Examining the Relationship between Economic Activity and Judicial Independence

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Abstract

The paper examines the relationship between Judicial Independence (JI) and using different measures of economic activity besides GDP for a cross-sectional data for 104 countries. The paper isn't concerned in computing the JI indicators, but it used the de Jure and de facto JI indicators from Voigt et at. (2015) directly. EPI and HDI were chosen beside GDP as dependent variables. The paper confirmed the results of having a significant positive relationship between de facto and GDP, positively significant between de jure and EPI, while HDI is statistically significant with de jure but with negative signs.

1. Introduction

Officials and Governors their most important aim always is to lower the uncertainty. Lowering it is never done by speeches, media or even by the law, citizens will only feel safe and trust the government if they know that the law is fair and will be implemented on everyone impartially even the officials and governors themselves. Therefore, the importance of judicial independence can't be doubted. JI indicates that judges' decisions will be implemented independently without caring whether it is n the for the government or not. An independent judiciary system will lead to increasing the percentage of enforcing law and credibility of commitment. That will result in increasing the trust in the system and as a consequence will enhance the investment which will directly affect the economic activity.

This paper doesn't focus on how to measure the judicial independence or how to determine its indicators. But it totally focuses on defining the relationship between judicial independence and broader measures of the economy rather than GDP and whether these measurements will have different results than economic growth or not.

The results found by EPI and HDI are different than economic growth. The de facto is statistically significant with economic growth only while de jure is significant with both EPI and HDI but with different signs. These results show that GDP per capita growth rate isn't sufficient in reflecting the whole economic activity because the results differ when using an index for macroeconomic and when using an indicator for well-being.

The paper is structured as the following: Section 2 presents the theory and the literature. Section 3 elaborates the JI concept, importance and its indicators. Section 4 present alternative measure of economic activity; GDP, EPI and HDI. Section 5 explains the paper methodology and data description for all the three model. Section 6 contains the estimation results for all economic growth, EPI and HDI. Section 7 concludes the paper.

2. Theory and Literature

Investors will only invest if there is profit and they are confident that they will earn their profit and that courts and judicial system will protect their rights and investment without any expropriates. Besides that, one of the major function of the government is to gain citizens trust and reduce uncertainty. The reduction will only occur when citizens expect that the law will be

implemented on everyone in the society. Therefore, this will lead to more investment that will enhance economic growth.

Countries progress and development levels were first measured by their national income (using GDP and GDP per capita). This measurement means that the more the country produce, the better progress of the society. Later on, it was discovered that a country's growth doesn't only depend on that, but it indicates the development needed to lower inequality levels, unemployment rates and improve health, education and environment. Thus, real growth and progress in the economy are necessary to be measured by an indicator that represents all aspects. It was found that high GDP growth isn't usually associated with any improvements in the quality of living. This result supports the argument that GDP isn't enough and there is a need to a more broadened indicator that can include more than one aspects of the economy (Deb, 2015).

Based on the previous, Therefore, besides the GDP, this paper will use HDI and EPI as a broader indicator than GDP to represent the economic performance of the countries.

Deb (2015) proved in their overall sample of all the countries that the GDP per capita and HDI are positively strong related. But this positive relationship is evident in low-income countries than middle and high-income countries over all the time.

Moreover, there were many attempts in defining JI. Others just only focus on the importance of judicial independence for economic activity. The importance of judicial independence is not only for human rights and justice, but it helps in the economic progress especially for developing and transition economies. Besides that, it helps the government to make its commitment more credible which helps in growth (Matthew, World Bank).

There were many other attempts in measuring the judicial independence. However, many failed in doing this because of the lack and difficulty of gathering the data on this topic. Judicial budget, selection rules and criteria could be comparable across countries but moving to the degree of implementing the standards in an independent way without any influence, it is hard to be comparable even in the country itself. How it will be calculated from the different types of cases and courts. Besides that, each era may follow certain policy; Democratic president will courage independent judiciary, or dictator president will try to influence the government (Matthew, World Bank).

