

Commentary

The Importance of the Suez Canal for Global Energy Flow



Raed Al Mestneer and Malik Selemankhel

About KAPSARC

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Overview

On March 23, 2021, the Ever Given, a northbound ship loaded with more than 18,000 containers from China to the Netherlands drifted off course and became stuck in a single-lane section of the Suez Canal. As a result, hundreds of ships carrying food, oil, chemicals, and other goods were stuck at both the north and south entrances of the canal. This case was the first of its kind in the history of the Suez Canal – a cargo vessel caused the closure of the canal for a week due to a nonconflict event. However, the timing of the event was extraordinary, as the world was still struggling in its fight against COVID-19. The disruption caused by the stranded ship further exacerbated the supply chain chaos due to global lockdowns. The result was a halt to trade movement worth an estimated \$400 million an hour (Baker, Watkins, and Osler 2021). After a week of dredging and tugging operations, the ship was successfully refloated and freed, leading to the opening of the canal.

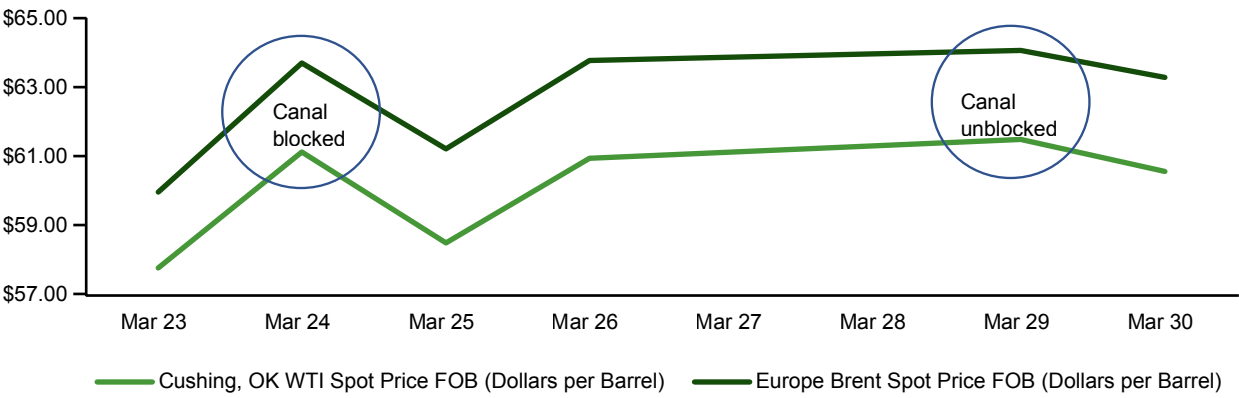
The West Texas Intermediate (WTI) and Brent crude benchmark climbed by more than 5% the day after the canal blockage. The prices fell back down on Friday, March 26 as oil traders weighed the potential impact of the canal blockage for a longer period on the northbound supply of oil products to Europe and the southbound supply of petrochemical feedstock to Asia. As soon as the stranded ship was refloated, oil prices dropped slightly, as shown in Figure 1.

Given that approximately 7% of global seaborne oil trade passes through the canal, this is an adequate volume to create oil price shocks. The disruption of the canal trapped approximately 90 oil tankers and liquefied natural gas (LNG) carriers according to the average monthly traffic data of the Suez Canal Authority (SCA). While this number constitutes only a small share of the respective consumption levels in the destination markets, a prolonged blockage of the canal would have increased costs across the value chain due to rerouting and delays. This is especially a concern for oil product supplies to Europe and the naphtha supply to Asia. The closure of the canal came at a time when the oil markets were suffering from lost demand due to COVID-19 disruptions;

as a result, consumer markets were shielded with ample stock levels.

Although the ship was no longer blocking the canal, its impact on international trade and supply chains continued to disrupt supply chains. The implications of a prolonged canal closure in today's high-volume, closely connected trade relationship between the East and the West would have far more adverse effects on global trade than the prolonged historical closures due to wars. More recently, according to the Federal Reserve Bank of Cleveland (Clark 2023), both aggregate demand and supply forces, including supply chain disruptions, have driven inflation. As countries increase their dependence on trade choke points such as the Suez Canal, the degree of economic losses increases in the event of a blockage. However, with the development of the NEOM port, the OXAGON, the increase in maritime traffic will offer the Suez Canal a boost in investment to facilitate and improve vessel movements. In this paper, we develop a dependence index to measure the vulnerability of countries on the basis of their dependence on a trade choke point. We do so to highlight to policymakers the common ground for unbiased cooperation on the security and enhancement of the Suez Canal.

Figure 1. Oil price movements during the Suez Canal blockage.



Source: IEA.

