Effect of Education Aid on Primary Enrolment Rate

By Region and Income Group

By

Kim Hyo Sun

THESIS

Submitted to

The KDI Graduate School of Public Policy and Management

In partial fulfillment of the requirements

For the degree of

MASTER OF DEVELOPMENT POLICY

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ABSTRACT

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Kim Hyo Sun

The purpose of this paper is to study the effects of education aid on primary enrolment rate and growth rate of enrolment rate by region and income group. Regression analysis was conducted using aid disbursement (independent variable), net enrolment rate on primary school and the growth rate of primary enrolment rate (dependent variables), and the follwoing 8 control variables: 1) initial enrolment rate (L.NER); 2) GDP per capita; 3) government expenditure per primary student as a percent of GDP per capita(EDUCEXP); 4) share of children and youths aged 0-14 as a percentage of overall population (YOUNG POP); 5) agriculture of GDP (%) (Agr/GDP); 6) Political rights (FREE); 7) pupil-teacher ratio in primary education (PTR); and 8) government effectiveness (Effectiveness) from the World Bank except for FREE that is from Freedom House. All data are from 2012 to 2014. The result is that education aid has an effect on primary enrolment rate but it is not effective to growth rate of primary school enrolment rate. Also, education aid has an effect on the growth rate of enrolment rate for the low income group only. There are no statistically significant coefficient for other income and all region groups. Also, variables affecting aid effectiveness are also different by region and income group. Therefore, national characteristics should be considered when aid is allocated.

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1. Introduction

This paper aims to analyze the effectiveness of education aid on net enrolment rate of primary school and growth rate of primary school enrolment rate. In particular, this study intends to find the difference of aid effectiveness for each region and income group through regression analysis.

Development aid-at-a-glance statistics by region (OECD 2016 edition) shows that ODA net disbursement (2013 million USD) has been growing steadily from 150,800 in 2013 to 160,556 in 2014, while the population increased from 5,851,506,000 in 2013 to 5,930,578,000 in 2014. The largest ODA donor in 2014 is the United States, providing 27,509 million USD equivalent to 17% of total ODA donation. EU institutions mark the second, with 16,389 million USD equivalent to 10% of total ODA donation. The largest ODA recipients in 2014 is Afghanistan, receiving 4,823 million USD composing 3% of total ODA , following by Vietnam with 4,218 million USD accounting for 3% of total ODA.

According to the list of ODA sorted by income group, the ODA sum of unspecified and least development countries amount to more than a half of total ODA, and majority of the ODA goes to the social sector (38%) followed by economic sector (22%). Regional statistics show that the region receiving the largest net ODA with second largest number of population is Africa (54,193 million USD to 1,155 million people) followed by Asia which receives 53,785 million USD for 3,993 million people.

For states, the size of ODA and the number of population continued to increase, inviting countless debates on aid effectiveness without reaching a clear consensus despite large volume of studies. Some say that aid is effective, but others say that aid is a failure.

Even though many scholars have studies about aid effect, there is only so much literature for the effectiveness of aid in the education sector. Even more so, there are

almost no studies on aid effectiveness on the education sector analyzed by region and income group. Figure 1 in Appendix shows a regional graph on the relationship between official amount of aid on education and net enrolment rate for primary schools from 2002 to 2012. As Birchler and Michaelowa (2016) show, enrolment rate and education aid do not seem to be correlated, especially in the South Asia and the Middle East and North Africa.

This leads to the purpose of this paper, which is to study aid effectiveness, particularly its effectiveness on education for each region and income group since the current academic trend prefers looking into individual sector rather than taking all aid approach (Birchler and Michaelowa, 2016). The region and income groups are divided in accordance with the criteria set by the World Bank, resulting in six regional groups and five income groups. The dependent variables are the net enrolment rate on primary school and the growth rate of enrolment rate on primary school because they are part of the Millennium Development Goals (MDG) which is to achieve universal primary education. Since MDG has expired in 2015 and Sustainable Development Goals (SDG) were initiated, this paper will be relevant in reviewing MDG's success or failure as well as the aid effectiveness on education by each regional and income group. This paper will use 2002 to 2012 data from the World Bank and it will use the data from Freedom House for political right variable (FREE). Birchler and Michaelowa (2016) argue, aid cannot be considered in isolation, but depends on the functionality of the education system as a whole. Therefore, there are 8 control variables that will be used in this paper. They will be further explained in Chapter 3.

The rest of this paper is structured as follows: Chapter 2 reviewed briefly the previous literature studies about aid and aid effectiveness; Chapter 3 explains the research method and the various variables (dependent, independent, and control) used in this research;

Chapter 4 takes on the regression analysis; Chapter 5 provides policy implications with a conclusion.

2. Literature Reviews

According to OECD (2016), the amount of education aid has been growing up steadily. Disbursement on education of DAC members was 9,012 million USD in 2012, which grew to 9,135 million USD in 2014 accounting for 7% of total ODA. “Since 1999 over 50 million more children have been enrolled in primary school, there was a significant reduction in the number of children not attending school, and a marked improvement in access to education for girls in primary education. Education aid has certainly played a role in supporting the global education sector to achieve these improvements” (Riddell, 2016). Even though education aid seems to be effective, many scholars still argue whether aid is effective or not. There are two perspectives: 1) aid is not a solution but a problem 2) aid has a positive effect on economic growth but with diminishing returns (Akramov, 2012).

Easterly (2003, p.45), in his article ‘The cartel of good intentions’, said that economic development is negatively correlated to foreign aid because education aid did not increase the enrolment rate at all (Birchler and Michaelowa, 2016). Peter Boone (1995,1996) said that foreign aid did not contribute to growth in poor countries (Burnside and Dollar, 2000). Even more so, there are “several side effects caused by aid such as causing real exchange rate appreciation (an effect known as the “Dutch disease”), disappearing into unproductive government consumption, inducing rent seeking, and adversely influencing legal and economic institutions” (Remmer 2004; Rajan and Subramanian 2005-2007; Heckelman and Knack 2008; Akramov, 2012, p.2). Recently, “Rajan and Subramanian (2008) used cross-sectional instrumental variables and dynamic

panel regressions to examine the effects of aid and economic growth. The result says that there is no statistically significant positive (or negative) relationship between aid and economic growth." Easterly (2003,2007) said that "one of the strong contemporary critics of foreign aid, there is too much corruption in recipient countries and unaccountability in aid delivery mechanism. Therefore, foreign aid has done much bad and little good in recipient countries and argues against upscaling foreign aid flows (Akramov, 2012).

