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## The Nexus between Economic Freedom and Economic Growth in the LDCs. An Empirical Analysis for the Period 2000-2021

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# The Nexus between Economic Freedom and Economic Growth in the LDCs. An Empirical Analysis for the Period 2000-2021

## Abstract

Economic freedom and economic growth can be connected in most countries, but it is often necessary to specify those aspects of economic freedom that can foster economic growth. This paper examines the nexus between economic freedom and economic growth in the Least Developed Countries (LDCs) using panel data for the period 2000-2021. Results show that, in general, economic freedom positively influences economic growth in the LDCs. Moreover, most economic freedom factors raise economic growth. However, the effect of government spending, fiscal and financial freedom on economic growth is negative. Using a Principal Component Analysis for the economic freedom sub-indicators confirms the results.

JEL-Codes: C230, G100, O100, O430.

Keywords: economic freedom, economic growth, LDCs, financial development, panel data.

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## 1. INTRODUCTION

Economic freedom is considered a relevant explanatory factor for economic growth. On the basis of Amartya Sen's (2006) concept of development as freedom, this both the goal and the means of development as he divides freedom into five components: "economic empowerment, political freedoms, social opportunities, protective security and transparency guarantees". In this line, economists postulate that economic freedom is one of the pillars of a country's institutional structure, and following from this, institutions are amongst the prominent factors in explaining cross-country differences in living standards (Doucouliagos and Ulubasoglu, 2006).

In this context, according to Heritage Foundation (2023), economic freedom is the fundamental right of every human to control his or her own labor and property. In an economically free society, individuals are free to work, produce, consume, and invest in any way they please. In economically free societies, governments allow labor, capital, and goods to move freely, and refrain from coercion or constraint of liberty beyond the extent necessary to protect and maintain liberty itself.

Hence, in general terms, when we speak of economic growth, we can say with definite certainty that, apart from economic factors, economic growth is closely related to other socio-economic indicators. In this line, it can be said that the different components of economic freedom could affect growth in developing countries, because providing free environments to institutions and individuals that directly affect the living standards of households is important for socio-economic welfare. Moreover, according to the literature, it is seen that economic freedom generally affects economic growth positively.

The determinants of economic growth have already been analysed in the literature but there have not been many studies assessing the impact of available indicators of economic freedom on economic growth in countries with the lowest development levels in the world, the Least Developed Countries (LDCs). Thereby, the economic freedom index (EFI) published by the Heritage Foundation could be analysed at overall and at dimensional level that comprises twelve sub-indices. Thus, the main aim of this study is to investigate the effects of all components of economic freedom on economic growth in the LDCs. As far as we know no study discusses the effect of all components of economic freedom on economic growth in the LDCs during a large period of time (2000-2021). Therefore, the main research question of this work is to study how economic freedom affects economic growth and, consequently contribute to the literature on economic freedom.

Our results show that, in general, economic freedom positively influences economic growth in the LDCs. Moreover, most economic freedom factors raise economic growth. However, the effect of government spending, fiscal and financial freedom on economic growth is negative. Finally, using a Principal Component Analysis for the economic freedom sub-indicators confirms the results.

The remainder of the paper is as follows. Section 2 reviews the literature. Section 3 describes the data and methodology used in this work. Section 4 presents the results, and section 5 offers some conclusions.

## 2. LITERATURE

In the last years, the relationship between economic freedom and economic growth has been recognized in the economic literature and, consequently, there exists a large literature discussing this topic. However, the effects of different indicators of economic freedom on growth are ambiguous, even though the general point of view is that economic freedom influence economic growth positively (see, for example, Carlsson and Lundström, 2002; De Haan and Sturm, 2000; Azman-Saini et al., 2010; Compton et al., 2011; Bashir and Xu, 2014; Pattanaik and Nayak, 2014; Bayar and Aytemiz, 2015; Coetzee and Kleynhans, 2017; Dkhili and Dhiab 2018; Malanski and Póvoa, 2021).

Thus, there are many studies in the literature suggesting that economic freedom has a positive effect on economic growth. In this line, Carlsson and Lundström (2002) suggest that economic freedom positively affects growth in 74 countries. However, according to the study, when economic freedoms are examined with their sub-components, there is no unidirectional relationship because of the effect of some sub-components on growth is insignificant and some are negative.

De Haan and Sturm (2000) compare various indicators for economic freedom. They conclude that, although these measures differ somewhat in their coverage, they show similar rankings for the countries covered. The robustness of the relationship between freedom and growth is also examined. Their main conclusion is that greater economic freedom fosters economic growth. The level of economic freedom is, however, not related to growth.

Azman-Saini et al., (2010) investigate the systemic link between economic freedom and economic growth in a panel of 85 countries. Their empirical results, based on the generalized method-of-moment system estimator, reveal that FDI by itself has no direct (positive) effect on output growth.

