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Does Economic Freedom Stimulate Human Development?

An empirical study on how governments can affect the well-being of developing countries

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This paper aims to investigate the relationship between economic freedom and human development in developing countries for a time span of ten years: 1998 until 2007. This has been done by analyzing a regression model consisting of the scores on the Human Development Index (HDI) and the Economic Freedom Index (EFI) along with various other factors of possible influence. The sample of countries this research has included, consists of developing countries as defined by the World Bank. Using various statistical models, a positive relationship has been found between the HDI and EFI scores, although not significant in every single model.

INTRODUCTION

Throughout the centuries, economic research has investigated a considerable amount of different aspects of modern society and its diversity across the world. However, few topics stimulated an amount of interest as important as poverty and its unequal distribution across the world. In explaining this phenomenon, substantial effort have been made in trying to clarify how society and government can act in order to eradicate poverty and stimulate development (Rosen & Gayer, 2008). Political, scientific and ideological movements in the past have always battled in establishing the reasons for different grades of development across the globe, often with the intent of creating an institutional framework that could face this issue.

The underlying thought behind this historical motivation to overcome poverty through new governmental policies is well summarized by Charles Darwin (1836), as he wrote that: "If the misery of the poor be caused not by the laws of nature, but by our institutions, great is our sin". In the last decades, always an increasing amount of institutions and researchers, and even newspapers, have started to advocate that development could be decisively stimulated through an institutional environment which promotes economic freedom, and markets as main source of allocation of the resources (Holmes, 2015; Holmes,2015).

Economic freedom is usually defined as the ability of individuals to take economic actions and directions without interference (Gwartney & Lawson, 2013). An individual is "economically free" when his personal choice regarding his belongings is totally respected (Miller & Kim, 2006). This implicates that all the decisions regarding the allocation of resources should be made freely by individuals, without any supervision made by the political system. Therefore, economic freedom is also defined as the extent to which resources are allocated through the open market and not through government intervention (Gwartney & Lawson, 2013).

The proposition that economic freedom would foster the development of poorer countries is based on researches that found a positive correlation between economic growth and economic freedom (Holmes, 2015). However, there is not academic consensus over this relationship. Several researches have contested the causality relationship between economic freedom and growth (Heckelman, 2000) and especially if that applies to poorer countries (Altman, 2008). Moreover, the proposition makes an important assumption: that economic growth is a synonym of development. However, development consists not only of economic growth, but also of other aspects such as education and health for which economic growth does not take account for (UNDP, 2014).

As a result, the proposition that economic freedom causes development needs to be carefully analyzed. In fact, it implicates that all those governmental institutions that are commonly used in order to redistribute resources in the society and that are aimed at fighting poverty could be part of the problem and not of the solution. Specifically, income subsidies, public healthcare and education would not be present in an "economically free" society (Gwartney & Lawson, 2013). This would be a particular problem in poorer parts of the world, where education and health are heavily reliant on the government intervention (UNDP, 2014).

Therefore, this paper aims at analyzing empirically the controversial relationship between economic freedom and human development . This work would represent the first research that analyzes the specific relationship of these two variables. Moreover, it aims at investigating how

economic freedom could help the development of the so called less-developed countries, given the specific and dramatic nature that the issues of poverty and development assume in those places.

The paper aims at answering the following question: "*What is the relationship between economic freedom and human development in less developed countries between 1998 and 2007?*"

In the next section of the paper, a theoretical framework will be presented, in which economic freedom and human development will be formally defined. Moreover, the theoretical relationship between these two will be analyzed, using standard economic theory and past research. Following this, there will be a section where the data used for the empirical analysis collected from UN, World Bank and Heritage Foundation will be presented. Then, the methodology through which data will be analyzed will be carefully described. Finally, the paper will provide the results of the empirical analysis. Moreover, a conclusion where the answer to the research question is discussed will be provided, along with the limitations of the study and recommendation for further research.

THEORETICAL FRAMEWORK

The definitions of economic freedom and human development

In order to analyze the relationship between economic freedom and human development properly, it is important to define these terms coherently. This paper will use the definition given by the Fraser Institute and the Heritage Foundation. There are two reasons for this choice. First of all, both institutions provide a definition of economic freedom which is very similar and which has its origins on the points of view of well-known economists such as Friedman and Von Hayek, which focuses on the relationship between individuals and government (Gwartney & Lawson, 2013). Therefore, it is convenient to use this definition that is both well-rounded and focuses on possible future activities of policymaking. Moreover, these two institutes are the only ones that publish regularly measurements of economic freedom (Doucouliagos & Ulubasoglu, 2006). As a result, the academic debate on governmental policy and economic freedom strictly refers to this definition, given that all the empirical research on the topic used these data.

