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Institutions as the Main Determinant in Economic Growth

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Abstract. *The studies on human capital and technological progress have given incredible insights on how countries in the world differ from one another. Yet there are more than those two reasons to account for differences among countries. There is a third reason why a country would differ in terms of its economic development progress, namely institutional factors. Hence developing institutional indices would give a deeper explanation than a mere theory. On the other hand, we can corroborate the institutional index with the general theory that low-quality institutions will impact an economy negatively. This study seeks to broaden the understanding of causes of economic growth by incorporating institutional index into a semi-endogenous growth model and finds a relationship between that index with human capital and technological progress.*

Keywords: *institutions, human capital, technological progress, economic growth*

JEL Classification: E01, E02, O43.

Abstrak. *Penelitian akan topik mengenai modal manusia dan perkembangan teknologi telah memberi wawasan yang mendalam dan penjelasan yang baik atas perbedaan-perbedaan yang terjadi dalam hal pertumbuhan ekonomi diantara negara-negara di dunia. Akan tetapi ada lebih dari 2 alasan mengapa terjadi perbedaan diantara negara-negara tersebut. Alasan ketiga mengapa terjadi perbedaan adalah adanya perbedaan dalam faktor institusi. Sehingga dengan membangun indeks institusi, kita akan mendapat pemahaman lebih ketimbang hanya sekedar memahami teori saja. Selain itu, kita dapat memperkuat teori umum dengan indeks institusi, yaitu ketika suatu negara memiliki indeks institusi yang rendah maka pertumbuhan ekonominya pun akan rendah. Penelitian ini berupaya untuk memahami penyebab-penyebab pertumbuhan ekonomi yang dikaitkan dengan indeks institusi dan model pertumbuhan semi endogen serta mencari hubungan antara indeks tersebut dengan modal manusia dan perkembangan teknologi.*

Kata Kunci: *institusi, modal manusia, perkembangan teknologi, pertumbuhan ekonomi*

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Introduction

A question of interest for most of the macroeconomists is a question related to the cause of the difference in economic growth among countries in the world. According to Acemoglu & Robinson (2008), economic growth is related to people's ability to accumulate human capital, physical capital, and technology. Acemoglu & Robinson (2008) further summarize the causes of the difference in economic growth to only 2, namely the proximate cause and fundamental cause. Proximate cause or the most active and dominant cause is human capital, physical capital, and technology. While the fundamental cause is the most basic, and it will became the major cause of the resulting proximate cause. So if we want to get a satisfactory answer from the question at the beginning of the paragraph, then we should focus on the fundamental cause.

The fundamental cause is the most basic factor and the cause of differences in every country in the world. Institutions are fundamental causes that cause differences in world economic growth (Acemoglu & Robinson, 2008). Institutions shape how society behave and react to certain challenges in their lives. Institutions command a society to react by creating certain rules and regulations as guidelines. These rules and regulations are sometimes in the written formal code but most of the times they need not be written. Institutions are reflections of society and the people who live in therefore different countries possess different institutions. Therefore institutions are fundamental to every country as they dictate paths to where a country might progress. Whether it is on the right path or on the wrong one, clearly rely on institutions at play.

Different countries possess different qualities of institutions. Economic institutions determine incentives and constraints for economic actors and contribute to shaping the output of the economy. Economic institutions involve social choices in which social choice will vary between individuals so that these social choices will lead to conflict. Those who have a greater political advantage will ultimately win the conflict. Developed countries with high economic growth are supported by innovation and growth-oriented institutions. So the difference in economic growth in developed countries within developing countries lies in the quality of the institution. Therefore optimum human capital and technological advances, as drivers of economic growth, must go hand in hand with good institutions.

This is interesting because if we understand and know the quality and position of these institutions from institutions in developed countries so we can map the problems and catch up quickly with a higher rate of economic growth. By knowing our position in the global map of institutions, we can map and list our strength and weaknesses and later improve them. The rapid growth of the stock of knowledge and technological progress begin to flourish once good institutions are established. Advanced economies all have good institutions in place. Good institutions can foster the growth of the stock of knowledge and technological progress by accommodating all possible knowledge spillover from advanced and other countries. The difference in the rate of economic growth between countries is not merely the issue of capital accumulation, the role of technology, and human capital; there is a role of institutions in it (Acemoglu et al., 2001). They suggest that in certain cases, institutions are the main determinants of economic growth.

