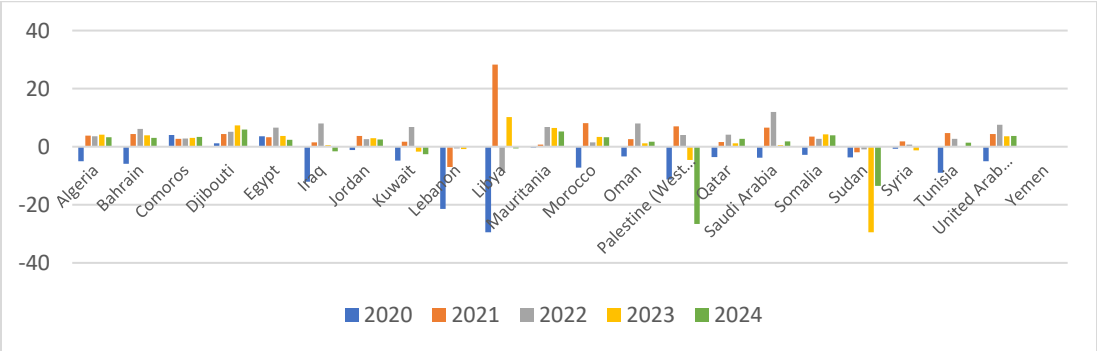

Figure (1) GDP Growth of Arab States during the period of (2020-2024)

Source: World Bank. (n.d.) World Development Indicators Retrieved [14-7-2025] from https://data.worldbank.org/

According to the Arab Monetary Fund (AMF), the global economy was hit hard by the consequences of COVID-19 pandemic, the war between Ukraine and Russia, and the high inflation in the developed economies. Consequently, the economic growth in most of Arab states was negative, with Comoros, Djibouti, and Egypt being the exception.

During 2021, most of the Arab countries achieved positive, but varying, growth rates depending on the progress they made in the vaccination process and the ability of the governments to support the recovery in addition to the positive outlook for the high growth expectations for the global economy and international trade, and the possible recovery in international energy demand. Moreover, many Arab central banks and ministries of finance were able to extend the implementation of several stimulus measures for aggregate demand within the context of financial support packages totaling $341.5 billion from the beginning of 2020 until the end of September 2021 (AMF, 2021).

In 2023, the situation was further complicated by the occurrence of the war on Gaza which had compounded the negative effects on tourism sector, international trade, and, revenues of Suze canal in Egypt. In addition to ongoing challenges of Russia-Ukraine crisis, declining oil prices, high food prices, geopolitical tensions, and natural disasters. However, the impact varied on the growth of Arab countries. That included the declining of GDP growth, the contraction of primary sectors, and the worsening of trade balances. The growth in Arab states, as a group, was -5.5% (AMF, 2024).

The growth rates in 2024, despite the continuous uncertainty and regional tensions, have been improved due to the gradual increase in oil production, the partial ease of geopolitical tensions, the stabilizing of macroeconomic conditions, and resilience of non-oil sectors such as manufacturing and services (World Bank, 2025).

2.2. The trade indicators in the Arab-region

The Arab countries contributed by 5.8% in the global exports. The Arab region is an important exporter of energy products, mainly crude oil and natural gas. However, due to the 10% decrease in the crude oil prices and the 63 per cent decline in natural gas prices compared to their 2022 levels in 2023, the total value of the region’s exports was negatively impacted. Product concentration, in addition to the market concentration of the Arab trade poses a significant challenge in realizing the full potential of export diversification. (ESCWA, 2024)

Table (1) shows the group of products that represents 90% of the Arab states' export. It's noted that 67% of the Arab exports are concentrated in the Mineral fuels. Hirschman Herfindahl Index, which is calculated as the sum of the squared shares of each product in total export, equals 0.4578. This means that on a scale from 0 (most diversified) to 1 (least diversified), the Arab states' exports are very concentrated.

Table 1 Main Exports of Arab States in 2024 in thousand USD

HS code	Product Description	Arab States' exports	Share of Total Arab Exports
'27	Mineral fuels, mineral oils and products of their distillation;	791,556,577	67%
'71	Natural or cultured pearls, precious or semi-precious stones, ..	84,573,580	7%
'39	Plastics and articles thereof	35,053,475	3%
'85	Electrical machinery and equipment and parts thereof; …	31,333,205	3%
'31	Fertilizers	21,080,610	2%
'76	Aluminum and articles thereof	19,151,157	2%
'29	Organic chemicals	19,091,984	2%
'87	Vehicles other than railway or tramway rolling stock, ..	14,042,333	1%
'84	Nuclear reactors, boilers, machinery and mechanical appliances; ..	11,080,800	1%
'62	Articles of apparel and clothing accessories, not knitted ..	10,360,670	1%
'72	Iron and steel	10,194,260	1%
'89	Ships, boats and floating structures	9,383,474	1%
'28	Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, ...	8,569,368	1%

Source: Author's calculations based on International Trade Centre (n.d.). Trade Map – Trade statistics for international business development. Retrieved [15-7-2025], from https://www.trademap.org

Moreover, in the past five years, most of the Arab countries have been struggling to maintain the fragile recovery achieved after the COVID 19's negative consequences on supply chains and trade. Despite being exposed to the reverberation of the global geoeconomic fragmentation, conflicts, climate-related shocks, and country-specific challenges, the growth rate of exports' value between 2020 and 2024 were mostly positive, except for the UAE and Palestine (Figure 2).

