EXPLORING THE VALUE OF THE SEA: A STUDY OF THE BLUE ECONOMY IN THE EU AND PORTUGAL

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Abstract This paper examines the concept of the "blue economy" in the context of the European Union (EU) and Portugal, exploring the economic importance of the sea and its resources. First, it provides an overview of the EU blue economy and its contribution to the overall EU economy over the last decade. Data from the European Commission shows that coastal tourism is the most important sector both in terms of Gross Value Added (GVA) and employment, with the four largest EU countries (Spain, Germany, Italy, and France) being the largest contributors to the EU blue economy. In this context, this study aimed to investigate the performance of Portuguese coastal tourism in comparison to other European coastal countries, particularly in relation to the 2008 financial crisis and the COVID-19 pandemic. The findings show that Portugal's GVA generated by the coastal tourism sector was consistently lower than the respective mean of all other European coastal countries in several years. The statistical tests confirm these results and suggest that Portugal's coastal tourism sector may need more attention and efforts to improve its economic performance.

Keywords:
sea resources, coastal toursm, blue economy, European Union, Portugal

JEL:
Q01, Q20, R11

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1 Introduction

The concept of the "blue economy" has become increasingly prominent in recent years due to its potential for providing economic benefits while protecting and preserving the world's oceans and seas. It refers to any type of economic activity that takes place at sea or is dependent on it, including marine natural capital and non-tradable services from marine ecosystems. It is expected that this economy will maintain its relevance due to increasing demands from growing populations and their standards of living (demand side), as well as developments in technology, economics, and logistics that have opened new possibilities for exploration (supply side) (EY-AM&A, 2019).

Although it is gaining traction internationally and regionally (Mulazzani & Malorgio, 2017; Bennett et al., 2019), there remains no single definition accepted by all on what exactly constitutes a "blue economy". The European Commission defines it as "all activities related to water bodies such as oceans, seas and lakes" which includes traditional uses like fishing but also other sustainable economic endeavors for Member States` (MSs`) coastal communities (European Commission, 2022). According to the OECD's take on this matter, any description would be inadequate if it did not include non-quantifiable natural stocks or non-market goods and services. Thus, they suggest that "the ocean economy should be understood as encompassing economic activities based around marine industries plus assets, goods, and services offered through marine ecosystems" (OECD 2016, 22).

There is a great complexity of maritime activities exercising one or more functions, and it is particularly difficult to establish a consensual delimitation of all sectors that integrate the so-called "hyper cluster" of the blue economy (SaeR and ACL, 2009). Despite the difficulty, it is possible to identify a set of maritime activities that fit into three types of industries: established, emerging, and potential. The established sectors are the major contributors to the blue economy. According to the European Commission (2022), seven sectors stand out due to their economic importance, each further divided into subsectors. These include marine living resources (primary production, processing and distribution of fish products); marine non-living resources (oil and gas, other minerals, support activities); marine renewable energy (offshore wind energy); port activities (cargo and warehousing, port and water projects); shipbuilding and repair services (shipbuilding, equipment and machinery),

maritime transport services (passenger transport, freight transport, transportation services); coastal tourism related activities such as accommodation and transportation; as well as other expenditures.

Portugal, an oceanic country with a coastline extending over 2,500 km, is one of the countries that recognizes the economic value of the sea; 48% of all maritime waters in areas adjacent to Europe under MS jurisdiction are part of Portuguese territory (DGPM, 2020a). It is therefore of utmost importance to analyze the importance of the blue economy in this country and compare it with the other EU MSs.

This research paper presents a description of the blue economy in the European and Portuguese contexts. Besides, since coastal tourism is the most important sector, both in terms of Gross Value Added (GVA) and employment, this study proposes to investigate whether Portuguese coastal tourism was more affected by the 2008 financial crisis and the COVID-19 pandemic than other European coastal countries.

After introducing some key features about the blue economy, section 2 focuses on the particularities of the EU context, while section 3 presents a national view of the evolution of the blue GVA and employment. Section 4 presents the adopted methodology, followed by the discussion and analysis of the achieved results. The paper ends with the main conclusions.

