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THE IMPACT OF ECONOMIC FREEDOM UPON ECONOMIC GROWTH: AN APPLICATION ON DIFFERENT INCOME GROUPS

Cemil Serhat AKIN

Mustafa Kemal University, FEAS, Department of Economics, Turkey

Cengiz AYTUN

Çukurova University, Kozan Vocational School, Department of Finance-Banking and Insurance, Turkey

Başak Gül AKTAKAS

Kozan Faculty of Administration Science, Turkey

ABSTRACT

The objective of the study is to investigate the relationship between economic growth and economic freedom for different income groups. Therefore, the data were collected from 94 different countries belonging to five different income groups in order to cover the period from 2000 to 2010. In the study, relationship between the economic growth of the country and the level of freedom index which Fraser Institute measured and its sub-components constituting was questioned through the panel data analysis method. As a result of the analyses, it was found that there is a statistically significant positive relationship between the level of economic freedom for all income groups and economic growth. With the inclusion of sub-components of freedom index into the model, the effects of such sub-components vary depending on the income groups.

Keywords: Economic freedom, Economic growth, Property rights, Trade, Regulations, Panel data analysis.

JEL Code: C 33, O40, O43.

1. INTRODUCTION

Economists have felt obliged to seek different explanatory variables as the countries having similar the equipment of factor production have different distances they have traveled on the way to economic growth vary. Besides endogenous growth models, the conditions of the environment, where economic activities are conducted, are included into economic analysis as determinants of economic growth. In this sense, the activities of the environment in which economic activity takes place can be positively influenced in compliance with the economic performance. There are various studies available on the removal of commercial barriers and the invisible barrier, prevention of

price and quantity restrictions, facilitation of transport to finance facilities the state's economic activity such as leaving the market for the private companies the which are real players along with some studies suggesting that the realization of freedom-oriented activities has positive effects on economic performance. The main purpose of this study is to investigate the relationship between the level of economic freedom of the environment and the economic performance. Within the scope of the current study, the definition and measurement of economic freedom will be explained, and then the literature regarding the interaction between economic growth and economic freedom will be presented.

In the empirical section of the study, the levels of economic performance of countries are to be associated with their freedom which was obtained within the scope of the study performed by the Fraser Institute survey and the results will be questioned through the panel data analysis.

2. ECONOMIC FREEDOM AND MEASUREMENT

There is not a generally accepted definition of the concept of economic freedom which is recognized by everyone. The Gwartnev et al. free defining the free activities as the activities which can be performed without external intervention adding that economic freedom of an individual is to protect the property which is acquired lawfully from the outsiders and use it at his free will (Gwartney *et al.*, 1992). Beach and Miles defined the concept of economic freedom within the state's axis as there should be no sanctions without the restrictions of the state on the state's production of goods and services, distribution and consumption (Beach and Miles, 2005). In a free economic system while individuals are involved in economic activities, the state is to be responsible for only the control over the performance of market. The basis of economic freedom is the voluntary exchange of individuals (Hanke and Walters, 1997). As for the components of economic freedom, they can be defined as personal choice, voluntary activities carried out in the markets, free entry to the market and freedom of competition; moreover, people should have the right to own property and protection of these rights (Gwartney *et al.*, 2012).

The activities of units which perform economic activities cannot be considered as independent of their own environment. While individuals maximize their benefits, they should also optimize the conditions in which they exist. Therefore, the interaction of economic decisions of individuals with the economic environment will have an effect on the economic performance. The liberal market economy in which large free areas creates an environment enabling growth-enhancing and acceleration in the development (Beskaya and Koc, 2006). When economic freedom is associated with economic growth, the increase in the amount of income per capita is taken into account as a token of economic growth (Acemoglu and Robinson, 2012).

When it comes to the measurement of economic freedom, it is hardly possible to perform it numerically. Measurements are generally expressed as the comparison of states numerically. As for the strength of level of economic freedom, it is performed through the comparisons made by different authorities. The closeness between index values created by the institutions may give an idea about the accuracy of measurements (Hanke and Walters, 1997).