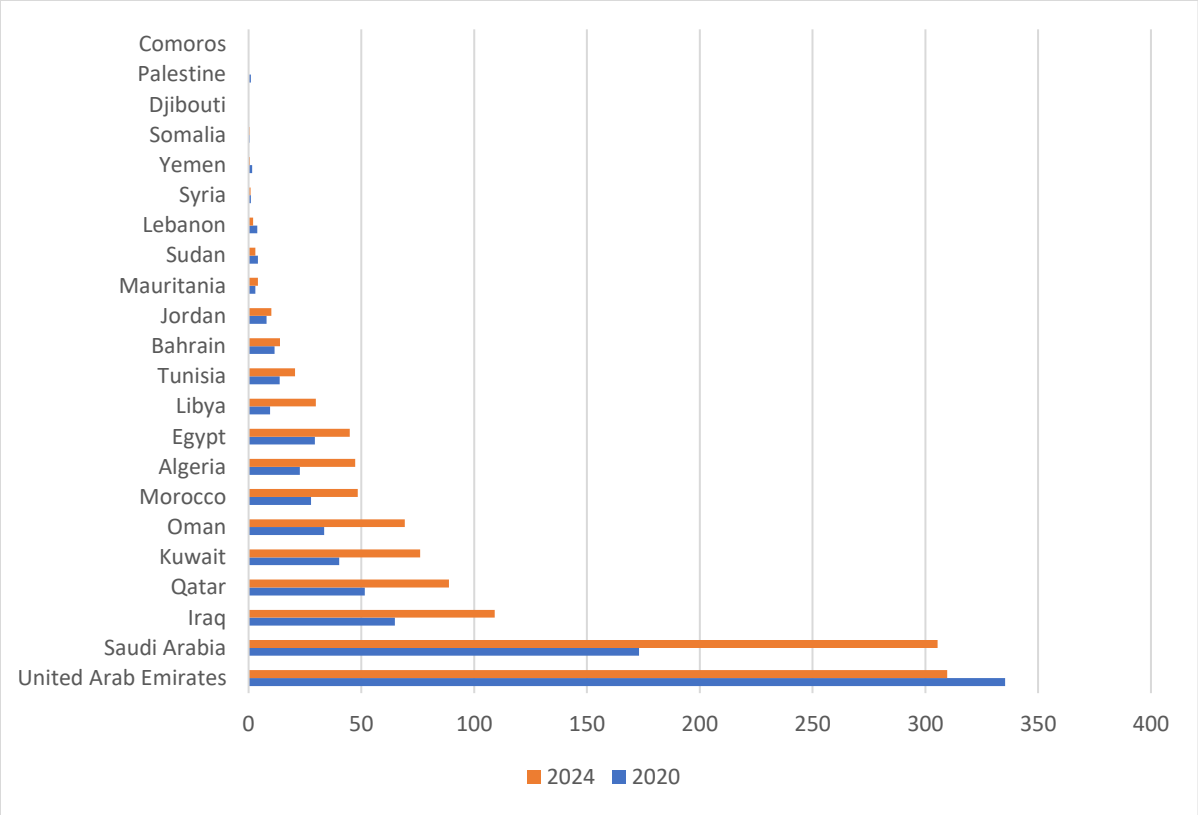

Figure (2) Exports' value of the individual Arab countries in 2020 and 2024 in thousand USD

Source: International Trade Centre (n.d.). Trade Map – Trade statistics for international business development. Retrieved [15-7-2025], from https://www.trademap.org

Table (2) reveals some insights on the distribution of Arab exports across Arab countries. Simply, this percentage has been calculated as the sum of the country's exports' value to Arab states and then it was divided by the country's total exports. It shows a significant difference in the degree of reliance on the Arab market as a main destination.

Table 2 Share of Arab States in Each Country's Total Exports (%)

Country	Share of Arab states' imports of Country's Exports
Somalia	89%
Bahrain	55%
Lebanon	45%
Jordan	37%
Egypt	32%
United Arab Emirates	18%
Oman	18%
Saudi Arabia	17%
Comoros	16%

Country	Share of Arab states' imports of Country's Exports
Mauritania	14%
Palestine	10%
Tunisia	9%
Qatar	8%
Djibouti	8%
Morocco	4%
Kuwait	4%

Source: Author's calculations based on International Trade Centre (n.d.). Trade Map – Trade statistics for international business development. Retrieved [15-7-2025], from https://www.trademap.org

As shown in Table (3), considering the imports and according to Trade Map, the Arab countries, in total, imported 1,043,979,925 USD thousand in 2024. This accounts for 4% of the global imports (which recorded 24,090,360,830 USD thousand). Nuclear reactors, boilers, machinery and mechanical appliances was the highest imported commodity in that year. Yet, Food related imports account for approximately 13% of total Arab imports which highlights the food security challenge that some countries face.

