# **Trade Networks in the MENA Region**

Panorama

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### Introduction

Forecasts for economic growth in the Middle East and North Africa (MENA) stand at between a modest 1.5 and 3.5 percent for the period 2019-2021 (World Bank, 2019). This growth is also likely to be heterogeneous, with some laggards and a few emerging growth stars (Arezki et al., 2019). Growth is traditionally linked to trade: countries more integrated in the international production network tend to grow more. In the case of MENA countries, some of them are oil producers and export mainly raw materials, others (namely Morocco and Tunisia) have a stronger manufacturing industry. The most important trading partner for MENA countries, especially for the Maghreb, is the EU. Gross exports to the eurozone in 2016 were around 26% of GDP for Tunisia, and 16% for Morocco. If the region must develop, opportunities cannot rely solely on exports of either raw materials or final goods. MENA countries and their firms may find ways to develop a constructive integration into global value chains to spur specialization, positive spillovers and, eventually, growth (Del Prete, Giovannetti & Marvasi, 2017). Whether or not global value chains offer opportunities depends on several factors, including positioning relative to competitors and trade partners, product specialization, geographic characteristics, productivity and labour costs, as well as institutions and specific policies aimed at facilitating the international flow of goods, people and ideas. All these aspects are relevant, yet policies are necessarily contingent on understanding the economic situation. In what follows, we investigate trade patterns from the point of view of international fragmentation of production. We address the following questions: What are the global value chain relationships of countries within the MENA region and between the region and the rest of the world? And, given that trade configuration, which countries are more likely to benefit? We describe the present situation concentrating on the trade of intermediate goods in the MENA region and assess the specialization of the different countries, as well as their position in the production network to assess their potential to develop.

# The Intermediate Trade Network of the MENA Region

Let us consider two main networks: the first examines trade within the MENA countries, and the second, trade between the MENA region and trade partners outside the region. To obtain a comprehensive view of trade in intermediate goods, we make use of the Eora global multi-regional input-output tables. The advantage of using input-output data lies in the possibility of using the international inter-sectoral exchanges of intermediate goods, which accurately measure the production linkages between countries and sectors.<sup>1</sup> In what follows we present a country-level analysis for

<sup>1</sup> Relative to similar sources, such as. WIOD and TiVA, the Eora database includes a larger number of countries, most of which are of direct interest here.

the year 2015 (the last available at the time of writing). There are 26 sectors encompassing goods and services (see the appendix). Analysing all sectors together, i.e. both goods and services, affords us a broad picture. However, global value chains involve many inter-sectoral linkages. Since in the MENA region there are many resource-abundant countries, for which trade in primary goods is still very relevant, after a general analysis, we single out the intermediate trade network for the manufacturing sectors. To this end, we consider trade from manufacturing sectors towards all use sectors.

### Overall Trade in Goods and Services

The value of overall intermediate trade (sum of imports and exports) of MENA countries is very heterogeneous across countries. Saudi Arabia, the UAE, Iran and Israel are the top traders, with a value of over \$100 billion; while the smaller traders account for a fraction of that value, with countries such as Yemen and Bahrain trading less than \$10 billion.

Among the top traders, only Iran is a net exporter of intermediate goods, i.e. has a positive normalized intermediate trade balance (see Table 3). Kuwait, Qatar and Libya are net exporting countries, with a normalized intermediate trade balance of above 50%. Lebanon, Jordan and Tunisia are net importing countries, all with a negative balance of above 18%. Looking at the composition of intermediate trade, top intra-MENA traders are Jordan, Oman and Lebanon, for which the exchanges with MENA partners account for more than 20% of all intermediate goods. The most outward-oriented countries, in contrast, are Israel, Algeria and Morocco, for which more than 98% of intermediate trade involves non-MENA countries.

