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Do Labor Productivity and Exports Stimulate Growth? Empirical Evidence from the Least Developed Countries (LDCs)*

İşgücü Verimliliği ve İhracat Ekonomik Büyümeyi Destekler Mi? En Az Gelişmiş Ülkeler Üzerine Ampirik Bir İnceleme

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ÖZ

Büyük bir nüfusa sahip olmalarına rağmen, En Az Gelişmiş Ülkeler (EAGÜ), düşük insan sermayesi seviyeleri, kırılgan ekonomileri ve son derece düşük iş gücü verimliliği nedeniyle dünya ticaretinin yalnızca %1'ini oluşturmaktadır. İhracatta düşük iş gücü verimliliği bu oranın artırılmasının önündeki en büyük engel olmasına rağmen, ihracat bu ülke grubunun ekonomik büyümesinde önemli bir role sahiptir. Bu çalışmanın amacı, 2000-2021 yıllarını kapsayan, 24 EAGÜ (tam veri setine sahip) ülkesinde iş gücü verimliliği ve ihracatın ekonomik büyüme üzerindeki etkilerini incelemektir. Ayrıca, çalışma, ihracata dayalı bir büyüme modelinin seçilen ülke grubunun benimsemesinin rasyonel olup olmadığını ortaya koymayı amaçlamaktadır. Çalışma sonuçlarına göre, Dumitrescu ve Hurlin'in (2012) Granger nedensellik testi, iş gücü verimliliği ile ekonomik büyüme arasında çift yönlü bir nedensellik olduğunu ortaya koymuştur, ancak ihracat ile ekonomik büyüme arasındaki ilişkinin istatistiksel olarak anlamsızdır. İhracat ile ekonomik büyüme arasındaki nedensellik göz önüne alındığında, ihracata dayalı ekonomik büyüme modelini bu ülkelere uygulanabilir olmadığı sonucuna ulaşılmıştır.

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ABSTRACT

Despite having a large population, the Least Developed Countries (LDCs) only make up 1% of world trade because of their low levels of human capital, fragile economies, and extremely low labor productivity (LP Herafter). Although low LP in exports is the biggest barrier to increasing this rate, exports have a crucial role in the economic growth (EG herafter) of this country's group. The purpose of this study is to examine, using complete data covering the years 2000–2021, the impacts of LP and exports on EG in 24 of the LDCs countries. Additionally, the study aims to determine if applying an export-based growth model contributes to the EG in selected country groups. Dumitrescu and Hurlin's (2012) Granger causality test revealed a bidirectional causality between LP and EG, however the relationship between exports and EG was found to be statistically insignificant. Given the causality between exports and EG, applying the export-led EG model to these countries does not appear feasible.

JEL Classifications: B17, F43, J27.

1. INTRODUCTION

Even though various countries have distinct production and growth strategies because of differing factor endowments, the ultimate objective of all countries from past to present has been to produce more with fewer resources. Selling goods abroad, where markets are often more lucrative than local ones, and using resources as effectively as possible by raising LP are mostly seen as the best ways to achieve this goal since exports boost macroeconomic and microeconomic income and increase productivity by enabling the resources to be used more efficiently (Irwin and Tervio, 2002). Furthermore, exports

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contribute to the manufacture of cheaper goods and services, which eventually serve to boost profitability at the national level. (Sofuoğlu and Kızılkaya, 2018).