Moreover, other attempts in measuring JI failed because they focused on formal provisions. As Salzberger (1993) refers that laws are inadequate as politicians refrain from using controls that could legally employ to discipline judges. Domingo (1999) mentioned that formal guarantees of independence are routinely ignored. Therefore, legal protection isn't enough to evaluate the real independence.

Furthermore, Feld and Voigt (2003) developed new indicators that measure JI which are de jure JI and de facto JI and they test the relationship between these indicators and economic growth. They found that de jure JI that is based on legal foundations isn't related to the economic growth, while de facto JI that released on countries' tual experience is highly correlated with economic growth. Voigt et al. (2015) used the same indicators without any changes just updating the data to be more recent until 2008 and include more countries. They confirmed the previous results and proved that de facto is highly significantly correlated with economic growth.

On the other hand, Klerman (2007) argued that although Judicial independence enhances the investment by protecting property rights and enforcing contracts, the independence isn't necessary for investment because there are other tools and mechanisms as reputation or government executive restraints.

3. Judicial Independence

3.1 Concept and Importance

Judicial Independence could be defined in many different aspects. Most of the scholars agreed that an independent judiciary should have certain characteristics. Starting with unbiasedness of judges' decisions that should not be affected by any personal interest. Also, the selection of judges shouldn't be biased on their political background. Second, Judges decisions should be respected by all the parties, regardless those parties have power or not. Finally, one of the main judicial independence characteristics that no one can interfere in the judges' decisions; by other meaning to protect judges from any interfering corruption or coercion by any influenced government whether it is a government or not (Matthew, World Bank).

In a nutshell, an independent judiciary means that Judges decisions are implemented on everyone in the society, and there are no any consequences on the judges because of their

decisions, as expel them outside, lower their wages or be discriminated (Feld and Voigt, 2003). Apparently, this will help in preventing any corruption.

The importance of JI is not just needed in a certain sector of the economy, but it is essential in all the sectors. Feld and Voigt (2003) explained that JI is important in disputes between citizens, between government and citizens and also between government branches. An independent judiciary will lower the transaction cost that can be made by the people while negotiating as a consequence that each party trusts the impartial judicial system. It is so crucial that the dispute resolution is fair even between citizens and government to protect the rule of law. Besides that, the impartial and independence of the arbiter will prevent any state branch from expanding its power on the other.

Furthermore, sometimes governors are pro-JI. They usually have long term goals that promote economic growth but, the problem arises when there is a conflict between theses long term goals with politicians' short term interest. With the existence of judicial independence, there will be able to implement their aims.

3.2 Judicial Independence Indicators

This paper will use the two judicial independence indicators; de jure JI and de facto JI that was firstly presented in Feld and Voigt (2003). The de jure JI indicator is based on constitutions, legal foundations and laws, while de facto JI indicators are the implemented degree in reality. De facto represents the level of independence judges are enjoying, and judgments are applied even in government (Feld and Voigt, 2003).

Feld and Voigt (2003) were the first to introduce the two indicators and to have the indicators for all the countries and to be comparable, they focused only on the higher court in each country as the court's system is hierarchical, so the higher ones overrule, the lower ones. Therefore, the independence of the upper one is so important and also this is less costly.

Feld and Voigt (2003) had a significant advantage in their indicators as they were focused and interested in their calculations of both indicators to be based on facts, not subjective ones.

Each indicator was calculated separately. The de jure indicator is based on 23 characteristics that are grouped into 12 variables, and each variable takes values between 0 -1where one is the greatest level of independence. The de facto indicator was based on eight variables. Also, each

one of them takes values between 0-1 and one is the greatest independence level. Because of the missing data in some variables in some countries, a mean is taken for each indicator.

De jure data was available for 124 countries, and de facto which is more difficult was available for118 countries. In this paper, 104 countries were taken that have values for both indicators (Voigt et al., 2015)[1].

4. Alternative Measures of Economic Activity

4.1 Gross Domestic Product

Gross domestic product is an aggregate measure of production equal to the sum of the gross values added of all resident institutional units engaged in production (plus any taxes, and minus any subsidies, on products not included in the value of their outputs)[2]

Therefore, GDP is the quantitative measure of a country's economic activity by measuring all the final goods and services produced in a country over a period. GDP per capita measures the average income per person in a country. It is calculated by the division of GDP by the nation's population. GDP and GDP per capita are considered to be the most used indicators for measuring the economic growth. However, both of them don't present the economy in its full picture or reflect a view for most of the sectors (Kharmov and Lee, 2013).