On the other hand, Michaelowa and Weber (2007) said that aid on education impacts primary education in developing countries, measuring both in terms of enrolment and completion rates based on empirical application. Birchler and Michaelowa (2016) found that donor's increase in funding has substantially contributed to the successful increase in enrolment rate over the last 15 years (1996-2010). "Similarly, Dreher, Nunnenkamp, and Thiele (2006), using panel data, found that a higher level of per capita aid for education has a statistically significant positive impact on primary school enrollment (Akramov, 2012)." Asiedu (2014) found out that aid has effect on primary education positively and Dreher, Nunnenkamp, and Thiele (2006) argued that "foreign aid significantly enhances the completion rate of primary school. Furthermore, it also finds positive effect of foreign aid, during 1970-2005 for education to 100 countries, on enrolment rate" (Kemal and Jilani, 2016). Other studies, such as the one by, Baldacci, Clements and Gupta (2008) claimed that expenditure on education has an effect on enrolment of schools in reference to 118 developing countries from 1971 to 2000. Kemal and Jilani (2006) concluded that foreign aid could be effective for primary school enrolment. They used a nonlinear model including square term of foreign aid to capture the nonlinear association with the primary enrolment.

Burnside and Dollar (2000), one of more remarkable papers on aid, found that "aid has a positive impact on growth in developing countries with good fiscal, monetary, and trade

policies." Their paper studied the interaction of aid, deducing result that the coefficient for interaction term is positive and statistically significant, implying that aid works in 'a good policy environment' but has little impact in 'a poor policy environment' (Burnside and Dollar 2000; see also the World Bank 1998; Akramov 2012).

One of the more recent papers by Birchler and Michaelowa (2016) has conducted a similar study on aid effects on education. They carried out a generalized method of moments regressions (GMM) with a replication Michaelowa and Weber (2007) from 1996 to 2010 and they used net primary enrolment rate as the dependent variable along with other control variables. Education aid per capita is coefficient with net enrolment rate (P-value 0.01) but growth enrolment rate is a little different. One of the regressions including both countries and period fixed effects were not coefficient with p-value 0.79 but another regression with all logs except for cash surplus/deficit was coefficient with p-value 0.09. This paper takes more focus on education aid by different purpose on primary school enrolment such as facilities and training or teacher training.

Based on the previous literature mentioned above, a study is clearly necessary for the effectiveness of education aid on primary school enrolment. There are many studies on aid effectiveness in general, but this cannot be used to generalize all countries. Each country has different characteristics such as income, weather, or location, meaning that the effect of aid will be also be different. Therefore, this paper seeks to study the effectiveness of education aid on primary enrolment by region and income groups.

3. Methodology and Data

The basic regression model for the education aid effectiveness on primary enrolment rate and the growth rate of enrolment rate by region and income group can be expressed as the following,

$$\mathbf{Y(N)_{it} = a_0 + AID_{it} + X_{it}} \qquad \mathbf{(1)}$$

$$\mathbf{Y(G)_{it} = a_0 + AID_{it} + X_{it}} \qquad \mathbf{(2)}$$

Where,

i stands for country and **t** stands for year,

Y(N) is the dependent variable which measured net enrolment rate for primary schools.

Y(G) is another dependent variable which measured the growth rate of enrolment rate in primary schools.

AID is an aid amount allocated to recipient countries for education/per capita.

X is the vector for 8 control variables; 1) initial enrolment rate (L.NER); 2) GDP per capita; 3) government expenditure per primary student percent of GDP per capita (EDUCEXP); 4) share of children and youths aged 0-14 as a percentage of overall population (YOUNG POP); 5) agriculture of GDP (%) (Agr/GDP); 6) Political rights (FREE); 7) pupil-teacher ratio in primary education (PTR); and 8) government effectiveness (Effectiveness).

a is a constant.

As mentioned in a previous study by Birchler and Michaelowa (2016), this research also used net enrollment rate (NER) for primary schools as the dependent variable. Not only NER, but also the growth rate of enrollment rate (GER) was also added as the dependent variable. NER itself is the important factor to discern aid effectiveness based on the amount of financial support for education, but it does not go far enough to explain how much it should grow in order to serve as a clear-cut answer that there is indeed aid

effectiveness. This is why two dependent variables are necessary for this study. The NER data is from the World Bank and GER is calculated by NER.

Independent variable is the total amount of aid allocated to recipient countries for education (AID).

Control variable includes initial enrollment rate in primary schools (L.NER) that means the enrollment rate at the beginning of each period and it suppose that it should be more difficult to reach high level of enrolment at the starting point (Birchler and Michaelowa, 2016, p.39). The other control variable is GDP percentage of government expenditure per primary school student per capita (EDUCEXP). This variable is controlled, since the portion of education disbursement among government budget might affect increase on the primary enrollment. If not only aid but also government budget is invested in primary education, then it would not find a clear answer to which factor influence to increase in primary school enrolment. A similar argument can be made for GDP per capita (GDP per capita) since GDP constrains the government's own budget, thus limiting its possibility to invest in education (Birchler and Michaelowa, 2016, p.39). Some of factors for characterizing the national education system in recipient countries are controlled (Michaelowa and Weber, 2007, p.5). These factors include a pupil-teacher ratio in primary education (PTR) and the percentage of children and youths from age 0 to 14 from overall population (YOUNG POP). Both factors indicate structural difficulties a country may have in increasing enrolment rate (Birchler and Michaelowa, 2016, p.39). While aforementioned components are control variables for economic and social factors, it is also necessary to look into the aspect of good governance including: Political rights (FREE) and government effectiveness (Effetiveness). Burnside and Dollar (2000) suggest that aid would be more effective if it were more systematically based on good policy. Under condition of bad governance, the impact of aid on enrolment may actually turn

