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Economic Integration of Mediterranean States

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Times of economic crisis are an opportunity for greater integration of the markets of the Mediterranean countries. The chosen method makes it possible to confirm this hypothesis. Unfortunately, this cannot be realized without greater, comprehensive institutional connectivity within he economic space. The greatest role in this can be played by the major members of the Mediterranean basin, which are very important to global trade and through which the effects of major crises are also transmitted most significantly to the economic space of the Mediterranean basin.

Key Words: Mediterranean countries, economic integration, Markov chains

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INTRODUCTION

At first glance, the title of this article and its field of analysis may seem overly optimistic, especially in light of the current geopolitical situation and the ongoing war in the Middle East between two members of the Mediterranean basin – Israel and Palestine. However, we believe that, regardless of the circumstances – or perhaps precisely because of them – it is essential to maintain a degree of optimism and to redouble efforts toward identifying pathways to peaceful coexistence and cooperation for the common good. Our focus, of course, is on economic cooperation. A strong understanding of the past can always help to find better and more lasting solutions for the future.[1]

[1] 'Interestingly, national influences tend to correlate negatively with regional influences, suggesting that national specificities play a somewhat countercyclical role in the Western Mediterranean region (Portugal, Spain, France, Italy)' (Canova and Ciccarelli 2011).

BASIC RESEARCH CONCEPT

This analysis focuses on the general characteristics of international trade among the countries of the Mediterranean basin over a period of nearly a quarter of a century. Our primary interest lies in examining
[104] the current state and nature of mutual trade relations, particularly in terms of their potential for improvement.

Specifically, we concentrate on the level of connectivity or integration of the economies of the Mediterranean countries during the period from 1995 to 2018. From this foundation, however, we move toward a 'what if' type of analysis: what might the future hold if the existing nature of these relationships continues to prevail? We deliberately conclude our analysis before the onset of major external, non-market disruptions such as the COVID-19 pandemic, energy crises, wars, and interventionist state policies. However, the period under review does include the significant global financial and economic crisis that followed the collapse of Lehman Brothers in the United States on September 15, 2008.

STATISTICAL METHODS AND DATA MANAGEMENT

A major problem in conducting a comprehensive and long-term analysis of international trade in goods and services among the twenty-one countries bordering the Mediterranean Sea is the availability and comparability of data. More than a third of these countries, or eight in total, are members of the European Union (EU), and three of them (ranking second, third, and fourth in GDP within the EU, after Germany) also belong to the European Monetary Union (EMU). Consequently, it makes sense to pursue data consistency by relying on European statistical standards and methodologies. Setting aside considerable heterogeneity of these economies – whose past cooperation we seek to examine over an extended period to inform future possibilities for deeper integration – we should concentrate on the relative shares of mutual trade, expressed as a percentage of each country's GDP.

In light of the above, we concluded that the most useful database is provided by the European Central Bank (ECB) through its public data portal. In the context of international relations and in view of current geopolitical, environmental, demographic, and other external factors, the ECB has emphasized a strong need to jointly address the major challenges of our time, including, or especially, with the rest of the Mediterranean countries outside the EMU (Lagarde 2023).

We aim to estimate the minimum, average and maximum levels of cooperation, or economic integration, in the past by analyzing the available 24-year time series of the aforementioned data on international trade in goods, covering the period from 1995 to 2018. These scenarios – representing low (minimum), typical (average), and high (maximum) levels of cooperation – serve as the foundation for constructing and applying matrices of integration rates among individual countries in the Mediterranean basin, with a view toward potential future collaboration. To explore long-term established relationships, we employ methods of forecasting and extrapolation. [105]

The integration stage can be understood as the degree of import or export interdependence among the countries of the Mediterranean basin. For the purpose of this analysis, we focus exclusively on one-sided trade flows – exports. The most appropriate measure is the double export weight, which reflects the degree of competitiveness of an exporting country within a particular market. This indicator accounts for the exporting country's relative share in total exports, its market position relative to other exporters in the same market and competition from domestic suppliers, in other words, all relevant market competitors. In our analysis, the competitive position of each Mediterranean country in the market of another Mediterranean country is represented by the rows of a square matrix (square matrix row), while the competitive positions of other Mediterranean countries within the market of the country under consideration are represented by the columns (square matrix column). Thus, exports are illustrated as flows from the *i*-th row to the *j*-th column. Conversely, the reverse direction of the matrix reflects the import activity of each Mediterranean country from the other members of the basin.

Methodologically, we aim to extrapolate the available data using the quantitative Markov chain method, as it allows for the possibility of establishing an equilibrium distribution over time. The association for the use of this method stems from its relevance to the gravitational model commonly used to study mutual trade relations among countries (UNCTAD 2012).[2]

[2] 'It has been known since the seminal work of Jan Tinbergen (1962) that the size of bilateral trade flows between any two countries can be approximated by a law called the 'gravity equation' by analogy with the Newtonian theory of gravitation. Just as planets are mutually attracted in proportion to their sizes and proximity, countries trade

The *concept of double-weighted trade* often involves *using a gravity model* to analyze trade flows. The gravity model in international trade is analogous to Newton's law of gravitation and is typically expressed as:

[106]

$$T_{ij} = D_{ij} \times A \times Y_i \times Y_j, \quad (1)$$

where T_{ij} is the trade flow between country (i) and country (j), A is a constant, Y_i and Y_j are the economic sizes (usually GDP) of countries $Y_j(i)$ and (j), respectively, and D_{ij} is the distance between the two countries, which can also include other factors like trade barriers.

To apply the Markov chain method, we require a square transition matrix in which each row sums to one (and, where appropriate, symmetry is maintained). This approach is well suited to our study because Markov chains are 'memoryless' – they depend only on the most recent state – which aligns perfectly with our characterization of 'bad,' 'mediocre,' and 'promising' trade periods. Since the sum of the probability of transition from a single row to all columns of the matrix must be equal to 1, we will use import probabilities to define our baseline scenarios, and for each scenario, we then compute the average of each column in the transition matrix to serve as the last known state of the Markov chain – effectively quantifying the export attractiveness of each Mediterranean country to its counterparts (Hudoklin-Božič 1999).

As a unit of measure, we use a relative measure expressed in hundredths of a percent of double-weighted exports, i.e. in percentages to four decimal places, because the competitive position of each country in question, assuming the absence of major crises, usually changes over time with very small relative changes in its market position.

Example of the time series dimension of the relative market share of Slovenian exports of goods and services on the Algerian market: 'WTS.A.SI.DZ.ZOZ.XO.T.TMS.F, Slovenia, Annual:'

- WTS: This likely stands for 'World Trade Statistics.'
- A: Indicates that the data is annual.
- SI: Refers to Slovenia as the reference area.
- DZ: Represents Algeria.

in proportion to their respective GDPs and geographic closeness. Initially, the gravity equation was thought of merely as a representation of an empirically stable relationship between the size of economies, their distance and the volume of their trade.' UNCTAD (2012).

- ZOZ: This part is not immediately clear without additional context, but it could be related to specific trade categories or products.
- XO: Indicates that it's a double export weight.
- T: The unit of measurement is in hundredths of a percent.
- TMS: Possibly related to total manufactured products (SITC 5 to 8).
- F: The frequency of data collection is annual.