Shortcomings GDP that it doesn't include any environmental externalities such as pollution or damages ignores all the unpaid work by households, excluded all kind of capital assets like human capital and failed to reflect inequality. Therefore, there were many attempts to construct indicators that are broader than GDP so that it will present the economy better.

Consequently, many others economic indicators have been built trying to add income distribution, health, social costs, environment damage and many other variables to present the economy better such as Index od Sustainable Economic Welfare and Genuine Progress Indicator. Most of the indicators initiated suffer from technical and theoretical disputes and one of the biggest problems of these indicators that they are too complicated in their analytical and economic procedures (Kharmov and Lee, 2013).

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[1] All the details of the calculations methods of the two JI indicators exist in Voigt et al. (2015).
[2] Definition from the glossary of Organization for Economic Cooperation and Development (OECD).

On the other hand, GDP has a significant advantage in using data evaluated at market prices, oppositely, this isn't applicable in other development indicators. (Weimann et al. ,2015).

4.2 Economic Performance Index (EPI)

It is an indicator that measures the macroeconomic performance of a nation in a simple way to that was initiated by Kharmov and Lee (2013). It is the only patented indicator published by IMF (International Monetary Fund).

"*EPI is a powerful macroeconomic indicator that measures the performance of the economy's three primary segments: firms, governments and households.*" [3]

The EPI indicator consists of 4 primary variables that all influence the three sectors:

- Inflation rate
- Unemployment rate
- Budget deficit as a percentage of total GDP
- Real GDP growth

One of its principal advantages that it isn't a complicated index that needs hard procedures, it is designed in a very simple way for everyone to understand and apply it (Kharmov and Lee, 2013).

EPI was used in U.S. history from 1790 till 2012 using both raw and weighted EPI, and it was proved that it captures and shows all the highlighted events, for example, wars and recession periods (Kharmov and Lee, 2013).

There is always a deep need for a country's historical economic performance to be able to compare it with the current situation. Businesses and politics all require more information about the past economic performance to compare it with the current one to identify the right time to invest, make changes in their investment or change policies. EPI indicator helps all the individuals in the economy whether they are in business, politicians or even voters to see the full picture of how things are going (Kharmov and Lee, 2013).

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[3] Vogit, S., Gutmann, J. & Feld, L. P. (2015). Economic growth and judicial independence, a dozen years on cross-country evidence using updated set of indicators. *European journal of political economy* 38(2015), 197-211.

That's why EPI was chosen as a macroeconomic indicator that includes more macroeconomic variables rather than GDP and can show any changes or deviations that occur in the economy. As previously explained, it was proved on the US.

Since JI importance is a very well known, and it is already proved in the literature the significant of de facto with de jure. This paper interest to check the relationship with JI and other measurements besides GDP and to check how far JI could relate to the economy. This examination is done by using EPI and HDI.

4.3 Human Development Index[4]

HDI was provided since 1990 by the United Nation Development Programme (UNDP) as an aggregate measure of wellbeing (Deb 2015). The HDI construction aim is to put the criteria for the development of a country based on people and their capabilities instead of just basing the development on the economic growth. HDI is also used in comparing two countries that have the same GNI per capita level but different development levels (HDI report, 2016).

Deb (2015) informed that the widely used of HDI that it combined three dimensions rather than just one dimension as GDP per capita. Moreover, HDI includes indicators that reflect human development, but it doesn't involve any indicators for human security, empowerment, human security and inequalities.

5. Data Description and Methodology

The empirical approach used in this paper, is similar to the one used in Voigt et al. (2015). To be able to compare the difference between using different economic measurements. It is based on a standard growth regression for cross-sectional data.

