

The Significant Contribution of Indonesian Human Capital to the Economic Growth

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ABSTRACT

This study examines the contribution of human capital to Indonesia's productivity. The result of this study reveals a significant contribution of human capital as shown in the model which is using highest weighted of primary and secondary level of education. The most significant result found in the model using secondary level as the highest weighted of human capital. In contrast, there is no significant contribution of human capital using proportional weighted between education levels. This suggests that improvement in knowledge, adoption of technology and skill in the primary and secondary education meet the demand of industries in Indonesia. This study uses a time series regression to analyze data 1985-2010.

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In the past decade, the development of human capital has been a great concern in development planning in developing countries. Related to that, it is relevant to mention the significant economic growth of South Korea which is often called as 'Korean miracle' (Chung, 2009). In the 1960-1988 period, the average increase in South Koreans' income per capita was 6.2% per year. It is not surprising that in 2010, the country was categorized as a developed country and ranked 12th in the world's HDI ranking.

It was a contrast; Compared with the condition in 1960s, the welfare of Indonesian people was above that of the South Korean. At that time South Korea was equal to the Philippines in terms of GDP per capita, population size, industrial structure and export commodities.

The key success of South Korea as studied by Pyo (1995) and Lucas (1997) is intensive investment of human capital. The finding is supported by Lim (1996) who found that the impressive economic

growth of South Korea and Japan were driven by the success of their government in reducing the number of illiterate population in the early phase of their development. In the next phase, the mastery of Information and Communication Technology (ICT) and increasing investment in R & D become the follow-up strategy in creating high-quality human resources (Myeong, 2011). As a result, the country has managed to generate world leading producers in electronic industries.

Learning from their success, the development of human capital in Indonesia should become an important agenda, especially to support changes in economic structure in the globalization. Twenty years from now, Indonesia's economic activity in the sector of services will expand as its agricultural sector becomes less significant in size. The 2009 BPS data reveals that Indonesia's manufacturing sector is still the dominant sector with 48% contribution to GDP, followed by 37% from the service sector and 15% from the agriculture sector.

In the next 15 years, the Indonesia's economy should resemble that of current South Korea which is supported by the service sector contributing more than 60% to the overall economy. In the process of structural change, Malaysia has managed to demonstrate its achievement earlier than Indonesia with its dominant contribution of the service sector at 47% (World Bank, 2009).

To become a developed country, Indonesia needs being supported by reliable human resources as a factor which significantly determines a country's economy growth. The role of development of human resources through education becomes very important. To ensure better targeted education development policies to the present and future needs, we need to know on which level of education, the changes and improvement should be focused. Thus, it is interesting to see the contribution of Indonesia human capital at each level of education between 1985 and 2010.

The Role of Human Capital in Economy

Social factors such as education have long been considered to play an important role in determining the economic growth. However, in the past there was a debate whether the influence of social factors was the impact of economic growth due to capital accumulation or mastery of technology. It was not until in the 1960's that Schultz and Becker explained the influence of social factors as a non-physical capital which has an impact on economic growth. Lucas (1988) then incorporates this variable as one of the variables in the factors of production.

In its development, human capital has become the engine of economic growth in some countries for several reasons: First, investment in human capital increases worker productivity which boosts outputs and generates growth of a country; Second, increase in worker productivity also leads to increase productivity of other factors of production. This is referred to as the internal and external effects of human capital (Lucas 1988, p.18)

The contribution of human capital to the economy has increased over time. In the 1965-1989 period, Denison (1962) estimates that the contribution of this variable to Taiwan's economic growth was 45%. Leung (1992) finds that the coefficient of the correlation between education expenditure and GDP per capita in China increased. The finding of Ihm (1995) shows that investment in education in East Asian was rising, generating even a higher rate of being return than that of in the developed countries.