The Standard International Trade Classification (SITC) distinguishes four main groups of industrial goods: (i) chemicals (SITC 5) – this category includes chemical products and industrial goods classified mainly by material, (ii) manufactured goods (SITC 6) – that is, goods made mainly from special materials, such as textiles, wood, paper, and cork (iii) machinery and transport equipment (SITC 7) – this group includes machinery, equipment, and vehicles, (iv) miscellaneous manufactured articles (SITC 8) – products that do not fall into other categories are classified here. This classification also includes the service component of trade, where transport, commerce, tourism, and financial services have historically played leading roles. Significant progress has been made in the latter since 2013, but there remains substantial closure in the sector, often due to dominant state ownership of financial institutions. The less developed countries of the Mediterranean basin tend to focus excessively on low-value-added activities, are relatively less open to international markets, their mutual trade is lower and their dependence on trade with EU countries is significantly higher (Ayadi 2013; Giovannetti 2013)

Table 1 highlights the problematic nature of data availability in the desired comparison of twenty-one countries. 'Shadow' countries do not provide data on the relative strength of mutual international trade. The statistical principles of data availability and transparency are not met. As a result, the planned analysis can focus on the twelve non-shadowed countries listed in table 1 – essentially, a good half of the total. High statistical standards are maintained by all EU and EMU members. The opposite is true for members in the Middle East, with the exception of Israel. From a representational standpoint, it is encouraging that we have harmonized data from two North West African countries: Morocco and Algeria.

As the chosen method requires full methodological comparability

TABLE 1 Availability of Comparable Data within a Symmetric Matrix

	MA	DZ	**TN**	**LY**	**EG**	**PS**	IL	**LB**	**SY**	TR	CY	MT	GR	**AL**	**ME**	**BA**	HR	SI	IT	FR	ES
MA			•	•	•	•		•	•					•	•	•					
DZ			•	•	•	•		•	•					•	•	•					
TN	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
LY	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
EG	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PS	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
IL			•	•	•	•		•	•					•	•	•					
LB	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•
SY	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•
TR			•	•	•	•		•	•					•	•	•					
CY			•	•	•	•		•	•					•	•	•					
MT			•	•	•	•		•	•					•	•	•					
GR			•	•	•	•		•	•					•	•	•					
AL	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•
ME	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•
BA	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•
HR			•	•	•	•		•	•					•	•	•					
SI			•	•	•	•		•	•					•	•	•					
IT			•	•	•	•		•	•					•	•	•					
FR			•	•	•	•		•	•					•	•	•					
ES			•	•	•	•		•	•					•	•	•					

NOTES MA – Morocco, DZ – Algeria, TN – Tunisia, LY – Libya, EG – Egypt, PS – Palestine, State of, IL – Israel, LB – Lebanon, SY – Syrian Arab Republic, TR – Turkey, CY – Cyprus, MT – Malta, GR – Greece, AL – Albania, ME – Montenegro, BA – Bosnia and Herzegovina, HR – Croatia, SI – Slovenia, IT – Italy, FR – France, ES – Spain. We used a concept of the Union for the Mediterranean, which, for our analytical purposes, includes only all the coastal Mediterranean countries (European Parliament 2014). Based on data from the ECB Data Portal (https://data.ecb.europa.eu).

[108]

of the data, we unfortunately only need to focus on 12 of the 21 countries of the Mediterranean basin (table 1). As can be seen from table 1, a Mediterranean country is defined for our analysis by its location on the Mediterranean Sea. For these twelve, we have a time series of methodologically completely comparable data for the period up to and including 2018, i.e., for the period before the outbreak of the COVID-19 crisis and the Ukrainian war or the energy crisis, all of which significantly affect international trade flows by disrupting transport routes and constraining supply chains. Subsequent disruptions include the war in Gaza and the trade war resulting from US tariff policy through 2025. Nevertheless, despite the limitations in comparative integrity across all twenty-one Mediterranean countries, focusing on a subset of twelve with the highest statistical standards underscores the importance of data quality as the foundation for analysis. In the future, harmonization of statistical monitoring under international (European) statistical standards should be a prerequisite for improved economic cooperation and, consequently, a higher degree of integration.

TABLE 2 Average Values of Double-Weighted Exports from the Country in Row (*i*) of the Table to the Country in Column (*j*) of the Table for the Period 1995–2018, Relative to the GDP of the Exporting Country

	DZ	HR	CY	FR	GR	IL	IT	MT	MA	SI	ES	TR	∑
DZ		0.0022	0.0013	0.0956	0.0112	0.0044	0.0737	0.0007	0.0190	0.0022	0.0518	0.0164	0.2784
HR	0.0010		0.0014	0.0928	0.0112	0.0060	0.0739	0.0008	0.0022	0.0023	0.0504	0.0137	0.2556
CY	0.0006	0.0025		0.0393	0.0598	0.0116	0.0349	0.0039	0.0013	0.0020	0.0133	0.0067	0.1759
FR	0.0076	0.0015	0.0006		0.0053	0.0049	0.0695	0.0008	0.0073	0.0026	0.0583	0.0140	0.1725
GR	0.0034	0.0020	0.0241	0.0534		0.0085	0.0669	0.0018	0.0020	0.0021	0.0231	0.0220	0.2092
IL	0.0010	0.0014	0.0006	0.0400	0.0047		0.0318	0.0006	0.0016	0.0010	0.0208	0.0139	0.1172
IT	0.0037	0.0044	0.0010	0.0924	0.0115	0.0054		0.0012	0.0032	0.0049	0.0441	0.0177	0.1895
MT	0.0005	0.0040	0.0021	0.0734	0.0082	0.0054	0.0693		0.0016	0.0019	0.0234	0.0136	0.2033
MA	0.0030	0.0019	0.0013	0.0917	0.0117	0.0053	0.0695	0.0009		0.0020	0.0511	0.0161	0.2544
SI	0.0013	0.0445	0.0008	0.0641	0.0037	0.0042	0.1008	0.0005	0.0012		0.0213	0.0126	0.2549
ES	0.0051	0.0013	0.0008	0.1168	0.0063	0.0050	0.0668	0.0006	0.0093	0.0021		0.0150	0.2291
TR	0.0068	0.0024	0.0011	0.0712	0.0090	0.0109	0.0582	0.0006	0.0049	0.0021	0.0389		0.2062
$\bar{x}$	0.0031	0.0062	0.0032	0.0755	0.0130	0.0065	0.0650	0.0011	0.0049	0.0023	0.0360	0.0147	0.2122

NOTES Based on data from the ECB Data Portal (https://data.ecb.europa.eu).

Since 1996, the EU has provided technical assistance to Mediterranean countries in this area in five packages under the MEDSTAT program, which ends in 2025 (Eurostat 2022).

Based on the basic methodological data framework outlined above, we have selected the Markov chain method to estimate the potential degree of integration, assuming the exclusion of major external crisis factors (i.e., the analysis covers the period up to 2018).

We have constructed a data warehouse that enables the preparation of a content-complete and comparable square matrix for twelve Mediterranean countries. For the entire period under consideration, from 1995 to 2018, we calculate minimum, average and maximum values, in accordance with the three predefined scenarios. Since double-weighted exports are expressed as a percentage of each country's total exports, we present the baseline average values for the twelve selected Mediterranean countries over the observed period.

In table 2, we observe that the countries with the largest average market shares of exports of goods and services – by each of the other eleven Mediterranean countries under consideration – on world markets are: France (7.55%), Italy (6.5%), Spain (3.6%), Turkey (1.47%) and Greece (1.3%). Israel falls somewhere in the middle (0.65%). On the other hand, the markets of the smaller Mediterranean members appear more diversified in terms of international trade. Exporters from non-Mediterranean countries are clearly present in greater proportions in these smaller markets. While caution is warranted due to data limita-

tions – the remaining nine Mediterranean countries are not included in the table – this pattern *may* be generalized to the broader group of twenty-one Mediterranean countries. The calculated average ($\bar{x}$) of each column represents the degree of import integration of each country within the Mediterranean basin into this common market (import integration as an export attraction for other members). For example, Algeria is integrated at a rate of 0.31%, meaning that, on average, other countries of the Mediterranean basin will export to the Algerian market with such an average probability. Similarly, the Moroccan market is integrated into the Mediterranean basin at a rate of 0,49 %. As shown in table 2, the most integrated or desirable export markets within the Mediterranean basin are those of France (7.55%), Italy (6.5%), Spain (3.6%), Turkey (1.47%), and Greece (1.3%). For all the Mediterranean markets listed, the integration rate (i.e., the column average) exceeds 1 %, indicating a relatively high level of market integration into the Mediterranean basin, measured against the global economy.