Compton et al. (2011), using the measures of economic freedom developed by Karabegovic et al. (2003), investigate the nature of the relationship between economic freedom and economic growth for the fifty US states during the period 1981 to 2004. They find a significant positive relationship between economic freedom and economic growth. However, not all components of economic freedom affect growth equally.

According to Bashir and Xu (2014), economic freedom positively affects economic growth in 117 countries covering time period from 1980 to 2012. The data was analysed using the alternative econometric methodologies including panel ordinary least square (OLS), panel fixed effects (FE) and dynamic system generalized method of movements (SGMM). However, depending on the model used, political rights freedom affects growth positively in some models and negatively in others. In particular, the results revealed that economic freedom and political stability have positive and statistically robust impact on economic growth while they observed a fragile mixed positive and negative effect of political freedom on economic growth.

Pattanaik and Nayak (2014) study this relationship in India for a panel of twenty states for three time periods, 2004/2005, 2006/2007 and 2009/2010. They use a pooled linear regression model applied to categorical data containing economic freedom and its three components as independent variables, and growth rates of income per capita and gross state domestic product as dependent variable. Their conclusions tend to establish the fundamental effects of economic freedom in fostering economic growth.

Bayar and Aytemiz, (2015) examine the impact of economic freedom, political stability and economic policy uncertainty in the United States on economic growth in emerging Asian countries during the period 2002-2013 and they find that economic freedom had positive impact on economic growth.

Coetzee and Kleynhans (2017) show that greater levels of economic freedom support higher rates of economic growth in South Africa. They apply the Index of Economic Freedom, the Economic Freedom of the World Index and the Freedom in the World Index to South Africa by using a vector auto-regression model (VAR).

Dkhili and Dhiab (2018) aim to explain the role of economic freedom in attracting foreign investments and thus raising the level of economic growth on a sample composed of the Gulf Cooperation Council countries (Saudi Arabia, United Arab Emirates, Qatar, Kuwait, and Oman) during the period from 1995 to 2017. They base on the analytical descriptive and use a multivariate analysis based on the panel unit root test, the cointegration and finally the regression Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) following the existence of a long-term integration, which includes the modern

standard methods to determine the role of economic freedom in raising foreign direct investment and thus economic growth in the second stage. The research findings conclude that there are indeed some indications that greater levels of economic freedom support higher rates of economic growth in a country.

Malanski and Póvoa (2021) found that economic freedom positively affects growth in developing Latin American and Pacific Asian countries. They analyse the effects of corruption on economic growth for different levels of economic freedom. The effects of corruption on the economy, which can increase or decrease growth, were tested in emerging countries in Latin America and Pacific Asia, between 2000 and 2017, through one-step System-GMM estimation panel data regressions. The results showed that economic freedom works as a moderator in the relationship between corruption and economic growth. On both continents, greater economic freedom, on average, supports the growth of GDP per capita. In Latin America, it was possible to corroborate the hypothesis that corruption damages countries with greater economic freedom but favors economic growth in countries with lower economic freedom levels. Regarding the Asian countries studied, there was only a negative effect of corruption on economic growth in countries with less economic freedom.

In addition, Thi (2021) investigate the impact of economic freedom on economic growth in 65 developing countries worldwide in the period from 1995 to 2014 and reveals that economic freedom is a growth stimulus factor as a higher degree of economic freedom results in a faster economic growth.

In sum, it can be said that, in general, economic freedom affects economic growth positively. Studies suggesting that economic freedoms affect growth negatively are quite limited. However, findings differ when sub-components of economic freedoms are included in the analysis. In general, for the sub-components of economic freedom, trade freedom, property rights, and business freedom have a strong effect on economic growth. However, government size has a negative effect on growth generally. But, what occur in countries with the lowest development levels in the world, the LDCs? There have not been many which analyse the impact of available indicators of economic freedom on economic growth in these countries. Therefore, this study fulfils this research gap and endeavoured to identify the effects of all components of economic freedom on economic growth in the LDCs by using a random effects model for the period 2000-2021.



### 3. DATA AND METHODOLOGY

This section describes the database and discusses the methodological approach proposed to analyse the connection between economic growth and financial freedom in the LDCs, which comprises 46 countries (see Appendix for the list of countries). These countries constitute the poorest and weakest segment of the international community, and although there are significant differences among them, they present the lowest human development index ratings of all countries in the world. Overall, their living conditions are very poor and highly vulnerable to economic shocks, mainly in Sub-Saharan Africa. The United Nations essentially uses three criteria to identify LDCs: i) low income, based on a three-year average estimate of the gross national income per capita; ii) weakness in human resources, as detected by a composite Human Assets Index based on indicators of nutrition, health, education, and adult literacy; and iii) a criterion of economic vulnerability, involving the percentage of population displaced by natural disasters and a composite Economic Vulnerability Index based on indicators such as the instability of agricultural production, the instability of exports of goods and services, the economic importance of non-traditional activities, merchandise export concentration, and the handicap of economic smallness.

