The Contribution to Economic Growth by Human Capital: The Comparison among BRICs[1]

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This paper aims to analyze the relationships between economic growth and human capital in emerging countries, especially BRICs. The human capital has been considered as the major tool for keeping high productivity. Education is likely to have a positive effect on economic growth by increasing labor productivity and leading to a higher level of output.

The cost-benefit analysis is found useful to explain the returns of education. However, those results unlikely analyze the quality aspects of human capital.

In this paper empirical results show that quantitative achievements less likely promise economic growth by enhancing human capital. In fact, some emerging countries, which achieved the educational attainment set by the government, are still under slow economic growth while others do without meeting educational goal.

Therefore, we analyze factors, which contribute to economic growth from the quality and the stock side of human capital.

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I. INTRODUCTION

Education for All (EFA) advocated by UNESCO is based on MDGs (Millennium Development Goals) and Goal 2 aims to "enable children everywhere, boys and girls alike to achieve universal primary education by 2015". These approaches to educational attainment have become effective since the EFA conference held in Jomtien, Thailand in 1990. In 2000, Dakar Framework for action was adopted in Dakar, Senegal to improve and promote EFA.

Education can bring the high human capital[3] in the labor force, which increases labor productivity and thus leads to a higher level of output. According to Baker (1998), schooling by an individual enhances his/her own productivity and enables him/her to get more income in the future. It can also increase the innovative capacity of the economic knowledge for new technologies, products, and processes to promote growth. It can facilitate the diffusion and transmission of knowledge needed to understand new information and to implement new technologies devised by others. Therefore, the human capital has been regarded as one of the important factors to promote economic growth. Investments in education can be an important tool to increase income both at the individual and national levels. They lead to redistributions not only of the present income but also of long-term earning through increased opportunity for the future[4].

[3] Human capital approach is known as estimating the rate of return to education, pioneered by Schultz (1961).

[4] One way of considering the total economic impact of education on society is to look at the relationships
between education and growth in the national economy on a per capita basis representing productivity growth. There are many externalities or spillovers, from education that might cause the individual and national (Sweetman, 2002).

This paper mainly aims to analyze the relationships between education and economic growth from the view point of the human capital among emerging countries which have already achieved economic growth. This will be the key to explain whether higher education leads to economic growth: the rate of returns to investment in education.

The rate of returns to education less likely refers its quality aspects. Today, EFA is emphasized concerning the quantitative achievements such as enrollment rates. However, such a spread of education is less likely leading to economic growth with the higher human capital. In fact, some emerging countries, which achieved the spread of education, are still under serious poverty, while others have achieved economic growth without achieving the high rate of schooling. Therefore, learning achievements should be focused on productivity growth than on the average number of years of schooling or on enrollment rates.

Since 1900s, a number of studies have discussed the relationships between education and economic growth. Recent empirical studies suggest that education is important in facilitating research and development (R&D); in the form of imitation in the early stages, and innovation that requires higher education in later stages.

Psacharopoulos and Mattson (1998) show that in developing countries, higher education causes wages differential because of the scarcity of human capital as compared to their average education level. Therefore, education promotes economic growth. On the other hand, Blis and Klenow (2000) state that reverse causation running from higher economic growth to additional education may be at least as important as the causal effect of education to growth in the cross-

country analysis, showing that the projection of growth on schooling is fewer than 30%. They claim the opposite opinion that economic growth promotes education. These studies suggest that the relationships between education and economic growth are different across countries. However, studies have not shown the relationships with the consideration of the difference of economic scale across individual countries.

Moreover, studies of returns to education tend to focus individual income and educational level without considering the contribution to economic growth. According to Emmanuel and Patrinos (2008), the higher is the rate of the high education; the lower is its returns, and Bils and Klenow (2000) remark that there is time-lag between education and economic growth. These indicate that higher school background does not necessarily lead to enhancing the productivity directly. If some factors are found to bring a positive effect on economic growth, it will be used to assign policy priorities to educational or other activities at the expense of taxes and other revenues.