[110]

If we examine the rows of the square matrix, following the approach described above, we can identify a significant variation in the export presence of each member country in the markets of other comparable countries. In the Algerian market (first column), France (0.76%), Turkey (0.68%), and Spain (0.51%) demonstrate a relatively higher export interest compared to other Mediterranean countries – highlighting the methodological importance of using double-weighted exports. If we read the matrix row by row, then the average probability, taking into account its total world exports and the entire period considered (1995–2018), that France will export to the Algerian market is 0.76 %. During the same period, Spain exported to the markets of the other (eleven) Mediterranean countries with a probability of almost 23 % (sum of the line; 22.91 %), accounting for the predominant share of the probability of its world exports to France (11.68 %) and Italy (6.68 %). Even at the level of world trade, the matrix reveals relatively strong competitive presences in certain Mediterranean markets. For example, Greece exports to Cyprus with a 2.41% probability, while Slovenia exports to Croatia with a 4.45% probability – both figures indicating meaningful regional trade dynamics within the Mediterranean basin. It is therefore useful to narrow the analytical scope from the level of total global exports to the subset of exports within the Mediterranean countries under consideration. Let us make the same calculation as in table 2 for the minimum and maximum values of the relative data of the

TABLE 3 Square Matrix of Markov Properties for Transition Probabilities Based on *Minimum Values* of Double-Weighted Exports among a Sample of Mediterranean Countries, for the Period 1995–2018, Relative to the GDP of the Exporting Member

	DZ	HR	CY	FR	GR	IL	IT	MT	MA	SI	ES	TR	Σ
DZ	0.0000	0.0075	0.0050	0.3731	0.0380	0.0170	0.2502	0.0020	0.0554	0.0100	0.2043	0.0375	1.00
HR	0.0018	0.0000	0.0046	0.3963	0.0371	0.0197	0.2769	0.0023	0.0073	0.0092	0.1973	0.0476	1.00
CY	0.0027	0.0081	0.0000	0.2029	0.3582	0.0628	0.2002	0.0054	0.0063	0.0126	0.0996	0.0413	1.00
FR	0.0402	0.0099	0.0030	0.0000	0.0258	0.0288	0.3980	0.0045	0.0470	0.0167	0.3457	0.0804	1.00
GR	0.0030	0.0085	0.0953	0.3054	0.0000	0.0401	0.3497	0.0043	0.0049	0.0085	0.1026	0.0777	1.00
IL	0.0073	0.0104	0.0042	0.3873	0.0355	0.0000	0.2443	0.0031	0.0084	0.0094	0.1764	0.1138	1.00
IT	0.0143	0.0220	0.0052	0.5143	0.0422	0.0292	0.0000	0.0065	0.0149	0.0266	0.2348	0.0901	1.00
MT	0.0022	0.0153	0.0051	0.4135	0.0385	0.0196	0.2827	0.0000	0.0058	0.0102	0.1170	0.0901	1.00
MA	0.0045	0.0081	0.0050	0.3995	0.0413	0.0156	0.2589	0.0030	0.0000	0.0086	0.2045	0.0509	1.00
SI	0.0026	0.1597	0.0031	0.2676	0.0159	0.0149	0.4073	0.0015	0.0036	0.0000	0.0832	0.0406	1.00
ES	0.0136	0.0049	0.0033	0.5510	0.0256	0.0229	0.2921	0.0027	0.0283	0.0093	0.0000	0.0463	1.00
TR	0.0355	0.0120	0.0057	0.3722	0.0380	0.0507	0.2644	0.0032	0.0152	0.0114	0.1915	0.0000	1.00
$\bar{x}$	0.0106	0.0222	0.0116	0.3486	0.0580	0.0268	0.2687	0.0032	0.0164	0.0110	0.1631	0.0597	1.00

NOTES Based on data from the ECB Data Portal (https://data.ecb.europa.eu).

double-weighted exports of the selected countries at the world level. In the 'total' column and the 'average' row of table 2, we can see that, on average, during the period under consideration, trade in goods among the twelve countries under consideration accounted for almost 22% of their total world exports (21.22%)

Depending on the chosen analytical method (Markov chains) we construct a square matrix in tables 3 to 5 that represents the transition probabilities from each row country to each column country – that is, the probability of mutual trade among a selected sample of Mediterranean countries. The matrices are constructed to ensure that all conditions required for a Markov chain are satisfied, specifically that the sum of each row equals 1.

When converting basic matrices such as that in table 2 to Markov-type transition probability matrices (tables 3 to 5), it is not to be expected that the probability data for the minimum, average, or maximum values will maintain a similar relationship overall. This is because we must satisfy the condition that the sum of the probability of state transitions in the row is equal to 1.

The last row of averages in tables 3 to 5 represents the average probabilities of the degree of market integration over the period under study for each country represented in the columns of the matrix, taking into account the closed trade system of the twelve countries in question. Let's call it an initial matrix of *states of the first order* of 1×12. We have

TABLE 4 Square Matrix of Markov Properties for Transition Probabilities Based on the *Average Values* of Double-Weighted Exports among a Sample of Mediterranean Countries, for the Period 1995–2018, Relative to the GDP1of the Exporting Member

[112]

	DZ	HR	CY	FR	GR	IL	IT	MT	MA	SI	ES	TR	Σ
DZ	0.0000	0.0079	0.0045	0.3435	0.0402	0.0157	0.2648	0.0026	0.0681	0.0080	0.1860	0.0588	1.00
HR	0.0037	0.0000	0.0053	0.3633	0.0437	0.0236	0.2892	0.0030	0.0087	0.0090	0.1971	0.0535	1.00
CY	0.0036	0.0140	0.0000	0.2232	0.3401	0.0661	0.1986	0.0224	0.0072	0.0111	0.0754	0.0382	1.00
FR	0.0441	0.0085	0.0037	0.0000	0.0308	0.0285	0.4032	0.0048	0.0423	0.0149	0.3381	0.0812	1.00
GR	0.0163	0.0094	0.1152	0.2552	0.0000	0.0405	0.3197	0.0087	0.0094	0.0101	0.1104	0.1051	1.00
IL	0.0084	0.0116	0.0049	0.3415	0.0397	0.0000	0.2710	0.0048	0.0138	0.0086	0.1773	0.1183	1.00
IT	0.0195	0.0233	0.0055	0.4877	0.0605	0.0285	0.0000	0.0063	0.0166	0.0257	0.2327	0.0936	1.00
MT	0.0023	0.0195	0.0104	0.3612	0.0402	0.0266	0.3409	0.0000	0.0079	0.0092	0.1150	0.0668	1.00
MA	0.0119	0.0075	0.0052	0.3604	0.0460	0.0209	0.2730	0.0034	0.0000	0.0077	0.2008	0.0631	1.00
SI	0.0052	0.1744	0.0031	0.2516	0.0146	0.0166	0.3953	0.0018	0.0045	0.0000	0.0834	0.0494	1.00
ES	0.0221	0.0057	0.0035	0.5099	0.0274	0.0218	0.2918	0.0026	0.0407	0.0092	0.0000	0.0654	1.00
TR	0.0330	0.0116	0.0055	0.3454	0.0436	0.0529	0.2823	0.0031	0.0238	0.0100	0.1888	0.0000	1.00
$\bar{x}$	0.0142	0.0245	0.0139	0.3202	0.0606	0.0285	0.2775	0.0053	0.0202	0.0103	0.1587	0.0661	1.00

NOTES Based on data from the ECB Data Portal (https://data.ecb.europa.eu).