Importance of the Suez Canal for International Trade Movements

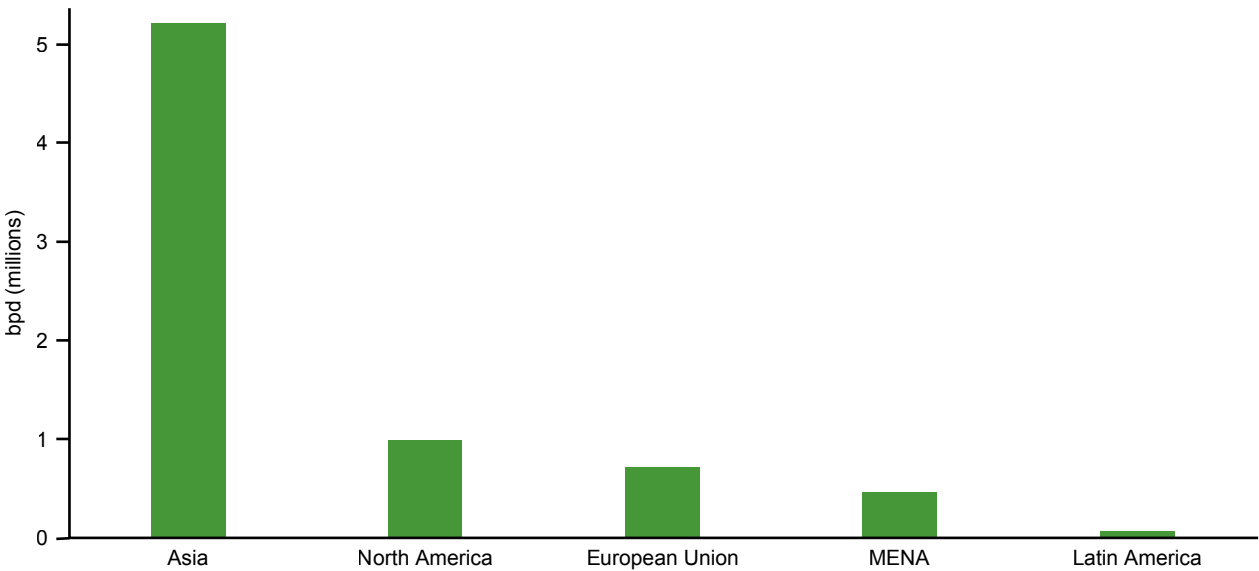
The Suez Canal is a man-made waterway connecting the Mediterranean Sea to the Indian Ocean via the Red Sea, making it the shortest route between the East and the West compared to the Cape of Good Hope, which involves circumnavigating the African continent. A journey from the Suez Canal in Egypt to Rotterdam in the Netherlands – Europe's largest port – typically takes approximately 11 days. According to Refinitiv, the financial data company (Reed 2021), venturing south around Africa's Cape of Good Hope adds at least 26 more days. The negative effect of distance on bilateral trade is one of the most robust findings in international trade. According to Feyrer (2009), distance is found to have a significant impact on trade and, hence, on income. This finding highlights the importance of the Suez Canal for global trade and the economy, as it provides a considerable mileage improvement for global trade. In 2019, more than 10%¹ of international maritime trade passed through the canal, where the major cargo types were oil and gas, bulk, and container carriers. Approximately 52 vessels passed daily, with an average of more than 330,000 tons of cargo (Suez Canal Authority 2019). The unique geographical position of the Suez Canal makes it of special importance to the world as a lifeline for all trade, mainly between the East and the West. The Suez Canal and, similarly, other global maritime choke points play an important role in arbitrage opportunities, and traders exploit the imbalance in particular regions due to transit delays.

¹ Based on a percentage calculation of data from the United Nations Conference on Trade and Development (UNCTAD) and the SCA.

The Suez Canal also plays a vital role in the economies of Gulf states such as the UAE and Saudi Arabia in terms of exports and imports. In 2020, Saudi Arabia exported more than 600 MMb/d of crude oil and more than 800 MMb/d of petroleum products to the EU (see Figure 10). The Kingdom’s ability to depend on the canal for its oil trade is not of serious concern because the majority of the oil from the Kingdom goes to Asia and a portion of the crude oil that is exported to the West transits via the SUMED Pipeline (2.8 MMb/d) from the Red Sea port of Ain Sukhna to the Mediterranean Sea port of Sidi Kerir. However, a canal disruption can pose a risk for refined petroleum products,