#### 3.1. DATA

In this work, we take notably the data from the World Development Indicators (World Bank, 2023) and from the Heritage Foundation. In order to perform our analysis, we work with an unbalanced panel of 39 LDCs for the period 1990-2021 (we consider all LDCs except Myanmar, South Sudan and Tuvalu, which statistical information is not available), using the available statistical information. As noted by Beck et al. (2007), many countries do not have data for every year and therefore lack sufficient observations. We report in the Appendix the summary statistics for the variables used in the analysis.

In general, the rate of growth of the GDP or GDP per capita is often used as an indicator of economic growth. Therefore, as dependent variable we use per capita GDP, more specifically real GDP per capita in constant 2017 international US dollars, adjusted for differences across countries at purchasing power parity (PPP).

As explanatory variables, and since we focus on the effects of economic freedom on economic growth, we take into consideration the twelve factors of the economic freedom index provided by the Heritage Foundation (Kim et al., 2023). The index measures economic freedom based on 12 quantitative and qualitative factors, grouped into four broad categories, or pillars, of economic freedom: rule of law (property rights, government integrity, judicial effectiveness), government size (government spending, tax burden, fiscal health), regulatory efficiency

(business freedom, labor freedom, monetary freedom) and open markets (trade freedom, investment freedom, financial freedom). Each of the twelve economic freedom factors within these categories is graded on a scale of 0 to 100 (where 0 corresponds to highest restraints and 100 corresponds to the maximum level of flexibility). A country's overall score is derived by averaging these twelve economic freedoms, with equal weight being given to each.

We also use the following control variables in our analysis since there exist other determinants of economic growth, as it is highlighted in the literature.

Financial development also promotes economic growth (see, for example, King and Levine, 1993; Levine and Zervos, 1998; Beck *et al.*, 2000; Levine *et al.*, 2000; Prochniak and Wasiak, 2017; Afonso and Blanco-Arana, 2021), in the way that an efficient financial system leads to real sector development and strong economic growth by strengthening competition and encourages capital accumulation. Then we introduce broad money (Broad money) measured as a percentage of GDP is the sum of currency outside banks; demand deposits other than those of the central government; the time, savings, and foreign currency deposits of resident sectors other than the central government; bank and traveller's checks; and other securities such as certificates of deposit and commercial paper.

Financial inclusion is a key factor for growth in most developing countries. It is widely accepted in the literature that there are various dimensions to financial inclusion. Kim *et al.* (2018) examine the relationship between financial inclusion and economic growth in countries of the Organization of Islamic Cooperation (OIC) and conclude that financial inclusion has a positive effect on economic growth in OIC countries. In addition, Nizam *et al.* (2020) show that there is a threshold effect of the financial inclusiveness-growth nexus, so that financial inclusiveness exhibits a non-monotonic positive relation with economic growth. In this line, according to Boitano and Abanto (2020), bank concentration is the main variable affecting financial inclusion. Thus, we use the variable Concentration, measured through the concentration of banks (%), since a more competitive financial system could help reduce financial exclusion if banks seek to reach unattended population segments to increase their market share and position.

Inflation has been identified as one of the most important determinants of growth (Ghosh and Phillips, 1998). Beck *et al.* (2000) use inflation as a determinant of the economic growth of countries. More recently, according to Raghutla and Reddy Chittedi (2020), inflation had a considerable positive effect on economic growth in a study for emerging markets economies. Accordingly, inflation is included as a control variable in our study.

In its most basic form, Okun's law investigates the statistical relationship between a country's unemployment rate and the growth rate of its economy (Okun, 1962). That rule of thumb describes the observed relationship between changes in the unemployment rate and the growth rate of real GDP. Okun's law thus states that adjustment within the labour market over major economic cycles is mainly derived through employment and hence there is a strong association between changes in real GDP and in the employment rate. For this reason, we use the unemployment rate in our study.

Then, we introduce all control variables in our models, and, in accordance to the literature on economic growth, we include the initial value of GDP per capita.

### 3.2. METHODOLOGY

Our main aim is to analyze the effects of the twelve dimensions of financial freedom on economic growth. In an Ordinary Least Squares (OLS) estimation, the correlation of individual errors with the observations is not corrected, and in consequence, estimates made will be biased (Breusch and Pagan, 1980). Thus, the use of panel data estimation seems to be essential, as it permits controlling the existence of individual effects, which may be correlated with the explanatory variables observed in the model; it also permits controlling through variables that change over time (Hausman and Taylor, 1981).

With the objective of analyzing the effects of the dimensions of financial freedom on economic growth in the LDCs during the period 1990-2021, we estimate a model with panel data. Some of the advantages and disadvantages of the use of panel data are listed in the study carried out by Baltagi (2001). Among the advantages are mentioned the following: control over individual heterogeneity, greater variability, less collinearity between variables, more degrees of freedom, greater efficiency, better adaptation to the study of adjustment dynamics, better adequacy for identifying and measuring effects that are not detectable in pure cross-sectional or time-series data, and better analysis capacity in a more complicated behavior. As disadvantages, panel data presents the problem of data collection, distortions due to measurement errors, and the short time dimension that is generally found in the data sets. According to Hausman and Taylor (1981), one of the most noteworthy characteristics of the use of panel data is the ability to control specific individual effects that may be correlated with other variables.