TABLE 5 Square Matrix of Markov Properties for Transition Probabilities Based on the *Maximum Values* of Double-Weighted Exports among a Sample of Mediterranean Countries, for the Period 1995–2018, Relative to the GDP of the Exporting Member

	DZ	HR	CY	FR	GR	IL	IT	MT	MA	SI	ES	TR	Σ
DZ	0.0000	0.0088	0.0040	0.3026	0.0390	0.0141	0.2551	0.0037	0.1049	0.0064	0.1837	0.0778	1.00
HR	0.0055	0.0000	0.0058	0.3397	0.0492	0.0294	0.2820	0.0051	0.0103	0.0089	0.2105	0.0537	1.00
CY	0.0044	0.0342	0.0000	0.1855	0.4028	0.0659	0.1660	0.0355	0.0085	0.0085	0.0625	0.0260	1.00
FR	0.0434	0.0080	0.0038	0.0000	0.0307	0.0269	0.4170	0.0061	0.0382	0.0142	0.3354	0.0764	1.00
GR	0.0312	0.0101	0.1198	0.2204	0.0000	0.0468	0.3000	0.0105	0.0113	0.0109	0.1077	0.1311	1.00
IL	0.0088	0.0122	0.0054	0.3227	0.0421	0.0000	0.2846	0.0088	0.0149	0.0075	0.1719	0.1209	1.00
IT	0.0232	0.0254	0.0058	0.4748	0.0628	0.0316	0.0000	0.0062	0.0165	0.0245	0.2370	0.0922	1.00
MT	0.0017	0.0343	0.0166	0.2757	0.0506	0.0294	0.4376	0.0000	0.0084	0.0079	0.0939	0.0439	1.00
MA	0.0161	0.0077	0.0050	0.3438	0.0458	0.0211	0.2682	0.0053	0.0000	0.0065	0.2032	0.0774	1.00
SI	0.0090	0.2019	0.0035	0.2342	0.0152	0.0206	0.3794	0.0019	0.0055	0.0000	0.0781	0.0506	1.00
ES	0.0327	0.0059	0.0033	0.4857	0.0301	0.0219	0.2781	0.0033	0.0557	0.0089	0.0000	0.0743	1.00
TR	0.0309	0.0112	0.0052	0.3206	0.0458	0.0619	0.2788	0.0040	0.0333	0.0096	0.1985	0.0000	1.00
$\bar{x}$	0.0173	0.0300	0.0149	0.2921	0.0678	0.0308	0.2789	0.0076	0.0256	0.0095	0.1569	0.0687	1.00

NOTES Based on data from the ECB Data Portal (https://data.ecb.europa.eu).

three such matrices depending on the calculated historical minimum, average, or maximum trade participation of the twelve countries considered in the period 1995–2018.

In addition, tables 3 to 5 provide three transition matrices *P*, one for each individual scenario. For example, to try to find out how the states or probabilities of the transition matrix gravitate across n periods from 2019 onwards, we convert the last row (tables 3, 4 or 5) to a matrix of size 1 × 12 and we can multiply it by the previous matrix of size 12x12 of

the probability of transitions according to the expected scenario in the future by n number of periods.

$$S^n_{kl_{ij}} = I_{k_{ij}} \times P^n_{l_{ij}}, \tag{2}$$

whereby [113]

- $k = 3$, in the case of initial matrices also $I_{k_{ij}}$ of the order 1×12 and $l = 3$ in the case of transient matrices $P^n_{k_{ij}}$ of order 12×12, and their set of values is: min, avg, max, since they arise from the same 'history,'
- therefore, there are two *variables* k and l with the same sets of values, and given their chosen combination, i.e. the chosen base state I and the selected transition matrix P, we can obtain nine combinations of Markov matrices S;
- the matrix S, due to the characteristics of the Markov chain that they depend only on the last known state, is decisively influenced by the selection of the scenario l in the future: thus, we obtain three calculations of matrices for the pessimistic scenario (l = min), the baseline scenario (l = avg) and the best case – optimistic scenario (l = max) of the values of the probability of transition after $S^n_{kl_{ij}}$ – n number of periods in the future.

In the following approach, we attempt to determine the dynamics of further economic integration among Mediterranean countries by calculating transitional matrices of order of 1×12 in the n-th years. In such a simplified model, based on equation 1 or the logic of the gravitational model, the baseline states at a given point in time can be adjusted due to the influence of various external factors (variable $S^n_{kl_{ij}} D_{ij}$ in equation 1) on trade relations between two countries (e.g. changed tariffs). Alternatively, a different initial matrix of states I may be applied within the closed group of countries to reflect such changes.

HYPOTHESIS

The average level of integration (the average of each column) was expressed, within the selected sample of Mediterranean countries, as the probability of transition (export likelihood) from other Mediterranean countries in the sample to each country in the sample (i.e., transition from row to column in the table). We aim to determine the range of the integration rates for individual countries in the Mediterranean sample over the long-term period of cooperation. Thus, the

transitional – initial matrix (table 4), based on average values (the baseline scenario) indicates probabilities of 1.42% for Algeria, 2.02% for Morocco, and 32.02%, 27.75% and 15.87% for France, Italy and Spain respectively. The matrix of minimum values of the probability of tran-
[114] sition (table 3) is constructed using the lowest relative GDP shares of total (global) double-weighted exports for each country from any year within the 1995–2018 period. It therefore represents the worst-case scenario of economic cooperation or integration. In contrast, table 5, is based on the maximum observed relative shares in GDP of bilateral double-weighted exports over the period and represents the best-case scenario for economic cooperation or integration among the Mediterranean basin countries, drawn from various years depending on each bilateral trade relationship.

The trade-cooperation probabilities (the likelihood that exports flow from a country in a row to a country in a column of the matrix) within our selected sample of Mediterranean countries are therefore based on each country's total trade with the world during the study period and then translated into the three scenarios described. We examine a 24-year period of methodologically consistent data up to 2018, that is, before the onset of major external crises that have significantly affected mutual trade relations worldwide (COVID-19 pandemic, the Ukraine-Russia war and energy crisis, and tariff wars). We then hypothetically extrapolate the normal long-term cooperation of the Mediterranean countries and establish equilibrium matrices of cooperation for the three scenarios described, assuming that external factors would not occur. We are therefore interested in the trend of economic integration of Mediterranean countries during downturns, average periods, and upswings in global goods trade. In this way, we explore the nature of long-term cooperation and the potential for its improvement, while remaining aware of the significant risks of the present time. Hypothetically, we expect that favorable conditions would enhance the levels of economic integration for the less developed Mediterranean countries within the basin's internal trade.

In our case, we are dealing with a Markov process with discrete states in discrete time, which means that we are dealing with Markian chains that are homogeneous, since the conditional probability of being in a given state depends only on the length of the time interval – the year, and not on the specific time – period. Conditional probabilities over a longer period can be expressed in terms of the conditional probabilities

over shorter intervals. In a Markov process – or in our extrapolation – the conditional probability distribution of a random variable depends only on the most recent state, not on its previous history. The latest situation is created on the basis of three selected scenarios for the entire considered period and is obtained in the average of the column of [115] calculated transitional matrices for different scenarios (the degree of integration of each country into the Mediterranean market). We then multiply such states by the selected transitional matrix for each scenario six times ($n = 6$), covering the period from 2019 to 2024. Although this period has passed and data are not yet fully comparable, it is characterized by major external crises. Theory predicts that, over long time horizons, the properties of these Markov chains cause the state probabilities to converge to a stationary distribution. This limit distribution allows us to determine the equilibrium probabilities for each state.