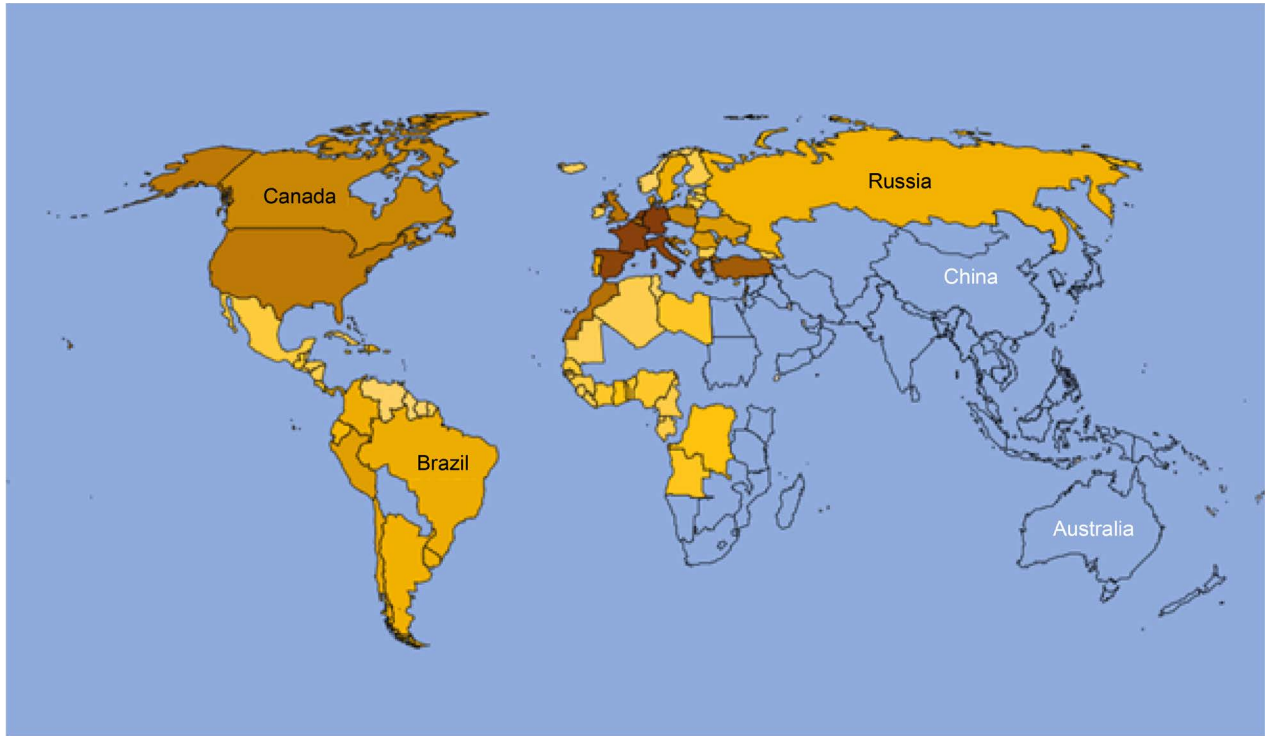
as the Kingdom is the second largest exporter of refined petroleum products to Europe after the U.S. As shown in the map chart in Figure 3, the EU and the Americas, including Mediterranean countries, are highly dependent on the Suez Canal for their maritime bilateral trade connectivity with the Kingdom. In the map chart, darker shades represent a higher degree of dependence on bilateral trade with the Kingdom. More than 100 countries are connected to the Kingdom via the Suez Canal for bilateral trade. Therefore, the safety, security, and operational effectiveness of the Suez Canal is of immense importance not only for the Kingdom but also for the world.

Figure 2. Imports of Saudi Arabian crude petroleum oil products in 2018.



Source: World Integrated Trade Solutions.

Figure 3. Sea trade partners of the Kingdom via the Suez Canal.

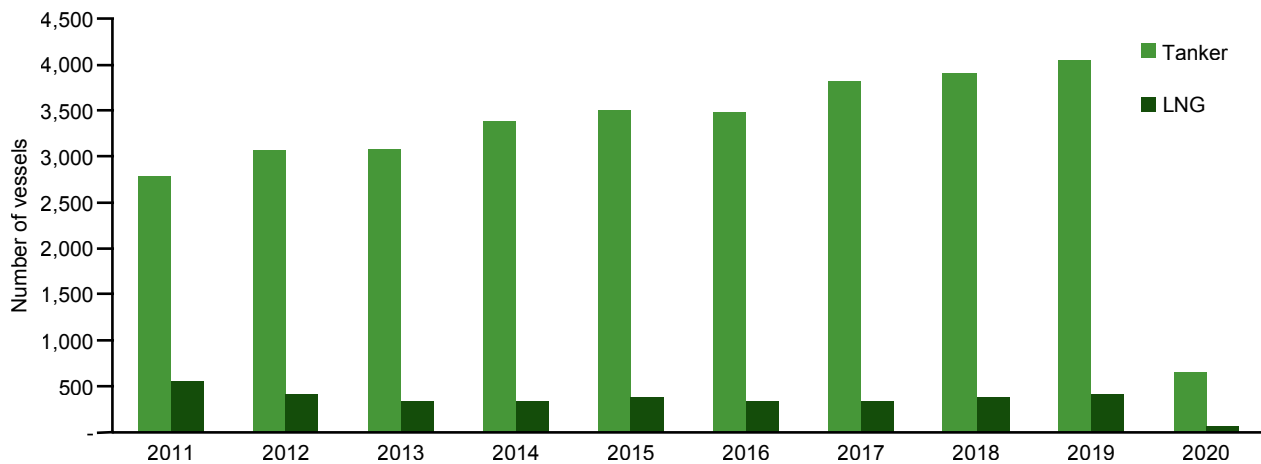


Source: KAPSARC analysis of data from the United Nations Conference on Trade and Development (UNCTAD). 2019. *Handbook of Statistics*. New York: United Nations.

