



Cargo Demand Forecasting at Samsun Ports Through Multiple Regression Analysis

Çoklu Regresyon Analizi ile Samsun Limanlarında Yük Talebinin Öngörülmesi

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ABSTRACT

This study seeks to forecast the future trajectory of cargo handling volumes at the ports of Samsun, situated along Türkiye's Black Sea coast. Employing multiple linear regression analysis, economic and demographic indicators covering the period 2005–2024 were utilized. The dependent variable was defined as the annual cargo throughput at Samsun ports, while the independent variables comprised Türkiye's Gross Domestic Product (GDP), the populations of Türkiye and Samsun province, as well as import and export figures. The results demonstrate that the model possesses a high explanatory power ($R^2 = 0.98$). The findings indicate that the volume of imports directed to Samsun constitutes the principal variable significantly driving port demand, whereas Türkiye's population exhibits borderline statistical significance. Other macroeconomic indicators (GDP, total imports and exports, and Samsun's exports), though included in the model, were not found to be statistically significant.

Projections suggest that the total cargo throughput at Samsun ports will reach approximately 17.6 million tons by 2030 and 20.4 million tons by 2035. This upward trend underscores the strengthening of Samsun's logistical role within the Black Sea basin and highlights the increasing importance of hinterland connectivity. The study provides a data-driven decision support mechanism for port authorities, local administrations, and investors in the domains of capacity planning, infrastructure development, and operational strategy formulation. Future research is recommended to incorporate additional variables such as container and Ro-Ro traffic, and to employ time-series or artificial intelligence-based methodologies.

Keywords: Samsun Ports, Demand Forecasting, Multiple Regression, Cargo Handling.

JEL Codes: C53, C51, R41, R42.

ÖZ

Bu çalışma, Türkiye'nin Karadeniz kıyısında yer alan Samsun Limanları için yük elleçleme miktarının gelecekteki eğilimini tahmin etmeyi amaçlamaktadır. 2005–2024 yılları arasındaki ekonomik ve demografik göstergeler kullanılarak çoklu doğrusal regresyon analizi gerçekleştirilmiştir. Bağımlı değişken olarak Samsun limanlarında yıllık yük elleçleme miktarı ele alınmış; bağımsız değişkenler ise Türkiye'nin Gayri Safi Yurtiçi Hasılası (GSYİH), Türkiye ve Samsun ili nüfusu, ithalat ve ihracat verileridir. Analiz sonuçları, modelin yüksek açıklayıcılık düzeyine sahip olduğunu ($R^2 = 0.98$) göstermektedir. Bulgulara göre Samsun'a yapılan ithalat

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hacmi liman talebini anlamlı biçimde artıran temel deęişken olarak öne çıkarken, Türkiye nüfusu sınırdan anlamlılık göstermiştir. Diğer makroekonomik göstergeler (GSYİH, toplam ithalat ve ihracat, Samsun ihracatı) modelde yer almakla birlikte istatistiksel olarak anlamlı bulunmamıştır.

Projeksiyonlara göre Samsun limanlarında toplam yük elleçleme miktarının 2030 yılında yaklaşık 17,6 milyon ton, 2035 yılında ise 20,4 milyon ton seviyesine ulaşması beklenmektedir. Bu artış eğilimi, Samsun'un Karadeniz havzasındaki lojistik rolünün güçleneceğine ve hinterland bağlantılarının öneminin artacağına işaret etmektedir. Çalışma, liman yönetimleri, yerel idareler ve yatırımcılar için kapasite planlaması, altyapı yatırımları ve operasyonel stratejilerin geliştirilmesi açısından veri temelli bir karar destek mekanizması sunmaktadır. Gelecek araştırmalarda, konteyner ve Ro-Ro trafięi gibi ek deęişkenlerin modele dahil edilmesi ve zaman serisi ya da yapay zekâ tabanlı yöntemlerin kullanılması önerilmektedir.

