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An Analysis Of The Effects Of Infrastructure Quality On The Logistics Performance For The International Trade

Uluslararası Ticaret İçin Altyapı Kalitesinin Lojistik Performans Üzerindeki Etkilerinin Analizi

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Abstract

In this study, it is investigated the effects of infrastructure quality on the logistics performance. The analysis covers the 160 countries across the world and used statistical techniques to compare the mean of the country groups having different level of infrastructure quality. According to the test results, the mean of the logistics performance index for the country groups having different level of infrastructure quality are statistically not equal for each country group. As a result, it can be concluded that the quality level of trade transport related infrastructure affects positively the logistics performance. It is very important to improve the quality level of trade transport related infrastructure in order to increase the volume of the international trade.

Keywords: Infrastructure Quality, Logistics Performance, International Trade

JEL Codes: *F10, F13, F14*

Özet

Bu çalışmada, altyapı kalitesinin lojistik performans üzerindeki etkileri incelenmiştir. Analiz, dünya genelinde 160 ülkeyi kapsamaktadır ve farklı altyapı kalitesine sahip ülke gruplarının ortalamasını karşılaştırmak için istatistiksel teknikler kullanılmıştır. Test sonuçlarına göre, farklı altyapı kalitesine sahip ülke grupları için lojistik performans endeksinin ortalaması, her ülke grubu için istatistiksel olarak eşit değildir. Sonuç olarak, ticaret taşımacılığı ile ilgili altyapının kalite seviyesinin lojistik performansını olumlu yönde etkilediği sonucuna varılabilir. Uluslararası ticaretin hacmini arttırmak için ticaretle ilgili altyapının kalite seviyesini iyileştirmek çok önemlidir.

Anahtar Kelimeler: Altyapı Kalitesi, Lojistik Performans, Uluslararası Ticaret

JEL Kodları: *F10, F13, F14*

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1. INTRODUCTION

The quality level of trade transport related infrastructure is very important for the logistics performance of the countries in order to increase international trade. For this reason, it is vital to improve the quality level of trade transport related infrastructure by considering the developments in technology and value chain in the global level.

In this study, it is investigated the effects of infrastructure quality on the logistics performance. The analysis covers the 160 countries across the world and used statistical techniques to compare the mean of the country groups having different level of infrastructure quality.

It is clear that improvement in the infrastructure quality and logistic performance have important positive effects both international trade and economic development indicators for the countries. There are many studies supporting in the literature for the positive effects of infrastructure quality and logistic performance on the economic indicators. (see Wagner and Bode 2008, Arvis et al 2012, Portugal-Perez and Wilson 2012, Martí et al 2014, Puertas et al 2014, Bensassi et al 2015, Marlow and Casaca 2003, Hausman et al 2013, Munim and Schramm 2018, Closs and Thompson 1992, Ruamsook et al 2009, Khan et al 2017, Arvis et al 2018, Arvis et al 2016, Skorobogatova O, & Kuzmina-Merlino I, 2017, Gillen 1996, Bookbinder andTan 2003, Klumpp et al 2013) .

2. DATA AND METHODOLOGY

The data used in the study is from The World Bank, World Development Indicators Data Base (WDI), 2018 year for the 160 countries across the world.

The methodology used in the study is Kruskal-Wallis test that is one of the statistical techniques to compare the means of the country groups with the different level of infrastructure quality

The variables used in the study is The Logistics Performance Index and Quality of trade- and transport-related infrastructure, *1-5 scale and 5 is the best.*

The hypothesis tested in study as follows:

H_0: there is no significant difference among the groups (the mean of the logistics performance index for the country groups by the level of quality of trade- and transport-related infrastructure is equal)

H_1: there is at least one significant difference among the groups (the mean of the logistics performance index for the country groups by the level of quality of trade- and transport-related infrastructure is not equal)

3. EMPIRICAL RESULTS

Table.1. shows descriptive statistics for the logistics performance index by quality level of trade transport related infrastructure. According to the results, the mean of the logistics performance index is 2.21 for the countries with low quality level of trade transport related infrastructure, 2.90 for the countries with medium quality level of trade transport related infrastructure and 3.60 for the countries with high quality level of trade transport related infrastructure.