The estimated equation is

$$\Delta Y_i = \alpha * M_i + \beta * JI_i + \gamma * Z_i + \varepsilon_i$$

Where ΔY_i is the different measurements for the economy. While M_i is a vector of standard explanatory variables, JI_i is a vector of de jure and de facto JI, Z_i is a vector that consists of

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[4] Human Development Index (HDI): A composite index measuring average achievement in three basic dimensions of human development—a long and healthy life, knowledge and a decent standard of living from HDI 2016 reports

additional explanatory variables, and ε_i is the error term which is all used similarly to Voigt et al. (2015).

ΔY_i is the dependent variable which is the main thing that will vary in the analysis using average annual GDP per capita growth rate, Human development index and finally, EPI.

The vector M_i consists of the main three regression variables. Initial income which is the initial real GDP per capita in 1990 or later if 1990 don't exist. Investment is the average share of investment as a percentage of GDP covering the period 1990 to 2008, while education is the share of the population with completed secondary school over 15 years for the year 1990 or later upon data exist.

JI_i is the two indicators of Judicial independence that were first introduced by Feld and Voigt (2003) and then were updated by Voigt et al. (2015). This paper will directly take the updated set of the two indicators of JI, because the paper is interested in measuring the effect of JI on different measurements of the economy. Therefore, the paper will include 104 countries that are available for both de jure and de facto JI. Thus, the average period of variables is restricted to be the same of the JI reference which is between 1990 to 2008. Also, this is better for comparability. So, all the variables that are taken in average are between 1990 to 2008 using the same data sources of Voigt et al. (2015) but the updated datasets. Appendix A includes all details of variables description, and its data sources while Appendix B contains the JI indicators data.

Z_i is a vector consists of four additional explanatory variables that are added for the robustness of the model. Government consumption which is the average share of government consumption in GDP over the period 1990 to 2008. Trade openness and inflation rate are also expressed in their mean values for the yearly data over the same time frame. While population growth is the share of the population, who finished their secondary school and over 15 years old. It is taken the initial year which is 1990 or later upon exist. All these variable are from the same data sources of Voigt et al. (2015) but used the new datasets for Penn World Tables Version 9.0 by Feenstra et al. (2015) and Barro and Lee (2016). Table 1 includes the statistics summary for all the dependent and independent variables listed in the model.

Voigt et al. (2015) had an additional variable for transition countries, but it wasn't significant which means that those countries aren't anymore transition and become normal. Therefore, there was no need to add it in this paper model.

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The empirical methodology will be repeated for each section of each dependent variable. First, the basic regression with the primary three variables will be run. Then each indicator of the JI will be estimated alone. The fourth regression will be calculated with the both de jure and de facto JI indicators. Finally, the four controlled variables will be added for robust regression.

Table 1: Descriptive Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Economic growth	104	2.3	1.7	-4.1	7.3
Initial Income	104	10,339.5	9,704.9	520.4	37,684.9
Investment	104	0.2	0.1	0.1	0.4
Education	104	19.0	13.6	0.6	57.8
Dejure index	104	0.6	0.1	0.3	0.9
Defacto index	104	0.6	0.2	0.1	1.0
Government Size	104	0.2	0.1	0.1	0.4
Population growth	104	0.9	1.3	-0.8	7.0
Trade openness	104	74.0	46.0	20.9	336.5
Inflation rate	104	52.8	197.7	0.6	1,824.4
Initial HDI	104	0.6	0.2	0.2	0.9
HDI Value	104	4.5	3.3	-3.9	18.7
Initial Weighted EPI	94	35.2	259.5	-1,590.2	490.5
Weighted EPI	94	0.1	0.5	-0.9	3.8

5.1 EPI computation

GDP construction was made to present all the final output produced within the economy, EPI construction to show the main three sectors in an economy; households, firms and government. Therefore, it includes four variables that present the three sectors. It is computed through two systems. Raw EPI which gives equal weights for all the four variables. Weighted EPI which gives was proven in Kharmov and Lee (2013) that both of them gives approximately the same results for developed countries but for different economies, it is preferred to use normalised EPI to give a right image for the economic activity. (Kharmov and Lee, 2013) Accordingly, since this paper is based on a cross-sectional data for 104 countries, the weighted EPI will be used in the model.