negative (Michaelowa and Weber, 2007). Political rights from the Freedom House index covers the broader political environment. The index is based on the evaluation of free election, the real power of elected political representatives, the de facto power of the opposition, the right to organize in groups, freedom of domination by the military or other powerful groups, and self-determination rights of minority groups. This was measured on a one-to-seven scale, with one representing the highest degree of freedom and seven the lowest (Michaelowa and Weber, 2007, p.6). Although this index also includes civil liberties, this paper has considered the aspects of political rights only. Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Percentile rank indicates the country's rank among all countries covered by the aggregate indicator, with 0 corresponding to lowest rank, and 100 to highest rank. Percentile ranks have been adjusted to correct for changes over time in the composition of the countries covered by the WGI (World Bank). All variables above are from the World Bank from 2014 to 2016 except for FREE. The last variable, agriculture of GDP (%) (Agr/GDP) from the World Bank in 2014, is controlled. According to Zhang (2006, p.582), rural education in many less developed countries is often synonymous with disadvantages for learning. Indeed, the available evidence suggests that, in the latter half of the 1990s, primary school students in rural areas consistently underperformed their urban counterparts by substantial margins in sub-Saharan Africa. This is why Agr/GDP is chosen as one of control variables.

However, aid cannot affect the rate of primary school enrolment on a year-to-year basis because the result of education can only be turned up gradually. Thus, lagged regression model is needed as demonstrated below,

$$Y(L.G)_{i(t)} = a_0 + L.AID_{i(t-3)} + X_{i(t-3)} \quad (3)$$

Y(L.G) is the dependent variable that measured the growth rate of enrolment rate on primary school.

L.AID is the independent variable for 3-year aid allocated to recipient countries for education/per capita.

X is the vector for 8 control variables; 1) initial enrolment rate (L.NER); 2) GDP per capita; 3) government expenditure per primary student percent of GDP per capita (EDUCEXP); 4) share of children and youths aged 0-14 as a percentage of overall population (YOUNG POP); 5) agriculture of GDP (%) (Agr/GDP); 6) Political rights (FREE); 7) pupil-teacher ratio in primary education (PTR); and 8) government effectiveness (Effectiveness).

a is a constant.

Note that all data are from 2002 to 2014 (over 13years) because Education Aid value is only available from 2002. Region and income group are divided in accordance with the criteria set out by the World Bank and raw data set considers missing values so that all missing data are deleted with no imputation. Therefore, some countries might not have a serial data.

4. Econometric Analysis

This paper has some similarity and dissimilarity with Birchler and Michaelowa (2016), and it will be discussed in details below. In order to verify aid effectiveness on education, 4 regressions have been conducted.

1) Regression of Full Data Set : Dependent Variable (NER and GER)
2) Regression for AID and GER by region
3) Regression for AID and GER by income group
4) Regression including interaction term AID and Effectiveness/ AID square
5) Regression for lagged AID and GER

The 339 observations of 73 countries are used with no missing data and the basic descriptive statistics can be seen on Table 1.

Table 1. Sample Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
L.LER	339	.0	98.5	8.663	26.3203
NER	339	38.0	99.5	86.195	13.1555
GER	339	-7.7	46.7	1.323	4.4422
AID	339	.2	272.2	10.347	30.1870
GDP per capita	339	115.3	21188.1	3331.696	3569.4913
EDUCEXP	339	4.3	58.1	14.990	9.2461
YOUNG POP	339	14.1	50.4	34.140	9.0159
Agr/GDP	339	.4	54.5	16.027	10.8379
FREE	339	1.0	7.0	3.490	1.7648
PTR	339	8.7	67.3	29.973	11.1699
Effectiveness	339	2.4	91.7	41.664	18.7184
Valid N	339				

Table 2. Regression of Full Data Set : NER and GER

Independent Variable	(1) NER	(1-1) GER
L.NER	0.029	0.015
	(0.019)	(0.009)
AID	-0.046*	0.013
	(0.019)	(0.009)
GDP per capita	0.000	-1.637
	(0.000)	(0.000)
EDUCEXP	-0.462***	0.050*
	(0.060)	(0.028)
YOUNG POP	-0.891***	-0.047
	(0.108)	(0.051)
Agr/GDP	0.178***	-0.013
	(0.055)	(0.026)
FREE	-0.389	0.097
	(0.299)	(0.141)
PTR	-0.262**	0.163***
	(0.083)	(0.039)
Effectiveness	0.110**	-0.014
	(0.036)	(0.017)
No. of Observation	339	339
No. of Countries	73	73
R^2	0.548	0.123

*, **, *** Significant at the 10%, 5%, 1% level

Starting with (1) full data set regression with dependent variable NER (see Table 2), it shows that aid's coefficient on NER is -0.046 with P-value 0.016. In short, aid does have a negative effect on NER. If aid as a percentage of GDP increases by 1% point, then enrolment rate will be decreased by 0.046%point.

This paper has come up with results similar with the ones by Birchler and Michaelowa (2016) for GMM analysis NER, EDUCEXP, YOUNG POP, and PTR are the same. This is significant in case of under 1% for EDUCEXP, 1% for YOUNG POP and 5% for PTR with negative. Also, this paper and Birchler and Michaelowa (2016) found out that

government expenditure on education negatively affects NER. The higher value of EDUCEXP, YOUNG POP, and PTR, the lower the NER. In order to increase NER by 1%, it requires cutting government expenditure on primary schools by 32.5%, the reduction of young people rate by 61.1%, and pupil-teacher rate by 22.3%. This is considered as a structural difficulty of the education system. When YOUNG POP and PTR are high, meaning that the countries have many young people and students compared with the number of teachers, increasing NER is hard. Agr/GDP and Effectiveness are also significant under 1% and 5% level with positive. It means that enrolment rate rises when recipient countries have large agricultural industries ratio within the GDP, and NER gets higher under the good government policy, just as Burnside and Dollar argued (2000). Other variables, L.NER, GDP per capita, and FREE, are not significant.

(1) NER = 126.677 * -0.046 AID * -0.462 EDUCEXP * -0.891 YOUNG POP * -0.262 PTR * 0.178 Agr/GDP * 0.110 Effectiveness

With (1-1) full data set regression with dependent variable GER, the biggest difference from (1) is that AID does not have an effect on GER with p-value 0.157. Interestingly, aid can affect enrolment rate on primary schools but it cannot be effective on the growth rate of primary school enrolment rate.

