

Educational System Reform in Indonesia: Assessing the Impact of BOS Fund Allocation to School Participation Rate

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ABSTRACT

At the beginning of the new millennia, Indonesia implemented the 9th year of compulsory basic educational policy. Since then, there have been rapid changes with the launching of programs by the government to address the needs of free and affordable education. One is known by BOS funding program that was introduced in 2005. Basically, this program aims to boost the school participation rate of students who inhibited due to financial circumstances, but in 2009 this programs also transfer a certain amount of money to subsidize low-quality school in the rural area. Despite all positive review and report from several survey institution, many still question the effectiveness of the BOS fund, and the impact it brings to the student's participation rate. This paper argues about the impact of BOS funding on school participation rate, and whether there is an underlying correlation between BOS fund and the poverty rate. The result of the fixed effect method revealed a positive correlation between BOS fund and school participation rate, in both primary and secondary schools, with the effect of primary school intervention showing a larger effect.

1. Introduction

Education throughout the years has proven to be an agent of advancement, bringing about the growth in skill and productivity necessary to nurture the economic competitiveness of a country. This explains the current trend of educational reforms taking place in developing nations which aims for an equal distribution to all levels of society. In fact, country such as Indonesia has started their educational reform in 1999 by introducing 9th-year compulsory basic education, although the program has been working properly, government had the initiative to accelerate completion of 9th-year school program by implementing school tuition subsidy or well known as BOS funding program. This program provided additional funding for primary and secondary school students across Indonesia, by providing more fund to them hopefully the school participation rate can be increased, the dropout rates can be minimized and 9th-year basic schooling policy can be achieved faster.

Figure 1 and 2 shows the school participation rate for primary and secondary school in Indonesia, the data starts from 1994 until 2013. Here, the graph depicts an increasing trend towards a 100% enrollment ratio both in primary and secondary school, this is a good sign for the government as it tells that most of the population is receiving secondary school diploma, in addition, it also indicate that BOS funding has accelerated the completion of 9th year basic schooling.

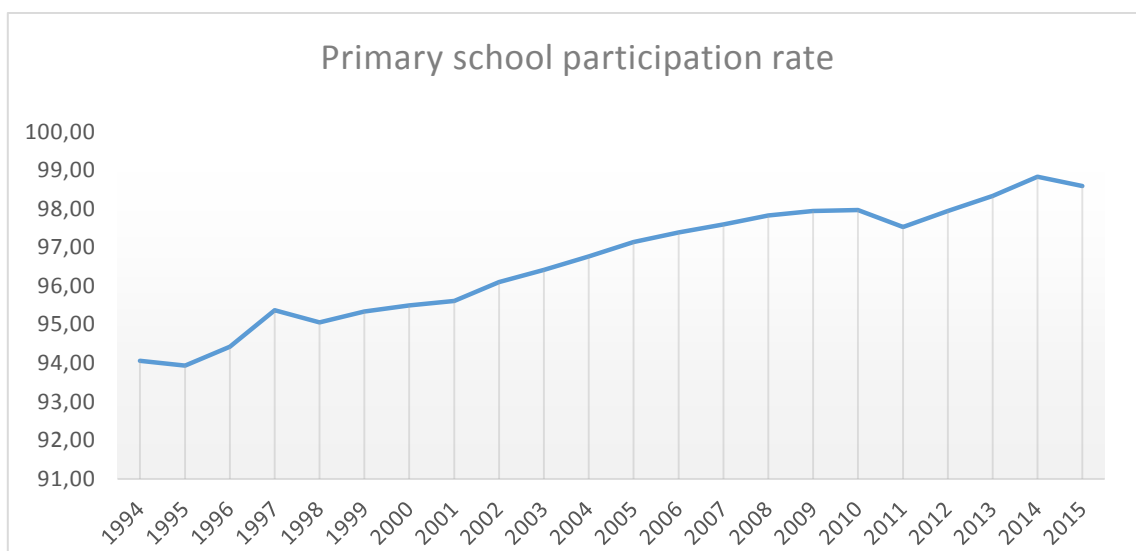


Figure 1. Primary school participation rate 1994-2013 in Indonesia, source: Badan Pusat Statistik <https://bps.go.id/>

