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FDI and Economic Growth: The Role of Economic Freedom

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Abstract

In this study, we examine the effects of economic freedom and foreign direct investment (FDI) on economic growth. We utilized a panel of 83 developed and developing countries over the period 1970 to 2009. We observed that, including the interaction term of economic freedom and FDI makes the estimation results more powerful. In other words, our findings show that economic freedom does have a power to affect economic performance through FDI.

Key words: Foreign Direct Investment, Growth, Economic Freedom

JEL codes: F21; O43

Doğrudan yabancı yatırımlar ve ekonomik büyüme: Ekonomik özgürlüğün rolü

Özet

Bu çalışmanın amacı doğrudan yabancı yatırımlar (DYY) ve ekonomik özgürlüğün, ekonomik büyüme üzerine etkisini incelemektir. Analiz, Fraser Enstitüsü ve Heritage Vakfı tarafından oluşturulan birbirinden farklı iki önemli ekonomik özgürlük endeksine dayanmaktadır. Çalışmada, doğrudan yabancı yatırımların ekonomik büyüme üzerindeki doğrudan etkisinin yanısıra, DYY ile ekonomik özgürlük etkileşimi üzerinden dolaylı etkisi de analiz edilmiştir.

1970-2009 yılları arasında toplam seksen üç gelişmiş ve gelişmekte olan ülkenin dahil edildiği panel veri seti kullanılarak, En Küçük Kareler Yöntemi ve Sabit Etkiler Modeli gibi farklı panel veri analiz tekniklerinin kullanıldığı çalışmamız, DYY ile ekonomik büyüme arasında pozitif bir ilişkinin varlığını ortaya koymaktadır. Bunun yanında, ekonomik özgürlüğün, DYY üzerinden ekonomik büyümeyi etkilediği, fakat bu etkinin büyüklüğü Fraser Enstitüsü ve Heritage Vakfı tarafından sağlanan endeksler için farklı olduğu bulunmuştur.

Anahtar kelimeler: Doğrudan yabancı yatırımlar; Ekonomik büyüme; Ekonomik özgürlük

JEL kodu: F21; O43

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1. Introduction

It is suggested by the relevant literature that FDI inflows are, in principle, expected to induce a host country's economic growth by acting as a channel to transfer knowledge and positive externalities. The more absorptive capacity receivers have in different areas, the stronger the positive impact of FDI on growth. Thus, FDI is a form of investment and is therefore likely to favour both recipient developed and developing countries (Crespo and Fontoura, 2007).

There are also many studies which have extensively analysed the relationship between economic freedom (EF) and FDI, for instance, Quasi (2007), Kapuria-Foreman (2007), Bengoa *et al.* (2003). Many of these studies demonstrated a positive relationship between them. The main idea underlying this conclusion is that the effect of good institutions represented by high EF has a positive effect on attracting FDI (for example, Javorcik, 2004 and Nunnencamp and Spatz, 2004).

The main aim of this study is to examine the relationship between these three key economic concepts. The driving force behind this analysis was the relatively scanty existence of empirical works based on FDI, EF and economic performance, although there have been several studies on either the FDI/growth relationship or on the EF/growth nexus on an empirical basis.

In this paper, the analysis is based on a study by Azman-Saini, Baharumshah and Law (2010) who conducted an empirical examination of the relationship between FDI, economic freedom and economic growth. In the first stage, the effect of FDI inflows on economic growth will be examined. The second stage will be an examination of the direct relationship between economic freedom and growth. The final examination will consider whether economic freedom can explain change in economic performance indirectly. A sample of 83 developed and developing countries over the period 1970-2009 will be examined.

We utilised use two different indices of economic freedom published by the Fraser Institute and the Heritage Foundation/Wall Street Journal. The use of two separate indices of economic freedom in this study differentiates it from other research studies which have generally made their analysis using an economic freedom dataset provided by only one index. In the study by Azman-Saini *et al.* (2010), for example, economic freedom was measured by the Fraser Institute's index. Therefore, when we test either the direct or the indirect effect of economic freedom on economic performance, first, we shall carry out an analysis using the index of EF

provided by the Fraser Institute together with other control variables. In subsequent tests, we shall employ the Heritage Foundation's economic freedom dataset. At the end of the regression estimates, we shall compare those results which differ from one another depending on which index has been used.

The paper is organized as follows. Section 2 provides a discussion of the data sources. In Second 3 the empirical methodology will be explained. In the final section, the results will be presented.

2. Data

In this study, we utilized a panel of 83 developed and developing countries over the period 1970 to 2009. Most of the dataset used in this study was collected from the World Bank Database, the rest was taken from the Penn World Table (PWT), the Barro-Lee Database (2011) which compiled a dataset on educational attainment, the Fraser Institute (Gwartney, Lawson and Hall, 2011) and the Heritage Foundation/Wall Street Journal. We followed Azman-Saini *et al.* (2010), while we choose the countries included in our database, however some countries were removed and others added to constitute the current sample. In this respect, the sample was selected by taking into account the availability of reliable data for each country over the specified periods of time. Since the investigation is primarily based on the links between three variables, FDI, EF and growth, the explanation of the data sources gives priority to these variables before proceeding to elucidate other control variables.