II. COST- BENEFIT MEASUREMENT OF EDUCATION

As a measurement of cost-benefit analysis [5] of schooling, the internal rate of return (IRR) [6] is commonly used. This method has two kinds of definitions. One definition is called private rate of

[5] Cost-benefit analysis is a systematic process for calculating and comparing benefits and costs of a project. On investments as public policy, the government can have a priority to the project being the most benefit based on this analysis.

[6] Returns to schooling based on the human capital theory have been estimated since the late 1950s. They indicate the benefits between an individual and a society by measuring of mainly three methods: internal rate of return (IRR), the short-cut and the earning function methods.

return to education, which compares earning profiles for people with different educational levels such as primary, secondary or higher education. The other is called social rate of return to education, which is based on social benefit through considering public cost for school such as construction costs and pay for teachers. The IRR can measure returns to education most exactly, provided that the current average cost and wage are same in the future. Therefore, as time passes, the data will become less accurate. However, when the future changes in wage level are somehow estimated, it can be used to increase the data accuracy [7].

Formula for Rate of Return to Education

In this part, we will introduce some of the formulas to calculate the rate of returns to education. Typical one is to equate the net present value [8] to 0.

$$\sum_{t=1}^{n} \frac{E_t}{(1+r)^t} = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} \qquad (1)$$

This formula solves the private rate of returns [9] to education, which comprises three factors. E is extra benefit, which is defined as the difference between two of the following series of incomes [10]: non-

[7] The formula is shown in footnote 12.

[8] Net present value is defined as the sum of the present values of individual cash flows of same entity, which is the purchase price. In the case when all future cash flows are incoming (such as coupons and principal of a bond) and the only outflow of cash is the purchase price, the NPV is simply the PV of future cash flows minus the purchase price.

[9] Income to measure the private rate of returns is net private income excluding tax.

[10] For example, comparing EU with EH can show EU-EH.

schooling (N), primary school graduates (P), junior high school graduates (J), high school graduates (H) and university graduates (U). Returns to each education level are shown by adding "E" to these series: EN, EP, EJ, EH, and EU. CF comprises two parts: C for the cost for education, which includes direct cost such as the tuition and teaching materials, and F for the forgone income, which means opportunity cost of attending school. By using these factors, the left side of (1) represents the benefit from the investment in education while the amount of cost to education is on the right side. CF is measured to be equal to E (under 0 means loss). Therefore, a rational investor--in this case a student or his/her family--will invest in an additional level of schooling, if the net present value is positive. The range of sum is from 6 to 60 years old (6-year-old is regarded as the age of entering primary school [11]). The IRR obtained from (1) is regarding the two education levels in concern. (E_t) is benefit, which is the earnings differential among graduates of different education level.

For example, in the case of college education compared with that to high school education, the formula is given as follows:

$$\sum_{t=19}^{22} \frac{CF_t}{(1+r_{hu})^{t-19}} = \sum_{t=19}^{60} \frac{EU_t - EH_t}{(1+r_{hu})^{t-19}} \qquad (2)$$

As the premise, he/she enters college at 19 years old and will graduate 4 years later [12], and then continues to work until being 60

[11] Primary school children, mostly aged 6 to 12 years, do not forego earnings during the entire length of studies (Emmanuel and Patrinos, 2008).

[12] This paper is on the supposition that EU_t is equal to 0 and doesn't include the wage of part-time job.

years old. In (2), E_t indicates the wage gap between university and high school graduates: $W_u - W_h$.

(CF) is the cost for university "C" and the wage for those who started work after graduating from high school
"F": Cu+W_h [13]. And (r_{hu}) shows the IRR between high school and university graduates.
A similar calculation can be made for the other levels of education.

Like the private rate of return to education, the social rate of returns [14] to education needs three factors: extra benefit, direct cost, and forgone income. In addition, it needs to add tax [15] (T) to extra benefit and to include subsidy(S) in direct cost as public expense as follows:

$$\sum_{t=1}^{n} \frac{(E_t + T) - (CF_t + S)}{(1+r)^t} = 0 \qquad (3)$$

In (3), costs need to include not only CF, for schooling and forgone income, but also society's investment in education as public expense (S) such as the rental of buildings and professorial salaries.

