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The Nexus between Economic Freedom and Economic Growth in the Least Developed Countries. An Empirical Analysis for the Period of 2000-2021

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Abstract

Economic freedom is the fundamental right of every human to control his or her own labour and property, and therefore it constitutes the essence of the market economy. In this sense, economic freedom leads to economic growth and although economic freedom can have an impact on economic growth, it is necessary to specify those aspects of freedom that can foster growth. This paper examines the nexus between economic freedom and economic growth in the Least Developed Countries (LDCs), using panel data for the period of 2000-2021. In particular, we investigate the effects of economic freedom on economic growth in the LDCs by using the 12 dimensions of the economic freedom index published by the Heritage Foundation. Accordingly, this study investigates the potential effects of freedom on growth, revealing that economic freedom is a growth stimulus factor and although not all pillars are determinants of growth in the LDCs, the significance of economic freedom as a whole is crucial. By using different estimation methods (Fixed effects model and Principal Component Analysis), we confirm that economic freedom influences growth in the LDCs. Furthermore, certain variables related to financial development, political stability, capital formation and education, are key for attaining economic growth in these countries.

1. Introduction

Economic freedom is considered to be a relevant explanatory factor for economic growth. The most evident benefit of economic freedom is that it is the most conducive system for prosperity for society as a whole. Based on Amartya Sen's (2006) concept of development as freedom, which refers to both the goal and the means of development, we divide freedom into five components: economic empowerment, political freedoms, social opportunities, protective security, and transparency guarantees. Adopting this approach, economists postulate that economic

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freedom is one of the pillars of a country's institutional structure, and following on from this, that institutions feature amongst the prominent factors in explaining cross-country differences in living standards (Doucouliagos and Ulubasoglu, 2006). Economic freedom in the form of free markets and trade in the world is crucial for human freedom. Without it, people cannot improve their conditions and therefore be able to progress. Accordingly, the study of the economic freedom of the most vulnerable countries is key to encountering paths that improve the welfare of countries. In addition, there is currently considerable awareness of the importance for economic growth of institutional factors related to economic freedom, including the rule of law, the security of property rights, the openness of the political process, limitations on the power of the executive, monetary stability, liberal trade regimes, and civil liberties (see, for example, Acemoglu et al., 2005).

In this context, according to the Heritage Foundation (2023), economic freedom is the fundamental right of every human to control his or her own labour 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 labour, capital, and goods to move freely, and refrain from coercion or constraint of liberty beyond the extent necessary to protect and maintain liberty itself. In this vein, since the 1980s, most countries in the world have experienced notable increases in economic freedom under the widely-accepted belief that greater economic liberalisation fosters economic growth (see, for example, Farr et al., 1998; De Haan and Sturm 2000; Cole 2003; Powell 2003; Berggren and Jordahl 2005; Doucouliagos and Ulubasoglu 2006; Cebula 2011; Compton et al., 2011; Hall and Lawson 2014).

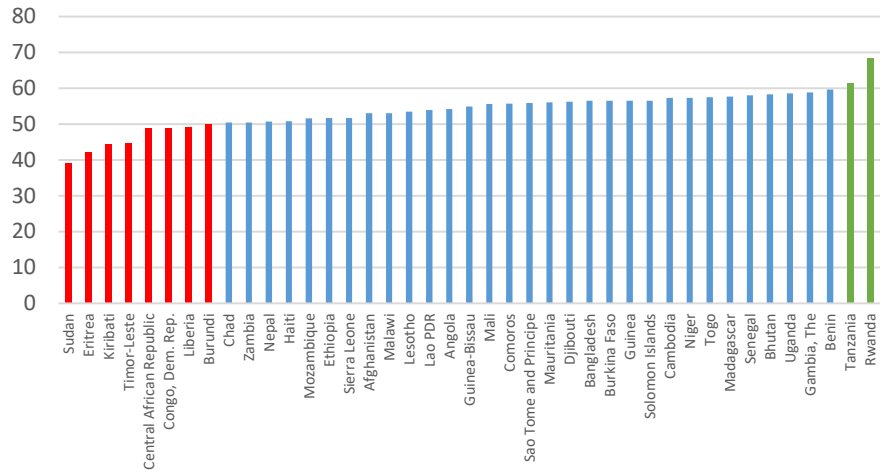
Thus, in general terms, when one talks about economic growth, one can say with definite certainty that, apart from economic factors, economic growth is closely related to other socio-economic indicators. Similarly, it can also be said that the different components of economic freedom can affect growth in developing countries, as providing freer environments to institutions and individuals that directly affect the living standards of households is important for the progress of socio-economic welfare. Furthermore, according to the literature, it is observed that economic freedom generally affects economic growth positively. In this context, McCloskey and Carden (2020) attribute modern economic growth to liberalism and the bourgeois attaining freedom.

In the developing world, the determinants of economic growth have already been analysed in the literature, however not many studies have assessed the impact of the available indicators of economic freedom on economic growth in countries with the lowest development levels in the world – the LDCs. Accordingly, the economic freedom index (EFI) – which is published by the Heritage Foundation and comprises twelve sub-indices – can be analysed at both the overall and dimensional level. In this context, according to the Heritage Foundation, there is a country ranking which classifies countries into the following: free (100-80), mostly free (79.9-70), moderately free (69.9-60), mostly unfree (59.9-50), and repressed.

Figure 1 displays the global index for the LDCs in 2021, showing that most of them (in blue) are unfree; the eight countries located at the bottom (in red) are repressed and only two of them can be considered to be moderately free – Tanzania

and Rwanda. In this scenario, one can but wonder whether economic freedom could have had a significant impact on the well-being of these eight countries.

Figure 1 Economic Freedom Index for the LDCs in 2021



Source: Heritage Foundation (2023).

The main aim of this study is thus to investigate the effects of all the components of economic freedom on economic growth in the LDCs. To the best of our knowledge, to date 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). This paper attempts to provide useful evidence of the relationship between economic freedom and economic growth in the LDCs for the period of 2000-2021. The main research question of this work is therefore to study how economic freedom affects economic growth, and consequently to contribute to the literature on economic freedom.

The results show that economic freedom does matter for increasing economic growth in the LDCs, and consequently and consequently for improving their welfare. Nevertheless, it was found that not all the categories have the same influence and that the first and fourth pillars have a positive effect on growth, whereas the others have no influence on it. Furthermore, the significance of economic freedom as a whole is crucial for increasing the growth of LDCs. Finally, the results were confirmed by carrying out a Principal Component Analysis (PCA) for the economic freedom sub-indicators.

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 recognised in the economic literature and consequently a large

amount of literature exists on this topic. However, the effects of various different indicators of economic freedom on growth are ambiguous, even though the general point of view is that economic freedom influences 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).