Firstly, we could consider the basic approach to regression analysis with panel data such as pooled regression. The advantage of estimation through Ordinary Least Squares (OLS) lies in the simplification, which results from being able to determine the value of a certain

endogenous variable through a linear relationship with all the exogenous variables that participate in the system. In contrast, the main drawback of this method lies precisely in the simplification of the model, where the correlation of individual errors with observations are not corrected and, therefore, the resulting estimates will be biased. In this direction, the null hypothesis of ‘no country effects’ is rejected, implying that a pooled regression model is inappropriate, as estimates made with pooled OLS would be biased (Breusch and Pagan, 1980).

Therefore, the use of panel data seems fundamental since it allows for considering the existence of individual effects not controlled by the explanatory variables observed in the model and, in addition, it allows controlling for variables that change over time. Furthermore, the use of panel data offers more informative data and, as stated, more variability, less collinearity, and a greater degree of freedom (Klevmarken, 1989, and Hsiao, 2003). Thus, and because the considered series is sufficiently long, we opt for an estimation based on panel data.

Hence, given the specification of the baseline model, first, we applied the Hausman test (Hausman, 1978) and the results suggest applying random effects estimation, therefore, we estimate a random effects model. The random effects estimator allows that differences between states are not constant correlation, as it considers that the differences between countries in this case, are random. Hence, applying the random effects model assumes that the error is composed of a random variable (with a mean value and a non-zero variance) for each country in addition to another part corresponding to the disturbance. This is equivalent to obtaining a different trend for each country, giving each country a different point of origin, which will make it possible to include within the same model all of the trends in the different countries under study.

In sum, the model proposed is as follows:

$$GROWTH_{it} = \beta_0 + \beta_1 GROWTH_{i0} + \beta_2 EF_{it} + \beta_3 FD_{it} + \beta_4 X_{it} + v_i + u_{it} \quad (1)$$

where  $GROWTH_{it}$  refers to the GDP per capita for each country  $i$  at time  $t$ ,  $GROWTH_{i0}$  refers to the average GDP per capita for each country  $i$  in the first 5 years of the period analysed, because of in dynamic models, it is useful to take into account the base period of the sample (e.g., see Barro and Sala-i-Martin, 2003).  $EF_{it}$  refers to the respective index of economic freedom of each country  $i$  at time  $t$ ,  $FD_{it}$  refers to each of the financial development variables of each country  $i$  at time  $t$ ,  $X_{it}$  are the control variables of each country  $i$  at time  $t$  mentioned above,  $v_i$  is the intercept for each country  $i$ , and  $u_{it}$  are the individual errors.

#### 4. RESULTS

According to the methodology presented in the previous section, the results of the regression analysis of the random effects model for the group of countries considered in the analysis are reported in Tables 1, 2, 3 and 4. This has been measured by using different dimensions of financial development, as robustness analysis, as potential factor on economic growth (Afonso and Blanco-Arana, 2021).

Results show that, in general, the effect of most economic freedom factors on economic growth is positive. In Tables 1 and 2, we observe that the effect of property rights, government integrity, judicial, business freedom, labor freedom, trade and investment on economic growth is positive, whereas the effect of govern spending and financial freedom is negative. The negative effect of govern spending may be due to insufficient government spending in these countries and with respect to financial freedom, it may be because these are the least developed countries in the world and, therefore, the financial issue is not very developed. In the models the variables tax and fiscal are insignificant on economic growth. In Tables 3 and 4 we observe that govern spending is not statistically significant and neither are the variables tax and fiscal. In any case, when the findings are evaluated in general, by using the Economic Freedom Index, results show a positive effect on economic growth.

As regards the control variables, there is a negative and statistically significant relationship between unemployment rate and the economic growth in most models. Additionally, the dimensions of financial development and concentration are positively linked to economic growth. In addition, regarding the inflation rate, results show a negative and statistically significant influence on the evolution of economic growth.

Alternatively, and in order to reduce the dimension of the Economic Freedom indicators, we also do a Principal Component Analysis (PCA) of the 12 factors. The PCA approach reduced to the factors to 4 components (by using the variables which more influence on GDP per capita in our analysis of the four categories), the factors with eigenvalues above unity that we then use simultaneously as explanatory variables (see Table A.3. in the Appendix). We show that factor 1 is positive and statically significant in all models, therefore, as factor 1 is more associated to variables included in rule of law, it appears that this rule of law is a key determinant of economic growth in the LDCs. Whereas factor 4 (the most relevant variable is government spending) is negative and statically significant in all models, concluding similar findings than in the previous analysis, as the negative effect of govern spending may be due to insufficient government spending in these poor countries. However, the other two factors are not statically significant.