Yet, MENA countries are heterogeneous in terms of their intermediate export and import shares with other MENA countries. Some countries mostly operate as suppliers within the MENA region (intra-MENA exporters), while others are buyers (intra-MENA importers). Lebanon exports almost 60% of its intermediates towards the MENA region; Jordan and Bahrain's intermediate exports are also relatively concentrated towards the region. In contrast, Algeria, Libya and Israel's intermediate exports are almost completely oriented to outside the region. On the import side, Oman, Iraq and Qatar source intermediate goods from the region at a relatively higher rate than other countries. A clearer picture emerges if we also compare the intra and extra-MENA trade

TABLE 3	Normalized Trade Balances and Intra and Extra-regional Trade - Overall Trade in Goods and Services						
	Normalized intermediate trade balance (%)			Weight of intra-MENA on intermediate trade (%)			
	Intra-MENA	Extra-MENA	World	Total trade	Export	Import	
Algeria	-45.7	46.1	45.2	1.0	0.4	2.6	
Bahrain	75.4	7.0	17.3	15.0	22.5	4.5	
Djibouti	-5.9	-17.3	-16.6	6.1	6.9	5.5	
Egypt	62.9	-14.9	-9.1	7.4	13.3	2.5	
Iran	-2.1	17.7	15.7	9.8	8.3	11.9	
Iraq	-90.3	46.6	30.2	12.0	0.9	32.7	
Israel	6.0	-7.7	-7.6	0.5	0.6	0.4	
Jordan	31.2	-40.2	-21.7	25.9	43.4	14.7	
Kuwait	8.1	70.6	69.2	2.2	1.4	6.5	
Lebanon	23.4	-76.8	-55.3	21.5	59.2	10.6	
Libya	-79.3	55.9	50.8	3.7	0.5	13.6	
Malta	58.1	-12.1	-9.7	3.3	5.8	1.3	
Morocco	32.7	2.2	2.7	1.8	2.3	1.2	
Oman	-22.1	43.1	27.5	23.9	14.6	40.2	
Qatar	-17.2	66.6	60.3	7.5	3.9	22.1	
Saudi Arabia	-67.8	4.3	0.4	5.4	1.7	9.1	
Syria	57.2	7.9	13.8	11.9	16.4	5.9	
Tunisia	32.3	-22.0	-18.4	6.5	10.6	3.7	
UAE	39.5	-10.6	-3.8	13.4	19.5	7.8	
Yemen	7.8	12.6	12.2	7.2	6.9	7.5	

Strategic Sectors | Economy & Territory

balances. Interestingly, we see that some countries operate as buyers from the MENA region, but as suppliers to the rest of the world, and vice versa. Those countries seem to operate as hubs of inward or outward connections between the region and the rest of the world.

## MENA countries are heterogeneous in terms of their intermediate export and import shares with other MENA countries

In Chart 30, countries in the top-right quadrant are exporters of intermediate goods both towards the region and outside, in general acting as net suppliers. No country lies in the bottom-left corner: i.e. there are no net importers of intermediates both from inside and outside the region. Countries in the topleft quadrant tend to import from the region while exporting to the rest of the world, while countries in the bottom-right quadrant import from the rest of the world and export to the other MENA countries. The above evidence suggests an underlying network structure in which different countries play very differentiated roles, with some of them serving as important gates connecting the region with the rest of the world. We can see this more clearly if we take a network approach to investigating trade in intermediates.

Chart 31 displays the overall intermediate trade network of MENA countries. In the chart, each country is a node (MENA countries highlighted), the spokes are proportional to trade, the arrows indicate the direction of the trade flow, and more connected countries tend to occupy central positions. The largest traders – namely Saudi Arabia, the UAE and Iran – are very central. The US and Germany are also very central and have a role in connecting some MENA countries. For instance, Algeria is clearly an extra-MENA supplier of intermediates and is connected to other MENA countries only through third countries, namely the US, Belgium and Spain, thus being an indirect supplier of intermediate goods.

Outward linkages of the region are more clearly observed if we consider the aggregate MENA region, as in Chart 32. The main partners are China, the US, Germany, France, South Korea, Japan and Italy. The region is a supplier of intermediates to many third



Source: Produced by the authors using the Eora dataset Note: Circles are proportional to total intermediate trade



Network of Trade in Intermediates for MENA countries - Overall Trade in Goods and Services (flows above 0.5%)



Source: Produced by the authors using the Eora dataset.



Source: Produced by the authors using the Eora dataset

countries, especially to South Korea, Japan and the US. Intermediate trade is mostly balanced with China, France and Italy, while the region imports from Germany, the UK and Switzerland.