One of the many studies in the literature. which suggests that economic freedom has a positive effect on economic growth is that of Carlsson and Lundström (2002), which suggests that economic freedom positively affects growth in 74 countries. However, according to these authors' study, when the examples of economic freedoms are examined for all of their sub-components, no unidirectional relationship is found, as the effect of some sub-components on growth is insignificant and indeed some have a negative effect.

De Haan and Sturm (2000) compare various indicators for economic freedom for the period of 1975-1990 for 80 countries and conclude that, although these measures differ somewhat in their coverage, they all show similar rankings for the countries under study. De Haan and Sturm also examine the robustness of the relationship between freedom and growth, with their main conclusion being that greater economic freedom fosters economic growth. Furthermore, they found that the level of economic freedom is not related to growth.

In turn, 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.

Using the measures of economic freedom developed by Karabegovic et al. (2003), Compton et al. (2011), investigate the nature of the relationship between economic freedom and economic growth for the 50 US states during the period of 1981 to 2004 and find evidence for a significant positive relationship between economic freedom and economic growth. However, not all the components of economic freedom affect growth equally.

According to Bashir and Xu (2014), economic freedom positively affects economic growth in 117 countries covering the time period of 1980-2012. In this study, the data were 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, but negatively in others. In particular, these authors' results revealed that economic freedom and political stability exercise a 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 20 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, using the growth rates of income per capita and gross state domestic product as dependent variable. Their

conclusions reinforce the fundamental effects of economic freedom in fostering economic growth.

Another study by Bayar and Aytemiz, (2015) examines 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 of 2002-2013 and they find that economic freedom had a positive impact on economic growth.

Coetzee and Kleynhans (2017) show that higher 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) for the period of 1995-2016.

Two other authors, Dkhili and Dhiab (2018), attempt to explain the role of economic freedom in attracting foreign investments and in consequently improving the level of economic growth in a sample composed of the Gulf Cooperation Council countries (Saudi Arabia, United Arab Emirates, Qatar, Kuwait, and Oman) during the period of 1995 to 2017. They base their work on the analytical description and use a multivariate analysis based on the panel unit root test and the co-integration. They also calculate the Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) regressions, 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. Their research findings conclude that there are indeed some indications that greater levels of economic freedom support higher rates of economic growth in a country.

In their research, Malanski and Póvoa (2021) found that economic freedom positively affects growth in developing Latin American and Pacific Asian countries in an analysis of the effects of corruption on economic growth for different levels of economic freedom. They found that the effect of corruption on the economy is to either increase or decrease growth in a sample of emerging countries in Latin America and Pacific Asia, from 2000 to 2017, using one-step System-GMM estimation panel data regressions. Their results showed that economic freedom acts as a moderator in the relationship between corruption and economic growth and that, on average, greater economic freedom supports the growth of GDP per capita in both continents. In the case of Latin America, it was possible to corroborate the hypothesis that corruption damages countries with greater economic freedom, but favours economic growth in countries with lower levels of economic freedom. On the other hand, in the Asian countries under study, the authors found that 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 for the period of 1995 to 2014 and reveal that economic freedom is a growth stimulus factor, based on the evidence that a higher degree of economic freedom results in faster economic growth.

Further evidence is based on historical natural experiments. For example, the study of Spruk and Kešeljević (2018) finds a relationship between economic freedom

and growth across 407 German districts. They build six indicators of economic freedom and cluster these indicators into categories that reflect tax rates and the size of both the government and the public sector. By exploiting the variation in the constructed indices of economic freedom, the evidence suggests less indebted districts with a lower share of taxes and a relatively smaller public sector achieve consistently higher rates of growth and income levels. The beneficial effect of economic freedom on growth is robust to the variety of specification checks and does not appear to be driven by the sample selection. The evidence from Spruk and Kešeljević's research does not indicate a lower level of economic freedom in former East German districts, nether greater economic freedom in West German districts, albeit it confirms a persistent north–south divide in the post-unification period.

In sum, it can be said that, in general, economic freedom affects economic growth positively. The quantity of studies suggesting that economic freedom affects growth negatively is limited. However, overall, the findings of the various studies differ when sub-components of economic freedoms are included in the analysis, which indicates that trade freedom, property rights, and business freedom have a strong effect on economic growth for the sub-components of economic freedom, while government size has a negative effect on growth generally. However, what is the scenario in countries with the lowest development levels in the– the LDCs? Few studies in the Literature analyse the impact of available indicators of economic freedom on economic growth in LDCs. Accordingly, this study fulfils this research gap and endeavours to identify the effects of all the components of economic freedom on economic growth in the LDCs by using a fixed-effects (FE) model for the period of 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 46 LDCs under study (see Appendix for the list of all these 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 the countries in the world. Overall, living conditions in these LDCs are very poor and are highly vulnerable to economic shocks, mainly in Sub-Saharan Africa. The United Nations essentially uses three criteria to identify LDCs, namely: 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) economic vulnerability, calculated as 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 specifically use data from the World Development Indicators (World Bank, 2023) and from the Heritage Foundation (2023). As the LDCs constitute the poorest and weakest segment of the international community this makes it difficult to obtain valid data that is required for econometric analysis. Thus, although we have a rich source of data, there is no statistical information for some countries in the LDC group and accordingly we do not have data for all the years analysed for some of the countries. Therefore, we do not have a balanced panel with information for all the countries and periods, as is usually the case in the literature in studies about these countries. Instead, it would be desirable to have a complete and homogeneous database for all the LDCs and thus the possibility of extrapolating the data of the explanatory variables could be considered, although this might distort the results to a certain extent. Accordingly, to perform our analysis we work with an unbalanced panel of 32 countries for the period of 2000 to 2021. Given the limitations of existing data for the control variables for the LDCs, it should be highlighted that when introducing control variables in our models the number of countries analysed diminished. As noted by Beck et al. (2007), many countries do not have data for every year and therefore lack sufficient observations. The summary statistics for the variables used are described in the Appendix.

Dependent Variable

In general, the rate of growth of the GDP or GDP per capita is often used as an indicator of economic growth (see, for example, Levine et al., 2000; Levine, 2003; Afonso and Blanco-Arana, 2022; among others). The fact is that while GDP pc measures the level of economic development, GDP pc growth measures the economic situation or evolution of the economy. In this paper, in line with Afonso and Blanco-Arana (2024), we use the GDP pc to enable us to check whether there is in an increase in the economic growth of LDCs. Therefore, as dependent variable we use per capita GDP adjusted for differences across countries at purchasing power parity (PPP), more specifically real GDP per capita in constant 2017 international US dollars.