FDI net inflows are used as percentages of GDP provided from the World Bank Database. Another main variable, economic freedom, is available from two different indices. One of these is the Economic Freedom of the World (EFW) published by the Fraser Institute. The 2011 edition of the EFW index measures economic freedom for 141 countries over the period 1970-2010. While the index was published at five-yearly intervals until 2000, it has been reported annually over the last decade. The EFW index comprises five main economic freedom components as shown in Table 1.[1] In total, the index benefits from forty-two sub-components to make the concept of being economically free more clear. All the components and sub-

[1] See the 2011 version Economic Freedom of the World to find detailed definitions of the components.

components measure the level of economic freedom on a scale from 0 to 10. The zero means that a country is far from being economically free, whereas a country with the score of ten represents complete economic freedom. In the empirical tests, the acronym EFFRS denotes economic freedom as employed by the Fraser Institute.

An alternative economic freedom index used in this study is the Index of Economic Freedom published by the Heritage Foundation and Wall Street Journal since 1995. From that year, the Index has measured the different levels of economic freedom held by countries all over the world. The latest publication (2011 Index of Economic Freedom) covered 183 countries and evaluated their market-oriented economic environment as in previous years. The Index of Economic Freedom consists of ten specific components. Numbers from 0 to 100 are used to measure each of those elements. The overall economic freedom score is the average value of the whole group of factors. The number 0 signifies that the degree of economic freedom in a country is zero, in other words, the country is economically unfree, whereas a country with a maximum score of 100 is identified as completely free. The ten components are shown in Table 1.[2]

Furthermore, the Index of Economic Freedom published by the Heritage Foundation/Wall Street Journal classifies countries' overall economic freedom scores into five categories: the score intervals of 80-100, 70-79.9, 60-69.9, 50-59.9, 0-49.9 indicate 'free', 'mostly free', 'moderately free', 'mostly unfree' and 'repressed' economies respectively. As shown in Table 2, the freedom scores for the majority of the countries are between 60 and 69.9, signifying that they are all moderately free. However, only one country, Singapore, was in the 'free' category for the specified period of time. It scored between 80 and 100 over the period 1995-2009, which was the highest category that a country could achieve.

In the light of the relevant literature, the two variables FDI and economic freedom are expected to be linked with economic growth. We also included Gross Domestic Product (GDP) *per capita* variable in our dataset.[3] This is denoted as GDPGR. We have observed the effects of FDI and EF – both independently and in interaction with each other – together with other control variables used in assessing economic performance.

[2] More detailed explanation can be provided from 2011 Index of Economic Freedom.
[3] Chain series from 7.0 Penn World Tables - Purchasing Power Parities (PPPs) at 2005 constant prices (Heston, Summers & Atens, 2011)

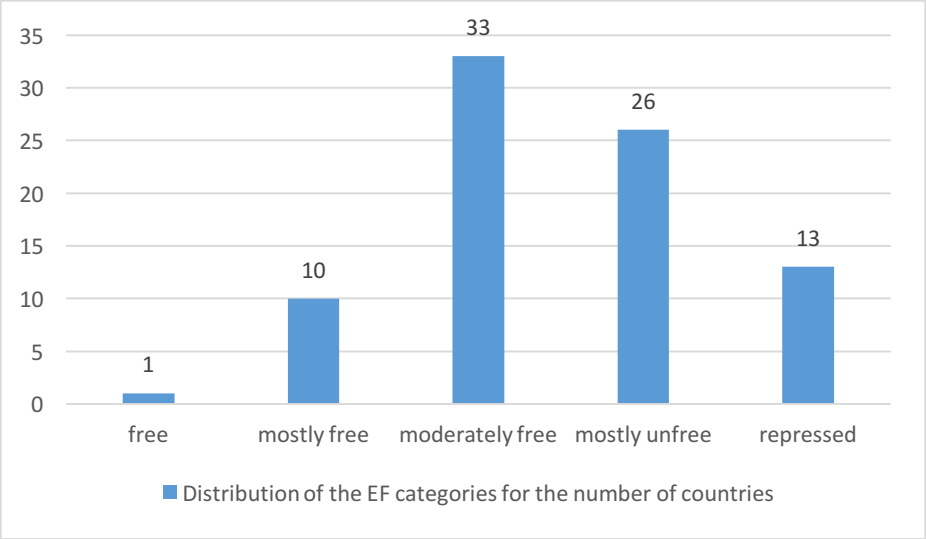
Table 1. A comparison of the components of the two indices of the economic freedom

FRASER INSTITUTE	HERITAGE FOUNDATION/WALL STREET JOURNAL	
- Size of Government: Expenditures, Taxes, and Enterprises	- Business Freedom	-Investment Freedom
- Legal Structure and Security of Property Rights	- Trade Freedom	- Monetary Freedom
- Access to Sound Money	- Fiscal Freedom	- Financial Freedom
- Freedom to Trade Internationally	- Government Spending	- Property Rights
- Regulation of Credit, Labour, and Business	- Labour Freedom	- Freedom From - Corruption

In addition to FDI, EF and economic growth, a set of independent variables was utilized to estimate the regression analyses: initial GDP *per capita*, population growth, life expectancy and inflation, which were collected from the World Bank Database. One of the other two control vectors, investment, was taken from Heston *et al.* (release 7.0 version in June 2011) and average years of total schooling database was obtained from Barro and Lee (2011).