Thus, for each projected year studied in the future under each scenario, we can calculate a transitional matrix representing the probabilities of occupying each state. However, our primary interest lies in whether there is a matrix of equilibrium states for each scenario. This depends on the nature of the individual states (i.e.,the probability of transition for a particular country). An analysis of the properties of the states of the Markov chain under consideration confirms that the conditions for the existence of a matrix of equilibrium states are met. This means that, regardless of the initial probabilities of occupying the states, i.e. the initial level of economic integration of an individual member of the Mediterranean basin, there exists a long-term equilibrium probability of integration, which reflects the dynamics and patterns of cooperation observed during the historical period under study. The key question, however,is how external factors on one hand, and economic and integration policies on the other, can influence changes in equilibrium distributions (Hudoklin-Božič 1999).

Positively recurrent, associated, non-periodic states reflect the traditional Mediterranean trade established over the centuries, each state represented by an individual country (table 6) is related to another state and, theoretically, can return in one step. Therefore, these are interconnected, non-periodic states. All countries were, to varying degrees, engaged in international trade of goods with one another, conducted across or along the Mediterranean basin (Lagarde 2023).

However, we are dealing with a closed set of conditions within a sample of Mediterranean countries. On the one hand, we do not have com-

TABLE 6 Properties of the Markov Chain of States under Consideration

State	Type	Class num.	State	Type	Class num.
Algeria (DZ)	Recurrent	1	Italy (IT)	Recurrent	1
Croatia (HR)	Recurrent	1	Malta (MT)	Recurrent	1
[116] Cyprus (CY)	Recurrent	1	Morocco (MA)	Recurrent	1
France (FR)	Recurrent	1	Slovenia (SI)	Recurrent	1
Greece (GR)	Recurrent	1	Spain (ES)	Recurrent	1
Israel (IL)	Recurrent	1	Turkey (TR)	Recurrent	1

NOTES Own calculations using POM QM (Weiss 2005).

prehensive data for all 21 countries of the Mediterranean basin, and on the other hand, Palestine is effectively isolated or excluded from economic activities in 2024 and 2025. Hypothetically, if comparable data were available for all twenty-one, we would be faced with a disconnected chain and an absorbing state. In that case, stochastic processes would more accurately reflect the current reality, which is not captured by our analysis based on the available data (1995–2018). Our Markov chain is therefore irreducible in nature, finite, and composed of nonperiodic states. As a result, there exist equilibrium distributions that are invariant for state occupation.

Thus, for example, the average level of economic cooperation (matrix I, k = avg) observed during the period 1995 to 2018 can, under the influence of major structural crises in the following 6 years, be multiplied by the matrix P, which represents the worst-case scenario (l = min). However, we begin by assuming consistent scenarios for both the past and the future. Accordingly, the average initial cost I in the baseline scenario is multiplied by the transition matrix for the transverse transition states P to the desired power (n) or the number of transitions (transitions) and similar in the other two scenarios (an example of the calculation in the appendix). Using a 'what if' type analysis, we can simulate how trade in goods might have continued from 2019 to 2024 under normal conditions. Over the long term – or in the limit – this approach yields an equilibrium distribution that reflects the stable probabilities of mutual trade among the countries.

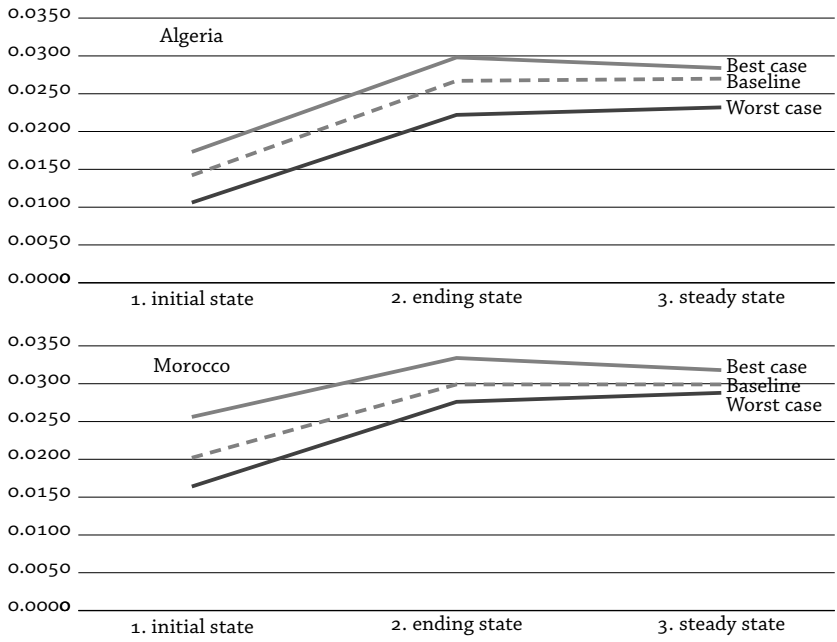
A major advantage of the transition matrices developed for the worst- and best-case scenarios lies in the method of selecting the minimum or maximum values from the 24-year dataset for each country in the sample. These scenarios establish an estimated corridor of minimum and maximum levels of economic cooperation among the coun-

tries of the Mediterranean basin effectively outlining the lower and upper bounds of potential economic integration. Such a corridor can be assessed or extrapolated over a six-year horizon, or extended to determine its long-term equilibrium state. The key question, however, is how the EU's economic and integration policies might alter this dynamic [117]
for the better and influence the transitional matrices in the context of creating scenarios for the future development of the Mediterranean basin.

RESULTS AND ANALYSIS

In particular, in the selected sample of Mediterranean countries, we highlight two African countries or countries in the south of the Mediterranean basin, Algeria and Morocco, recognizing that the European integration processes have strongly linked all Mediterranean EU members in international trade. From the perspective of examining the degree of economic integration across the entire Mediterranean basin, we believe that both countries could serve as important indicators of general trends in the EU's trade relationship with the North African countries of the Mediterranean basin. Unfortunately, there are no comparable data available for Tunisia, Libya and Egypt.

We observe that in all selected scenarios, the degree of economic integration of Algeria and Morocco into the Mediterranean basin increases, but to a much higher level in the optimistic scenario and to a lower level in the pessimistic scenario (table 7). The integration processes in the southern Mediterranean basin are therefore occurring regardless of major external crises, such as the global financial and economic crisis during the period under consideration. On the other hand, when using data from the best or worst individual years of economic participation by individual members in the transitional matrix of minimum probabilities for occupying states and the transitional matrix of maximum probabilities for occupying states, we can conclude that the levels of integration for these countries are much stronger and higher in the absence of crises. This is determined by analyzing a 'what-if' scenario in which we extrapolate these integration rates over the next six years (2019–2024), to the present day (ending), and further into the steady state. We use the Markov chains method, the properties of which allow us to calculate a matrix of equilibrium states. We find that their levels of integration, measured by the attractiveness of their market to other Mediterranean members during both bad and good



Own calculations using POM QM (Weiss 2005). The degree of economic integration of a country in the Mediterranean basin is defined as the degree of export attractiveness of its market for other members of the Mediterranean basin. The initial states for Algeria are represented by the first value of the matrix of the first order of magnitude 1 × 12, and the ninth value corresponds for Morocco. The Ending states for $n = 6$ and for $n =$ the limit value in the equilibrium matrix (Steady) are shown in the examples in figure 1 and correspond to the same positions (the first value for Algeria and the ninth for Morocco) in the matrix *S*.

FIGURE 1 Degree of Economic Integration of the Markets of Algeria and Morocco with Other Mediterranean Countries under the Selected Scenario, Shown for the Initial (2018), Final (2024) and Equilibrium Phases (Steady State)

times of world trade, increase more significantly during favorable periods than during unfavorable ones.