Table 1. Random effects models (LDCs, 2000-2021)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
GDP initial value	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]
Inflation	-0.007 [0.005]	-0.003 [0.005]	-0.013 [0.012]	-0.004 [0.005]	-0.004 [0.005]	-0.014 [0.013]	-0.005 [0.005]	-0.012** [0.005]	-0.005 [0.005]	-0.003 [0.005]	-0.002 [0.005]	-0.002 [0.005]	-0.005 [0.005]
Unemployment rate	-0.110*** [0.035]	-0.048 [0.034]	-0.138** [0.061]	-0.094*** [0.035]	-0.089** [0.035]	-0.135** [0.063]	-0.095*** [0.035]	-0.090*** [0.035]	-0.092*** [0.035]	-0.079** [0.034]	-0.085** [0.034]	-0.095*** [0.035]	-0.106*** [0.035]
Broad Money	0.041*** [0.006]	0.043*** [0.006]	-0.006 [0.008]	0.047*** [0.006]	0.048*** [0.006]	-0.004 [0.009]	0.047*** [0.006]	0.043*** [0.006]	0.046*** [0.006]	0.040*** [0.006]	0.046*** [0.006]	0.046*** [0.006]	0.044*** [0.006]
Concentration	0.251*** [0.031]	0.195*** [0.030]	0.166*** [0.045]	0.243*** [0.032]	0.226*** [0.032]	0.170*** [0.048]	0.231*** [0.031]	0.222*** [0.030]	0.243*** [0.031]	0.222*** [0.030]	0.226*** [0.031]	0.237*** [0.031]	0.224*** [0.031]
Property rights	0.032*** [0.007]												
Government. integrity		0.057*** [0.007]											
Judicial effectiveness			0.024*** [0.007]										
Tax burden				-0.009 [0.010]									
Government spending					-0.011** [0.004]								
Fiscal health						0.001 [0.004]							
Business freedom							0.013** [0.006]						
Labor freedom								0.022*** [0.007]					
Monetary freedom									0.012 [0.009]				
Trade freedom										0.047*** [0.006]			
Investment freedom											0.022*** [0.004]		
Financial freedom												-0.025*** [0.008]	
EFI													0.080*** [0.015]
Constant	65.958*** [0.668]	65.166*** [0.676]	69.028*** [0.961]	67.268*** [0.970]	67.424*** [0.726]	69.893*** [0.941]	65.988*** [0.699]	65.638*** [0.729]	65.673*** [0.940]	63.555*** [0.748]	65.442*** [0.688]	67.638*** [0.720]	62.493*** [0.996]
Observations	509	517	113	515	517	113	517	494	516	512	517	509	509
Number of countries	38	38	32	38	38	32	38	38	38	38	38	38	38

Data source: World Development Indicators (World Bank, 2023) and Heritage Foundation (2023).

Standard deviations in brackets. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 2. Random effects models (LDCs, 2000-2021)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
GDP initial value	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]
Inflation	-0.011** [0.005]	-0.006 [0.004]	-0.039*** [0.011]	-0.008* [0.005]	-0.008 [0.005]	-0.038*** [0.012]	-0.008* [0.005]	-0.015*** [0.005]	-0.008* [0.005]	-0.006 [0.005]	-0.005 [0.005]	-0.006 [0.005]	-0.009* [0.005]
Unemployment rate	-0.107*** [0.035]	-0.035 [0.033]	-0.100 [0.068]	-0.082** [0.035]	-0.085** [0.035]	-0.093 [0.069]	-0.090*** [0.034]	-0.084** [0.034]	-0.087** [0.035]	-0.075** [0.034]	-0.080** [0.034]	-0.089** [0.035]	-0.101*** [0.035]
Domestic Banks	0.051*** [0.006]	0.056*** [0.006]	0.011 [0.012]	0.057*** [0.006]	0.056*** [0.006]	0.015 [0.012]	0.059*** [0.006]	0.051*** [0.006]	0.056*** [0.006]	0.048*** [0.006]	0.055*** [0.006]	0.055*** [0.006]	0.053*** [0.006]
Concentration	0.216*** [0.031]	0.149*** [0.031]	0.126** [0.062]	0.206*** [0.032]	0.204*** [0.032]	0.124* [0.064]	0.188*** [0.032]	0.199*** [0.031]	0.214*** [0.032]	0.201*** [0.030]	0.198*** [0.031]	0.209*** [0.032]	0.194*** [0.031]
Property rights	0.037*** [0.006]												
Government. integrity		0.062*** [0.007]											
Judicial effectiveness			0.024** [0.010]										
Tax burden				0.008 [0.010]									
Government spending					-0.008* [0.004]								
Fiscal health						0.000 [0.005]							
Business freedom							0.021*** [0.006]						
Labor freedom								0.018** [0.007]					
Monetary freedom									0.014 [0.009]				
Trade freedom										0.044*** [0.006]			
Investment freedom											0.022*** [0.004]		
Financial freedom												-0.025*** [0.008]	
EFI													0.082*** [0.015]
Constant	66.178*** [0.665]	65.394*** [0.671]	68.599*** [0.966]	66.496*** [0.950]	67.721*** [0.729]	69.478*** [0.933]	66.029*** [0.685]	66.265*** [0.713]	66.012*** [0.931]	64.169*** [0.751]	65.921*** [0.682]	68.059*** [0.715]	62.808*** [0.998]
Observations	512	520	116	518	520	116	520	497	519	515	520	512	512
Number of countries	38	38	32	38	38	32	38	38	38	38	38	38	38