Besides, EDUCEXP and PTR are significant only on 10% and 1% level and another difference between regression results on NER and GER is that both valid variables turn from negative (NER) to positive (GER). EDUCEXP and PTR positively affect GER and other variables are not significant at 1%, 5% or 10% level.

This shows that the growth rate of enrolment rate on primary schools can increase when government uses the budget on primary education. Also, when there are more students

than teachers which means PTR is high, the growth rate of enrolment rate may still rise. According to the equation, PTR can affect much more than EDUCEXP can as the quation suggests below.

(1-1) GER = 0.05 EDUCEXP * 0.163 PTR

(2) Regression for AID and GER by region

When equation (2) was run by region, aid does not influence growth rate of enrolment rate (GER) over all regions. All aid coefficients are not significant at 10% level. See the Table 3.

In case of a more in-depth analysis, the Middle East and North Africa has a significant coefficient for, L.NER, EDUCEXP, Agr/GDP at the 10% level. In the South Asia, L.NER, EDUCEXP, YOUNG POP and Effectiveness have significant coefficient at the 10% level and PTR is only significant at 10% level in the Sub-Saharan Africa.

(2-1) Middle East & North Africa

GER = 0.033 L.NER * 0.454 EDUCEXP * 0.175 Agr/GDP * -0.093 Effectiveness

(2-2) South Asia

GER = -33.190 * 0.093 L.NER * -0.860 EDUCEXP * 1.122 YOUNG POP

**** 0.129 Effectiveness***

(2-3) Sub-Saharan Africa GER = 0.226 PTR

Table 3. Regression by Region Group

Independent Variable	(1) GER	(2) GER	(3) GER	(4) GER	(5) GER	(6) GER
L.NER	-0.003		0.006	0.033*	0.093*	0.034
	(0.023)		(0.008)	(0.019)	(0.047)	(0.026)
AID	-0.091	-0.001	0.103	0.107	0.025	-0.007
	(0.074)	(0.010)	(0.074)	(0.118)	(0.088)	(0.041)
GDP per capita	-0.001	0.000	0.000	-9.970	0.001	0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
EDUCEXP	0.023	-0.081	0.040	0.454*	-0.860*	0.143
	(0.319)	(0.058)	(0.036)	(0.220)	(0.310)	(0.101)
YOUNG POP	-0.167	-0.149	-0.003	0.025	1.122*	-0.261
	(0.218)	(0.327)	(0.076)	(0.223)	(0.367)	(0.254)
Agr/GDP	0.141	-0.037	-0.038	0.175*	0.167	0.018
	(0.116)	(0.144)	(0.031)	(0.096)	(0.114)	(0.076)
FREE	-0.553	0.651	0.107	0.859	-1.036	-0.394
	(0.483)	(0.466)	(0.134)	(0.731)	(0.813)	(0.515)
PTR	-0.173	-0.190	0.076	0.269	-0.002	0.226*
	(0.130)	(0.323)	(0.052)	(0.328)	(0.176)	(0.097)
Effectiveness	-0.014	0.031	-.0.018	-0.093*	0.129*	-0.061
	(0.046)	(0.056)	(0.021)	(0.039)	(0.052)	(0.052)
No. of Observation	27	22	114	33	24	119
No. of Countries	9	6	20	7	7	24
R^2	0.369	0.73	0.058	0.7	0.731	0.115

*Note : parenthesis (1)~(6) means that

(1)East Asia&Pacific(2)Europe&Central Asia (3)Latin America&Caribbean(4)Middle East&North Africa(5)South Asia (6)Sub-Saharan Africa

* Significant at the 10% level

Table 4. Descriptive Statistics by Region Group

Region		N	Minimum	Maximum	Mean	Std. Deviation
East Asia & Pacific	L.LER	27	.0	95.9	13.226	32.4697
	NER	27	76.2	97.8	91.719	5.0406
	GER	27	-3.2	8.9	.171	2.6416
	AID	27	.2	50.0	7.388	11.3760
	GDP per capita	27	319.5	4431.2	2349.393	1320.9437
	EDUCEXP	27	6.9	20.1	12.265	3.5653
	YOUNG POP	27	20.3	42.3	31.902	5.1398
	Agr/GDP	27	5.4	36.0	14.403	8.7363
	FREE	27	1.0	6.0	3.741	1.8932
	PTR	27	16.0	48.4	27.227	8.1533
	Effectiveness	27	10.2	84.9	44.097	17.5075
	Valid N	27				
Europe & Central Asia	L.LER	22	.0	.0	.000	.0000
	NER	22	87.5	99.3	93.892	4.3093
	GER	22	-2.9	5.2	.364	1.8413
	AID	22	1.8	272.2	62.027	97.2480
	GDP per capita	22	1230.4	18094.5	7177.687	6096.6035
	EDUCEXP	22	14.8	58.1	35.518	12.7797
	YOUNG POP	22	14.1	19.4	16.261	1.4137
	Agr/GDP	22	6.2	40.6	17.762	14.3132
	FREE	22	2.0	5.0	3.182	1.1396
	PTR	22	8.7	19.1	14.735	2.4772
	Effectiveness	22	21.8	84.0	50.661	22.4288
	Valid N	22				
Latin America & Caribbean	L.LER	114	.0	98.1	9.902	29.0216
	NER	114	79.4	99.5	93.400	4.3454
	GER	114	-7.7	8.0	.071	2.2403
	AID	114	.2	23.3	2.606	3.1004
	GDP per capita	114	913.6	21188.1	5493.134	3847.4001
	EDUCEXP	114	4.6	49.3	13.259	8.7140
	YOUNG POP	114	17.6	42.4	30.481	5.9133
	Agr/GDP	114	.4	40.9	13.405	9.1288
	FREE	114	1.0	7.0	2.991	1.9302
	PTR	114	9.1	45.5	24.025	6.7009
	Effectiveness	114	10.7	91.7	46.925	16.8497
	Valid N	114				