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With recent development in semi-endogenous growth model and the availability of data on institutions, it is imperative to develop an extension to semi-endogenous growth model with attention towards institutions. Semi-endogenous growth model emphasizes ideas creation where human capital and technological progress are the key ingredients. There must exist a relationship between institutions and ideas creation aspects. The first step in extending a semi-endogenous growth model can be directed toward building an institutional index. This study attempts to employ PCA methodology popularized by Filmer & Pritchett (2001) in building an institutional index. Later, a relationship between institutions and ideas creation is established. The previous study that has attempted to elaborate institutions in their analysis is of Hall & Jones (1999). The big difference with our study lies in their methodology in constructing the index. Hall & Jones (1999) use simple mean techniques of several institutions indicators developed by Knack & Keefer (1995), while our methodology is based on PCA. Since institutions influence knowledge directly and thus influence the rate of economic growth, we then build an institutional index in relation to the growth of knowledge. The technique used to calculate the growth of knowledge follows Jones (2002). The next section will briefly explain institutions and PCA methodology before we come to calculate the institutional index.

Methods

This study will use some indicators of the International Country Risk Guide (ICRG) database between 1983 and 2013. Indicators used in this study are perceived to have direct impacts on the stock of knowledge and technological progress. The choice of the time span is merely a case of data availability. The ICRG data that is utilized in this study consists of: (a) Investment Profile; (b) Internal Conflict; (c) Corruption; (d) Law and Order; (e) Bureaucracy Quality.

Investment Profile measures risk factors in the business. Risk factors in the business include contract cancellation factors, the rate at which investors can recover their capital (repatriation), and the level of government delay in making payments to investors. Internal Conflict measures the factors of political violence and its influence on government. Corruption assesses the extent of corruption in the order of the political system. Law and Order measure the level of strength, independence, and fairness of the legal system. On the point of view of the government and institutions in relations with knowledge and technological affairs then the greater the risk signals the more likely knowledge and technological affairs receive less attention or become the priority. On the point of view of an investor then the greater the risk the less likely an investor would invest in the projects.

This study includes 100 countries, after that the countries can be grouped according to values of S and growth of A_t. S, and A_t are institutional index and growth of knowledge consecutively. We then plot this value on quadrant graphs that will give us 4 quadrants of countries. The use of this classification method is due to the number of countries involved but also to give better views on the current position of each country. This study is also new in terms of using 100 countries in the analysis. The original Jones (2002) involves only 6 countries. We will combine the concept of growth of A_t as is explained in Jones (2002) to

find correlation among sources of growth. The number of studies involving many countries is expected to provide a more general and comprehensive picture and can represent the entire sample well.

To avoid collinearity bias, this study used Principal Component Analysis (PCA) to form a composite index. PCA is used to describe the variance-covariance matrix structure of a set of variables through a linear combination of these variables. In general, the main components can be useful for the reduction and interpretation of variables. Let's say there are p variables consisting of n objects. Suppose also that from p variable, k main component is made (with $k \leq p$) which is a linear combination of p of that variable. K, the main component, can replace the p-variables that makeup without losing much information about the whole variable. Generally, PCA is an intermediate analysis that means the main component results can be used for further analysis.

To calculate the impact of social infrastructure or institutions we will use a composite measure defined as "the sum of the weighted components of the political risk measure of the International Country Risk Guide". The index is based on the rating of the ICRG on the 6 components as below: (i) 12 points for each variable that includes investment profile and internal conflict; (ii) 6 points for each variable including corruption and law and order; (iii) 4 points for each variable that includes bureaucratic quality.

Socioeconomic conditions variables are not included, because these variables are related to economic performance. So, it has a great possibility to influence perceptions of the institution as described by Jellema & Roland (2011). His replacement uses an additional open trade. So the PCA model used is:

$$SS = \alpha_1.X_1 + \alpha_2.X_2 + \alpha_3.X_3 + \alpha_4.X_4 + \alpha_5.X_5 + \alpha_6.X \qquad (12)$$

Where:

X_1 : Bureaucratic Quality

X_2 : Investment Profile

X_3 : Internal Conflict

X_4 : Corruption

X_5 : Law and Order

X_6 : Trade Openness

Panel data analysis can be used in dynamic models in relation to dynamic dynamics of adjustment. This dynamic relationship is characterized by the presence of lag of the dependent variable among the regressor variables.

