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Human capital development via education and economic growth in ASEAN economic community

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Article Info

Abstract

This research aims to analyze causal relation between human capital development via education and economics growth in ASEAN Economic Community (AEC). Several human capital development variables and key economic indicators at the reginal level of 10 ASEAN countries during 1990–2018 are examined using the Pooled Bivariate Granger Causality Test. The results indicate that the FDI as well as education related indicators such as education index, average year of schooling, and pupil-teacher ratio can affect output growth in the region. Further evidence indicates that a rise in human capital can cause GDP growth and per capita GDP growth. The average year of schooling can attract Foreign Direct Investment (FDI). There is no direct evidence to support the idea that lower fertility rate in aging society will harm economic growth in this region.

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Introduction

Human capital is the most important factor of production in the economy because it can serve as labor and entrepreneur in the production of goods and services. Improving the quality of human capital will affect productivity and create sustainable wealth of nations. Most nations aim to develop and reform their education system as national agenda in order to prepare human capital and to enhance knowledge capital. Such capitals consist of wisdom, knowledge, and necessary skills for the population required for various occupations used to create output necessary to fulfill the needs of society. The quality of human capital starts from households and further develops in school. The education system is an important tool used to prepare and enhance the performance of human capital for economic productivity. For rapid social and economic changes, most countries in the ASEAN Economic Community (AEC) continuously develop and reform their education system in accordance with their national development plans. Most of the related researches focus on the specific needs to develop human capital for each country, but few studies mention the overall structural relationship of human capital development via education in AEC. To align and integrate human capital development via education in AEC for future benefits of labor mobility in the region, this research aimed to analyze the structural relationship between human capital development via education and economic growth in AEC. As such, this research can benefit education and economic policymakers as well as schools to solve structural problems. The current quality of education and its future improvement will

benefit entrepreneurs to further improve their skills for productive results.

Literature Review

Education philosophy is a branch of philosophy focusing on knowledge and wisdom for the facts of life. This philosophy is used for human development to serve the way of life. Education curriculum and procedure follows such philosophy with 4 components including; (1) idealism, (2) materialism or realism, (3) experimentalism or pragmatism, and (4) existentialism. Idealism focuses on training mindset and discipline using systematic thinking. The teaching method is based on teacher centric method. Materialism or realism is based on natural facts and is object based, so the learning method should use scientific procedure, demonstration, and field trips. Experimentalism or pragmatism aims at learning experience, scientific learning, and learning by doing, problem solving, experimental design, and self-learning and exercise practice. Existentialism is a belief in freedom of oneself, so the student learning process should start from the interest of oneself by focusing on the different abilities of the learners.

Historically, the most frequently employed measure of individual skill has been the years of schooling attained. Mincer (1970), and Psacharopoulos and Patrinos (2004) researched the role of education in economic analysis based on labor market outcomes, and found that the value of school attainment is just a rough measure of individual skills. The common measurement problem of student outcomes is that the years of schooling assume to produce the same amount of learner's skills in every country over time, because it counts only the time spent in schools without judging what happens in schools. Thus, it does not provide a complete or accurate picture of student outcomes. Mulligan (1999) and Murnane, Willett, Duhaldeborde, and Tyler (2000) concluded that cognitive achievement of individual significantly affects labor market returns to individual.

Using four decades of international information of nations around the world, Hanushek and Kimko (2000) found a solid link between differences in school quality and differences in economic growth with a dramatic impact on productivity and national growth rates. The evidence indicates that a difference in test performance of one standard deviation was related to a 1 percent difference in the annual growth rate of per-capita GDP, so the impact of such a difference in growth rates is very large. In addition, Hanushek (2008) pointed out that the provision of schooling and purchased inputs to schools is very inefficient. Class size, teacher experience, and teacher education have small

systematic relationships to student outcomes, implying that conventional input policies are unlikely to improve achievement on student performance: however, differences in teacher quality, defined in terms of the effects on student performance, have been shown to be very important. This research aspect distinguished it from many others because the results of analyses entered quite directly into the policy process.