[13] If long-term economic growth is expected, the growth of wage level can be supposed as follows:
$\sum_{t=1}^{n} \frac{E_t(1+g) - C_t(1+g)}{(1+r)^t} = 0$

[14] Social income indicates GNP before tax as the social benefit against private income after tax.

[15] This paper regards tax as being the same for all educational levels, because it is difficult to assess the tax of respective levels.

Psacharopoulos and Patrinos (2002) have presented the results such as the following Tables (1 through 3) based on equations in this section. Such an analysis will be necessary to convince policy makers, especially core economic ministries such as finance, budget or planning to allocate the appropriate budget for education, especially as developing countries make crucial decisions that go well-beyond expanding primary education, where the social benefits are uncontroversial (Emmanuel and Harry, 2008). Almost all of countries recognize the need to provide education for enhancing the human capital. But the trade-offs become more obvious as countries decide how much to invest in improving what goes on in schools, in expanding access to secondary and even higher level institutions, and in rationalizing the technical and vocational education curriculum with an academic one.

In these decisions, the analysis of cost-benefit, even if it does not produce the 'classical' IRR, is crucial in informing the tough choices that policy makers need to make (Psacharopoulos and Patrinos, 2002). Research shows that good analytical method of evaluating economic projects, including cost-benefit analysis, is strongly associated with better project outcomes. In fact, the quality of the cost-benefit analysis is associated with the higher quality of project outcomes. The probability of less than satisfactory project outcomes given a poor economic analysis rating at the design stage is four times higher than that for a project with good quality economic analysis (Vawda et al, 2003).

Returns to Education based on Empirical Literature

Psacharopoulos and Patrinos (2004) renewed the data by IRR method (Tables 1 through 3). The object of analysis mainly is

divided into two: Regions such as Europe/Middle East, North Africa, OECD, Asia, Sub-Saharan Africa and Latin America, and Income levels of countries including low, middle, and high income. As the previous results in 2002, returns to education by level of economic development and level of education are also presented.

Regions and Income Levels

The rates of returns were calculated by cumulating average wages by age [16] based on IRR method. The results of regional analysis are presented in Table 1. The highest average returns are found in Sub-Saharan Africa, which is the area gathering the lowest income countries, followed by Latin America. Returns to schooling for Asia gathering middle income countries are showing the world average. On the other hand, lower returns are observed in the educationally-advanced OECD and non-OECD Europe/Middle East/North Africa.

Table 1.Returns to schooling by Region (%)

	Social			**Private**		
	Primary	Secondary	Higher	Primary	Secondary	Higher
Europe/Middle East and North Africa	15.6	9.7	9.9	13.8	13.6	18.8
OECD	8.5	9.4	8.5	13.4	11.3	11.6
Asia	16.2	11.1	11.0	20.4	15.8	18.2
Sub-Sahara Africa	25.4	18.4	11.3	37.6	24.6	27.8
Latin America	17.4	12.9	12.3	26.6	17.0	19.5
World	18.9	13.1	10.8	13.4	11.3	11.6

Source: (Psacharopoulos and Patrinos, 2004)

[16] Data sources are from the survey of ILO but not directly for these analyses, so there is a bias in data (Psacharopoulos and Patrinos, 2002).

Returns to education by level of country income are presented in Table 2. The highest average return is recorded for low income countries. This data renewed in 2004 includes updated estimates for 42 countries. These results indicate that the returns are higher in lower income areas. The return to primary education is highest all of levels except low income countries [17]. This result proves that primary education is the basis for enhancing skills needed in his/her daily life including reading, writing and counting. Therefore, it goes without saying that spread of basic education has been emphasized as the action for poverty reduction in developing countries.