Economic freedom is therefore defined both at an individual and at an institutional level. In fact, economic freedom is defined as "the condition in which individuals can act with maximum autonomy and minimum obstruction in the pursuit of their economic livelihood and greater prosper" (Miller & Kim, 2006:48). At an institutional level, economic freedom indicates the extent to which countries rely on free and open markets to allocate resources rather than using government intervention (Gwartney & Lawson, 2013). In fact, in order to maximize personal economic freedom, governments should establish a strong and stable legal structure which guarantees effectively personal freedom and property rights (Gwartney & Lawson, 2013). However, economic freedom requires also that government should refrain from other activities such as taxes, regulation and public provision of goods, which entails a limitation of personal freedom in choosing how to behave with their belongings (Gwartney & Lawson, 2013). The measurement of the level of economic freedom at country level therefore refers to estimates of taxes level and government spending, rule of law and the regulatory level of the internal market and of the trade (Beach & Miles, 2006).

Regarding human development, this paper will use the definition adopted by the United Nations Development Program (UNDP), which is the most important international institution which deals with development, and which takes inspiration from the work on welfare economics made by Amartya Sen (Fukuda-Parr, 2003). The UN's human development approach embodies the idea that the essence of development is to improve human conditions by expanding the range of things that an individual can be or make (Fukuda-Parr, 2003). In other terms, development can be seen as "removing the obstacles to what a person can do in life" (Fukuda-Parr, 2003:305) .

The main conceptual problem faced by the UN in creating a precise definition of human development has been the identification of what these "obstacles" should be. In selecting them, they used two criteria: the overcoming of these issues had to be universally valued across the world and had to face basic needs, in the sense that the persistence of these issues would prevent individuals to perform many activities (Fukuda-Parr, 2003). As a result, UN developed a strict definition of human development which could be quantified and used for policymaking (UNDP, 2014). They defined human development as being composed equally by access to healthcare, to education and also by the level of income per capita (UNDP, 2014).

The relationship between economic freedom and human development

Despite the claims that economic freedom stimulates human development, the relationship between these two is not straightforward. This is partly due to the fact that research has mainly focused on how economic freedom is related to economic growth (and therefore on income per capita) (Doucouliagos & Ulubasoglu, 2006), whereas no other study strictly referred to the analysis of the other dimensions of human development such as education and healthcare.

The vast body of research regarding economic freedom and economic growth is well described in the meta-analysis performed by Doucoliagos and Ulubasoglu (2006). In their meta-analysis, they agree that the majority of the studies found that economic freedom is positively correlated with growth (Doucouliagos & Ulubasoglu, 2006)

However, specific studies draw different conclusions that particularly refer to the issue of growth in less developed countries. In fact, Altman (2008) concluded that the positive correlation between freedom and growth is consistent only after a certain level of income. Therefore, he found that there is a threshold effect: for poorer countries economic freedom does not influence growth, whereas for richer ones economic freedom matters (Altman, 2008). Moreover, the positive relationship seems to hold only for certain components of economic freedom, such as rule of law, and not others such as government size (Carlsson & Lundström, 2002). On top of that, Heckelman (2000) tried to study this relationship using a stronger definition of causality than correlation: Granger causality. In his study, he found that economic freedom does not Granger-cause growth (Heckelman, 2000). Therefore, the beneficial effect of economic freedom on economic growth could be not as strong as usually proposed.

Regarding the effect of economic freedom on healthcare and education, there is no specific literature present. However, theoretical considerations can be made on the topic. Specifically, research sustains that the cause of the positive effect of economic freedom on growth is mainly the increased amount of investment that economic freedom causes (Bengoa & Sanchez-Robles, 2003). With respect to education, it can be inferred that higher amount of investments can be related to higher investment on human capital, and therefore on education. The idea is that economic free countries stimulate competition, and therefore in a competitive labor market

education will be more rewarded(Burda & Wylopsz,2013). Furthermore, economic growth and higher levels of personal income may allow people to spend more money both on their education and their health (Rosen & Gayer, 2008). If this is the case in developing countries, economic freedom could be positively correlated with all the dimensions of human development.

On the other hand, economic freedom also entails a role of the government which can be negatively correlated with education and healthcare. In fact, economic freedom means that government should refrain in any activity of allocation of resources and of regulation (Gwartney & Lawson, 2013). However, education and healthcare are commonly thought as those activities where government should step in given the typical market failures that affects them, namely externalities and asymmetric information (Rosen & Gayer, 2008). Given the presence of this market failures, standard economic theory sustains that government should both regulate and provide education and healthcare, in order to avoid inefficient outcomes or under-provision (Rosen & Gayer, 2008). This problem may be amplified in underdeveloped countries, where lower incomes may prevent people to adequately invest in education and healthcare.