Weighted EPI Calculations based on four variables of computing the EPI are all from the same data source: World Bank. The budget deficit wasn't found directly on the World Development Indicators and even in some other trusted data sources. Total Government Expenditure as a percentage of GDP and Government Tax Revenue as a percentage of GDP were found on the World Development Indicators. Therefore, the government spending was subtracted from tax revenue to get the budget deficit on a yearly basis for each country. The tax revenue as a percentage of GDP has many missing variables. Therefore, the number of countries were declined from 104 to 94.

First, the construction for weighted EPI is taken from Kharmov and Lee (2013) and presented in box 1 in the appendix. [5] Then, to have a comparable result with GDP and other indicators, Weighted EPI should be calculated by the same method as GDP. Therefore, the growth rate of EPI is calculated for the same period of GDP from 1990 to 2008. Then the average is taken over the whole time frame because of the comparability with GDP and the missing year's values. The regression is then run.

5.2 Human Development Index Computation

HDI formula is composed of 3 main sectors. Health that is presented through life expectancy, education is observed through a combination of the adult literacy and school enrolment rates and standard of living given by GNI per capita.

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[5] It includes the construction of Weighted EPI that it is taken exactly from Kharmov and Lee (2013).

The statistics calculations and computation for the HDI exist in Human Development Index 2016 Report. This paper takes the HDI values for the 104 countries over the same time frame 1990 till 2008. HDI and EPI are all calculated the same as GDP for comparison. Therefore, the growth rate of HDI is calculated on a yearly basis, and then the average is computed for each country over the time frame.

6. Estimation Results

6.1 Judicial Independence and Economic Growth

In Table 2, the regressions are run for economic growth as a dependent variable. This regression is run as the same one in Voigt et al. (2015) but most the data used is the updated version. This model hasn't faced any of multicollinearity or misspecification problems. However, it faces a heteroskedasticity problem; using Breusch Pagan test; unlike the literature. Therefore, based on this result a regression that accounts for heteroskedasticity was estimated.

The regression results for all the variables are almost the same as the literature and signs are as expected. Although education isn't statistically significant, it is the same as in Voigt et al. (2015). Both primary regression variables; initial income and investment are significant as the literature but at a different percent.

 The de jure remains statistically insignificant, unlike the de facto which support the literature and is statistically significant at 5% level. The de facto coefficient increased to 1.45 which implies that a country that changes from entirely subordinate judiciary to a fully independent judiciary is expected to a have a faster growth rate than a country that remained at its original level of de facto by 1.4 percentage. The result of de facto slightly increased that the original paper results in Voigt et al. 2015. Adding the four controlled variables to check the robust. It is found that the de facto is still significant with the same coefficient value but at 10% significant level. From the four variables, Inflation is the only one significant with the expected negative sign.

Summing up, the de facto and economic growth are statistically and robustly significantly.

Table 2: Economic Growth

	(1)	(2)	(3)	(4)	(5)	(6)
Initial_Income	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***

	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)
Education	0.018	0.020	0.015	0.015	0.020	0.022
	(0.025)	(0.027)	(0.022)	(0.025)	(0.024)	(0.023)
Investment	10.160***	10.160***	10.695***	10.771***	10.675*	10.891*
	(3.755)	(3.773)	(3.579)	(3.617)	(5.916)	(5.514)
dejure_index		-0.527		-0.305	-0.433	-0.471
		(1.299)		(1.170)	(1.514)	(1.324)
defacto_index			1.469**	1.452**	1.529*	1.451*
			(0.669)	(0.681)	(0.827)	(0.753)
Population_growth					-0.106	-0.104
					(0.210)	(0.204)
Trade_openness					0.00001	-0.001
					(0.004)	(0.004)
Government_Size					-2.169	-2.049
					(4.160)	(3.828)
Inflation_rate						-0.003***
						(0.001)
Constant	0.793	1.124	-0.147	0.047	0.556	0.740
	(0.731)	(1.274)	(0.868)	(1.322)	(1.483)	(1.350)
Observations	104	104	104	104	104	104
R^2	0.220	0.223	0.276	0.275	0.304	0.420
Adjusted R^2	0.196	0.191	0.247	0.238	0.245	0.365

Note: $^*p<0.1; ^{**}p<0.05; ^{***}p<0.01$

6.2 Judicial Independence and Economic Performance Index

In Table 3, the regressions are run for weighted EPI as a dependent variable. All the independent variables are the same as for GDP except for the initial weighted EPI is put instead of the initial GDP. This change is to reflect

the preexistence (initial) state of the performance of the economy for each country. This regression is run for 94 countries because of some missing values in tax revenue variable.