Some of the criteria used to find the best dynamic model or GMM model are: First, Not biased. Estimators of pooled least squares are biased upward and estimators of fixed effects are biased downwards. An unbiased estimate is in between. Second, the instrument must be valid. The valid meaning is if there is no correlation between the instrument and the component error. This validity is checked using the Sargan test. The null hypothesis of the Sargan test states that the instrument has no problem with validity (valid instrument). The instrument will be valid if the Sargan test cannot reject the null hypothesis. If the result of the

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AB-GMM method indicates the instrument used is invalid, then the SYS-GMM method is used. Third, the estimation result must be consistent. An autocorrelation test on the GMM approach is used to determine the consistency of the estimation results. The consistency properties of the estimators obtained can be checked from Arellano-Bond statistics m_1 and m_2, which can be calculated automatically on some software. The estimate will be consistent if m_1 denotes the null hypothesis is rejected and m_2 indicates the null hypothesis is not rejected (Arellano & Bond, 1991)

Result and Discussion

Islam (1995) mentions the importance of the institutional role in explaining differences in economic growth. Research on the determinants of differences in economic growth and income between countries can be grouped into 3 broad theoretical groups. The first group of theories is a group that focuses on factors of input to production processes, such as physical and human capital, and technological advances that support economic performance. Solow (1956), Lucas Jr (1988), Romer (1986, 1990), Grossman & Helpman (1991), Jones (1995a, 1995b, 2002), Segerstrom (1998) had started the discussion about this topic. Endogenous growth models fall into the first group. The second theoretical group is the focus group on location and geographical location where certain characteristics will support the economy to reach the highest level of growth while the location or other location is less supportive. Sachs (2001), Gallup et al., (1999), and others had conducted the study from this group. A third theoretical group is a group that focuses on institutions as a driver of economic growth. North (1991) had pioneered the study in the third group.

Good institutions foster the growth of knowledge. Jones (2002) argues that the engine of economic growth is the creation of ideas. Jones (2002) seeks to explain the stagnant rate of growth in the United States during 1950 – 1993 and concludes that much of the growth is attributable to the growth in ideas (almost 70%). Jones (2002) mentions that the differences among economies are endowment and allocation. This creates opportunities in extending Jones (2002) by incorporating institutions into the model. Good or bad institutions can be considered as endowment while effective or ineffective allocations are results of good or bad institutions.

Jones (2002) proposes to calculate the accumulated knowledge with the following equation:

$$\dot{A}_t = \delta . H_{A_t}^{\lambda} . A_t^{\phi} , A_0 > 0 \qquad (2)$$

In Nugroho (2018), equation 3 has been modified to become:

$$\dot{A}_t = \delta . H_{A_t}^{\lambda} . \left[\left(\frac{A_t^*}{A_t} \right)^{1-S} . A_t \right]^{\emptyset} , A_0 > 0 \qquad (3)$$

The channel we will use to incorporate institutional index into Jones modified model is through variable, S, which we limit its value to a maximum of 1. The reason for the maximum value is to that after a certain country reaches S =1 then it becomes what Jones (2002) explained in his research, an advanced country. As $S \approx 1$, the equation (10) will return

to its original Jones (2002) version, in equation (9). Jones (2002) assumes that countries in his model are all the same in level of ability to conduct research and to foster new knowledge. In our model, it then translates to $S = 1$. We allow for countries' variabilities in their ability to conduct research and to foster new knowledge. This is a novelty this study will offer.

Determination of the number of components in the PCA is done by searching for variables or components that are not correlated, independent of each other, but fewer than the initial variables. Although it produces a fewer number of variables, it absorbs most of the information contained in many more initial variables and can contribute to the variance of all variables. In PCA, the determination of the component refers to the eigenvalue value, indicating the amount of contribution of the component to the variance or diversity of all initial variables. In this case, if the eigenvalue value obtained is greater than one, then the component formed can be maintained. Otherwise, if the eigenvalue value is less than one, then the component cannot be used.