One of the most important strategies that countries seek to maintain their market shares in international trade is raising LP, which is calculated by dividing real Gross Domestic Product (GDP) by total employment. (Alam et al., 2013). While there are several ways to increase LP, exports are seen to be among the most effective. Research generally agrees that exports and LP have a long-term relationship, but there are disagreements concerning the direction of it. However, the widespread consensus on this relationship's direction is that countries with a greater tendency to export have higher LP than other countries (Herzer et al., 2006). The fact that exports are more profitable than domestic sales and raised local market competition are the main reasons for the improvement in LP. Eventually, the increase in employment per output leads to an increase in LP since an increase in profitability occurs (De Hoyos and Iacovone, 2013). However, it is shown that improvements in EG led to gains in LP when the link between LP and growth is investigated. Additionally, these improvements encourage expenditures in human capital, which is essential for raising LP. Because national productivity and efficiency are significantly impacted by investments, particularly in the areas of health and education. Mankiw et al., (1992) argue that increasing the number of years in which individuals receive education increases LP. Additionally, there is an increase in LP when both the degree of education and technological adaptation rise. According to Nelson and Phelps (1966) existing human capital is crucial for the advancement of technology and the overall development of the country, while according to Kaldor (1968) specialization that occurs as a result of the increase in the amount of production in a country and the adaptation of individuals to technological progress are the main factors that cause an increase in LP.

Even though higher exports boost economic development (ED Hereafter) and LP, this effect is seen to be less pronounced in countries where a sizable portion of exports consists of raw materials and unprocessed goods (Csordás, 2018). Fluctuations in exports in the LDCs and developing countries such as agriculture and mining, where LP is low, also cause the effect of exports on LP and EG to be limited. Furthermore, because of the poor use of technology in mining and the seasonality of agriculture, these countries do not profit from exports to the same extent as industrialized countries. Apart from these factors, the primary cause of the restricted impact of LP on EG and exports in LDCs have much lower investment on health and education, resulting in poor schooling and adult literacy rates, and hence low technology adoption. For this reason, the effect of LP on exports and EG is seen limited. (World Bank, 2023). Beyond these limited effects, when LDCs' common characteristics are examined, it is observed that they are trapped in a vicious cycle of low income, and low human capital (CDP, 2021), and these common features might be the possible answer to the question "*Why are some countries poorer than others*?" stated Acemoglu et al. (2005) in their study.

Although studies on LDCs' EG, export, and LP are rare, it is estimated that the special focus of the World Trade Organization (WTO) and the United Nations (UN) in this group of countries and the programs they implement for the sustainable ED of these countries will increase interest in these countries. In this sense, the study's primary goal is to demonstrate how LP and exports affect the EG of least developed countries (LDCs) and offer potential policy recommendations based on the implementations of international organizations. Additionally, to explore the applicability of the export-led growth model for a selected country group and to demonstrate whether exports support EG.

2. LITERATURE REVIEW

While a large body of research has been done on the relationship between LP, EG, and exports, it is rather uncommon to find studies that combine these three variables. While Emako et al. (2022) investigated the impact of FDI on LP, per capita income (indirectly EG), and exports, Sojoodi and Baghbanpour (2023) examined the link between high-tech industry exports, LP, and EG. According to Emako et al. (2022) figured out that FDI boosts overall LP and per capita income and export. Sojoodi and Baghbanpour (2023) figured out that high-tech industry exports benefit economies by increasing LP and stimulating EG.

Since there are few studies examining the effect of export and LP on EG, the following major literature is examined in groups of two, exports and EG LP. Accordingly, the literature review was created from these two perspectives to compile the empirical findings from relevant studies regarding relationships.

Exports affect EG positively in many ways. Since products can be sold at higher prices to foreign markets countries may gain more by export (Doyle, 2001). Secondly, exports increase competition in the domestic market and thus enable more efficient use of resources within the country (Saatçioğlu and Karaca, 2004). The other positive effect of exports on businesses is to have more opportunities to realize economies of scale because of the expanding market (Awokuse, 2008). Moreover, increasing exports support the country's benefit from information transfer; and finally, exports contribute to employment by increasing production within the country (Ramos, 2001).