Anahtar Kelimeler: Samsun Limanları, Talep Tahmini, Çoklu Regresyon, Yük Elleçleme.

JEL Kodları: C53, C51, R41, R42.

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1. INTRODUCTION

In recent years, the acceleration of economic globalization and the expansion of international production networks have facilitated the spatial reorganization of industrial activities; within this process, ports have evolved beyond their traditional role as cargo handling nodes and increasingly emerged as centers where logistics, trade, and industrial activities cluster, giving rise to port–industry agglomerations (Notteboom & Rodrigue, 2005; Ducruet & Lee, 2006). With the acceleration of globalization, maritime transport and port management have become integral components of international trade and global supply chains (Notteboom, Pallis, & Rodrigue, 2016). In particular, maritime transportation plays an indispensable role in international commerce due to its cost efficiency and high-volume carrying capacity. Benefiting from its geography, surrounded by seas on three sides, Türkiye possesses significant port infrastructure, which serves as gateways for the national economy to global markets.

Samsun Ports, as the largest and most functional ports in the Black Sea Region, hold a strategic position for both domestic and international trade. Industrial facilities, agricultural activities, and mining operations located in Samsun’s hinterland directly influence the flow of cargo to the ports. Furthermore, Samsun’s railway, highway, and air transport connections render it an advantageous hub for multimodal transportation (Özkan, 2020).

To ensure the uninterrupted execution of port operations, the sustainability of infrastructure and superstructure services, the prevention of traffic irregularities and congestion, the mitigation of security vulnerabilities, the efficient utilization of natural and financial resources, and the minimization of adverse effects arising from supply-demand imbalances, demand forecasting in ports is employed (Doğusel, 2021). In recent years, the expansion of foreign trade volume, diversification of logistics demands, and regional population growth have rendered demand forecasting critical for capacity planning and operational efficiency at Samsun Ports. A fundamental prerequisite for future demand forecasting is the construction and/or modernization of port infrastructure and superstructure (Jarrett, 2015). Demand forecasting in ports aims to optimize resource allocation by anticipating future cargo volumes, container traffic, and service requirements. Such forecasts improve the timing of infrastructure investments, reduce operational disruptions, and enhance the competitiveness of ports. Demand forecasting studies provide not only port operators but also local governments, investors, and regional development agencies with a strategic decision-support mechanism. Accurate forecasts enable more effective planning of logistics villages, warehouses, customs areas, and transportation infrastructure surrounding ports.

In this study, multiple linear regression analysis was employed to estimate cargo handling volumes at Samsun Ports. The dependent variable was defined as the annual cargo throughput at Samsun Ports, while the independent variables included Türkiye’s Gross Domestic Product (GDP), the populations of Türkiye and Samsun province, as well as import and export figures. The objective is to provide port authorities with a data-driven decision-support mechanism and to contribute to infrastructure planning.

2. SAMSUN PORTS

The evolutionary trajectory of a city’s foundation and its subsequent development dynamics is shaped by a composite of multidimensional factors. Among these, locational characteristics—namely the geographical position—play a decisive role. The analytical framework of location is primarily defined by the physical conditions of the settlement site and secondarily by the spatial context, which encompasses the network of relationships established with both its immediate and distant surroundings

(Yılmaz, 2015). As long as the environmental and functional relations arising from this locational advantage operate effectively, processes of urban growth and development progress in a stable manner.

Within this framework, the city of Samsun is situated along the coastal strip of the Black Sea Region and geographically occupies a central position within the area. This strategic location not only renders Samsun the principal gateway of a vast hinterland to the Black Sea but also elevates it to the status of a starting point for commercial arteries that connect the Black Sea to the Persian Gulf and the Mediterranean basin through the interior regions of Anatolia. Consequently, Samsun emerges as a port city of historical and economic significance, functioning as a critical transshipment hub between maritime and land transportation.

Samsun hosts a total of 11 port and terminal facilities, each serving different categories of cargo. These facilities and their operational domains are presented in Table 1.