Explanatory Variables

The main aim of this paper is to analyse the effects of the 12 dimensions of economic freedom on growth. As we are focussing on the effects of economic freedom on economic growth, we predominantly consider these 12 factors as the explanatory variables, using the economic freedom index provided by the Heritage Foundation (Kim et al., 2023). The three most comprehensive studies on the measures of economic freedom are the Heritage Foundation's Index of Economic Freedom, the Fraser Institute's Economic Freedom of the World Index, and the Freedom in the World Index published by Freedom House (Puddington and Roylance 2016). The Heritage Foundation publishes an Index of Economic Freedom of 186 countries on an annual basis, in collaboration with the Wall Street Journal, using 12 qualitative and quantitative factors, which includes the legislative framework that protects private ownership and opposes corruption. This index considers the size of government expenditure and its efficiency to regulate exchange labour freedoms, as

well as the accessibility to markets and funds, as well as the financial freedom of a country. It is thus understandable why the Index of Economic Freedom published by the Heritage Foundation is used to measure economic freedom, especially as it is frequently used by scholars, policy-makers, and international organizations. The index measures economic freedom based on 12 quantitative and qualitative factors, which are grouped into four broad categories, or pillars, of economic freedom, namely: i) rule of law (property rights, government integrity, judicial effectiveness); ii) government size (government spending, tax burden, fiscal health); iii) regulatory efficiency (business freedom, labour freedom, monetary freedom); and iv) open markets (trade freedom, investment freedom, financial freedom). Each of the 12 economic freedom factors within these categories is graded on a scale of 0 to 100 (where 0 corresponds to the highest restraints, and 100 corresponds to the maximum level of flexibility). A country's overall score is derived by averaging these 12 economic freedoms, with equal weight being given to each.

Control Variables

As highlighted in the literature, there are other determinants of economic growth, and accordingly we also use the following other control variables in our analysis: i) financial development; ii) financial inclusion, iii) inflation, iv) unemployment rate, v) political stability, and vi) gross capital formation as percentage of GDP (capital), all of which are explained in detail below.

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; Gurgul and Lach, 2012; Prochniak and Wasiak, 2017; Afonso and Blanco-Arana, 2022), in the same way that an efficient financial system leads to real sector development and strong economic growth by strengthening competition and encourages capital accumulation. As a validity analysis, we introduce the following financial development variables into separate tables:

- Broad money, measured as a percentage of GDP (Broad money), which 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 cheques; and also other securities, such as certificates of deposit and commercial paper.
- Domestic credit to the private sector by banks as a percentage of GDP (Domestic banks) by other depository corporations (deposit taking corporations, except for central banks), such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable that establish a claim for repayment (in some countries, these claims include credit to public enterprises).
- Claims on central government as annual growth as percentage of broad money (Claims), which include gross credit from the financial system to households, non-profit institutions serving households, nonfinancial corporations, state and local governments, and social security funds.

- Domestic credit to private sector as a percentage of GDP (Domestic private) by financial corporations, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries, these claims include credit to public enterprises. Financial corporations include monetary authorities and deposit money banks, as well as other financial corporations where data are available (including corporations that do not accept transferable deposits, but do incur such liabilities as time and savings deposits). Examples of other financial corporations are finance and leasing companies, moneylenders, insurance corporations, pension funds, and foreign exchange companies.

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, whereby financial inclusiveness exhibits a non-monotonic positive relation with economic growth. In an empirical analysis for the LDCs, Afonso and Blanco-Arana (2024) conclude that concentration of banks are robustly associated with economic growth in the LDCs. Accordingly, we use the variable of Concentration in our analysis, 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 being 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.

In our models we also include other variables related with politics and corruption, as different levels of these issues impact economic growth in different regions (Bayar and Aytemiz, 2015; Spyromitros and Panagiotidis, 2022). Political stability and the absence of violence/terrorism (political stability) measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. The estimate provides the country's score for the aggregate indicator, in units of a standard normal distribution, i.e., ranging from

approximately -2.5 to 2.5. In this context, the World Bank's Country Policy and Institutional Assessment (CPIA) assesses the conduciveness of a country's policy and institutional framework to sustainable growth. Accordingly, we include CPIA transparency, accountability, and corruption in the public sector rating (corruption). These three variables assess the extent to which a country's governing executive can be held accountable for its use of funds and for the results of its actions by the electorate and by the legislature and judiciary, as well as the extent to which public employees within the executive are required to account for administrative decisions, use of resources, and the results obtained. The three main dimensions assessed here are the accountability of the executive to oversight institutions and of public employees for their performance, access of civil society to information on public affairs, and state capture by narrow vested interests.

In line with the literature on economic growth (see, for example, Sturm, and De Haan, 2001; Levine, 2003), we also include gross capital formation as percentage of GDP (capital), which consists of outlays on additions to the fixed assets of the economy, plus net changes in the level of inventories, and secondary school enrolment as a percentage (secondary enrolment), which is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Secondary education refers to the completion of basic education that began at the primary level, with the objective to establish the foundations for lifelong learning and human development, by offering more subject- or skill-oriented education using more specialized teachers.

We introduce all the above-mentioned control variables in our models. To conform with the existing literature on economic growth, it is to be expected that we should also include the initial value of GDP per capita (see, for example, Barro and Sala-i-Martin, 2003; Afonso and Blanco-Arana, 2022). However, because fixed-effects estimates are based on characteristics that change over time, those variables that remain unchanged do not contribute significantly to the analysis or are omitted altogether by design. Additionally, we take into account the global economic and financial crisis, in line with Afonso and Jalles (2013), since financial crisis are detrimental for growth. For this reason, we use a dummy variable called Crisis, which takes the value 1 in the period of 2008-2011, and 0 otherwise.

3.2 Methodology

Our principle objective is to analyse the effects of the 12 dimensions of economic freedom on economic growth. In an OLS estimation, the correlation of individual errors with the observations is not corrected and consequently the estimates made will be biased (Breusch and Pagan, 1980). Thus, the use of panel data estimation seems to be essential, as not only does it permit controlling the existence of individual effects that may be correlated with the explanatory variables observed in the model, but it also permits controlling through variables that change over time (Hausman and Taylor, 1981).

With the objective of analysing 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 described in the study carried out by Baltagi (2001). Among the

advantages, the author mentions 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 behaviour. 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.

We could consider the basic approach to regression analysis with panel data, such as pooled regression. The advantage of estimation through 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. On the other hand, 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. If this occurs, 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 to be key, as permits considering the existence of individual effects not controlled by the explanatory variables observed in the model and, in addition, it enables controlling for variables that change over time. Furthermore, the use of panel data offers more informative data and, as stated above, more variability, less collinearity, and a greater degree of freedom (Klevmarken, 1989, and Hsiao, 2003). For this reason, and also because the considered series is sufficiently long, we opt for an estimation based on panel data.

Thus, given the specification of the baseline model, we estimate a fixed effects model[2]. The more recent literature relies heavily on various sets of (country) fixed effects to combat causal inference. Acemoglu et al. (2019) is a good example of how to set up an empirical framework to analyse the impact of a measure of institutional quality on growth. We estimate a fixed effects model with panel data. The fixed effects estimator ensures that differences between states are constant correlation, and thus we estimate the panel data model conventionally with country fixed effects. In turn, the fixed effects estimator ensures that differences between states are a constant correlation. Accordingly, we estimate the panel data model conventionally with country fixed effects.