Table 3 Main Imports of Arab States in 2024 in thousand USD

HS code	Product Description	Arab States' exports	Share of Total Arab Exports
'84	Nuclear reactors, boilers, machinery and mechanical..	119,834,716	11%
'85	Electrical machinery and equipment and parts…	109,225,409	10%
'87	Vehicles other than railway or tramway rolling, ..	97,805,188	9%
'27	Mineral fuels, mineral oils and products of their distillation;...	84,607,843	8%
'71	Natural or cultured pearls, precious or semi-precious stones...	83,161,317	8%
'39	Plastics and articles thereof	32,237,670	3%
'30	Pharmaceutical products	28,138,321	3%
'73	Articles of iron or steel	26,918,876	3%
'10	Cereals	26,251,728	3%
'72	Iron and steel	24,867,108	2%

Source: Author's calculations based on International Trade Centre (n.d.). Trade Map – Trade statistics for international business development. Retrieved [15-7-2025], from https://www.trademap.org

The imports increased between 2020 and 2024 as figure (3) depicts for all Arab states, except for the conflict-impacted countries, namely Iraq, Yemen, Syria, and Palestine, in addition to Somalia. That growth occurs despite the tariff shock wave

by the USA and the regional conflicts and geopolitical tensions. The later factor, not only negatively impacted the region's trade, but led to a global diversion in sea shipments and raised freight costs (WTO, 2024).

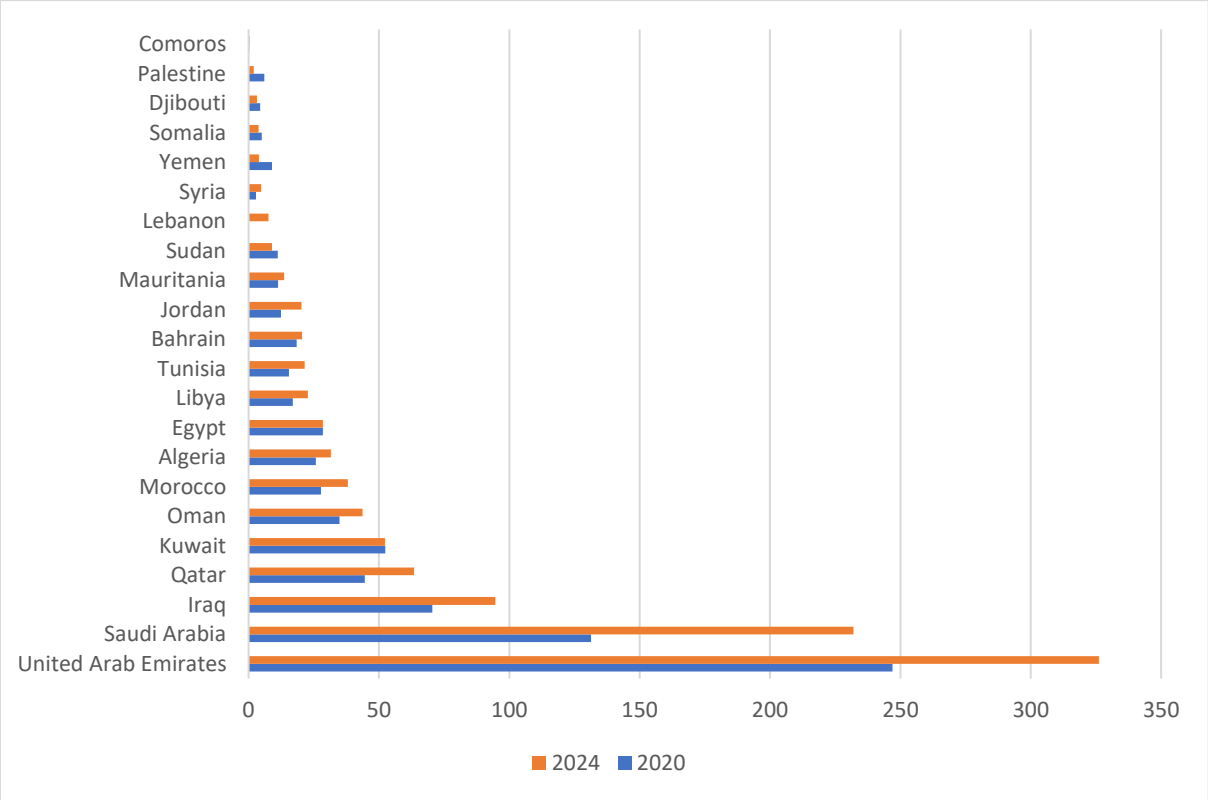

Figure 3 Imports' value of the individual Arab countries in 2020 and 2024 in thousand USD

Source: International Trade Centre (n.d.). Trade Map – Trade statistics for international business development. Retrieved [15-7-2025], from https://www.trademap.org

When it comes to inter-regional imports, Arab countries show significant distinction. Oman and Somalia have high shares of imports from Arab states but Egypt and Saudi Arabia have a moderate one. Qatar and the UAE show low levels of import dependence on other Arab states, as presented in table (4)

Oman ranked first in the share of Arab states' exports as a percentage of the country's imports. Its imports from GCC countries—especially in mineral fuels—have improved between 2020 and 2023, with the exception of imports from UAE. Mineral fuels remain the fastest growing import group.