Table 1.

Ports, terminals, and operational domains in Samsun (URL-1)

No	Facility	Operational Domain
1	Altınbaş Petroleum and Trade Inc. (Alpet) Filling Facility	Fuel
2	Aygaz Samsun Terminal	LPG
3	Likitgaz Samsun Filling and Storage Terminal	LPG
4	Petrol Ofisi Inc. Samsun Terminal	Fuel
5	Samsunport	General cargo bulk, Container, and Ro-Ro
6	Toros Agriculture Samsun Port	General cargo bulk
7	Akpet Fuel Samsun Terminal	Fuel
8	Sadaş Samsun Terminal	Fuel
9	Yeşilyurt Port	General cargo bulk
10	Eti Copper Coastal Facility	General cargo bulk
11	MBT Chemical Samsun Port	Chemical

As of 2024, a total of 12,747,789 tons of cargo was handled at Samsun ports. This volume consisted of 3,480,023 tons of loading operations and 9,267,766 tons of unloading operations. During the same period, the number of vessels calling at Samsun ports was recorded as 2,567 (URL-2).

Due to its strategic hinterland within the Black Sea Region, Samsun plays a significant role in regional logistics activities. This locational advantage has particularly contributed to the concentration of fuel and LPG terminals, while also becoming a fundamental factor enhancing the city's attractiveness in terms of general cargo and bulk freight transportation.

3.THEORETICAL FRAMEWORK AND LITERATURE REVIEW

3.1 The Concept of Demand Forecasting

Demand forecasting is an analytical process employed by businesses and public institutions to anticipate future needs for products, services, or resources. This process is carried out through the analysis of historical data, the evaluation of economic indicators, and the application of statistical modeling techniques. Armstrong (2001) defines demand forecasting as “a systematic tool that enables decision-makers to make the best possible predictions about the future under conditions of uncertainty.”

Demand forecasting plays a crucial role in the strategic planning processes of organizations. Specifically, it functions as a decision-support mechanism in operational and managerial domains such as the efficient allocation of resources, prevention of waste, guidance of production processes, determination of pricing strategies, formulation of sales policies, minimization of business risks, and optimization of inventory management (Akar & Esmer, 2015). In the context of port management, demand forecasting is of critical importance for predicting cargo volumes, container traffic, vessel calls, and logistics service requirements. Accurate forecasts allow for effective planning of port infrastructure, human resources, equipment, and storage facilities. Moreover, the development of transportation networks and logistics centers surrounding ports is also shaped by these forecasts.

3.2 Literature Review

Accurately forecasting cargo demand at ports is critically important for both the capacity planning of port operators and for making sound strategic investment decisions regarding transportation infrastructure. The increasing global trade volume, variable economic conditions, and the complex structure of logistics networks have made it necessary to widely use statistical and econometric methods to predict port demand, moving beyond traditional approaches. In this context, in the literature; Research is being conducted across a wide range of methodologies, from time series models and machine learning algorithms to regression-based prediction methods and spatial analyses.

Güzey (2019), in a master’s thesis prepared at Bursa Uludağ University, conducted a capacity adequacy analysis for a port enterprise. In the study, general cargo, container, and vehicle handling data were utilized, applying both statistical forecasting methods and machine learning algorithms. The results indicated that the most effective forecasting method for container and vehicle handling volumes was the Additive Holt-Winters model, whereas the ARIMA model yielded the most successful outcomes for general cargo. In his study, Söner (2023) examined Türkiye's future maritime transport demand using simple linear regression and multiple linear regression methods. The study aimed to develop a guiding model for predicting the demand for Turkish ports in the near future, utilizing GDP and population data.

The report “Main Agendas and Solution Proposals of the Port Sector” published by TÜRKLİM (2023) presented cargo volume forecasts for Turkish ports in line with the 2023 and 2050 vision targets. The report emphasized that forecasts based on historical data were successfully realized with a margin of error of approximately 5%, demonstrating the effectiveness of demand forecasting as a tool in sectoral planning.