Table 1 presents the results of eigenvalue calculations for the formation of the corporate vulnerability index, the percentage of total diversity (Proportion) and the cumulative total diversity (Cumulative Proportion) capable of being explained by the diversity of the components formed. Based on Table 1, of the 12 components formed there are three components that have eigenvalue greater than one. Component 1 has an Eigenvalue of 2.784994, Component 2 of 1.255002, and Component 3 of 1.010487.

Table 1. Eigenvalue Value for Each Component

Eigenvalues: (Sum = 12, Average = 1)					
Number	**Value**	**Difference**	**Proportion**	**Cum. Value**	**Cum Proportion**
1	2.784994	1.529992	0.4642	2.784994	0.4642
2	1.255002	0.244515	0.2092	4.039995	0.6733
3	1.010487	0.355627	0.1684	5.050482	0.8417
4	0.654859	0.434570	0.1091	5.705341	0.9509
5	0.220289	0.145920	0.0367	5.925631	0.9876
6	0.074369	---	0.0124	6.000000	1.0000

Meanwhile, in Table 1 there is also a column 'Proportion' which shows the percentage of variance or diversity that can be explained by each component and column "Cumulative Proportion" which describes the cumulative of each component simultaneously. The magnitude of diversity capable of being explained by Component 1 is 46.42 percent. The diversity explained by Components 1 and 2 is 67.33 percent. The diversity explained by Components 1, 2, and 3 is 84.17 percent. Based on the eigenvalue of the three components greater than 1, and the cumulative percentage of the three components of 84.17 percent, it can be concluded that the three components can represent the diversity of the initial variables.

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Table 2. Component Matrix

Components	*Loading Factor*
Bureaucratic Quality	0.185092
Investment Profile	0.458274
Internal Conflict	0.053452
Corruption	-0.534463
Law and Order	0.397554
Trade Openness	0.556030

Table 2 presents the component matrix that shows the magnitude of the correlation of each variable in the formed component, or loading factor. Based on Table 2 below, it appears that there are three factors or components that are formed from the six indicators of vulnerability. This shows that the three components are the most optimal amount to reduce the six original variables.

We can determine the Factor Equation by comparing the correlation value on each line within each component formed (see Table 2). We use the general form below to generate a factor equation.

$$y_i = \alpha_1\left(\frac{x_1 - \bar{x}_1}{s_1}\right) + \alpha_2\left(\frac{x_2 - \bar{x}_2}{s_2}\right) + \cdots + a_k\left(\frac{x_k - \bar{x}_k}{s_k}\right)$$

Where $\bar{x}_k$ expresses mean and s_k is a standard deviation of indicators (component), x_k. α expresses weight or loading factor of each indicator, x_k in the first main component. If we combine the information from Table 2, with the above factor equation, we can get:

$$S_i = 0.185\left(\frac{x_1 - \bar{x}_1}{s_1}\right) + 0.458\left(\frac{x_2 - \bar{x}_2}{s_2}\right) + 0.0534\left(\frac{x_3 - \bar{x}_3}{s_3}\right)$$
$$- 0.5344\left(\frac{x_4 - \bar{x}_4}{s_4}\right) + 0.397\left(\frac{x_5 - \bar{x}_5}{s_5}\right) + 0.556\left(\frac{x_6 - \bar{x}_6}{s_6}\right)$$

Where: X_1 is bureaucratic quality; X_2 is an investment profile; X_3 is internal conflict; X_4 is corruption; X_5 is law and order; X_6 is trade-openness.