Table 7 shows the aggregate results of the calculations for all three selected scenarios for the sample of Mediterranean countries, based on the assumption that the scenario of initial cooperation simply continues. The central, or baseline, scenario – based on the average values, shows that the final probabilities for the occupation of states after 6 iterations (transitions) for each individual member are very similar to, or even identical with, the long-term equilibrium probabilities for the occupation of states. his suggests that the number of iterations already approximates the limiting number of iterations quite well. This observation is reminiscent of the gravitational model. It is very clear that the economic Mediterranean basin is dominated by the three largest

TABLE 7 Rates of Economic Integration for a Sample of Mediterranean Countries

	DZ	HR	CY	FR	GR	IL	IT	MT	MA	SI	ES	TR
Pessimistic												
(a)	0.0106	0.0222	0.0116	0.3486	0.0580	0.0268	0.2687	0.0032	0.0164	0.0110	0.1631	0.0597
(b)	0.0222	0.0142	0.0070	0.3223	0.0332	0.0280	0.2505	0.0043	0.0276	0.0160	0.2068	0.0680
(c)	0.0232	0.0148	0.0073	0.3355	0.0346	0.0292	0.2614	0.0045	0.0288	0.0167	0.2158	0.0709
Base line												
(a)	0.0142	0.0245	0.0139	0.3202	0.0606	0.0285	0.2775	0.0053	0.0202	0.0103	0.1587	0.0661
(b)	0.0267	0.0144	0.0089	0.3038	0.0410	0.0282	0.2517	0.0047	0.0299	0.0149	0.2012	0.0746
(c)	0.0267	0.0144	0.0089	0.3038	0.0410	0.0282	0.2517	0.0047	0.0299	0.0149	0.2012	0.0746
Optimistic												
(a)	0.0173	0.0300	0.0149	0.2921	0.0678	0.0308	0.2789	0.0076	0.0256	0.0095	0.1569	0.0687
(b)	0.0298	0.0154	0.0095	0.2921	0.0432	0.0296	0.2505	0.0057	0.0334	0.0142	0.2000	0.0765
(c)	0.0284	0.0147	0.0090	0.2780	0.0412	0.0281	0.2384	0.0055	0.0318	0.0135	0.1904	0.0728
Optimistic – Pessimistic												
(a)	0.0066	0.0078	0.0032	−0.0564	0.0098	0.0040	0.0102	0.0043	0.0092	−0.0015	−0.0062	0.0090
(b)	0.0076	0.0012	0.0025	−0.0302	0.0100	0.0016	0.0000	0.0014	0.0058	−0.0018	−0.0068	0.0085
(c)	0.0052	−0.0001	0.0017	−0.0575	0.0066	−0.0011	−0.0230	0.0010	0.0030	−0.0032	−0.0254	0.0019

NOTES Row headings are as follows: (a) initial, (b) ending, (c) steady. Own calculations using POM QM (Weiss 2005).

[119]

EU and EMU members, namely France, where the average long-term equilibrium probability of economic integration (defined as the attractiveness of its market for the export from other Mediterranean countries) into the Mediterranean basin is equal to 30.38%, Italy 25.17% and Spain 20.12%. These large markets are undoubtedly the great export potential for the rest of the Mediterranean countries in the sample. Other markets also show a fairly high equilibrium level of economic integration into the Mediterranean basin, with Turkey at (7.46%), followed by Greece (4.1%), Morocco (2.99%), Israel (2.82%), Algeria (2.67%), Slovenia (1.47%), Croatia (1.44%), Cyprus (0.89%) and Malta (0.47%).

The differences between the optimistic and pessimistic scenarios (last section of table 4) show that after six iterations, or in the long-term equilibrium probability of the distribution of stocks, the rates of economic integration into the Mediterranean basin increase the most for Greece (from 3.32% to 4.32% after 6 iterations, and from 3.46% to 4.12% at equilibrium rates, followed by Algeria (from 2.22% to 2.98% and from 2.32% to 2.84%) and Morocco (from 2.76% to 3.34% and from 2.88% to 3.18%, respectively). The strong global economic situation allows these countries to import more from other Mediterranean partners. Long-term equilibrium levels of integration are also slightly increased for Turkey (by 0.19 percentage points), Cyprus (by 0.17 percentage points) and Malta (by 0.1 percentage points). The equilibrium distribution remains almost unchanged in Croatia (down 0.01 p.p.),

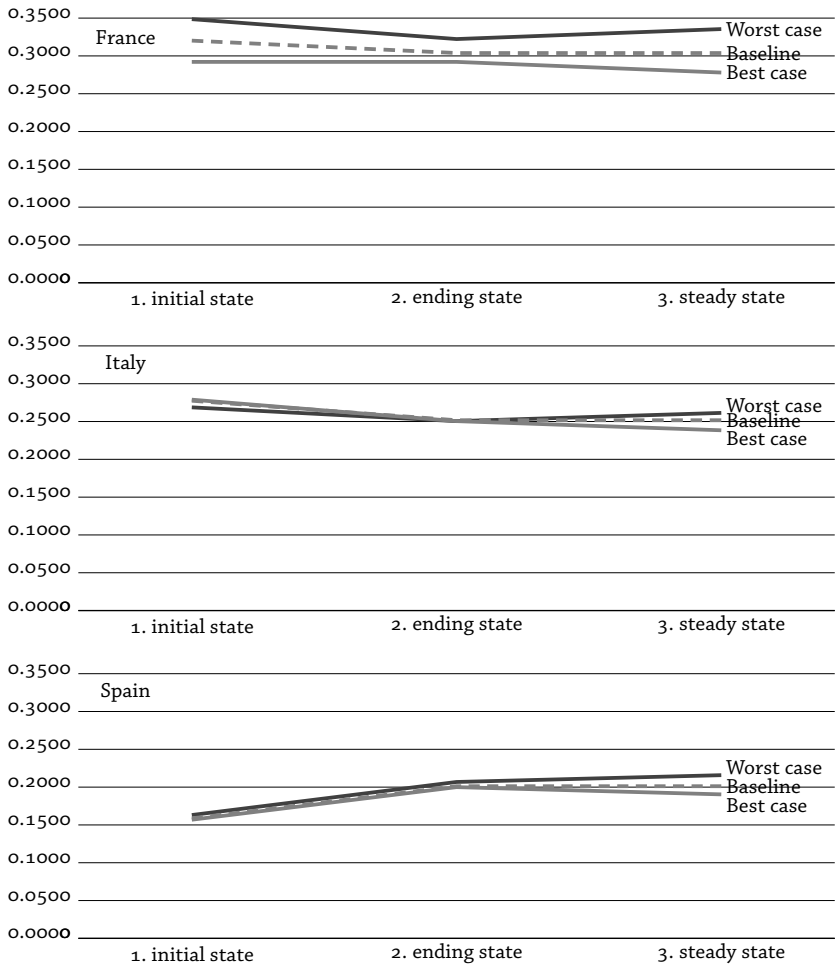


FIGURE 2 Degree of Economic Integration of the Markets of France, Italy and Spain with Other Mediterranean Countries under the Chosen Scenario, Shown for the Initial (2018), Final (2024) and Equilibrium Phases (Steady State)

slightly decreasing in Israel (by 0.11 p.p.) and Slovenia (by 0.32 p.p.).

The differences in the initial levels of integration between the optimistic and pessimistic scenarios are strongly negative for France and Spain, but not for Italy, where this difference is positive. The latter indicates that in the baseline optimistic scenario for Italy, we expect an increase in its level of integration, as hypothesized. However, as we shall see, this is not the case.