Doğusel (2021), in a study on Kocaeli Ports, employed multiple regression analysis to forecast cargo and container handling volumes. Variables such as GDP, imports, exports, and population were incorporated into the model, and the findings projected that container capacity would become

insufficient by 2033. Ergün and Şahin (2019) highlighted the vital importance of demand forecasting in strategic decision-making processes for enterprises, particularly emphasizing its cost-reducing and efficiency-enhancing effects in infrastructure investments such as ports, which require substantial capital.

For short-term forecasts of import and export containers at Taiwanese ports, a regression model was applied (Chou et al., 2008). The model included nine macroeconomic explanatory variables, such as regional population and Gross Domestic Product (GDP). The results revealed that forecasts generated through models accounting for non-stationary variable coefficients provided more accurate outcomes compared to traditional regression methods. Furthermore, the study noted that regression models were reviewed in detail.

Notteboom (2006) argued that demand forecasting plays a decisive role in the timing of infrastructure investments in European ports, stressing that hinterland connections and regional development strategies should be integrated into forecasting models. In a study on the Port of Antwerp, a spatial method was employed to analyze the relationship between cargo volumes handled at the port and GDP (Vanoutrive, 2010). The findings indicated that the growth of the transport sector occurs with a time-lag relative to economic growth. Moreover, the study highlighted that this relationship may vary across countries and commodity types.

4.METHODOLOGY AND DATA SET

Regression analysis is conducted to determine whether there exists a causal relationship between two or more variables and to utilize this relationship for making predictions regarding the subject matter. Regression analysis is a statistical technique employed to estimate the relationship between variables that exhibit cause-and-effect dynamics. The primary focus of population regression is to analyze the relationship between the dependent variable and the independent variables, and to formulate the linear equation that represents this relationship (Kaya Uyanık & Güler, 2013).

In regression analysis, models that employ only one independent variable are referred to as simple regression analysis (univariate regression), whereas models that include multiple independent variables are termed multiple regression analysis (Tabachnick & Fidel, 1996; Büyüköztürk, 2002). Multiple linear regression analysis essentially differs from simple linear regression in that it incorporates more than one independent variable simultaneously. When the independent variables are predetermined and measurable factors, the multiple linear regression model provides a high level of explanatory power and predictive accuracy for the dependent variable (Şenel et al., 2014). This distinction is crucial in determining whether the effects on the dependent variable are explained by a single factor or by multiple factors.

For regression analysis to be properly constructed, variables must be classified as dependent and independent. The dependent variable is the one that is explained or predicted by the independent variables. Typically, the dependent variable is denoted by Y, while the independent variable(s) are represented by X. The general form of a simple linear regression model with a single independent variable is expressed as follows:

$$Y=\beta_0+\beta_1 X+\varepsilon \quad (1)$$

Here, β_0 and β_1 represent the unknown parameters of the model, while ε denotes the error term. Y indicates the observable value of the dependent variable, and X represents the observable value of the

independent variable. For the i^{th} observation unit, the dependent variable value is denoted as Y_i , and the error term is defined as $\varepsilon_i = Y_i - E(Y_i)$ or equivalently $\varepsilon_i = Y_i - \mu_i$.

In the case where more than one independent variable is included, the model takes the form of a multiple linear regression equation, which can be expressed as follows:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki} + \varepsilon_i \quad (2)$$

where Y_i denotes the dependent variable for the i^{th} observation, $X_{1i}, X_{2i}, \dots, X_{ki}$ represent the independent variables, β_0 is the intercept, $\beta_1, \beta_2, \dots, \beta_k$ are the regression coefficients, and ε_i is the error term (Ünver vd., 2011).