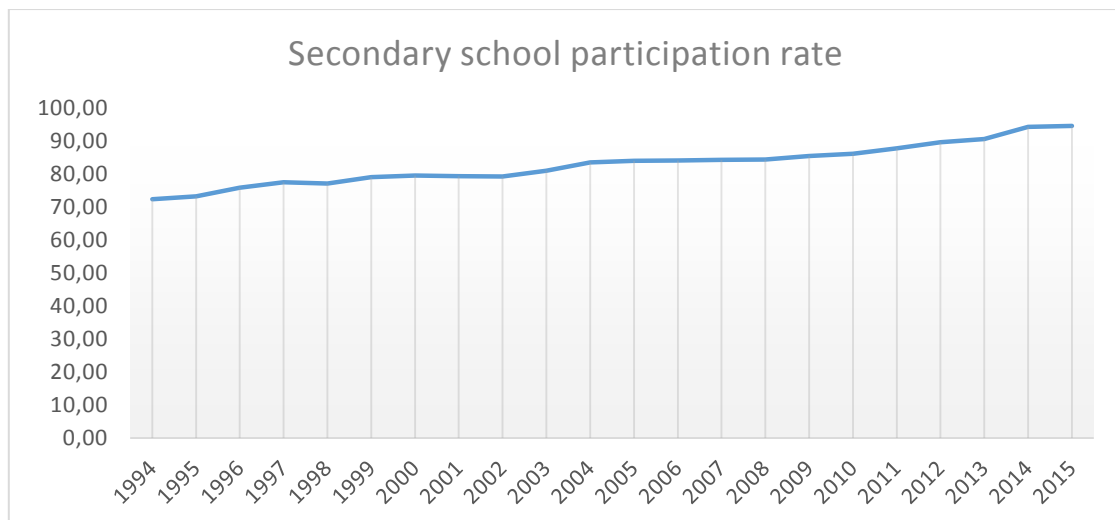


Figure 2. Secondary school participation rate 1994-2013 in Indonesia, source: Badan Pusat Statistik <https://bps.go.id/>

Despite the fact of increasing school participation rate since the implementation of educational reform, we are still unsure of the exact impact of the BOS program. We don't know, whether the program has significantly increased the school participation rate or not, On a more pressing matter, there haven't been many pieces of research that evaluating the BOS funding program, although the raw data has been published by the government and ministry of finance/education.

Because of that reason, this research will try to evaluate the BOS funding program by empirically find the correlation between BOS funding to school participation rate and poverty rate on 497 urban/non-urban areas across Indonesia, starting from the beginning of BOS funding program until 2013. Furthermore, in order to minimize selection bias and to capture the real impact of the program, the research will be conducted using fixed effect regression method. The remainder of this research is organized as follows, next part will explain the BOS funding program; section 3 will be literature review; section 4 will be empirical strategy and data description; section 5 describe the variable; section 6 reports of the result; section 7 sensitivity analysis followed by the conclusion and suggestion for improvement.

2. BOS Funding Program

Under the Constitution of the Republic of Indonesia section 20 article 34 the year 2003 on the premise of compulsory basic education and backed by article 34 clause 2 which states, "Indonesia's government carries the responsibility to assure education is effective and equally distributed". Indonesia launched the 9 years of compulsory basic schooling policy in 1999 that

aims to ensure every citizen's right in gaining at least a basic level of education (primary and secondary school). However the enforcement of the policy itself does not greatly contribute to the enrollment rate or even the school's quality. Thus, to increase the enrollment rate as well as the school's quality, another government intervention was launched in 2005, known as Bantuan Operasional Sekolah (BOS).

BOS fund is part of the government 9th year compulsory basic educational policy, the program main objective is to relief tuition fee of the student, so, parents will have the incentive to keep enrolling their children in school. Moreover, starting in 2009 BOS funding also facilitate school by providing a direct fund that has to be used to improve school qualities or to pay school operational cost. Based on the data provided by the Ministry of Education, the amount of BOS fund is on an upward trend, at the beginning of the BOS funding program each primary school student was receiving Rp235.000,00 while secondary school student receiving Rp324.000,00 but in 2013 the amount increasing to Rp580.000,00 for primary school and Rp710.000,00 for secondary school.