After six iterations (Ending State), Italy's integration rate declines,

in the optimistic scenario, by almost 3 percentage points and is nearly identical (central graph in figure 2) across all three scenarios at the final time at $n = 6$ (Ending state). In equilibrium, the attractiveness of its market for other Mediterranean countries in the sample increases in the pessimistic scenario and decreases in the optimistic scenario, in [121] both cases by almost 2 percentage points. Similarly, Spain's equilibrium level of integration decreases in the optimistic scenario and increases in the pessimistic scenario, by approximately one percentage point (third graph in figure 2), or by almost 2.5 percentage points when compared to the optimistic scenario. The degree of integration, or export attractiveness, of its market for other members of the Mediterranean basin increases over 6 iterations through 2024 in all scenarios by nearly 4 percentage points. Conversely, during this extrapolated period up to 2024, integration rates decline across all scenarios for Italy, and for both the baseline and pessimistic scenarios for France. France's initial degree of integration in the optimistic scenario is lower than the initial level of integration in the pessimistic scenario by as much as 5.64 percentage points, and in the case of long-term equilibrium distributions, by slightly more, 5.75 percentage points.

The integration processes of the Mediterranean basin are significantly dependent on the economic policies of its three largest members: France, Spain and Italy, as they (table 2) absorb an average of 13.2% of the annual global exports of the other Mediterranean basin countries studied during the period from 1995 to 2018. The transition from the final stage (2. Ending State, 2024) to the equilibrium distribution (3. Steady State) for all three countries shows roughly the same pattern in terms of the ratios of the probabilities of occupying each state across different scenarios. Their rates of integration into the Mediterranean basin ((i.e., the export attractiveness of their markets for other Mediterranean members) increase significantly in the pessimistic scenario and, conversely, decrease significantly in the optimistic scenario, while remaining roughly stable relative to 2024 (2. Ending State) under the baseline scenario. Thus, periods of global economic crisis, which have a major impact on the global export capacity of the three largest Mediterranean economies, may represent an opportunity for an increase in exports and mutual trade by other Mediterranean members to these markets. The hypothesis that this opportunity arises in optimistic scenarios can generally be rejected. Is this opportunity being realized in pessimistic scenarios?

TABLE 8 Relative Shares of Global Double-Weighted Exports for Algeria in the Period 1995–2018 within a Sample of Mediterranean Countries

	HR	CY	FR	GR	IL	IT	MT	MA	SI	ES	TR
1995	0.0016	0.0010	0.1044	0.0103	0.0034	0.0846	0.0004	0.0155	0.0022	0.0440	0.0075
1996	0.0016	0.0010	0.1044	0.0103	0.0034	0.0846	0.0004	0.0155	0.0022	0.0440	0.0075
[122] 1997	0.0016	0.0010	0.1044	0.0103	0.0034	0.0846	0.0004	0.0155	0.0022	0.0440	0.0075
1998	0.0015	0.0013	0.1107	0.0123	0.0042	0.0912	0.0006	0.0132	0.0022	0.0537	0.0085
1999	0.0015	0.0013	0.1107	0.0123	0.0042	0.0912	0.0006	0.0132	0.0022	0.0537	0.0085
2000	0.0015	0.0013	0.1107	0.0123	0.0042	0.0912	0.0006	0.0132	0.0022	0.0537	0.0085
2001	0.0015	0.0015	0.1140	0.0147	0.0035	0.0961	0.0006	0.0111	0.0023	0.0648	0.0094
2002	0.0015	0.0015	0.1140	0.0147	0.0035	0.0961	0.0006	0.0111	0.0023	0.0648	0.0094
2003	0.0015	0.0015	0.1140	0.0147	0.0035	0.0961	0.0006	0.0111	0.0023	0.0648	0.0094
2004	0.0017	0.0015	0.1034	0.0144	0.0038	0.0840	0.0005	0.0395	0.0023	0.0692	0.0149
2005	0.0017	0.0015	0.1034	0.0144	0.0038	0.0840	0.0005	0.0395	0.0023	0.0692	0.0149
2006	0.0017	0.0015	0.1034	0.0144	0.0038	0.0840	0.0005	0.0395	0.0023	0.0692	0.0149
2007	0.0019	0.0014	0.0848	0.0126	0.0044	0.0685	0.0005	0.0281	0.0024	0.0544	0.0206
2008	0.0019	0.0014	0.0848	0.0126	0.0044	0.0685	0.0005	0.0281	0.0024	0.0544	0.0206
2009	0.0019	0.0014	0.0848	0.0126	0.0044	0.0685	0.0005	0.0281	0.0024	0.0544	0.0206
2010	0.0032	0.0012	0.0803	0.0086	0.0053	0.0590	0.0007	0.0144	0.0023	0.0409	0.0189
2011	0.0032	0.0012	0.0803	0.0086	0.0053	0.0590	0.0007	0.0144	0.0023	0.0409	0.0189
2012	0.0032	0.0012	0.0803	0.0086	0.0053	0.0590	0.0007	0.0144	0.0023	0.0409	0.0189
2013	0.0033	0.0011	0.0928	0.0091	0.0051	0.0564	0.0014	0.0148	0.0021	0.0459	0.0219
2014	0.0033	0.0011	0.0928	0.0091	0.0051	0.0564	0.0014	0.0148	0.0021	0.0459	0.0219
2015	0.0033	0.0011	0.0928	0.0091	0.0051	0.0564	0.0014	0.0148	0.0021	0.0459	0.0219
2016	0.0028	0.0011	0.0747	0.0076	0.0052	0.0501	0.0010	0.0150	0.0020	0.0413	0.0293
2017	0.0028	0.0011	0.0747	0.0076	0.0052	0.0501	0.0010	0.0150	0.0020	0.0413	0.0293
2018	0.0028	0.0011	0.0747	0.0076	0.0052	0.0501	0.0010	0.0150	0.0020	0.0413	0.0293

NOTES Based on data from the ECB Data Portal (https://data.ecb.europa.eu).

For the entire period studied, the finding that the integration process is present, whether in its negative or positive form, is supported by the use of Markov, which track changes in the probability of occupying states and focus exclusively on relations within the Mediterranean basin (i.e., the selected sample of countries). However, it is necessary to revisit the analysis and examine the time dynamics of the source data on global export trade over time. If we consider Algeria and Morocco, both of which have generally increased their levels of integration into the Mediterranean basin (becoming more attractive destinations for exports from other Mediterranean countries, including each other), in relation to the three largest countries, which, according to our findings, can significantly influence integration processes, we have to analyze the time periods corresponding to minimum, average and maximum levels of economic cooperation (the method of creating matrix I at k = min or k = max, or the P matrices at l = min or l = max) taking into account the source data on the relative share of their world exports.

Table 8 which presents data for Algeria, and similarly table 9 for

TABLE 9 Relative Shares of Global Double-Weighted Exports for Morocco in the Period 1995–2018 within a Sample of Mediterranean Countries