Table.1. Descriptive Statistics for Logistics performance index score by Country Groups

	Quality Level of trade transport related infrastructure		
	Low Countries	Medium Countries	High Countries
Mean	2.2157	2.9016	3.6042
Median	2.0000	3.0000	4.0000
Variance	.173	.090	.244
Std. Deviation	.41539	.30027	.49420
Minimum	2.00	2.00	3.00
Maximum	3.00	3.00	4.00
Range	1.00	1.00	1.00
Interquartile Range	0.00	0.00	1.00
Skewness	1.425	-2.766	-.440
Kurtosis	.030	5.840	-1.887

Table.2. shows tests of normality for the logistics performance index by quality level of trade transport related infrastructure of country groups. According to test results, normality assumption is invalid all sub-groups. For this reason, we test the null hypothesis by using Kruskal-Wallis Test

Table 2. Tests Results of Normality

Quality Level trade transport related infrastructure	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
low	,483	51	,000	,507	51	,000
medium	,530	61	,000	,340	61	,000
high	,393	48	,000	,621	48	,000

a. Lilliefors Significance Correction

Table.3. shows the Kruskal-Wallis test results, according to the test results, the null hypothesis is rejected at 0.01 significant level, meaning that there is at least one significant difference among the mean of the logistics performance index by quality level of trade transport related infrastructure.

Table.3. Kruskal-Wallis Test Results

Hypothesis Test Summary

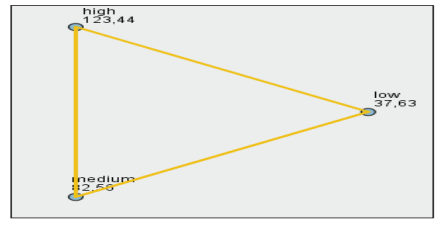
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Logistics_performance_index_score is the same across categories of Quality_Level_trade_transport_related_infrastructure.	Independent-Samples Kruskal-Wallis Test	,000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is ,05.

Table.4. shows the test results for the pairwise comparisons of the distributions. According to the test results, the means of the logistics performance index by quality level of trade transport related infrastructure are not equal for each country group. (also see the Figure.1.)

Table.4. Test Results for the Pairwise Comparisons of the Distributions for Quality Level trade transport related infrastructure

Pairwise Comparisons of Quality_Level_trade_transport_related_infrastructure



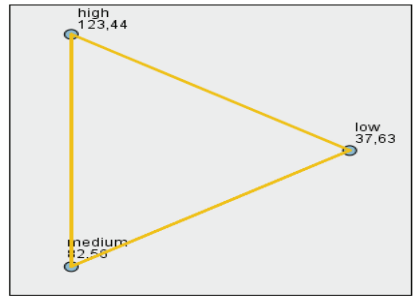
Each node shows the sample average rank of Quality_Level_trade_transport_related_infrastructure.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
low-medium	-44,930	7,962	-5,643	,000	,000
low-high	-85,810	8,439	-10,168	,000	,000
medium-high	-40,880	8,097	-5,049	,000	,000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is ,05.

Figure.1. Test Results for the Pairwise Comparisons of Quality Level trade transport related infrastructure

Pairwise Comparisons of Quality_Level_trade_transport_related_infrastructure



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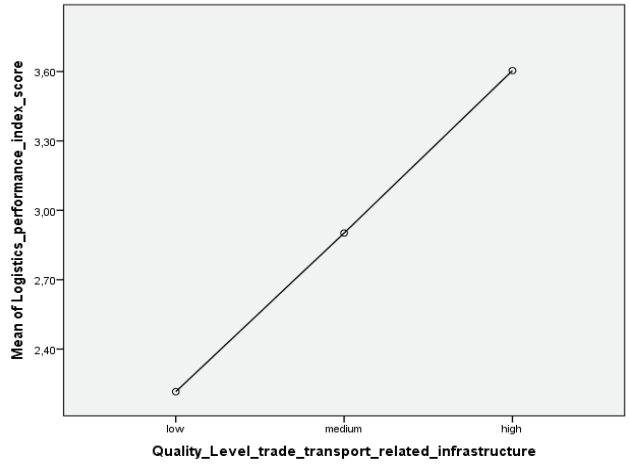

4. CONCLUSION

In this study, it is investigated the effects of infrastructure quality on the logistics performance. The analysis covers the 160 countries across the world and used statistical techniques to compare the means of the country groups imposing different level of infrastructure quality. According to the test results, the means of the logistics performance index by quality level of trade transport related infrastructure are not equal for each country group. As a result, it can be concluded that the quality level of trade transport related infrastructure affects positively the logistics performance. It is very important to improve the quality level of trade transport related infrastructure in order to increase the volume of the international trade.

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