A year after the implementation of BOS program most of the nation had undergone the change, the tuition fee for most schools in Indonesia especially in the rural area is free, even better, on the following year school participation rate has increased significantly. For your information, in 2005, gross participation rate stood still at 106% but 4 years after the implementation it gradually increases to 110%. The government made an announcement during Education for all (EFA) declaration at Dakar 2009, "this program is a huge success as it accelerates the accomplishment of 9th-year basic schooling program by 7 years." The government also mention that the success of BOS fund is closely related to strict rule created by the Ministry of Education, which were distributed as BOS manual guidance. This guide describes everything about BOS fund in details. It also describes schools that eligible to receive the BOS fund. Below is the rules based on the BOS manual guide:

1. State school that already have national school number (NPSN), and has been enlisted at educational data online (DAPODIK) must receive the BOS fund
2. Private school that have national school number (NSPN) and also enlisted at educational data online (DAPODIK) can receive the BOS fund, however, private school has an option to reject it

3. State school are not allowed to charge any fee to the student if that respective school already receive BOS fund
4. Private school are allowed to charge any fee even though the respective school already receive BOS fund, however, it only applicable if the BOS fund given during that period is not enough, or additional operational cost occurred before the next BOS fund being distributed
5. School can raise fund if the money subsidized by the government is not enough, but school is neither allowed to set the amount nor set the deadline date of payment. Local government has authorities to monitor and decline the raising fund program by the school.

Interesting fact happened in 2009 until 2011, as the fund given to urban and non-urban area are differ. However, the policy was considered as inefficient because the one who needs the subsidy are concentrated in non-urban area, hence, in 2012 the BOS fund decided to deactivate differentiation policy and enacted a policy similar to the period 2005-2008. Below is the list of how much fund per student receive in the respective year.

Type of school	Year	BOS Fund
Primary school	2005	\$ 12.57
Secondary school		\$ 21.19
Primary school	2006	\$ 17.64
Secondary school		\$ 24.36
Primary school	2007	\$ 19.06
Secondary school		\$ 25.90
Primary school	2008	\$ 19.06
Secondary school		\$ 25.90
Urban Primary school	2009-2011	\$ 30.02
Rural Primary school		\$ 29.80
Urban Secondary school		\$ 43.06
Rural Secondary school		\$ 42.80
Primary school	2012	\$ 43.53
Secondary school		\$ 53.29
Primary school	2013	\$ 43.53
Secondary school		\$ 53.29

Table 1.0 BOS fund allocation per-student (current US dollar), source: Asian Development Bank <https://www.adb.org/sites/default/files/publication/176604>

In spite of the strict rules proposed by the Ministry of education, there are some issues that need to be fixed, the first one is chance of fraud or corruption surrounding BOS funding program, according to CNN Indonesia¹, in 2015 there were 9 headmasters and teachers who were fired because of fraud and unethical conduct in allocating the fund, meanwhile, in 2014,

¹Donatus Fernanda Putra, CNN Indonesia, Published Saturday, 24/01/2015 09:40 WIB

400 million Rupiah of BOS fund are gone which resulted to unpaid salary of several honorary teachers in Polewali Mandar. The Second issue is BOS fund distribution, this kind of problem must be taken into account because some regencies did not receive the BOS fund, and it could heavily affecting the children enrollment in that respective region. The regional government claimed that some regencies are too deep to the forest or particularly unreachable, however, no further action has been done to build infrastructure in order to access the region. Hence cooperation between central government and regional government are necessary to keep the money flow, monitoring by central supreme financial audit (BPK) and regional financial audit is also needed to keep the money safe and distributed to those who need it. Below is the list of provinces which did not receive the BOS fund allocation in 2013:

List of Provinces Not Receiving BOS Fund 2013

Selected Provinces	Total Population	Poverty Headcount Ratio	Average Enrollment Rate 2006-2013 (Primary)	Average Enrollment Rate 2006-2013 (Secondary)	Average Illiteracy Rate	Average Per-capita Expenditure
Sumatra Utara	5,366,763	380,630	98.81	92.2	2.62	\$104.41
Sulawesi Utara	2,482,921	326,170	98.0	89.12	7.39	\$91.09
Nusa Tenggara Timur	5,240,337	802,450	98.2	92.23	15.33	\$105.88
Lampung	7,975,149	1,108,210	98.57	89.47	2.76	\$132.53
Aceh	1,802,229	125,020	98.59	90.35	2.09	\$113.98

Table 1.1 list of region which did not receive BOS fund in 2013 source: Kementerian Pendidikan dan Kebudayaan

<http://salur.bos.kemdikbud.go.id/> and <https://bps.go.id/>

3. Literature review

Since 2005, the BOS funding program has fully operated, hundred thousand of Rupiah were given to subsidize every school-aged children across Indonesia. Few pieces of literature explain the benefits of this program, some mentioned that BOS program has greatly reduced the school tuition fee and incentives parent to keep enrolling their children into school, on the other hand, some study claim BOS funding is still a premature program and internally cracked due to lack of monitoring and unequal distribution. Following these, several local and international study has been carried out to investigate the true impact of BOS funding to human capital and school participation rate.