2 Theoretical Background

2.1 The EU Context

The EU's Directorate-General for Maritime Affairs and Fisheries is responsible for centralized maritime and fisheries policy. They are guided by two main policies, the Integrated Maritime Policy (IMP) and the Common Fisheries Policy (CFP). The IMP aims to coordinate policies that affect the oceans, seas, islands, coastal and outermost regions, and maritime sectors, to foster sustainable development in these areas. This policy has several objectives, including maximizing sustainable use of the oceans, building a knowledge base for maritime policy, improving the quality of life in coastal regions, promoting EU leadership in international maritime affairs, and raising the visibility of maritime Europe through various initiatives.

The Common Fisheries Policy (CFP) is a set of rules for sustainably managing European fishing fleets and conserving fish stocks. This policy was reformed in 2013 and now features attention to the environmental, economic, and social dimensions of fisheries, fish stock management at maximum sustainable yield, a landing obligation, continued application of multiannual plans, regionalization, fleet capacity ceilings, and the EU Marine Strategy Framework Directive (MSFD) to protect the marine ecosystem and biodiversity. The MSFD sets out 11 illustrative qualitative descriptors to achieve good environmental status (GES), but more concrete measures at the international level are proposed to address environmental, fisheries, and climate issues.

Furthermore, the EU's 2013-2020 Atlantic Action Plan (COM (2013) 279 Final) aims to boost the sustainable blue economy in the four MSs (Ireland, France, Portugal, and Spain) with Atlantic coasts and their outermost regions. The plan prioritizes promoting entrepreneurship and innovation, protecting, and enhancing the marine and coastal environment, improving accessibility and connectivity, and creating a socially inclusive and sustainable model of regional development (European Commission, 2023).

All in all, the contribution of established blue economy sectors in the EU varied greatly among MSs in 2020. In terms of employment, Spain had the highest share at 19%, while Luxembourg had the lowest at 0.1%. Germany had the highest share of GVA at 18%, while Luxembourg had less than 0.1%. Generally, the blue economy had a significant contribution to national GVA or employment in insular MSs or those with archipelagos, such as Greece, Malta, Cyprus, Croatia, and Portugal. However, Estonia was an exception, with a 6% employment share. Other MSs with relatively large blue economy sectors were Spain, Denmark, Latvia, Ireland, and Bulgaria, while landlocked MSs had limited contributions. Among the four largest EU economies, only Spain exceeded the EU average. Some MSs, such as Greece, Malta, Portugal, Latvia, and Denmark, saw a significant increase in blue jobs, while Bulgaria and Estonia experienced a decrease. The largest contributors to the EU blue economy in terms of both employment and GVA were the four largest MSs (Spain, Germany, Italy, and France), with Greece ranking second in employment contribution. Portugal, the Netherlands, and Denmark also made significant contributions. Most MSs saw an increase in GVA generated by established blue economy sectors between 2009 and 2020, with the most significant expansion

recorded in Ireland, Portugal, and Malta. However, GVA in Bulgaria and Greece had not yet recovered to 2009 levels in 2020. Some MSs, including Bulgaria, Croatia, Estonia, France, Italy, Romania, and Sweden, had not yet recovered 2009 employment levels.

2.2 The Portuguese context

From 2009 to 2020, the number of people employed in Portugal's blue economy sectors increased by 43.7%, from 167,615 to 240,875, despite some fluctuations due to the 2008 crisis and the COVID-19 pandemic (European Commission, 2023) – see Figure 1. Coastal tourism was the most significant sector, while ocean energy employed zero people throughout the analyzed period.

Figure 1: Persons employed in the sectors of the blue economy
Source: Adapted from European Commission (2023).