In the first place, one of the control variables used in this study and by Azman-Saini (2010) was initial GDP *per capita* and is represented in constant 2000 US dollars. It is measured as the logarithm of initial *per capita* GDP and is equal to the initial year of the five-year period and of a decade in the panel data analysis. We also included both investment and population growth by following Azman-Saini (2010). The population growth rate may be correlated with growth and can reflect either a positive or a negative effect on economic performance. Its positive influence is discernible in technology, innovation and entrepreneurship (TIE) through an increase in the likelihood of more contribution to those areas (Bauer, 2000). However, population growth leads to concern about an increasing opportunity cost of economic activities (Barro & Sala-i Martin, 1995). We included the average years of total schooling as a proxy for human capital on the grounds of a suggestion made by Barro (2001). The average years of schooling is denoted as SCHOOLING, and inflation, is denoted as INF.

Table 2. The number of countries in terms of economic freedom scores for Heritage Foundation-Wall Street Journal over the period of 1995 to 2009



3. Empirical Methodology

The econometric technique was based on the use of panel data. Some advantages of panel data are summarised by Hsiao (2003). First, the panel data method gives an opportunity to observe each country in the given sample over a specific period of time. Thus, it is possible to make multiple observations for each country. Second, more favourable panel data was used rather than the cross-country and time-series datasets since the intention was to increase empirical estimation success. Panel data helped to fulfil this intention because it provided a large amount of data, mitigating the strong linear relationship between explanatory variables (or the effect of collinearity) and augmenting the degree of freedom (Hsiao, 2003). Finally, panel data sets are available for country groups at different levels of development. That is, investigators can reach data for developing countries as well as developed countries even though it can be challenging to find data for the former due to the lack of regular data. The World Bank is the most used data source in this study since it has dealt with the problem mentioned above by making surveys and this has contributed to the creation of datasets for less-developed economies.

The main objective of this paper is to identify the linkage between FDI, economic freedom and economic growth. To assess how FDI and economic freedom affect economic growth, two econometric methods were employed. First, the model is tested with ordinary least squares (OLS):

$$GDPGRW_i = \beta_0 + \beta_1 EFFRS_i + \beta_2 FDI_i + \beta_3 logINITGDP_i + \beta_4 POPGRW_i + \beta_5 INVEST_i + \beta_6 INF_i + \beta_7 SCHOOLING_i + \beta_8 EFFRS * FDI_i + \varepsilon_i$$

$$GDPGRW_i = \beta_0 + \beta_1 EFHRT_i + \beta_2 FDI_i + \beta_3 logINITGDP_i + \beta_4 POPGRW_i + \beta_5 INVEST_i + \beta_6 INF_i + \beta_7 SCHOOLING_i + \beta_8 EFHRT * FDI_i + \varepsilon_i$$

Initially, an ordinary least-square (OLS) method was employed. However, the OLS ignores the possibility of the existence of unobservable country heterogeneity. As a matter of fact, such a possibility weakens the reliability of the findings. In order to eliminate that problem, we also estimated the regressions using the fixed-effects method, which is widely used in macro-economic studies (Wooldridge, 2005). Additionally, we employed the random effects method, since it can be considered an alternative to the fixed-effects model.[4]

The models for fixed effects are as follows:

$$GDPGRW_{it} = \beta_0 + \beta_1 EFFRS_{it} + \beta_2 FDI_{it} + \beta_3 logINITGDP_{it} + \beta_4 POPGRW_{it} + \beta_5 INVST_{it} + \beta_6 INF_{it} + \beta_7 SCHOOLING_{it} + \beta_8 EFFRS * FDI_{it} + a_i + \varepsilon_{it}$$

$$GDPGRW_{it} = \beta_0 + \beta_1 EFFRS_{it} + \beta_2 FDI_{it} + \beta_3 logINITGDP_{it} + \beta_4 POPGRW_{it} + \beta_5 INVST_{it} + \beta_6 INF_{it} + \beta_7 SCHOOLING_{it} + \beta_8 EFFRS * FDI_{it} + a_i + \varepsilon_{it}$$

where i denotes country and t indicates time. a_i is regarded as a time-constant variable measuring unobserved country-specific effect. ε is error term, which changes over time. The regressions also include a constant term β_0. The symbolization of the variables in the regressions is represented in Table 3.

4. Results

The estimation results are shown in Tables 8 and 9, which consist of eight columns (four each for the OLS and Fixed Effect). In this framework, columns (1) and (5) show the two independent variables, FDI and economic freedom, which are the main subjects of this study. In addition, columns (3) and (7) show an interaction term between FDI and economic freedom.

[4] However, the use of the random effects model seems to have some disadvantages since country-specific effects cannot be cancelled out individually, so the fixed-effects method was usually applied.

The more complex columns (2) and (6) show the effects of FDI and economic freedom on economic growth by adding other control variables: initial GDP *per capita*, population growth, investment, average years of school attainment and inflation, which could also affect economic performance. Finally, an interaction term, representing the effect of FDI on economic growth through economic freedom, was added to the regressions and the results are shown in columns (4) and (8). For the sake of clarity, the regression results will be analysed separately from the regression equations with and without the interaction term. Thus, in the following sub-sections, we shall focus on columns (2) and (6) of Tables 8 and 9.