Table 4 Share of Arab States in Each Country's Total Imports (%)

Country	Share of Arab states' exports of Country's Imports
Oman	53%
Somalia	37%
Comoros	31%
Djibouti	28%
Mauritania	27%
Jordan	26%
Bahrain	20%
Kuwait	19%
Egypt	15%
Saudi Arabia	14%
Lebanon	13%
Tunisia	12%
Morocco	9%
Palestine	9%
Qatar	8%
United Arab Emirates	7%

Source: Author's calculations based on International Trade Centre (n.d.). Trade Map – Trade statistics for international business development. Retrieved [15-7-2025], from https://www.trademap.org

2.3. Production Capacities Analysis in Arab Countries

UNCTAD has been publishing data PCI since 2000. The PCI assess the ability of a country to produce goods and services. Three main pillars are included productive resources, entrepreneurial capabilities, and production linkages. Collectively, these three pillars govern the country's productive resources, entrepreneurial capabilities and production linkages. Eight categories are used to quantify the three pillars of the index, namely, natural capital, human capital, energy, institutions, private sector, structural change, transport, and information and communication technologies. The overall PCI is a composite index of 42 indicators relevant to these categories (UNCTAD, n.d.).

It is noted that the GCC countries maintained higher PCI values compared to non-oil exporting countries and the world average during the period of (2000-2022). Thriving revenues from oil exports enabled large scaled investment health, education, sanitation, and physical infrastructure. This largely contributed to improving the PCI sub-indicators (Cherif, 2016).

However, in order to sustain the economic growth, the GCC states have been pursuing diversification in their economic and social development strategies to boost

the human capital of the citizens and develop non-oil high-productivity industries and services. One key element that was emphasized on is to continue the injection of investments in physical infrastructure and human capital, strengthening of the legal and regulatory environment to reduce the cost of doing business, and improving access to information, communication technology, and finance.

Investments in physical infrastructure, strengthening of the legal and regulatory environment to reduce the cost of doing business, and enhancing the role of private sector in creating high quality high productivity jobs (Callen et al., 2014).

On the contrary, non-oil producers suffered from lower PCI baselines, compared to the oil-producers, but steadily demonstrated a progress over time. Their progress can be attributed to improving productivity rather than capital investment. For example, according to PCI data, Tunisa, Jordon, Lebanon, and Libya recorded above period and country average in the human capital component, while Morocco, Tunisa, and Palatine ranked higher in the institution's component. Lebanon, Morocco, Palestine, and Tunisia exceled in the structure change progress (UNCTAD, n.d.).

3. Empirical Analysis

This study employs panel data analysis methodology. This method is appropriate in this context to study the dynamics of change with short time series and it's favorable over time series analysis because the combination of time series with cross-sections improves the quality and quantity of data (Gujarati, 2003).

The dependent indicator is the Intra-regional trade intensity index (IRT) which captures the depth of trade integration within the Arab region. The main explanatory variable is the UNCTAD's overall PCI score, which reflects a country's capacity to produce and trade efficiently and competitively.

The equation to be estimates is

$$IRT_{it}=\alpha+\beta_1 PCI_{it}+\beta_2(Doil)_i+\beta_3(PCI_{it}\times Doil_i)+\beta_4 DTA_{it}+\gamma X_{it}+\varepsilon_{it}$$

The data covers 13 Arab countries (both oil and non-oil) from 2000 to the 2022 (the last available data for the PCI). The period of analysis (2000–2022) was chosen for two reasons, first; the availability of data on the PCI indicator, starting from the year 2000 up 2022 and the second reason is that this period incorporates major economic cycles — such as the 2008 global financial crisis and the COVID-19 pandemic, which benefits the model in capturing long-term effects.

A dummy for oil exporters (Doil) will capture economic structural differences, while another (DTA) will indicate the country's participation in the GAFTA. Interaction

term of $PCI_{it} \times Doil_i$ is included to examine whether the impact of productive capacities on trade differs between oil and non-oil exporters. Control variables (X_{it}) include gross Domestic Product growth (GDPg), population growth rate (POPg), the IMF's Financial Development Index (FD), the value-added of the manufacturing sector (Manv), and the exchange rate (Xch).

3.1. Estimation of IRT variable

Data on IRT variable is not available for the Arab countries' intra-regional trade, so it must be calculated for the period of the analysis. this index is the percentage of intra-regional trade share to the share of global trade with the region, calculated using export and import data. It is calculated as:

$$IRT = \frac{T_{ii}/T_i}{T_i/T_w}$$

where T_{ii} is exports of country i to country i plus imports of country i; T_i is total exports of country i to the world plus total imports of country i from the world; and T_w is total world exports plus imports.

It analyzes whether trade within a country is greater or smaller than should be expected on the basis of the country's importance in world trade. (The Asia Regional Integration Center (ARIC), n.d.). Originally, the IRT deals with regional analysis, but for the propose of this analysis, it's calculated for selected Arab countries during the period from 2000 to 2022, using trade data for each country from WITs database from 2000-2004 and from Trademap database for the remining period. As rule of thumb, higher IRT indicates that the country of interest trades more with the region and vice versa.