From the results, the most ideal in the determination of the institutional index is the first group. This is because the nature of the equation is non-negativity that means each indicator gives a positive contribution to the resulting index. After obtaining the index value of each country we then do rescaling of value between 0 – 1. We use value 0 - 1 to analyze institutional index where 0 is the minimum value of the institutional index while 1 is the maximum value. Before we come to the growth of A_t, we calculate A_t using the following equation:

$$A_t = \left(\frac{y_t}{\left(\frac{K_t}{Y_t}\right)^{\frac{\alpha}{1-\alpha}} . l_{Y_t} . h_t} \right)^{\frac{\sigma}{1-\alpha}}$$

Thus the growth of A_t is the log of two consecutive years or we can take a log of the above equation then differentiate with respect to time. We need to calculate the growth of A_t in order to compare each individual country's institutional indices with the growth of A_t. In doing so, we can easily make a conclusion about the relationship between institutional indices with the growth of A_t. We can say that to measure productivity, we calculate the growth of A_t and the higher the indices, the higher the productivity of a country will be. Hence, countries with higher productivity also translate to higher economic growth.

Table 3. Calculation Result of Index of Institution in 1984-2013

No.	Country	Average of S	No.	Country	Average of S
1	Luxembourg	0.937	51	Jamaica	0.479
2	Singapore	0.907	52	Uruguay	0.478
3	Netherlands	0.871	53	India	0.464
4	Finland	0.867	54	Turkey	0.464
5	Switzerland	0.851	55	Dominican Republic	0.463
6	Sweden	0.849	56	Madagascar	0.459
7	New Zealand	0.848	57	Ecuador	0.456
8	Denmark	0.843	58	Gabon	0.449
9	Norway	0.838	59	Panama	0.448
10	Canada	0.838	60	Kenya	0.447
11	Austria	0.836	61	Paraguay	0.444
12	Iceland	0.834	62	Ghana	0.438
13	Belgium	0.808	63	Malawi	0.432
14	Ireland	0.790	64	Nicaragua	0.431
15	Australia	0.787	65	Cote d'ivoire	0.431
16	United States	0.773	66	Burkina Faso	0.428
17	United Kingdom	0.768	67	Iran	0.428
18	Japan	0.747	68	Egypt	0.427
19	Germany	0.740	69	Senegal	0.424
20	France	0.724	70	Yemen	0.418
21	Malta	0.710	71	Mozambique	0.407
22	Cyprus	0.703	72	Guinea	0.407
23	Taiwan	0.687	73	Suriname	0.404
24	Portugal	0.684	74	Cameroon	0.404
25	Spain	0.650	75	Philippines	0.402

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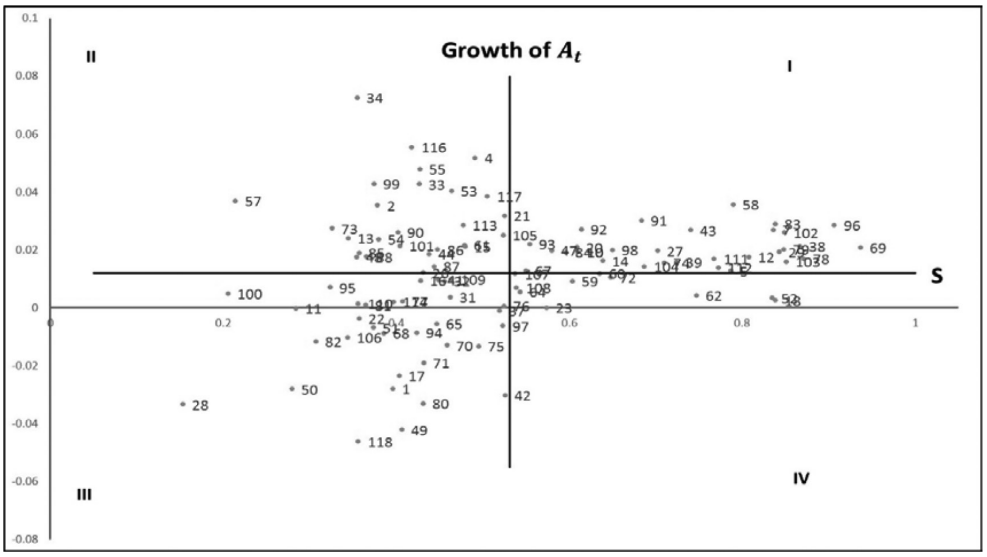
No.	Country	Average of S	No.	Country	Average of S
26	Malaysia	0.648	76	Venezuela	0.397
27	Botswana	0.639	77	Algeria	0.396
28	Italy	0.635	78	Liberia	0.386
29	Republic of Korea	0.614	79	Indonesia	0.380
30	Bahrain	0.610	80	Angola	0.378
31	Chile	0.609	81	Sri Lanka	0.375
32	Israel	0.604	82	Honduras	0.374
33	Oman	0.596	83	Peru	0.366
34	Greece	0.580	84	Niger	0.365
35	Costa Rica	0.574	85	Pakistan	0.357
36	Saudi Arabia	0.555	86	Colombia	0.357
37	Kuwait	0.550	87	Zimbabwe	0.356
38	Jordan	0.543	88	Uganda	0.356
39	Tunisia	0.539	89	El Salvador	0.355
40	Trinidad & Tobago	0.538	90	Guatemala	0.354
41	Gambia	0.526	91	Bolivia	0.345
42	China	0.525	92	Togo	0.344
43	Morocco	0.525	93	Mali	0.326
44	Thailand	0.524	94	Sierra Leone	0.324
45	South Africa	0.524	95	Nigeria	0.307
46	Ethiopia	0.520	96	Bangladesh	0.284
47	Zambia	0.505	97	Haiti	0.279
48	Mexico	0.496	98	Iraq	0.214
49	Argentina	0.491	99	Sudan	0.206
50	Brazil	0.480	100	Congo	0.153