There are four institutions measuring the level of a country's economic freedom these are:

i) Fraser Institute
ii) Heritage Foundation;
iii) Freedom House;
iv) Scully and Slottje (1991).

The first two institutions renew their data sets on a regular basis every year. As the data set frequently used in studies is more comprehensive than the others, it is the data set of the Fraser Institute (Gwartney *et al.*, 2000). Institute Economic Freedom of the World Index (EFW Index), which was also used in the application part of the study published by the Fraser, was created through the measurements first performed in 1970. EFW index of economic freedom is established under five main headings:

1) Size of Government
2) Legal System and Property Rights
3) Sound Money
4) Freedom to Trade Internationally
5) Regulation

Under these five areas, the index is calculated according to 42 different sub-components depending on 24 different categories. Each sub-component has scores ranging from 0 to 10. The rise in score values means the increase in economic freedom.

3. THE LITERATURE ON THE RELATIONSHIP BETWEEN ECONOMIC GROWTH AND ECONOMIC PERFORMANCE

When the empirical literature, in which the relationship between economic freedom and economic growth is questioned, is analyzed, there is a consensus that economic freedom has a positive effect on economic growth. In the analysis, although aggregated indexes composed of several sub-components can be used, sub-components used for the formation of such indexes may be included separately in the analysis. Gwartney and Lawson (2004), who performed analysis through formed aggregated index in their study, while they revealed the positive effect of economic freedom on economic growth, Islam (1996) supported the idea that there is a positive relationship between economic freedom and per capita income in all countries with low, medium or high income levels. Similarly, Sturm and De Haan (2001) found a positive relationship between the level of economic freedom and economic growth. Levine and Renelt (1992) has also consistent findings with those belonging to Sturm and De Haan (2001). Levine and Renelt tested the compatibility with the models and thus consolidated the study. The way of the effects of economic freedom on economic growth while querying the index of the effects of the sub-components may be different. Therefore, in order to question the effects of these sub-components, the index components were included as independent variables in the model and a second analysis was performed. Relevant literature (Table 1) related to studies on sub-components has been introduced

on the axis of the five main categories composed of the EFW index which was used in the application.

With the creation of the indices, which measure the level of the countries' economic freedom, and the ease of access to these data, the number of the studies investigating the relationship between the economic growth and the level of freedom has rapidly increased. However, these studies have also been exposed to a great number of criticisms. Of all the criticisms, the most striking one refers to the fact that there is a casual relationship between the variables.

One of the oldest studies performed with a view to questioning the casual relationship is the causality analysis conducted by Farr and his colleagues. Farr et al. questioned the relationship between the economic growth and the level of GDP and thus having revealed the casual relationship; furthermore, as a result of the analyses, they found out that this relationship is bilateral (Farr *et al.*, 1998). Lately, Vega and Alvarez (2003) have investigated the present causality by means of the methods of various panel data analysis and thereby suggesting the impact of economic freedom upon economic growth. In the study conducted by (Dawson, 2003), the causality was also questioned once more and it was found that the causality is bilateral (Dawson, 2003). The study in which Carlsson and Lundstrom (2001) investigated the direction of causality has alleged that economic growth is the provider of economic freedom.

4. DATA AND EMPIRICAL METHODOLOGY

The data used in the application were obtained from World Bank (2013), Fraser Institute (Gwartney *et al.*, 2012) and Groningen Growth and Development Centre (Feenstra *et al.*, 2013). The definitions and sources related to data are presented in Table 2.

One of the aimed issues within the scope of study is whether the effects of the explanatory variables in the countries belonging to different income groups vary. Therefore, countries included in the study are classified into five different income groups. The classification of the countries depending on the income group is summarized in Table 3. The income classification criteria of the World Bank provide a basis for this classification. The countries included in the applications are presented in Table 4 depending on the income groups.