To sum up, the relationship between human development and economic freedom is not clear. This ambiguity is reinforced by the fact that no research studies specifically the relationship of these two variables. There may be a positive relation since economic freedom is related positively with economic growth . However, governmental policies related to economic freedom could have a negative impact on education and healthcare. Therefore, this paper will test the following hypothesis:

There is a positive relationship between economic freedom and human development for developing countries

DATA

In order to test our main hypothesis, historical data about developing countries is needed. Based on the distinction provided by the World Bank, we have determined which countries to include in our definition of developing countries. These are: low income, lower middle income and middle income. After defining our concept of developing countries, some of them had to be taken out due to information incompleteness. As a result, 66 developing countries have been included in our sample. For a specification of the countries included, the appendix can be used.

First of all, there are two main indexes currently published by the Heritage Foundation and by the Fraser Institute. Both of these are commonly used in the research on the topic. This paper will make use of the index of the Heritage foundation, since it provides annual values for economic freedom, whereas Fraser Institute provides values that refers only to a 5 years' span. The scores on the Economic Freedom Index (EFI) have been retrieved from www.heritage.org/index/, which contains an extensive database on Economic Freedom scores .These scores have been subdivided into several scores on more specific subjects, for example trade freedom, fiscal freedom, property rights. However, in this research the overall Economic Freedom scores have been used, as to gain a more comprehensive model by using the complete set of variables.

On the other hand, the Human Development Index (HDI) scores have been obtained through the annual official reports of the United Nations Development Programme. This report contains the

scores on the Human Development Index separately for each country, including separate scores for male only and female only. We have chosen to use a country average including both genders, as it gives a more comprehensive reflection of the human development than using just one of the genders for comparison. The Human Development Index consists of indices on three main subjects: length and healthiness of life, being knowledgeable and having a decent start of living (UNDP, 2014). Therefore, the scores on the HDI reflect indications on all of these three components, rather than merely looking at a narrow definition of wealth or welfare.

Furthermore, all of the necessary data has been collected on the set of control variables, which consists of: annual inflation, population share of people younger than 15 years old, population share of people older than 64, foreign direct investment and foreign aid per capita. We have chosen to include these control variables, as we think they might have an effect on our dependent variable which would lead to omitted variable bias if not included. All of the data on these control variables has been retrieved from www.worldbank.org, containing extensive datasets on a wide variety of economic and development indicators.

Annual inflation is measured by the consumer price index, representing changes in the costs of buying a basket of various goods. Moreover, foreign direct investments (FDI) is measured by the net cash dollar inflows by investments on the balance of payments of the specific country. Foreign aid per capita has been retrieved from the indicator on www.worldbank.org called: Net official development assistance (ODA) per capita, which includes concessional loans and grants by institutions or other countries to the developing country.

For all variables, we have included a time span of ten years, from 1998 until 2007, resulting in a very balanced set of panel data. This particular period has been chosen in order to control for changes in calculation methods, as either the EFI or the HDI has been calculated using different methods before and after this period. However, a time span of ten years should nevertheless be sufficient to observe important differences in the variables.

METHODOLOGY

As mentioned in the data section, this paper made use of panel data instead of a cross-section, including data of 66 countries from 1998 until 2007. In order to analyse the available data, several models have been applied. The research question – whether there is a relationship between the score of a development country on the Human Development Index and on the Economic Freedom Index between 1998 and 2007 – will be tested by the means of three different models.

In the paper, two different regression models have been estimated, using pooled ordinary least squares (OLS) regression. They differ only in the functional form assumed by the independent variable EFI (Economic Freedom score). One model, which will be defined log-linear, will present the variable EFI without any functional transformation. The other one, which will be denominated as the log-log model, will use as a regressor the natural logarithm of EFI. In this way, it will be possible to study the effect of both the levels and of the changes of economic freedom with respects to human development. As a result, these multiple regression models take the form of the following formulas:

-For the log-linear model:

$$ln(HDI * 1000_t) = \beta_0 + \beta_1 * EFI_t + \beta_2 * inflation_t + \beta_3 * (share < 15)_t + \beta_4 * (share > 64)_t + \beta_5 * ln(FDI_t) + \beta_6 * ln(ODA_t) + u_t$$

-For the log-log model

$$ln(HDI * 1000_t) = \beta_0 + \beta_1 * ln(EFI_t) + \beta_2 * inflation_t + \beta_3 * (share < 15)_t + \beta_4 * (share > 64)_t + \beta_5 * ln(FDI_t) + \beta_6 * ln(ODA_t) + u_t$$

In this model, our dependent variable is the natural logarithm of HDI, denoting the score on the Human Development Index. We have chosen to use the natural logarithm, as the HDI consists of three components (see data section) that are possibly all positively influenced by EFI, resulting in a non-linear relationship. Furthermore, the HDI score has been multiplied for 1000, given that HDI score is given in thousandths.