Table 3. Dependant and independent variables

GDPGRW	Gross Domestic Product Growth	*POPGRW*	Population growth
EFFRS	Economic freedom data (from Fraser Institute)	*INITGDP*	Initial GDP
EFHRT	Economic freedom data (from Heritage Foundation/Wall Street Journal)	*INF*	Inflation
SCHOOLING	Average year of schooling	*INVEST*	Investment
FDI	Foreign Direct Investment		

Tables 8 and 9 report the results for the OLS and the Fixed Effect estimates. Column (2) of Table 8 reports OLS estimation results for the effect of FDI and EF on economic growth by controlling other variables. The OLS estimates show that both economic freedom and FDI have positive coefficients, while the former is statistically highly significant (at 1% level) and the latter is weakly significant (at 10% level). So the results from the OLS estimates suggest that both economic freedom and FDI are growth-enhancing variables. As can be seen in column (6), when the fixed-effects estimates were considered, the FDI coefficient lost its statistical significance, while economic freedom, significant at 1% level, was consistent with the OLS results. These results are consistent with the findings of Azman-Saini *et al.* (2010) and of Alfaro *et al.* (2004): economic freedom affects economic growth positively, whereas it seems impossible to conclude the presence of FDI-related economic growth. The results for the relationship between economic freedom and economic growth is also consistent with the findings of de Haan and Sturm (2000, 2006), Doucouliagos and Ulubasoglu (2006) and Gwartney *et al.* (1999).

One of the main objectives of this research was to compare the regression results for two different economic freedom indexes. In this sub-section, we shall analyse the results for the economic freedom index provided by the Heritage Foundation/Wall Street Journal (EFHRT).

The OLS estimates in column (2) in Table 9 show that FDI is positive and statistically significant (at 5% level), with a p-value of 0.04, while economic freedom has been found to be negative and insignificant, which is a totally different result from the result for the economic freedom data provided by the Fraser Institute, which was positive and significant. According to the fixed-effects estimations, in column (6), FDI is found to be statistically insignificant, while economic freedom has a negative coefficient. The results for economic freedom are different from our expectations. This result might arise from the fact that the economic freedom index published by the Heritage Foundation covers a shorter period of time.

Following Javorcik (2004) and Nunnencamp and Spatz (2004), we aim to analyse the effect of FDI on economic growth through economic freedom. To do that, an interaction term of these two variables is added to the regression equation.

When an interaction term is added to a regression, things get complicated in terms of interpreting the regression results (Braumoeller, 2004; Brambor, Clark & Golder, 2006). Braumoeller (2004) suggested that there are two major issues which have to be analysed accurately. The first difficulty is about analysing coefficients: lower-order interaction-term coefficients (economic freedom and FDI, in our case) cannot be interpreted as if they were ordinary coefficients in the model. Braumoeller (2004) provided a detailed explanation on the issue and suggested being extremely careful while interpreting the results for the regressions with the interaction term.[5] Second, Braumoeller (2004) highlighted another major potential problem about the statistical significance of the interaction term. He stated that when a regression includes an interaction term, more efficient hypothesis testing methods should be applied, since the statistical significance of the lower-order coefficients might be misleading or insufficient to make a robust analysis. Thus, Wooldridge's (2000) approach was followed

[5] See Appendix B for a detailed explanation.

in this current study to address this issue. All the results below are interpreted in the way suggested by Braumoeller (2004) and Wooldridge (2000).[6]

By including the interaction term ($EFFRS * FDI$), we aimed to understand whether FDI has an impact on economic growth through economic freedom. In other words, high economic freedom might help to attract FDI and hence promote growth. As can be seen, the effect of FDI on economic growth through economic freedom is reported in columns (4) and (8) in Tables 8 and 9. The OLS estimates show that at the average economic freedom level (which is 5.98) FDI has a positive and significant (at 1% level) effect on economic growth. The estimates from the fixed-effects method shows again that the FDI coefficient is positive and significant (at 1% level) at the average economic freedom level (5.98). Thus, the results show that adding the interaction term to the regression improved both the significance of the FDI coefficients and their magnitude value (from 0.0009 to 0.0018 for OLS and from 0.0009 to 0.0022 for FE).

Finally, the effect of FDI on economic growth through economic freedom using the economic freedom index from the Heritage Foundation was analysed. Adding the interaction term produced results similar to those described in the previous section. As can be seen in column (8) in Table 9, at the average level of economic freedom, there is a positive and significant (at 1% level) coefficient for FDI from both the OLS and the fixed-effects estimates. The FDI coefficient increased to 0.0024 (significant at 1% level) from 0.0008 (which was insignificant). Even this comparison provides convincing results of the benefit of adding the interaction term to the regression.

5. Conclusion

The aim of this study was to analyse the linkage between foreign direct investment (FDI), economic freedom (EF) and economic growth. The driving force behind the study was the relatively scanty previous research based on FDI, economic freedom and economic performance, although there have been several studies on both the FDI/growth relationship and the EF/growth nexus.

The empirical analysis in this study was based on the studies of Azman-Saini, Baharumshah and Law (2010). In the first stage, we estimated the independent effect of foreign direct investment inflows on economic growth. The second stage was an examination of the direct

[6] See Chapter 4 section 4.4(p.136) and Chapter 6 (p.190) in Wooldridge (2002).

relationship between economic freedom and economic growth. Finally, the question of whether economic freedom could explain economic performance indirectly was explored. All the empirical results were obtained using panel data analysis. The sample comprised 83 developed and developing countries over the period 1970-2009.