First, The Asia Development Bank (2013), published an article that investigates how effective is BOS funding program to boost school quality and participation. Asia Development

Bank stated BOS Funding is closely related to Free Basic Education (FBE) policy and Pro-Poor programs. Furthermore, the program is believed to be easily understood not only within the education system but also the citizen of Indonesia as well because every student will receive the same amount of subsidy depends on where's the school and how many students enrolled.

The analysis of BOS fund do not end there, they also include how the subsidy was distributed, how the subsidy was documented, reported and used for school related operational cost. But at the last part, ADB states that the biggest concern surrounding BOS funds is how the school monitor and allocate the subsidy, given that the government does not have any trace of the subsidy that's been distributed to the local government, then ADB concludes that the monitoring system in Indonesia is still weak and not very well-developed, which make this program so vulnerable to act of debauchery and fraud, even worse auditing by the National Supreme Audit Office is neither coordinated nor undertaken, hence the effectiveness of BOS funding is still questioned.

A research about the similar program has been done by Eric Bettinger, Erik Bloom, Elizabeth King, and Michael Kremer (2002). They analyze the effect of the voucher program in Colombia, the researchers use a quasi-experimental research design to compare the student who wins the lottery and receive the voucher and student who does not get it. The First result they found that lottery winner has 15% more chance to be enrolled in secondary private school, lottery winners also less likely to repeat grades. Although the effect of the voucher to variable school enrollment is insignificant but the effect on years of schooling is clearly seen through a reduction probability of grade repetition. A Higher test score is also experienced by lottery winner and they estimate the economic benefits of the participant (lottery winner) is much higher compared to total cost. Thus they conclude that such program might be cost effective way to increase educational attainment

In related pieces, a research by David Bravo, Sankar Mukhopadhyay and Petra E. Todd (2010) reveal how school voucher subsidy reform in Chile has been affecting not only competitiveness among school there but also increase the demand for private school since the voucher acts as a support for the citizen to enroll in private school. To find the total impact of the voucher, they implemented a dynamic behavioral model, this model is estimated by simulated maximum likelihood, then, subset parameters are included through earning density. As the result, first, they found the return on earning of secondary school student is

twice higher than primary school. Second, after the reform has been implemented, the cost of primary and secondary school is gradually decreased. Third, rate of return to schooling increases, which accompanied by increase in primary and secondary school graduation rates. Lastly, they mention “the voucher reform increase the lifetime utility by 10% on average”.

As per Abdul Aziz (2009) he conducted a statistical test to evaluate how effective is BOS funding program to gross participation rate and net participation rate is. Additionally, he also includes variable such as dropout ratio, graduation rate and school continuing rate into the calculation. The result is in line with what has been expected as most of the variable shows an improvement compared to the period before BOS fund is established, moreover he also mentioned this improvement is statistically significant but only for secondary school. While the variable primary school participation rate, dropout rate, and graduation rate have not changed significantly thus, for the conclusion BOS funding is not yet effective to improve school participation rate at every level of education, he also mention that monitoring stood as the catalyst in order to assure the effectivity and efficiency as the program so the BOS funding will not only improve quality of education but also accelerate the school participation rate each year.

A qualitative study has been done by Karisun (2010), however, it does not specify how effective the BOS funding program at a higher aggregate level is, as it focuses more on evaluating the BOS fund in state high school at Gunung Kidul, Yogyakarta. The authors conducted this research in order to understand how school makes use of the BOS fund, how effective the fund is allocated and what is the overall impact of the BOS fund. His analysis shows that student’s parents are involved in supervising the allocation of BOS fund, the fund also being strictly monitored and used only for school operational purpose. The headmaster of state high school in Gunung kidul stated that the subsidy was allocated according to BOS manual guidance² which was published each year by the ministry of education, and student’s parents will also be involved in the monitoring process of the funds. Thus they ensure a minimal level of misuse in this region. Last but not least, the impact of BOS fund is clearly seen as the tuition fee now is free of charge and the school can provide more school related activities due to the improved school facilities.