EFI is our independent variable of main interest, which is the score on the Economic Freedom Index. The control variables are inflation (measured in annual percentage); dummy variables for both population share below the age of 15 and population share exceeding the age of 64; foreign direct investment (measured in current US dollars and transformed in the natural logarithm form); ODA denoting foreign aid (measured in US dollars per capita, and transformed as natural logarithm of ODA).

Based on this OLS multiple regression model, conclusions can be drawn with respect to the existence of a significant relationship between HDI and EFI. This can be done by applying a T-test on the coefficient β_1 whether it significantly differs from zero, using a significance level of 5%:

$$\mathbf{H_0: \beta_1 = 0}$$

$$\mathbf{H_1: \beta_1 \neq 0}$$

If the null-hypothesis is to be accepted, HDI and EFI can be concluded to have a significant relationship other than zero. However, this model does not draw any conclusions regarding the causality of the relationship.

Second, the same models including the same variables have been estimated using a random effects model, assuming that the variation in the data has been assigned randomly across the countries. However, it is relatively unlikely for the country-specific characteristics, leading to variation across countries, to have been randomly distributed. On the other hand, the main advantage of the random effects model is that time invariant variables do not get cancelled out by the model itself. In this particular case, time invariant variables could be the population shares below the age of 15 and above the age of 64, in as much as they do not tend to change that much over time.

Subsequently, a fixed effects model has been estimated. Unlike the random effects model, this one does not assume the variation between countries to have been assigned randomly. Therefore, the country-specific characteristics between are considered as determinants of the variation and are used as explanation for the HDI. The main advantage of the fixed effects model

is that it cancels out bias caused by omitted, country-specific variables that do not change over time. At the same time, the use of a fixed effects model can cancel out information provided by the data of included variables as well, provided that they do not vary much over time. As mentioned before, this can lead to a loss of the variables on population shares.

This three different models will be compared through statistical tests in order to assess which one is preferable over the others. To compare the pooled OLS model and the random effects model, we will make use of the Breusch-Pagan test. The hypotheses that will be considered are:

H_0: The OLS pooled regression model is the preferred model

H_1: The random effects model is the preferred model

Finally, to test whether either a random effects, or a fixed effects model should be applied to the data, a Hausman test is used. This test determines which of the two models fits the data best, using the different coefficients found in these two models. If the Hausman test finds that the error terms are correlated with the regressors, the fixed effects model should be used. The hypotheses of the Hausman test are:

H_0: The random effects model is the preferred model

H_1: The fixed effects model is the preferred model

Ultimately, the model that best fits the data will be used to draw conclusions regarding the research question whether there is a significant relationship between the scores on HDI and EFI between 1998 and 2007. This will again be done using a T-test, accepting the null-hypothesis if there is no significant effect, rejecting it if there is.

Having decided which model to use, finally a robustness check will be carried out, running the chosen model separately on the three income groups as mentioned before: low income, lower middle income and middle income countries.

Concluding, it should be noted that neither of the models provided in this methodology section can be used to draw a very clear conclusion on the issue of causality. Merely the relationship or correlation can be found. This restriction will be further elaborated upon in the discussion section.

RESULTS

The analysis of the results will start from the model which uses the economic freedom's score as a regressor of the natural logarithm of Human development Index (the log-linear model). Both the OLS pooled regression model and the random effects model present a significant positive effect of economic freedom on human development (Appendix 3). However, for the same variables, the fixed effect model shows a positive but insignificant effect, as the p-value is 0.077, exceeding the 5% significance level (Appendix 3).

Both the Breusch-Pagan test and the Hausman Test reject strongly the null hypothesis (Appendix 3). As a result, the Fixed Effect model is considered the most suitable for the data used. This result has an important impact on the validity of the research, since fixed effects

model have the ability to control for both country specific and time-based omitted variables, rendering the model less susceptible to omitted variable bias. According to the model, levels of economic freedom do not have a significant effect on changes in Human Development Index. Exactly, this does not mean that there is no relationship between the two, but that it is not statistically possible to identify the relationship precisely.