According to 2020 data from the SCA, 27% of the total loaded ships passing through the canal were LNG and oil tankers, and they carried approximately 5.87 MMb/d of oil and LNG. Of that total, approximately 2.1 MMb/d consisted of crude oil tankers, both northbound and southbound (see Figure 5). As of 2015, approximately 2.9 billion tons of oil and natural gas products was shipped by maritime transportation, approximately 62% of all petroleum produced. For the remaining 38%, pipelines (dominantly), trains, or trucks were used. Crude oil alone accounted for 1.77 billion tons. The maritime circulation of petroleum follows a set of maritime routes between the regions where it was extracted and the regions where it will be refined and

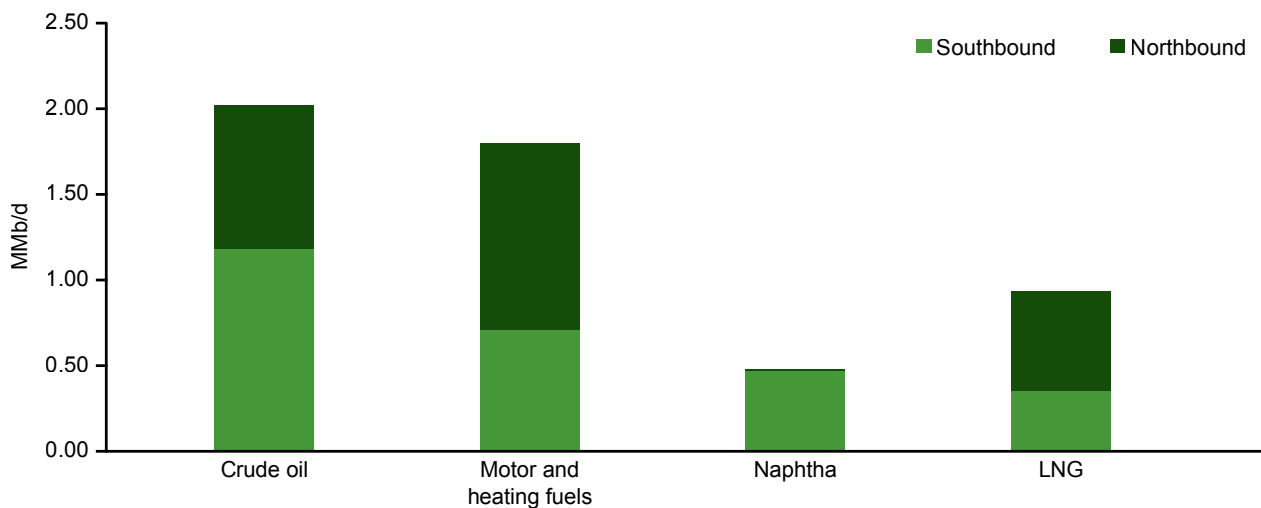
consumed. More than 100 million tons of oil is shipped each day by tankers. Approximately half the petroleum shipped is loaded in the Middle East and then shipped to Japan, the United States, and Europe. On the global scale of the seaborne oil trade, approximately 7% of all tankers worldwide pass through the Suez Canal, making it a critical constraint on the global hydrocarbon value chain and a critical energy security choke point. One of the constraints on crude oil transit through the canal is the limit on the size of crude carriers. Currently, the largest crude carrier that can pass through the Suez Canal is only partially loaded, i.e., a very large crude carrier (VLCC) with up to 1.75 million barrels due to the canal's depth limitation.

Figure 4. Number of tankers and LNG ships passing through the Suez Canal.



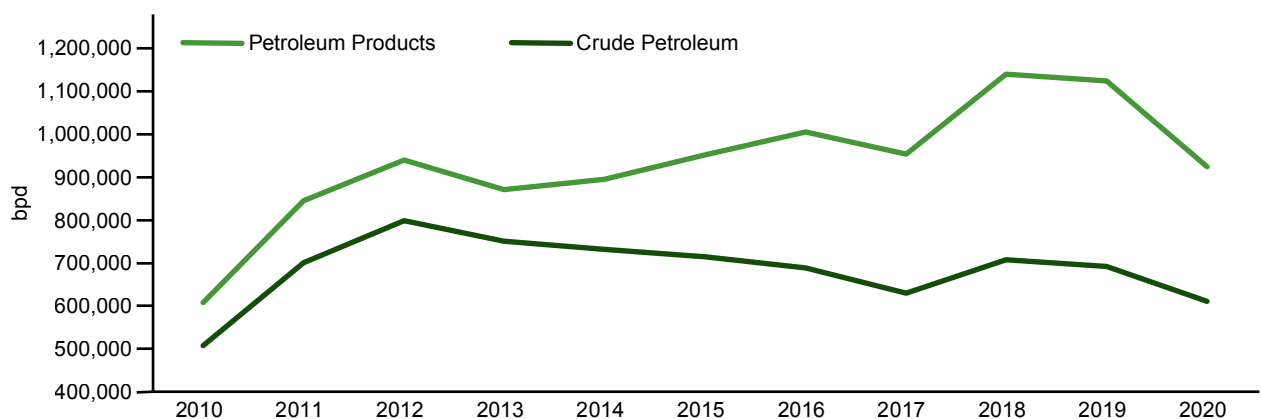
Source: KAPSARC analysis of SCA data.

Figure 5. Amount of crude oil, motor and heating fuels, naphtha, and LNG carried through the Suez Canal.



Source SCA.

Figure 6. Seaborne oil trade between Saudi Arabia and the EU.