Data source: World Development Indicators (World Bank, 2023) and Heritage Foundation (2023).

Standard deviations in brackets. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 3. Random effects models (LDCs, 2000-2021)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
GDP initial value	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]
Inflation	-0.014*** [0.005]	-0.008* [0.005]	-0.040*** [0.011]	-0.011** [0.005]	-0.010** [0.005]	-0.039*** [0.011]	-0.011** [0.005]	-0.018*** [0.005]	-0.011** [0.005]	-0.008* [0.005]	-0.008 [0.005]	-0.009* [0.005]	-0.012** [0.005]
Unemployment rate	-0.153*** [0.036]	-0.079** [0.035]	-0.093 [0.068]	-0.128*** [0.037]	-0.127*** [0.036]	-0.089 [0.070]	-0.134*** [0.036]	-0.130*** [0.036]	-0.130*** [0.037]	-0.111*** [0.035]	-0.123*** [0.036]	-0.134*** [0.037]	-0.143*** [0.036]
Claims	-0.032*** [0.009]	-0.027*** [0.009]	-0.044** [0.020]	-0.023** [0.009]	-0.021** [0.009]	-0.048** [0.020]	-0.024*** [0.009]	-0.014 [0.009]	-0.023** [0.009]	-0.018** [0.009]	-0.032*** [0.009]	-0.027*** [0.009]	-0.025*** [0.009]
Concentration	0.378*** [0.025]	0.329*** [0.026]	0.146*** [0.050]	0.386*** [0.027]	0.378*** [0.027]	0.152*** [0.051]	0.378*** [0.026]	0.355*** [0.026]	0.390*** [0.026]	0.348*** [0.025]	0.372*** [0.026]	0.380*** [0.026]	0.357*** [0.026]
Property rights	0.048*** [0.007]												
Government. integrity		0.063*** [0.008]											
Judicial effectiveness			0.023** [0.009]										
Tax burden				0.002 [0.010]									
Government spending					-0.007 [0.005]								
Fiscal health						0.002 [0.005]							
Business freedom							0.015** [0.006]						
Labor freedom								0.025*** [0.008]					
Monetary freedom									0.017* [0.009]				
Trade freedom										0.052*** [0.006]			
Investment freedom											0.026*** [0.005]		
Financial freedom												-0.032*** [0.008]	
EFI													0.094*** [0.016]
Constant	66.671*** [0.679]	66.177*** [0.691]	68.880*** [0.987]	67.677*** [0.989]	68.382*** [0.722]	69.714*** [0.957]	67.165*** [0.702]	66.605*** [0.763]	66.579*** [0.976]	64.326*** [0.781]	66.520*** [0.702]	69.123*** [0.734]	62.924*** [1.033]
Observations	512	520	116	518	520	116	520	497	519	515	520	512	512
Number of countries	38	38	32	38	38	32	38	38	38	38	38	38	38

Data source: World Development Indicators (World Bank, 2023) and Heritage Foundation (2023).

Standard deviations in brackets. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.



