

Comparison of Efficiencies in Protectionist and Liberal Cabotage Policies

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Abstract

This paper focuses on cabotage, which is a long-standing regulation that restricts coastal trade to domestic ships. As globalisation has grown, global trade organisations have pushed for the removal of these barriers to promote a competitive market environment. In this research, Data Envelopment Analysis (DEA) is used to evaluate and compare the efficiencies of countries which have protectionist and liberalised cabotage policies. To do this, maritime statistics in 2022 from the World Bank database are considered for 50 different countries. We find that both protectionist and liberal policies have advantages and disadvantages, but neither is inherently superior. In addition, cabotage policies must be structured according to each country's conditions, and a delicate balance must be established between these policies, considering the dynamics of the global economy. This paper has also considered advantages and disadvantages by comparing countries that have different policies on cabotage, such as the UK and Türkiye, to show how cabotage regulations generate different perspectives created by their respective maritime pasts and geopolitics. In terms of an effective and competitive maritime industry, the study is one of the unique types of research that underlines the need for a cabotage strategy balanced between the liberalised and protectionist components.

Keywords: Cabotage, Protectionism, Liberalism, Maritime Trade, Maritime Policy, Market Liberalization

1. Introduction

Looking into the history of the global economy, nations were and still are at the crossroads as to which trade policy they were to adopt depending on intricate links between political, structural, and market variables. While protectionist trade policies were much in vogue for a long time, a sea change happened in the early

1650s when the British Government adopted mercantilism, as stated in its Navigation Act of 1651.

Along with this problem, in the modern world of the globalised economy, the importance of transportation has been increasing. Within the remit of supply chain management, terms like logistics, warehousing, shipment, freight, and cargo handling have become discussion topics, and newer concepts, such as the cold chain, have emerged (Talay 2020). In this regard, the role of maritime transport is also expanding. Notably, countries with coastlines use various measures linked to managing ports and maritime trade to increase transportation.

Currently, the connection of markets in different parts of the world entails the fundamental aspect of fast, reliable and seamless transport systems. However, Petrova (1997) claimed that there has been a gradual liberalisation of foreign trade processes and an increasing differentiation in relevant regulations. This push is occurring on the international level through such institutions as the World Trade Organization (WTO) and the Organization for Economic Cooperation and Development (OECD), as well as at the regional level with respect to such formations as the European Union (EU) and the North American Free Trade Agreement (NAFTA). Paixão Casaca and Lyridis (2021) highlighted that, over the years, many countries implemented policies and legislative measures that limited foreign companies from offering transportation services internationally. Although these regulations protected the transportation sector of a country from competition, they also resulted in increased expenses and poor service quality.

The establishment of the World Trade Organization and the global shift towards economic integration have promoted the dismantling of such political and legal barriers. Nonetheless, specific areas within the transportation industry, like protectionist cabotage markets, continue to uphold the abovementioned barriers. In the past, the safeguarding of domestic fleets and the maritime sector was aided by cabotage monopolies. However, at present, this approach runs counter to the values of a free-market economy and the trade liberalisation advocated by the EU, OECD and WTO. These organisations advocate dismantling these monopolies to foster a more liberalised and competitive market.

Cabotage is the reservation of coastal trade for the ships of the instigating country. This is usually a right that protects the citizens of the given country in its seas, highways, and airspace. However, regarding the current, dynamic, global relations in international trade, there has been much debate over the issue of foreigners gaining access to cabotage rights more easily through changes in laws regulating cabotage. The EU aims to create a single EU maritime trading fleet instead of separate fleets for member states, which limits some countries' cabotage rights. In recent times, states, especially those in the EU, have adjusted their cabotage policies to align with their economic and political objectives.

Market liberalisation, through economic policies aiming to ease global trade and break down barriers, which essentially pervades international seaborne trade, charts one of the significant factors that shape the industrial scene globally. Paixão Casaca and Lyridis (2018) highlighted that the theory of comparative advantage has contributed much towards ensuring continuous growth and prosperity for nations adapting to market liberalisation. However, the journey to adopting liberalised market policies remains bumpy with issues of unemployment, dumping, and loss of domestic production that eventually turn a country into dependence on foreign countries. Multilateral agreements, instrumental to adopting liberalised policies, are also complicated by differences in pace between participating countries. On the other hand, protectionist markets—based on hindrance measures toward international trade through mechanisms like tariffs, quotas, and non-tariff barriers—are adopted by countries for widely varying reasons emanating from economic considerations to social, political, strategic, and cultural grounds. Indeed, a good number of them are motivated by valid reasons. However, protectionism provisions heighten isolationism, making them developmental antennas that catalyse problems of this nature: monopolistic tendencies, price increments, and inefficient systems of production (Paixão Casaca and Lyridis 2018).

As also mentioned by Paixão Casaca and Lyridis (2021), when we come to the transport sector—road, rail, air, and sea—a finely nuanced interaction of liberalised and protectionist features gives itself out. Throughout an extended timeframe, several nations enacted policies to protect their transportation sectors from foreign

competition, leading to the provision of transport services characterised by high costs and low quality. The formation of the World Trade Organization and the worldwide inclination toward globalisation contributed significantly to removing these impediments. Nonetheless, some markets remain closed to competition, a clear case being *cabotage*. Conventionally, cabotage laws have had the twin objectives of reservation of coastal trade to ships flying a country's flag and protection of trade undertaken by metropolitan countries with their colonies. The theory changed with the end of the Second World War, when most European colonies attained independence, allowing many countries to see their cabotage markets as a strategic asset.