Source: Eurostat.

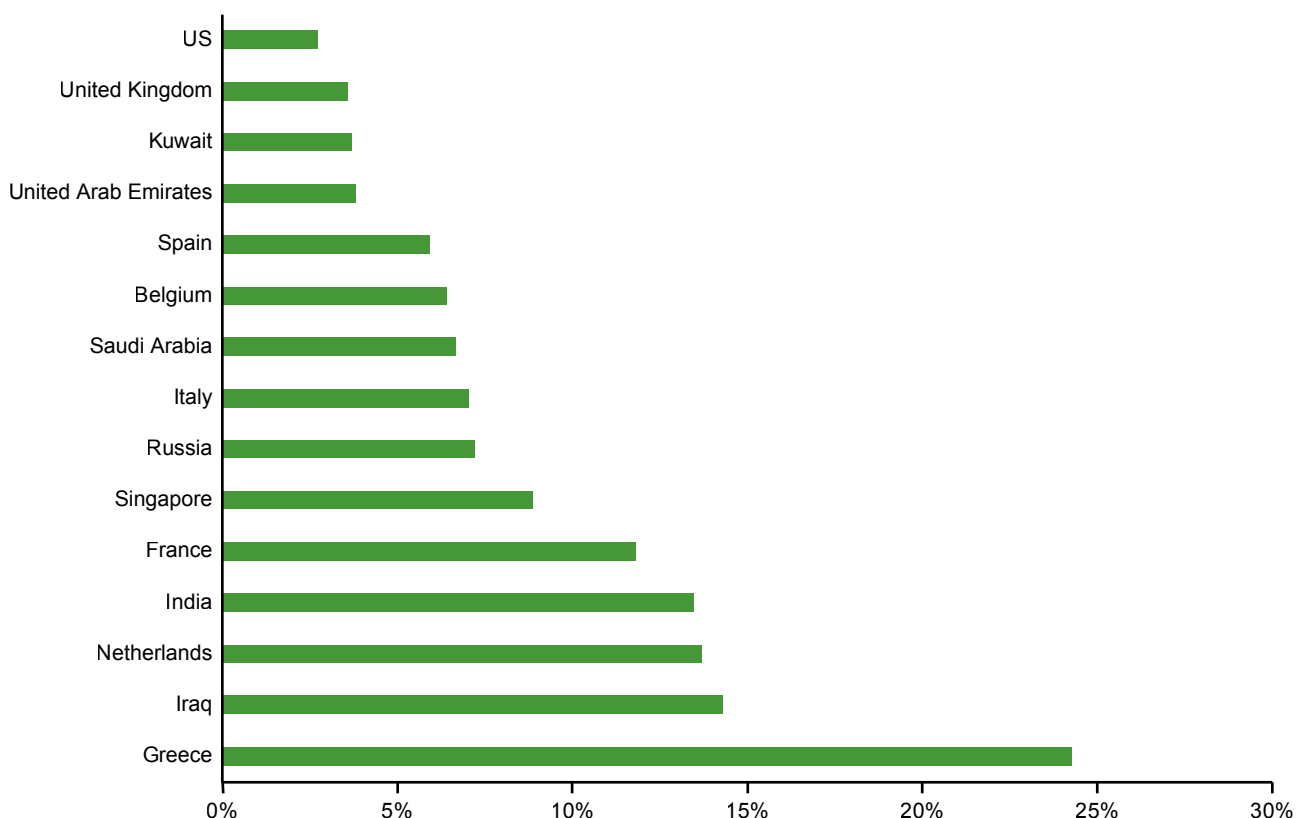
As countries increase their dependence on trade choke points such as the Suez Canal, the degree of economic losses increases in the event of a blockage. Therefore, it would be beneficial to measure countries' degree of dependence on the Suez Canal for their trade through a numerical measurement. Such a numerical measurement will indicate which countries are more vulnerable, for instance, to energy insecurity and economic losses, if any passage disruption occurs. This paper constructs a parameter called the "Degree of Dependence on a Choke point for Trade" (DDCT) to measure this type of dependence. Here, we construct the index for the **oil trade through the Suez Canal** as follows:

Degree of Dependence on the Suez Canal for Oil Trade Transaction Index¹ =

$$\frac{\text{Total Oil Trade Transactions Passing through the Suez Canal by Country}_i}{\text{Total Oil Trade Transactions of Country}_i}$$

A higher value of the equation above indicates a country's higher dependence on the Suez Canal in its oil trade. Furthermore, a higher value indicates that the degree of economic loss will increase and that the country's energy security position will weaken. The bar chart below demonstrates the degree of dependence of the seaborne oil trade on the Suez Canal by different countries. As shown in the dependence chart for the oil trade, many West European countries are highly dependent on the Suez Canal for their oil trade (see Figure 7).

Figure 7. Country-level dependence on the Suez Canal for the oil trade. KAPSARC analysis of data from UNCTAD. 2019. Handbook of Statistics. New York: United Nations and SCA



Source: KAPSARC analysis of data from UNCTAD. 2019 Handbook of Statistics, New York: United Nations and SCA.