Table 4. Random effects models (LDCs, 2000-2021)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
GDP initial value	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]
Inflation	-0.011** [0.005]	-0.004 [0.005]	-0.039*** [0.012]	-0.008 [0.005]	-0.007 [0.005]	-0.038*** [0.012]	-0.008 [0.005]	-0.018*** [0.006]	-0.008 [0.005]	-0.006 [0.005]	-0.004 [0.005]	-0.007 [0.005]	-0.008 [0.005]
Unemployment rate	-0.028 [0.040]	0.038 [0.039]	-0.099 [0.067]	-0.006 [0.041]	-0.012 [0.041]	-0.091 [0.069]	-0.023 [0.040]	-0.030 [0.040]	-0.015 [0.041]	-0.022 [0.040]	0.001 [0.040]	-0.011 [0.042]	-0.036 [0.041]
Domestic private	0.050*** [0.006]	0.056*** [0.006]	0.012 [0.012]	0.057*** [0.006]	0.056*** [0.006]	0.015 [0.012]	0.059*** [0.006]	0.050*** [0.006]	0.055*** [0.006]	0.049*** [0.006]	0.055*** [0.006]	0.055*** [0.006]	0.053*** [0.006]
Concentration	0.214*** [0.030]	0.147*** [0.031]	0.126** [0.062]	0.199*** [0.032]	0.198*** [0.032]	0.124* [0.064]	0.186*** [0.032]	0.197*** [0.031]	0.215*** [0.032]	0.199*** [0.031]	0.200*** [0.031]	0.209*** [0.032]	0.193*** [0.031]
Property rights	0.045*** [0.006]												
Government. integrity		0.061*** [0.007]											
Judicial effectiveness			0.023** [0.010]										
Tax burden				0.014 [0.009]									
Government spending					-0.011** [0.004]								
Fiscal health						0.000 [0.005]							
Business freedom							0.026*** [0.006]						
Labor freedom								0.022*** [0.007]					
Monetary freedom									0.016* [0.009]				
Trade freedom										0.039*** [0.006]			
Investment freedom											0.022*** [0.004]		
Financial freedom												-0.013* [0.008]	
EFI													0.088*** [0.014]
Constant	65.926*** [0.678]	65.350*** [0.683]	68.581*** [0.963]	65.993*** [0.948]	67.821*** [0.735]	69.455*** [0.928]	65.780*** [0.699]	66.053*** [0.722]	65.777*** [0.943]	64.472*** [0.755]	65.835*** [0.694]	67.517*** [0.734]	62.458*** [0.988]
Observations	489	497	116	495	497	116	497	476	496	492	497	489	489
Number of countries	38	38	32	38	38	32	38	38	38	38	38	38	38

Data source: World Development Indicators (World Bank, 2023) and Heritage Foundation (2023).

Standard deviations in brackets. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

## 5. CONCLUSIONS

The main aim of this work is to investigate the effects of all components of economic freedom on economic growth in the LDCs by using the 12 dimensions of economic freedom index published by the Heritage Foundation. So, this work investigates potential effects of economic freedom on economic growth revealing that economic freedom is a growth stimulus factor. In general, most economic freedom factors have a significant and positive effect on economic growth. However, the effect of government spending, fiscal and financial freedom on economic growth is negative. This finding suggests the LDCs would experience higher economic growth when there is improvement in higher size of government, in particular in government spending and financial health. Moreover, open markets such as more financial freedom help to foster economic growth in the LDCs. Regarding results, our conclusion is that, in additions to other factors, economic freedom has positive effects on the economic growth in LDCs. Moreover, when the analysis findings are evaluated in general, by using the Economic Freedom Index (EF), results show a positive effect on economic growth.

Thus, we conclude that, in general, most economic freedom factors on economic growth are positive, such as the effect of property rights, government integrity, judicial, business freedom, labor, trade and investment. However, the effect of government spending, fiscal and financial freedom on economic growth is negative in the LDCs. In addition, the effect of the tax and monetary on economic growth is not statistically significant. This negative effect of govern spending may be due to insufficient government spending in these countries and the with respect to financial freedom, it may be because these are the least developed countries in the world and, therefore, the financial issue is not very developed. These Findings are support by studies for trade freedom (Güney, 2017; Hussain and Haque, 2016), property rights (Kacprzyk, 2016; Mahmood et al. 2010), monetary freedom (Kacprzyk, 2016), financial freedom (Hussain and Haque, 2016; Bunda et al. 2012), and business freedom (Hussain and Haque, 2016; Mahmood et al. 2010).

Then, considering the positive effect of economic freedoms on growth, policies for sub-components that strongly affect growth are important in the LDCs. In the first place, the important role played by government spending to fostering economic growth in countries with scarce resources. Moreover, the financial freedom, for example, to promoting the independence of economic decisions from the political administration. Thus, the financial freedom has embraced by policymakers as important tool for promoting inclusive development. In this context, the benefits of economic freedom on developing countries, are that, as a system, it is the most conducive to widespread prosperity, that is, to high or rising income and consumption for the bulk of the population. In any case, it is necessary to consider the context of countries, for example, Udeogu (2016) showed, with empirical evidence

from Nigeria, that the neoliberal strategies have had relatively little to no significant impact on economic development in the country.

Economic growth is one of the most important issues and aspirations of governments of all countries. So, the present study shows that the components of economic freedom have a great explanatory power for fostering economies, mainly those more weakened.