Table 4. Descriptive Statistics by Region Group

Region		N	Minimum	Maximum	Mean	Std. Deviation
Middle East & North Africa	L.LER	33	.0	98.5	16.579	35.7961
	NER	33	40.0	99.5	89.255	15.3917
	GER	33	-.8	14.4	2.238	3.6212
	AID	33	.2	40.4	9.019	8.8795
	GDP per capita	33	974.6	8670.3	2980.711	1660.4951
	EDUCEXP	33	8.5	22.9	15.949	3.7547
	YOUNG POP	33	23.4	40.1	29.253	4.1885
	Agr/GDP	33	2.3	36.1	15.893	12.8004
	FREE	33	2.0	6.0	4.242	1.3926
	PTR	33	17.3	35.5	25.380	4.0489
	Effectiveness	33	17.5	73.7	44.623	16.1944
	Valid N	33				
South Asia	L.LER	24	.0	72.3	3.011	14.7509
	NER	24	70.1	99.1	88.170	8.0962
	GER	24	-4.4	10.7	1.234	4.1730
	AID	24	.4	35.1	9.690	10.5067
	GDP per capita	24	254.6	5850.2	2123.447	1404.6808
	EDUCEXP	24	4.8	16.1	9.655	3.1003
	YOUNG POP	24	25.2	40.4	31.345	3.8288
	Agr/GDP	24	3.5	37.5	14.686	8.8432
	FREE	24	1.0	6.0	3.708	1.3667
	PTR	24	13.3	47.5	30.227	9.8275
	Effectiveness	24	19.7	71.1	48.335	16.6561
	Valid N	24				
Sub-Saharan Africa	L.LER	119	.0	94.5	6.987	22.5496
	NER	119	38.0	98.3	75.371	14.2116
	GER	119	-6.5	46.7	2.726	6.1982
	AID	119	1.0	107.7	9.379	16.9460
	GDP per capita	119	115.3	5666.6	1113.939	1185.6970
	EDUCEXP	119	4.3	33.3	14.281	6.7001
	YOUNG POP	119	30.4	50.4	43.378	4.1888
	Agr/GDP	119	3.1	54.5	18.893	11.2798
	FREE	119	1.0	7.0	3.714	1.7180
	PTR	119	22.9	67.3	40.334	9.0553
	Effectiveness	119	2.4	72.8	32.241	17.4716
	Valid N	119				

(3) Regression for AID and GER by income group

In case of regression by income groups, AID can have an effect on GER only in the Low income group with P-value 0.081. If aid increases by 1% percent point, GER increases by 0.704 percentage point. Other income groups have no relation between AID and GER (see the Table 6).

According to the regression analysis, only the low income, the lower middle income, and the upper middle income group have significant other coefficients. In order to increase GER based on the result, much aid disbursement and many agricultural industries in the recipient countries are required in the low income group but GDP per capita and political rights do not have a positive relationship. In the lower middle income group, the higher government budget on primary school and pupil-teacher rate goes up, the higher the GER. Unlike the lower middle income groups, high initial enrolment rate and good policy are needed for the upper middle income group, in order to increase GER. GDP per capita and YOUNG POP have a negative relationship.

(3-1) Low Income

GER = 0.704 AID * -0.010 GDP per capita * 0.283 Agr/GDP * -1.774 FREE

(3-2) Lower Middle Income

GER = 0.104 EDUCEXP * 0.132 PTR

(3-3) Upper Middle Income

GER = 4.094 * 0.016 L.NER * GDP per capita * -0.154 YOUNG POP * 0.336 FREE

Table 5. Descriptive Statistics by Income Group

Income Group		N	Minimum	Maximum	Mean	Std. Deviation
High Income	L.LER	21	.0	97.5	12.909	32.4748
	NER	21	83.7	97.5	93.936	3.2127
	GER	21	-3.4	5.4	.246	1.8982
	AID	21	.2	272.2	61.778	100.6188
	GDP per capita	21	7049.6	21188.1	14104.808	3606.8026
	EDUCEXP	21	8.1	27.1	16.801	5.5826
	YOUNG POP	21	14.9	36.0	20.795	4.9413
	Agr/GDP	21	.4	40.6	13.026	17.5101
	FREE	21	1.0	6.0	2.667	1.6833
	PTR	21	11.5	25.1	17.654	4.6721
	Effectiveness	21	59.7	91.7	78.133	9.9792
	Valid N	21				
Low Income	L.LER	73	.0	93.5	6.768	21.6467
	NER	73	38.0	95.9	72.155	15.8747
	GER	73	-6.5	46.7	3.041	6.7476
	AID	73	1.2	10.3	4.627	2.1903
	GDP per capita	73	115.3	988.4	502.848	182.3559
	EDUCEXP	73	4.3	33.3	13.761	7.1991
	YOUNG POP	73	33.5	50.4	45.636	2.7935
	Agr/GDP	73	8.0	54.5	24.886	10.7844
	FREE	73	1.0	7.0	3.932	1.5214
	PTR	73	23.9	67.3	44.262	7.6295
	Effectiveness	73	2.4	45.9	25.008	11.9871
	Valid N	73				
Lower Middle Income	L.LER	131	.0	98.5	7.941	25.2546
	NER	131	40.0	98.9	86.511	11.0289
	GER	131	-4.6	20.4	1.657	4.1644
	AID	131	.3	107.7	10.728	17.2725
	GDP per capita	131	319.5	4342.8	1970.596	1010.0942
	EDUCEXP	131	4.6	41.7	14.278	7.8348
	YOUNG POP	131	14.1	46.6	33.708	7.3599
	Agr/GDP	131	2.7	40.9	12.820	9.4541
	FREE	131	1.0	7.0	3.191	1.8022
	PTR	131	15.3	56.5	30.364	8.6119
	Effectiveness	131	10.2	73.7	40.777	16.2520
	Valid N	131				

Table 5. Descriptive Statistics by Income Group

Income Group		N	Minimum	Maximum	Mean	Std. Deviation
Not Classified (Argentina)	L.LER	5	.0	.0	.000	.0000
	NER	5	99.0	99.5	99.240	.2074
	GER	5	-.3	.3	-.020	.2405
	AID	5	.5	.8	.648	.1400
	GDP per capita	5	4696.1	9999.1	7043.012	2109.8474
	EDUCEXP	5	9.4	12.8	10.870	1.3561
	YOUNG POP	5	26.3	27.1	26.720	.3386
	Agr/GDP	5	9.5	12.5	11.058	1.1672
	FREE	5	2.0	2.0	2.000	.0000
	PTR	5	15.5	17.1	16.399	.5874
	Effectiveness	5	51.0	58.0	54.142	2.5665
	Valid N	5				
Upper Middle Income	L.LER	109	.0	98.1	10.379	29.6594
	NER	109	79.4	99.5	93.130	4.8864
	GER	109	-7.7	10.2	.041	2.4007
	AID	109	.2	35.1	4.256	6.0260
	GDP per capita	109	999.2	9730.3	4616.265	1877.4383
	EDUCEXP	109	4.6	58.1	16.509	12.1608
	YOUNG POP	109	17.0	40.3	29.872	5.8601
	Agr/GDP	109	2.4	31.7	14.754	7.4563
	FREE	109	1.0	7.0	3.780	1.7917
	PTR	109	8.7	32.6	22.931	5.6621
	Effectiveness	109	10.7	84.9	46.285	13.7232
	Valid N	109				