In the model which was formed to be used in the empirical part of the study, it was inspired by the growth model which Baro (1991) generalizes Solow-Swan model by means of descriptive endogenous variables. Solow and Swan's model has been improved with the inclusion of the human capital case, which may affect the productivity of the production factors over time, and hence Augmented Solow model has emerged. In line with the developments, endogenous growth models have been created through the internalization of the variables which were included in Augmented Solow model; moreover, the explanatory variables which will be a direct impact on growth such as population have been internalized. Thus, the efficiency of production factors has been associated with the elements in the market (Whiteley, 2000).

$$y_i = \beta \ln Y_{i0} + \psi X_i + Z_i + \varepsilon_i \quad (1)$$

The growth rate 'y' in a country 'i' is explained with respect to the convergence term, initial income 'Y' in year 0. The 'X' contains the parameters in the Solow growth model. The growth rate is a determined by a range of 'Z' variables that lie outside of the Solow model (Durlauf *et al.*, 2005; Jerven, 2006). Barro has generalized the model by adding various explanatory variables as well as endogenized the human capital (HC) in the model. The Population (POP) and the Economic Freedom Summary Index (EF) (Equation 2) was added to the model formed for the application part of the study as a representation of Z explanatory variables of Barro model. Moreover, Size of Government (GS), Legal system and property rights (LSPR), Sound Money (SM), Freedom to trade internationally (FTI) and Regulations (REG) were included in the study (Equation 3). Accordingly, the models belonging to the application can be expressed as follows.

MODEL 1: $$LGDP_{i,t} = \alpha_i + \beta_1 LGCF_{i,t} + \beta_2 LHC_{i,t} + \beta_3 LPOP_{i,t} + \beta_4 LEF_{i,t} + v_t + \varepsilon_{i,t} \quad (2)$$

MODEL 2: $$LGDP_{i,t} = \alpha_i + \beta_1 LGCF_{i,t} + \beta_2 LHC_{i,t} + \beta_3 LPOP_{i,t} + \beta_4 LSG_{i,t} + \beta_5 LLSPR_{i,t} + \beta_6 LSM_{i,t} + \beta_7 LFTI_{i,t} + \beta_8 LREG_{i,t} + v_t + \varepsilon_{i,t} \quad (3)$$

In the models concerning the implementation (Equation 2 and 3) index i refers to countries, index t symbolizes time, α_i represents fixed country effects and v_t indicates unobservable time effect, last $\varepsilon_{i,t}$ denotes the error term. The aim of the present study is to perform analyses considering 94 countries and five different income groups between the years from 2000 to 2010.. All the variables are expressed in their natural logarithmic forms

Letter "L" which is used in front of variable symbols indicates that the logarithmic transformation was done to the related variable series. The most appropriate tool for the application, which offers various advantages by means of bringing together cross-sectional and time-series data consisting of different countries, is the panel data analysis. Simple linear panel data models can be estimated through basically three different methods. The first of these is the method which contains common constant. It is named as the pooled ordinary least squares method (POLS).The second one is the fixed effects model (FEM) which includes country and time effects as constant terms. The third one is the random effects model (REM) which includes country and time effects as random parameters rather than fixed ones. With the combination of the data on a panel, they can be estimated via various methods. Moreover; the process by which systematic differences are revealed by means of using dummy variables on panel data is called as fixed effects model. Another method is called as the random effects model (Asteriou and Hall, 2007).

In the study for the purpose of making a selection among three basic estimators F test (Moulton and Randolph, 1989), LM test (Breusch and Pagan, 1980; Honda, 1985) and Hausman (1978) test were used. Presence of group specific effect (H_0: $\alpha_1 = \alpha_2 = ... = \alpha_n$) is tested by F test. According to the null hypothesis, intercepts related to individuals are common. The method which can be applied in such homogeneity will be pooled OLS. When H_0 is rejected, intercepts are considered to be different for each individual. The second essential tool in the model selection is the Breusch and Pagan (1980) Lagrange Multiplier test. In this test, the null hypothesis refers to the fact that the random effects variance between the individuals is zero (H_0: $\sigma_\mu^2 = 0$). The failure in the rejection of the null hypothesis leads to the fact that the random effects between the individuals are not significant. However, the problem in this test is that alternative hypothesis is set up double-