3.2. Results and discussion

According to the literature review, PCI should have a positive impact on the IRT (Beverelli et al., 2018); Caporale et al., 2022). Similarly, FD's parameter is supposed to have a positive sign (Manova, 2013; Hur et al., 2006; Becker et al., 2013). According to (Bun & Klaassen, 2002; Alam & Ahmed, 2018), GDPg should boost the IRT. As well, the Popg should expand the market for better exportation and importation performance as per the conclusion of (Alam & Ahmed, 2018; Wani & Mir, 2023). Manuv, supposedly, improves export potential, especially in manufactured goods (Brugnoli et al., 2018). The dummy representing the Trade Agreements (DTA) should also have positive sign as these arrangements are expected to reduce barriers, enhance trade flows (Abu Hatab, 2015; Ebaidalla & Ali, 2022). While Xch and the dummy representing the Oil producers (Doil) can have

positive or negative sign. The rationale behind the undecided sign for Xch is that depreciation may boost exports but, it also may increase import costs and inflationary pressures and by that hindering the trade flows (Karam & Zaki, 2019; El-Sahli (2023). The Doil unclear prior expectation for the sign indicates that oil exporters may depend heavily on energy exports, restraining diversification and regional integration (Karam & Zaki, 2019; El-Sahli, 2023).

In addition to these core variables, two institutional dummies were included to capture the effect of trade policy integration. A regional trade agreements dummy reflects the number and timing of regional trade agreements in which each country is a party. It's included by using the date of entry into force, depending on the WTO's Regional Trade Agreements (RTAs) database, for each agreement and then converts into a yearly numerical variable (RTA_count) representing the cumulative number of active trade agreements for each country during the period 2000–2022.

The other variable is the WTO membership dummy (WTO), which demonstrates whether the state was a member of the World Trade Organization in a given year or not. These variables account for policy-related trade openness and regional commitments that may influence intra-Arab trade flows.

The selection criteria of the countries excluded the country of conflicts or countries with incomplete datasets for the model's variables. The model analyzes the above-mentioned relationships in 13 countries, namely Algeria, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emiratis, which are an Oil- producing states (OPEC current members), in addition to non-oil countries pool of Egypt, Jordon, Lebanon, Morrocco, Tunisia. Table (5) presents the descriptive statistics of the model's variables.

Table 5 The descriptive statistics of the model's variables

Variable	Obs	Mean	Std. dev.	Min	Max
IRT	276	76.05815	109.1766	1.187109	553.3992
PCI	276	50.0663	7.236196	32.5	64.7
Doil	276	0.75	0.4337993	0	1
PCIDoil	276	38.72971	23.32881	0	64.7
DTA	276	1	0	1	1
GDPg	276	3.842824	4.442965	-21.3999	26.17025
POPg	276	2.997831	3.239754	-10.92744	21.70034
FD	276	0.3605493	0.1186388	0.1138031	0.5859304
Xch	276	135.8886	415.0713	0.2688284	1507.5
Manuv	276	12.45242	5.302048	1.42683	44.9804

Variable	Obs	Mean	Std. dev.	Min	Max
RTA_count	276	0.7572464	1.164217	0	5
WTO	276	0	0	0	0

Source: Authors' Compilation based on STATA 17 output.

The dataset presents a balanced panel, guaranteeing that the same countries are observed across all time periods, which ensures consistent comparisons and reinforces the robustness of the panel analysis. For the purpose of primer inspection of the regression analysis, the Pooled OLS is employed to estimate the parameters. The results, shown in table (7) in annex (1), demonstrate that PCI, Doil, DTA, GDPg has negative impact on IRT but GDPg, Popg and Manuv are insignificant. The variance inflation factor (VIF), presented in table (8) in annex (1), which addresses the multicollinearity in the regression, shows that the interaction term of PCIDoil and Doil are sources of high multicollinearity so this must be taken into consideration. As well, it shows that WTO and DTA are omitted because of multicollinearity. Therefore, the strategy is to estimate two models; one with DTA only and the other includes WTO and RTA_count.

In addition, the Wooldridge test for autocorrelation in panel data, shown in table (9) in annex (1) confirms the existence of first-order autocorrelation in your panel dataset (Prob > F = 0.0000). Finally, to check the existence groupwise heteroskedasticity, an initial FE model must be estimated first to enable the use of Modified Wald test for groupwise heteroskedasticity. The result of the of FE is shown in table (10) in annex (1).

The result shows that the panel data model suffers from groupwise heteroskedasticity, which raise the threat of the variance of the errors being not constant across cross-sectional units.

Consequently, there's a need for a more robust statistical inference for this analysis. one of the most effective methods is to use Driscoll-Kraay standard errors because it addresses heteroscedasticity, autocorrelation, and cross-sectional dependence in the error terms of regression models compared to simpler methods like FE or RE models (Hoechle, 2007).

However, before turning to estimating the regression with Driscoll-Kraay standard errors, simple FE and RE are estimated to be able to apply the Hausman test to figure out which model fits the data better. As of such, the test result has a Prob > chi2 = 0.6516, which indicates that we can't reject the Ho and thereby, we should estimate the RE model (Baltagi, 2005) but with the use of Driscoll-Kraay standard errors.

Table (6) presents the estimation results of Regression with Driscoll-Kraay standard errors using the method of Random-effects GLS regression.