Regarding the model with logarithm of human development as dependent variable and logarithm of economic freedom as regressor (the log-log model), both the Breusch-Pagan and the Hausman Test reject the null hypothesis (Appendix 4). As with the log-linear model, the fixed effects model is the most suitable for our data.

The fixed effect model shows that there is a positive and significant (given the p-value being 0.028) effect of economic freedom on human development (Appendix 4). The relative coefficient has been estimated to be 0.075 (Appendix 4). Given that both the variable assume the logarithmic form, the interpretation of the coefficient is: a 1% increase in economic freedom score leads to a 0.075% increase in human development score. From this interpretation, it is evident that the effect of economic freedom on human development is a minor one : a doubling of economic freedom score would only increase human development by 7.5%. Nevertheless, this effect seems to be strongly significant from the regression estimation.

However, the robustness check shows that this result is not as robust as the inference testing showed (Appendix 5). In fact, the same model applied to different subgroups of our datasets shows that the result is not always constant (Appendix 5). The log-log model applied separately to Low-Income and Lower Middle-Income countries shows results very similar to the general model (Appendix 5). However, taking into consideration only Middle Income countries, it is possible to observe a shift in the direction of effect , being the coefficient -0.071 at 0.046% significance (Appendix 5).

To sum up, the log-linear model does not show any significant relationship between economic freedom and human development. On the other hand, the log-log model shows a significant and positive effect of changes of economic freedom on changes of human development. However, this effect is a minor one and it is not consistent at the robustness check.

CONCLUSION

All in all, the relationship between the HDI and EFI was found not to be significant in the log-linear model. However, it was concluded significant in the log-log model, although this was a small significant effect. The robustness check finally showed that the results are not very constant, as a change of sign was observed in the coefficient for Middle Income countries. Therefore, we cannot draw a general conclusion on the relationship between HDI and EFI, other than that there tends to be a positive effect between the two.

The main limitations of this research are simultaneous equation bias and a missing variable on the effects of governance on the HDI score. First of all, the problem of simultaneous equation cannot easily be solved, as there is always a chance that the causality works both ways. In fact, it may have been possible that an increase in development caused an higher demand by the individuals of personal freedom and rule of law , causing therefore an increase in economic freedom. A Granger-causality test could have been performed, although that does not

completely solve this problem either as this test can also not give a decisive answer to the causality issue.

Secondly, we could not find a representative variable with respect to quality of institutions or governance. This could represent an omitted variable bias, since it is easily comprehensible that quality of government is directly correlated to how government can provide economic freedom, as well as an important driver for development. Initially, we had a control variable governance, consisting of scores on a few aspects of institutional quality. However, this data was not complete and gaps of three years made us exclude this variable. Yet, this could not be fundamentally altering the validity of the model. In fact, the short-time span used renders less likely strong institutional changes, since these usually occur in bigger time spans. Moreover, fixed effect models have the property of controlling for country specific and time variant omitted variables. Nevertheless, for future research, this could be improved by looking for another variable that represents this effect.

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APPENDIXES

The first two appendixes will show the list of countries whose data have been used in this paper and how they are differently classified according to the world bank, in relation to the robustness check.

Afterwards, the appendixes will provide the estimated models with the different regression specifications, and also the results of the statistical tests that were used in order to test which model specification is the most suitable. First, there will be the estimated models and then the tests.

Finally, the last appendix will show the robustness check for the statistical model which has been found to give a precise answer on the relationship between economic freedom and human development, in this case the log-log fixed effect model.

APPENDIX 1

This appendix shows the list of all the 66 countries that have been used in the study.

Albania	Madagascar
Algeria	Malawi
Armenia	Malaysia
Azerbaijan	Mali
Bangladesh	Mauritania
Belize	Mexico
Benin	Mongolia
Bolivia	Morocco
Botswana	Mozambique
Brazil	Nepal
Burkina Faso	Niger
Cote d'Ivoire	Nigeria
Cameroon	Pakistan
China	Panama
Colombia	Paraguay
Costa Rica	Peru
Dominican Republic	Philippines
Ecuador	Senegal
Egypt	South Africa
El Salvador	Sri Lanka
Ethiopia	Suriname
Fiji	Swaziland
Gabon	Syria

Ghana	Tanzania
Guatemala	Thailand
Guyana	Tunisia
Haiti	Turkey
Honduras	Uganda
India	Vietnam
Indonesia	Yemen
Iran	Zambia
Jamaica	
Jordan	
Kenya	
Laos	

APPENDIX 2

In order to perform the robustness check, the different countries where subdivided in subsets according to the World Bank classification: Low income, lower middle income, middle income