From 2009 to 2020, the contribution of blue economy sectors to Portugal's GVA at factor cost (GVAfc) increased significantly, with coastal tourism being the most significant sector. The blue sectors generated a GVAfc of €153,812.5 million in 2009, which increased to €181,820.1 million in 2020, representing an 18.2% increase – see Figure 2. However, there were periods of retraction during the economic crisis and the COVID-19 pandemic.

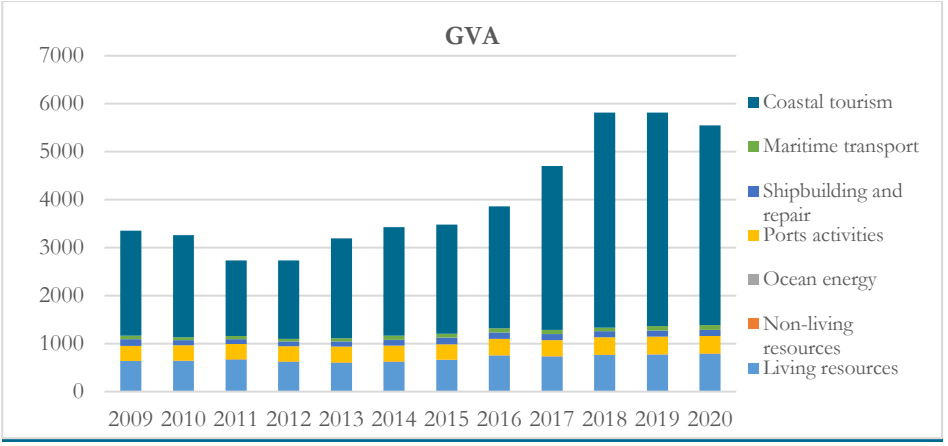

Figure 2: GVA in the sectors of the blue economy
Source: Adapted from European Commission (2023)

4 Methodology

This research study proposes to test the following hypothesis:

H1: Since 2010, Portugal's coastal tourism suffered more when compared with the group of all other European coastal countries from the impacts of the 2008 financial crises and its aftermath and the COVID-19 pandemic.

To test this hypothesis, the data used was the annual GVA at factor cost (GVA_{fc}) generated by the coastal tourism sector of all European coastal countries between 2009 and 2020, provided by the EU Blue Economy Observatory (European Commission, 2023). The hypothesis was operationalized in terms of the annual variation rate of the GVA_{fc}, comparing, for each year, the one for Portugal against the average of all other European coastal countries (amounting to 22 countries, the UK included). The statistical tests used were the one-sample Student's t-test or the Wilcoxon test, depending on the normality result provided by the Shapiro-Wilk (SW) test. Student's t-test and the Wilcoxon test were formulated with one-sided alternative hypotheses, and Cohen's d (d) and Common Language Effect Size (CLES) were computed to respectively assess the effect size.

5 Results and Discussion

Considering the observed values, reported in Table 1 and represented in Figure 3, the years effectively tested were 2010, 2011, 2012, 2015, 2016, 2019, 2020, as in those years the Portugal's GVA_{fc} is lower than the respective mean of all other European coastal countries.

Table 1: Annual variation rate of GVA_{fc} for Portugal and other European coastal countries

Statistics	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Portugal (Mean)	**-0.027**	**-0.259**	**0.040**	0.272	0.086	**0.007**	**0.116**	0.345	0.310	**-0.007**	**-0.065**
Other (Mean)	0.037	-0.004	0.047	**0.090**	**-0.018**	0.022	0.158	**0.080**	**0.224**	0.008	0.035
Other (Standard Deviation)	0.193	0.128	0.516	0.270	0.116	0.086	0.203	0.127	0.241	0.032	0.175

Note: Values in bold indicate the lowest value for each year.