The estimated parameters of PCI have negative significant values. To date, there is limited evidence on investigating the PCI impact on intra-regional Arab trade; However, these findings are aligned with the conclusion by (Abu Hatab, 2015; Hoekman, 2016; Boughanmi et al., 2021), which has been attributed to similar production structure, high costs of trade, and low commitments to regional integration. It also noted that many Arab countries, especially the Oil-exporters favor the developed countries over the Arab ones. EU is the second trade partner of the GCC countries. The main exported goods from the GCC are fuels, accounting for over 75% of EU's imports from GCC countries in 2023, and the main imported goods are machinery and transport (Council of the European Union, 2025).

As well, non-oil exporters are also oriented towards non-Arab countries, due to the long trade relations, other more effective trade agreements, and/ or other determinants such as foreign direct investment flows and development assistance that shapes that relationship, and enhances by that the trade flows. Evidence on this can be noticed from the EU- Egypt trade performance. EU is the main trade partner for Egypt, accounting for approximately 25% of the country's total trade. In addition, bilateral trade in goods raised considerably since the FTA entered into force. The EU countries are also an important investor in Egypt, with an accumulated investment stock of approximately EUR 27.6 billion in 2022 (European External Action Service (EEAS), 2025).

Nevertheless, such negative impact can be attributed to the relatively low performance of some Arab countries in one or more of the PCI components. For instance, transportation, a report by ESCWA (2019) showed that most Arab countries suffer from high trade and transport costs which hinder their ability to improve trade flows, globally and regionally, due to policy and non-policy factors that increase trade costs. In addition, Legrenzi & Calculli (2013) found that poor institutions and governance measures hinder the regional integration in the MENA region, generally, and the Arab region, specifically. Moreover, the skill mismatch and the emigration of skilled Labour are considered one of the obstacles that hinders investments and growth opportunities (ESCWA, 2023). As well, manufacturing and private investment in productive sectors have been weak because of the persistence of rentier economies and dependence on oil exports (ESCWA, 2024b).

Table 6 RE model with Driscoll-Kraay standard errors

```
Regression with Driscoll-Kraay standard errors   Number of obs     =       299
Method: Random-effects GLS regression            Number of groups  =        13
Group variable (i): country1                     Wald chi2(8)      =    119.82
maximum lag: 2                                   Prob > chi2       =    0.0000
corr(u_i, Xb) = 0 (assumed)                      overall R-squared =    0.3838
```

IRT	Coefficient	Drisc/Kraay std. err.	t	P>|t|	[95% conf.	interval]
PCI	-13.51556	4.698524	-2.88	0.009	-23.2597	-3.771421
Doil	-541.3757	246.1986	-2.20	0.039	-1051.96	-30.79116
PCIDoil	10.48675	5.091276	2.06	0.051	-.0719137	21.04541
DTA	-234.0792	127.1663	-1.84	0.079	-497.806	29.6476
GDPg	-2.504121	2.152232	-1.16	0.257	-6.967578	1.959336
POPg	-3.831063	1.569178	-2.44	0.023	-7.085339	-.5767874
FD	277.4918	140.7944	1.97	0.061	-14.49799	569.4816
Xch	.0478674	.0209227	2.29	0.032	.0044764	.0912583
Manuv	-.0563218	.6541798	-0.09	0.932	-1.413008	1.300364
_cons	899.0676	224.2682	4.01	0.001	433.9638	1364.171
sigma_u	46.564126					
sigma_e	90.417912					
rho	.20961893	(fraction of variance due to u_i)				

Source: Author's compilation based on the output of Stata 17.

The dummy that represents the Oil-exporting countries has a negative relatively large parameter. This goes in accordance with the fact that many Arab countries are rentier economies. For example, GCC countries highly depend on oil exports, with the majority of their crude oil exports going to Asian markets, not Arab states (Legrenzi & Calculli, 2013).

However, the interaction term (PCIDoil) in this regression has a positive and statistically significant coefficient. This term captures how the effect of PCI on IRT changes depending on the value of oil dummy. This suggests that the impact of productive capacities on intra-regional trade is magnified in oil Arab economies, meaning that improving productive capacities in these economies is associated with higher intra-regional trade integration compared to non-oil economies. That is, policies to attract investment to manufacturing sectors and renewable energy ones, improve institutional strength, and opt for economic diversification, in combination with natural resources wealth, is expected to boost regional trade (Saidi & Prasad, 2023).

The negative sign of the DTA variable implies that the GAFTA trade agreement has been less effective in fostering the trade integration status among its member countries. This finding line up with the broader literature, which presents conflicting results. For example, Péridy and Abedini (2008) suggested that the impact of

GAFTA on trade creation has been modest (around 20%), while others, such as El-Sahli (2021) pointed at considerable trade volume gains but with insignificant welfare effects. Sectoral analysis shows further limited benefits for many member states.

To further investigate this result, it is worthy to consider the structural features of trade integration in the region and compare them with other integration practices. For example, The trade complementarity index of the European Union (EU) and the North American Free Trade Agreement (NAFTA) has a trade complementarity index that typically exceeds fifty. On the contrary, it remains very low in Arab region. This highlights the limited depth of intra-regional trade linkages. One contributing factor could be the high tariff measures which has been estimated at 17%, while in other trade blocs, it ranges between 8 to 13%. In addition to the non-tariff barriers which is considers more pronounced in the Arab region that any other region. Finally, the effectiveness of trade agreements is questionable because Middle Eastern countries, in general, apart from Turkey and Israel, are very similar in their export and import structures (Legrenzi & Calculli, 2013).