Table 2.Return to Investment in Education by level, Latest Year, Averages by per capita Income Group (%)

Per Capita Income Group	**Mean per capita (US$)**	**Social**			**Private**		
		Primary	Secondary	Higher	Primary	Secondary	Higher
High Income ($9,266 or more)	22,530	13.4	10.3	9.5	25.6	12.2	12.4
Low Income ($755 or less)	363	21.3	15.7	11.2	25.8	19.9	26.0
Middle Income (to $9,265)	2,996	18.8	12.9	11.3	27.4	18.0	19.3
World	7,66	18.9	13.1	10.8	26.6	17.0	19.0

Source: (Psacharopoulos and Patrinos, 2004)

The private returns are higher than the social returns, which are defined on the basis of private benefits. This is because of the public subsidization of education is not accounted in the typical social rate of return estimates, and thus fails to fully include social benefits (Psacharopoulos and Partrinos, 2004).

[17] In low income countries, the private return to higher education is highest because average education level is low.

Individual Countries

Alike the results of region and level of country income, the diminishing returns apply across countries: the more developed is the country; the lower is the returns to education at all levels (Emmanuel and Harry, 2008). As described in Introduction, high returns to education must be attributed to the relative scarcity of human capital, because average educational level is less likely high in low income countries. Table 3 presents the results of rate of returns to education in emerging countries “BRICs”, which include Brazil, Russia, India and China. These countries are noticed as ones being one of the engines of the economic growth in the future. As each country’s data shown in the study of Psacharopoulos and Patrinos (2004) came from different researchers [18], some of them are likely compiled with different data source or calculation. Moreover, it is likely difficult to calculate returns to education of some of BRICs (India and Russia) due to missing data. However, the IRR has been used as the most dependable measure in various institutions. Therefore, we also employed the data set, but the missing data are supplemented with the use of alternative source through the earning function method [19].

In the studies of returns to education in individual countries, the earning function method is widely used because of requiring relatively less data compared with the IRR method. Table 3 shows

[18] The sources of quoted data by Psacharopoulos and Patrinos (2004) are as follows: Brazil: Psacharopoulos (1998), China: Hossain (1997).

[19] The earnings function method is one of regression analysis and uses an individual earnings as the explained variable, as explanatory variable, not only years of schooling but also other one affecting his/her income such as years of labor market experience, gender or the kind of work. In spite of convenience requiring less data, this method is slightly inferior to the IRR method, as the earnings function method assumes flat age-earnings profiles for different levels of education.

that there is no distinctive tendency[20], but it appears that returns to schooling are still high in all levels in these emergent countries.

Nevertheless, they are lower than the average of African Continent having least developed countries. This suggests, as shown in this section, the returns are higher in lower income areas. Highest rate of return to primary education except India[21] has just kept the tendency of returns in developing countries.

Studies on BRICs show that the rate of returns to education had increased during the period of 1980 -1995 by the longitudinal survey. In the study on China, Ma (2003) shows that the returns to education differ in the region and they are higher in the urban area, especially for the person with higher level education. Regarding India, Duraisamy (2000) indicates that the returns differ between gender, that is, women's returns to education exceed men's ones at all education levels. However, the reward for men's technical diploma has increased in recent years.

Reza, Galrao and Andrew (2003) studied the impact of education and experience on the earnings distribution in Brazil. According to this research in Brazil, rates of return to additional years of schooling were very high in the late 1980s at the top of earning distribution compared to the bottom. This study showed that the factor of better paid jobs appeared, in the middle 1990s, to have shifted from rationing or screening workers into their inherent association with higher productivity; one of educational qualifications. Andrew

[20] To clearly explain the cause of these numerical values, it is needed to analyze the educational policy of each country, but it is beyond the scope of this paper.

[21] In India, as IT technology is progressing, the higher return to high level education is guaranteed.

(2003)`s analysis on the earning function in Russia during 1994-98, showed that there was the remarkable difference of returns in education levels, age and experience in labor market in addition to the increase of the rate of returns with development of market economy. In addition, Ma (2003) and Andrew (2003) suggest the possibility to decrease returns to education by increased investment in education among individuals in emergent countries achieving rapid economic growth.

