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G-7 ve E-7 Ülkelerinde Lojistik Performans, Ekonomik Büyüme ve Finansal Gelişme İlişkisi

Relationship between Logistics Performance, Economic Growth and Financial Development in G-7 and E-7 Countries

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G-7 ve E-7 Ülkelerinde Lojistik Performans, Ekonomik Büyüme ve Finansal Gelişme İlişkisi

Öz

Lojistik bir ürünün ilk üreticiden son tüketiciye ulaşana kadar kadar gerçekleşen nakliye, depolama, gümrükleme, amblajlama, dağıtım gibi süreçleri ifade eder. Küreselleşme ile birlikte önemi günden güne hızla artan lojisitik sektörü ülkelerin kalkınmalarında büyük bir rol oynamaktadır. Özellikle günümüzde ülkeler arasında artan uluslarası ticaret faaliyetleri lojistik sektörünün önemini daha da artımıştır. Yine gelişen sanayi ve bunun için gerekli olan hammdelerin nakliyesinde de (demir, çelik, petrol vb.) lojisitk sektörü önemli bir rol oynamaktadır. Bu çalışmanın amacı, 2007-2018 dönemi için E-7 ülkeleri ve G-7 ülkeleri için lojistik performans, ekonomik büyüme ve finansal kalkınma arasındaki ekonometrik ilişkiyi incelemektir. Bu amaçla E-7 ülkeleri ve G-7 ülkeleri ile ilgili toplam dört model oluşturulmuş ve modellerde uzun vadeli ilişki ve uzun vadeli katsayılar incelenmiştir. Bulgulara göre; E-7 ülkeleri için finansal gelişme ile lojistik performans endeksi arasında uzun vadeli bir ilişki olmadığı tespit edilmiştir. G-7 ülkelerinde ise yüksek finansal derinlik nedeniyle finansal gelişme ile lojistik performans arasında uzun vadeli bir ilişki olduğu tespit edilmiş, ancak uzun vadeli ilişki katsayısı istatistiksel olarak anlamsızdır. Hem G-7 ülkeleri hem de E-7 ülkeleri için ekonomik büyüme ile lojistik performans arasında uzun vadeli bir ilişki olduğu tespit edilmiştir. Bununla birlikte, E-7 ülkeleri için uzun vadeli ilişki katsayısı istatistiksel olarak önemsizken, lojistik performans endeksinin G-7 ülkelerindeki ekonomik büyümeyi olumlu etkilediği görülmüştür. Bu bağlamda, politika perspektifinden bakıldığında, lojistik altyapısına yapılan yatırımın, ülkelerde gelecekteki ekonomik büyüme ve finansal büyüme için yüksek getirilere sahip olabilecek en faydalı yatırım olacağı unutulmamalıdır. Bu yüzden politika yapıcıların lojisitik konusuna gereken önemi vermeleri ve gerekli politikları geliştimeleri ekonomik büyüme ve finansal gelişme için elzemdir.

Anahtar Kelimeler: Lojistik Performans Endeksi, Ekonomik Büyüme, Finansal Kalkınma, E7, G7

Relationship between Logistics Performance, Economic Growth and Financial Development in G-7 and E-7 Countries

Abstract

Logistics refers to the processes such as transportation, storage, customs clearance, packaging, distribution of a product from the first manufacturer to the end consumer. The logistics sector, whose importance is increasing

day by day with globalization, plays an important role in the development of countries. Especially today, the increasing international trade activities between countries have increased the importance of the logistics sector. The logistics sector also plays an important role in the developing industry and the transportation of raw materials required for this (iron, steel, petroleum, etc.). The aim of this study is to analyze the relationship between logistics performance, economic growth and financial development econometric for E-7 countries and G-7 countries for the period 2007-2018. For this purpose, a total of four models related to E-7 countries and G-7 countries were established, and the long-term relationship and long-term coefficients were examined in the models. According to the findings; It is determined that there is no long term relationship between financial development and logistics performance index for E-7 countries. In G-7 countries, due to the high financial depth, it has been determined that there is a long-term relationship between financial development and logistics performance, but the long-term relationship coefficient is statistically insignificant. It has been determined that there is a long term relationship between economic growth and logistics performance for both G-7 countries and E-7 countries. However, the long-term relationship coefficient for E-7 countries was statistically insignificant, whereas the logistics performance index positively affected economic growth in G-7 countries. In this context, it should be kept in mind that from a policy perspective, investment in logistics infrastructure will be the most beneficial investment that can have high returns for future economic growth and financial growth in countries. Therefore, it is essential for the economic growth and financial development that policy makers give due importance to the issue of logistics and develop the necessary policies.