For the reasons mentioned above, various research have been discovered to identify the association between exports and EG. (Ghartey, 1993; Aktaş, 2009; Elbeydi et al., 2010; Ağayev, 2011 Sandalcılar, 2012; Uysal and Sat, 2019). However, the direction of the link between exports and ED varies according to the country groups and time periods under consideration. In the study conducted by Ghartey (1993), the relationship between EG and exports in America, Taiwan, and Japan was examined. Results

show that EG affects exports unidirectionally in America, and exports affect EG unidirectionally in Taiwan, the author concludes that there is a bidirectional link between EG and exports in Japan. The primary factors influencing the direction of the positive link between EG and exports vary throughout countries, as explained by the author. These factors include differences in exchange rates and tariff regulations.

While a large body of research indicates that exports have a positive effect on EG, some studies do not find a causal relationship between these two variables. Adelman (1984) examined the relationship between EG and exports to test if export-led growth is reasonable for LDCs and concluded that adopting the export-based EG model for LDCs would not contribute to EG. In addition, the author stated that the Agricultural Demand-led Industrialization model (ADLI), instead of the export-led growth model, will contribute more to the EG of LDCs to help the increase in domestic demand which contributes the EG more than exports. The results of another study by Fosu (1990) did not support the idea that exports and EG are causally linked. The study concluded that exports have little or no effect on EG in LDCs. In contrast to this conclusion, the manufacturing sector has a favorable and significant influence on EG in these countries from a sectoral standpoint. Based on the analysis of both authors, the primary explanation for the inability to establish a causal link between exports and ED is the country group under investigation. According to the authors, LDCs receive a very small portion of global exports, and the majority of the exports from these nations are from low- LP commodities.

While exports and EG have received more attention to the literature than the link between LP and growth, this relationship has nonetheless been the subject of several highly significant studies. Verdoorn (1949) was one of the fundamental researchers who examined the relationship between LP and EG. Verdoorn, unlike previous studies, stated that the elasticity of the workforce should also be calculated to estimate the effect of LP on EG. Eventually, he found a positive relationship between EG and LP. This relationship from EG to LP was calculated as 0.45 in selected countries. Another important study investigating the effect of l LP on EG was conducted by Kaldor in 1968. Kaldor (1968) examined related factors and tried to explain the long-term relationship between these two variables. According to Kaldor, the reasons for this relationship are the existence of static and dynamic economies of scale associated with the division of labor and learning by doing processes, and the increasing level of specialization and increasing investments that embody technical progress.

The primary cause of the relationship between LP and EG is the increase in spending on health and education that follows EG said Mankiw et al., 1992. The authors' key argument for their conclusion that LP and EG have a relationship is due to increasing health and education expenditure followed by EG (Korkmaz and Korkmaz, 2017; Podkaminer, 2017; Ngutsav and Ijırshar, 2018 Dizon, 2019). In addition, technological adaptation rises in line with people's lengthening educational duration. Productivity rises and resource waste in manufacturing is reduced because of increased technological utilization.

3. DATA SET AND METHODOLOGY

The purpose of this research is to investigate how LP and exports affect EG using panel data analysis. The cross-section of the panel data analysis due to data limitation was carried out on 24 countries (Bangladesh, Benin, Bhutan, Burundi, Central African Republic, Chad, Comoros, Gambia, Guinea, Haiti, Madagascar, Mali, Mauritania, Mozambique, Nepal, Niger, Rwanda, Senegal, Sierra Leone, Solomon Islands, Sudan, Tanzania, Togo, Uganda) selected from the LDCs group (with complete data). And the time dimension of this study is the years between 2000-2021.

The data set is presented in the following abbreviations and details about sources are shown in Table 1.

Table 1. Descriptions of Data

Variable	Abbreviation of Variable	Description of Variables	Source of Variable
Economic Growth	GDP	Gross Domestic Product Annual Growth (% Annual)	The World Bank Open Database
Export	EXP	Export Goods and Services (%GDP)	The World Bank Open Database
Labor Productivity	LPV	Output per Worker The ratio of total employment in the country to gross domestic product calculated according to purchasing power parity in US $ in 2015 constant GDP	International Labor Organization

Descriptive statistics of the variables are stated in Table 2.