Table 3.Returns to Investment in Education on selected countries

	Social			**Private**		
	Primary	Secondary	Higher	Primary	Secondary	Higher
India*	------	------	------	2.6 (3.2)	17.6 (20.8)	18.2 (24)
China	14.4	12.9	11.3	18.0	13.4	15.1
Brazil	35.6	5.1	21.4	36.6	5.1	28.4
Russia**	------	------	------	------	------	------

Source: (Psacharopoulos and Patrinos, 2004)

* Kingdon (1998) shows by the earning function method, the rate of private returns[1] between men and women: rates of Primary, Secondary and Higher. ( ) indicates one of women.

**In the study of Nesterova and Sabirianova (1998), the represented rate as function on overall years of schooling is 7.2%.

The high returns to primary education provide an added justification for assigning higher priorities to education in developing countries. However, the rate of returns to education has fallen over time. This decline coincides with a significant increase in average years of schooling for the population as a whole. During the last two and half decades, average returns to schooling have declined, while average schooling levels have increased. Therefore, an increase in the supply of education has led to a slight decrease in the returns to schooling, ceteris paribus. That is, if there were no shocks – such as changes in technology –that increase the demand for schooling,

then an increase in overall schooling levels should have led to a decrease in the returns to schooling (Emmanuel and Harry, 2008).

Over the recent decades, the returns to schooling have declined in many low income countries, while the technological revolution has increased demand for skilled labor in some developed countries and the returns to schooling have increased. Among the fluctuations, there has been a downward trend in the returns to schooling since the 1980s. The proportion of the population with secondary schooling and above has risen markedly over the decades while the proportion of the population with only primary has declined. For secondary education, both rate of returns and the proportion of population have risen together until the 1980s when the proportion of the secondary education population appeared to be inversely related to the private rate of return to secondary education (Emmanuel and Harry, 2008). This means that primary education has become almost universal: subsequently, the return to primary schooling has declined over time. Estimates such as these suggest that the returns to education at all level depend on his/her ability rather than school background.

Limits to Applying the IRR method as Cost-Benefit Analysis

The IRR method as cost-benefit analysis is certainly useful for the policy makers related to education. However, we must admit that this method has also limitations. The IRR entails the risk of either overestimation or underestimation of the returns to education. The former is that even though the wage differential is due to the difference of his/her knowledge rather than that of education level, the benefits from other factors are regarded as the returns to schooling. For example, through his/her parents, he/she may learn something required to obtain higher wages. On the other hand, the

latter is that non-monetary benefits [22] are not considered. The benefits of education may extend to others beyond an individual.

Moreover, average schooling levels have increased and an increase in the supply of education has led to a slight decrease in the returns on schooling. For this reason especially in emerging countries, it is difficult to explain contributes to economic growth by only the schooling. Expanding the amount of human capital doesn't always lead the economic growth. In other words, it doesn't mean that this directly leads to technical innovation for the economic growth. Therefore, it is needed to analyze factors to the growth from other aspect of human capital.

In addition, to analyze the returns to education across individual countries, the effect of migration should be considered. The brain drain in the developing country can contribute to making the wage of university graduates higher because the brain drain causes shortage of the capable human capital in the country. This means that the wage of workers doesn't necessarily reflect the human capital of an individual [23]. However, measuring the effect of migration is beyond the scope of this paper.

[22] According to Wolfe and Zuvekas (1997), non-market and external benefits of education are as follow: improving own or spouse's health, realizing desired family size, affecting child's health or education, getting better working treatment such as a paid vacation or insurance cover (as the private benefits), helping R&D, reducing the criminal activity (as the social benefits).

[23] If in the draining country, the government pays all costs to education and immigrants are not required taxing, its social income and productivity decrease.

III. MODEL

To evaluate the relationships between the economic growth and the quality of human capital, Toya (1998) analyzed the quality and the stock of human capital with the use of the regression analysis. The factors of the quality and the stock of the human capital can be classified into two categories: the factors related to educational quality, and the ones related to the level of human capital stock. Most of the current studies on the quality of human capital stock dealt with the study areas all over the world. It is also necessary to focus on the differences in income levels and growth rates across the countries. To consider these differences, we selected some of the emergent countries with the similar income and the growth levels. Following Toya (1998), we conduct regression analyses, in an attempt to explain the relationships between those factors and the economic growth.