4.1 Data Set

The data set employed in this study covers economic and demographic indicators for the period 2005–2024. It consists of the following four primary variables:

- Cargo Handling Volume (tons): The annual total cargo throughput handled at Samsun Ports.
- Gross Domestic Product (GDP, \$): Annual GDP figures for Türkiye and Samsun province, obtained from TÜİK (Turkish Statistical Institute) and the Central Bank of the Republic of Türkiye (CBRT).
- Population (persons): Annual population data for Türkiye and Samsun province, sourced from TÜİK’s Address-Based Population Registration System.

Imports and Exports (\$): Annual foreign trade data for Türkiye and Samsun province, provided by the Ministry of Trade and the Samsun Chamber of Commerce and Industry.

Table 2.
Data on Dependent and Independent Variables (TÜİK, Directorate General of Maritime Trade)

Data	Dependent Variable							
	Samsun Total Cargo (tons)	Türkiye GDP	Türkiye Imports	Türkiye Exports	Samsun Imports	Samsun Exports	Samsun Population	Türkiye Population
Year	Unit Ton	\$	\$	\$	\$	\$	Person	Person
2005	3.181.586	7.376	116.774	73.476	263.928	118.872	1.229.361	68.860.539
2006	4.348.707	7.971	139.576	85.535	346.857	158.329	1.229.587	69.729.967
2007	5.774.896	9.735	170.063	107.272	521.955	218.370	1.228.959	70.586.256
2008	6.474.729	11.018	201.964	132.027	784.032	459.818	1.233.677	71.517.100
2009	6.691.606	9.044	140.928	102.143	479.458	304.163	1.250.076	72.561.312
2010	7.282.107	10.629	185.544	113.883	612.437	275.084	1.252.693	73.722.988
2011	8.270.317	11.289	240.842	134.907	946.107	441.316	1.251.729	74.724.269
2012	8.910.426	11.675	236.545	152.464	1.006.611	422.749	1.251.722	75.627.384
2013	9.552.213	12.582	260.822	161.480	778.068	423.397	1.261.810	76.667.864
2014	9.358.634	12.178	251.142	166.504	773.568	465.377	1.269.989	77.695.904
2015	9.776.562	11.085	213.619	150.982	645.672	402.714	1.279.884	78.741.053
2016	10.003.832	10.964	202.189	149.246	558.050	367.582	1.295.927	79.814.871

2017	12.325.083	10.696	238.715	164.494	764.740	461.934	1.312.990	80.810.525
2018	11.847.538	9.799	231.152	177.168	828.304	642.185	1.335.716	82.003.882
2019	11.150.996	9.208	210.345	180.832	706.924	730.349	1.348.542	83.154.997
2020	12.995.840	8.600	219.516	169.637	788.046	744.444	1.356.079	83.614.362
2021	13.177.075	9.601	271.425	225.214	1.147.774	1.305.257	1.371.274	84.680.273
2022	13.584.153	10.659	363.710	254.169	1.137.172	1.318.573	1.368.488	85.279.553
2023	14.176.568	13.243	361.966	255.627	1.195.152	1.280.182	1.377.546	85.372.377
2024	12.747.789	7.376	344.010	261.778	1.106.490	1.430.236	1.382.376	85.664.944

Regression analysis is a quantitative method that aims to explain the relationship between a dependent variable and one or more independent variables assumed to have an effect on it, through a statistical model (Gürbüz & Şahin, 2015: 263). For the period 2005–2024, a multiple linear regression analysis was conducted using annual total cargo volumes at Samsun ports (dependent variable) together with Türkiye’s and Samsun province’s GDP, population, imports (in tons or value), and exports (independent variables).