To understand the basis of quality differences, it is important to pay attention to objective components for the quality of education deeply hidden in the root of education philosophy in order to measure and to model its impact correctly. Education quality has some basic characteristics. First, education is cumulative, so measures only current input available and may result in analytical errors. Second, schools operate within a policy environment controlled by the government and the government provides sources of funds, governs labor laws, and determines rules for the certification frequently at national level. Such conditions significantly affect the school operations; therefore, these conditions must be incorporated into performance analysis. Hanushek (2008) suggested that in order to deal with these problems it is adequate to use a simple index of study quality. Even though Coleman et al. (1966) concluded that schools do not matter, Hanushek (2008) provided evidence that neither supported that schools do not matter nor indicated that money and resources never impact achievement. It is worth mentioning that extensive research since the Coleman Report has made it clear that teachers do indeed matter. Moreover, research related to the estimation of education production functions currently indicates no clear, systematic relationship between resources and student outcomes. Similarly, in the case of class size, the evidence has been inconclusive (Rivkin, Hanushek, & Kain (2005).

Hanushek (2003) found that the measurement problem is ameliorated if one uses the value added instead of level form in estimation. When the achievement relationship holds at different points in time, it is possible to concentrate on the growth in achievement and on exactly what happens educationally between those points when learning outcomes are measured. Hanushek (2008) further mentioned an additional issue, which is particularly important for policy purposes, concerning whether this analytical approach accurately assesses the causal relationship between resources and performance. Hanushek (2005) argued that even though there might be a correlation between growth and school attainment, there may not be a causal relationship.

Hanushek and Wößmann (2008) stated that human capital investment becomes a primary tool to produce inclusive growth, but there is no clear evidence in research

support. The problems arise from the measurements and only few researches having been done in developing nations. With proper measurement of skills and learning, cognitive skills and knowledge capital become the driving force for economic growth and development. Glewwe and Lambert (2010) pointed out that most research related to the education production function in developing countries focused on school enrollment, not cognitive skills and learning outcome. Hanushek, Jamison, Jamison, and Woessmann (2008) discovered that the level of cognitive skills is positively correlated to whether a nation's economy is open to outside trade and other external influences. Nevertheless, Hanushek (2005) found that most government made an effort to improve cognitive skills by focusing on schools. The evidence from many countries shows that insufficient attention has been paid to teacher quality, and the data show that good teachers in developed countries can move the achievement of a typical student up at least four percentiles. Typical studies find that quantity of schooling is highly related to economic growth rates, but the quantity of schooling is a very crude measure of the knowledge and cognitive skills of people. Hanushek and Woessmann (2015) mentioned that inclusive growth is possible through the achievement of basic skills. These skills have tremendous potential to reduce poverty, and foster new technologies needed to ensure sustainable growth in a competitive world economy. The most important step for the United Nations was to establish an explicit quality goal such as Level 1 in mathematics and reading for 15-year- olds on the Programme for International Student Assessment (PISA), or its equivalent.

Economists largely ignore the existence or potential of such international testing and assessments. The international investigations of the determinants of educational achievement have followed voluminous literature based on data for individual countries. Economists have pursued two separate lines of inquiry, each related to notions of human capital. The first subsection considers studies that take the cognitive skills measures from the international tests as direct measure of human capital. The second major line of inquiry has turned to cross-country investigations of the outcomes of human capital. More recent studies in the last decade have seen tremendous upsurge in research activity on cross-country issues. These researches tend to rely heavily on panel data sets that follow the achievement of students that can link to the growth characteristics. With these extensive data sets, identification of separate causal determinants of achievement is frequently much clearer than in the simple cross-sections of data supplied by the international assessments (Hanushek & Woessmann, 2012).

The importance of human capital is the value creation that is correlated to the value-added process in economics. Competency is highly correlated to intellectual capital. Both can uplift economic performance. The model used in this research is a growth model extension from the neoclassical endogenous growth model introduced by Romer (1986). The Romer model was developed from the Ramsey model. The Ramsey model can create Pareto optimum in both production and consumption. In contrast to the Ramsey model, the Romer model can obtain steady stage growth under technological progress, so it can fulfill sustained growth objective in AEC.