Table 3 shows that OECD countries dominate index values with the first top 20 countries. It proves that OECD countries have better institutions compared to other groups of countries. Another interesting finding is Botswana that places no 27, just above Italy. Perhaps this is so because of the successful and continuous efforts of the Botswana government in eradicating corruptions. North (1991) defines institutions, as rules of the game in a society or in more formal definitions do humans that ultimately shape human relationships within the society create boundaries. In the case of Botswana, its government has done a great job in defining rules of the game in society hence translating to a better quality of institutions and economic growth. North (1991) argues that institutions are a major cause of economic development and have hypothesized that institutions play a role in both short and long term growth. As we can see most African countries lack good quality institutions resulting in lower economic growth. The rest of the African countries is at the bottom of the index.

Figure 1. Quadrant



As was expected, most OECD countries lie in the first quadrant that is characterized by the value of S near 1 and the above average value of growth of At (See Figure 1). From the first quadrant, we can also find that Luxembourg (69) has the highest institutional index (0,9371) of all 100 countries (refer to Table 4). Another interesting finding is that Botswana, the only African country, made it to the first quadrant with the value of index 0,6393 (refer to Table 5). This can be related to the successful effort of the Government of Botswana in fighting against corruption in recent years. If this value is compared to that of Indonesia, then Indonesia still falls behind Botswana (0,6393 > 0,3797). Yildirim & Golkap (2016) says that institutional factors can increase or decrease productivity. To achieve high economic growth, the state must have institutions that encourage every organization within the country to engage in productive activities. In developing countries, the existing institutions prioritize distribution activities rather than production activities so that conditions leading to monopolies are created that ultimately inhibit productive opportunities. In addition to increased productivity, good institutions will increase efficiency and trust. Complete values of the institutional index of all 100 countries can be referred to Table 3.

The effect of institutional indexes is estimated using the GMM method, where the data used is non-OECD data because OECD countries are considered as the maximum limit of the multifactor productivity value. The estimation result shows that the model used is valid and consistent. This result is valid and consistent (See Table 6). Variables that have an impact on the growth of A_t are human capital, multifactor productivity of the country, and multifactor productivity of advanced countries, institutional index, and growth of A_t in the preceding year. Value of coefficient of the institutional index of 0.0310 describes that whenever there is a rise of 1% in the institutional index then it will raise the growth of A_t by 0.03%. Value of growth of A_t at lag 1 is less than 1 but slightly more than 0 that shows there is convergence among OECD countries being analyzed.