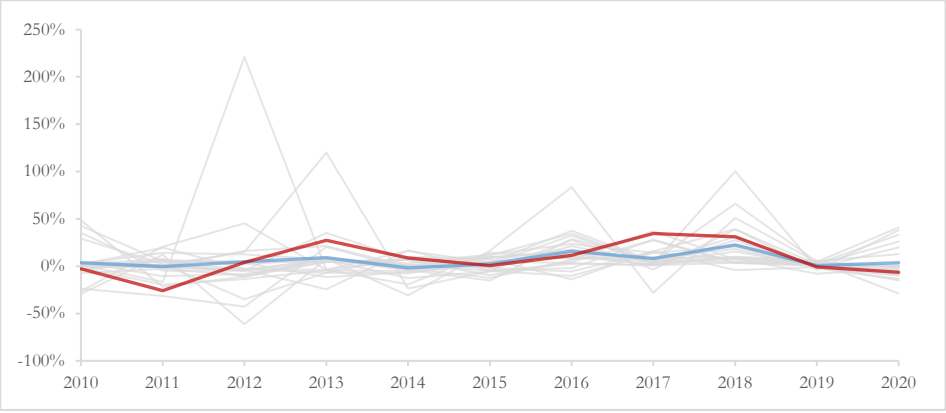

Figure 3: Annual variation rate of GVA_{fc} generated by the coastal tourism sector for Portugal (red line), other European coastal countries (light blue lines) and the respective mean (dark blue line).

Table 2 presents the statistical tests. The results obtained show that out of the seven years tested, only for 2010, 2011, 2019, and 2020, the null hypothesis, according to which the average GVA_{fc} in Portugal is equal to that of other European coastal countries, is rejected at a 5% level. Only on those four years does the alternative

hypothesis that Portugal's GVA was significantly lower than the respective average for all other European coastal countries prevail.

Table 2: Results of the statistical tests

year	Shapiro-Wilk		Student's t-test			Wilcoxon test		
	stat	p-value	t-stat	p-value	d	w-stat	p-value	CLES
2010	0.854	*0.004*	1.502	0.074	0.320	187	**0.025**	**0.727**
2011	0.953	0.355	9.085	**0.000**	**1.937**	251	0.000	0.955
2012	0.590	*0.000*	0.064	0.475	0.014	75	0.954	0.273
2015	0.969	0.686	0.788	0.220	0.168	152	0.212	0.591
2016	0.887	*0.016*	0.944	0.178	0.201	144	0.294	0.500
2019	0.960	0.496	2.101	**0.024**	**0.448**	194	0.014	0.682
2020	0.898	*0.028*	2.623	0.008	0.559	200	**0.008**	**0.773**

Notes: Italics in the SW p-value indicates normality rejection at a 5% level (thus pointing to Wilcoxon test). Values in grey indicate that the test was not considered due to the result of the SW test. Values in bold correspond to rejection of the null hypothesis at a 5% level, either in Student's t-test or in Wilcoxon test.

Looking at the effect size in Table 2, it is medium in 2010, 2019, and 2020, and large in 2011 (Fritz et al., 2012). Thus, the impact was more noticeable in 2011. As to the impact in 2019, even though the effect size is medium, it is relevant to notice that, on that year, the annual variation rate was very small in magnitude in all countries (0.008, thus 0.8%, in mean and with a standard deviation of 0.032).

6 Conclusions

The blue economy is becoming increasingly important in the global economy due to population growth, demand for resources, and advances in technology and logistics. The blue economy comprises three types of industries, namely established, emerging, and potential sectors. Coastal tourism is the most significant sector in terms of GVA and employment. This study investigates whether Portuguese coastal tourism was more affected by the 2008 financial crisis and the COVID-19 pandemic than other European coastal countries. Portugal's GVA_{fc} generated by the coastal tourism sector was consistently lower than the respective mean of all other European coastal countries in the years 2010, 2011, 2019, and 2020. The statistical tests conducted confirm these findings, as the null hypothesis that the average GVA_{fc} in Portugal is equal to that of other European coastal countries is rejected at a 5% level only for those four years. The effect size analysis indicates that the impact was more noticeable in 2011, although in 2019, the effect size was medium but with a very

small annual variation rate in all countries. These results suggest that Portugal's coastal tourism sector may need further attention and efforts to improve its economic performance compared to other European coastal countries.

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