Chart 33 shows the intra-MENA intermediate trade network. The graph confirms the centrality of the UAE, Saudi Arabia and Iran. Out of the 20 countries considered, 15 are represented in the graph (which excludes



flows of below 0.5% of total trade), showing that most countries are well integrated inside the region, and only a few (e.g. Israel and Algeria, which are among the larger traders in the region) do not exploit the geographical proximity, and are therefore relatively isolated. Saudi Arabia and Jordan have the highest number of linkages (number of import and export trade partners, i.e. indegree + outdegree), being connected with all the other MENA countries. They are also the two most central countries of the network, together with Iran, Oman, Qatar and Tunisia, in terms of number of linkages (i.e. ignoring the traded values or, equivalently, considering the unweighted structure of the network). Some of these countries, despite being well integrated inside the region, present very low traded values, which reduces their importance in the production chain. For instance, Jordan is very well connected and central, but its flows are relatively small.

Table 4 reports the (weighted) centrality indexes, providing a more detailed description of the role of each country within the region. The PageRank measures the number of times a given country is encountered when moving within the network: Saudi Arabia, the UAE and Iran are the most central countries. There is a probability of randomly encountering one of these three countries of between 27% (unweighted) and 43% (weighted). Hubs and authorities are recursive connected measures. Hubs represent countries who export to many important destinations, while authorities represent countries that import from many impor-



Source: Produced by the authors using the Eora dataset.

TABLE 4

# Centrality Indicators of the Intra-regional Intermediate Trade - Overall Trade in Goods and Services (indexes weighted by trade flow; flows above 0.1%)

	De ve De vie	United	A	Out de sus e	la de sue e	Deterrore
	PageRank	Hubs	Authorities	Outdegree	Indegree	Betweenness
Algeria	0.023	0.000	0.008	0.5	1.4	12
Bahrain	0.009	0.046	0.000	2.9	0.1	0
Egypt	0.021	0.055	0.001	6.2	1.2	40
Iran	0.125	0.032	0.383	15.5	16.3	81
Iraq	0.084	0.006	0.011	0.4	9.4	13
Israel	0.012	0.000	0.001	0.6	0.7	0
Jordan	0.072	0.024	0.011	5.5	2.8	64
Kuwait	0.023	0.022	0.002	1.9	1.7	0
Lebanon	0.029	0.012	0.007	4.0	2.4	2
Libya	0.036	0.000	0.001	0.1	1.3	17
Malta	0.008	0.000	0.000	0.2	0.0	0
Morocco	0.016	0.011	0.000	0.9	0.3	0
Oman	0.090	0.025	0.292	8.2	12.9	70
Qatar	0.064	0.018	0.049	2.8	4.4	0
Saudi Arabia	0.158	0.039	0.216	4.5	23.6	135
Syria	0.015	0.028	0.001	3.7	1.0	0
Tunisia	0.053	0.010	0.001	2.2	1.0	51
UAE	0.148	0.659	0.016	35.1	15.0	127
Yemen	0.014	0.012	0.001	0.8	0.6	0

Source: Produced by the authors using the Eora dataset.

tant sources. These measures are more sophisticated than outdegree and indegree, but the intuition is similar. The UAE is by far the most important hub in the region and the one with the largest (weighted) outdegree. Authorities are less concentrated: Iran, Oman and Saudi Arabia are the main ones; while the UAE is not a particularly important authority despite having a high indegree. Finally, Saudi Arabia and the UAE are the most central countries in terms of betweenness, a measure that indicates the frequency with which the shortest path between two countries passes through a given country.

### Trade in Manufacturing

We will now focus on manufacturing trade only, i.e. intermediate export from manufacturing sectors towards all sectors of importing countries. Specifically,

the definition used here considers international exports of manufacturing industries towards all sectors of importing countries. This definition keeps track of actual standard international flows of manufacturing intermediate products and corresponds to the way in which customs data are recorded.

Manufacturing represents about 46% of all the MENA countries' trade in intermediates (Table 5). The manufacturing share for import (63%) is almost twice that for export (33%), indicating that the region is a net importer of processed intermediates. This is confirmed if we look at the normalized trade balances. The trade balance for goods and sectors is positive, while the balance for manufacturing alone is negative. This means that the region is a net exporter of non-manufacturing intermediates (i.e. primary goods and services) and a net importer of intermediate products.