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Table 4. Countries-Quadrants

	Quadrant 1		Quadrant 2		Quadrant 3		Quadrant 4
5	Australia	2	Angola	1	Algeria	18	Canada
7	Austria	4	Argentina	10	Bahrain	23	Costa Rica
10	Bahrain	13	Bolivia	11	Bangladesh	52	Iceland
12	Belgium	15	Brazil	16	Burkina Faso	59	Israel
14	Botswana	21	China	17	Cameroon	60	Italy
20	Chile	26	Cote d 'Ivoire	22	Colombia	62	Japan
27	Cyprus	33	Egypt	28	Congo	64	Jordan
29	Denmark	34	El Salvador	31	Dominican	72	Malaysia
38	Finland	44	Ghana	32	Ecuador	107	Trinidad & Tobago
39	France	48	Guatemala	37	Ethiopia	108	Tunisia
43	Germany	53	India	41	Gabon		
47	Greece	54	Indonesia	42	Gambia		
58	Ireland	55	Iran	49	Guinea		
67	Kuwait	57	Iraq	50	Haiti		
69	Luxembourg	61	Jamaica	51	Honduras		
74	Malta	73	Mali	65	Kenya		
78	Netherlands	85	Pakistan	68	Liberia		
79	New Zealand	86	Panama	70	Madagascar		
83	Norway	87	Paraguay	71	Malawi		
84	Oman	88	Peru	75	Mexico		
91	Portugal	90	Philippines	76	Morocco		
92	Rep. of Korea	99	Sri Lanka	77	Mozambique		
93	Saudi Arabia	101	Suriname	80	Nicaragua		
96	Singapore	105	Thailand	81	Niger		
98	Spain	113	Uruguay	82	Nigeria		
102	Sweden	116	Yemen	94	Senegal		
103	Switzerland	117	Zambia	95	Sierra Leone		
104	Taiwan			97	South Aftica		
111	United Kingdom			100	Sudan		
112	United States			106	Togo		
				109	Turkey		
				110	Uganda		
				114	Venezuela		
				118	Zimbabwe		

Table 5. Institutional Index and Growth of A_t

Quadrant 1	Avg. of S	Avg. of Growth of At	Quadrant 2	Avg. of S	Avg. of Growth of At	Quadrant 3	Avg. of S	Avg. of Growth of At	Quadrant 4	Avg. of S	Avg. of Growth of At
Australia	0.7866	0.0127	Angola	0.3783	0.0353	Algeria	0.3960	-0.0281	Canada	0.83810	0.00246
Austria	0.8359	0.0268	Argentina	0.4914	0.0518	Bahrain	0.6101	0.0192	Costa Rica	0.57388	-0.00001
Bahrain	0.6101	0.0192	Bolivia	0.3448	0.0241	Bangladesh	0.2841	-0.0002	Iceland	0.83438	0.00331
Belgium	0.8077	0.0175	Brazil	0.4800	0.0211	Burkina Faso	0.4281	0.0093	Israel	0.60352	0.00905
Botswana	0.6393	0.0161	China	0.5253	0.0318	Cameroon	0.4037	-0.0236	Italy	0.63530	0.01182
Chile	0.6091	0.0208	Cote d 'Ivoire	0.4313	0.0120	Colombia	0.3571	-0.0038	Japan	0.74698	0.00421
Cyprus	0.7027	0.0196	Egypt	0.4272	0.0426	Congo	0.1532	-0.0334	Jordan	0.54345	0.00549
Denmark	0.8430	0.0192	El Salvador	0.3555	0.0725	Dominican	0.4626	0.0036	Malaysia	0.64792	0.01044
Finland	0.8667	0.0211	Ghana	0.4380	0.0185	Ecuador	0.4560	0.0091	Trinidad & Tobago	0.53770	0.01164
France	0.7240	0.0156	Guatemala	0.3544	0.0175	Ethiopia	0.5195	-0.0011	Tunisia	0.53921	0.00692
Germany	0.7403	0.0267	India	0.4640	0.0402	Gabon	0.4486	0.0096			
Greece	0.5797	0.0196	Indonesia	0.3797	0.0235	Gambia	0.5260	-0.0303			
Ireland	0.7900	0.0357	Iran	0.4277	0.0478	Guinea	0.4065	-0.0422			
Kuwait	0.5499	0.0128	Iraq	0.2144	0.0369	Haiti	0.2795	-0.0281			
Luxembourg	0.9371	0.0208	Jamaica	0.4791	0.0216	Honduras	0.3737	-0.0069			
Malta	0.7099	0.0154	Mali	0.3257	0.0274	Kenya	0.4472	-0.0056			
Netherlands	0.8715	0.0168	Pakistan	0.3572	0.0189	Liberia	0.3859	-0.0088			
New Zealand	0.8480	0.0201	Panama	0.4482	0.0200	Madagascar	0.4588	-0.0130			
Norway	0.8383	0.0289	Paraguay	0.4441	0.0143	Malawi	0.4321	-0.0190			
Oman	0.5963	0.0190	Peru	0.3660	0.0176	Mexico	0.4958	-0.0133			
Portugal	0.6841	0.0301	Philippines	0.4022	0.0260	Morocco	0.5248	0.0006			
Rep. of Korea	0.6141	0.0271	Sri Lanka	0.3746	0.0427	Mozambique	0.4073	0.0022			
Saudi Arabia	0.5546	0.0219	Suriname	0.4025	0.0213	Nicaragua	0.4313	-0.0332			
Singapore	0.9067	0.0285	Thailand	0.5239	0.0250	Niger	0.3649	0.0008			
Spain	0.6504	0.0199	Uruguay	0.4776	0.0284	Nigeria	0.3072	-0.0117			
Sweden	0.8487	0.0259	Yemen	0.4181	0.0554	Senegal	0.4240	-0.0086			
Switzerland	0.8508	0.0158	Zambia	0.5054	0.0384	Sierra Leone	0.3238	0.0070			
Taiwan	0.6871	0.0141				South Aftica	0.5236	-0.0063			
United Kingdom	0.7677	0.0168				Sudan	0.2058	0.0049			
United States	0.7726	0.0138				Togo	0.3438	-0.0103			
						Turkey	0.4638	0.0096			
						Uganda	0.3560	0.0013			
						Venezuela	0.3968	0.0019			
						Zimbabwe	0.3560	-0.0463			