This model doesn't face any of multicollinearity or misspecification problems. But, it faces heteroskedasticity problem as economic growth regression. The problem was detected by Breusch Pagan test. Therefore, the estimated regression accounts for the heteroskedasticity problem.

In the basic model, the education is positively significant at 5% significant level as expected. However, the initial weighted EPI and the investment were both not statistically significant.

Since that EPI construction is based on four variables that include the inflation rate and checking the robustness of the model has inflation as an independent variable, inflation is removed from the controlled variables to prevent falling in any problems. Looking at the indicators of GDP, to find that de facto isn't statistically significant while de jure is significant at 5% level. Moreover, with adding the three controlled variables without inflation, de jure is still significant. But the three variables have the expected sign, but they aren't statistically significant.

To sum up, these results indicates that a country that changes its laws and rules from totally dependent judiciary to a completely independent judiciary is expected to have a better performing economy than a country that remains at its original level.

Table 3: Weighted EPI

	(1)	(2)	(3)	(4)	(5)
Initial weighted EPI	0.00000	0.00000	0.00001	0.00000	0.00001**
	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)

	(1)	(2)	(3)	(4)	(5)
Education	0.0002**	0.0002**	0.0002**	0.0002**	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Investment	-0.021	-0.020	-0.022	-0.021	-0.017
	(0.015)	(0.015)	(0.015)	(0.015)	(0.017)
De jure index		0.016**		0.015**	0.013*
		(0.007)		(0.007)	(0.007)
De facto index			0.003	0.002	0.004
			(0.004)	(0.004)	(0.004)
Population growth					-0.0003
					(0.001)
Trade openness					0.00001
					(0.00002)
Government Size					0.047
					(0.031)
Constant	0.003	-0.007	0.001	-0.008	-0.015*
	(0.004)	(0.006)	(0.004)	(0.006)	(0.009)
Observations	94	94	94	94	94
R^2	0.055	0.095	0.056	0.094	0.148
Adjusted R^2	0.024	0.055	0.015	0.044	0.070

Another regression is run for the weighted EPI using the same exact variables as the economic growth in the appendix table 6. The de jure is significant at 5% level in all regression even with adding the controlled variables. However, de jure is the only variable that is significant is the model and is associated with a very low R-squared.

6.3 Judicial Independence and Human Development Index

The following table 4 in this section is for the HDI. The regression is run using independent variables exactly as economic growth regression. Unlike the other regressions, this model doesn't face heteroskedasticity problem or multicollinearity.

All the independent variables are significant at 1% significant level. Investment has a positive expected sign, while education and initial income has a negative sign. Similar to EPI, de facto JI isn't statistically significant with HDI, while de jure JI is statistically significant at 10% significant level. Looking at the last regression to check the robustness, the de jure JI remains significant but at 1%, besides both population growth and inflation rate. Both of them have the expected negative significant sign with the HDI.

Therefore, these results mean that changes its legal foundations from a dependent to an entirely independent judiciary isn't associated with a higher HDI values. This is justified that social factors that are included in the HDI are based on norms, not rules.

A second regression is run for the HDI using the same variables but switching the initial income with initial HDI to consider the initial state of the HDI for each country. The regression is represented in the appendix table 7. The de jure still has the negative sign but isn't anymore statistically significant, and this supports the opinion that social factors are based mainly on customs and norms that aren't usually represented in the law. Finally, this regression model doesn't face heteroskedasticity problem, and both Inflation rate and population growth get the right expected signs, besides the investment.