TABLE 5	Manufacturing and Overall Trade of the MENA Region				
	Manufacturing	All sectors	Share (%)		
Intermediate trade (\$ bn)	417	910	45.8		
Intermediate export (\$ bn)	168	513	32.7		
Intermediate import (\$ bn)	249	396	62.9		
Normalized trade balance (%)	-19.6	12.8			

Source: Produced by the authors using the Eora dataset

While the region is a net importer of intermediate manufacturing goods, some countries have a positive trade balance regarding either intra-MENA or extra-MENA trade, or both (Table 6). Egypt, for instance imports from outside the region, but exports towards other MENA countries. Morocco, however, has a positive trade balance with respect to both areas, but its intra-MENA surplus is much larger. Kuwait, Bahrain and Morocco are the only countries with a positive trade balance outside the region, all other countries import intermediates. In contrast, many countries are net regional exporters.

The intra and extra-MENA normalized trade balances are visualized in Chart 34. While for goods and sectors the correlation between the regional intermediate trade balances is negative, there is a positive correlation for manufacturing. Exporting countries tend to export manufactured intermediates both inside and outside the region, and the same holds for imports. A few countries, however, import from outside the region and export towards other MENA countries, while, no country does the opposite. The change in correlation observed for manufacturing intermediate products, as compared to overall intermediate trade in goods and services, is mainly due to the exclusion of primary resources, which are mostly outward-oriented. The extra-MENA trade balances, in fact, change significantly, while the intra-MENA balances are much more stable. Focusing on manufacturing improves the extra-regional trade balance for intra-MENA exporters (upward shift) and worsens it for intra-MENA importers (downward shift). Intra-MENA exporters of goods and services (positive intra-regional trade balance) tend to have relatively developed manufacturing sectors and to import some non-manufacturing intermediates from the rest of the world. If we do not account for the nonmanufacturing products, mostly imports, then the extra-regional trade balance must improve. Similarly, resource abundant countries, while their industry needs to import manufactured goods, also tend to sell large amounts of primary inputs outside the region, which gives rise to a positive extra-regional trade balance. Excluding non-manufacturing intermediates, mostly exports of primary goods, reduces the extra-regional trade balance, which becomes negative.

The manufacturing intermediate trade network that emerges does not change much relative to the intermediate overall trade in goods and services as regards the network's main country nodes, namely Saudi Arabia, the UAE, Iran and Israel (see Chart 35). However, three things stand out: first, the direction of the trade flows is in many cases reversed; second, the role of France in the network is now much more evident; third, some manufacturing-oriented countries, such as Morocco and Tunisia, gain importance and are now included in the network (which only shows the main flows for clarity's sake). Take, for instance, Algeria. Overall, it is a net exporter to France, the US, Belgium and Spain, but if we look exclusively at manufacturing, we observe that it imports from France and Saudi Arabia to export to Brazil. The link between Algeria and France is through non-manufacturing intermediates and is France's only important link in overall intermediate trade with the region. But, in terms of manufacturing only, France is much more central and has many export links that include Algeria, Israel, Tunisia and Morocco, the latter further exporting to Singapore.