The Objective of Analysis

In addition BRICs countries, the selected countries are the following 10 countries with high rate of GDP (net)[24]: Hong Kong, Malaysia, Singapore, South Korea, Taiwan, Thailand (The countries in NICs[25]), Indonesia, Philippines, Turkey and Vietnam (Next 11[26]).

[24] In 10 countries, average Net GDP rate is over 6 % and these countries have been positioned as promising emerging countries.

[25] NICs stand for Newly Industrializing Economics. The countries called NICs are defined as ones having achieved the economic growth rapidly during 20 Century. NICs indicate South-Korea, Taiwan, Hong Kong, Singapore, Mexico, Brazil, Greece, Portugal, Spain and Yugoslavia and China, Malaysia, Thailand (The last three countries were added in 1988.)

[26] NEXT 11 indicate 11 countries expected to achieve rapid economic growth following BRICs: Iran, Indonesia, Egypt, South Korea, Turkey, Nigeria, Pakistan, Bangladesh, Philippine, Vietnam and Mexico.

The Regression Analysis with Four Factors

The explained variable is the growth rate of net GDP (2001-2010) and explanatory variable are the following four factors:

1. Quality of the human capital: (a) the pupil / teacher ratio and (b) the rate of education expenditure.
2. Trade: (a) the share of export to GDP (2001-2010) and (b) the rate of manufactured products to whole export.
3. Distribution of income: (a) the Gini coefficient (around 1990-94) and (b) the Gini coefficient (around 2000-10)
4. Population growth: (a) the rate of labor force, (b) the rate of population growth and (c) the growth rate of GDP per capita.

Ⅳ. ANALYSIS

The result shows that all factors except population growth have positive or negative effect to the economic growth in Table 4.

Table 4.Statistics of Regressions to economic growth

	The quality of human capital		The stock of human capital		
explanatory variable	(1a)(1b) All 14 countries	BRICs	Trade (2a)(2b) 12 countries*1	Distribution of Income (3a)(3b) All 14 countries	Population growth (4a)(4b)(4c) All 14 countries
R square	0.587835	0.963357	0.735515	(3a)0.594568 (3b)0.144448	0.42383
Constant term	1.064469	13.92031	2.25081	(3a)12.00544 (3b)7.938187	-6.24337
Partial regression coefficient	(1a)-1.3124 ** (1b) 0.001289	-2.02694* 0.04177	(2a) 0.05999* (2b) 0.114036**	(3a)-0.1448** (3b)-0.08994	(4a) 0.22509 (4b) -0.65372 (4c) -0.06969
R square (Adjustment)	0.484794	0.890072	0.669394	(3a)0.557711 (3b)0.230445	0.175901

*1: The shares of export to GDP in Singapore and Hong Kong are over 150% because intermediate goods are often counted doubly. Therefore, these two countries are not included.

* and ** represent P value under 0.05 and under 0.01 respectively.

Correlation between Economic Growth and Quality of Human Capital

As factors to explain the quality of education, the pupil / teacher ratio and the rate of education expenditure of government to GDP are often used due to its availability. Decrease of the former is likely improving the quality of education, because teachers can possibly provide more effect to one student. On the other hand, increase of the latter can enhance, by improving facilities, materials on school and the wage of teachers, the quality of education on whole aspect. As the result, it is shown that the increase of factor (a) brings a minus effect to the economic growth, while factor (b) bringing a plus. Especially, in BRICs, higher correlation is presented. The rate of the education expenditure of government to GDP in these 4 countries is not extremely high compared with other countries, but the average GDP in BRICs is larger and thus it is thought that the sum of proper expenditure on education is also larger than the average of all countries. Moreover, the education level of the three countries except India is higher compared with those of other emergent countries and the average rates of graduating from primary school and entering secondary school are about 90% and 82% respectively.