From various empirical studies in East Asia, it is evident that the development of human capital has made progress in various fields. In Korea, an addition of one year of a worker's education increases farmers' productivity by 2.22% (Lau, 1982). Therefore, the higher the education of the farmers, the better the technology they choose, leading to improved productivity. In Japan, the contribution of improved human capital are gained through education encourages entrepreneurship,

individual responsibility, the ability to take risks with careful consideration and long-term planning (Lim, 1996). Education stimulates people to adapt more quickly to the changing technology and environment.

The development of human capital not only increases productivity and economic growth but it also accelerates equitable income distribution and poverty reduction. The impact is especially apparent in rural areas. This is what makes economic growth and equitable income distribution take place simultaneously in Japan, Taiwan, Korea, Singapore and Hong Kong (Weiss, 1996).

The development of human capital also affects public health in the form of reduced fetal and infant mortality rates, and increased children's health and life expectancy (Dreze and Sen, 1989). A number of studies conducted in Korea, Taiwan, Japan, China and several other countries confirm this (Cochrane 1986; Powers 1975; Tilak, 1994). Being literate helps people select and buy proper food and medicine, and also provides them better access to public health services.

Another interesting issue is that a number of researches reveal that the development of human capital also plays a role in promoting a country's nationalism. According to Lee (1991), his research in Japan, China and Korea, reveals that education is the most effective tool to promote nationalism and togetherness.

The emphasis on the development of human capital, however, may differ from one country to another, depending on the phase of development and industrialization of each country. According to Richardson (1999), the emphasis on development of primary and secondary education is very important in countries with low income per capita. Meanwhile, in developed countries, the emphasis on higher education is increasingly important. Accordingly, the cross-section results of studies in several countries in the world by Gemmel (1996)

found that primary education has a very significant role in the poorest countries. In the 'intermediate' countries, secondary education is the key while higher education plays the role in developed countries (OECD).

The research by Pritchett (1996) concludes that education does not have the same impact on all countries in the world. Regression coefficients between countries show differences from one another for some reasons. First, in some countries schools are an effective medium to transfer knowledge and expertise while in other countries they are not. Second, the demand for educated workers is different in each country, depending on the sectoral shift, policies and openness to the world economy. The different demand for educated workers results in different levels of marginal return of education in different countries. The research by Gundlach (1999) also supports this finding as he finds that in some countries, the development of education is only successful in reducing illiteracy rates but is less able to produce skilled workers. In other words, human capital investment is not effective in fostering productivity in the country.

Portrait of Indonesian Human Capital

With its population of more than 4 billion, Asia plays an important role in world trade, both as a market and as a provider of workers. The current strategic role of Asia is also supported by the acceleration of growth in a number of East Asian countries and the economic crisis in the United States and several European countries.

Compared with the condition in the previous decade, the welfare of a number of countries in Asia is now increasing. In terms of income per capita, Hong Kong, South Korea, and Japan are now categorized as developed countries. Malaysia, China and Thailand are categorized as upper-middle income countries, while Indonesia is one of the lower-middle income countries, along with the Philippines and Vietnam.

Table 1 : The development of income per capita of some Asian countries

GDP PER CAPITA	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Indonesia	771	928	1,099	1,187	1,304	1,643	1,923	2,244	2,345	3,039
Malaysia	3,903	4,159	4,459	4,956	5,378	5,998	7,028	8,212	7,030	8,519
Thailand	1,834	1,991	2,211	2,472	2,674	3,114	3,687	4,045	3,892	4,679
Philippines	962	1,007	1,019	1,089	1,206	1,403	1,684	1,921	1,830	2,132
Singapore	20,700	21,152	22,651	26,319	29,401	33,019	38,645	39,134	36,758	43,324
Vietnam	413	440	489	554	637	724	835	1,047	1,113	1,172
South Korea	10,655	12,094	13,451	15,029	17,551	19,707	21,653	19,162	17,110	20,757
Japan	32,210	30,745	33,113	36,051	35,627	34,148	34,264	38,212	39,456	43,161
China	1,042	1,135	1,274	1,490	1,731	2,069	2,651	3,414	3,749	4,393
Hongkong	24,812	24,285	23,559	24,454	26,092	27,699	29,900	30,865	29,882	31,877
India	463	484	563	668	762	857	1,105	1,065	1,195	1,477

Source: <http://data.worldbank.org/indicator>

As the third most populous country in Asia, Indonesia should have the opportunity to improve welfare through its abundant supply of manpower (demographic dividend). Unfortunately, the quality of Indonesia's workers is relatively low as seen in the composition which is still dominated by low educated workers. Data from BPS in 2010 reveal that of the total labor force of 116,527,546 in Indonesia, 20% did not go to or never finished elementary school and, 28% completed primary education, 43% finished secondary education and only 9% completed higher education.