Two different indices of economic freedom were used, that published by the Fraser Institute and the other by the Heritage Foundation/Wall Street Journal. The use of two separate indices of economic freedom within the study differentiates this work from other studies which have generally carried out their analyses from economic freedom datasets obtained from only one index. Azman-Saini *et al.* (2010), for example, examined economic freedom as measured by the Fraser Institute. Therefore, when we tested either the direct or the indirect effect of economic freedom on economic performance, we first analysed data from the index of EF provided the Fraser Institute together with other control variables. In subsequent tests, the Heritage Foundation's economic freedom dataset was used.

Through the empirical analysis, three regression results were obtained. But these conclusions are not straightforward and they vary according to the estimation methods or the index of economic freedom used. First, we tested the impact of foreign direct investment and economic freedom on economic growth. The OLS results were inconsistent with those reported by Azman-Saini *et al.* (2010). According to our findings, FDI has a positive (and statistically significant) effect on economic growth. In order to eliminate unobservable country heterogeneity problem, we also estimated the regressions by the fixed-effects method. We confirmed the result of Azman-Saini *et al.* (2010), namely, that FDI does not promote economic growth directly.

The effect of economic freedom on output growth was also estimated. We initially tested the impact of economic freedom by using the data published by the Fraser Institute. The results for the relationship between economic freedom and economic growth were in line with those of de Haan and Strum (2000, 2006) and of Azman-Saini *et al.* (2010): an economically free society contributes importantly to the promotion of economic growth. Following this, we used the economic freedom data that is taken from the Heritage Foundation/Wall Street Journal, and the coefficient of EF was negative and statistically significant. This result was totally different

from the expectation, and might arise from the fact that the economic freedom index published by the Heritage Foundation covers only a short period of time and used more subjective components (Berggren, 2003).

We then included an interaction term (FDI*EF) into the regressions to provide empirical evidence the effect of FDI on economic growth through economic freedom. We followed Wooldridge's (2000) approach, and found that FDI affects economic growth positively and significantly in the mean level of economic freedom for both indexes. We observed that, including the interaction term makes the estimation results more powerful. Therefore, we have identified a strengthened and significant relationship between FDI and growth. In other words, we showed that economic freedom does have a power to affect economic performance indirectly.

Appendix A

A.1. Components of Economic Freedom (From Fraser Institute)

The Areas, Components, and Sub-Components of the EFW Index

***1. Size of Government: Expenditure, Taxes, and Enterprises*:** A. General government consumption spending as a percentage of total consumption; B. Transfers and subsidies as a percentage of GDP; C. Government enterprises and investment*;* D. Top marginal tax rate: i**.** Top marginal income rate; ii. Top marginal income and payroll tax rates.

2. Legal Structure and Security of Property Rights: A. Judicial independence (GCR); B. Impartial courts (GCR); C. Protection of property rights (GCR)[7]; D. Military interference in rule of law and the political process (ICRG); E. Integrity of the legal system (ICRG); F. Legal enforcement of contracts (DB); G. Regulatory restrictions on the sale of real property (DB).

3. Access to Sound Money: A. Money growth; B. Standard deviation of inflation; C. Inflation: Most recent year; D. Freedom to own foreign currency bank accounts.

4. Freedom to Trade Internationally: A. Taxes on international trade: i. Revenues from trade taxes (% of trade sector): ii. Mean tariff rate; iii. Standard deviation of tariff rates; B. Regulatory trade barriers: i. Non-tariff trade barriers (GCR); ii. Compliance cost of importing & exporting (DB); C. Size of trade sector relative to expected; D. Black-market exchange rates; E. International capital market controls: i. Foreign ownership/investment restrictions (GCR); ii. Capital controls.

5. Regulation of Credit, Labour, and Business: A. Credit market regulations: i. Ownership of banks; ii. Foreign bank competition; iii. Private sector credit; iv. Interest rate controls/negative real interest rates; B. Labour market regulations: i. Hiring regulations and minimum wage (DB); ii. Hiring and firing regulations (GCR); iii. Centralized collective bargaining (GCR); iv. Hours regulations (DB); v Mandated cost of worker dismissal (DB); vi. Conscription; C. Business regulations: i. Price controls; ii. Administrative requirements (GCR); iii. Bureaucracy costs (GCR); iv. Starting a business (DB); v. Extra payments/bribes/favoritism (GCR); vi. Licensing restrictions (DB); vii. Cost of tax compliance (DB).

A.2. Components of Economic Freedom (From Heritage Foundation)

The descriptions of the 10 components that construct the Index of Economic Freedom would be given as follows:

Business Freedom is a measure of the mixed abilities in terms of creating, running and ending a commercial activity. The more elimination of ineffective government regulations lead to

[7] GCR = Global Competitiveness Report; ICRG = International Country Risk Guide; DB = Doing Business.

preclude private entrepreneurship, the higher business freedom score.

Trade Freedom is a measure of to what degree government refrains itself from creating trade barriers. Redundant restrictive trade rules induced by governments impede imports and exports of goods and services. Principally, the combination of the absence of tariff and non-tariff barriers explains the freedom on trade well. Besides, the component score is described by using two inputs: the trade-weighted average tariff rate and non-tariff barriers.

Fiscal Freedom bases mainly on national tax policy determined by government. Thus, the component score is measured through taxes levied on individual and corporate income, and also the ratio of the amount of tax revenue to GDP.