Table 4: **Human Development Index**

	(1)	(2)	(3)	(4)	(5)	(6)
Initial income	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***
	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)
Education	-0.073***	-0.070***	-0.074***	-0.071***	-0.066***	-0.066***
	(0.019)	(0.020)	(0.019)	(0.019)	(0.013)	(0.013)
Investment	11.356**	11.846**	11.375**	11.887**	13.325***	12.510***
	(4.589)	(4.811)	(4.600)	(4.797)	(3.552)	(3.674)
De jure index		-2.669*		-2.644*	-3.784***	-3.882***
		(1.580)		(1.544)	(1.368)	(1.360)
De facto index			0.341	0.388	0.537	0.299
			(1.193)	(1.142)	(0.832)	(0.833)
Population growth					-0.842***	-0.834***
					(0.272)	(0.289)
Trade openness					-0.001	-0.001
					(0.003)	(0.003)
Government Size					-4.306	-4.172
					(3.595)	(3.664)
Inflation rate						-0.002***

						(0.0005)
Constant	4.284***	5.885***	4.103***	5.659***	7.747***	8.255***
	(1.210)	(1.619)	(1.436)	(1.793)	(1.994)	(1.982)
Observations	104	104	104	104	104	104
R^2	0.370	0.402	0.373	0.404	0.532	0.552
Adjusted R^2	0.351	0.378	0.348	0.373	0.492	0.509

Note: *p<0.1; **p<0.05; ***p<0.01

7. Conclusion

Different measurements of the economy are used with the indicators of JI for a cross-sectional data. It is confirmed that de facto and economic growth are statistically and positively significant which means that a country that switches to a completely dependent JI will have higher rates of economic growth. It is found that de jure JI is statistically and robustly positive significant with EPI which means that the growth rate of the economic performance of a country is significant with its legal rules and foundations. It is also observed that de jure is significant with HDI but with a negative sign which means that changing the degree of independence of JI to be a total independent JI doesn't result in a high rate of HDI.

Therefore, the growth rate of GDP per capita isn't sufficient in presenting the economy as with using different measures, the results changes.

Eventually, the existence of an independent judiciary system is so crucial where its benefits are in all the sectors of the economy. Therefore, studying the relationship between JI and different measurements of the economy is so important. The paper scope is limited in examining only two measurements. Testing this relationship with other measures that represents other aspects of the economy is left for further researches.

Appendix

Table 5: Variables Description and Data Sources

Variables	Description and Data Sources
Economic Growth	Average annual GDP per capita growth rate over the period 1990 to 2008. It is based on "rgdpna" from Penn World Tables Version 9.0 by Feenstra et al. (2015).
Human Development Index	Data are taken from Human Development Index (2016).
Government Expenditure (% of GDP)	General government final consumption expenditure (% of GDP). It is taken from World Development Indicators.
Tax Revenue (% of GDP)	All compulsory transfers to the government as a % of GDP. It is taken from World Development Indicators.
Unemployment rate	Unemployment rate according to the International Labour Organization. It is taken from World Development Indicators.
Initial real GDP per capita	The first year of observation starting from 1990 or later if 1990 don't exist. It is based on "rgdpe" from Penn World Tables Version 9.0 by Feenstra et al. (2015).
Investment	The average share of investment in GDP over the period 1990 to 2008. It is based on "csh_i" Penn World Tables Version 9.0 by Feenstra et al. (2015).

Education	The first year of observation starting from 1990 or later if 1990 don't exist for population share over 15 with complete secondary education. It is based on "lsc" by Barro and Lee (2016).
De Jure JI	Data are taken exactly from Voigt et al. (2015)
De Facto JI	Data are taken exactly from Voigt et al. (2015)
Government Consumption	The average share of government consumption in GDP over the period 1990 to 2008. It is based on "csh_g" Penn World Tables Version 9.0 by Feenstra et al. (2015).
Population Growth	Average annual population growth rate over the period 1990 to 2008. It is based on "pop" Penn World Tables Version 9.0 by Feenstra et al. (2015).
Trade Openness	The average annual level of trade openness over the period 1990 to 2008. It is based on "openk" from the Penn World Tables version 7.1 by Feenstra et al. (2015).
Inflation Rate	Average annual inflation rate over the period 1990 to 2008. It is taken from the World Development Indicators based on Consumer Price Index.

Table 6: Judicial Independence and Weighted EPI using initial GDP as one of the independent variables.