Table 6. Regression by Income Group

Independent Variable	(1) GER	(2) GER	(3) GER	(4) GER	(5) GER
L.NER	-0.002	0.036	-0.005		0.016*
	(0.019)	(0.038)	(0.016)		(0.008)
AID	0.009	0.704*	0.022	-1.300	-0.021
	(0.016)	(0.397)	(0.022)	(0.000)	(0.041)
GDP per capita	0.000	-0.010*	0.000		0.000*
	(0.000)	(0.005)	(0.001)		(0.000)
EDUCEXP	-0.206	0.097	0.104*	0.392	-0.031
	(0.179)	(0.143)	(0.062)	(0.000)	(0.029)
YOUNG POP	-0.397	0.298	0.047		-0.154*
	(0.419)	(0.428)	(0.086)		(0.074)
Agr/GDP	-0.213	0.283*	-0.023		0.009
	(0.188)	(0.138)	(0.046)		(0.036)
FREE	1.424	-1.774*	0.327		0.336*
	(1.501)	(0.910)	(0.207)		(0.167)
PTR	-0.114	0.108	0.132*	0.180	0.012
	(0.280)	(0.124)	(0.078)	(0.000)	(0.059)
Effectiveness	0.108	-0.005	0.006	0.058	0.014
	(0.107)	(0.075)	(0.025)	(0.000)	(0.020)
No. of Observation	21	73	131	5	109
No. of Countries	6	15	29	1	22
R^2	0.421	0.245	0.147	1.000	0.122

*Note : parenthesis (1)~(5) means that
(1)High Income (2)Low Income (3)Lower Middle Income (4)Not Classified(Argentina) (5)Upper Middle Income
* Significant at the 10% level

(4) Regression including interaction term AID and Effectiveness/ AID square

To show whether government effectiveness can or cannot affect enrolment rate depending on regions or income groups, regression (3) can be analyzed which Burnside and Dollar (2002) suggested. To this end, regression has included an interaction term between AID and Effectiveness. The equation also include AID square to check whether the aid variable has a diminishing return or not. See the Table 7. The interactive term is

not significant. If the moderate value controls the dependent variable, then R square will increase from model A to C with significant level. The value of R square has not been increased much from Model A to C 0.548 to 0.549. That means good governance, government effectiveness, is not a necessary condition for increasing primary school enrolment rate and it is the opposite conclusion compared with Burnside and Dollar (2002). The Aid square term is insignificant statistically, too. Therefore, Aid variable effect on GER is not decreasing when Aid is increasing sharply, which is also different

from the Burnside and Dollar (2002).

(5) Regression for lagged AID and GER

Regression (1) to (3) have analyzed year on year correspondence so far, however, aid cannot affect the primary school enrolment rate on a yearly basis. Wagner (2015) suggests the financial education is not very effective to short-term behaviors. Therefore,

Table 7. Regression including interaction term AID and Effectiveness

Independent Variable	(1) GER
L.NER	0.014
	(0.009)
AID	0.084
	(0.057)
GDP per capita	1.951
	(0.000)
EDUCEXP	0.051*
	(0.028)
YOUNG POP	-0.048
	(0.051)
Agr/GDP	-0.004
	(0.027)
FREE	0.097
	(0.141)
PTR	0.163***
	(0.039)
Effectiveness	-0.011
	(0.018)
Effect*Aid	-0.001
	(0.001)
Aid*Aid	-6.133
	(0.000)
No. of Observation	339
No. of Countries	73
R^2	0.129

*, **, *** Significant at the 10%, 5%, 1% level

Partial R^2	
A.Predictor: (constant), NER,AID	0.008
	(0.11)
B.Predictor: (constant), NER, AID, Effective	0.548***
	(0.000)
C.Predictor: (constant), NER, AID, Aid*Effective	0.549
	(0.798)

the regression (4) is carried out by average of years. Basically, starting out for 5 years average only for the first observation starting year, it will be 4-years average for the following observations year. Year 1 observation is the average of a period from 2002 to 2006, year 2 observation is the average of a period from 2007 to 2010 and year 3 observation is the average of a period from 2011 to 2014. We can see how average aid on education affects the growth rate of primary enrolment rate over several years.

According to the result, lagged aid cannot influence lagged growth rate of enrolment rate on primary school with P-value 0.747, 0.629, and 0.951. This is the same as the regression (1-1) and it clearly shows that AID and GER have no positive or negative relation. Despite of amount aids, the main independent variable has no effect on GER, other variable can be effective.

In Year 1 (2002 to 2006) and Year 2 (2007 to 2010), a total of 9 years, they are only significant on L.NER with negative under 1% level (P-value 0.000) and Year 3 (2011 to 2014) is a little different from Year 1 and 2. PTR has only positive relationship with 10% level (P-value 0.009) and L.NER and YOUNG POP are negative under 10% (P-value 0.82, 0.75). Other variables are not significant. GER and L.NER shows that the lower initial enrolment rate at the beginning is, the higher the growth rate of enrolment rate is. This is logical that it would be easy to increase GER from the lower starting point. Furthermore, the interesting point is that aid seems to affect GER by passing times. In Year 1 and Year 2, they are only significant with L.NER but as aid cumulated over years, more significant variables came out during Year 3 for L.NER, YOUNG POP, and PTR. For increasing GER, it is required to have less young people and many pupil students than teachers.