From the fact that the average growth rates of GDP in Malaysia and Indonesia, which keep high level of education, are still lower than those of BRICs, we can understand that it takes long time for educational investments to attain the economic growth. India is an exception with the lower educational level below the average of all 14 countries, but with the second highest GDP growth only after China. One of the reasons is because the rapid technical innovation in the field of IT has been achieved in India. This also shows that the improving the quality of education does not always explain the economic growth.

Correlation between Economic Growth and the Stock of Human Capital

While some studies have analyzed the contribution to the economic growth by the human capital from the aspect of investment in education, others have done it from the aspect of the stock. In this paper, three factors are employed: the trade, the distribution of income and the population growth, as the stock of the human capital.

Trade

First, we consider the trade as the factor accumulating the human capital, because it is expected to enhance the productivity in the country through the competition with other countries. Therefore, the acceleration of trade is likely stimulating the economic growth with the progress of the human capital (Toya, 1998). We used the following indexes to explain the relationships between the trade and economic growth: the average growth rate of net GDP (2001-2010), the share of export to GDP (2001-2010) and the rate of manufactured products to whole export. The study using the rate of manufactured products as explanatory variable was practiced by Fukuda and Toya (1995). They proved that industrial products required high skilled human capital have advanced the economic growth. As they remarked, our analyses also suggest that the countries which succeeded in industrialization with the strong manufacturing sector have achieved the higher economic growth. China and Vietnam are the first and the second highest on the rate of manufactured products. These countries are keeping the high growth rate of GDP (10.5% and 7.3% respectively during 2001-2010). In addition, on the rate of export to GDP, we can regard this as a positive impact on the economic growth. Through international competition among countries with increasing export, workers are encouraged to enhance

their skills. Therefore, the more increase their export, the more skilled is their human capital.

Distribution of Income

As the second factor, the equal distribution of income is regarded as positive factor to the economic growth. If it is unequal, the poor may not able to make their children enter school as their incomes are not enough to do so. Moreover, existence of non-educated people means decreasing the human capital and the social benefit. For the explanation of the economic growth from the viewpoint of the income distribution, explanatory variable are as follows: the Gini coefficient[27] (around 1990-1994) and the growth rate of gross GDP per capita[28] (2001-2009). According to Sylwester (2002), the rate of distribution of income differs with the country's policy. The equal distribution of income often makes the economic growth slowdown because it declines the incentive of workers. As stated in his study, our analysis showed the equal distribution of income is irrelevant to the economic growth. The Gini coefficient (during 2005-2010) of the countries keeping the rate of the high economic growth is not always low. However, as suggested in the theory of Kuznets[29], it is shown that the low Gini coefficient on the initial stage of the economic

[27] A Gini coefficient measures the size distribution of income. A Gini coefficient takes on values between 0 and 100 percent. A higher value indicates larger inequality (Sailesh, 1999).

[28] On the gross GDP per person, I calculated by the following data source. <http://www.jetro.go.jp/indexj.html>

[29] Simon Kuznets proposed the theory so-called the inverted U-shaped relation between income inequality and economic growth. Based on this theory, economic growth increase the income disparity between the rich and the poor in poor countries and in countries experienced economic growth, the income inequality first increases and then decreases. See Kuznets (1971) about the detail of his theory.

growth has developed the country's economy more rapidly at the later stage.

Table 4 indicates the correlation between the Gini coefficient on the initial stage of the economic growth (during 1990-1994) and the rate of economic growth. This result suggests that the lower Gini coefficient gives a positive effect on the economic growth. For example, when the BRICs are ordered by the economic growth rate, it coincides with the order by the Gini coefficient [30]. This result supports the study by Galor and Zang (1997).

Population Growth

It is often said that population growth decreases economic growth. However, it is proved that in developed countries, the decrease of population growth often provides a positive effect rather than a negative one. This is because when youth workers are decreasing, their wage level becomes higher and then this encourages youth workers to work harder. These theories suggest that the relationships between the population growth and the economic growth may have both plus and minus effects. The explanatory variable of the population growth are shown as follows: the growth rate of gross GDP per capita, the rate of population growth, the average growth rate of labor force [31] (2001-2010). Against above theories, our analysis didn't show the specific relationships between the population and the economic growth. The rate of labor force, which is one of explanatory variable to the population growth, have been

[30] The order is China, India, Russia, Brazil and the Gini coefficient (around 1990-94) is 32.1%, 33.2%, 38%, 60.7% respectively.