Keywords: Logistics Performance Index, Economic Growth, Financial Development, E7, G7

Introduction

Undoubtedly, there is a close relationship between the efficiency of the transport system and the profitability of the industry. The ability to continue production with less inventory with the fast turnover of stocks, to respond quickly to changing demands and to reach the shortest delivery time with the lowest cost are indicators of a company's competitive strength. Transport infrastructure has a significant impact on businesses productivity and costs. For example, better ports, hinterland connections and the sophistication of distribution networks can reduce the expenditure required for raw material shipping. Empirical studies show that direct foreign investments are attracted to areas with efficient transportation systems. Thus, the foundation of a productive economy in attracting foreign investment is an effective and efficient logistics system. In addition, transportation systems are considered

as one of the major factors in making decisions about the production factor and facility location (Ojala & Çelebi, 2015, p.7). As a result, countries where the logistics sector works efficiently become attractive for investments, which has a positive impact on the country's growth rate.

Some studies have examined the relationship between the logistics performance of countries and their economic growth (Bardakçi, 2020). Hoekman and Nicita (2010) found a significant and positive relationship between LPE scores and trade intensity. According to this research, it has been observed that the average LPE score of low-income countries than the increase of the average LPE of middle-income countries leads to 15% more trade, and this effect is stronger than the removal of tariffs. Hausman et al. (2013) examined the impact of countries' logistics performance on global bilateral trade. It found that shorter export times and lower importer costs led to more trade. In general, better LPE scores were found to be associated with more trade and lower logistics costs in previous studies, while several study findings showed that the relationships were not linear (Shong-Iee Ivan Su, 2017, p.57). On the other hand, Bozma et al. (2017), Kaynak and Mert (2004), Şimşek and Yiğit (2019) found that there is a positive relationship between economic growth and logistics performance index.

In an economy, the financial system is a whole formed as a result of certain individuals and institutions, markets, instruments and organizations coming together to perform various functions. The function of transferring savings to investments is realized through the financial system. This system, in which money and various financial instruments performing money

functions at different levels are produced and included in the functioning of the economy, is also the determinant of the micro and macro performances of the economy (Afşar, 2007, p.188). From a theoretical point of view, Levine and Zervos (1998), McKinnon (1993) and Shaw (1973) stated that advanced financial systems support or 'drive' economic growth, as they help mobilize savings awareness (Morris, 2002, p.154)).

Many studies have shown that the free movement of trade and capital, in other words globalization, can affect economic growth through financial development. By providing funds to entrepreneurs who can provide profitable investment opportunities, liberalized financial markets lead to economic development. The theory suggests that in a global world where capital flows freely, financial systems will affect economic growth through various channels. First, liberalization may allow the (real) rate of interest to rise to competitive market equilibrium by reducing financial pressure on protected financial markets. Second, removing capital controls allows domestic and foreign investors to do more portfolio diversification. Third, and most importantly, the process of liberalization often increases the efficiency of the financial system by weeding out inefficient financial institutions and putting pressure on financial infrastructure reform. Such an improvement in financial infrastructure can further increase the availability

of credit and support economic growth (Chinn & Ito, 2005, p. 164). In the literature review, there is no study other than Özdemir (2017) on the relationship between financial development and logistics performance index. This situation has been the motivation for the study.

Data Set

In the study, E-7 and G-7 countries are examined for the period 2007-2018. However, for Canada, data are not included in the analysis as they are incomplete. The economic growth (EG) use in the study, the growth rate in economic growth, financial development (FD) loans given to the private sector by banks, logistics performance index (LPI) are taken from the World Bank data set.