(5-1) Year 1 GER = 47.185 * -0.502 L.NER

(5-2) Year 2 GER = 34.493 * -0.304 L.NER

(5-3) Year 3 GER= -0.126 L.NER * -0.234 YOUNG POP * 0.263 PTR

Table 8. Descriptive Statistics for Lagged Year

Region		N	Minimum	Maximum	Mean	Std. Deviation
Year 1 (2002~2006)	L.LER	55	29.8	99.5	81.675	18.1108
	NER	55	34.9	99.3	83.385	15.8555
	GER	55	-9.8	49.1	6.194	12.5396
	AID	55	.3	85.7	9.723	18.5661
	GDP per capita	55	127.3	10965.9	2275.955	2469.8531
	EDUCEXP	55	5.1	38.0	13.703	6.4783
	YOUNG POP	55	15.6	49.1	36.455	7.4092
	Agr/GDP	55	.9	51.2	18.327	11.9956
	FREE	55	1	7	3.64	1.792
	PTR	55	10.6	66.9	33.133	12.6858
	Effectiveness	55	3.8	84.1	41.057	19.2336
	Valid N	55				
Year 2 (2007~2010)	L.LER	53	43.1	99.4	86.933	13.1394
	NER	53	-.1	99.5	85.765	17.1675
	GER	53	-9.3	24.9	1.852	5.3045
	AID	53	.5	206.4	11.590	29.4758
	GDP per capita	53	337.2	17016.9	3949.460	4246.0653
	EDUCEXP	53	6.1	55.6	15.541	9.5321
	YOUNG POP	53	15.0	49.8	32.851	9.1951
	Agr/GDP	53	.5	42.0	16.313	10.6941
	FREE	53	1	7	3.53	1.658
	PTR	53	8.8	52.5	29.049	11.3802
	Effectiveness	53	1.1	89.8	42.725	20.0893
	Valid N	53				
Year 3 (2011~2014)	L.LER	44	59.4	99.7	87.857	11.3180
	NER	44	60.9	99.3	87.961	10.7167
	GER	44	-8.3	21.8	0.189	4.4983
	AID	44	.4	252.6	12.993	38.3050
	GDP per capita	44	405.2	18562.0	3928.808	4072.2473
	EDUCEXP	44	.3	51.0	14.949	9.2202
	YOUNG POP	44	14.3	50.3	32.992	10.1301
	Agr/GDP	44	3.3	53.2	16.738	11.8531
	FREE	44	1	7	3.68	1.717
	PTR	44	9.1	62.1	29.295	12.0468
	Effectiveness	44	2.5	85.7	37.565	19.0346
	Valid N	44				

Table 9. Regression for Lagged AID and GER

Independent Variable	(1) GER	(2) GER	(3) GER
L.NER	-0.502***	-0.304***	-0.126*
	(0.093)	(0.066)	(0.070)
AID	0.020	0.013	-0.001
	(0.061)	(0.026)	(0.019)
GDP per capita	0.000	0.000	0.000
	(0.001)	(0.000)	(0.000)
EDUCEXP	0.062	-0.034	0.070
	(0.203)	(0.079)	(0.076)
YOUNG POP	-0.184	-0.181	-0.234*
	(0.268)	(0.143)	(0.127)
Agr/GDP	0.027	-0.023	0.076
	(0.109)	(0.075)	(0.062)
FREE	0.478	-0.136	0.542
	(0.700)	(0.398)	(0.372)
PTR	0.162	0.018	0.263*
	(0.158)	(0.108)	(0.095)
Effectiveness	-0.035	0.035	0.050
	(0.079)	(0.047)	(0.048)
No. of Observation	55	53	44
No. of Countries	103	103	103
R^2	0.683	0.445	0.465

*Note : parenthesis (1)~(3) means that (1)2002~2006 (2)2007~2010 (3)2011~2014

* Significant at the 10% level

5.

Conclusion

The relationship between Education aid (AID) for primary enrolment rate (NER) and the growth rate of primary enrolment rate (GER) by region and income group are mainly purpose of this paper. In order to find out, the paper has set NER and GER as dependent variables and aid disbursement in recipient countries as independent with 8 control variables: L.NER, GDP per capita, EDUCEXP, YOUNG POP, Agr/GDP, FREE, PTR, and Effectiveness. All analyses are carried by linear regression and all data are from 2002 to 2014 since AID value is only available starting from the year 2002. All variables except for FREE are from the World Bank and Free is from Freedom House. More details

are on the Appendix.

Based on the statistical analysis, this paper conclude as follows;

1. Aid has had an effect on net enrolment rate (NER) but it has not influenced the growth rate of primary enrolment rate (GER). Not only GER, but also lagged aid does not have influence on GER.

2. Based on the result of analysis on region and income groups, aid has no effect on the growth rate in primary school enrolment rate over all regional groups and income groups. The only group that aid has an effect on is in low income group. In other words, aid is effective to GER only in low income countries.

3. Aid has no relationship with good policy or good governance Effectiveness. Like Burnside and Dollar (2000), this paper also analyzed the relationship between aid and good policy in recipient countries by interaction term and the result is the opposite to the previous research. Aid effect is not conditioned by good governance among recipients.

Even though education aid has not had any effect in most region and income groups, we can see which variable can affect primary school enrolment either positively or negatively. Since donors have increased aid amount and the aid has flowed to the education section, the evaluation of aid effectiveness should be conducted. Moreover, each group's characteristic should be considered when aid is allocated.

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7. Appendix

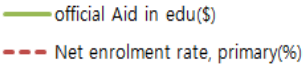
Table 1. List of Variables

No	Variable Name	Definition	Source
1	L.NER	Initial enrollment rate on primary school(%)	Calculated based on NET
2	NER	Net enrollment rate on primary school (%)	World Bank(2015)
3	GER	Growth of enrollment rate on primary(%)	Calculated based on NET
4	AID	Aid allocated to recipient countries for education/per capita (US$, constant 2014)	OECD(2014), Creditor Reporting System(CRS)
5	GDP per capita	GDPpercapita(currentUS$)	World Bank(2015)
6	EDUCEXP	Government expenditure per primary student (% of GDP per capita)	World Bank(2014)
7	YOUNG POP	Population ages 0-14 (% of total)	World Bank(2015)
8	Agr/GDP	Agriculture, value added (% of GDP)	World Bank(2015)
9	FREE	Political Rights(the most free=1,the least free=7)	Freedom House(2016)
10	PTR	Pupil-teacher ratio in primary education(%)	World Bank(2014)
11	Effectivness	Government Effectiveness(%)	World Bank(2014)