Table 2. Descriptive Statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
GDP	528	4.191989	4.695436	-36.39198	33.62937
EXP	528	20.49402	10.36877	2.24987	56.27576
LPV	528	-1.358939	4.932109	-21.79	56.49

The model below was used to study the impacts of exports and LP on EG.

$$\text{GDP}_{it} = \alpha_{it} + \beta_1 \text{EXP}_{it} + \beta_2 \text{LPV}it + \varepsilon_{it} \quad (1)$$

In the given model, i=1, 2,...,24 and t=1, 2,...,22. The data used in the model represents a balanced panel data set with 528 (24x22) observations, consisting of values of 24 countries for 22 years (2000-2021).

4. RESULTS

The cross-section dependence test is used to examine how the units that make up the cross-section respond to shocks throughout the data analysis period (Baltagi et al., 2012). Additionally, the findings of the cross-sectional dependency analysis are utilized to choose the unit root tests that will be used in the study (Turgut & Uçan, 2019). Consequently, Peseran (2004) LM, Peseran (2008) LMadj, and CDLM tests were used, and Table 3 shows the cross-sectional dependency results for the panel.

Table 3. Cross Section Dependence Test Results

Test	Statistics	P-Value
LM	668.999	0.000***
LM_{adj}	20.308	0.000***
CD_{LM}	16.727	0.000***

Note: **** indicates that the alternative hypothesis is accepted at the 5% level.*

The group of countries under consideration have relatively comparable structural characteristics and economic deficiencies, which explains why their reactions to shocks are also very similar. Furthermore, Table 3's findings demonstrate that the studied country group displays cross-sectional dependence.

Table 4. Cross Section Dependence Tests Results For Each Variable

	GDP		EXP		LPV	
	Statistics	p-Value	Statistics	p-Value	Statistics	p-Value
CD_{lm} (BP,1980)	379.649	0.000***	384.135	0.00***	358.564	0.00***
CD_{lm} (Pesaran, 2004)	4.412	0.000***	4.603	0.00***	3.514	0.00***
CD (Pesaran, 2004)	-1.725	0.042**	-1.620	0.053*	-1.258	0.104
LM_{adj} (PUY, 2008)	3.290	0.00***	12.291	0.00***	0.233	0.408

Note: **** indicates that the alternative hypothesis is accepted at the 5% level.*

Table 4 shows the cross-sectional dependency results for each variable. To determine whether the slope coefficients of the independent variables in the study's model are the same, a homogeneity test must be performed after the cross-section dependence test. In order to test homogeneity in the study, the Slope Homogeneity Test, developed by Peseran and Yamagato (2008), was used and the results of the test are shown in Table 5.

Table 5. Slope Homogeneity Tests Results

Test	Statistics	P-Value
Δ	3.168	0.000***
Δ*adj*	3.502	0.000***

Note: **** indicates that the alternative hypothesis is accepted at the 5% level.*

According to the homogeneity test results in Table 6, the p-values of both the delta and delta adj tests are less than 0.05 at the 5% significance level. Therefore, the H0 hypothesis is rejected, and the alternative hypothesis is accepted, and the conclusion that the sequence is not homogeneous is accepted. Although countries are quite similar to each other in terms of structural characteristics and economic vulnerabilities, they can integrate into international trade at different levels. The main reason why the analyzed econometric model does not have a homogeneous structure can be attributed to this result.

In panel data analysis, the results of slope test homogeneity and cross-section dependency are used to decide which unit root tests need to be conducted to ascertain if the variables are stationary. In order to obtain reliable findings from the analysis, second-generation unit root tests must be employed. Given that the study's data has a heterogeneous structure, consequently cross-sectional dependency needs second-generation unit root tests. While there are many unit root tests available in the literature, it is important to make sure the test used is suitable for the kind of data being studied.