Our research identifies not only insufficiencies in past research but also upholds a strong appeal for restructuring in the cabotage sector with pronounced urgency. In this light, the paper seeks to explore how liberalised and protectionist market economies interact with each another and thus bring centre stage their main characteristics against the canvas of global economic dynamics. It is in this focused analysis that we seek to expand our understanding of the trade policy and its multiple effects on economic growth, global cooperation, and intricacies involved in the transport sector, especially in maritime cabotage markets. To be precise, this study asks which of these two otherwise opposite policies, one protectionist, the other liberalist, works better.

The paper aims to outline the complex relationship between liberalised and protectionist market economies, bringing their essential characteristics to light in global economic dynamics. In our methodological approach, an in-depth analysis is conducted, utilising Data Envelopment Analysis (DEA), specifically the Charnes, Cooper, and Rhodes (CCR) model (1978). We increase our understanding of trade policies by epitomising the different influences of such policies on economic growth and world cooperation.

2. Literature Review

Glisson and Jones (1999) argue that people have engaged in cabotage since the 15th century. Nevertheless, there is minimal agreement among scholars on when it exactly originated, as this is explained below and referred to in Paixão Casaca and Lyridis (2018). There is also controversy regarding the source of the term 'Cabotage'.

Lazarus and Ukpere (2011) argue for its origin as Spanish, but others appear to trace it to the French 'caboter', which means 'navigation along the coast, from port to port' as quoted by Agama and Alisigwe (2018).

Initially designed to protect coastal trade, limiting it to national vessels, including colonial traders, cabotage laws began experiencing profound changes after World War II. European countries came to view cabotage as a crucial national strategic asset and adopted much more protectionist cabotage policies impelled by the loss of hold on key shipping markets customarily supplied by European fleets. Today, cabotage incorporates intra-area or constrained sea area shipping services, covering activities among coastal ports, island cabotage, and offshore supply services.

Applying EU competition rules to cabotage has always been a highly sensitive issue. Since considerable attention has been directed to cabotage policies by various nation-states, it is crucial to place the respective policy landscapes within the context of the broader literature on protectionist and liberalised trade policies. As Petrova (1997) argues, shipping is at the very centre of international trade, and thus, a developed maritime industry is a foundation for the economic and political integration of developing countries into the global economy. In many cases, and to foster this integration, developing countries consequently subsidised and protected national shipping fleets after the end of World War II. It is for this reason that the United Nations Conference on Trade and Development, UNCTAD, was created to help third-world countries through trade and aid. The 1974 United Nations Convention on the Code of Conduct for Liner Conferences, or UN Liner Code, was an event which provoked new relations within the world's oceans. Yet, the code was ratified mostly by developing nations. The controversy among its Member States (the United Kingdom opposed the adoption of the UN Liner Code, as did Denmark) was clearly reflected in the divergent opinion between the European Community and, therefore, its shipping practices as stipulated by its Common Transport Policy under the EC Treaty.

Regarding the cabotage study, Greece has not been left out. For instance, Giannopoulos and Aifandopoulou-Klimis (2004) analyse how cabotage used to work in Greece before and after it became more liberalised. It is expected that the change in Greece's cabotage laws will bring both benefits and challenges. It is thought that the

easing will increase efficiency and competition and improve service standards on routes, but more lucrative smaller islands may only see improvements through government-sponsored activities. According to Giannopoulos and Aifandopoulou-Klimis (2004), ensuring benefits across the maritime transportation network will require universal oversight and possible policy changes. Of importance is how one looks at the way policies shape the maritime scene in such an interesting nation with a rich history focused on the sea. There is also the work by Chlomoudis et al. (2007), who took a broader view, looking at how European Union policies of maritime liberalisation impacted places such as the Greek Islands. This research is not solely about Greece; it is about how decisions taken at the EU level resonate with the ground of local communities and economies. Although Greece is interesting, European countries differ regarding cabotage policies—with all their rules and implications. At the end of that research, Chlomoudis et al. (2007) found that Greece's recent cabotage laws are advantageous since they comply with EU norms that protect island interests and improve transportation. However, maintaining these regulations and ensuring that island societies are involved in licensing, public service obligations, and subsidy distribution are critical to success. A smooth transition to EU regulations might establish a standard for island regions.

It is in these regard that cabotage research has gained massive attention in the European context. Regarding the cabotage markets of such maritime giants as Norway and the United Kingdom, liberalisation has been carried out concerning the obligation of the European Union to provide free access to maritime cabotage services. This general trend is now broadly analysed; for example, Christodoulou et al. (2019) consider short-sea shipping. Their research, using the case of the UNCTAD study of 2017, extends the scope of inquiry to different cabotage regimes worldwide. It concludes that current restrictions inhibit competition, cause higher operating costs, and lower efficiency with larger vessels. According to that study, one response is to liberalise cabotage restrictions, facilitating maritime connectivity between countries, regions, and continents through strategic improvements in the liner shipping service.

Park and Medda (2015) compared cabotage policies in Korea, China, and Japan. The evaluation of cabotage laws in the region of Northeast Asia highlights several aspects. First, strict cabotage regulations have limited port competition and

affected the routes connecting Taiwan and mainland China by influencing the development of hub and spoke networks focused on ports like Busan. Second, Busan may benefit more from short-sea transport networks than ports due to its geographic proximity. Government cooperation, as exemplified by the yearly ministerial conference attended by representatives from Korea, China, and Japan, might play a significant role in shaping the future of short-sea shipping by addressing issues like intermodal transport efficiency and IT alignment standards. It is essential to keep studying treaties and domestic logistics exchanges to understand the shifting dynamics and potential benefits of these regional policies.