The total number of observations in the model is $n=20$, and the objective is to generate medium-term (5 years) and long-term (10 years) demand forecasts for Samsun ports. By employing multiple linear regression analysis, this study seeks to estimate cargo handling volumes based on economic and demographic indicators. The regression model is defined as follows:

$$\begin{aligned}
 & \text{[Cargo]}_t = \beta_0 + \beta_1 \cdot \text{[GDP]}_t + \beta_2 \cdot \text{TPopulation}_t + \beta_3 \cdot \text{SPopulation}_t + \beta_4 \cdot \text{TImport}_t + \beta_5 \cdot \text{TExport}_t + \beta_6 \cdot \text{SImport}_t + \beta_7 \cdot \text{SExport}_t + \varepsilon_t
 \end{aligned}
 \tag{3}$$

Here:

- [Cargo]_t : Total cargo handling volume at Samsun ports in year t (tons)
- GDP_t : Türkiye’s Gross Domestic Product (billion \$)
- TPopulation_t : Population of Türkiye (persons)
- SPopulation_t : Population of Samsun province (persons)
- TImport_t : Türkiye’s total imports (billion \$)
- TExport_t : Türkiye’s total exports (billion \$)
- SImport_t : Imports of Samsun province (billion \$)
- SExport_t : Exports of Samsun province (billion \$)
- β_0 : Intercept term
- β_i : Coefficient of each independent variable
- ε_t : Error term

F-Test: Applied to examine the overall significance of the model.

p-values: Evaluated to determine the statistical significance of each independent variable.

4.2. Research Findings

This section presents the findings obtained from the multiple regression analysis. The multiple regression analysis, performed using 20 observations in Microsoft Excel, yielded the following results:

Multiple R: The value of 0.9923 indicates a very strong linear relationship between the dependent variable (Total Cargo) and the independent variables.

R-Squared (R^2): The value of 0.9848 shows that the model explains 98.48% of the variance in the total cargo variable, demonstrating a very high level of explanatory power.

Adjusted R-Squared: The value of 0.9759 confirms that the explanatory power remains strong even when the number of independent variables in the model is taken into account.

F-Statistic: The value of 110.72 and the significance level ($p < 0.000000001$) indicate that the model is statistically significant overall and that the independent variables jointly explain the total cargo in a meaningful way.

Table 3 summarizes the effects of the independent variables on total cargo and their statistical significance:

The validity of the model was assessed using the following statistical tests:

R^2 (Coefficient of Determination): Used to measure the explanatory power of the model.

Table 3.

Effects of Independent Variables on Total Cargo and Their Statistical Significance

Variable	Coefficient	t-Statistic	p-Value	Significance
GDP	172.97	1.31	0.213	Not significant
TImport	6.38	0.68	0.509	Not significant
TExport	-15.76	-0.63	0.537	Not significant
SImport	3.24	2.23	0.046	Significant
SExport	-2.05	-0.85	0.410	Not significant
SPopulation	22.22	1.13	0.279	Not significant
TPopulation	0.42	2.16	0.0517	Marginally significant
Variable	Coefficient	t-Statistic	p-Value	Significance

Samsun Imports (SImport): Exhibits a positive and statistically significant coefficient. This indicates that an increase in imports to Samsun directly and significantly raises port demand.

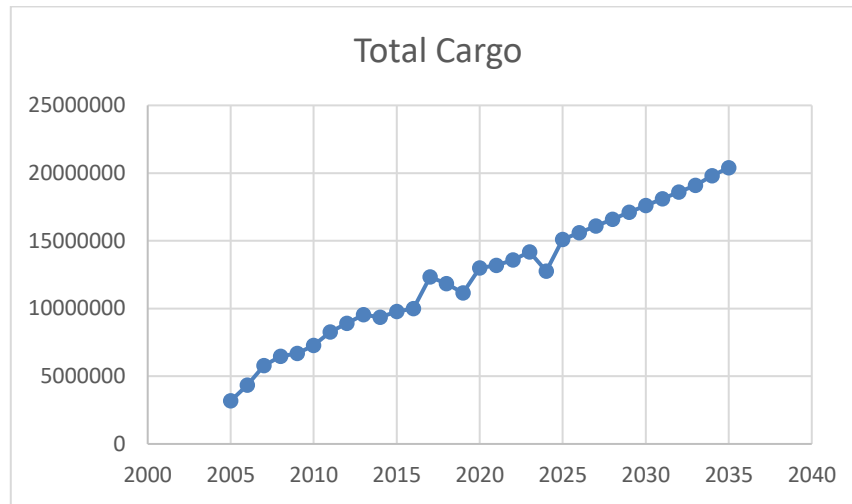
Total Population (TPopulation): Marginally significant ($p \approx 0.05$). Population growth may indirectly influence port demand.