Arrow (1962) concluded that knowledge and productivity gains come from investment; however, there are various kinds of investment such as investment in physical capital and investment in human capital. Thus, sustainable economic growth can be started from human capital investment. This can lead to the change in productive technology. Wilson and Briscoe (2003) examined the effects of human capital on economic growth and concluded that the investment in human capital by increasing overall education level can positively affect economic growth at the multinational level. Saviottia, Pykac, and Junc (2016) summarized the linkages and transmission mechanism from education to economic growth passing through various economic and social factors as shown in Figure 1.
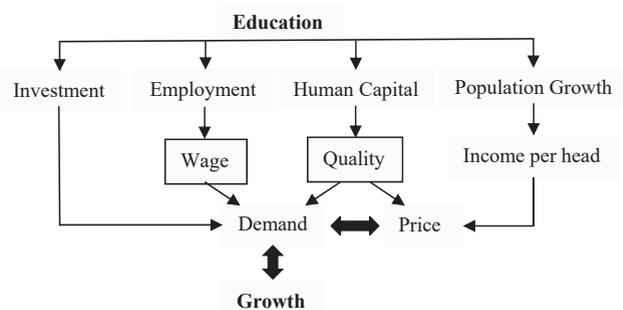

Figure 1   The linkages from education to economic growth
Source: Saviottia, Pykac, and Junc (2016)

Supply side assumptions are as following. Firm maximizes profit. There are spillovers from growth driving mechanism. Factors of production are physical capital (K), labor (L), and human capital (H). Human capital includes education and skills which can create productivity. The change in human capital is independent from the amount of labor. The production function for firm i is shown in Equation (1):

$$Y_i = F(K_i, H_i) = K_i^\alpha H_i^{1-\alpha} = K_i^\alpha h^{1-\alpha} L_i^{1-\alpha} \quad,$$
$$0 \prec \alpha \prec 1, \quad h = \frac{H_i}{L_i} \tag{1}$$

where L_i is the amount of labor in firm i and h is the ratio of human capital per labor. The economy consists of N identical firms. Each firm produce Y_i units of output. Equation (2) represents total output and Equation (3) represents accumulation of physical capital. Equation (4) represents human capital accumulation.

$$Y = NY_i = NF(K_i, H_i) = F(NK_i, NH_i) = F(K, H)$$
$$= NK_i^\alpha H_i^{1-\alpha} = NK_i^\alpha h^{1-\alpha} L_i^{1-\alpha}$$
$$Y = K^\alpha H^{1-\alpha} = C + I_K + I_H \tag{2}$$

$$\dot{K} = I_K - \delta K \tag{3}$$

$$\dot{H} = I_H - \delta H \tag{4}$$

The model assumes the depreciation rate of both physical capital and human capital equals δ. The aggregate production function will have the scale effect meaning that the economic growth would be adjusted based on the level of human capital accumulation.

Assumptions on demand side are as following. Household maximizes intertemporal utility subject to budget constraint. Policymaker maximizes social welfare where the utility function takes the form of the Constant Elasticity of Substitution (CES) shown in Equation (5) and the budget constraint shown in Equation (6). The CES function is applied because it is often used in the education demand as well as other consumption (Gradstein, Justman, & Meier, 2005).

$$U = \int_0^\infty u(c) L e^{-\rho t} dt = \int_0^\infty \frac{c^{1-\theta}}{1-\theta} L e^{-\rho t} dt \tag{5}$$

$$Y = C + I_K + I_H = C + (\dot{K} + \delta K) + (\dot{H} + \delta H) \tag{6}$$

Hamiltonian for policymaker is shown in Equation (7):

$$J = \frac{c^{1-\theta}}{1-\theta} L e^{-\rho t} + v(I_K - \delta K) + \mu(I_H - \delta H)$$
$$+ \lambda(K^\alpha H^{1-\alpha} - C - I_K - I_H) \tag{7}$$