In sum, the baseline model proposed is as follows[3]:

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

[2] We use clustered standard errors in order to control within-country dependence.

[3] In all models, as robustness analysis, we also included the 1-year lag of the dependent variable (Acemoglu, et al., 2019). The results remain robust and are available upon request.

where GDP_{it} refers to the GDP per capita for each country i at time t. 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. Finally, we also introduce the effect of crisis through a dummy variable that takes a value of 1 if it covers the period of crisis (2008-2011), and 0 otherwise.

Alternatively, in order to reduce the dimension of the Economic Freedom indicators, we also run a PCA of the 12 factors. Large datasets are increasingly common and are often difficult to interpret. Principal component analysis (PCA) is a technique for reducing the dimensionality of such datasets, increasing interpretability, while at the same time minimizing information loss. It does so by creating new uncorrelated variables that successively maximize variance. The new variables become the principal components, which are reduced to solving an eigenvalue/eigenvector problem. These new variables are defined by the dataset at hand, not a priori, which thus hence makes PCA an adaptive data analysis technique (Jolliffe and Cadima, 2016). To avoid problems of correlations, the PCA is a statistic technic and uses orthogonal transformation to convert a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables. Furthermore, PCA is also a tool to reduce multidimensional data to lower dimensions, while retaining most of the information. It covers standard deviation, covariance, and eigenvectors (Karamizadeh, et al., 2013). Accordingly, the idea of PCA is to describe the variation of a multivariate data set through linear combinations of the original variables (see, for instance, Everitt and Dunn, 2001).

4. Results

In line with the methodology presented in the previous section, the results of the regression analysis of the fixed-effects model for the group of countries considered in the analysis are reported in Tables 1, 2, 3 and 4. This is measured by using different dimensions of financial development as a potential factor on economic growth as a validity analysis, (Afonso and Blanco-Arana, 2022).

The results show that, in general, the effect of economic freedom factors on economic growth is positive. In Tables 1, 2 3 and 4, we observe that in the first pillar – rule of law (property rights, government integrity, judicial effectiveness) – all the sub-indicators except judicial effectiveness are positively significant, highlighting the importance of rules for national welfare. The fourth pillar – open markets (trade freedom, investment freedom, financial freedom) – also significantly impact on economic growth in the LDCs. The results thus show that economic freedom is indeed important for growth. However, both the second pillar – government size (government spending, tax burden, fiscal health) - and the third pillar -– regulatory efficiency (business freedom, labour freedom, monetary freedom) – do not affect the economic growth of the LDCs. Furthermore, the economic freedom index as a whole has a significant impact on economic growth. In line with Carlsson and Lundström (2002), this does not mean that increasing economic freedom, as defined in general terms, is good for economic growth, as some of the categories in the index are insignificant.

With regards the control variables, we find that political stability and absence of violence/terrorism positively and significantly influence economic growth in the LDCs, in line with other studies (see, for example, Bayar and Aytemiz, 2015; Spyromitros and Panagiotidis, 2022). Nevertheless, the impact of the control of corruption seems to be irrelevant in these countries, which leads one to believe that in these countries the key for the prevention of corruption is to address some of the challenges of fostering economic growth and encourage the wholesome development of both state and society.

In addition, capital formation has a direct impact in increasing economic growth. This result is in line with Uneze (2013), who advocates that the increase in capital formation results in greater economic growth in sub-Saharan African countries, suggesting that capital formation could boost the growth of GDP. Furthermore, enrolment in secondary education is crucial to boost economic growth, suggesting that the role of education is fundamental for making progress in developing a country.

The different dimensions of financial development are all positively linked with economic growth according to Afonso and Blanco-Arana (2022), who advocate that there is a positive and statistically significant relationship between financial development and GDP per capita. Regarding the concentration variable, this measure of financial inclusion is perhaps among the most important challenges faced by authorities who are responsible for promoting economic growth in countries with lower levels of development (Afonso and Blanco-Arana, 2024). In a less concentrated, more competitive scenario, banks ostensibly try to reach unaffiliated segments of the population to increase turnover.

In addition, despite the fact that our results show that inflation and unemployment rates are not statistically significant, the implementation of anti-inflationary measures must also be considered, together with effective labour market policies, especially in countries with lesser resources, in order to increase growth in the long term. With regards the impact of financial crisis, this does not appear significant in most models, highlighting the fact that the effect of financial crisis was especially virulent for developed countries, but not so much for countries with lower levels of development.

Alternatively, we also carry out a Principal Component Analysis (PCA) of the 12 factors. The PCA approach reduced the factors to four components (by using those variables that most influence GDP per capita in our analysis of the four categories). Next, we simultaneously use those factors with eigenvalues above unity as explanatory variables (see Table A.3. in the Appendix). On the one hand, our findings show that Factor 1 is positive and statistically significant in all models, and therefore, as Factor 1 is more associated with variables included in rule of law, it appears that the rule of law is a key determinant of economic growth for LDCs in relation to economic freedom. However, on the other hand, Factor 2 is negative and statistically significant in all models. However, the other two factors are not statistically significant.

Table 1 Fixed Effects Models (LDCs, 2000-2021)

VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*
Property rights	0.058***												
	[0.011]												
Government. integrity		0.040***											
		[0.014]											
Judicial effectiveness			0.028										
			[0.020]										
Tax burden				-0.020									
				[0.020]									
Government spending					-0.006								
					[0.005]								
Fiscal health						-0.004							
						[0.009]							
Business freedom							-0.003						
							[0.009]						
Labour freedom								0.011					
								[0.017]					
Monetary freedom									0.014				
									[0.027]				
Trade freedom										0.037***			
										[0.007]			
Investment freedom											0.027***		
											[0.008]		
Financial freedom												-0.002	
												[0.024]	
EFI													0.095***
													[0.033]