TABLE 6	Normalized Trade Balances and Regional Trade Manufacturing						
	Normalized intermediate trade balance (%)			Weight of intra-MENA on intermediate trade (%)			
	Intra-MENA	Extra-MENA	World	Total trade	Export	Import	
Algeria	-62.6	-23.8	-22.9	2.2	1.1	2.9	
Bahrain	75.8	27.5	20.0	13.5	18.6	4.5	
Djibouti	-39.2	-54.8	-55.6	5.4	7.2	4.8	
Egypt	62.8	-14.2	-21.1	8.1	15.4	2.6	
Iran	-5.8	-33.0	-38.8	17.6	24.8	14.0	
Iraq	-95.6	-96.8	-97.5	38.2	52.5	38.0	
Israel	-9.5	-2.8	-2.8	0.5	0.5	0.6	
Jordan	32.8	-26.4	-48.9	27.6	49.8	14.7	
Kuwait	9.6	36.2	37.4	4.5	3.7	6.4	
Lebanon	47.4	-47.5	-76.5	23.4	65.8	8.4	
Libya	-91.1	-24.4	-17.9	8.8	1.0	13.6	
Malta	63.9	-14.6	-17.3	3.3	6.4	1.1	
Morocco	31.0	2.5	2.0	1.6	2.1	1.1	
Oman	-26.6	-48.4	-73.4	53.4	76.0	45.6	
Qatar	-19.8	-11.3	-8.9	22.6	20.5	24.4	
Saudi Arabia	-67.3	-35.8	-33.0	8.4	4.3	10.3	
Syria	33.4	-46.8	-62.3	16.2	40.6	7.3	
Tunisia	38.8	-23.2	-27.3	6.3	11.3	3.1	
UAE	50.5	-18.9	-32.0	15.9	29.5	6.6	
Yemen	-47.5	-62.3	-63.7	8.4	11.7	7.6	

Source: Produced by the authors using the Eora dataset.



Source: Produced by the authors using the Eora dataset. Note: Circles are proportional to total intermediate trade.

The above network represents individual countries and their main bilateral flows. A different picture is obtained by taking the aggregate MENA region and its manufacturing links with other countries (Chart 36). For instance, it can be noted that, relative to overall intermediate trade, Italy becomes part of the network as an exporter of manufactured goods; Thailand, switches from importer to exporter, and several other



#### Network of Trade in Intermediates for MENA Countries: Manufacturing (flows above 0.5%)



Source: Produced by the authors using the Eora dataset.



Source: Produced by the authors using the Eora dataset.

countries strengthen their role as exporters, including China, India, South Korea, Germany and others.

The intra-MENA network of intermediate trade, on the other hand, does not change much when we focus on manufacturing products only. The main traders are the same and the structure and direction of the flows remain similar (see Chart 37). One notable change is Israel, which, in general, is relatively less integrated within the region regarding overall trade but cannot be excluded from the manufacturing trade network. The similarity of the intra-regional overall trade and manufacturing networks confirms the evidence obtained from trade balances.

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Table 7 shows the intra-regional centrality measures for the manufacturing network. Saudi Arabia, Iran and the UAE are the most central countries according to the PageRank index. On the export side, the UAE is the most important country within the region (Hub), while on the import side we have Iran, Oman and Saudi Arabia (Authorities). This is also confirmed by the outdegree and indegree. In terms of betweenness the most central countries are Saudi Arabia and the UAE.

### Conclusions

We have examined the trade opportunities of MENA countries, focusing on their position in the network of world trade in intermediate goods and services, as well as in manufacturing intermediate products. We have taken a network perspective not usually considered in standard trade analysis and investigated the global production linkages of the different MENA countries highlighting the heterogeneity in their degree of centrality within the intermediate trade networks.



Source: Produced by the authors using the Eora dataset.

Centrality Indicators of the Intra-regional Intermediate Trade: Manufacturing (indexes weighted by trade flow; flows above 0.1%)

	PageRank	Hubs	Authorities	Outdegree	Indegree	Betweenness
Algeria	0.023	0.000	0.010	0.323	1.668	0
Bahrain	0.011	0.038	0.000	2.575	0.151	0
Egypt	0.022	0.065	0.001	6.300	1.256	54
Iran	0.159	0.022	0.386	14.683	16.500	45
Iraq	0.106	0.005	0.008	0.212	10.465	3
Israel	0.013	0.000	0.002	0.501	0.834	0
Jordan	0.047	0.031	0.012	5.637	2.898	76
Kuwait	0.029	0.030	0.002	2.298	1.978	0
Lebanon	0.028	0.015	0.006	5.075	1.731	0
Libya	0.023	0.000	0.000	0.000	1.133	0
Malta	0.009	0.000	0.000	0.340	0.000	0
Morocco	0.011	0.009	0.000	0.809	0.193	0
Oman	0.093	0.026	0.262	7.275	12.624	69
Qatar	0.062	0.020	0.040	2.385	4.013	0
Saudi Arabia	0.172	0.038	0.258	5.100	26.034	167
Syria	0.016	0.019	0.001	2.366	1.146	0
Tunisia	0.026	0.008	0.001	2.333	0.821	43
UAE	0.137	0.673	0.011	38.102	12.425	110
Yemen	0,015	0.003	0.001	0.228	0.673	0

Source: Produced by the authors using the EORA dataset.