Having established the main barriers that hinder the prospected regional trade, it is not surprising that the GDPg has a negative but insignificant coefficient, indicating that economic growth may not necessarily translate into more trade with regional partners. According to Lee & Gohar (2009) this could be attributed to the divergent levels of development among Arab states and the trade orientation of some countries towards developed non-Arab countries. Correspondingly, the Manuv's coefficient is negative and insignificant. United Nations Industrial Development Organization (UNIDO) (2024) reported that there's high divergence in the industrial development performance between African and Asian Arab economies.

Expectedly, both FD and Xch have positive significant coefficients. That is, a better financial development index means deeper banking systems and better capital markets, which contributes to lowering risks and costs, and therefore, boosts intra-regional trade. Such result is consistent with findings of Manova (2013), Hur et al. (2006), and Becker et al. (2013).

The significant positive coefficient of the exchange rate suggests that a depreciation of Arab domestic currencies vis-à-vis the USD benefit intra-regional trade. In this case, the price competitiveness of regional partners is enhanced against non-Arab partners. This result aligns with evidence by Nabli & Veganzones-Varoudakis

(2004). This result complements that finding by Sokolova (2016) by showing that in Arab RTAs, depreciation could enhance IRT.

With respect to robustness check of the model, one should note that the measurement of model goodness of fit, overall R-squared, is 38%, which, despite being low, doesn't undermine the model validity, given the significance of all explanatory variables at 10%, except for GDPg and Manuv (Ozili, 2023). As well, the Wald Chi^2 p-value is 0.000 confirms the joint significance of the explanatory variables in the model, which supports the consistency of the estimated coefficients.

As an additional robustness check, the second random-effects model that includes the two dummies of RTA_count and WTO was estimated and the results are shown in table (11) in annex (1). However, the dummies of WTO and DTA were automatically omitted by Stata 17 due to perfect or near-perfect collinearity, as most of our sample of countries are long-standing members of the Greater Arab Free Trade Area (GAFTA) and the WTO throughout the study period. In addition, the RTA_count dummy's coefficient was insignificant. Thus, the first model has been proved to be better suited for the study's objectives.

This lack of cross-sectional and temporal variation rendered these dummies statistically uninformative and prevented their inclusion in the final model. Consequently, the results of this extended specification did not provide additional insights and were therefore excluded from the main discussion, though, the results are shown in the annex. Therefore, the baseline estimations remain the most reliable and interpretable representation of the data.

Conclusion and Recommendations

This study examined the production capacities dynamics in enabling or hindering the intra-Arab trade integration. The IRT index has been calculated for selected Arab countries during the period from 2000 to 2022, using the trade data for each country to analyze whether trade within a country is greater or smaller than should be expected on the basis of the country's importance in world trade.

Employing Driscoll-Kraay standard errors random effects GLS model on 13 oil and non-oil exporting Arab states from 2000 to 2022, the findings posited that PCI have a negative impact on IRT. This has been attributed to similar production structure, high costs of trade, low commitments to regional integration, favoring the developed countries over the Arab ones, poor institutions and governance measures, the skill mismatch and the emigration of skilled, and the weakness of manufacturing and

private investment in productive sectors. GAFTA trade agreement was shown to be less effective in fostering the trade integration status among its member countries, due to the high tariff measures and the non-tariff barriers. Moreover, the effectiveness of trade agreements is questionable because generally Middle Eastern countries, apart from Turkey and Israel, have similar in their export and import structures.

Thus, it is recommended to enhance the poor PCI components, especially for non-GCC countries. Moreover, the Arab states should identify and implement corrective measures for their orientation towards non-Arab states. In this context, it is suggested to create a vehicle to enhance the integration along the regional value chain for selective body of products that currently heavily imported from outside the region. The value chains of these products should be distributed across Arab countries according to their corresponding productive capacities. Such products should be exempted from all tariff and non-tariff measures to enable intra-Arab trade, while, at the same time, being safeguarded by protective non-tariff measures against being imported from non-Arab countries. The burden of the potential higher costs should be shared among the countries in corresponding to their relative economic capacities. Instruments could include direct investment by higher-income Aran countries, finance through development funds, created for this purpose, and tax incentives for private sector. Finally, enhancing intra-Arab trade integration requires moving beyond tariff reduction toward coordinated investment in regional value chains, supported by improving the productive capacities in each country as required.