sided; however, the variance components are known to be positive. With a view to resolving such a problem, LM statistics was adapted by Honda (1985) to make the alternative hypothesis one-sided. As a result of the tests, pooled OLS estimator will be preferred in case of the absence of random panel effect. Moreover, between these two estimators, Hausman (1978) test is widely used on condition that fixed and random effects belonging to the individuals in F and LM tests are found to be significant. The main point to be mentioned in decomposing fixed and random effects methods is whether there is a correlation between such elements as individual as well as time and the explanatory variables in the model or not. The correlation of these elements with X_{it} refers to the fixed effects model while the absence of this correlation reveals random effects model. H_0 hypothesis follows: "there is not a correlation between the explanatory variables and individual effects". When zero hypothesis is accepted, both estimators will be consistent; nevertheless, as random effects estimator is more efficient, it will be appropriate to use it. In case of rejection of the hypothesis H_0, as random effects estimator would be biased, the use of consistent fixed effects estimator would be appropriate. In addition, before using the appropriate estimator, the presence of autocorrelation and heteroscedasticity problems should be explored. In order to detect the autocorrelation in practice, Baltagi and Li (1995) LM statistic test and to detect heteroscedasticity, LM test statistics developed by Greene (2008) were used.

5. EMPIRICAL FINDINGS

The statistical values of the selected F, LM, LM-Honda and Hausman estimator related to the model (Equation 2) in which economic freedom is represented with a single index (LEF) are presented in the bottom panel of Table 5. According to the probability values of F-test, fixed effects estimator is significant at 1% for all income groups compared to the pooled OLS estimator. In this case, H_0 hypothesis related to F test suggesting that fixed effects belonging to the groups are equal is rejected. On the other hand, according to the probability values of LM-test random effect estimator significant at the 1% for all income groups compared to the pooled OLS estimator. The fact that H_0 hypothesis is rejected according to LM test random effects between the individuals is significant.

In both tests, pooled OLS estimator is not preferred. After this stage, a preference is to be made between fixed and random effects. According to the probability value of Hausman tests, H_0 hypothesis is rejected at 1% significance level for all income groups. Therefore, consistent fixed effects are supposed to be used since random effects estimator is biased. The same selection procedure is also applied for the model (Equation 3) in which elements of economic freedom are represented as five separate sub-indexes. According to the probability values presented in the bottom panel of Table 5, the most appropriate one is the fixed effects estimator. In short, according to the F, LM, LM-Honda and Hausman test preformed for two different models and five different income groups, the fixed effects estimator is preferred for all income groups. In addition, the results of the autocorrelation and heteroscedasticity tests which are carried out for both models shows that the problems mentioned arise for each income group. Asymptotic t statistics cannot be used;

instead, the "panel-corrected standard errors" (PCSE) method which was developed by Beck and Katz (1995) was used in both models in order to obtain robust t statistics.

The fixed effects estimation results performed for different income groups by using the first model are presented in Table 5. When an overall assessment was done on the basis of income group in relation to the first model, it is evident that coefficients pertaining to the economic freedom (LEF) are positive and significant at 1% for all income groups. Solely 1% increase which is likely to occur in the composite index leads to the economic growth in OECD countries % 0.482, in high-income non-OECD countries % 0.422, in upper middle-income countries % 0.266 and in lower middle income group % 0.555 as well as in low income group % 0.331. Furthermore, the significance and sign of the fixed capital, human capital and population variables is in accordance with the existing literature. The adjusted R^2 values showing the power of all the independent variables to explain the movements in the dependent variable is in the range of 0.76 to 0.92 for different income groups. F-test values which express the unified explanatory power of the all coefficients are significant at 1% for each income group. Thus, it is clear that economic freedom leads to economic growth in each income group for Model 1.

Having used the second model, the results of the fixed effects estimation carried out for different income groups are presented in Table 6. Based upon the estimation results, the significance and sign of the fixed capital, human capital and population variables is in accordance with the existing literature. When the coefficients concerning the size of government (LSG) are analyzed, it was found that these coefficients are positive and statistically significant in upper-middle and lower-middle income groups while they are not significant in high-and low-income groups. In the upper income countries the role of the state on economy is expected less because of the robust institutional structure.