In this regard, the CADF unit root test (Crosssectionally Augmented Dickey Fuller) developed by Pesaran (Pesaran, 2006) was used. CADF unit root test results are shown in Table 6, Table 7 and Table 8.

Table 6. GDP CADF Unit Root Test Results

GDP	Constant		Constant and Trend	
	Lag	CADF Stats	Lag	CADF Stats
Bangladesh	1.000	-1.104	1.000	**-3.488****
Benin	4.000	-1.620	4.000	-2.527
Bhutan	1.000	-3.115	1.000	**-3.241***
Burundi	1.000	-2.028	1.000	-2.062
Central African Republic	1.000	**-3.076***	1.000	-2.976
Chad	2.000	-1.748	2.000	-2.598
Comoros	1.000	-2.865	1.000	-2.798
Gambia	1.000	**-4.120****	1.000	**-4.135****
Guinea	1.000	-2.773	1.000	**-4.390***
Haiti	1.000	-2.448	4.000	-2.041
Madagascar	1.000	**-4.323****	1.000	**-5.232*****
Mali	1.000	-3.048	1.000	-2.758
Mauritania	1.000	**-3.298***	1.000	-3.172
Mozambique	1.000	-1.563	1.000	-1.957
Nepal	2.000	-1.550	2.000	-2.473
Niger	4.000	0.520	4.000	0.387
Rwanda	1.000	**-5.005*****	1.000	**-5.294***
Senegal	1.000	-1.697	1.000	-2.431
Sierra Leone	1.000	**-3.502****	1.000	**-4.025****
Solomon Islands	3.000	-2.987	1.000	-2.901
Sudan	1.000	-2.451	1.000	-2.844
Tanzania	1.000	-2.798	1.000	-2.409
Togo	4.000	-0.776	4.000	-0.757
Uganda	1.000	-2.572	1.000	-2.951

Note 1: *** indicates that the alternative hypothesis is accepted at the 1%, **5% and *10% levels.

Note 2: Critical values to be compared for the CADF test were obtained from Pesaran (2006), Table 1b. These critical values are -4.32, -3.42, -3.02 for 1%, 5%, and 10%, respectively.

Table 6 shows the CADF unit root test findings for the EG data. According to these findings, Rwanda is the only country in the panel with a unit root at the 1% significance level, although Gambia, Madagascar, and Sierra Leone have unit roots at the 5% significant level. At the 10% significance level, the Central African Republic and Mauritania have a unit root.

Table 7. EXP CADF Unit Root Test Results

EXP	Constant		Constant and Trend	
	Lag	CADF Stats	Lag	CADF Stats
Bangladesh	1.000	-1.254	1.000	2.257
Benin	1.000	-1.694	1.000	0.357
Bhutan	1.000	-1.767	1.000	1.540
Burundi	1.000	-0.800	4.000	1.817
Central African Republic	2.000	-0.323	3.000	1.012
Chad	1.000	-2.081	1.000	1.514
Comoros	1.000	-1.702	1.000	3.215
Gambia	1.000	-2.373	1.000	2.549
Guinea	1.000	-0.984	1.000	**4.099****
Haiti	1.000	-1.488	1.000	0.254
Madagascar	1.000	-2.171	1.000	2.168
Mali	1.000	-2.536	1.000	2.365
Mauritania	1.000	-2.573	1.000	2.499
Mozambique	1.000	-1.554	1.000	**3.319***
Nepal	2.000	-0.434	2.000	0.299
Niger	1.000	-1.079	3.000	1.202
Rwanda	1.000	0.392	3.000	2.543
Senegal	1.000	-1.058	1.000	**3.758****
Sierra Leone	1.000	-2.035	1.000	1.867
Solomon Islands	1.000	-1.457	1.000	1.027
Sudan	4.000	**-3.069***	1.000	2.244
Tanzania	1.000	-0.975	1.000	2.154
Togo	1.000	-1.336	1.000	1.410
Uganda	1.000	-2.804	1.000	2.759

Note 1: *** indicates that the alternative hypothesis is accepted at the 1%, **5% and *10% levels.