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

Table 1 Fixed Effects Models (LDCs, 2000-2021) continued

VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*
Broad money	0.024**	0.033**	-0.026	0.033**	0.034***	-0.024	0.033**	0.033***	0.033**	0.030**	0.030**	0.035***	0.032**
	[0.012]	[0.013]	[0.021]	[0.012]	[0.012]	[0.022]	[0.012]	[0.012]	[0.013]	[0.011]	[0.012]	[0.012]	[0.012]
Concentration	0.048	0.047	0.053	0.049	0.036	-0.002	0.048	0.047	0.051	0.085	0.072	0.037	0.060
	[0.108]	[0.103]	[0.100]	[0.110]	[0.109]	[0.093]	[0.113]	[0.111]	[0.115]	[0.097]	[0.096]	[0.116]	[0.104]
Inflation	-0.001	-0.000	-0.011	0.000	0.001	-0.011	0.001	-0.000	-0.000	0.001	0.003	0.003	0.001
	[0.009]	[0.008]	[0.013]	[0.007]	[0.008]	[0.012]	[0.008]	[0.007]	[0.008]	[0.006]	[0.007]	[0.008]	[0.008]
Unemployment rate	-0.010	0.092	0.044	0.046	0.070	0.106	0.072	0.068	0.063	0.070	0.034	0.074	0.050
	[0.082]	[0.100]	[0.144]	[0.090]	[0.103]	[0.162]	[0.103]	[0.105]	[0.109]	[0.101]	[0.094]	[0.104]	[0.097]
Political	0.453*	0.393	-0.075	0.410*	0.445	0.006	0.447*	0.422	0.456*	0.341	0.532*	0.480*	0.468*
	[0.244]	[0.264]	[0.448]	[0.250]	[0.285]	[0.600]	[0.278]	[0.274]	[0.279]	[0.229]	[0.266]	[0.277]	[0.238]
Corruption	-0.501	-0.443	-0.181	-0.246	-0.261	-0.043	-0.267	-0.279	-0.279	-0.004	-0.384	-0.288	-0.384
	[0.364]	[0.421]	[0.630]	[0.408]	[0.443]	[0.544]	[0.437]	[0.426]	[0.437]	[0.296]	[0.376]	[0.429]	[0.374]
Enrolment secondary	0.083***	0.072**	0.108	0.085**	0.084**	0.162**	0.084**	0.082**	0.084**	0.065**	0.073**	0.084**	0.071**
	[0.028]	[0.031]	[0.070]	[0.033]	[0.033]	[0.060]	[0.033]	[0.033]	[0.033]	[0.030]	[0.031]	[0.034]	[0.029]
Capital formation	0.031**	0.027*	0.003	0.028*	0.030*	0.006	0.030*	0.029*	0.031*	0.029*	0.028*	0.031*	0.030*
	[0.015]	[0.016]	[0.016]	[0.018]	[0.018]	[0.018]	[0.017]	[0.018]	[0.017]	[0.016]	[0.016]	[0.018]	[0.016]
crisis	-0.144	-0.178		-0.196	-0.178		-0.194	-0.206	-0.164	-0.241*	-0.066	-0.201	-0.176
	[0.124]	[0.136]		[0.135]	[0.141]		[0.137]	[0.134]	[0.171]	[0.127]	[0.134]	[0.138]	[0.137]
Constant	72.295***	72.552***	74.875***	74.288***	73.216***	72.803***	72.895***	72.299***	71.713***	70.289***	72.628***	72.704***	68.478***
	[1.297]	[1.586]	[3.267]	[2.079]	[1.766]	[2.732]	[1.737]	[1.916]	[2.471]	[1.596]	[1.520]	[2.321]	[2.313]
Observations	261	265	55	264	265	55	265	265	265	264	265	261	261
Number of countries	32	32	23	32	32	23	32	32	32	32	32	32	32

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

Table 2 Fixed Effects Models (LDCs, 2000-2021)

VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*
Property rights	0.062***												
	[0.011]												
Government. integrity		0.041***											
		[0.014]											
Judicial effectiveness			0.017										
			[0.025]										
Tax burden				0.001									
				[0.020]									
Government spending					-0.008								
					[0.007]								
Fiscal health						-0.002							
						[0.011]							
Business freedom							0.001						
							[0.009]						
Labour freedom								0.005					
								[0.017]					
Monetary freedom									0.023				
									[0.024]				
Trade freedom										0.032***			
										[0.007]			
Investment freedom											0.027***		
											[0.008]		
Financial freedom												0.000	
												[0.025]	
EFI													0.088**
													[0.036]

Source: World Development Indicators (World Bank, 2023) and the Heritage Foundation (2023).
Notes: Standard deviations in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 2 Fixed Effects Models (LDCs, 2000-2021) continued

VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*
Domestic banks	0.033***	0.041***	0.005	0.043***	0.043***	0.007	0.043***	0.042***	0.043***	0.037***	0.039***	0.043***	0.039***
	[0.005]	[0.007]	[0.013]	[0.006]	[0.006]	[0.013]	[0.006]	[0.007]	[0.006]	[0.006]	[0.006]	[0.007]	[0.006]
Concentration	0.006	0.002	-0.072	-0.001	-0.012	-0.106	-0.002	0.000	0.006	0.044	0.024	-0.003	0.022
	[0.102]	[0.102]	[0.134]	[0.109]	[0.110]	[0.118]	[0.113]	[0.111]	[0.114]	[0.099]	[0.097]	[0.116]	[0.104]
Inflation	-0.006	-0.007	-0.075***	-0.006	-0.006	-0.074**	-0.006	-0.006	-0.007	-0.006	-0.003	-0.005	-0.006
	[0.007]	[0.007]	[0.027]	[0.006]	[0.007]	[0.027]	[0.006]	[0.006]	[0.007]	[0.006]	[0.006]	[0.006]	[0.006]
Unemployment rate	0.006	0.116	-0.127	0.096	0.094	-0.078	0.095	0.094	0.083	0.090	0.058	0.096	0.072
	[0.080]	[0.112]	[0.211]	[0.109]	[0.117]	[0.218]	[0.119]	[0.120]	[0.122]	[0.118]	[0.100]	[0.119]	[0.111]
Political	0.446*	0.391	-0.101	0.453*	0.441	-0.052	0.453*	0.437	0.458*	0.354	0.533*	0.468*	0.459*
	[0.239]	[0.266]	[0.589]	[0.259]	[0.286]	[0.709]	[0.278]	[0.274]	[0.278]	[0.230]	[0.266]	[0.275]	[0.245]
Corruption	-0.308	-0.194	0.874	-0.023	0.004	0.949	-0.027	-0.021	-0.013	0.194	-0.130	-0.029	-0.132
	[0.353]	[0.429]	[1.101]	[0.427]	[0.455]	[1.003]	[0.447]	[0.438]	[0.442]	[0.313]	[0.391]	[0.438]	[0.392]
Enrolment secondary	0.085***	0.076**	0.119	0.087**	0.088**	0.152**	0.087**	0.087**	0.088**	0.071**	0.077**	0.088**	0.076**
	[0.028]	[0.032]	[0.088]	[0.035]	[0.034]	[0.063]	[0.034]	[0.034]	[0.035]	[0.030]	[0.032]	[0.035]	[0.030]
Capital formation	0.020	0.012	-0.036	0.015	0.014	-0.034	0.016	0.014	0.016	0.014	0.012	0.015	0.014
	[0.015]	[0.018]	[0.028]	[0.019]	[0.020]	[0.029]	[0.020]	[0.020]	[0.020]	[0.019]	[0.018]	[0.020]	[0.019]
crisis	-0.123	-0.153		-0.171	-0.147		-0.173	-0.175	-0.120	-0.210*	-0.041	-0.173	-0.150
	[0.108]	[0.122]		[0.123]	[0.130]		[0.121]	[0.119]	[0.148]	[0.116]	[0.115]	[0.122]	[0.117]
Constant	72.060***	72.408***	73.682***	72.551***	73.245***	72.337***	72.597***	72.420***	70.918***	70.535***	72.434***	72.547***	68.734***
	[1.216]	[1.640]	[4.328]	[2.200]	[1.859]	[3.371]	[1.861]	[2.077]	[2.459]	[1.806]	[1.598]	[2.401]	[2.418]
Observations	262	266	56	265	266	56	266	266	266	265	266	262	262
Number of countries	32	32	23	32	32	23	32	32	32	32	32	32	32