¹ The numerator includes tons of oil exported and imported by a country through the Suez Canal, while the denominator represents the total oil exported and imported by that country.

Disruptions to oil movements cause knock-on effects on the entire oil value chain from production to the end-user markets. The 1956 Suez Crisis caused substitutional impacts such as cargo diversion and changes in routing and transshipment. It also led to new and expanded trade relations as well as the development of transshipment hubs and logistic zones as options to provide reliable alternate routes and modes of transport. For example, to avoid the Suez Canal for oil imports, some European countries might establish alternative oil trade relations with countries that do not depend on the Suez Canal, such as countries in North and West Africa and the U.S., which is experiencing a boom in shale oil. However, despite the substitutional impacts, the relevance of the Suez Canal for international trade is trending upward. For example, as of 2019, tanker traffic had increased by 31% since 2011. In 2020, due to COVID-19, traffic dropped by

more than 70% (see Figure 4). Any disruption in the canal causes far-reaching ripple effects on trade with a severe impact on prices and the timely availability of essential goods such as food and energy.

Long-term or frequent disruptions could cause trade shifts and the emergence of other alternatives and/or markets that avoid maritime choke points. In the case of the oil trade, this could translate into various alternatives or actions, such as more pipelines to the Mediterranean Sea originating from Red Sea coastal regions or, in the worst-case scenario, production cuts and/or discounts by the exporting countries that use the canal for the oil trade. Hence, the stability of the region around the canal, as well as operational safety and robust business continuity measures to avoid and mitigate disruptions, is of critical importance for international trade.

Alternative Route Challenges

Long-distance transportation seeks to minimize distances, but maritime shipping must follow specific routes under the constraints of strategic passages. The focus here is the routing alternatives between East Asia and Northern Europe, two of the world's most significant markets. The selection of a specific route is commonly related to factors such as cost, speed, and reliability. The Suez Canal provides the shortest route between the East and the West, saving time and money, improving trade, and ultimately leading to improved economies of the trading regions. However, other alternatives to the Suez Canal have challenges regarding cost, safety, and operational viability.

Alternative Maritime Route

The Cape of Good Hope route is a shipping alternative involving a long detour around the southern tip of Africa. Nevertheless, it represents an opportunity to handle African cargo and to connect with routes bound for South America. In addition to the Cape route, several other routing alternatives are being planned or are in operation to accommodate part of the trade volumes

between Europe and Asia. However, their market shares are expected to remain low compared to the Suez route, which offers substantial capacity, low costs, and reliability. For example, shipments from Ras Tanura to Rotterdam, the Netherlands, will add 42% more distance, equating to approximately 13 days of voyage plus extra fuel costs, which can reach more than \$1 MM. Fuel costs represent as much as 50-60% of total ship operating costs. Depending on the type of ship and service, this factor will lead to increased freight rates. Other shipping routes, such as the Arctic route, provide alternatives between Asia and Europe and North America; however, due to the harsh winter conditions, navigation is risky and requires more expensive ships to break sea ice, which will increase the shipping costs and insurance rates.

Figure 8. Alternative shipping route.



Source: Suez Canal Authority. 2019. Suez Canal Traffic Statistics. Suez Canal Authority Planning & Research Department Information Center.

On the other hand, piracy around the African continent is an ongoing concern for the maritime shipping industry. In 2019, the Gulf of Guinea remained the area most affected by piracy and the maritime robbery of vessels worldwide, while the African continent represented 39% of global maritime piracy and robberies. This phenomenon incurs costs to the shipping sector in terms of both money and human life. In 2020, oil and chemical tankers accounted for 42% of the maritime piracy attacks in West and East Africa, where West Africa had 40 piracy attacks compared to East Africa (Joubert 2020).

Land Corridors

Land-based alternatives to the Suez Canal, such as the China-Europe railways, play an important role in the trade between Asia and Europe. However, there are challenges related to the transit time, capacity, and eastbound return cost. Future growth is limited by trade imbalances, the comparative value that maritime shipping offers, and infrastructure constraints (Hillman 2018). The existence of trade routes with comparative advantages such as the Suez Canal will continue to offer benefits for international trade.

Figure 9. China-Europe rail routes.



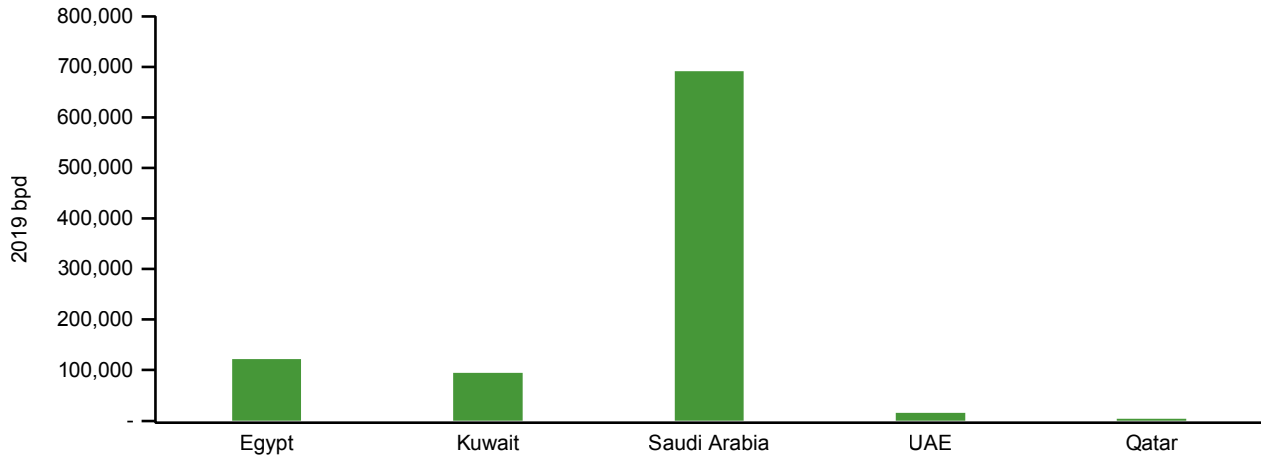
Source: CSIS.