Such qualitative studies were also conducted by Nadira Sukma Amiini (2016), which reveals how state schools in Karanganyar district manage their BOS funds. To do this analysis

²the guidance followed by the authors is BOS manual guidance published in 2010

the authors interviews the teacher, school accountant, and school headmaster, she also reviews the school operational budget plan and being involved in supervising the budget plan next year. Based on the research the school first arrange a draft budget, then the headmaster and schools fund auditors will review the fund allocation, once the draft budget is approved each parent will get the copy of it and will be asked to participate in evaluating or monitoring the distribution of the fund. The evaluation of BOS fund has been done each year and so far there is no complaint regarding the fund allocation as the school always tries to be transparent on their fund by publishing their budget plan. Finally, the authors also mention that monitoring is crucial in order to keep the track of the BOS fund and maximize the utility of it, the government should also be involved in monitoring and auditing thus minimizing the chance of fraud or misuse the fund.

Last but not least, the general directorate of funds, ministry of finance published their evaluation on the effectivity of BOS fund in 2015, the analysis was trying to answer whether the BOS funding program is distributed on time or not, and whether BOS funding is really a 'pro-poor program'. The result of the evaluation was quite severe, the authors found that the distribution of BOS funds was not timely, some regions are not receiving the subsidy, and it turns out the BOS program was not 100% pro-poor since in some state high schools the 'free tuition' was not implemented, most of them only receiving a "discounted fee", the amount of discount varying from 25% up to 75% depending on the financial background of the student.

Based on the previous article the evidence of BOS fund is effective to improve school participation rate is still questioned, some claiming the effects to be positive since it helps poor citizens to enroll their children in school while the other claims that it's not yet effective and not equally distributed. In addition, most of the previous evaluation and research share a similar range of studies which is at the district level. Here our analysis will try to solve this puzzle and clarify the effect of BOS fund at the national level, hence we will include 497 urban and non-urban area and regencies in Indonesia starting from 2006 until 2013. Our fixed effects method reveal that increased school participation rate is induced by BOS funding program, although we only find a small effect but the effects are significant and enough to justify the effect of BOS fund.

4. Empirical Strategy and Data description

The aim of empirical analysis is to capture or evaluate the impact of a policy/intervention, In this case, we are trying to find and evaluate the impact of BOS funding program to school participation rate and poverty rate. However, the evaluation would not be as easy as looking at the raw data published by the government, because if we only use it as the tool to capture the impact of such program then the result will be biased considering other time-varying factor occurred since the launch of the program. Another potential problem that might arise is selection bias, this kind of problem will often occur in a data set comprising of a before after or with/without comparison as it will not take into account the initial differences among each regency or cities.

To overcome those issues, this research will try to control another variable that could give an impact to our main variable and our treatment variable, such as government educational expenditure and country political stability index. How that variable could intervene with the impact evaluation, first Government educational expenditure will affect the amount of BOS fund allocated in that respective year, if the government decided to cut the amount of educational expenditure on their state budget plan then the ministry of education will not have any other choice instead of reducing the amount of BOS fund. Additionally, this variable also affects the outcome which is the school participation rate as it will act as an incentive to build more school in the rural area or modernize the school in the cities which also acts as an incentive for every parent to enroll their children in schools. Second the countries political stability index, politics stands as one of the most crucial factors in most countries especially democratic countries since the decision of government state budget and government programs depends on the majority of representative council, thus the BOS funding also depends on it. Furthermore, political stability not only relates to the program but also the outcome (school participation rate). To understand this, consider a state in which the country was facing a lot of serious problems like what happened during the financial crisis of 98'. Where for most countries it's only a financial crisis but for Indonesia, it's a multiple crises including political and development instability. The impact of the crisis was tremendous and lead to unemployment, massive inflation, riots, and most importantly it leads to the decline in school participation rate because parents are unable to afford the tuition. Including that kind of variable into our research will reveal the true impact of the

program, in addition, it makes our research less biased and can be used as a decision tool for the government whether to continue the program or not.

Next, the estimation will be calculated by employing a fixed effect method at the econometric models, the main reason the author decided to use fixed effect is to simplify the time-invariant omitted variable that is unobservable and might lead to biases if it's not controlled for. Fixed effect will help us since we have a huge range of variety in each area, and it is impossible to consider every single one of those variations, thus, by applying the fixed effect method, region specific variables which are time invariant will implicitly be controlled hence will not end up in error term.