As for the middle and lower income groups, it is obvious that the regulation and size of the government have a positive impact on the economy with the aim of operationalizing the market (Kneller *et al.*, 1999). The obtained findings support this view.

The sign of the coefficients related to the legal system and property rights (LLSPR) is expected to be positive for all income groups. According to the results of the analyses, despite the fact that all of the results do not have positive sign, in such countries which are non-OECD members and those which belong to lower-middle and low-income groups the obtained results are statistically significant. With the declining of the income levels, the effects are becoming statistically more significant. When the coefficients of sound money (LSM) variable, it was found that they are positive and significant at 1% only in high-income OECD and in lower-middle income groups. Just a 1% increase which is likely to occur in sound money leads to economic growth in high-income OECD countries at the rate of % 0.581 and also in the lower middle income group at the rate of % 0.159. The binding of monetary policy to the rules or withdrawal from the populist policies give way to the occurrence of more significant positive results in upper income groups. In such countries belonging to low-income groups, the impact of sound money on the economy is statistically insignificant despite the negative coefficient. This result should be elaborately

examined in future studies; in particular, the contribution of the inflationary policies to the production in low-income groups should be questioned.

When it comes to the "freedom to trade internationally" (LFTI) variable, it was revealed that an 1 % increase in this variable causes a 0.101 % reduction in high-income OECD countries. The same effect has a positive impact in upper-middle income group at the rate of 0.128 % and in the low-income group at the rate of 0.074 % High-income countries are more innovative countries and without earning enough from new products produced are copied by imitator countries according to the theory of these products on items periods before being imported to the country from innovative high-income countries may have an adverse effect on economy. An increase in trade liberalization affects the economy of those countries belonging to low-income groups in a positive way. When the regulations (LREG) being the last of the indexes which represent the economic freedom in the model are analyzed, it was observed that only in high-income OECD and low income groups, they are positive and significant. In this regard, a 1% increase in regulations leads to the economic growth in high-income OECD countries at the rate of 0.124 % while in the low-income group, this growth occurs at the rate of 0.161 %. Even though the increase in regulations is considered as the restriction of economic freedom, it may influence the growth positively since it increases the level of confidence and reduces the friction in economic transactions as well as operationalizing economic activities especially in those countries member to low-income group. Finally, the adjusted R^2 values showing the power of all the independent variables to explain the movements in the dependent variable is in the range of 0.79 to 0.93 for five different income groups. F-test values which express the unified explanatory power of the all coefficients are significant at 1% for each income group.

6. CONCLUSION

The research area of the study is to investigate the impact of the level of freedom and the components which make up the level of freedom for different income groups upon economic growth. For this reason, the basic hypothesis is as follows: "there is a statistically significant positive relation between economic growth and the level of economic freedom." As a result of the application, it was found that the country member to all income groups the level of freedom represented by the freedom index is a positive and significant determinant of the economic growth. Lower-middle income group is the one which economic freedom has greatly contributed to growth.

In the second stage of the analysis, the components are added to the model as explanatory variables through the separation of the index in order to evaluate the effects of components constituting the freedom index separately. Moreover, another obtained result is that the aspect of the effects of the sub-components of the index varies depending on the income groups. The size of the government has a positive sign in both the upper-middle and lower-middle income groups. There is a statistically significant and positive impact of efficient work of legal institutions and well-defined property rights on economic growth in non-OECD countries belonging to high-

income and lower-middle and low-income groups. The reduction of income level increases the value of the coefficient effect.

In the economy, the effect of strong currency variable which represents such factors as the price stability and the procession of money supply depending upon the rule as well as the freedom to have foreign currency on economic growth is statistically significant and positive in not only OECD countries belonging to upper income group but also those which are included in lower-middle-income groups.