Some countries operate as regional buyers and extra-regional suppliers, while others do the opposite, operating as extra-regional buyers and regional suppliers. Many countries, thus, seem to operate as hubs of inward or outward connections of the region with the rest of the world. Inward hubs (i.e. net import from outside the region and net export to other MENA countries) include Egypt, Jordan, Lebanon, Malta, Tunisia and the UAE. This applies to both intermediate goods and services and to intermediate manufacturing products. Outward hubs (i.e. net import from other MENA countries and net export to the rest of the world) include, unsurprisingly, six oil-rich countries: Algeria, Iran, Iraq, Libya, Oman and Qatar. Excluding services and primary inputs, we see that these six oil-rich countries import

Panorama

- DEL PRETE, D., GIOVANNETTI, G. and E. MARVASI "Global value chains: New evidence for North Africa." *International Economics* 153 (May 2018): 42-54.
- GRUBEL, H. G. and P. J. LLOYD. "The Empirical Measurement of Intra-Industry Trade." *Economic Record* 47, no. 4 (1971): 494-517.
- LAFAY, G. "The Measurement of Revealed Comparative Advantages." in M.G. DAGENAIS and P.- A. MUET (eds.), *International Trade Modelling*. London: Chapman & Hall, 1992.
- SCHOTT, P. K. "The relative sophistication of Chinese exports." *Economic Policy* 23, no. 53 (January 2008): 6-49.
- WORLD BANK. Global Economic Prospects: Darkening Skies. Washington, D.C., January 2019.

### Appendix: Sector classification

TAB	E 8 Sector classification in Eora26			
1	Agriculture			
2	Fishing			
З	Mining and Quarrying			
4	Food & Beverages			
5	Textiles and Wearing Apparel			
6	Wood and Paper			
7	Petroleum, Chemical and Non-Metallic Mineral Products			
8	Metal Products			
9	Electrical and Machinery			
10	Transport Equipment			
11	Other Manufacturing			
12	Recycling			
13	Electricity, Gas and Water			
14	Construction			
15	Maintenance and Repair			
16	Wholesale Trade			
17	Retail Trade			
18	Hotels and Restaurants			
19	Transport			
20	Post and Telecommunications			
21	Financial Intermediation and Business Activities			
22	Public Administration			
23	Education, Health and Other Services			
24	Private Households			
25	Others			
26	Re-export & Re-import			

intermediate manufacturing products both from inside and outside the region.

Among the MENA countries, there are no outward hubs of intermediate manufacturing products. The only countries with a positive trade balance outside the region are Kuwait. Bahrain and Morocco: all these countries are also exporters to other MENA countries. Focusing on intermediate manufacturing products, the role of France as a supplier of intermediate products for further processing stands out, for instance for Morocco and Tunisia (also geographically close). In particular, Morocco, whose involvement in global value chains is renowned, occupies an interesting position: it is a net manufacturing exporter, but it imports intermediates from France; and its additional exports towards Singapore represent a nonnegligible link of the trade network. However, Morocco does not occupy a very central position in the intra-regional trade network: its outward orientation does not seem to have significant effects on other MENA countries.

In contrast, the UAE and Saudi Arabia are very central in the MENA intermediate trade network and may possibly induce significant spillovers in the region, but they have a very different role. The UAE represents an inward hub, therefore what matters is its capacity to supply intermediate manufacturing products to other MENA countries. Saudi Arabia, instead, is a net importer and its role as regional buyer of intermediate manufacturing products is relevant. A deeper integration of these countries in global value chains is thus likely to bring about further effects on third countries as well.

This has important consequences since it helps to assess the potentiality of different countries to enter the international production networks. We believe that MENA countries have important unexploited opportunities.

## References

AREZKI, R. et al. "Reforms and External Imbalances: The Labor-Productivity Connection in the Middle East and North Africa." *Middle East and North*