The main econometric model for the study is:

$$Y_{i,t}: \alpha_1 + \alpha_2 \log \beta_i + \alpha_3 X_{2i} + \alpha_4 X_{3i} + f_i + \varepsilon_{it}$$

$Y_{i,t}$: School participation rate (1st Objective) or Poverty rate (2nd Objective)

α_n : Parameter (correlation value)

α_1 : Constant

$\alpha_2 \log \beta_i$: Bos fund allocation (Primary or Secondary)

$\alpha_3 X_{2i}$: Vector control variable Total population in each regencies
: Vector control variable government education expenditure

$\alpha_4 X_{3i}$: Vector control variable country political stability
: Vector control variable country corruption rate

f_i : Time invariant unobserved characteristic (Fixed effect)

ε_{it} : Error term

To counter the effect of various variables on the outcome and see the correlation between school participation and BOS fund, we sub divided the main econometrics model into four sub models, with BOS fund allocation as the treatment variable (main variable) and school participation and poverty rate as output.

MODEL 1

This model is developed by using fixed effect method to find the direct correlation between treatment and outcome variable, moreover, it also acts as an initial indicator

whether BOS fund for primary school and secondary could positively affecting the school participation rate or not. The equation:

$$Y_{i,t}: \alpha_1 + \alpha_2 \log \beta_i + f_i + \varepsilon_{it}$$

MODEL 2

2nd model act as the justification if we include total population from each urban non-urban area and government education expenditure using fixed effect method, the result from this regression are expected to be more valid compared to the previous model. Here we are not only regressing BOS fund for primary school and net participation rate for primary school, but also BOS fund for secondary school and net participation rate for it. The equation:

$$Y_{i,t}: \alpha_1 + \alpha_2 \log \beta_i + \alpha_3 X_{2i} + f_i + \varepsilon_{it}$$

MODEL 3

This model aiming to capture the true impact of the BOS fund for primary and secondary school to school participation rate, we include additional time-varying control variables such as country political stability index and country corruption rate index. The result will be much more valid considering all time variant control variables in this research has been included, while fixed effect will implicitly take control the time-invariant variables. The equation:

$$Y_{i,t}: \alpha_1 + \alpha_2 \log \beta_i + \alpha_3 X_{2i} + \alpha_4 X_{3i} + f_i + \varepsilon_{it}$$

MODEL 4

Model 4th aiming to capture the long-term impact of BOS funding to urban non-urban poverty rate, the variable poverty rate will replace the participation rate as the outcome variable, while keeping the treatment variable the same. This model act as our additional objective to show whether the long term effect is yet to appear. The equation:

$$Y_{i,t}: \alpha_1 + \alpha_2 \log \beta_i + f_i + \varepsilon_{it}$$

4.1 Data Description

The data for the topic covered 497 urban and non-urban areas across 32 provinces in Indonesia, in addition, the analysis will take places from 2006, or one year after the implementation of BOS fund, until 2013. This research is bounded by the availability of data since there's a large portion missing especially during the period before 2005, thus before and after comparison using various techniques are impossible. The main data sources for the outcome and treatment was World Bank database supplemented by the country official statistical department or Badan Pengelola Statistik. But for the variable such as political stability and corruption index, we gather the data from Global Economy website.

5. Variable Description

Variables selected in this research are BOS funding (treatment variable), then, the outcome variable, which are net enrollment ratio for primary school, secondary school and poverty rate. Time-varying control variables such as total population at each specific urban and non-urban area, yearly government expenditure on education, country political stability index and country corruption index. Below is a detailed explanation of each variable used in this research.

School participation rate

This is our dependent variables (outcome variable), later we will reveal how this variable relate to our treatment or independent variable. School participation rate represented by the number of school-aged children enrolled in primary or secondary school in that respective year divided by total school-aged children in the same year.

BOS fund allocation

This variable will be our treatment variable, as each school receiving BOS fund then we want to know how that fund correlates with school participation rate. BOS fund allocation is measured using money received per capita (per student) instead of using terms yes or no, because, the money differ not only throughout the year but also the area, especially around the year 2009 until 2011. In addition nominal value in this variable will help us in regressing BOS fund with poverty rate, as we believe there is a correlation among them.

Total population per-regencies

According to Charles Pearson on article “factors affecting the decrease in enrollment in schools”, low population or low birth rates could have affected the enrollment rate, because it means the respective area has fewer children that could lead to enrollment shortages. These problems often happened in the rural area with low quality of life. Following this explanation, we expect a positive correlation between total population and school participation rate.