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Table 6. GMM result

Variables	Coefficient	P>|z|
GA(-1)	0.1079	0.0000
S	0.0310	0.0000
LogH	0.0094	0.0000
LogA	0.0935	0.0000
LogA*	0.0958	0.0000
C	-0.4397	0.0000
Arrelano Bond Test		
M1	0.0001	
M2	0.9125	
Sargan Test		
Prob > chi^2	1.0000	

This result is consistent with Siddiqui & Ahmed (2013) that suggest favorable institutions positively affect economic growth. There is a causal link between a cluster of good institutions and rapid ling run economic growth (Lin & Chen, 2011). Institutional is a key role in the process of economic development (Osman et al., 2011; Roy et al., 2014; Ahmad & Hall, 2017). According to the result, it is imperative that the government should pay more attention to institutional indices. The improvement of institutional quality can attract more foreign direct investment (Kandil, 2009). The success of institutions is largely determined by the degree of accountability and corruption (Sumanjeet, 2015). The institutional reforms to upgrade the quality of both political and economic institutions are crucial for the countries (Slesman et al., 2015; Rachdi et al., 2018).

Conclusion

PCA result shows that there is a difference in index values between each quadrant. The result shows that developed countries have a tendency of higher index value relative to other countries. Quadrant I characterizes developed countries in which institutional index is higher than any other quadrant. The growth of A_t is fairly high in this quadrant but not the highest. Institutional influence on economic growth is evidenced by the results of GMM where the influence of institutions has a positive and significant impact on economic growth. It proves that countries with higher institutional indexes have higher economic growth than those with lower institutional indices. GMM results also prove that human capital and multifactor productivity have a significant effect on economic growth that means economic growth is not only influenced by capital and labor but also influenced by human capital and multifactor productivity variable.

The government must redefine its definition of good institutions as being innovation and growth-oriented institutions. From the perspective of innovations, we mean that institutions must provide ways and environment to cultivate new ideas. Besides that, from growth-oriented, we mean that institutions must actively seek new ways to improve available knowledge and technology. The government can start from very technical research

and development institutions and later make ways to other institutions in the nations. The improvement of the institutions that can foster and advance knowledge and technology are prioritized. Improvement can take many forms from increasing budget, increasing human capital involved, or creating conditions that can sustain continuous research and development. The conditions that sustain research and development can also be further supported by means of law and regulations.

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