Low Income Countries	Lower Middle Income Countries	Middle Income Countries
Bangladesh	Armenia	Albania
Benin	Bolivia	Algeria
Burkina Faso	Cote d'Ivoire	Azerbaijan
Ethiopia	Cameroon	Belize
Haiti	Egypt	Botswana
Kenya	El Salvador	Brazil
Madagascar	Ghana	China
Malawi	Guatemala	Colombia
Mali	Guyana	Costa Rica
Mozambique	Honduras	Dominican Republic
Nepal	India	Ecuador
Niger	Indonesia	Fiji

Tanzania	Laos	Gabon
Uganda	Mauritania	Iran
	Mongolia	Jamaica
	Morocco	Jordan
	Nigeria	Malaysia
	Pakistan	Mexico
	Paraguay	Panama
	Philippines	Peru
	Senegal	South Africa
	Sri Lanka	Suriname
	Swaziland	Thailand
	Syria	Tunisia
	Vietnam	Turkey
	Yemen	
	Zambia	

APPENDIX 3

In this appendix, there are all the results regarding the log-linear model (linear for Economic freedom, logarithmic for Human Development). First, there all the results of the regression using the different models, followed by the statistical tests used to judge which model is better.

OLS Pooled Regression Model

Source	SS	df	MS	Number of obs =	600
				F(6, 593) =	159.87
Model	26.4933707	6	4.41556178	Prob > F =	0.0000
Residual	16.3781978	593	.027619221	R-squared =	0.6180
				Adj R-squared =	0.6141
Total	42.8715684	599	.071571901	Root MSE =	.16619

lnhdi	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
economicfre~e	.0065857	.0010007	6.58	0.000	.0046203	.0085511
population~15	-.0276234	.0018237	-15.15	0.000	-.0312051	-.0240417
population~64	.0067732	.006625	1.02	0.307	-.0062381	.0197845
lnfdi	.0028249	.0045611	0.62	0.536	-.0061329	.0117827
lnoda	-.0046364	.0074507	-0.62	0.534	-.0192693	.0099965
inflation	.0017785	.0005754	3.09	0.002	.0006485	.0029084
_cons	.0773123	.1571862	0.49	0.623	-.2313972	.3860217

Fixed Effects Model

Fixed-effects (within) regression — Number of obs = 600
Group variable: countrycode — Number of groups = 66

R-sq: within = 0.2112 — Obs per group: min = 3
between = 0.6370 — avg = 9.1
overall = 0.5354 — max = 10

F(6,528) = 23.56
corr(u_i, Xb) = -0.8443 — Prob > F = 0.0000

lnhdi	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
economicfre~e	.0011302	.000637	1.77	0.077	-.0001213	.0023816
population~15	.01129	.0016522	6.83	0.000	.0080442	.0145358
population~64	-.0002929	.0064443	-0.05	0.964	-.0129525	.0123668
lnfdi	-.005945	.0022644	-2.63	0.009	-.0103934	-.0014966
lnoda	.0028838	.0052806	0.55	0.585	-.0074897	.0132573
inflation	.0007405	.0002299	3.22	0.001	.0002889	.0011922
_cons	-.8918224	.0869799	-10.25	0.000	-1.062692	-.7209533
sigma_u	.32855515					
sigma_e	.04635468					
rho	.9804831	(fraction of variance due to u_i)				

F test that all u_i=0: F(65, 528) = 109.14 — Prob > F = 0.0000

Random Effects Model

```
Random-effects GLS regression                   Number of obs      =       600
Group variable: countrycode                     Number of groups   =        66

R-sq:  within  = 0.1316                         Obs per group: min =         3
       between = 0.3486                                        avg =       9.1
       overall = 0.3174                                        max =        10

                                                Wald chi2(6)       =    103.22
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
```

lnhdi	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
economicfre~e	.0020765	.0006915	3.00	0.003	.0007212	.0034317
population~15	.0005304	.0014892	0.36	0.722	-.0023884	.0034493
population~64	.0383296	.0057415	6.68	0.000	.0270765	.0495828
lnfdi	-.0065943	.0024672	-2.67	0.008	-.0114299	-.0017586
lnoda	-.001922	.0056262	-0.34	0.733	-.0129491	.0091051
inflation	.0008779	.000255	3.44	0.001	.0003782	.0013776
_cons	-.6835447	.0952414	-7.18	0.000	-.8702143	-.496875
sigma_u	.14872453					
sigma_e	.04635468					
rho	.91145626	(fraction of variance due to u_i)				