Method and Findings

Economies that have become integrated with globalization are naturally affected by each other. In this context, in the panel data analysis, the shock coming to any of the countries involved may affect other countries as well. For this reason, when conducting econometric analysis, it is of great importance to examine the cross-sectional dependency between variables.

In this context, firstly, cross section dependencies of variables and models will be examined. In the case of cross-section dependency, second generation econometric tests are used because they give more reliable results. If cross-sectional dependency is rejected, first generation econometric tests are preferred for the same reason. Breusch-Pagan (1980), Peseran (2004) CDLM, Peseran (2004) CDLM2 tests were developed for cross-sectional dependency in variables and models. In cases where the time dimension is greater than the cross-section size, the Breusch-Pagan (1980) and Peseran (2004) CDLM tests can be used. Only the Peseran (2004) CDLM test is used in cases where both the time dimension and the cross section size are high.

The hypotheses of the cross section dependency test are;

H0: There is no cross section dependency in the model.

H1: The model has a cross section dependency.

Probe. If the value is greater than 5%, the basic hypothesis is rejected, whereas if it is less than 5%, the basic hypothesis cannot be rejected.

Table1: Cross Section Dependency Test Results for Variables

		FD		EG		LPİ	
E-7 COUNTRİES		**Stat.**	**Prob.**	**Stat.**	**Prob.**	**Stat.**	**Prob.**
	LM	32.691	0.000***	13.899	0.308	9.230	0.161
	CD_{LM}	6.550	0.000***	1.125	0.260	-	0.824

						0.222	
	CD_{LM2}	6.368	0.000***	0.943	0.345	-0.403	0.686
		FD		EG		LPİ	
G-7 COUTRİES (Excluding Cnada)		**Stat.**	**Prob.**	**Stat.**	**Prob.**	**Stat.**	**Prob.**
	LM	30.215	0.110	19.347	0.198	29.00	0.216
	CD_{LM}	1.682	0.092	-0.301	0.762	1.460	0.144
	CD_{LM2}	2.252	0.024**	2.901	0.003***	3.781	0.002**

Note: ***, ** It indicates that the variables contain cross-sectional dependency at 1% and 5% significance level, respectively.

When Table 1 is examined, it is seen that only the FD variable in E-7 countries has cross-section dependence in the FD, EB and LPI variables according to the CDLM2 test in the G-7 countries. However, since FD, EB and LPI variables in G-7 countries do not contain cross-sectional dependency according to LM and CDLM tests, it is assumed that these variables do not include cross-section dependency.

Cross section dependency test results of the models are reported in Table 2. According to Table 2, it is determined that models contain cross-section dependence in only one of the 3 tests in E-7 and G-7 countries. In this context, preference of first generation econometric tests, which do not take into account cross-section dependency in analysis, helps to obtain econometrically reliable results.

Table 2: Section Dependency Test Results for Models

E-7 COUNTRIES					G-7 COUNTRIES (Excluding Canada)			
	M1a: FD= f(LPİ)		M1b: EG=f(LPİ)		M2a: FD= f(LPİ)		M2b: EG=f(LPİ)	
	Stat.	**Prob.**	**Stat.**	**Prob.**	**Stat.**	**Prob.**	**Stat.**	**Prob.**
LM	23.15135	0.058	13.46429	0.362	29.710	0.130	18.249	0.249
CD_{LM}	3.796467	0.012**	1.000054	0.317	1.590	0.111	-0.502	0.615
CD	4.401583	0.258	3.407643	0.000***	2.020	0.043**	3.486	0.000***

Note: ***, ** It indicates that the variables contain cross-sectional dependency at 1% and 5% significance level, respectively.

In the study, since variables are assumed not to include cross-sectional dependency, the stationarity of the variables is analyzed using the first generation panel unit root tests Im, Peseran and Shin (2003) (IPS). The IPS test is the panel version of the ADF unit root test in the time series analysis, and it is formulated as follows.

In the test, the basic hypothesis is in the direction of at least one unit with unit root, and if the basic hypothesis cannot be rejected, it is accepted that the panel series is not unit-rooted or in other words stationary.