In addition, in terms of mastery of technology, the quality of human resources in Indonesia is still very low. Only about 8 of 100 are internet-literate. In this regard, the figure in Indonesia is much lower compared to those of Malaysia and Thailand. Indonesia is even under Vietnam. Similarly, the proportion of exports of high-tech manufactured goods is smaller in proportion than that of other Asian countries.

The quality of human resources in Indonesia can also be seen from the proportion of educational expenditures which is still low. In 2008, only 2.8% of GDP was spent on education. This small proportion reflects the fact that the public pay less attention to the importance of education. The country's

Table 2. The number of internet users per 100 people, 2008

Country	Number
Indonesia	7.9
Japan	75.2
South Korea	75.8
Singapore	69.6
Malaysia	55.8
Philippines	6.2
Thailand	23.9
Vietnam	24.2
India	4.5
China	22.5
Hongkong	67

Source: <http://data.worldbank.org/indicator>

Table 3 : Export of High Technology Goods of a Number of Asian Countries, 2009 (% total manufactured goods)

Country	Number
Indonesia	7.9
Japan	75.2
South Korea	75.8
Singapore	69.6
Malaysia	55.8
India	4.5
China	22.5
Hongkong	67

Source: <http://data.worldbank.org/indicator>

Table 4 : Proportion of people's expenditures for education (% against GDP)

Country	2001	2002	2003	2004	2005	2006	2007	2008
Indonesia	2.5	2.6	3.2	2.7	2.9	3.6	3.5	2.8
Malaysia	7.5	7.7	7.5	5.9	7.5	4.7	4.5	4.1
Thailand	5	na	na	4.2	4.2	4.3	3.8	3.8
Philippines	3.2	3.2	3.2	2.7	2.5	2.6	2.7	2.8
Singapore	3.1	na	na	na	na	na	na	2.6
Vietnam	na	5.3						
South Korea	4.1	4	4.4	4.4	4.4	4.1	4.2	4.2
Japan	3.6	3.6	3.7	3.7	3.5	3.5	3.5	na
Hongkong	3.9	4.0	4.3	4.6	4.2	3.9	3.5	3.3
India	na	na	3.7	3.4	3.1	3.1	na	na

Source: <http://data.worldbank.org/indicator>

Table 5: Percentage of government's expenditures on education (% of APBN)

Country	2001	2002	2003	2004	2005	2006	2007	2008
Indonesia	11.5	14.3	16	14.2	14.9	17.2	18.7	17.9
Malaysia	20	20.3	28	25.2	na	na	18.2	17.2
Thailand	28.3	na	na	26.8	25	25	20.9	20.5
South Korea	14.7	15.5	15	16.5	15.3	15.2	14.8	na
Japan	10.5	10.6	9.7	9.8	9.5	9.5	9.4	na
Vietnam	na	19.8						
Philippines	14.0	17.8	17.2	16.4	15.2	16.7	15.9	16.9
Hongkong	22.9	21.9	23.3	23.3	23.0	23.9	23.2	23.0

Source: <http://data.worldbank.org/indicator>

proportion of expenditures is still lower than the proportion in other Southeast Asian countries such as Malaysia, Thailand and even Vietnam.

However, if it is looked at the amount of government's expenditures, the actual spending on education is quite large. Currently, it reaches 20% of APBN (the state budget). Nevertheless, they are not spent effectively to make a difference in terms of the quality of Indonesian workers.