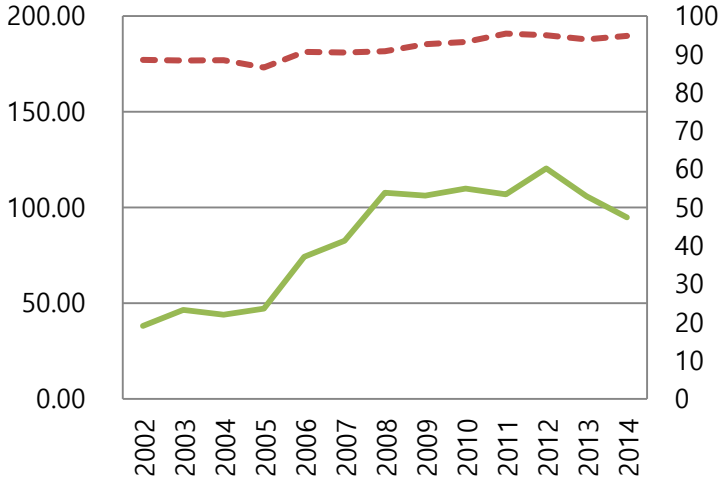
Table 2. Country Coverage of the Data Set

	High income	Low Income	Lower Middle Income	Upper Middle Income	Not Classified
East Asia & Pacific			Cambodia, Indonesia, Lao PDR, Mongolia, Philippines, Tonga	Fiji, Malaysia, Thailand	
Europe & Central Asia	Estonia		Moldova, Ukraine	Albania, Georgia, Serbia	
Latin America & Caribbean	Antigua and Barbuda Barbados Chile Trinidad and Tobago		Bolivia, El Salvador, Guatemala, Nicaragua	Belize, Colombia, Cuba, Dominican Republic, Ecuador, Guyana, Jamaica, Mexico, Panama, Paraguay, Peru	Argentina
Middle East & North Africa	Oman		Djibouti, Morocco, Syrian Arab Republic, Tunisia	Algeria, Iran, Islamic Rep.	
South Asia		Nepal	Bangladesh, Bhutan, India, Pakistan, Sri Lanka	Maldives	
Sub-Saharan Africa		Benin, Burkina Faso, Burundi, Chad, Eritrea, Gambia The, Guinea, Guinea-Bissau, Mali, Mozambique, Niger, Tanzania, Togo, Uganda	Cabo Verde, Cameroon, Ghana, Kenya, Lesotho, Mauritania, Swaziland, Zambia	Botswana, Namibia	

Figure 1. Education Aid and Rate of Enrolment by Region

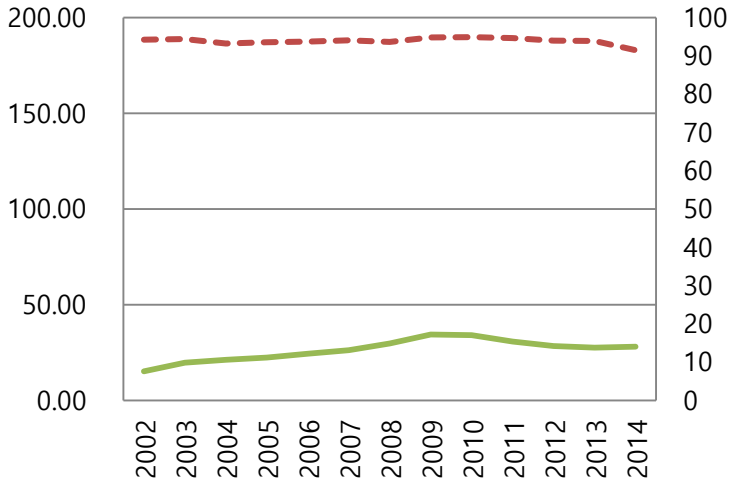


East Asia & Pacific

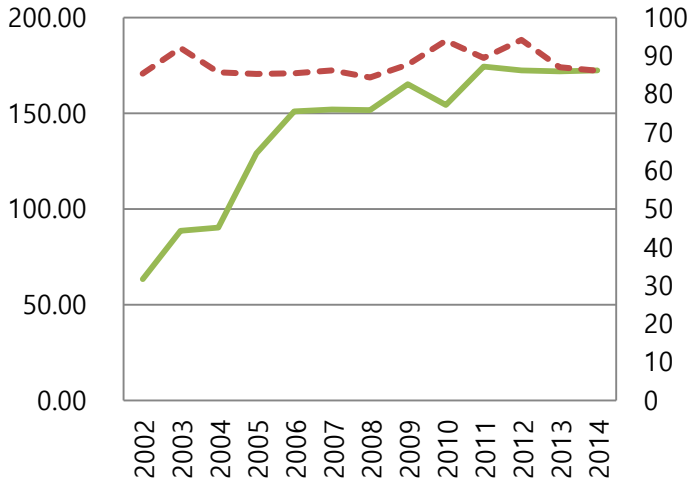


Europe & Central Asia

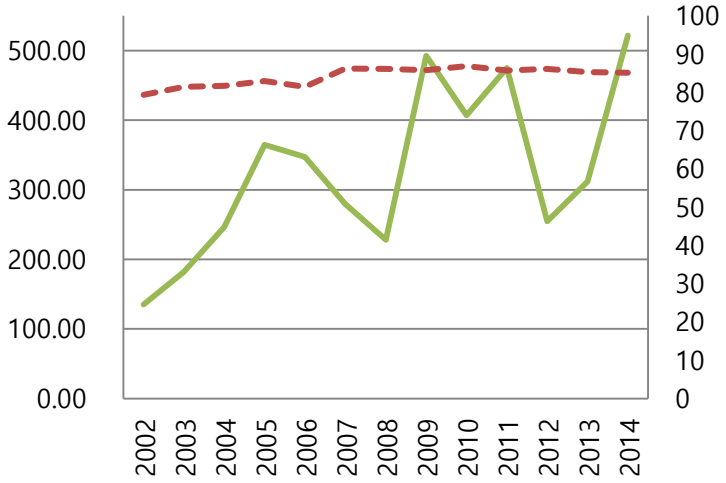
Latin America & Caribbean



Middle East & North Africa



South Asia



Sub-Saharan Africa