



An index to assess maritime importance in the European Atlantic economy



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ABSTRACT

Successive marine policies set by the European Union identify the maritime sectors as crucial drivers for growth and jobs in the EU economy. The design of marine policies and the assessment of the importance of the maritime economy need empirical support that provides the basic data to help the decision-making process. This paper proposes a metric, in the form of a synthetic index, to measure and compare the importance of the maritime sectors in the European Atlantic area. The index scores can be used to assess the position of each Atlantic region so that it is possible to compare its performance to the rest of the area. The results show the relative weight of the maritime sectors in the European Atlantic regions and the high heterogeneity among them. Analyzing the maritime economy with this index can provide guidance for the design of economic policies to identify and revitalize the regions with greater potential for Blue Growth in the Atlantic area. This may help to put into perspective the importance of the maritime economy and can serve to improve the socio-economic dimension of the use of marine waters.

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1. Introduction

Since the second half of the last century there is a growing interest in analyzing the importance for human development of the ocean and its resources. In this field the United Nations (UN) has played an important role in ensuring cooperative, peaceful and sustainable use of marine resources worldwide, especially from the enactment in 1982 of the "United Nations Convention on the Law of the Sea" [1]. In the European context, in addition to the concern for the protection of the ocean [2] or its sustainable management [3], the maritime economy is considered a tool to facilitate greater European cohesion [4]. In fact, successive marine policies set by the European Union [5–8, among others] identify the maritime sectors as crucial drivers for growth and jobs for the EU economy in the present economic context [9]. Europe is surrounded by four seas and two oceans that traditionally have played an important role in the development of European culture, history and economy. The European Union has a coastline of 68,000 km and the maritime surface areas under the jurisdiction of the Member States are larger than the total land area of the European Union. Almost half of the Union's population lives less

than 50 km from the sea and the sea is Europe's most popular holiday destination. The European Commission estimated in 2012 that maritime sectors represent 5.4 million jobs and an annual gross value added of nearly 500 billion euros [9].

The design of marine policies, the monitoring of maritime sectors or the valuation of the importance of the maritime economy need empirical support that provides the basic data to help the decision-making process. Data availability allows a scientific approach, besides the political one, to be used in the management of the oceans [10]. However, the economic knowledge of the marine/maritime environment available in quantitative terms is not yet sufficient.

Nationally, many countries have developed specific plans for ocean management that focus on the need to measure and analyze the maritime economy in the most reliable manner [see 11,12, among others]. This has resulted in the publication during recent years of studies for different countries that have attempted to quantify the weight of the maritime economy [13–15]. These studies are mainly based on official statistics on employment, businesses and value added, but they may also include other variables, mainly physical, to quantify some maritime-related activities such as tourism, urban areas, ports and maritime transport. All these works have found similar problems in quantifying the maritime economy since official statistics are not specifically designed to measure the economic contribution of the oceans. On the other hand, the results obtained in these studies are not

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comparable because the selection of maritime activities, classification systems, data collection methodology, time periods or geographical scale, that is, the very definition of what it is considered maritime economy varies from country to country [16–18]. These issues are relevant when you consider the importance of international cooperation in managing the resources of the oceans, a common heritage where it is difficult to draw borders.

The European Union has proposed a comprehensive marine management policy, the EU integrated marine policy [5,7], in order to revitalize the marine/maritime economy so that it may become a driving force in the way out of the economic crisis. The implementation of this policy is carried out through various action plans which take into account local and regional differences between the different seas (Baltic, Mediterranean and Black Sea) and European oceans (Atlantic and Arctic). To manage these policies extensive information on the maritime economy of each area is required. The Marine Atlantic Regions Network (Marnet) project was created in response to this [19]. It was a collaborative project funded over three years by the European Regional Development Fund (ERDF) and the Interreg Atlantic Area Programme 2007–2013 involving regional authorities and marine socio-economic experts from Ireland, Spain, France, Portugal and the UK. The main objective of the Marnet project was to develop a coherent framework for a marine socio-economic database and to apply a robust methodology for the collection of comparable data on maritime activities in the European Atlantic area. This common database aims to deal with the problems mentioned above of data homogeneity between countries, allowing supranational analysis of the maritime economy not only on a nation-by-nation basis but also at a more detailed regional level [20].