METHODS

Data
This study uses annual statistical data released by Indonesia's Central Bureau of Statistics (BPS), during the period of 1985-2010. The data used

includes data on education, workers, formation of fixed capital and GDP.

Research Method

The model used in this study is Solow Growth Model which was also used by Gundlach (1999) and Denison (1986) to determine the contribution of human capital and physical capital to analyze the productivity of a country.

$$\ln(Y/L) = \ln A + \alpha \ln(K/L) + \beta \ln(H/L)$$

In this model, the values of α and β are the elasticity of physical capital and β is the elasticity of human capital. The value of A is the contribution of the technological factor. The value of Y is measured

using the value of GDP, K is the value of fixed capital formation and L is the number of labor in that period. The model suggests that the number of outputs per worker (productivity) will be affected by the amount of capital per worker, the duration of education per worker and the technological factor. This model uses a variable of output per worker as the variable of growth as compared with of the use of variable of output per capita. It aims to describe a more real condition (Young, 1993).

The weaknesses of the model are 1) the data used is still limited to discover the long run effect 2) In Cobb Douglas model, the contribution of technological advancement is considered as a residual 3) The causality is not known whether it is the education that leads to the increased productivity or the other way around.

This study will test three models based on the theories by assigning different weight to the variable of labour (L)

Model 1: Give a proportional weight. The highest weight was given to graduates of higher education while those of primary education received the lowest weight. This model was adopted from the model used by Denison (1986). Denison's research assigned weight at 0.7 for workers who never go to school, at 1 for workers who completed primary education, at 1.5 for workers who completed secondary education, and 2 for workers who completed high school education and higher education.

Model 2: Give the highest weight to primary education by adopting the model used by Bayhaqi (2000). The weight is determined as follows: not giving weight to workers who did not complete primary education, 1.5 for workers who finished primary education, and 1 for workers who completed other educational levels.

Model 3: Give the highest weight to secondary education by adopting the model used by Bayhaqi. The weight is determined as follows: not giving

weight to workers who did not complete primary education, 1.5 for workers who graduated secondary education and 1 to workers who completed other educational levels.

RESULTS AND DISCUSSION

The regression is on each model shows different results. The contribution of human capital is insignificant in the model with the highest weight on higher education. Higher weight assigned to the primary and secondary education in models 2 and 3 makes the contribution of human capital more significant. The results of the three regression models can be described as follows:

Result of Model 1:

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.915 ^a	.838	.824	.51621

a. Predictors: (Constant), Ln (H/L), Ln (K/L)

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	31.631	2	15.815	59.351	.000 ^a
	Residual	6.129	23	.266		
	Total	37.760	25			

a. Predictors: (Constant), Ln (H/L), Ln (K/L)

b. Dependent Variable: Ln (Y/L)

Model	Standardized Coefficients			
	Beta	t	Sig.	
1	(Constant)		-6.899	.000
	Ln (K/L)	.844	9.238	.000
	Ln (H/L)	.154	1.691	.104

From the regression result using model 1, it can be concluded that with confidence level at 95%, only variable of Ln (K/L) and constant (techonogical factor) are significant. The model can explain 82.4% of the variation in the variable of Ln (Y/L).

The resulting coefficient (K / L) shows that an increase of 100% in capital per worker can increase an average of 84.4% of output per worker. As a coefficient which is not significant, the variable of human capital (H / L) suggests that this variable does not have an important role in improving worker productivity in Indonesia.

The large number of workers who never go to school in Indonesia makes the giving of a high weight to higher education variable becomes insignificant. In other words, although a higher weight is given to workers who completed the primary education than those who did not, there is no significant difference in terms of skills and knowledge between the two groups in the job market.