Government Spending includes all government investment, consumption and transfer payments. The component is a measure of the level of government expenditure-GDP ratio. However, it could not be correct approach to specify a certain level for government spending because each country has their own characteristic of expenditure associated with some factors such as different level of economic development.

Labour Freedom is an assessment of some regulations on labour market. The labour freedom score is accounted for the weighted of six quantitative factors such as minimum wages, regulations on hiring and hours, mandatory severance pay and layoff laws.

Investment Freedom denotes that to what extent government uses restrictions on capital flow investments, foreign and domestic investments. The component reaches its best form when it receives a score of 100 like other components.

Monetary Freedom is closely related to inflation and price controls imposed, which seem reasons behind market distortion. Ideal form for a free market is to achieve price stability in the absence of microeconomic interventions such as price controls. Calculation of the component's score is based on the combination of two sub-factors. One of them is the weighted average of inflation for most recent three years and the other is price controls.

Financial Freedom is used to define the degree of government interventions in financial sector. A high score of financial freedom means minimum level government inferences and state ownership of banks and financial institutions. That is to say, the less government control, the more efficient banking system and independent financial institutions.

Property Rights as a component shows that how strictly a government protect private property rights by means of laws enforced by itself. In addition, a lower probability of government expropriation of property indicates a higher property right score.

Freedom From Corruption score is accounted for by converting the data obtained through Transparency International's Corruption Perception Index (CPI). This index ranks countries in

terms of corruption with using numbers ranging from 0 to 10. The Index of Economic Freedom shows that freedom from corruption score by multiplying the CPI score for each country by 10. Thus, the component score ranges from 0 to 100. The higher a country's score, the lower the level of corruption.

Appendix B

Interaction Terms and Hypothesis Testing

Braumoeller (2004) take this model as an example:

$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_{12} x_1 \beta x_x + \varepsilon$

This model (such as ours) analyses whether or not an interactive relationship between x_1 and x_2 (FDI and economic freedom in our case) exist. According to him, this model is considerably more complex than a basic multivariate regression. He states that following procedure fails when an interaction term is added to the model.

• β_1 is statistically significant; therefore, $H_1 : \beta_1 \neq 0$ cannot be rejected, and the theory that relates x_1 to y passes this test.

• β_2 is statistically significant; therefore, $H_2 : \beta_2 \neq 0$ cannot be rejected, and the theory that relates x_2 to y passes this test.

• β_{12} is statistically significant; therefore, $H_3 : \beta_{12} \neq 0$ cannot be rejected, and the theory that relates the combination of x_1 and x_2 to y passes this test.

β_1 captures the impact of x_1 on y when x_2 = 0 (and vice-versa), not the impact of x_1 on Y in general. Because interactive relationships imply that the impact of x_1 on y varies depending on the level of x_2.

At this point, we adopted Wooldridge's (2000) approach in order to prevent the problem arising from such a situation. If we reconsider our equation (2):

$$GDPGRW_i = \beta_0 + \beta_1 EFFRS_i + \beta_2 FDI_i + \beta_3 logINITGDP_i + \beta_4 POPGRW_i + \beta_5 INVEST_i + \beta_6 INF_i + \beta_7 SCHOOLING_i + \beta_8 EFFRS * FDI_i + \varepsilon_i$$

If we calculate the effect of FDI on economic growth:

$\Delta GDPGRW = \beta_2 + \beta_8 EFFRS$

Wooldridge (2000) suggests not to analyse β_2 and β_8 separately. He states that one should calculate the results for some interesting values of economic freedom, such as mean value of

it (as we did in our analysis). Thus our new model becomes:

$$GDPGRW_i = \alpha_0 + \alpha_1 EFFRS_i + \alpha_2 FDI_i + \alpha_3 logINITGDP_i + \alpha_4 POPGRW_i + \alpha_5 INVEST_i + \alpha_6 INF_i + \alpha_7 SCHOOLING_i + \alpha_8 (EFFRS - \mu_1) * (FDI_i - \mu_2) + \varepsilon_i$$

where μ_1 and μ_2 are population means of economic freedom and FDI respectively.