Breusch-Pagan Test

```
Breusch and Pagan Lagrangian multiplier test for random effects

        lnhdi[countrycode,t] = Xb + u[countrycode] + e[countrycode,t]

        Estimated results:
                     |       Var     sd = sqrt(Var)
             ---------+------------------------------
               lnhdi |    .0715719       .2675293
                   e |    .0021488       .0463547
                   u |     .022119       .1487245

        Test:   Var(u) = 0
                             chibar2(01) =  1593.14
                          Prob > chibar2 =   0.0000
```

Hausman Test

```
. hausman FixedLinearLn .
```

	Coefficients (b) FixedLinea~n	(B) .	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
economicfr~e	.0011302	.0020765	-.0009463	.
populatio~15	.01129	.0005304	.0107596	.0007156
populatio~64	-.0002929	.0383296	-.0386225	.0029265
lnfdi	-.005945	-.0065943	.0006493	.
lnoda	.0028838	-.001922	.0048058	.
inflation	.0007405	.0008779	-.0001374	.

```
                b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =      154.39
                Prob>chi2 =      0.0000
                (V_b-V_B is not positive definite)

.
```

APPENDIX 4

In the same fashion of Appendix 3, the results for the log-log model (logarithmic for economic freedom and logarithmic for Human Development Index) are presented

OLS Pooled Regression

Source	SS	df	MS
Model	26.3341274	6	4.38902124
Residual	16.537441	593	.027887759
Total	42.8715684	599	.071571901

```
Number of obs =     600
F(  6,   593) =  157.38
Prob > F      =  0.0000
R-squared     =  0.6143
Adj R-squared =  0.6104
Root MSE      =    .167
```

lnhdi	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lneconomicf~m	.3297766	.0540825	6.10	0.000	.2235601	.435993
population~15	-.0278015	.0018325	-15.17	0.000	-.0314005	-.0242025
population~64	.0071075	.0066574	1.07	0.286	-.0059675	.0201826
lnfdi	.0029158	.0045878	0.64	0.525	-.0060945	.011926
lnoda	-.0042481	.0074906	-0.57	0.571	-.0189594	.0104632
inflation	.0017269	.0005778	2.99	0.003	.0005921	.0028617
_cons	-.8748742	.2506964	-3.49	0.001	-1.367235	-.3825133

Fixed Effects Model

```
Fixed-effects (within) regression               Number of obs      =       600
Group variable: countrycode                     Number of groups   =        66

R-sq:  within  = 0.2137                         Obs per group: min =         3
       between = 0.6328                                        avg =       9.1
       overall = 0.5283                                        max =        10

                                                F(6,528)           =     23.92
corr(u_i, Xb)  = -0.8396                        Prob > F           =    0.0000
```

lnhdi	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lneconomicf~m	.0751609	.0341018	2.20	0.028	.0081691	.1421527
population~15	.0110743	.0016571	6.68	0.000	.0078191	.0143295
population~64	-.0001271	.0064351	-0.02	0.984	-.0127687	.0125144
lnfdi	-.0058737	.0022598	-2.60	0.010	-.010313	-.0014344
lnoda	.0026893	.0052742	0.51	0.610	-.0076716	.0130503
inflation	.0007376	.0002294	3.22	0.001	.0002871	.0011882
_cons	-1.124063	.1557097	-7.22	0.000	-1.42995	-.8181763
sigma_u	.32671954					
sigma_e	.04628023					
rho	.98032961	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(65, 528) =   110.66             Prob > F = 0.0000
```

Random Effects Model

```
Random-effects GLS regression                   Number of obs      =       600
Group variable: countrycode                     Number of groups   =        66

R-sq:  within  = 0.1369                         Obs per group: min =         3
       between = 0.3536                                        avg =       9.1
       overall = 0.3214                                        max =        10

                                                Wald chi2(6)       =    106.94
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
```

lnhdi	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lneconomicf~m	.1295682	.0368557	3.52	0.000	.0573323	.2018041
population~15	.0004123	.0014897	0.28	0.782	-.0025075	.0033321
population~64	.0377777	.0057313	6.59	0.000	.0265445	.0490108
lnfdi	-.0065105	.0024552	-2.65	0.008	-.0113225	-.0016984
lnoda	-.0021046	.0056048	-0.38	0.707	-.0130899	.0088807
inflation	.0008685	.0002535	3.43	0.001	.0003716	.0013654
_cons	-1.082024	.1701942	-6.36	0.000	-1.415599	-.7484497
sigma_u	.15001174					
sigma_e	.04628023					
rho	.91309287	(fraction of variance due to u_i)				

Breusch-Pagan Test

Breusch and Pagan Lagrangian multiplier test for random effects

lnhdi[countrycode,t] = Xb + u[countrycode] + e[countrycode,t]

Estimated results:

	Var	sd = sqrt(Var)
lnhdi	.0715719	.2675293
e	.0021419	.0462802
u	.0225035	.1500117

Test: Var(u) = 0

chibar2(01) = 1623.42

Prob > chibar2 = 0.0000

Hausman Test