	DZ	HR	CY	FR	GR	IL	IT	MT	SI	ES	TR
1995	0.0029	0.0016	0.0012	0.1110	0.0119	0.0031	0.0866	0.0006	0.0020	0.0496	0.0117
1996	0.0029	0.0016	0.0012	0.1110	0.0119	0.0031	0.0866	0.0006	0.0020	0.0496	0.0117
1997	0.0029	0.0016	0.0012	0.1110	0.0119	0.0031	0.0866	0.0006	0.0020	0.0496	0.0117
1998	0.0009	0.0016	0.0013	0.1013	0.0124	0.0044	0.0829	0.0007	0.0020	0.0530	0.0101
1999	0.0009	0.0016	0.0013	0.1013	0.0124	0.0044	0.0829	0.0007	0.0020	0.0530	0.0101
2000	0.0009	0.0016	0.0013	0.1013	0.0124	0.0044	0.0829	0.0007	0.0020	0.0530	0.0101
2001	0.0014	0.0025	0.0016	0.0945	0.0135	0.0055	0.0792	0.0006	0.0020	0.0585	0.0111
2002	0.0014	0.0025	0.0016	0.0945	0.0135	0.0055	0.0792	0.0006	0.0020	0.0585	0.0111
2003	0.0014	0.0025	0.0016	0.0945	0.0135	0.0055	0.0792	0.0006	0.0020	0.0585	0.0111
2004	0.0023	0.0020	0.0015	0.0923	0.0147	0.0053	0.0784	0.0006	0.0021	0.0656	0.0129
2005	0.0023	0.0020	0.0015	0.0923	0.0147	0.0053	0.0784	0.0006	0.0021	0.0656	0.0129
2006	0.0023	0.0020	0.0015	0.0923	0.0147	0.0053	0.0784	0.0006	0.0021	0.0656	0.0129
2007	0.0033	0.0019	0.0015	0.0861	0.0148	0.0052	0.0673	0.0007	0.0021	0.0582	0.0155
2008	0.0033	0.0019	0.0015	0.0861	0.0148	0.0052	0.0673	0.0007	0.0021	0.0582	0.0155
2009	0.0033	0.0019	0.0015	0.0861	0.0148	0.0052	0.0673	0.0007	0.0021	0.0582	0.0155
2010	0.0052	0.0021	0.0013	0.0834	0.0096	0.0061	0.0583	0.0008	0.0017	0.0419	0.0187
2011	0.0052	0.0021	0.0013	0.0834	0.0096	0.0061	0.0583	0.0008	0.0017	0.0419	0.0187
2012	0.0052	0.0021	0.0013	0.0834	0.0096	0.0061	0.0583	0.0008	0.0017	0.0419	0.0187
2013	0.0043	0.0018	0.0010	0.0856	0.0085	0.0061	0.0514	0.0017	0.0017	0.0406	0.0234
2014	0.0043	0.0018	0.0010	0.0856	0.0085	0.0061	0.0514	0.0017	0.0017	0.0406	0.0234
2015	0.0043	0.0018	0.0010	0.0856	0.0085	0.0061	0.0514	0.0017	0.0017	0.0406	0.0234
2016	0.0040	0.0018	0.0012	0.0793	0.0082	0.0068	0.0516	0.0013	0.0020	0.0413	0.0250
2017	0.0040	0.0018	0.0012	0.0793	0.0082	0.0068	0.0516	0.0013	0.0020	0.0413	0.0250
2018	0.0040	0.0018	0.0012	0.0793	0.0082	0.0068	0.0516	0.0013	0.0020	0.0413	0.0250

NOTES Based on data from the ECB Data Portal (https://data.ecb.europa.eu).

Morocco, shows strong relative shares of exports to the three large Mediterranean EU members, particularly in the early years of the period under review, from 1995 until the onset of the great global financial and economic crisis in 2007. These years account for their maximum export shares, which form the basis for the optimistic scenario in the transition matrices. However, after 2007, a gradual cooling occurred, followed by a sharp decline in the relative export presence of Algeria and Morocco in France, Spain and Italy. The pessimistic scenario is thus grounded in these developments, with the selected minimum values coming primarily from the post-crisis years – especially the final years of the period under consideration.

The patterns of minimum, average and maximum periods of export competitiveness in the markets of the EU's Big Three Mediterranean countries are similar to those of Algeria and Morocco as they are for

other members of the selected sample of Mediterranean countries, particularly Turkey and Cyprus. Slovenia, Greece and Malta significantly increased their export competitiveness on the Spanish market during the post-crisis period. Greece and Croatia also managed to maintain a
[124] high level of export competitiveness in the French market, and to some extent in Israel as well. Greece was able to increase its export competitiveness in the Mediterranean basin after the post-crisis period by relatively maintaining its export share in the Italian market. The EU's support for Greece during the peak of the crisis is also reflected in a rise in its level of integration (measured as the attractiveness of the Greek market to other Mediterranean members), when considering the entire period from 1995 to 2018. This trend also highlights the institutional strength of the large Mediterranean members of the euro area in supporting integration processes.

DISCUSSION AND IMPLICATIONS

A study of the long-term trade relations among 12 members of the Mediterranean basin, out of a total of 21 countries geographically bordering the Mediterranean Sea, focused on measuring the dynamics of their degree of integration, particularly for North African countries, initially suggests a general trend of increased integration during the period under review. A more detailed analysis reveals that the global financial and economic crisis had a significant impact on the mutual relations between the three large EU countries and the other Mediterranean nations during the same period. Their global market power is so substantial that each Mediterranean country's level of integration, is heavily influenced by the export competitiveness of these major players on world markets. There has been a notable substitution effect, where other Mediterranean markets have partly replaced the dominant markets of the larger EU countries, as countries such as Algeria and Morocco attempt to maintain or enhance their level of integration. However, despite these efforts, it is difficult to ignore the trend indicated by the prevailing pessimistic scenario when forecasting integration processes for the period already elapsed (2019–2024), for which reliable data are not yet available. A 'what if' analysis, based on Markov chains and extrapolation of historical relations, surprisingly provides optimistic projections for a possible greater integration within the Mediterranean basin, particularly under a pessimistic global scenario, and thereby challenges the basic hypothesis that global trade

booms necessarily lead to greater regional integration . The gravitational analysis method, used to determine equilibrium distributions of trade within a sample of twelve Mediterranean countries suggests that a weaker global economic climate may offer a better opportunity for deeper economic integration of the Mediterranean basin than a [125] strong one. This conclusion is supported by similar findings in research conducted by the European Central Bank, using a different methodological approach (Canova and Ciccarelli 2011). Several broad factors may explain this trend: a greater incentive to share resources and markets during economic downturns, cost reductions through economies of scale, a stronger foundation for diversification and resilience to economic shocks, enhanced political stability, and improved access to international funding and aid through closer economic cooperation.

On the other hand, the last period studied, from 2007 to 2018, highlights the impact of the Great Financial Crisis on the stance of the three EU members of the Mediterranean basin towards the other members, indicating a reduced commitment to the region's integration processes. This trend is particularly concerning in light of major external crises that have occurred since 2019.

On the one hand, the analysis highlights the potential strength of the EU in enabling greater integration of Mediterranean markets and, on the other hand, underscores its necessity or even urgency. In an increasingly uncertain geopolitical environment, the EU should urgently pursue an agenda for deeper integration of the Mediterranean basin. If we further emphasize this key finding and focus on the importance and role of France, Spain and Italy in advancing economic integration in the region, then the data underpinning our analysis – double-weighted exports in total world trade in goods – show that under globally favorable conditions, as these countries' exports to the rest of the world increase, their integration rates within the Mediterranean basin actually decline, even in an optimistic scenario. In other words, during favorable phases of the economic cycle, the relative importance of other Mediterranean economies to the Big Three economies of the Mediterranean basin is relatively smaller (table 7). Conversely, under less favorable global economic conditions, the relative interconnectedness of their markets with other countries of the Mediterranean basin becomes significantly more important. Unfortunately, the original post-crisis data (see tables 8 and 9 for Algeria and Morocco, for example) do not yet reflect actual developments in this direction. The most notable exception

is the positive trend observved in the Spanish market. Other Mediterranean countries have mostly compensated for the decline in the share of exports to the three major Mediterranean economies during crises through mutual trade in goods (Lagarde 2023).

[126] Therefore, the crises that occurred from 2019 to 2024 certainly cannot have a positive impact on increasing the economic integration of the Mediterranean basin by themselves, and not without urgent and more decisive integration policies, especially from the major European economies of the region. It is thus a fundamental conclusion that major crises represent a significant opportunity to deepen economic integration in the Mediterranean basin (as shown by pessimistic scenarios and steady-state distributions). However, this opportunity cannot be realized without more systemic, regionally focused, and less bilateral financial support, along with stronger integration efforts from EU institutions,[3] which, despite numerous initiatives, have not materialized over the past decade. Currently, the EU's enlargement agenda for 2025 is focused on Ukraine, Moldova, and the Western Balkan countries. Some of these Western Balkan countries are also part of the Mediterranean basin considered in this analysis: Bosnia and Herzegovina, Montenegro and Albania.

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[3] 'The overall institutional system is complicated, and the division of tasks is unclear' (European Parliament 2014).

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