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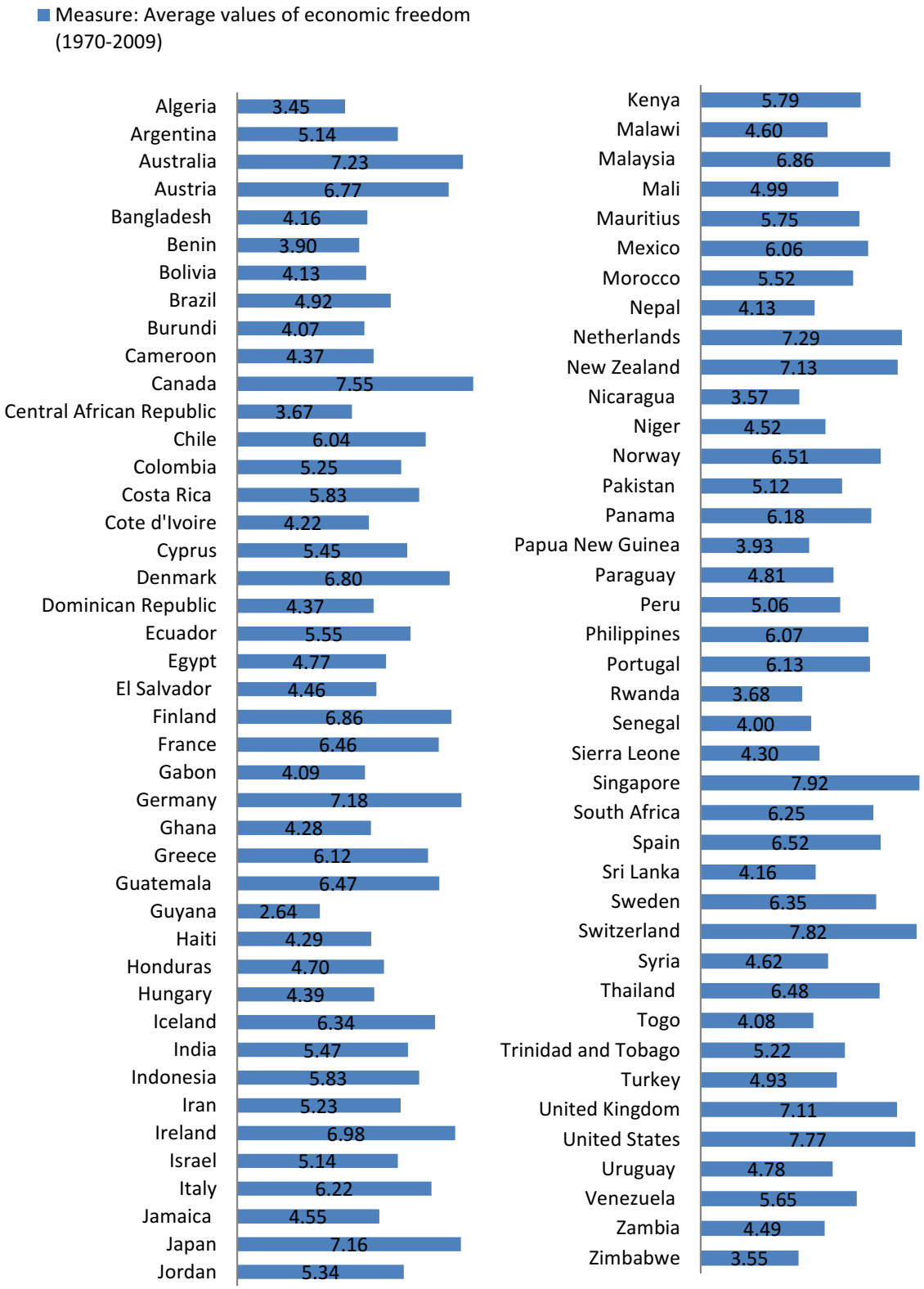
Table 4. Economic Freedom



(Source: FRASER INSTITUTE)