Bendall and Brooks (2011) and Brooks (2014) focused their research on that same topic, explicitly investigating Australian cabotage policies. In that research, the primary focus was identifying the main gaps related to coastal shipping: the lack of perspectives from prospective operators and cargo owners and the necessity of investigating whether establishing equitable terms for Australian and foreign flag operators could enhance shipping activities, and outline the directions for future research. The research highlights two main gaps related to coastal shipping: the lack of perspectives from prospective operators and cargo owners and the necessity of investigating whether establishing equitable terms for Australian and foreign flag operators could enhance shipping activities.

To obtain a greater understanding of modal competition and inform regulatory adjustments, further research should focus on evaluations, port assistance, rail congestion, and transportation mode preferences. Cabotage in New Zealand was reported before and after the institution of new regulatory frameworks in two separate studies (Cavana 1994; Cavana 2004). There is very little cabotage research done in Northern European countries. For two of them, Norway and the United Kingdom—somewhat more prominent maritime nations—hardly any research exists about their local cabotage markets. Both these nations, however, have liberalised their cabotage sectors and brought national legislation in line with EU legislation designed to promote free access to maritime cabotage services. This remains relatively under-researched compared to other areas.

Papadimitriou et al. (2018) have provided an in-depth analysis of short-sea shipping, particularly regarding the European Union's policies and cabotage services. They have pointed out the various kinds of complexities encountered in the concerned sector while offering an overall idea of the matter at hand, starting from policy framing down to operational reality. Despite such efforts, there remains a gap in our understanding of cabotage practices within the context of Northern European countries.

Paixão Casaca et al. (2017a; 2017b) contribute to this discussion by providing a more detailed analysis of Brazil's cabotage policy regarding demand and supply dynamics and the position occupied by cabotage in the context of intermodal transportation chains. More recently, de Moura and Botter (2019) have tried to explain the strategies of maritime transport growth itself and the growth of cabotage services for the improvement of the maritime logistics sector in Brazil. These researchers reflect on cabotage dynamics in a Latin American context and establish or situate Brazil as a case study site worthy of deeper investigation and strategic intervention.

Paixão Casaca and Lyridis (2018) expand the scope horizon further by classifying it geographically into seven regions and going through the legislative acts that govern cabotage in 71 countries with a magnifying glass. Building on the prior work, in particular the 1991 survey conducted by the United States Maritime Administration (MarAd), they developed a classification scheme of five categories of cabotage policies, giving proper and adequate insight into the type and level of regulatory constraints in each of the jurisdictions studied.

This means that the collective academic effort serves to update the state-of-the-art knowledge related to cabotage policies, giving a fine-grained insight into the regulatory regimes underpinning maritime activities worldwide. By close analysis and empirical investigation of the port system's influence on cabotage, researchers continued with brilliant dissection of the multi-aspect dynamics of cabotage, showing its deep impacts on worldwide trade, connectivity, and economic development.

Research on national cabotage policies has sprouted up in the academic arena, and to a large extent the twin perspective of protectionism and free trade also abounds. Most of the academic research has focused on the specifics of policymaking, and

hence, it has often been shown that typical policy instruments are directed toward the entire maritime market and not specifically designed for the cabotage market.

Scholars have espoused different policy measures in their reviews. For example, Gardner et al. (1984) examine several incentives that can be used for investment purposes to enhance the British fleet. Heaver (1993) considers specific tax and financial policies to encourage the growth of Canadian-flagged deep-sea shipping. Gardner et al. (1996) categorise post-war shipping policy measures as fiscal incentives, financial assistance, labour regulations, and external shipping policies. The multidimensional approach underlines the complex interplay of economic, regulatory, and strategic considerations involved in formulating national maritime policy.

At this point in the discourse, sensitivity to the interdependencies across a range of policy areas is important, and how those bear on cabotage regulations. Scholars can contribute much to the unravelled complexities associated with fostering a domestic maritime industry within the context of the broader currents of global trade dynamics. These scholarly efforts would enrich not only theoretical frameworks but also be of practical relevance for policymakers.

In the comprehensive literature review, although some research in the last years (Pagel et al. 2019; Ratnawati et al. 2023; Wong et al. 2019) it has been seen that there is a significant gap in the field of maritime management in comparing the effectiveness of countries implementing protective and liberal cabotage laws. This topic is intended to be addressed through this study by comparing two different cabotage policies, protective and liberalised, for economically important countries. For this purpose, research will be conducted on the countries mentioned in the research of Paixão Casaca and Lyridis (2018). In addition, this study considers Türkiye, which has protective cabotage laws, and the United Kingdom (UK), which has a liberal cabotage system, as case studies. From a geographical perspective, it will be discussed how the two countries benefit from two different methods of controlling cabotage. To sum up, the main objective of the study is to examine the impact of different cabotage policies on maritime operations within countries.

3. Methodology and Analysis

In this research, Data Envelopment Analysis (DEA) measures the efficiencies of countries with two different cabotage policies. This method is based on mathematical programming, and it has been developed by Charnes et al. (1978) to find the relative efficiency of decision-making units (DMUs). In DEA, there is no requirement of a production function, as in the case of the Stochastic Frontier Analysis (SFA).

The significant and commonly used Data Envelopment Analysis (DEA) models are the Charnes, Cooper and Rhodes (CCR) model (1978) and the Banker, Charnes and Cooper (BCC) model (1984). In this study, the CCR model is used since it intends to measure general efficiency, assuming constant returns to scale, which contrasts with the BCC model for pure technical efficiency with variable returns to scale.