```
. hausman FixedLnLn .
```

	Coefficients (b) FixedLnLn	(B) RandomLnLn	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
inflation	.0007376	.0008685	-.0001309	.
lneconomic~m	.0751609	.1295682	-.0544073	.
populatio~15	.0110743	.0004123	.010662	.0007256
populatio~64	-.0001271	.0377777	-.0379048	.0029262
lnfdi	-.0058737	-.0065105	.0006368	.
lnoda	.0026893	-.0021046	.004794	.

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 149.54

Prob>chi2 = 0.0000

(V_b-V_B is not positive definite)

APPENDIX 5

In this appendix, the results for the robustness check are showed

Group Lower Income

```
Fixed-effects (within) regression               Number of obs      =       128
Group variable: countrycode                     Number of groups   =        14

R-sq:  within  = 0.1643                         Obs per group: min =         3
       between = 0.2711                                        avg =       9.1
       overall = 0.0741                                        max =        10

                                                F(6,108)           =      3.54
corr(u_i, Xb)  = -0.5764                        Prob > F           =    0.0031
```

lnHDI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lneconomicf~m	.2811126	.1375828	2.04	0.043	.0083996	.5538255
population~15	.0232412	.0111679	2.08	0.040	.0011044	.045378
population~64	.0219952	.0327854	0.67	0.504	-.0429912	.0869816
lnfdi	-.0237165	.0076936	-3.08	0.003	-.0389666	-.0084664
lnoda	-.0019668	.0260782	-0.08	0.940	-.0536582	.0497246
inflation	.0014717	.0009937	1.48	0.142	-.0004979	.0034413
_cons	-2.700014	.7406568	-3.65	0.000	-4.168124	-1.231904
sigma_u	.23174833					
sigma_e	.07290541					
rho	.90994621	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(13, 108) =    21.96             Prob > F = 0.0000
```

Group Lower Middle Income

```
Fixed-effects (within) regression               Number of obs      =       249
Group variable: countrycode                     Number of groups   =        27

R-sq:  within  = 0.3542                         Obs per group: min =         4
       between = 0.4804                                        avg =       9.2
       overall = 0.3735                                        max =        10

                                                F(6,216)           =     19.74
corr(u_i, Xb)  = -0.8484                        Prob > F           =    0.0000
```

lnHDI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lneconomicf~m	.0964215	.0400945	2.40	0.017	.017395	.175448
population~15	.0173926	.0023015	7.56	0.000	.0128564	.0219288
population~64	-.0140782	.0093768	-1.50	0.135	-.0325599	.0044035
lnFDI	-.004578	.002773	-1.65	0.100	-.0100436	.0008876
lnoda	.0006822	.0065483	0.10	0.917	-.0122245	.0135888
inflation	.0005823	.0002807	2.07	0.039	.000029	.0011355
_cons	-1.421885	.181191	-7.85	0.000	-1.779014	-1.064756
sigma_u	.29345176					
sigma_e	.03954922					
rho	.98216041	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(26, 216) =   129.83             Prob > F = 0.0000
```

Group Middle Income

```
Fixed-effects (within) regression               Number of obs      =       216
Group variable: countrycode                     Number of groups   =        25

R-sq:  within  = 0.4924                         Obs per group: min =         3
       between = 0.2256                                        avg =       8.6
       overall = 0.0084                                        max =        10

                                                F(6,185)           =     29.91
corr(u_i, Xb)  = -0.5844                        Prob > F           =    0.0000
```

lnHDI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lneconomicf~m	-.0711476	.0354898	-2.00	0.046	-.1411644	-.0011308
population~15	.0099285	.0012966	7.66	0.000	.0073705	.0124866
population~64	.0081209	.0048382	1.68	0.095	-.0014243	.0176661
lnoda	.0079727	.0038389	2.08	0.039	.000399	.0155464
lnFDI	.0022394	.0023978	0.93	0.352	-.0024911	.00697
inflation	.0004921	.000233	2.11	0.036	.0000325	.0009517
_cons	-.4360128	.17228	-2.53	0.012	-.7758989	-.0961268
sigma_u	.09111397					
sigma_e	.02473537					
rho	.93135894	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(24, 185) =    51.54             Prob > F = 0.0000
```