Although other variables (GDP, total imports/exports, Samsun exports, etc.) are included in the model, they are not statistically significant. This indicates that these variables alone are not sufficient to explain port demand. The differences between the predicted total cargo values and the observed values are generally small, with standard deviations remaining within ± 2 . This demonstrates that the model performs with high accuracy in forecasts based on historical data and provides satisfactory predictive power.

The results of the regression analysis are presented graphically in Figure 1 and in tabular form in Table 3. Figure 1 illustrates the projection of total cargo demand at Samsun ports, showing actual data for the period 2005–2024 and forecast projections beginning in 2025. Table 4 expresses these forecast projections numerically, with values approximately rounded.

Figure 1.

Total cargo projection for Samsun ports

**Table 4.**

The main parameters of HSMV model

Year	Predicted Total Cargo (tons)
2025	15,100,000
2026	15,600,000
2027	16,100,000
2028	16,600,000
2029	17,100,000
2030	17,600,000
2031	18,100,000
2032	18,600,000
2033	19,100,000
2034	19,800,000
2035	20,400,000

5. CONCLUSIONS

In this study, future demand forecasts for Samsun Ports were generated based on cargo handling volumes recorded between 2005 and 2024. By employing multiple linear regression analysis, the relationships between economic and demographic indicators were examined, and the model was found to have a high explanatory power ($R^2 = 0.98$). The results demonstrate that the model is largely capable of accurately predicting port cargo demand.

According to the findings, the volume of imports to Samsun is one of the key variables that significantly influences port demand. Population growth was found to be marginally significant, suggesting that increases in urban and industrial activities indirectly raise cargo demand. Other macroeconomic indicators (GDP, total imports and exports, Samsun exports), although included in the model, did not exhibit statistically significant effects. This indicates that cargo flows at Samsun Ports

are more sensitive to regional trade dynamics and import-oriented logistics activities than to national economic trends.

Model projections suggest that the total cargo handling volume at Samsun Ports will reach approximately 17.6 million tons by 2030 and 20.4 million tons by 2035. This upward trend highlights Samsun's growing logistical role in the Black Sea basin and the strengthening of its hinterland connections. Accordingly, the findings provide an important reference for port authorities, local administrations, and investors in terms of capacity planning, infrastructure investments, and the development of operational strategies.

In his study, Doğusel (2021) made a demand forecast for Kocaeli Ports based on data from 2009-2020. Söner (2023), on the other hand, used data from 2004-2021 in his demand forecasting model study for Turkish ports and created a model accordingly. In our study, similarly, a demand forecast for Samsun Ports was made based on a longer time period.

In conclusion, this study demonstrates that a data-driven demand forecasting model specifically applied to Samsun Ports can contribute to foresight-based decision-making processes in port planning. For future research, it is recommended to enhance the accuracy of the model by incorporating variables such as types of foreign trade, container traffic, and Ro-Ro operations, as well as by employing time series analyses or artificial intelligence-based forecasting methods. In this way, stronger and more dynamic forecasting models can be developed to sustainably enhance the regional competitiveness of Samsun Ports. As Söner (2023) also stated, it is thought that obtaining broader and more reliable information in such studies will be effective in reaching clearer results.

Beyan ve Açıklama / Disclosure Statement

Yazarlar tarafından herhangi bir çıkar çatışması beyan edilmemiştir.

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Çalışmanın tüm aşamaları yazarlar tarafından ortak yürütülmüştür.

All stages of the study were conducted by the author.

Etik Kurul İzni / Ethics Board Approval

Bu çalışma etik kurul izni gerektirmemektedir.

This study does not require ethics board approval.

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