3.1. DEA model

Basically, DEA models are classified as input-oriented or output-oriented, respectively. The DEA model calculates the efficiency of a decision-making unit (DMU) by determining the inputs that need to be used to produce a certain amount of output to achieve efficiency. Secondly, it calculates what level of outputs a DMU with given inputs should produce to become efficient. Basically, input-oriented analysis is preferred when it is easier to adjust the inputs, while output-oriented analysis is preferred when it is easier to modify the outputs. In this study, there are two different DEA models. The first model implements the output-oriented DEA, while the second one considers the input-oriented DEA model.

To mathematically illustrate the basic DEA-CCR model, consider that each decision-making unit (DMU) utilises m inputs to produce n outputs given a certain technology level. Here, let X_{ij} denote the i -th input ($i=1,2,\dots,m$) for the j -th DMU ($j=1,2,\dots,k$), and Y_{sj} represent the s -th output ($s=1,2,\dots,n$) produced by the j -th DMU. The variables U_r ($r=1,2,\dots,n$) and W_i ($i=1,2,\dots,m$) correspond to the weights assigned to each output and input, respectively. The efficiency of a specific DMU is expressed as the ratio of the weighted sum of outputs to the weighted sum of inputs. The mathematical representation of this efficiency model is provided below.

$$Max = \frac{\sum_{r=1}^n u_r Y_{r0}}{\sum_{i=1}^m w_i X_{i0}} = 1 \quad (1)$$

s.t.

$$\frac{\sum_{r=1}^n u_r Y_{rj}}{\sum_{i=1}^m w_i X_{ij}} \leq 1 \quad j = 1, 2, \dots, k \quad (2)$$

$$u_r \text{ and } w_i \geq 0 \quad (r = 1, 2, \dots, n) \text{ and } (i = 1, 2, \dots, m) \quad (3)$$

Here, equation (1) shows the efficiency level and (2) satisfies that all efficiency levels are equal to or smaller than 1. Equation 3 shows the weights assigned to each output and input, respectively

The input-CCR model is presented below. In this framework, the most efficient DMU is assigned the score of 1.

$$Max = \sum_{r=1}^0 \mu_r Y_{r0} \quad (4)$$

Constraints:

$$\sum_{i=1}^m w_i X_{i0} = 1 \quad (5)$$

$$\sum_{r=1}^n \mu_r Y_{rj} - \sum_{i=1}^m w_i X_{ij} \leq 0 \quad (6)$$

$$\mu_r \text{ and } w_i \geq 0 \quad (r = 1, 2, \dots, n) \text{ and } (i = 1, 2, \dots, m) \quad (7)$$

For fractional equations above, equations (1), (2) and (3) are converted to equations (4), (5) and (6).

3.2. Results

An output-oriented model was set up to get an overview of the results of cabotage policies. For the first DEA model, inputs are Population, Coastline (km), Gross Domestic Product (current US\$), and Fleet Ownership (DWT); outputs are National Flag Fleet (DWT), Shipbuilding, Seafarer Supply, and Container Port Throughput (TEU). The inputs and outputs used in the analysis are determined according to the literature (UNCTAD 2022; Paixão Casaca and Lyridis 2018).

Cabotage policies are designed to protect and promote a nation's maritime industry by regulating the movement of goods and passengers within its territorial waters. The ultimate goal is to enhance national maritime capabilities, ensuring that domestic shipping operations are controlled by national carriers and that the country is less reliant on foreign vessels for its maritime activities. In this context, the inputs—population and GDP—are essential for understanding a country's overall economic activity and trade potential. These elements affect the demand for goods that need to be transported, which in turn influences the volume of maritime trade. A larger population or a higher GDP often correlates with increased demand for imports and exports, driving up the need for a robust maritime infrastructure. As for the national fleet size and the length of the coastline, these characteristics have a direct impact on maritime activities. A larger national fleet means more ships are available for domestic shipping, thus bolstering the national maritime sector. The length of the coastline is crucial because it determines the length of a country's territorial waters, which may increase its capacity for trade and necessitate more vessels to facilitate transportation.

Additionally, the mentioned outputs are direct consequences of these inputs. In other words, the larger the fleet, the longer the coastline, and the more trade is generated by population and GDP, the more developed and influential a country's maritime sector will be.

The data used above are in percentage values and are sourced from the dataset of World Shares for 2022 available on the UN Trade and Development website (<https://unctadstat.unctad.org/CountryProfile/MaritimeProfile/enGB/004/index.html>). The related countries were taken from the study by Paixão Casaca and Lyridis (2018). Countries with high economic activities are categorised based on whether they follow

a controlled cabotage policy or a liberalised cabotage policy in the research of Paixão Casaca and Lyridis (2018). The following countries were therefore considered: Japan, USA, Peru, France, Germany, Italy, Greece, Portugal, Spain, Finland, Sweden, Bulgaria, Romania, Croatia, Türkiye, Russia, India, South Korea, Thailand, Vietnamese, Taiwan, Canada, Mexico, Cuba, Panama, Venezuela, Brazil, Argentine, Chile, Ecuador, the Philippines, Malaysia, Indonesia, China, Egypt (having controlled cabotage policies-CCP); Australia, Belgium, the Netherlands, Denmark, Ireland, United Kingdom, Norway, Malta, Estonia, Latvia, Poland, Nigeria, South Africa, United Arab Emirates, Singapore (having Liberalised Cabotage Policies-LCP).