Country political stability

Politics can be defined as the heartbeat of a democratic country, the people consultative assembly take control the policy and program which has been enacted, not in exception BOS funding program. If one day the decision to continue the program is not receiving minimum vote requirement then the program will be deactivated, thus continuity of the program really depends on it. Political stability is measured using an index invented by the Global Economy and ranged from -2.5 up to +2.5, the more positive sign indicates a better political environment, and a negative sign indicating unstable political environment. Here we expect positive correlation between CPS and school participation rate because political stability not only affects decision to funding the program but also the education itself, moreover our view also being supported by a paper from Adam E. Nir Bhojraj Sharma Kafle, (2013), that mentioned “Political stability could affect education from very visible impacts such as the allocation and distribution of educational budgets, teacher appointment policies or innovative educational activities.”

Government educational expenditure

Educational expenditure represents the amount of money allocated to all aspect of education including BOS fund, this variable measured in terms of nominal value which varied each year. By including this control variable we could minimize any other effect of educational funding, so the true effect of BOS fund could be captured. We expect a positive correlation between government educational expenditure and school participation rate.

Corruption rate

Along with country political stability index, corruption index also somehow related to the school participation rate, Global Economy create corruption rate indexes which had number varied from 0 to 100, if a country has 100 corruption index then this country are considered free corruption if it 0 then the otherwise. Before continue we have a question on how corruption related to school participation rate? based on the paper by the IMF it shows that drop-out rates in countries with high corruption are five times as high as in countries with low corruption. These empirical analysis was being reinforced by a paper from Bettina Meier (2004), which stated "Low school enrolment in developing countries has been linked to illegal payments for school entrance and other 'hidden' costs for meals, uniforms, textbooks and other teaching materials as well as for additional services like extra tuition." Based on these views we expect the correlation between corruption rate and school participation rate will be negative.

Poverty rate

Last, our 2nd outcome variable is poverty rate. The relation between this variable and BOS fund will reveal whether BOS program has entered it long term impacts or not. The poverty rate is measured by dividing person living below standard poverty line in respective regencies to the total population. According to the BOS guidelines, the long-term impact of BOS fund is to reduce poverty rate, by enhancing human capital and accelerating the accomplishment of 9th-year basic schooling program for every citizen in Indonesia. Based on this reason, our expectation is a negative correlation among them.

6. Main Estimation Result

In this section we report the main estimation of BOS funding to our independent variable, moreover, we will also briefly interpret the result from each model along with test statistic employed in the estimation.

Model 1

In column (1) table 2 we input our first model including the fixed effect to implicitly control time-invariant variables, because, in this model we only regress our treatment variable to the outcome variable without including additional control variable, the result

shows the treatment variable is positively correlated with both net enrollment rate, and it's also statistically significant. Based on the result a 1% increase in the nominal value of BOS fund will increase primary school participation rate by 0.56% keeping other variables constant. In addition Increase on secondary school participation rate by 5.04% are also expected to happen if BOS fund increases by 1%. Although a clear positive effect is captured in this model but we still cannot use it as our main result considering there might be another factor that affecting school participation rate.

Model 2

For the 2nd model (see column (2) table 2) we include several control variables such as government educational expenditure and regency's total population as time varying control variable, in addition, a fixed effect also applied in this model thus the effect can be captured at a higher precision rate. Here, we can see the correlation between BOS fund and primary school participation rate is surprisingly higher than the 1st model, a 2.21% increase in school participation rate is expected to happen if the government increase the BOS funding program by 1%. Additionally, we found a negative and statistically significant correlation between government educational expenditure and primary school participation rate, which indicates if the government decide to increase the amount of money invested in education by 1%, school participation rate will drop by 0.4%. This negative result also happened with the correlation between total population and school participation rate, however, the result is statistically insignificant.

At the same time, calculation of the secondary school participation rate shows a similar result with the 1st model, a slight increase by roughly 2.5% if we include these time varying control variables into the calculation. Meanwhile, the correlation between government educational expenditure and school participation rate is exactly the same with the regression on primary school, these negative result on both variables might be caused by inefficient allocation of educational fund from the ministry of education or the local government to school, thus even though allocation from state government increases the school participation cannot be increased.