The route of the effect of international trade freedom on economic growth also varies with the change of the income groups. On the one hand, the international trade liberalization of the OECD countries member to the upper-income groups has a negative effect on economy; on the other, with the decline in the level of income, such effect becomes positive. However, the impact of regulations on economic growth has been observed merely in both OECD countries belonging to the upper income groups and those included in low-income groups. In these countries, the direction of the relationship is positive. The arrangements regulated by the Government are a contributing factor to the economy in terms of enhancing freedom and being accountable. Especially in low-income countries, the provision of the arrangements is essential for the realization of economic activities. The regulations and the reduction in the amount of friction and providing interoperability should be the fundamental elements of growth policies in the economy in the countries concerned. All in all, a basic limitation for the conducted application is worth mentioning. Having access to data which are necessary for making a detailed analyses especially for low-income groups is limited. The limitation of the stated statistical data causes a major obstacle for the planned applications.

Table-1. Related literature about relationship between economic freedom and economic growth

Author / Year	Categories	Findings and Results
Krueger (1974)	The Freedom to Trade Internationally	The implementations for the limitation of foreign trade will substantially require resources due to the high costs
Baro (1991)	The Size of Government	There was not a significant relationship between public investment and growth.
Rivera *et al.* (1991)	The Freedom to Trade Internationally	Production promotes information flow as well as trade in goods
Levine and Renelt (1992)	Sound Money	There is a negative relationship between the informal economy and economic growth
Torstensson (1994)	The Size of Government	There was not a significant relationship between public investment and growth.
Barro (1994)	Legal System and Property Rights / Sound Money	The safety and protection of property rights in the free markets having economic freedom is to encourage the growth. There is a negative relationship between the informal economy and economic growth.
Torstensson (1994)	Legal System and Property Rights / The Freedom to Trade Internationally	There is positive relationship between property rights and economic growth. There is negative relationship between the measures taken for the limitation of foreign trade and economic growth.
Knack and Keefer (1995)	The Size of Government / Legal System and Property Rights	Size of public expenditure prevents growth. There is positive relationship between property rights and economic growth
Holland (1995)	Sound Money	Uncertainty of parameters in the economy leads to high inflation and also high inflation uncertainty

Briault (1995)	Sound Money	Uncertainty prevents the long-term investments and economic growth
Bastiat (1995)	The Freedom to Trade Internationally	International trade will reduce the likelihood of war, and thus contributing to national security and economic growth
Alesina and Perotti (1996)	Legal System and Property Rights	As individuals' economic decisions taken freely, provided direction to property rights and investment and economic growth are provided
Martin (1997)	The Size of Government / Sound Money / The Freedom to Trade Internationally	The intervention of the state in economic life has a negative impact on the economic agents and limits their acting field. / There is a negative relationship between the informal economy and economic growth. / There is a positive and strong relationship between foreign trade freedom and economic growth.
Melicher and Norton (1997)	The Size of Government	Political interventions can increase the costs due to misuse of resources
Goldsmith (1997)	Legal System and Property Rights	There is positive relationship between property rights and economic growth
Tornell (1997)	Legal System and Property Rights	The description of property rights in details leads individuals to investments.
Addison and Hirsch (1997)	Regulations	Each of the new regulations makes the other ones even more necessary in the future
Gwartney *et al.* (1998)	The Size of Government / Legal System and Property Rights	The size of public expenditure prevents growth
Ayal and Karras (1998)	The Size of Government / Sound Money / Regulations	Investment in human capital positively affects the level of output. Government can promote economic growth. / There is a negative relationship between the informal economy and economic growth. / There is strong and negative relationship between credit constraints and the growth.
Nelson and Singh (1998)	The Size of Government	Investment in human capital positively affects the level of output. Government can promote economic growth
Svensson (1998)	Legal System and Property Rights	Weakness of property rights causes differentiation in the marginal return of capital, thus adversely affecting the investments
Kneller *et al.* (1999)	The Size of Government	Government interventions reduce uncertainty and provide a positive contribution to the economy.
Barro (1999)	The Size of Government	The size of public expenditures can prevents growth
Carlsson and Lundstrom (2001)	Legal System and Property Rights / Regulations	Robust economic growth of property rights has a strong and significant association. / Economic growth is the provider of economic freedom.
Uzay (2002)	The Size of Government	The populist political applications of the power reduces the efficiency of the system
Lundstrom (2003)	Sound Money / The Freedom to Trade Internationally	The state's freedom to keep money in foreign currency increases economic freedom. / Some institutional changes in the country for the promotion of foreign investment
Chang (2003)	Regulations	The policies of the countries tried to gain a competitive advantage in terms of labor costs via deregulation
Erdal (2004)	The Size of Government	The taxation of the citizens to keep to themselves that they earn and invest reduces the craving for freedom is restricted
Chheng (2005)	The Freedom to Trade Internationally	Economic freedom and free trade would increase foreign investment and thus they would provide a long-term economic growth
Aykac (2010)	Regulations	Deregulation is important for competitive markets