Alternative to Tankers: Pipelines

As shown in Figure 12, SUMED (Arab petroleum pipeline company) operates two parallel pipelines with a maximum capacity of 1.4 MMb/d per pipeline from Ain Sukhna on the Red Sea coast to Sidi Kerir on the Mediterranean Sea coast. The SUMED Pipeline acts as a complement to the Suez Canal for transporting oil. Since fully laden VLCCs, i.e., tankers carrying more than 240,000 tons of oil, cannot pass through the canal, they offload part of their crude oil at the Ain Sukhna terminal (lightening operation)

and pick up the crude oil at the Sidi Kerir terminal on the Mediterranean shore. Transit costs through the pipeline can reach \$1/bbl, which requires VLCC operations to justify these trade economics. On average, it takes approximately 36 hours for a crude batch from the Ain Sukhna terminal to reach the Sid Kerir terminal given smooth logistics scheduling. Crude oil dominates cargo traffic at Ain Sukhna. Refinitiv ship tracking data show an average of 729,000 bpd of crude discharges at Ain Sukhna since 2019, reaching 1.3 MMb/d in April 2020. This pipeline currently complements the Suez Canal, and shippers receive special rebates to transport some of their crude oil via the pipeline. Further widening and deepening of the canal to accommodate fully laden VLCCs at a higher frequency will significantly reduce the dependence on the pipeline, as the combined cost of a tanker and the pipeline might not be justified.

Figure 10. Crude oil exports to the EU.



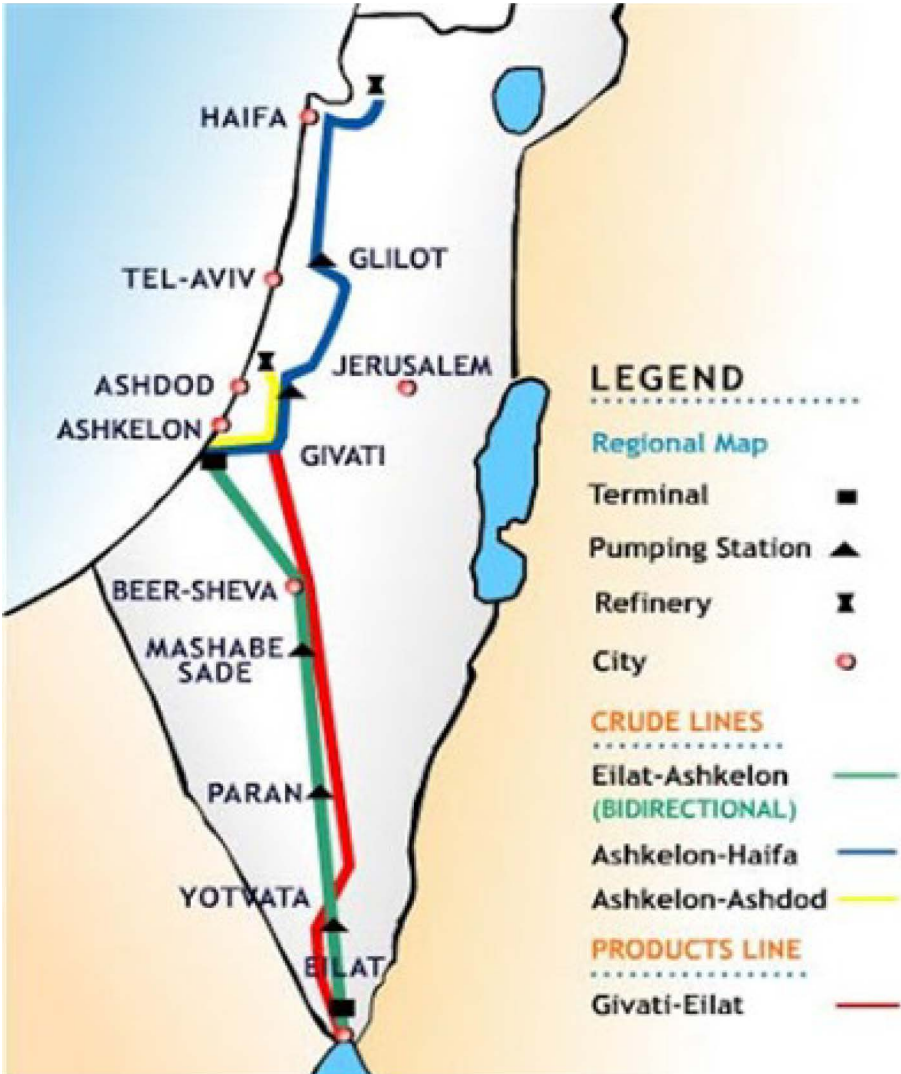
Source: Suez Canal Traffic Statistics Annual Report 2019.