The first-order conditions are described in Equation (8)–(12):

$$\frac{\partial J}{\partial C} = 0 \quad \Rightarrow \quad c^{-\theta} e^{-\rho t} = \lambda \tag{8}$$

$$\frac{\partial J}{\partial I_K} = 0 \quad \Rightarrow \quad v = \lambda \tag{9}$$

$$\frac{\partial J}{\partial I_H} = 0 \quad \Rightarrow \quad \mu = \lambda \tag{10}$$

$$\frac{\partial J}{\partial K} = -\dot{v} \quad \Rightarrow \lambda \alpha \left(\frac{K}{H}\right)^{-(1-\alpha)} = -\dot{v} + \delta v \tag{11}$$

$$\frac{\partial J}{\partial H} = -\dot{\mu} \quad \Rightarrow \lambda(1-\alpha)\left(\frac{K}{H}\right)^\alpha = -\dot{\mu} + \delta\mu \tag{12}$$

Transversality conditions are shown in Equation (13)–(14):

$$\lim_{t \to \infty} (v_t K_t) = 0 \tag{13}$$

$$\lim_{t \to \infty} (\mu_t H_t) = 0 \tag{14}$$

Solving Equations (1)–(14) to obtain the ratio of physical capital to human capital in the steady stage equilibrium as shown in Equation (15), both human capital and physical capital accumulation along with the output and consumption growth is in Equation (16).

$$\left(\frac{K}{H}\right) = \frac{\alpha}{1-\alpha} \tag{15}$$

$$\frac{\dot{Y}}{Y} = \frac{\dot{C}}{C} = \frac{\dot{K}}{K} = \frac{\dot{H}}{H} = \frac{1}{\theta}\left[\alpha\left(\frac{K}{H}\right)^{1-\alpha} - \delta - \rho\right]$$
$$= \frac{1}{\theta}\left[\alpha\left(\frac{\alpha}{1-\alpha}\right)^{1-\alpha} - \delta - \rho\right] \tag{16}$$

The steady stage growth of output, consumption, human capital and physical capital depend on the marginal rate of substitution parameter, the relative share of physical capital to human capital, and the depreciation rate of both capitals.

Methodology

The scope of this research included 10 countries in the ASEAN Economic Community. These countries are Brunei (BN), Cambodia (CA), Indonesia (ID), Laos (LA), Malaysia (MA), Myanmar (MY), Philippines (PH), Singapore (SG), Vietnam (VN), and Thailand (TH) respectively. The structural analysis was done by examining causal relation between human capital development via education and economic growth in AEC. Annual data were collected from 1990 to 2018. Several economic variables were used to capture the effects explained in the theoretical model. These variables included the growth rate of GDP

(GGDP), the growth rate of GDP per capita (GGDPP), and unemployment rate (UR). The variable used to represent human capital was human development indicator (HDI). Several variables used to describe education characteristics were education index (EDU), average years of schooling (YOS), school enrollment rate (POPSE) and pupil–teacher ratio (PTR).

According to Chi (2008), and Zhang and Zhuang (2011), these researches suggested that the average years of schooling (YOS) is the most suitable variable used to represent the effect of education on economic growth. The control variables used to capture other important factors described in the theoretical model are foreign direct investment (FDI), fertility rate (FER), and government spending on education (GEXP). The FDI represents the technological transfer across countries. Fertility rate is a proxy for population growth. Barro (1998) explained that when there is population growth, some resource will be used in taking care of children instead of being used for production of goods and services. Current investment in children is necessary to prepare for future human resource. Therefore, human resource investment can reduce economic growth in the short run. Government expenditure in education indicates the government policy action regarding education development.

Secondary data were obtained from Ministry of Education, Office of the Education Council, Bank of Thailand, Ministry of Finance, Office of the National Economic and Social Development Board, United Nations Development Program (UNDP), World Development Indicators from the World Bank and International Financial Statistics from the IMF. There were some missing values from the original sources, so the data pattern of each variable was examined. Then, interpolation and extrapolation techniques were applied to match each data pattern in order to preserve degree of freedom.