Table-2. Data Definitions and Sources

Code	Name	Source
GDP	Gross Domestic Product	WDI[a]
GCF	Gross Capital Formation	WDI[a]
HC	Human Capital Index	PWT 8.0[b]
POP	Population	WDI[a]
EF	Economic Freedom Index	EFD 2012[c]
SG	Size of Government	EFD 2012[c]
LSPR	Legal System and Property Rights	EFD 2012[c]
SM	Sound Money	EFD 2012[c]
FTI	Freedom to trade internationally	EFD 2012[c]
REG	Regulation	EFD 2012[c]

[a] The World Bank World Development Indicators: http://databank.worldbank.org/data/views/variable Selection/selectvariables.aspx?source=world-development-indicators
[b] Groningen Growth and Development Centre, Penn World Table 8.0 : http://citaotest01.housing.rug.nl/FebPwt/ Home.mvc
[c]Fraser Institude, Gwartney *et al*. (2012).

Table-3. Income Groups

Group Name	Group Code	GNI ($)
High Income OECD	HI-OECD	12.616 or more
High Income nonOECD	HI-nonOECD	12.616 or more
Upper Middle Income	UpMid	4.086 - 12.615
Lower Middle Income	LowMid	1.036 – 4.085
Low Income	Low	995 or less

Note: Economies are divided according to 2012 GNI per capita, calculated using the World Bank Atlas method. (http://data.worldbank.org/about/country-classifications) Access date: 08.11.2012)

Table-4. The Countries Included in the Application

High Income OECD (30 countries)
Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Korea, Rep., Luxembourg, Netherlands, New Zealand, Norway, Poland, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States
High Income non OECD (11 countries)
Croatia, Cyprus, Hong Kong SAR-China, Kuwait, Latvia, Lithuania, Malta, Qatar, Russian Federation, Singapore, Uruguay
Upper Middle Income (22 countries)
Albania, Botswana, Brazil, Bulgaria, China, Colombia, Costa Rica, Dominican Republic, Ecuador, Hungary, Jordan, Malaysia, Mauritius, Mexico, Namibia, Panama, Peru, South Africa, Thailand, Tunisia, Turkey, Venezuela
Lower Middle Income (17 countries)
Bolivia, Cameroon, Congo Rep., Egypt Arab Rep., El Salvador, Guatemala, Honduras, India, Indonesia, Pakistan, Paraguay, Philippines, Senegal, Sri Lanka, Syrian Arab Republic, Ukraine, Zambia
Low Income (14 countries)
Bangladesh, Benin, Burundi, Central African Republic, Kenya, Malawi, Mali, Nepal, Niger, Rwanda, Sierra Leone, Tanzania, Togo, Uganda

Table-5. The Comparison of Different Income Groups for Fixed Effects Estimator (Model 1)