Note 2: Critical values to be compared for the CADF test were obtained from Pesaran (2006), Table 1b. These critical values are -4.32, -3.42, -3.02 for 1%, 5%, and 10%, respectively.

The CADF unit root test results for export data are shown in Table 7. According to these results, at the 5% significance level, the export growth data for Guinea and Senegal contain a unit root. At the 1% significance level, Mozambique and Sudan contain a unit root.

Table 8. LPV CADF Unit Root Test Results

LPV	Constant		Constant and Trend	
	Lag	CADF Stats	Lag	CADF Stats
Bangladesh	1.000	**-3.606****	1.000	**-3.631****
Benin	2.000	-1.815	2.000	-2.486
Bhutan	1.000	**-3.024***	1.000	-2.937
Burundi	1.000	-2.290	1.000	-2.104
Central African Republic	1.000	-3.284	1.000	-3.361
Chad	2.000	-1.795	1.000	**-3.534****
Comoros	1.000	-2.842	1.000	-2.950
Gambia	1.000	**-3.643****	1.000	**-3.513****
Guinea	1.000	-2.512	1.000	**-4.288****
Haiti	1.000	-2.365	1.000	-2.246
Madagascar	1.000	**-4.261****	1.000	-3.311
Mali	1.000	-1.835	1.000	-1.766
Mauritania	1.000	**-3.039***	1.000	-2.800
Mozambique	1.000	-1.224	1.000	-2.215
Nepal	2.000	-1.228	2.000	-2.880
Niger	1.000	-2.408	1.000	-2.621
Rwanda	1.000	**-6.928*****	1.000	**-10.203*****
Senegal	2.000	**-4.332*****	2.000	**-5.116*****
Sierra Leone	1.000	**-3.976****	1.000	**-3.730****
Solomon Islands	3.000	-1.866	1.000	**-3.959****
Sudan	1.000	-2.858	1.000	**-3.697****
Tanzania	1.000	**-4.290****	1.000	**-5.047*****
Togo	1.000	-1.920	1.000	-2.131
Uganda	1.000	-2.408	1.000	-2.502

Note 1: *** indicates that the alternative hypothesis is accepted at the 1%, **5% and *10% levels.

Note 2: Critical values to be compared for the CADF test were obtained from Pesaran (2006), Table 1b. These critical values are -4.32, -3.42, -3.02 for 1%, 5%, and 10%, respectively.

The CADF unit root test results for LP data are shown in Table 8. According to these results, Rwanda and Senegal contain a unit root at the 1% significance level, Bangladesh, Gambia Madagascar, Sierra Leone, and Tanzania at the 5% significance level, and Mauritania and Bhutan at the 10% significance level.

To determine the causative relationship between the chosen variables, the Granger Panel Causality Test by Dumitrescu and Hurlin (2012) was employed. Findings shown in Table 9.

Table 9. Dumitrescu and Hurlin (2012) Granger Causality Test Results

GDP≠> EXP	EXP ≠> GDP	GDP≠> LPV	LPV≠> GDP	LPV≠> EXP	EXP≠> LPV
2.882425 (0.8235)	4.801855 (0.5695)	1.396 (0.00***)	1428.338 (0.00***)	1.158 (0.0622)	1.283 (0.5182)

Note: **** indicates that the alternative hypothesis is accepted at the 1% level.*

The findings demonstrated a bidirectional causality between LP and EG, however the relationship between exports, EG, and LP was found to be statistically insignificant. Given the causality between exports and EG, applying the export-led EG model to these countries does not appear feasible.

5. DISCUSSION

The LDCs are characterized by low levels of education, structural deficiencies in EG and development, and a reliance on a small number of product groupings for exports. These structural problems appear to be the biggest obstacles to EG.