The Trans-Israel Pipeline System

The Trans-Israel (TI) pipeline system connecting the Gulf of Aqaba oil receiving terminal to refineries represents another alternative to shipping crude north or south via the Suez Canal.

The Eilat Ashkelon Pipeline Company (EAPC) operates a single 42-inch bidirectional crude oil pipeline connecting the port of Eilat in the Red Sea with Ashkelon in the Mediterranean. The southbound pumping capacity is 400,000 bpd, and the northbound capacity is 1.2 MMb/d. Geopolitics prevents most Middle Eastern countries from entering the EAPC pipeline; however, the recent normalization of relations saw an agreement on transshipments of oil from the UAE via the TI pipeline system. The pipeline system connecting the Haifa and Ashdod refineries represents another immediate outlet for distressed crude cargoes.

Figure 11. Map of the oil supply chain connecting Eilat port to refineries.



Source: 246mag.com, and Tekmor Cyprus, Tekmore LLC.

NEOM's Transformational Role

NEOM is part of Saudi Arabia's broader economic transformation plan under Vision 2030, which seeks to reduce the country's dependence on oil and develop new sectors and industries. NEOM is a region in the northwest of the Kingdom that is strategically located along the Red Sea coastline, with access to important international trade routes. It spans over 26,500 square kilometers and extends into neighboring Jordan and Egypt, making it a cross-border economic zone with multiple subregions focusing on sustainability and circularity concepts. It aims to be a leading global hub for various sectors, including technology, energy, biotechnology, manufacturing, entertainment, and tourism. NEOM places a strong emphasis on sustainability, as it intends to become a leading center for renewable energy production and innovation, utilizing solar and wind power, as well as other sustainable technologies.

The Suez Canal plays a significant role in connecting NEOM with global trade routes. While NEOM is not directly situated along the Suez Canal, the canal's

proximity and importance for maritime trade have significant implications for NEOM. As NEOM aims to become a major economic hub and center for global trade, its close proximity to the Suez Canal provides easier access to international markets. The canal serves as a crucial link between NEOM and major consumer markets in Europe, Asia, and the Americas, facilitating the movement of commodities and goods such as energy and food. In describing how, through its OXAGON project, NEOM will benefit from its proximity to the Suez Canal, the CEO of OXAGON, Vishal Wanchoo, said, "This will be facilitated with its distinguished location on the Red Sea, through which about 13 percent of global trade crosses, as it will work to attract industries to build an export-based economy" (Saudi Gazette 2022). The Suez Canal is crucial not only for oil movements but also for the transportation of other energy resources, including LNG and hydrogen. NEOM aims to be a hub for renewable energy and sustainable technologies, and the availability of the Suez Canal can facilitate the import of energy resources, such as LNG, to support NEOM's energy needs. The Suez Canal's importance as a global trade route and NEOM's emergence as a global sustainable economic hub attract significant international investments and trade partnerships. Both of them can leverage their strategic position to attract businesses, investors, and trade partners, which can contribute to the economic growth and development of both the Suez Canal and NEOM. For the Suez Canal, there is a prospect of a parallel canal to facilitate increased vessel traffic due to NEOM.



OXAGON, Port of NEOM.

Conclusion

The Suez Canal is a critical maritime passage for global supply chains, and it is among the world's most significant trade choke points. The Ever Given blockage not only demonstrated the vulnerabilities of international shipping lanes and the fragility of supply chains but also stressed the importance of ensuring security and international cooperation in such areas. Although there are alternative routes and modes of transportation, they do not provide the same flexibility, cost-effectiveness, and operational and logistical viability as the Suez Canal. Maintaining the safety and security of the Suez Canal is a shared global responsibility to ensure stable and efficient trade flows across the globe. Further widening and deepening of the Suez Canal are paramount for international trade and the oil and gas value chains. To maintain its importance, relevance, and competitiveness in the area, further widening and deepening of the canal to accommodate larger oil carriers such as VLCCs must be expedited. NEOM can play a transformational role in the Suez Canal to facilitate additional vessel traffic and therefore enhance trade and investment in both areas. Maritime trade will remain dominant, and the Suez Canal will remain a vital passage for global maritime trade in the present and future.

Figure 12. Pipelines from the Red Sea to the Mediterranean Sea.



Source: KAPSARC generated through Google map.

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About the Project

The World-Wide Model & Outlook for the Oil Demand Emerging from the Petrochemical Sector is a project that aims to develop insights about the demand of petrochemical feedstocks and its final products through different modeling techniques and close market analysis in order to sustain the demand of oil by ascertaining the potential opportunities for oil products and mitigate any potential risks.



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