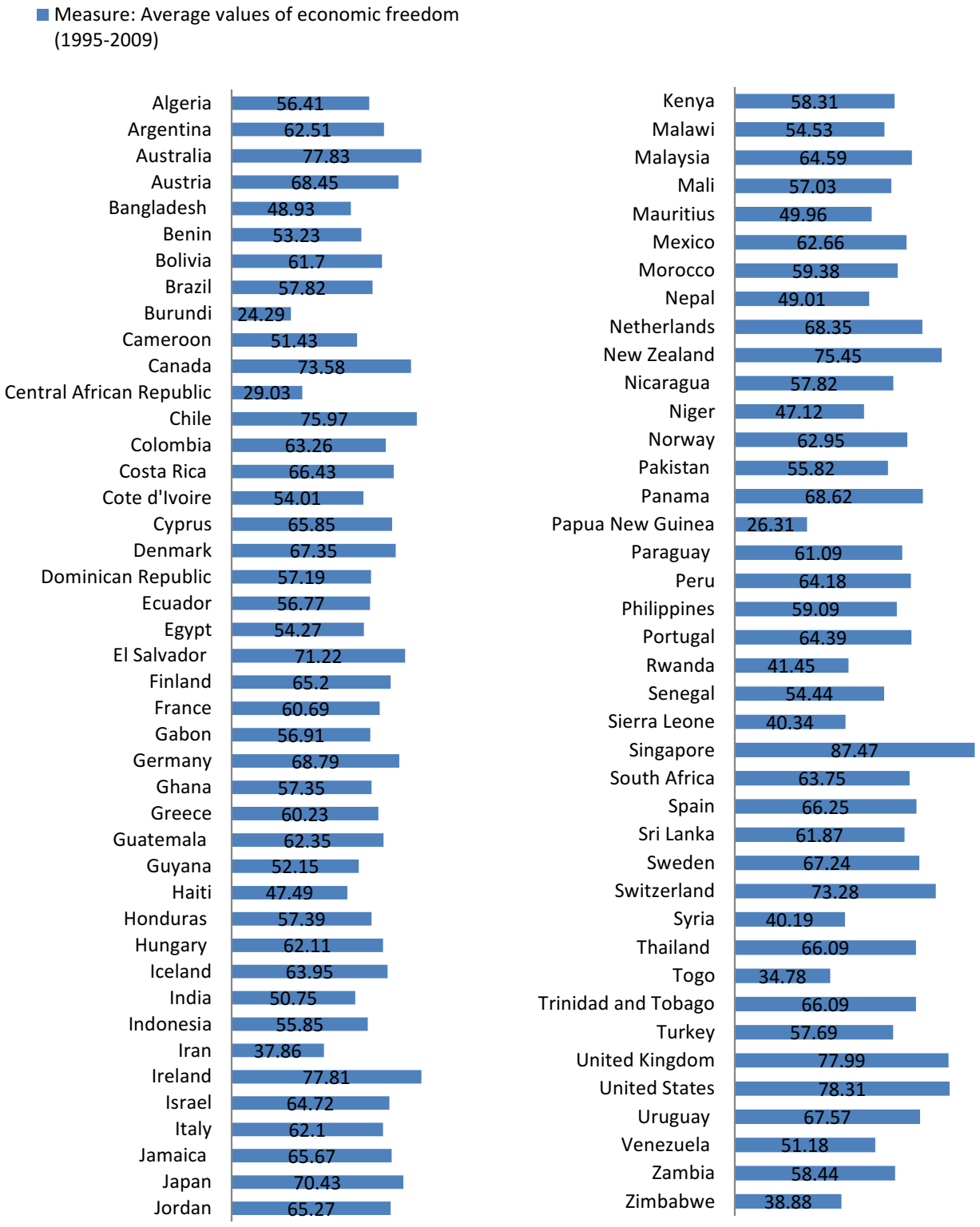


Table 5. Economic Freedom (Source: Heritage Foundation)

Table 6. OLS and Fixed-effects Estimates (dependent variable is growth rate, Economic freedom data comes from **Fraser Institute**)

	OLS				**FIXED EFFECT**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FDI	0.0011**	0.0009*	0.0020***	0.0018***	0.0001	0.0009*	0.0019**	0.0022***
	(0.0005)	(0.0004)	(0.0006)	(0.0007)	(0.0006)	(0.0004)	(0.0008)	(0.0008)
EFFRS	0.0062***	0.0057***	0.0071***	0.0067***	0.0075***	0.0057***	0.0090***	0.0117***
	(0.0011)	(0.0014)	(0.0013)	(0.0015)	(0.0017)	(0.0014)	(0.0017)	(0.0019)
EFFRS * FDI			-0.0008**	-0.0007*			-0.0015***	-0.0010**
			(0.0004)	(0.0004)			(0.0005)	(0.0004)
INITGDP		-0.0022		-0.0017		-0.0022*		-0.0223***
		(0.0013)		(0.0013)		(0.0013)		(0.0035)
INVEST		0.0006***		0.0007***		0.0007***		0.0005**
		(0.0001)		(0.0001)		(0.0001)		(0.0002)
INF		-0.0001***		-0.0001**		-0.00001**		0.00008
		(0.00005)		(0.00005)		(0.000005)		(0.00005)
POPGRW		-0.0021		-0.0017		-0.0020		0.0057***
		(0.0028)		(0.0013)		(0.0013)		(0.0017)
SCHOOLING		0.0002		-0.00005		0.0001		0.0027
		(0.0007)		(0.0007)		(0.0007)		(0.0014)
INTERCEPT	-0.0231	-0.0152	-0.0298	-0.0246	-0.0298	-0.015	-0.0393	0.0799
	(0.0065)	(0.0167)	(0.0074)	(0.0114)	(0.0095)	(0.01)	(0.0099)	(0.0240)
ADJUSTED R-SQUARED	0.09	0.14	0.09	0.14	0.15	0.14	0.12	0.19
N	578	576	578	576	578	576	578	576

Standard errors in parentheses. *** indicates significant at 1% level, ** indicates significant at 5% level, *indicates significant at 10% level

Table 7. OLS and Fixed-effects Estimates (dependent variable is growth rate, Economic freedom data comes from **Heritage Foundation**)

	OLS				**FIXED EFFECT**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FDI	0.0015***	0.0012**	0.0022***	0.0022***	0.0011	0.0009	0.0028***	0.0024***
	(0.0005)	(0.0006)	(0.0006)	(0.0006)	(0.0007)	(0.0007)	(0.0009)	(0.0009)
EFHRT	-0.000006	-0.0001	0.0001	0.00002	-0.0008***	-0.0007***	-0.0005**	-0.0005*
	(0.0001)	(0.0002)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
EFHRT * FDI			-0.00007*	-0.0001			-0.0002***	-0.0002**
			(0.00004)	(0.00004)			(0.00007)	(0.00007)
INITGDP		0.0002		0.0014		-0.0122		-0.0094
		(0.0024)		(0.0020)		(0.0105)		(0.0104)
INVEST		0.0005		0.0005**		0.0008*		0.0007
		(0.0003)		(0.0002)		(0.0004)		(0.0005)
INF		0.00004		0.00002		-0.0005*		-0.0004)
		(0.0001)		(0.0002)		(0.0003)		(0.0003)
POPGRW		0.0035		0.0046**		0.0095**		0.0095**
		(0.0046)		(0.0023)		(0.0041)		(0.0041)
SCHOOLING		0.0011		0.0007		0.0025		0.0018
				(0.0011)		(0.0036)		(0.0036)
INTERCEPT	0.0015	-0.0042	0.0050	-0.028	0.062	0.1058	0.042	0.075
	(0.0005)	(0.023)	(0.0092)	(0.016)	(0.013)	(0.075)	(0.015)	(0.074)
ADJUSTED R-SQUARED	0.03	0.06	0.04	0.08	0.7	0.14	0.11	0.17
N	249	249	249	249	249	249	249	249

Standard errors in parentheses. *** indicates significant at 1% level, ** indicates significant at 5% level, *indicates significant at 10% level