Table:3 IPS Panel Unit Root Test Results

	E-7 COUNTRIES		G-7 COUNTRIES (Excluding Canada)	
	I(0)	I(1)	I(0)	I(1)
FD	-0.853	-4.061***	-0.663	-4.746***
EB	-1.498	-26.078***	-1.267	-2.544**
LPİ	-1.510	-4.301***	-0.288	-3.657***

Note: ***, *** means that variables are stationary at 1% and 5% significance level, respectively.

According to the results of Table 3, the basic hypothesis in level value can not be rejected for all variables in both E-7 countries and G-7 countries and it is determined that the variables are unit rooted. In the case of the first difference, the basic hypothesis for the variables is rejected and it is found that the variables became stationary.

The fact that the variables have the stationary orders of I (1) suggests the possibility of a cointegration relationship between the variables. For this reason, the long-term relationship between variables was examined by Pedroni (1999) cointegration test, one of the first generation cointegration tests. The Pedroni cointegration test is divided into two groups. These are panel tests and group tests. In the Pedroni cointegration test, panel-v, panel -p, panel pp (not parametric), panel ADF (parametric) statistics are panel tests. Group-p, group pp (not parametric), group ADF (parametric) are group tests. The basic hypothesis in the test is that there is no cointegration, and rejecting the basic hypothesis means that there is a long-term relationship among the variables.

When Table 4 and Table 5 are examined, it is determined that there is no long-term relationship between financial development and logistics performance index in E-7 countries, and there is a long-term relationship between economic growth and logistics performance index. In G-7 countries, it has been determined that there is a long-term relationship between both

Financial development and logistics performance index and between economic growth and logistics performance index.

Table 4: Pedroni Cointegration Test Results for E-7 and G-7 Countries

E-7 COUNTRIES									
M1a: FD= f(LPİ)					M1b: EB=f(LPİ)				
(within-dimension)					(within-dimension)				
			Wh Stat.						
Statistic		Prob.		Prob.		Statistic	Prob.	Wh. Stat.	Prob.
Panel v-Stat.	0.953	0.170	0.102	0.459	Panel v-Stat.	-0.371	0.644	-0.261	0.603
Panel rho-Stat.	-0.826	0.204	-0.737	0.230	Panel rho-Stat.	0.588	0.721	0.048	0.519
Panel PP-Stat.	-0.585	0.279	-1.040	0.149	Panel PP-Stat.	-1.359	0.087*	-4.133	0.000***
Panel ADF-Stat.	-0.523	0.300	-0.967	0.166	Panel ADF-Stat.	-4.703	0.000***	-4.610	0.000***
(between-dimension)					. (between-dimension)				
	Statistic	Prob.				Statistic	Prob.		
Group rho-Statistic	0.498	0.690			Group rho-Statistic	0.841	0.800		
Group PP-Statistic	-0.226	0.410			Group PP-Statistic	-10.481	0.000***		
Group ADF-Statistic	-0.272	0.392			Group ADF-Statistic	-6.247	0.000***		
G-7 COUNTRIES									
M2a: FD= f(LPİ)					M2b: EB=f(LPİ)				
(within-dimension)					. (within-dimension)				
			Wh						
	Prob.		Stat	Prob.		Statistic	Prob.	Wh	Pro

Statistic								Stat	b.
Panel v-Statistic	1.160	0.122	0.447	0.327	Panel v-Statistic	-1.127	0.870	-0.865	0.806
Panel rho-Statistic	-0.527	0.099*	-0.531	0.097*	Panel rho-Statistic	0.487	0.687	0.469	0.680
Panel PP-Statistic	-1.951	0.025**	-1.847	0.032**	Panel PP-Statistic	-1.580	0.057	-1.648	0.049**
Panel ADF-Statistic	-1.928	0.026**	-1.833	0.033**	Panel ADF-Statistic	-1.593	0.055	-1.651	0.049**
(between-dimension)					(between-dimension)				
	Statistic	Prob.				Statistic	Prob.		
Group rho-Statistic	1.118	0.868			Group rho-Statistic	1.531	0.937		
Group PP-Statistic	-1.115	0.132			Group PP-Statistic	-2.617	0.004		
Group ADF-Statistic	-1.391	0.082*			Group ADF-Statistic	-1.851	0.032		

Note: ***, **, * respectively indicate cointegration at 1%, 5% and 10% significance level in the model.