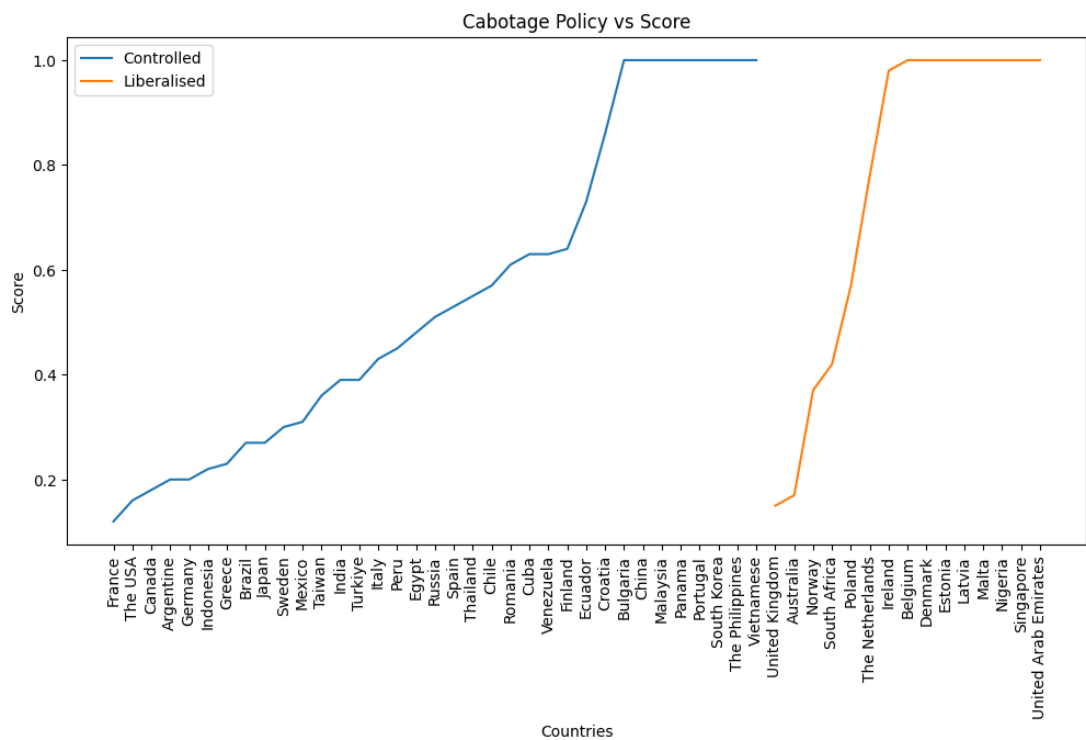
At the end of the analysis, Portugal, Bulgaria, South Korea, Vietnamese, Panama, the Philippines, Malaysia, China (controlled cabotage countries), Belgium, Denmark, Malta, Estonia, Latvia, Nigeria, United Arab Emirates, Singapore (liberalised cabotage countries) were found to be fully efficient. The efficiency scores of each country are shown in Table 1 below. Among the countries with controlled cabotage, France has the lowest efficiency score of 0.12. Additionally, among the liberalised cabotage countries, the country with the lowest score is 0.15 for the UK. The average score for the controlled cabotage countries group is 0.54, while the average for the liberalised cabotage countries group is 0.76. As seen in Table 1 and Figure 1, the most efficient countries are present in both groups. This indicates that the two policies yield similar results.

Table 1: Results of 1st DEA model

CCP				LCP	
Countries	Score	Countries	Score	Countries	Score
Portugal	1	Egypt	0.48	Belgium	1
Bulgaria	1	Peru	0.45	Denmark	1
South Korea	1	Italy	0.43	Malta	1
Vietnamese	1	Türkiye	0.39	Estonia	1
Panama	1	India	0.39	Latvia	1
The Philippines	1	Taiwan	0.36	Nigeria	1
				United Arab	
Malaysia	1	Mexico	0.31	Emirates	1
China	1	Sweden	0.3	Singapore	1
Croatia	0.86	Brazil	0.27	Ireland	0.98
Ecuador	0.73	Japan	0.27	The Netherlands	0.78
Finland	0.64	Greece	0.23	Poland	0.57

CCP				LCP	
Countries	Score	Countries	Score	Countries	Score
Cuba	0.63	Indonesia	0.22	South Africa	0.42
Venezuela	0.63	Germany	0.20	Norway	0.37
Romania	0.61	Argentina	0.20	Australia	0.17
Chile	0.57	Canada	0.18	United Kingdom	0.15
Thailand	0.55	The USA	0.16		
Spain	0.53	France	0.12		
Russia	0.51				

Figure 1: Comparison of efficiencies of countries



When we compare the efficiencies of countries in controlled and liberalised cabotage policy groups, we find that the average efficiency of the countries in the liberalised group is higher than the average efficiency of the countries in the controlled group.

Insert Fig 2 here (Boxplot of countries with controlled and liberalised cabotage policies).

The mean efficiency for the group of countries that have a controlled cabotage policy is 0.55 with a standard deviation of 0.30, whereas the mean efficiency for the group of countries with liberalised cabotage policies is 0.76 with a standard deviation of 0.33. After conducting the F-test for equality of variances of the two groups ($F = 1.202$, $df_1 = 14$, $df_2 = 34$, $p = 0.318$), we find no evidence that the variances are different. Hence, we conduct the t-test for independent samples assuming equal variance and find that the difference between the mean efficiencies of the two groups is not statistically significant at $\alpha = 0.01$ level ($t = -2.227$, $p = 0.031$).