[31] I calculated the share of labor force to gross population by the following data source;
<http://esa.un.org/wpp/unpp/panel_indicators.htm>

regarded as contributing to economic growth by enhancing the human capital and expanding domestic demands.

In fact, all 14 countries with the high GDP growth rate are keeping high rate of labor force to whole population [32], but the difference of this index doesn't indicate one above others based on the growth rate of GDP. While the rate of population growth, which is other explanatory variable regarded as giving the minus effect to the economic growth in developing countries, in emergent countries, especially BRICs, it seems that regardless of the population growth, the economic growth has accelerated with abundant labor force. China and India demonstrate the first and second high GDP growth rates during the study period, but they are quite different in their population growth rates, viz. the former having a negative rate.

However, Srinivasan and Robinson (1997) showed that there is the constant plus effect between the population growth and economic growth. To prove this theory, their study used the data of the population growth in the long term, because it took 20 years at least to make children contribute to the country as a labor force. Therefore, the relationships between the population growth and the economic growth may be evident only through the long term analysis.

V. CONCLUDING REMARKS

This paper has focused factors affecting the economic growth in emergent countries from the viewpoint of the human capital. First, to explain the returns to education, the results of cost-benefit analysis based on the educational levels have been shown as variable

[32] The average of labor force on all countries used for our analysis was about 60%.

parameters of the human capital. These results proved that the returns are higher in developing countries. However, it is not enough to indicate the relationships between the economic growth and the human capital by only schooling through cost-benefit analysis. Moreover, we must admit that the quantity of education doesn't always lead to the economic growth by the increase of demand for education. Thus we tried to explain the contribution to the economic growth from the viewpoints of educational quality (pupil/teacher ratio and education expenditure of government to GDP) and the human capital stocks (trade, distribution of income and population growth), following the previous studies. From this analysis, it was shown that the higher quality of education brings a positive effect on the economic growth, particularly in BRICs.

Among the three factors related to the human capital stocks including the trade, the distribution of income, and the population growth, the first factor is positively correlated to the economic growth, and proved that economic openness can expect the economic growth more rapidly by enhancing the country's human capital. As for the second one, the low Gini coefficient at the initial stage of economic development brings a positive effect on the economic growth. The last one showed no specific relations to the economic growth, similar to the previous studies, which found both of positive and negative effects on the economic growth.

These results have suggested that education is not the only measure to enhance the human capital and develop the economic growth. Therefore, it is considered that expanding education especially on the quantity aspect is not always an effective policy to attain economic growth. Our study also showed that a wide range of factors contributing to the economic growth would be introduced for

analysis from other viewpoint including the migration of human capital.

From the discussion in this paper that tried to identify the factors enhancing the human capital, we can derive some policy implications, especially for the educational policy makers in developing countries with tight budget. In developing countries, the spread of basic education has implemented as the main policy, but years of schooling do not necessarily lead to economic growth especially in countries having accelerated the growth. The increase in demand for schooling by an individual often reduces his/her returns. Therefore, effective educational strategy for development should focus not only on sending more children to school, as MDGs Goal 2 is often interpreted, but also on maintaining or enhancing the quality of schooling. The higher human capital with enhancing the quality will help cause the innovation such as new technology in a country.

Considering that equal income will contribute to economic development in the long term, it is important to achieve basic education quantitatively as the public policy. Public action may also be required if poor individuals cannot mobilize the resources to finance the investment now, despite a promise of big gains in the future. On the other hand, an educational policy maker needs to recognize that only schooling does not cultivate the productivity of human capital. For example, opening the market as a foreign policy can give an incentive to the higher competition through learning by doing or the job training. It means that we must find out a wide range of factors having a positive impact to economic development in the field of the human capital.

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