Result of Model 2:

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.936 ^a	.876	.865	.45158

a. Predictors: (Constant), Ln (H/L), Ln (K/L)

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33.069	2	16.535	81.081	.000 ^a
	Residual	4.690	23	.204		
	Total	37.760	25			

a. Predictors: (Constant), Ln (H/L), Ln (K/L)

b. Dependent Variable: Ln (Y/L)

Model	Standardized Coefficients			
	Beta	t	Sig.	
1	(Constant)		-3.002	.006
	Ln (K/L)	.516	3.707	.001
	Ln (H/L)	.457	3.285	.003

From the result of regression in model 2, the conclusion is that with confidence level at 95%, all

variables namely, costant, Ln (K/L) and Ln (H/L) are significant. This model itself can explain 93.6% of the variable of Ln (Y / L).

The coefficient of Ln (K / L) indicates that with the confidence level at 95%, an increase in the amount of capital per worker by 100% will lead to an increased productivity by an average of 51.6%. An increase in school enrollment by 100% will lead to greater productivity by an average of 45.7%.

Giving a higher weight to the primary education makes the variable of human capital significant. This suggests that in that period the proportion of workers who completed the primary education level was still quite large. Thus, it is important to provide the workers at this level with the adequate skills and knowledge which are useful in the job market.

Result of Model 3:

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.942 ^a	.887	.878	.42983

a. Predictors: (Constant), Ln (H/L), Ln (K/L)

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33.510	2	16.755	90.688	.000 ^a
	Residual	4.249	23	.185		
	Total	37.760	25			

a. Predictors: (Constant), Ln (H/L), Ln (K/L)

b. Dependent Variable: Ln (Y/L)

Model	Standardized Coefficients			
	Beta	t	Sig.	
1	(Constant)		-1.291	.210
	Ln (K/L)	.343	2.091	.048
	Ln (H/L)	.620	3.781	.001

From model 3, it can be concluded that with the confidence level at 95%, Ln (K/L) and Ln (H/L) are significant. However, the level of significance of capital per worker decreases as the significance of the role of human capital increases.

The coefficient of Ln (K / L) shows that an increase of 100% in capital per worker will increase the productivity at the average of 34.3%. Meanwhile, the coefficient of Ln (H / L) which shows an increase of 100% in school participation will increase the average productivity by 62%. It can be seen that the giving of a higher weight to the secondary education will lead to the increasing role of human capital in increasing productivity.

MANAGERIAL IMPLICATIONS

When the three models are compared, the highest weight assigned on the elementary and secondary education makes the contribution of human capital significant. When compared with model 1, in which the contribution of human capital is only 15%, in models 2 and 3 there is an increase in the coefficient of contribution between 45% - 62%. This shows that the improvement in primary and secondary education will create a demand for a quite large number of well-educated workers in Indonesia. The highest weight to the contribution of secondary education indicates the importance of the role of workers who completed secondary education in the industry. Thus, it is necessary to improve the quality of workers' skills and their mastery in technology when they are in the secondary educational level.

To realize the improvement, it is necessary to formulate a national education policy that supports the improvement through curriculum design, implementation and its evaluation. The target is the knowledge and skills acquired at school which should be able to used in the job market. The development of vocational education (Vocational

Secondary School) has been actively promoted by the government can be an alternative.

However, in order to ensure effective implementation of the policy on the development of vocational secondary school, the government should create a link and match scheme between the needs of industry and the skills of available workers. The purpose is school graduates who have acquired the appropriate skills can fit into the industry which needs workers. From the corporate side, this policy is an opportunity that can be beneficial as it reduces training costs which are often quite large to train new employees. In addition, this will further facilitate the talent management in companies because they have a great chance to get human resources of superior quality that will promote the growth of companies.

CONCLUSION

This study intent to determine the contribution of Indonesian labor at each level of their education to economic growth. The results show that workers with secondary education are playing the the most important role. It can be seen from coefficient of human capital in model 3, which is the most significant variable. It reveals that we need education policy to integrate secondary education level to the working environment needs, immediately. Thus, the education policy can create higher productivity to enterprise and drive economic growth.

However, because this study uses time series data, the results are depend on the current workforce education. Another limitation is that the proxy of human capital used is still only based on the level of education. Future research can be conducted to use more expanded human capital factors such as level of technology adaptation, skills, leadership and innovation. ■

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