3.3. Case Study: Comparison of two countries with and without cabotage policies

In this section, the cases of Türkiye and the United Kingdom are compared. The reason for choosing these two countries is that they have a similar population, extensive coastline, and prominent history and infrastructure in the maritime business. Türkiye has a controlled cabotage regime as opposed to the liberal policy of the UK. To evaluate and compare both countries' cabotage policies, both correlation analysis and DEA methods, as mentioned above, have been utilised. The GDP, fleet size, Liner Shipping Connectivity Index (LSCI), transportation sector volume, and coastwise traffic between national ports for both countries have been considered for these analyses. The data used, sourced from the website of TÜİK (Turkish Statistical Corporation-www.tuik.gov.tr) and Office for National Statistics (www.gov.uk) ranges from 2006 to 2022 years.

3.3.1. Correlation Analysis

Türkiye and the UK have been following different maritime strategies for many years. Accordingly, the correlation analysis conducted between variables can provide insights into the outcomes of these differing regimes.

As seen in Table 2 and Table 3 below, a correlation analysis has been conducted between coastwise traffic between ports and GDP, fleet size, LSCI, and transportation sector volume for Türkiye and UK, respectively. The results show a statistically significant positive relationship between coastwise traffic between ports and all the variables: GDP, fleet size, LSCI, and transportation sector volume for Türkiye. In contrast, for the UK, there are statistically significant negative relationships between

coastwise traffic between ports and GDP as well as LSCI. In this study, coastwise traffic represents transportation by national ships. The negative correlation with GDP and LSCI indicates that, within the UK, over the years (2006-2022) different alternatives such as road/air have been preferred more in the logistics of production and services or that transportation is carried out more by foreign ships. However, there is a statistically significant positive relationship between coastwise traffic between ports and fleet size in the UK. The analysis results indicate no statistically significant relationship between coastwise traffic between UK ports and transportation sector volume.

Table 2: Correlation Values for Türkiye

Correlations for Türkiye (TR)				
	GDP	Fleet Size	LSCI	Trans. Sector Volume
Coastwise Traffic between TR ports	0.736*	0.955*	0.961*	0.925*
Significance (2 tailed)	<.001	<.001	<.001	<.001

Table 3: Correlation Values for the UK

Correlations for UK				
	GDP	Fleet Size	LSCI	Trans. Sector Volume
Coastwise Traffic between UK ports	-0.725*	0.661*	-0.606*	0.193
Significance (2 tailed)	0.01	0.04	0.1	0.458

3.3.2. Second DEA Model

A second DEA model, with the abovementioned variables, has been used to measure the outcomes of the different cabotage policies in comparison with Türkiye and the UK cases. In this model, GDP—measured in British pound sterling —, fleet size,

LSCI, and transportation sector volume are considered as inputs. In contrast, coastwise traffic between national ports is considered as the output. In the first DEA model, both inputs and output are chosen according to UNCTAD Report (2022) and Paixão Casaca and Lyridis's (2018) article. Given that the inputs focus on the infrastructure and potential of national maritime trade and the general economy, they provide an understanding of the general economic environment affecting maritime trade. The output in the second DEA model shows how much cargo is transported between ports within the country. In short, this data focuses on the volume of transportation between national ports. This output is an important measure to evaluate how efficiently the local maritime sector operates in terms of internal connectivity and its capacity to meet local demand for maritime transport.

The applied CCR model is input-oriented. The data covers the period from 2006 to 2022. The results of the analysis are presented below (Table 4) and show the most and least efficient country-year observations. Accordingly, the UK was fully efficient in 2006, 2007, and 2008, while Türkiye was fully efficient in 2007, 2008, 2009, 2013, 2017, 2018, and 2022. On the other side, the least efficiency results of the analysis belong to the UK for the years 2018, 2013, and 2017, respectively.

Table 4: Best and worst variables in accordance with country-year observations

Best solutions		Worst solutions	
Variables	Efficiency Score	Variables	Efficiency Score
UK2006	1	UK2018	0.70
UK2007	1	UK2013	0.68
UK2008	1	UK2017	0.64
TR2008	1		
TR2017	1		
TR2018	1		
TR2019	1		
TR2022	1		

4. Discussion

At the beginning of this research, we thought that liberal cabotage policies were more effective than protective regimes. However, the study's findings reveal no significant difference between protective and liberal cabotage approaches. In this section, a comparative discussion of protective and liberal cabotage policies is provided.

In maritime cabotage, stringent policies are established to safeguard domestic industries, restricting foreign shipowners from operating except under rigorous conditions and often for brief durations (Paixão Casaca and Lyridis 2018). Such protectionist measures are characterised by the principle that domestic shipping activities are confined to vessels registered, constructed, owned, manned, and operated solely by citizens of the country in question (Agama and Alisigwe 2018). This strict regime mandates that vessels aspiring to engage in coastal trade adhere to three layers of legal restrictions, requiring them to be built, owned, and crewed exclusively by nationals.

The United States, exemplified by policies like the Jones Act, also known as the Merchant Marine Act of 1920, stands as a prominent model of stringent maritime cabotage laws aimed at fortifying national economic and security interests. This legislation, named after Senator Wesley Jones, mandates strict criteria for ships engaged in domestic transportation (Loch-Temzelides 2017). These criteria include vessels being built in the United States, owned by U.S. citizens or companies with at least 75% U.S. ownership, and crewed by a minimum of 75% U.S. citizens or permanent residents (Arnold & Itkin LLP 2018). Additionally, foreign repairs on these ships must utilise steel comprising less than ten per cent of the ship's overall weight, fostering the growth of a robust domestic ship-building sector. While the Jones Act aims to bolster national security and economic interests, it also exemplifies the broader implications of protectionist policies, which can lead to inefficiencies and increased costs in the domestic market.