Source: World Development Indicators (World Bank, 2023) and the Heritage Foundation (2023).
Notes: Standard deviations in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 3 Fixed Effects Models (LDCs, 2000-2021)

VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*
Property rights	0.068***												
	[0.012]												
Government. integrity		0.045***											
		[0.012]											
Judicial effectiveness			0.019										
			[0.027]										
Tax burden				-0.007									
				[0.022]									
Government spending					-0.007								
					[0.006]								
Fiscal health						-0.001							
						[0.011]							
Business freedom							-0.006						
							[0.010]						
Labour freedom								0.010					
								[0.018]					
Monetary freedom									0.020				
									[0.024]				
Trade freedom										0.039***			
										[0.009]			
Investment freedom											0.032***		
											[0.009]		
Financial freedom												-0.010	
												[0.025]	
EFI													0.101***
													[0.033]

Source: World Development Indicators (World Bank, 2023) and the Heritage Foundation (2023).
Notes: Standard deviations in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 3 Fixed Effects Models (LDCs, 2000-2021) continued

VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*
Claims	-0.013	-0.020	0.010	-0.012	-0.012	0.001	-0.011	-0.010	-0.012	-0.011	-0.022	-0.012	-0.014
	[0.015]	[0.017]	[0.033]	[0.018]	[0.017]	[0.029]	[0.017]	[0.016]	[0.017]	[0.016]	[0.017]	[0.018]	[0.017]
Concentration	0.125	0.155	-0.058	0.159	0.151	-0.086	0.161	0.157	0.166	0.188*	0.171	0.155	0.170
	[0.105]	[0.120]	[0.099]	[0.128]	[0.128]	[0.087]	[0.130]	[0.126]	[0.130]	[0.113]	[0.112]	[0.127]	[0.119]
Inflation	-0.009	-0.011*	-0.076***	-0.009	-0.009	-0.075**	-0.008	-0.009	-0.010	-0.008	-0.006	-0.007	-0.010
	[0.006]	[0.006]	[0.026]	[0.006]	[0.007]	[0.027]	[0.006]	[0.007]	[0.007]	[0.006]	[0.007]	[0.006]	[0.006]
Unemployment rate	-0.053	0.053	-0.157	0.021	0.027	-0.087	0.032	0.027	0.018	0.033	-0.012	0.030	0.007
	[0.086]	[0.121]	[0.239]	[0.117]	[0.125]	[0.237]	[0.124]	[0.127]	[0.130]	[0.123]	[0.110]	[0.125]	[0.118]
Political	0.408*	0.337	-0.186	0.399	0.404	-0.161	0.405	0.388	0.419	0.300	0.502*	0.434	0.416
	[0.243]	[0.287]	[0.508]	[0.277]	[0.304]	[0.617]	[0.298]	[0.296]	[0.297]	[0.255]	[0.275]	[0.300]	[0.265]
Corruption	-0.580	-0.524	0.742	-0.337	-0.336	0.820	-0.318	-0.347	-0.349	-0.039	-0.444	-0.356	-0.444
	[0.452]	[0.559]	[1.023]	[0.550]	[0.580]	[0.913]	[0.563]	[0.559]	[0.577]	[0.414]	[0.495]	[0.574]	[0.512]
Enrolment secondary	0.084***	0.074**	0.123	0.087**	0.086**	0.156**	0.086**	0.084**	0.086**	0.066*	0.075**	0.086**	0.073**
	[0.028]	[0.033]	[0.089]	[0.037]	[0.036]	[0.067]	[0.035]	[0.035]	[0.036]	[0.032]	[0.033]	[0.037]	[0.032]
Capital formation	0.020	0.011	-0.037	0.015	0.015	-0.035	0.015	0.015	0.017	0.014	0.011	0.015	0.015
	[0.015]	[0.019]	[0.027]	[0.020]	[0.021]	[0.029]	[0.021]	[0.022]	[0.021]	[0.020]	[0.018]	[0.022]	[0.020]
crisis	-0.120	-0.155		-0.171	-0.152		-0.167	-0.180	-0.128	-0.219*	-0.016	-0.176	-0.148
	[0.116]	[0.133]		[0.136]	[0.145]		[0.136]	[0.135]	[0.149]	[0.123]	[0.136]	[0.136]	[0.129]
Constant	73.190***	73.916***	74.068***	74.696***	74.743***	72.467***	74.407***	73.713***	72.746***	71.416***	73.821***	74.538***	69.602***
	[1.590]	[2.219]	[4.388]	[2.707]	[2.347]	[3.245]	[2.423]	[2.263]	[2.903]	[2.006]	[1.999]	[2.808]	[2.429]
Observations	262	266	56	265	266	56	266	266	266	265	266	262	262
Number of countries	32	32	23	32	32	23	32	32	32	32	32	32	32

Source: World Development Indicators (World Bank, 2023) and the Heritage Foundation (2023).
Notes: Standard deviations in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 4 Fixed Effects Models (LDCs, 2000-2021)

VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*
Property rights	0.061***												
	[0.011]												
Government. integrity		0.040***											
		[0.014]											
Judicial effectiveness			0.017										
			[0.025]										
Tax burden				0.002									
				[0.020]									
Government spending					-0.010								
					[0.007]								
Fiscal health						-0.002							
						[0.011]							
Business freedom							0.003						
							[0.009]						
Labour freedom								0.006					
								[0.017]					
Monetary freedom									0.025				
									[0.024]				
Trade freedom										0.032***			
										[0.007]			
Investment freedom											0.026***		
											[0.009]		
Financial freedom												0.009	
												[0.024]	
EFI													0.089**
													[0.037]

Source: World Development Indicators (World Bank, 2023) and the Heritage Foundation (2023).
Notes: Standard deviations in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 4 Fixed Effects Models (LDCs, 2000-2021) continued

VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*
Domestic private	0.035***	0.043***	0.005	0.045***	0.045***	0.006	0.045***	0.044***	0.045***	0.039***	0.041***	0.046***	0.041***
	[0.005]	[0.007]	[0.013]	[0.006]	[0.006]	[0.013]	[0.006]	[0.007]	[0.006]	[0.006]	[0.006]	[0.007]	[0.006]
Concentration	-0.000	-0.004	-0.071	-0.008	-0.020	-0.105	-0.011	-0.006	-0.000	0.037	0.020	-0.012	0.015
	[0.102]	[0.103]	[0.134]	[0.110]	[0.111]	[0.118]	[0.113]	[0.113]	[0.115]	[0.100]	[0.099]	[0.117]	[0.105]
Inflation	-0.007	-0.007	-0.075***	-0.006	-0.006	-0.074**	-0.006	-0.007	-0.008	-0.006	-0.002	-0.006	-0.007
	[0.008]	[0.007]	[0.027]	[0.007]	[0.007]	[0.027]	[0.007]	[0.007]	[0.007]	[0.006]	[0.007]	[0.007]	[0.006]
Unemployment rate	0.016	0.140	-0.127	0.125	0.122	-0.078	0.120	0.119	0.108	0.115	0.096	0.123	0.096
	[0.094]	[0.130]	[0.211]	[0.129]	[0.137]	[0.218]	[0.140]	[0.140]	[0.142]	[0.138]	[0.116]	[0.136]	[0.129]
Political	0.422*	0.369	-0.105	0.430*	0.411	-0.058	0.430	0.410	0.432	0.330	0.514*	0.434*	0.432*
	[0.246]	[0.270]	[0.589]	[0.264]	[0.292]	[0.710]	[0.283]	[0.277]	[0.282]	[0.229]	[0.273]	[0.264]	[0.246]
Corruption	-0.192	-0.066	0.868	0.108	0.150	0.942	0.101	0.114	0.126	0.324	-0.020	0.123	0.009
	[0.360]	[0.431]	[1.100]	[0.423]	[0.455]	[1.001]	[0.444]	[0.434]	[0.439]	[0.288]	[0.397]	[0.404]	[0.375]
Enrolment secondary	0.085***	0.076**	0.119	0.088**	0.088**	0.152**	0.088**	0.087**	0.088**	0.072**	0.078**	0.089**	0.076**
	[0.029]	[0.033]	[0.088]	[0.036]	[0.035]	[0.063]	[0.035]	[0.034]	[0.035]	[0.030]	[0.032]	[0.035]	[0.031]
Capital formation	0.020	0.012	-0.036	0.016	0.014	-0.034	0.016	0.014	0.016	0.013	0.012	0.015	0.014
	[0.015]	[0.018]	[0.028]	[0.019]	[0.020]	[0.029]	[0.019]	[0.020]	[0.020]	[0.018]	[0.018]	[0.020]	[0.018]
crisis	-0.121	-0.150		-0.169	-0.139		-0.172	-0.173	-0.110	-0.208*	-0.043	-0.168	-0.146
	[0.110]	[0.124]		[0.126]	[0.134]		[0.124]	[0.121]	[0.152]	[0.118]	[0.116]	[0.125]	[0.119]
Constant	71.458***	71.667***	73.689***	71.659***	72.527***	72.339***	71.731***	71.597***	69.903***	69.795***	71.640***	71.303***	67.879***
	[1.232]	[1.679]	[4.332]	[2.257]	[1.896]	[3.373]	[1.883]	[2.103]	[2.486]	[1.858]	[1.643]	[2.470]	[2.400]
Observations	256	260	56	259	260	56	260	260	260	259	260	256	256
Number of countries	31	31	23	31	31	23	31	31	31	31	31	31	31

Source: World Development Indicators (World Bank, 2023) and the Heritage Foundation (2023).
Notes: Standard deviations in brackets. *** p<0.01, ** p<0.05, * p<0.1.

5. Conclusion

The main objective of this work is to investigate the effects of all the components of economic freedom on economic growth in the LDCs by using the 12 dimensions of the economic freedom index published by the Heritage Foundation. Accordingly, we analyse the potential effects of freedom on growth, revealing that economic freedom is a growth stimulus factor and although not all pillars are determinants of growth in the LDCs, the significance of economic freedom as a whole is crucial. In addition to other factors, we conclude that economic freedom has a positive effect on the economic growth in LDCs. Furthermore, certain variables are clearly related with financial development, namely political stability, capital formation, and education, all of which are key for the growth of these countries.

Overall, we conclude that the first and fourth pillars of economic freedom have a direct impact on growth, although the other two pillars exercise no influence on growth. These findings support those of the studies on trade freedom (Hussain and Haque, 2016; Güney, 2017), property rights (Mahmood et al., 2010; Kacprzyk, 2016), monetary freedom (Kacprzyk, 2016), financial freedom (Bunda et al., 2012; Hussain and Haque, 2016), and business freedom (Mahmood et al., 2010; Hussain and Haque, 2016). In sum, in line with Doucouliagos and Ulubasoglu (2006) and Azman Saini et al. (2010), countries with an institutional environment that supports economic freedom tend to achieve higher growth. In addition, Sen (2006) highlights that diverse categories of freedom are important individually, and that when interlinked, they can assist bring about economic freedom and complement each other.

Next, when considering the positive effect of economic freedoms on growth, those policies for the sub-components that strongly affect growth are important in the LDCs. For example, the important role played by government spending in fostering economic growth in countries with scarce resources, and also the financial freedom to promote the independence of economic decision-making by the political administration, whereby financial freedom is embraced by policymakers as an important tool for promoting inclusive development. In this context, the benefits of economic freedom on developing countries are that, as a system, economic freedom is most conducive to widespread prosperity, that is to say, for increasing income levels and consequently consumption for the bulk of the population. Either way, it is necessary to consider the context of each country. For example, bead on empirical evidence from Nigeria, Udeogu (2016) showed that neoliberal strategies have had relatively little to zero impact on economic development in that country.

From a policy perspective, what emerges from the results is essentially the challenge to make progress in improving economic freedom as a key aspect of human liberty, which, in turn, fosters economic growth. Therefore, according to Pérez-Moreno and Angulo-Guerrero (2016), institutions and policies should be evaluated jointly from an efficiency perspective. Going beyond dogmas that favour or are against economic freedom, ideally economic governance should not be assessed merely by its degree of intervention, but rather by its results in terms of economic prosperity and the quality of life of all individuals.

As well as the economic freedom determinants, other relevant determinants exist which affect growth in the LDCs. For example: political stability, capital

formation, and education. Accordingly, policies aimed to improve political stability, capital formation, and education should be encouraged to bring about growth in the LDCs.

Economic growth is one of the most important issues and aspirations of governments of all countries. Therefore, the findings of this study show that the components of economic freedom have a considerable explanatory power in fostering the growth of economies, mainly those of economically weaker countries. However, given that our estimations are based on an unbalanced panel dataset, our findings should not be interpreted as being definitive. This paper constitutes a first attempt in the literature to analyse the relationship between economic freedom and growth in the LDCs over a long period of time. However, the findings may not be generalized internationally or particularized in each of these countries, owing to the particular characteristics of each of these countries. Further research is therefore needed to better understand the particular links of such a relationship, additionally addressing the diverse components and subcomponents of economic freedom, with the aim to provide detailed guidance for policy-makers.