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ANNEX 1

Table 7 Pooled OLS estimation for the model

Source	SS	df	MS	Number of obs	=	299
				F(9, 289)	=	21.89
Model	2929638.25	9	325515.361	Prob > F	=	0.0000
Residual	4297757.76	289	14871.1341	R-squared	=	0.4054
				Adj R-squared	=	0.3868
Total	7227396	298	24253.0067	Root MSE	=	121.95

IRT	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
PCI	-15.6196	2.440395	-6.40	0.000	-20.4228	-10.81639
Doil	-731.1183	124.1111	-5.89	0.000	-975.3946	-486.8419
PCIDoil	14.62229	2.692839	5.43	0.000	9.322231	19.92236
DTA	-305.0294	62.80844	-4.86	0.000	-428.6493	-181.4094
GDPg	-2.682274	1.777363	-1.51	0.132	-6.180491	.815943
POPg	1.244733	2.60393	0.48	0.633	-3.880338	6.369804
FD	202.2803	88.2256	2.29	0.023	28.63407	375.9265
Xch	.0634051	.0206979	3.06	0.002	.0226674	.1041429
Manuv	1.907573	1.607563	1.19	0.236	-1.256442	5.071589
_cons	1039.132	86.67763	11.99	0.000	868.5323	1209.731

Source: Author's compilation based on the output of Stata 17.

Table 8 VIF for the model's explanatory variables

note: **DTA** omitted because of collinearity.
note: **WTO** omitted because of collinearity.

Variable	VIF	1/VIF
PCIDoil	**277.39**	**0.003605**
Doil	**199.81**	**0.005005**
PCI	**24.47**	**0.040874**
FD	**2.34**	**0.427317**
Xch	**1.70**	**0.589970**
RTA_count	**1.55**	**0.646976**
POPg	**1.37**	**0.732102**
Manuv	**1.34**	**0.747140**
GDPg	**1.26**	**0.792274**
Mean VIF	**56.80**	

Source: Author's compilation based on the output of Stata 17.

Table 9 Wooldridge test for autocorrelation in panel data

```
Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F(  1,      12) =     51.955
           Prob > F =      0.0000
```

Source: Author's compilation based on the output of Stata 17.

Table 10 FE model with Driscoll-Kraay standard errors

note: **Doil** omitted because of collinearity.

Fixed-effects (within) regression		Number of obs	= 299
Group variable: country1		Number of groups	= 13
R-squared:		Obs per group:	
Within = 0.1916		min	= 23
Between = 0.0354		avg	= 23.0
Overall = 0.0269		max	= 23
		F(8,278)	= 8.24
corr(u_i, Xb) = -0.9812		Prob > F	= 0.0000

IRT	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
PCI	-11.52796	3.285156	-3.51	0.001	-17.9949	-5.061014
Doil	0	(omitted)				
PCIDoil	5.982802	3.912479	1.53	0.127	-1.719046	13.68465
DTA	-229.6751	47.57071	-4.83	0.000	-323.3196	-136.0305
GDPg	-2.526122	1.334916	-1.89	0.059	-5.15395	.101706
POPg	-5.313637	2.066993	-2.57	0.011	-9.382583	-1.244691
FD	343.0234	116.337	2.95	0.003	114.0101	572.0368
Xch	1.740839	.8184168	2.13	0.034	.1297574	3.35192
Manuv	-.298816	1.497913	-0.20	0.842	-3.247508	2.649876
_cons	405.7062	131.1004	3.09	0.002	147.6306	663.7818
sigma_u	681.30583					
sigma_e	90.417912					
rho	.98269219	(fraction of variance due to u_i)				

F test that all u_i=0: F(12, 278) = 25.90 Prob > F = 0.0000

Source: Author's compilation based on the output of Stata 17.

Table 11 Random-effects GLS regression with WTO and RTA-count

note: **DTA** omitted because of collinearity.
note: **WTO** omitted because of collinearity.

Random-effects GLS regression		Number of obs	= **276**
Group variable: **country_id**		Number of groups	= **12**
R-squared:		Obs per group:	
Within = **0.2532**		min	= **23**
Between = **0.2314**		avg	= **23.0**
Overall = **0.2359**		max	= **23**
		Wald chi2(**9**)	= **913.71**
corr(u_i, X) = **0** (assumed)		Prob > chi2	= **0.0000**

(Std. err. adjusted for **12** clusters in **country_id**)

IRT	Coefficient	Robust std. err.	z	P>|z|	[95% conf.	interval]
PCI	**-16.85317**	**9.202211**	**-1.83**	**0.067**	**-34.88918**	**1.182829**
Doil	**-409.4011**	**418.9783**	**-0.98**	**0.328**	**-1230.584**	**411.7813**
PCIDoil	**10.11408**	**8.868681**	**1.14**	**0.254**	**-7.268211**	**27.49638**
DTA	**0**	(omitted)				
GDPg	**-2.800903**	**1.848306**	**-1.52**	**0.130**	**-6.423517**	**.8217112**
POPg	**-4.893193**	**2.53451**	**-1.93**	**0.054**	**-9.860742**	**.0743555**
FD	**364.843**	**191.0602**	**1.91**	**0.056**	**-9.628126**	**739.3142**
Xch	**.085684**	**.0279243**	**3.07**	**0.002**	**.0309533**	**.1404146**
Manuv	**.0376126**	**2.441645**	**0.02**	**0.988**	**-4.747923**	**4.823148**
RTA_count	**12.41786**	**9.812113**	**1.27**	**0.206**	**-6.81353**	**31.64924**
WTO	**0**	(omitted)				
_cons	**707.5428**	**420.7101**	**1.68**	**0.093**	**-117.0338**	**1532.119**
sigma_u	**63.871542**					
sigma_e	**60.147204**					
rho	**.53000339**	(fraction of variance due to u_i)				

Source: Author's compilation based on the output of Stata 17.