The strictness of cabotage laws extends beyond the United States. In countries where nationals hold at least 51% of controlling shares in shipping companies and have ownership of vessel and shipbuilding and repair facilities, cabotage laws are still

considered stringent if vessels are compelled to register within the country they operate (Paixão Casaca and Lyridis 2018). However, some nations demonstrate a more flexible approach, fluctuating between protectionist and liberal policies within their maritime cabotage regulations. This spectrum of approaches highlights the complexity of balancing national interests with the global dynamics of maritime trade

In broader economic terms, a protectionist market encompasses measures such as tariffs, quotas, and non-tariff barriers to limit international trade. These policies, adopted for various economic, social, strategic, and cultural reasons, can have significant negative impacts on economic development (Paixão Casaca and Lyridis 2018). While some reasons for protectionism may be justifiable, the consequences are profound. Protectionist measures lead to isolationism, increased poverty, and distortions in market competition through the creation of monopolies, higher prices, and lower-quality products. Additionally, government subsidies and loans provided to domestic industries further distort market competition and can exacerbate these negative effects (Agama and Alisigwe 2018).

Despite its intentions, the Jones Act and similar protectionist measures can perpetuate economic inefficiencies and distortions. While they aim to safeguard national interests and foster domestic industries, they often result in higher prices, lower product quality, and inefficiencies in production systems. Additionally, the stringent criteria imposed by such policies can hinder international trade relations and provoke retaliation from other countries. Furthermore, the reliance on government subsidies and loans to support domestic industries distorts market competition and may not lead to sustainable economic growth in the long term. Thus, while protectionist policies like the Jones Act may address certain strategic and security concerns, they also pose significant challenges to economic development and global trade integration (Loch-Temzelides 2017).

Conversely, proponents, as emphasised by Wicker et al. (2020), maintain that the Jones Act is indispensable for preserving American jobs, safeguarding national security interests, and upholding the country's shipbuilding and maritime capabilities.

Historically, as O'Brien (2021) illustrates, the Jones Act has played a pivotal role, particularly during times of conflict like World War II, where it ensured the United States had a ready supply of merchant mariners and vessels to support the war effort. Over 200,000 Merchant Mariners and hundreds of commercial ships were mobilized, significantly contributing to the Allied victory. This historical context underscores the strategic importance of maintaining a robust domestic maritime industry capable of supporting both peacetime commerce and wartime logistics. Loch-Temzelides (2017) further emphasizes that the Act embodies a vital element of U.S. maritime policy, reflecting a longstanding commitment to safeguarding and promoting the nation's economic and national security interests.

Similarly, as Erim (2019) highlights, from the standpoint of national interests, many countries tend to implement protectionist cabotage policies through various means. Whether under cargo reservation schemes, commercial/trade codes, or specific legislation, the manner in which countries implement their cabotage regulations varies significantly. Some, like Japan, the United States, Peru, and Nigeria (though its enforcement remains incomplete), have adopted stringent policies. Recently, as noted by Erim (2019), Nigeria has initiated efforts toward compliance with a new strategy mandating detailed plans from both local and foreign operators in the oil and gas industry, focusing on marine services and vessel engagements.

Legally, protectionist policies like the Jones Act ensure compliance with national and international laws, making sure vessels meet necessary standards. Economically, they enhance cabotage contributions to the balance of payments, ensure the viability of national companies, promote the shipbuilding industry, shield both nascent and established industries from international competition, prevent dumping, support cargo reservation schemes, modernise the fleet, and conserve hard currency. Despite occasional concerns about potential cost hikes for American consumers, studies have indicated minimal effects on consumer prices. Moreover, the Jones Act serves as a cornerstone in upholding the robustness of the American merchant marine and civilian shipping sector, which is essential for bolstering the nation's preparedness during periods of potential conflict (O'Brien 2021). During the COVID-19 crisis, the

importance of the Jones Act became evident in ensuring the smooth flow of goods and vital supplies to communities and frontline workers (Wicker et al. 2020).

Critics of the controlled cabotage policies contend that its national security advantages have diminished in an increasingly globalised context while consumer expenses have risen sharply. Demands for repealing these types of regimes have intensified, with advocates arguing that abolishing these regulations could diminish shipping costs, consequently lowering consumer prices (Wicker et al. 2020).

Despite the critiques it faces, proponents of the controlled cabotage regimes stress its crucial role in safeguarding the rights of seafarers according to maritime law, especially in perilous working conditions (O'Brien 2021).

The absence of economic evaluation regarding the comparison of controlled and liberal cabotage policies remains a significant point of concern. Continuous discussions about this issue emphasise the necessity for a comprehensive assessment to ascertain whether the advantages of controlled cabotage policies surpass their disadvantages.

In fact, this study emphasizes exactly this point. The analysis of domestic transportation by national ships in two countries with different cabotage policies, namely the UK and Türkiye, is quite interesting. According to the correlation analysis results, for Türkiye which has a protective cabotage policy, a positive relationship exists between GDP, fleet size, LSCI, and transportation sector volume variables and domestic transportation by national ships.

The findings suggest that while a strong correlation between GDP, LSCI (Liner Shipping Connectivity Index) and coastal traffic might be expected, the relationships are different in the UK context. The negative correlation between coastal traffic (transport by national ships) and GDP suggests that as the UK economy grows, it increasingly relies on other transportation modes such as land/air or foreign ships, which may be faster or more cost-effective for logistics of goods and services. The same situation is valid for the LSCI relationship. The LSCI measures the connectivity of a country's ports to global shipping networks. This negative correlation means that as UK ports become more integrated with global shipping networks, the domestic

transport of goods by national ships (within the UK's own ports) is decreasing. This suggests that for domestic logistics, the country is increasingly importing foreign shipping services or is choosing different modes of transport rather than relying on national ships. In addition to these analyses, according to the second DEA model results, Türkiye has been more efficient in domestic maritime transportation with national ships between 2006 and 2022. In short, it can be said that Türkiye's protectionist cabotage policy has performed better compared to the UK's liberal cabotage policy over the years.