Quantitative analysis using pooled data causality test was applied in order to obtain the structural relationship between human capital development via education and economic growth in AEC. Optimum lag for each pair of variables was examined using grid search procedure and Akaike information criteria (AIC). The modified bivariate Granger causality test for a pooled data is shown in the following Equations (17)–(18):

$$y_{i,t} = \gamma_i + \sum_{p=1}^{m} \alpha_{i,p} y_{i,t-p} + \sum_{q=1}^{m} \beta_{i,q} x_{i,t-q} + \varepsilon_{i,t} \qquad (17)$$

$$x_{i,t} = \gamma_i + \sum_{p=1}^{m} \alpha_{i,p} x_{i,t-p} + \sum_{q=1}^{m} \beta_{i,q} y_{i,t-q} + \varepsilon_{i,t} \qquad (18)$$

where i represents cross sectional dimension or the country, t is time, and the parameters p, q and m are lag-orders.

Results and Discussion

The structural relationship between human capital development via education and economic growth in AEC is shown in Table 1 and Figure 2.

The evidence shown in Table 1 and Figure 2 indicates that at 95 percent confidence interval foreign direct investment (FDI), education index (EDU), human development indicator (HDI), average years of schooling (YOS), school enrollment rate (POPSE), pupil–teacher ratio (PTR), and government spending on education (GEXP) cause the growth rate of GDP (GGDP) as well as the growth rate of GDP per capita (GGDPP). This means these factors have been related to economic growth at both macroeconomic level and per capita level. It is worth noting that both the GDP growth and the per capita GDP growth (GGDPP) do not Granger cause education index (EDU) and human development index (HDI). In addition, government expenditure on education (GEXP) does not significantly affect secondary school enrollment (POPSE) and pupil–teacher ratio (PTR). All of the education variables lead to higher growth in the region. In addition, average years of schooling can attract foreign investment into the region assuming all other variables are constant. This means multinational corporations can benefit from higher human capital via school enrollment. Even though skills of labor forces are difficult to measure, the basic skills can be obtained from school and they can be indirectly observed via education assessment scores, but this research did not use PISA scores due to limited data available.

Unemployment rate (UR) in ASEAN Economic Community not only causes the change in education index at 95 percent confident interval, but it also affects human development index (HDI) at 90 percent confident interval. It is implied that the labor market responds to the unemployment partly by improving labor skills using the education system; however, its effect on HDI is less significant because HDI includes the health measure, which is not directly related to education. The external force such as foreign direct investment (FDI) is bilateral causal related to the average years of schooling (YOS) and population growth in AEC. The population growth in AEC measured by fertility rate (FER) does not cause economic growth. This implies that the change in the amount of population without an increase in labor skills does not benefit the economic performance as much. It further implies that, under an aging society, the economic growth of the countries in AEC may not be lower as long as there is a continuous rise in the quality of human capital in the region.