Out of the 4 models examine in the study, apart from model 1a, long-term relationships are found in the other three models. In this context, the long-term coefficients of the other three models, except for model 1a, should be examined. The review is carried out using the Panel DOLS method proposed by Stock and Watson (1993). This method is an econometrically robust method and eliminates the endogeneity problem by taking one lagged value and the next value of the independent variables. On the other hand, in this econometric method, the autocorrelation problem is eliminated by the Generalized Least Sequares-GLS method. The DOLS model is as follows.

$$y_{i,t} = \beta_0 + \beta^* x + \sum_{j=-q}^{p} d^* X_{t-j} + u_{i,t}$$

In the model, the dependent variable y denotes the matrix of X independent variables. β* indicates the cointegrated vector, the lag length p. -q represents the next period value.

Table:5 Panel DOLS Results

	Variable	Coefficient	Std. Error	t-Statistic	Prob.
For E-7 Contries EB=f(LPİ)	LPİ	-2.291570	2.848386	-0.804515	0.4345
	R-squared	0.649904	Mean dependent var		4.504880
	Adjusted R-squared	0.349821	S.D. dependent var		3.009007
	S.E. of regression	2.426273	Sum squared resid		82.41521
	Long-run variance	3.682167			
For G-7 Countries EB=f(LPİ)	Variable	Coefficient	Std. Error	t-Statistic	Prob.
	LPİ	3.413	0.516	0.7557	0.060*
	R-squared	0.469	Mean dependent var	1.532	
	Adjusted R-squared	0.095	S.D. dependent var	1.319	
	S.E. of regression	1.255	Sum squared resid	26.793	
	Long-run variance	0.556			
For G-7 Countries FD=f(LPİ)	Variable	Coefficient	Std. Error	t-Statistic	Prob.
	LPİ	-102.543	59.282	-1.729	0.1029
	R-squared	0.96	Mean dependent var	162.6451	
	Adj. R-squared	0.93	S.D. dependent var	45.14290	
	S.E. of regression	11.22	Sum squared resid	2017.043	
	Long-run variance	68.495			

Note: * It indicates that the variables are significant at the 10% significance level

When the panel DOLS results are examined, it is found that there is no statistically significant relationship between the logistics performance index and economic growth for E-7 countries. For the G-7 countries, when the models are analysed, it has been determined that there is no statistically significant relationship between the logistics performance index and financial development, whereas there is a statistically significant and

positive relationship between the logistics performance index and economic growth.

Conclusion And Evaluaiton

The aim of this study is to examine the relationship between the logistics performance index for the G-7 countries and the E-7 countries, with the exception of Canada for the period 2007-2018, in terms of financial development and economic growth. In order to choose the correct model, first, cross-section dependency analysis, then unit root test and cointegration test are performed for this purpose. Lastly, the long-term coefficients of the variables are calculated by the Panel DOLS method with the long-term coefficients estimator.

When the findings are examined, it has been determined that there is no long-term relationship between financial development and logistics performance index for E-7 countries. According to Özdemir (2017), when the logistics performance is high, markets are affected by this situation, even though they lack financial depth. In this context, it is thought that it does not affect the logistics performance, as the financial depth is low in E-7 countries. In G-7 countries, it is thought that there is a long-term relationship between financial development and logistics performance due to the high financial depth. However, the long-term correlation coefficient between financial development and logistics performance in G-7 countries is found to be statistically insignificant.

It has been determined that there is a long-term relationship between economic growth and logistics performance for both G-7 countries and E-7 countries. This finding supports the results of studies such as Chen (2011), Khan et al. (2017), Kaynak and Mert (2004). However, for E-7 countries, Topcuoğlu et al. (2016), it is found that its effect on economic growth is insignificant. According to Hakim and Merkert (2016), in countries with low income, large population and large GDP, logistics performance does not have a significant effect on economic growth. In G-7 countries, it has been determined that the inputs (investment and employment) in the logistics sector have a positive effect on economic growth as a result of the effective use.

In this context, it should not be overlooked that from a policy perspective, investment in logistics infrastructure will be the most beneficial investment that can have high returns for future economic and financial growth in countries. On the other hand, this study will be able to direct the work to be done in other country groups.

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