	(1)	(2)	(3)	(4)	(5)
Initial_Income	0.00000	0.00000	0.00000	0.00000	0.00000
	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
Education	0.0001	0.0001	0.0001	0.0001	0.00002
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Investment	-0.023	-0.023	-0.023	-0.023	-0.025
	(0.015)	(0.015)	(0.015)	(0.015)	(0.019)
dejure_index		0.017^{**}		0.016^{**}	0.015^{**}
		(0.006)		(0.007)	(0.007)
defacto_index			0.002	0.001	0.002
			(0.004)	(0.004)	(0.004)
Population_growth					-0.0002
					(0.001)
Trade_openness					0.00001
					(0.00002)
Government_Size					0.032
					(0.020)

Constant	0.003	-0.007	0.002	-0.008	-0.012
	(0.003)	(0.005)	(0.003)	(0.006)	(0.008)
Observations	94	94	94	94	94
R^2	0.057	0.110	0.057	0.110	0.144
Adjusted R^2	0.025	0.070	0.015	0.059	0.064

Note: $^{*}p<0.1;\ ^{**}p<0.05;\ ^{***}p<0.01$

Table 7: Judicial Independence and Human Development Index using initial HDI as one of the independent variables.

	(1)	(2)	(3)	(4)	(5)	(6)
Initial HDI	-12.121***	-11.901***	-12.246***	-12.032***	-13.164***	-13.167***
	(1.702)	(1.703)	(1.714)	(1.737)	(1.574)	(1.539)
Education	-0.027	-0.027	-0.028	-0.028	-0.028*	-0.026
	(0.019)	(0.019)	(0.018)	(0.018)	(0.015)	(0.016)
Investment	12.445***	12.435***	12.633***	12.632***	13.071***	12.605***
	(4.180)	(4.348)	(4.230)	(4.373)	(4.147)	(4.173)
De jure index		-0.752		-0.669	-1.747	-1.725
		(1.342)		(1.336)	(1.316)	(1.323)
De facto index			0.480	0.430	0.518	0.449
			(0.819)	(0.853)	(0.769)	(0.763)
Population growth					-0.674**	-0.635*
					(0.318)	(0.350)
Trade openness					-0.0002	-0.001
					(0.003)	(0.003)
Government Size					-3.395	-3.220
					(3.298)	(3.339)

Inflation rate						-0.003***
						(0.001)
Constant	10.005***	10.345***	9.761***	10.080***	12.425***	12.602***
	(1.385)	(1.599)	(1.474)	(1.710)	(1.873)	(1.752)
Observations	104	104	104	104	104	104
R^2	0.596	0.591	0.594	0.589	0.627	0.633
Adjusted R^2	0.584	0.574	0.577	0.568	0.596	0.597

Note: *p<0.1; **p<0.05; ***p<0.01

Box 1

Weighted EPI Construction

First, normalise the optimal EPI score to 100% and define any score below

100% as a decrease in economic performance. Next, we nominally define the

desired values for each of the indicator's subcomponents as follows:

- the desired inflation rate (I*) is 0.0%;

- the desired unemployment rate (U*) is 4.75%;

- the desired value for government deficit as a share of GDP

  (Def/GDP*) is 0.0%, consistent with a long-term balanced budget;

- the desired change in GDP (ΔGDP*) is a healthy real growth rate of

  4.75%.

These numbers are intended to describe a "perfect" economic performance of

a country.

The Weighted EPI formula is:

Weighted EPI = 100% - |Inf(%)–I|- (Unem(%)–U*) – (Def/GDP(%)–*

Def/GDP) + (ΔGDP(%)–ΔGDP*),*

where *Wi* is the weight of each component of the indicator, calculated by the

formula:

$$W_i = \frac{1}{STDi} * STDev_{AV}$$

Where STD_i is a standard deviation of each variable (inflation, or unemployment, or

deficit as a share of GDP, or GDP growth) and *STDev$_{AV}$* is the average standard

deviation, calculated as:

$$STDev_{Av} = \frac{1}{4} \sum STD_i \ where \ i \ is \ from \ 1 \ to \ 4.$$

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