	INCOME GROUPS				
LGDP	HI-OECD	HI-nonOECD	UpMid	LowMid	Low
LGCF	0.248***	0.245***	0.311***	0.259***	0.094***
	(0.020)	(0.027)	(0.024)	(0.028)	(0.031)
LHC	1.427***	3.587***	2.026***	1.432***	1.807***
	(0.210)	(0.337)	(0.329)	(0.227)	(0.417)
LPOP	1.261***	0.475***	0.642***	0.545***	0.561***
	(0.144)	(0.056)	(0.216)	(0.134)	(0.197)
LEF	0.482***	0.422***	0.266***	0.555***	0.331***
	(0.096)	(0.135)	(0.102)	(0.109)	(0.119)
CONSTANT	-2.780	7.342***	4.598	6.850***	9.616***
	(2.159)	(0.659)	(3.272)	(1.936)	(2.832)
Observations	330	121	242	187	154
Num. of count.	30	11	22	17	14
F	271.83***	346.25***	418.92***	347.33***	254.05***
Adj. R^2	0.762	0.920	0.873	0.880	0.867
	MODEL SELECTION AND DIAGNOSTIC TEST RESULTS				
F group	165.46***	178.23***	155.10***	222.62***	172.16***
LM group	393.03***	256.82***	663.41***	645.06***	458.50***
LM Honda gr.	19.82***	16.03***	25.76***	25.40***	21.41***
Hausman	158.58***	50.17***	35.59***	17.97***	13.80***
LM-heteros.	294.58***	22.66**	133.44***	117.86***	26.39***
LM-autocorr.	176.82***	38.12***	104.43***	66.99***	44.04***

Note: *** p<0.01, ** p<0.05, * p<0.1 Standard errors are in parentheses. Instead of asymptotic t statistics, robust t statistics calculated by means of (Beck and Katz, 1995) method

Table-6. The Comparison of Different Income Groups for Fixed Effects Estimator (Model 2)

	INCOME GROUPS				
LGDP	**HI-OECD**	**HI-nonOECD**	**UpMid**	**LowMid**	**Low**
LGCF	0.245***	0.237***	0.333***	0.261***	0.094***
	(0.019)	(0.026)	(0.025)	(0.028)	(0.023)
LHC	1.112***	3.263***	2.151***	1.478***	1.804***
	(0.203)	(0.347)	(0.327)	(0.219)	(0.340)
LPOP	1.245***	0.534***	0.577***	0.550***	0.528***
	(0.137)	(0.059)	(0.212)	(0.119)	(0.171)
LSG	0.008	-0.024	0.106**	0.153***	-0.038
	(0.022)	(0.094)	(0.043)	(0.046)	(0.033)
LLSPR	0.072	0.383***	0.014	0.112***	0.136***
	(0.050)	(0.097)	(0.042)	(0.033)	(0.026)
LSM	0.581***	0.067	-0.031	0.159***	-0.096
	(0.084)	(0.051)	(0.038)	(0.055)	(0.059)
LFTI	-0.101**	-0.014	0.128***	0.003	0.074*
	(0.046)	(0.059)	(0.040)	(0.037)	(0.037)
LREG	0.124**	0.063	-0.025	0.015	0.161***
	(0.058)	(0.078)	(0.074)	(0.069)	(0.061)

CONSTANT	-2.611	6.896***	5.190	6.924***	10.400***
	(2.165)	(0.683)	(3.208)	(1.873)	(2.461)
Observations	330	121	242	187	154
Num. of count.	30	11	22	17	14
F	164.53***	202.91***	217.38***	183.12***	176.14***
Adj. R^2	0.795	0.930	0.876	0.886	0.901
MODEL SELECTION AND DIAGNOSTIC TEST RESULTS					
F group	147.68***	112.12***	130.19***	198.88***	208.83***
LM group	320.23***	66.75***	543.01***	487.00***	366.52***
LM Honda gr.	17.89***	8.17***	23.30***	22.07***	19.14***
Hausman	177.63***	75.71***	39.22***	23.02***	15.39*
LM-heteros.	236.09***	27.63***	125.52***	75.71***	41.01***
LM-autocorr.	153.62***	25.92***	89.36***	66.76***	33.61***

Note: *** p<0.01, ** p<0.05, * p<0.1 Standard errors are in parentheses. Standard errors are in parentheses. Instead of asymptotic t statistics, robust t statistics calculated by means of Beck and Katz (1995) method.

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