Table 1 The Pooled data Bivariate Granger Causality Test for AEC

Null Hypothesis	Lags	Obs	F-Statistic	Prob.
EDU does not Granger Cause GGDPP	3	280	6.2986	.0004*
GGDPP does not Granger Cause EDU			0.4693	.7039
FDI does not Granger Cause GGDPP	3	214	6.0788	.0006*
GGDPP does not Granger Cause FDI			0.3509	.7885
FER does not Granger Cause GGDPP	3	280	1.8187	.1440
GGDPP does not Granger Cause FER			0.0276	.9938
GEXP does not Granger Cause GGDPP	3	280	2.9134	.0348*
GGDPP does not Granger Cause GEXP			0.5688	.6360
HDI does not Granger Cause GGDPP	3	280	7.3229	.0001*
GGDPP does not Granger Cause HDI			0.0347	.9913
POPSE does not Granger Cause GGDPP	3	280	4.0045	.0082*
GGDPP does not Granger Cause POPSE			0.5299	.6621
PTR does not Granger Cause GGDPP	3	280	5.8189	.0007*
GGDPP does not Granger Cause PTR			0.0058	.9994
UR does not Granger Cause GGDPP	3	280	1.4113	.2398
GGDPP does not Granger Cause UR			0.2035	.8939
YOS does not Granger Cause GGDPP	3	280	5.4157	.0012*
GGDPP does not Granger Cause YOS			0.4684	.7046
EDU does not Granger Cause GGDP	3	280	5.9575	.0006*
GGDP does not Granger Cause EDU			0.2093	.8899
FDI does not Granger Cause GGDP	3	214	5.3365	.0015*
GGDP does not Granger Cause FDI			0.1385	.9369
FER does not Granger Cause GGDP	3	280	1.8187	.1440
GGDP does not Granger Cause FER			0.0276	.9938
GEXP does not Granger Cause GGDP	3	280	2.7327	.0442*
GGDP does not Granger Cause GEXP			0.5339	.6594
HDI does not Granger Cause GGDP	3	280	7.0790	.0001*
GGDP does not Granger Cause HDI			0.0132	.9979
POPSE does not Granger Cause GGDP	3	280	3.6107	.0138*
GGDP does not Granger Cause POPSE			0.3129	.8160
PTR does not Granger Cause GGDP	3	280	6.4245	.0003*
GGDP does not Granger Cause PTR			0.0244	.9949
UR does not Granger Cause GGDP	3	280	1.0812	.3575
GGDP does not Granger Cause UR			0.1913	.9023
YOS does not Granger Cause GGDP	3	280	5.2484	.0016*
GGDP does not Granger Cause YOS			0.2101	.8894
FDI does not Granger Cause EDU	2	225	0.2733	.7611
EDU does not Granger Cause FDI			1.2370	.2923
FER does not Granger Cause EDU	2	288	0.0248	.9755
EDU does not Granger Cause FER			0.6816	.5067
GEXP does not Granger Cause EDU	2	288	0.0780	.9250
EDU does not Granger Cause GEXP			0.0216	.9786
HDI does not Granger Cause EDU	2	288	0.2082	.8122
EDU does not Granger Cause HDI			0.3624	.6963
POPSE does not Granger Cause EDU	2	288	0.8006	.4501
EDU does not Granger Cause POPSE			0.6549	.5203
PTR does not Granger Cause EDU	2	288	0.0009	.9992
EDU does not Granger Cause PTR			0.1969	.8214
UR does not Granger Cause EDU	2	288	4.8141	.0088*
EDU does not Granger Cause UR			0.5750	.5634

Table 1 Continued

Null Hypothesis	Lags	Obs	F-Statistic	Prob.
YOS does not Granger Cause EDU	2	288	0.3302	.7191
EDU does not Granger Cause YOS			0.1695	.8442
FER does not Granger Cause FDI	3	225	0.7977	.4517
FDI does not Granger Cause FER			9.5760	.0001*
GEXP does not Granger Cause FDI	3	225	0.7764	.4613
FDI does not Granger Cause GEXP			0.2671	.7659
HDI does not Granger Cause FDI	3	225	1.1113	.3310
FDI does not Granger Cause HDI			0.7821	.4587
POPSE does not Granger Cause FDI	3	225	0.5556	.5746
FDI does not Granger Cause POPSE			0.1257	.8820
PTR does not Granger Cause FDI	3	225	0.2664	.7664
FDI does not Granger Cause PTR			0.8009	.4502
UR does not Granger Cause FDI	3	225	0.3536	.7025
FDI does not Granger Cause UR			0.1766	.8382
YOS does not Granger Cause FDI	3	215	7.0669	.0002*
FDI does not Granger Cause YOS			2.8053	.0408*
GEXP does not Granger Cause FER	4	286	0.2230	.9255
FER does not Granger Cause GEXP			0.1253	.9733
HDI does not Granger Cause FER	4	286	0.3346	.8546
FER does not Granger Cause HDI			0.0301	.9982
POPSE does not Granger Cause FER	4	286	0.3833	.8205
FER does not Granger Cause POPSE			0.1019	.9817
PTR does not Granger Cause FER	4	286	0.2801	.8907
FER does not Granger Cause PTR			0.2494	.9099
UR does not Granger Cause FER	4	286	1.6421	.1638
FER does not Granger Cause UR			0.8293	.5074
YOS does not Granger Cause FER	4	286	0.3246	.8614
FER does not Granger Cause YOS			0.0917	.9850
HDI does not Granger Cause GEXP	1	289	0.4386	.5083
GEXP does not Granger Cause HDI			0.1903	.6630
POPSE does not Granger Cause GEXP	1	289	0.0004	.9846
GEXP does not Granger Cause POPSE			0.6090	.4358
PTR does not Granger Cause GEXP	1	289	0.4434	.5060
GEXP does not Granger Cause PTR			0.4681	.4944
UR does not Granger Cause GEXP	1	289	1.2794	.2590
GEXP does not Granger Cause UR			2.3465	.1267
YOS does not Granger Cause GEXP	1	289	0.5739	.4493
GEXP does not Granger Cause YOS			0.2896	.5909
POPSE does not Granger Cause HDI	3	288	0.7994	.4506
HDI does not Granger Cause POPSE			0.9401	.3918
PTR does not Granger Cause HDI	3	288	0.0401	.9607
HDI does not Granger Cause PTR			0.0315	.9690
UR does not Granger Cause HDI	3	288	2.6231	.0743**
HDI does not Granger Cause UR			0.4091	.6646