Thus, the Marnet database contains a large number of different economic indicators for many maritime activities that provide information to analyze and compare the maritime economy in the European Atlantic area at the regional level. To perform this analysis based on a large set of heterogeneous indicators with different units of measurement (such as value added, number of enterprises, number of passengers, landing tonnage, energy transmission, pipe length, etc.) an appropriate tool to aggregate and summarize all available information is needed. The objective of this paper is to construct a synthetic index in order to measure and compare the level of economic importance of the maritime sector in the regions of the European Atlantic area (EclMar index) using information from the system of maritime socio-economic indicators designed by the Marnet project.

Synthetic indicators are a very useful tool to policymaking and benchmarking at a supranational level because they facilitate the interpretation of the results by reducing the dimension of the number of indicators without losing information [21]. In this way, they provide policy-makers with the “big picture” on the question of interest. However, its use in the field of the maritime economy is relatively recent. To our knowledge, the only published study to date using synthetic indicators for the analysis of the marine economy of different countries is that by Halpern et al. [22] in which oceans around the world are analyzed not only from an economic point of view but also from that of sustainability. However, by using information available worldwide, the measurement is based on a very limited number of indicators aggregated in very general terms using fixed weights.

This paper presents a related but more specific objective, namely to measure the economic importance of the maritime sector in the European Atlantic regions. The EclMar index is built from indicators related to economic variables collected for 26 activities in seven maritime related major sectors and defined at least at the NUTS3 level covering the European Atlantic area. The proposed method uses data-based variable weights to summarize in a single score all the information contained in a number of

maritime indicators for each region. The EclMar index makes it possible to compare and rank each region's maritime performance with respect to the rest of regions in the area.

The paper is organized as follows. Section 2 describes the contents of the Marnet database that is the source of information used in this work. Section 3 provides a brief introduction to the use of synthetic indicators. Section 4 explains the methodology for the construction of the EclMar synthetic index based on the above information. First, it discusses the criteria followed to select the database indicators included in the index. Second, it explains the statistical method used to construct the EclMar index. The ensuing results obtained with the index for the European Atlantic NUTS3 regions are shown and interpreted in Section 5. Finally, Section 6 summarizes the main conclusions and implications of these results for the European maritime economy.

2. Maritime indicators database

One of the objectives of the Marnet project was to design a methodology to build a database of maritime socioeconomic data that were comparable between countries and replicable using available data sources [14]. The Marnet database was built taking into account four dimensions: maritime activities, indicators of interest, geographic area and time period. The process of data collection followed common criteria of consistency, comparability and replicability. To ensure this the preferred sources used were Eurostat and national and regional statistical institutes. Where it was not possible to obtain data from these institutions data were gathered from other public or private sources such as state agencies or industry associations.

Although there is no general consensus as yet on the set of economic activities that make up the maritime economy [18] some detailed proposals can be found in the literature [23,16,17]. In this respect, the Marnet database was designed following the theoretical framework put forward by Kalaydjian [16]. In order to select the activities included, Marnet set out from the NACE 2009 (*Nomenclature statistique des Activités économiques dans la Communauté Européenne*), the statistical classification of economic activities in the EU. The NACE classification assigns unique codes to each industry and provides a framework for collecting and presenting a wide range of statistical information by economic activity. The level of disaggregation of the activities considered in Marnet was the highest possible, reaching NACE four-digit level in order to identify the maritime-related activities as accurately as possible.¹

The indicator system designed to characterize socio-economically each maritime activity was based on two types of variables. First, business variables among which there are two groups: one formed by mandatory variables for all maritime activities (number of companies, gross value added at basic prices, employment, turnover and exports) and a second set made up of optional variables (production value, full-time equivalent employment, purchases of goods and services, personnel costs, energy products, etc.). Second, certain physical indicators were also included in the system, specific to each maritime activity and selected based on their economic relevance and data availability. These indicators provide additional information on a particular activity (e.g. landing tonnage, number of nights in hotels, etc.) and can be used as proxies to estimate the weight of the maritime component in some cases (mostly partially maritime activities) where it was not possible to find actual business data.

¹ The complete list of maritime activities considered in the Marnet project can be found in Foley et al. [14].

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