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## Appendix

Table A.1. Summary statistics

Variables	Obsv.	Mean	Std. Dev.	Min.	Max.
GDP per capita	873	2516.293	1670.41	628.6933	11797.28
Inflation	898	12.29781	89.97155	-19.34118	2630.123
Unemployment rate	923	6.690373	5.90567	0.14	28.678
Broad Money	798	31.65713	23.20107	2.857408	176.7889
Claims	803	15.58043	13.77717	0	139.5762
Domestic Banks	803	5.713926	19.26438	-72.49989	128.1915
Domestic private	766	16.41695	14.17518	0	139.5974
Concentration	654	4.307099	4.525023	0.1368348	32.24172
Property rights	802	31.19127	11.75949	6.8	76.5
Government. integrity	814	25.73845	9.15983	4	67.9
Judicial effectiveness	214	33.13318	12.35701	10.3	83.2
Tax burden	798	74.50088	10.39244	42.2	100
Government spending	804	74.88955	22.07158	0	97.6
Fiscal health	211	63.90379	30.61833	0	99.9
Business freedom	809	50.81768	11.26119	17.1	92.3
Labor freedom	661	56.29894	13.10122	26.3	91.8
Monetary freedom	804	72.80348	9.220437	0	90.4
Trade freedom	797	63.38331	11.17872	0	85.8
Investment freedom	802	43.40399	16.524	0	80
Financial freedom	792	37.57576	13.17707	0	70
EFI	791	52.80379	5.68018	24.3	71.1

Table A.2. List of LDCs

Countries			
Afghanistan	Djibouti	Malawi	Somalia
Angola	Eritrea	Mali	South Sudan
Bangladesh	Ethiopia	Mauritania	Sudan
Benin	Gambia, The	Mozambique	Tanzania, Ud. Rep.
Bhutan	Guinea	Myanmar	Timor-Leste
Burkina Faso	Guinea-Bissau	Nepal	Togo
Burundi	Haiti	Niger	Uganda
Cambodia	Kiribati	Rwanda	Vanuatu
Central Af. Rep	Lao PDR	S. Tome and Princ.	Yemen, Rep.
Chad	Lesotho	Senegal	Zambia
Comoros	Liberia	Sierra Leone	
Congo, Dem. Rep.	Madagascar	Solomon Islands	

Source: United Nations (2023)

Table A.3. Estimations with Principal Components Analysis

Variables	(1)	(2)	(3)	(4)
GDP initial value	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]	0.004*** [0.000]
Inflation	-0.012 [0.012]	-0.038*** [0.010]	-0.037*** [0.011]	-0.037*** [0.011]
Unemployment rate	-0.141** [0.061]	-0.107 [0.068]	-0.107 [0.066]	-0.107 [0.066]
Broad Money	-0.006 [0.008]			
Claims		-0.025 [0.019]		
Domestic Banks			0.011 [0.011]	
Domestic private				0.010 [0.011]
Concentration	0.131*** [0.046]	0.094** [0.048]	0.073 [0.058]	0.074 [0.059]
<b>Factor 1</b>	0.441*** [0.125]	0.571*** [0.142]	0.592*** [0.144]	0.592*** [0.145]
<b>Factor 2</b>	-0.319 [0.227]	-0.376 [0.255]	-0.373 [0.255]	-0.372 [0.255]
<b>Factor 3</b>	-0.087 [0.116]	-0.111 [0.139]	-0.066 [0.140]	-0.066 [0.141]
<b>Factor 4</b>	-0.328** [0.131]	-0.504*** [0.152]	-0.558*** [0.151]	-0.556*** [0.151]
Constant	70.315*** [0.940]	70.185*** [0.939]	69.987*** [0.906]	69.979*** [0.906]
Observations	113	116	116	116
Number of countries	32	32	32	32

Data source: World Development Indicators (World Bank, 2023) and Heritage Foundation (2023).  
Standard deviations in brackets. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A.4. PCA Eigenvalues table

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	2.9	0.95345	0.2417	0.2417
Factor2	1.94655	0.42818	0.1622	0.4039
Factor3	1.51837	0.34326	0.1265	0.5304
Factor4	1.17511	0.25768	0.0979	0.6283
Factor5	0.91744	0.02856	0.0765	0.7048
Factor6	0.88888	0.18814	0.0741	0.7789
Factor7	0.70074	0.12996	0.0584	0.8373
Factor8	0.57078	0.07786	0.0476	0.8848
Factor9	0.49292	0.08492	0.0411	0.9259
Factor10	0.408	0.14448	0.034	0.9599
Factor11	0.26352	0.04582	0.022	0.9819
Factor12	0.21769	.	0.0181	1

Table A.5. Pattern Matrix

Variable	Factor1	Factor2	Factor3	Factor4
Property rights	0.8425	-0.0645	-0.1008	0.1252
Government. integrity	0.8269	-0.1272	0.0544	-0.0307
Judicial effectiveness	0.7704	-0.0251	-0.2551	0.3028
Tax burden	-0.0658	-0.5871	0.3297	0.2702
Government spending	-0.3377	0.1475	-0.0381	0.8069
Fiscal health	-0.028	-0.0314	-0.783	0.2673
Business freedom	0.4874	-0.3427	0.3962	-0.1776
Labor freedom	0.4401	-0.3427	-0.1876	0.1058
Monetary freedom	0.4263	0.3745	-0.3244	-0.277
Trade freedom	0.2409	-0.0727	0.5323	0.3526
Investment freedom	0.1882	0.8159	0.2856	0.0701
Financial freedom	0.2955	0.7156	0.2338	0.15