In sum, the main finding of this analysis is essentially the challenge to progress with the implementation of polices designed to promote economic freedom in the poorest countries of the world, as an essential aspect of human liberty, with the objective to increase economic growth, and consequently the well-being of these countries. Accordingly, in line with Pérez-Moreno and Angulo-Guerrero (2016), economic governance should be assessed by both its degree of intervention and also by its results in terms of economic prosperity and the quality of life of the whole population.

APPENDIX

Table A1 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	418.019
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
Political	901	-0.6998174	0.9498675	-3.312951	1.422732
Corruption	703	2.698435	0.6086605	1.5	4.5
Enrolment secondary	574	38.2512	17.74524	5.460225	90.80358
Capital formation	739	23.24989	11.73419	-15.91664	76.78232
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
Labour 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 A2 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 A3 Estimations with Principal Components Analysis

Variables	*(1)*	*(2)*	*(3)*	*(4)*
Factor 1	0.440**	0.440**	0.440**	0.440**
	[0.187]	[0.187]	[0.187]	[0.187]
Factor 2	-0.684**	-0.684**	-0.684**	-0.684**
	[0.297]	[0.297]	[0.297]	[0.297]
Factor 3	-0.032	-0.032	-0.032	-0.032
	[0.122]	[0.122]	[0.122]	[0.122]
Factor 4	-0.355	-0.355	-0.355	-0.355
	[0.240]	[0.240]	[0.240]	[0.240]
Constant	78.332***	78.332***	78.332***	78.332***
	[0.014]	[0.014]	[0.014]	[0.014]
Observations	200	200	200	200
Number of countries	40	40	40	40

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

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

Table A4 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 A5 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
Labour 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

Table A6 Correlation Matrix

	GDP	*Inflation*	*Unemployment rate*	*Broad money*	*Domestic banks*	*Claims*	*Domestic private*	*Concentration*	*Political*	*Corruption*	*Enrolment secondary*	*Capital formation*	*Property rights*	*Government. integrity*	*Judicial effectiveness*	*Tax burden*	*Government spending*	*Fiscal health*	*Business freedom*	*Labour freedom*	*Monetary freedom*	*Trade freedom*	*Investment freedom*	*Financial freedom*	*EFI*
GDP	1																								
Inflation	-0.0043	1																							
Unemployment rate	0.2994	0.1844	1																						
Broad money	0.5632	-0.2023	0.1525	1																					
Domestic banks	0.4242	-0.196	-0.1854	0.8823	1																				
Claims	-0.0846	0.211	0.0903	-0.3427	-0.3172	1																			
Domestic private	0.4237	-0.1968	-0.1864	0.8818	1	-0.3173	1																		
Concentration	0.747	-0.1648	0.2103	0.7244	0.6362	-0.0306	0.6357	1																	
Political	0.5007	-0.3933	0.0656	0.4077	0.3419	-0.4429	0.3428	0.5017	1																
Corruption	0.1103	-0.3847	-0.009	-0.1252	-0.1649	0.15	-0.1662	0.2851	0.3312	1															
Enrolment secondary	0.6107	-0.0181	0.0181	0.5532	0.4179	-0.3384	0.4176	0.6625	0.5034	0.1718	1														
Capital formation	0.3612	-0.1588	-0.3792	0.1436	0.2587	-0.0029	0.2594	0.5345	0.3649	0.4227	0.4424	1													
Property rights	0.1456	-0.1574	-0.0168	0.105	0.2163	0.0191	0.2163	0.2392	0.4212	0.5336	0.1633	0.1144	1												
Government. integrity	0.001	-0.2192	0.1721	-0.2054	-0.2002	-0.0325	-0.2006	0.1419	0.3409	0.7381	0.1097	0.2417	0.588	1											
Judicial effectiveness	-0.0736	-0.1328	-0.03	-0.107	0.0534	0.1586	0.0536	0.11	0.2117	0.5674	0.0185	0.1661	0.8473	0.7357	1										
Tax burden	0.2941	0.1721	0.0384	0.439	0.4016	-0.4308	0.4013	0.3653	0.3409	-0.0435	0.3509	0.1593	0.163	-0.0528	-0.0574	1									
Government spending	-0.2241	0.2695	-0.5139	-0.1552	0.1243	0.4921	0.1245	-0.1381	-0.3959	-0.1837	-0.2605	0.1209	0.0368	-0.2681	0.1348	-0.0853	1								
Fiscal health	-0.1447	0.2437	-0.3842	-0.054	0.2936	0.3479	0.2947	0.0214	-0.1661	-0.163	-0.072	0.2086	0.2167	-0.1393	0.2894	-0.06	0.6382	1							
Business freedom	0.4772	0.0642	0.3658	0.0136	-0.1958	-0.0306	-0.1962	0.4544	0.3564	0.4941	0.5853	0.3881	0.173	0.4018	0.134	0.2176	-0.3095	-0.2518	1						
Labour freedom	0.4509	-0.0685	0.1994	0.1819	0.1751	-0.21	0.1773	0.3636	0.4564	0.1219	0.3172	0.2113	0.4435	0.3825	0.4346	0.2168	-0.15	-0.0691	0.3171	1					
Monetary freedom	-0.1986	-0.5997	-0.2734	-0.1068	0.0028	-0.3172	0.0032	-0.2047	0.0863	0.2966	-0.2766	-0.0388	0.1216	0.176	0.0746	-0.1075	-0.1438	-0.1376	-0.1775	-0.1011	1				
Trade freedom	-0.0855	-0.231	-0.386	0.0289	0.1577	-0.4954	0.16	-0.0275	0.4087	0.042	0.3074	0.2194	0.2058	0.1764	0.1399	0.3366	-0.1121	0.1681	0.0886	0.2042	0.2638	1			
Investment freedom	-0.3573	-0.5235	0.0514	-0.19	-0.225	-0.1026	-0.225	-0.4702	-0.1277	0.0204	-0.623	-0.4635	-0.0686	0.04	0.0081	-0.251	-0.1982	-0.3908	-0.4455	-0.0785	0.5176	-0.0621	1		
Financial freedom	-0.109	-0.4246	0.0445	0.1425	0.1917	0.0088	0.1915	-0.1092	0.1342	-0.0211	-0.5552	-0.3243	0.1576	-0.1281	0.0454	0.0203	-0.0155	-0.0575	-0.4522	-0.092	0.3979	-0.0765	0.6492	1	
EFI	-0.05	-0.1806	-0.2595	-0.0381	0.2335	0.0916	0.2346	0.0973	0.2441	0.3756	-0.0768	0.2096	0.7752	0.4721	0.809	0.185	0.4004	0.5191	0.009	0.4307	0.2376	0.3796	0.0524	0.2544	1

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