There has been a lot of research on the link between exports and EG (Balassa, 1978; Ram, 1985; Awokuse, 2008; Kalaitzi & Cleeve; 2018; Chrid et al., 2021). The causal relationship between exports and EG in these studies can be summed up as follows: exports become more profitable over time due to production specialization, capacity expansion, and cost reduction; export markets also contribute more to EG than local ones and are more profitable overall. Examining the goods that are subject to export in LDCs reveals three key industries that stand out: agriculture, mining, and textile goods. Even though export is a significant source of revenue for most countries, depending on a few products has a significant impact on LDCs' revenue (ITC, 2023). The fact that the causality relationship between exports and EG th is not statistically significant may be due to the fact that the exports of the examined country group are limited to with few products.

When studies addressing exports and LP are examined, it is observed that the causal relationship between these two variables is diverse. The studies conducted by Sjöholm (1999), Sinkkonen (2005) and Kox and Rojas-Romagosa (2010) are the main studies that find a causal relationship between exports and LP. The first study to find no causal relationship between exports and LP is Fu's (2005) study. This micro-scale study, conducted across both exporting and non-exporting firms, found no causal relationship between exports and LP, but the study concluded that imports, unlike exports, increase LP. Another study that found no causal relationship between exports and labor but concluded that imports increase LP was by Kim et al. (2009). The reason imports increase LP is, in line with Fu's (2005) study, the use of technology and knowledge transfer.

Our findings, which demonstrate that there is a bidirectional causation link between EG and LP, are broadly consistent with the literature. While the studies conducted by Auzina-Emsina (2014), Dizon(2019), Trpeski and Cvetanoska (2016) Rozkošová and Megyesiová (2018) concluded that the causal relationship between EG and LP runs from LP to EG, the studies conducted by Verdnoon (1949), Kaldor (1968), Azomahou (2009) Maia and Menezes (2014), Korkmaz and Korkmaz (2017) and Podkaimer (2017) revealed that the causal relationship between EG and LP runs from EG to LP In this direction, our study is parallel to the majority of the literature in terms of the causal relationship between the two variables.

6. CONCLUSION AND POLICY RECOMMENDATIONS

A country's degree of development is mostly determined by its LP since it indicates achieving sustainable EG. On the other hand, with appropriate investments in health and education, improvements in EG also boost LP. Increases in exports also boost competitiveness in the domestic market, allowing for more effective use of resources within the country as a whole. Furthermore, increased competitiveness and resource efficiency lead to improvements in LP.

Although LDCs constitute 14% of the world's population, their share of world trade is less than 1%. The structural problems of the economies of this group of countries, the dependence of their exports on a few product groups, and low LP are the biggest obstacles to the growth and development of these countries. LDCs have been shown to be stuck in a low-income and poor LP spiral.

Agriculture and mining are significant economic sectors in the countries investigated. However, when modern technologies are not used, the agriculture sector has been characterized as having the lowest LP (The World Bank, 2021) In addition, S&P (2017) examined LP in gold mines in 30 countries in its study, and among these countries examined, Mali, Tanzania and Mauritania are among the countries with the lowest LP. In this regard, the fact that industries with low LP account for a considerable amount

of exports in the countries studied might be regarded as the primary reason why the causal link between LP and exports is not statistically significant.

Finally, the absence of a causal relationship between exports and EG indicates that the export-led growth model is not appropriate for the selected country group. As emphasized by Adelman (1984), instead of adopting an export-based EG model for the countries in the LDC group, in order to increase the contribution of exports to EG, products sold to other countries should be diversified and an export structure independent of seasonal and environmental effects should be achieved. In addition, directing the majority of the country's resources to the production of basic agricultural products rather than to the export sector will contribute more to EG than exports. In addition, it is thought that the financial and technical support provided by international organizations (especially in the areas of access to finance and production) can be implemented with correct practices throughout the country and that increasing consumption with the help of policies aimed at increasing per capita income within the country can contribute to EG and solving structural economic problems.

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