The liberal cabotage policy seems to have allowed more flexibility in the UK's domestic transport preferences and become more dependent on foreign shipping and other modes of transport. This picture highlights the consequences of liberalism that may not be consistent with traditional expectations. Actually, industry reports assert that the UK will not be successful with liberal cabotage policies (Nautilus 2018, 2024). It would be interesting to investigate whether similar trends are found in other countries with liberal cabotage policies or whether this is unique to the UK context.

According to Paixão Casaca and Lyridis (2018), the reasoning behind the adoption of either a strict or liberalized cabotage regime spans six categories: strategic, legal, economic, social, cultural, and environmental. Irrespective of the category guiding a country's decision, continuous assessment of cabotage impacts remains essential to ensure goals are achieved without unintended repercussions. Recent deliberations have revolved around the emergence of new domestic shipping strategies, with debates questioning whether cabotage bolsters or impedes competitiveness in coastal shipping.

The decision on whether to adopt a protectionist or liberalised approach to market economies or cabotage policies is multifaceted and heavily influenced by governmental political decisions. Governments weigh socio-economic, political, and geographical factors to justify their chosen approach, which can fall within three main regulatory frameworks: protectionist, liberal, or flexible. This situation allows them to leverage the advantages offered by each policy approach to navigate the challenges presented by the global economic landscape. While no single approach is universally optimal, each may suit a particular country based on its characteristics and capacity.

Although limited data constrained the study's scope, the results still offer valuable insights for both industry stakeholders and policymakers.

The decision on whether to adopt a protectionist or liberalised approach to market economies or cabotage policies is multifaceted and heavily influenced by governmental political decisions. Rarely do countries fully embrace either extreme; instead, they tend to selectively liberalise certain economic sectors or cabotage policies while protecting others, considering their strategic significance. Governments weigh socio-economic, political, and geographical factors to justify their chosen approach, which can fall within three main regulatory frameworks: protectionist, liberal, or flexible. This allows them to leverage the advantages offered by each policy approach to navigate the challenges presented by the global economic landscape. While no single approach is universally optimal, each may suit a particular country based on its characteristics and capacity. Although limited data constrained the study's scope, the results still offer valuable insights for both industry stakeholders and policymakers.

5. Conclusion

In this research, we reveal that an effective trade policy should cover the balance between protectionism and liberal market sentiments. The governments are primarily responsible for adopting established policy-making models for developing comprehensive plans that integrate the requisite policy tools for making extensive evaluations and strategic advice to achieve desired ends. Efficient trade policies require a delicate blend of protectionism and liberal market principles guiding navigation through multifaceted challenges in global commerce.

One of the purposes of this study was to add value to the academic debate on cabotage policies by comparing the cabotage policies of the United Kingdom and Türkiye. Through the comparative efficiency analysis of their cabotage laws, this research has exemplified the protectionist and liberal cabotage policies moving within the surroundings of the United Kingdom and Türkiye, assessing their efficiency in the context of international trade. Based on the effects of the cabotage laws on the United Kingdom and Türkiye, this paper highlights the dilemma between protectionist and liberal cabotage policies of global trade.

The comparative case studies of the United Kingdom and Türkiye were chosen intentionally because of the strategic geographical locations of the two countries, their important roles in maritime activities, and the quite different cabotage regulations. The United Kingdom, given its great traditions of seafaring and central position in world trade, presents an interesting case in the effectiveness analysis of the cabotage laws. The UK cabotage regulations have witnessed several changes over time because of economic changes, an improvement in technology, and, quite importantly, international trade agreements.

Contrasted to those of the UK, the policies of Türkiye offer a different view on how protectionism is balanced against liberalisation in the maritime sector. The strategic location of Türkiye, as a bridge between Europe and Asia, is an important maritime power. The policy toward cabotage laws in Türkiye is historical, political, and economic; hence, it has some special features that are important for making an in-depth study possible. A comparative analysis between these two nations will be very suitable in light of these countries' strategic geographical locations and robust maritime activities.

In essence, the comparative analysis demonstrated in this study opines that cabotage policy should be applied prudently to balance protectionist and liberal principles toward developing a resilient and competitive maritime sector. Such insights realised are used by stakeholders in developing strategies that further the general goals of foreign trade and economic development.

As with many studies, this study has some limitations. An important problem is that the data used in the analyses are limited and unavailable for all countries. In future studies, the effects of protectionist and liberal -cabotage policies can be discussed with industry representatives and considering more countries.

Data Availability Statement

Data supporting this study are openly available from; data.worldbank.org/, www.gov.uk/government/statistical-data-sets/port-and-domestic-waterborne-freight-

statistics-port#port-and-domestic-waterborne-freight-table-index and
www.tuik.gov.tr

Author Contribution Statement

Deniz Karagöz: Writing- Original draft preparation, **Mehmet Fatih Acar:** Conceptualization, Methodology, Software, **Emel Aktas:** Writing- Reviewing and Editing, **Anıl Aba:** Writing- Reviewing and Editing.

Disclaimer

This study formed part of Deniz Karagöz's thesis studies for the master of science degree (M.Sc.) at Izmir Katip Celebi University, which has been further developed and revised after the completion of her thesis.

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Comparison of efficiencies in protectionist and liberal cabotage policies

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