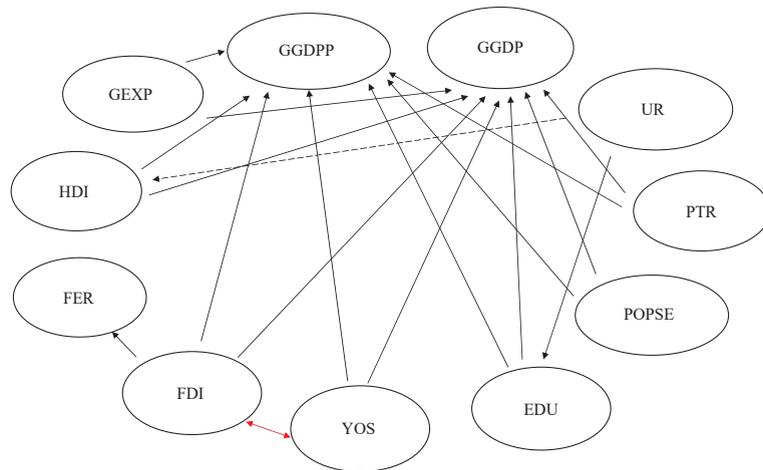*Note:* *, ** denoted 95 and 90 percent confidence interval, respectively.

Figure 2   The causal relation between human capital development via education and economic growth in AEC
Note: ——— and ----- denoted 95 and 90 percent confidence interval, respectively. The arrow indicates the direction of causal relation

Conclusion and Recommendation

ASEAN Economic Community is one of the fastest growing markets in the world. There are approximately 600 million people or about 10 percent of the global population. Freer trade in both goods and services causes more intense competition in this region. During the period of economic expansion, labor productivity improvement is a critical issue. Economic integration in the region creates mutual agreement on trade in services including 12 sectors. Education service is one of them. Education in this region must be developed to meet international standards. Freer labor mobility, especially high skilled labor movement in the region, is subject to the Mutual Recognition Arrangement (MRAs).

Higher skilled labor, high skilled labor, and more quantity of skilled labor become the main driving force for reginal economic growth. Although more robotic technology and artificial intelligence will be used in the production process of various industries in the region, problems related to the shortage of high skilled labor is worth mentioning. Unlike economic growth, unemployment will force human capital development, and the amount of labor force will no longer be the main driving force for economic growth in this region. The quality of education that helps to improve labor productivity will become the new challenge for economic growth in the region. The policy, which will uplift the education standard in the region, will increase the human capital development and future economic performance in AEC. Therefore, each country in the region should co-ordinate their educational policy for efficient use of education budget. The important findings suggest that increasing the ratio secondary school enrollment to population will draw foreign direct investment, and the future research should focus on measuring the magnitude of these dynamic effects of these structural changes for precise policy implication.

Conflict of Interest

There is no conflict of interest.

Acknowledgments

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