Main Estimation of the Effect of BOS Fund to School Participation Rate and Poverty Rate

Variable	Model							
	Primary School				Secondary School			
	School Participation Rate		Poverty Rate		School Participation Rate		Poverty Rate	
	1	2	3	4	1	2	3	4
BOS fund	0.56*** (0.15)	2.21*** (0.24)	7.11*** (0.6)	-6.4*** (0.11)	5.04*** (0.38)	7.84*** (0.7)	8.85*** (1.92)	-7.8*** (0.1)
Total population		-8.73 (1.02)	-3.22 (9.84)			2.45 (2.14)	2.33 (2.51)	
Govt education exp		-0.4*** (0.04)	-0.5*** (0.04)			-0.05*** (0.11)	-0.5*** (0.122)	
Corruption rate			-0.89*** (0.05)				0.31** (0.1)	
Political stability			4.04*** (0.75)				-4.4** (1.8)	
Number of observation	3712	3712	3712	3712	3712	3712	3712	3712
Number of Region	450	450	450	450	450	450	450	450
Within R ²	0.0027	0.026	0.09	0.479	0.052	0.059	0.06	0.52
Between R ²	0.0636	0.02	0.0058	0.03	0.05	0.028	0.026	0.083
Overall R ²	0.0002	0.0015	0.013	0.041	0.079	0.038	0.038	0.03

Table 2 Regression result ***p<0.01 **p<0.05 *p<0.1. The BOS fund represent log-value of nominal fund received per school. Fixed effect were included to all of the estimation, model 1 to 3 represent regression to the subject of School Participation Rate, while model 4 represent regression of BOS fund to Poverty rate.

Model 3

In the last model, we are about to capture the effect of BOS fund to school participation rate by including all time varying control variables and fixed effect into the calculation. Variables such as country corruption index and country political stability index are considered as a variable that could affect our treatment and outcome variable and it cannot be controlled by just including fixed effect into the calculation. As the result, (see column (3) table 2) value of treatment variable is increasing sharply, in the previous model the correlation between BOS fund for primary school and primary school participation rate is around 2%, but on model number 3, the value increases to 7.11. How about the correlation of the newly added control

Model 4

In column (4) we change the outcome variable from school participation to poverty rate while maintaining the treatment variable, the 4th model describe the correlation between poverty rate and BOS fund for both school, the result is quite surprising because we found a negative correlation, yet statistically significant for both primary school and secondary school. Thus based on these result we decided to accept that poverty rate and BOS fund is negatively correlated, as an increase in BOS fund by 1% will reduce the poverty rate by 6,4% if it's allocated to primary school and a 7.8% reduction in poverty rate if the increase is allocated to the secondary school.

7. Sensitivity Analysis

Before inferring the conclusion from the regression result, it is important to undertake a sensitivity analysis test in order to investigate the validity of the result. To do this sensitivity analysis we exclude several region that we believe could heavily affecting the estimation result such as urban areas like DKI Jakarta and Yogyakarta which has more than 96% of school enrollment rate after the implementation of BOS funding and non-urban area like Karimun that receiving a whopping 7% increase in school participation rate few years after the implementation of BOS fund. Once we remove all of that region we conduct another regression based on the previous model explained before and we found that the result does not change much. Below is the full list of correlation between school participation rate and BOS funding for either primary or secondary:

Model	BOS fund Primary School	1	0.48***
		2	2.14***
		3	7.12***
		4	-6.87***
	BOS fund Secondary School	1	5.19***
		2	7.50***
		3	7.62***
		4	-7.85***

Table 3. Regression between school participation rate and BOS fund after excluding several urban and non-urban area that heavily affecting the correlation

Comparing these result with our main result, we could see a slight change in the value, for example take a look at model 1 BOS fund primary school, in our main result it's 0.56% increase in primary school participation rate if BOS fund increase by 1%, but here the number seems to be slightly lower just like what we have expected as we have removed several regions that heavily affecting the correlation among them. Although there's a decrease in the effect but it does not greatly differ from our main result thus we are sure that our result is the true impact of BOS funding program.

8. Conclusion

In this study, the effect of the BOS funding program is concluded, the research encompasses all urban/non-urban areas in 32 provinces across Indonesia since evaluation on the national scale has rarely been conducted prior, we hope this research could shed the light on how BOS funds affect school participation rate. At the beginning of this paper, several previous findings regarding the impact of BOS funds show a huge variety, some claim the impact is tremendous since the tuition fee for most school is free, thus school participation rate increases, however, the other claim the BOS funding program is not effective yet, a lot of potential problem such as limited monitoring from supreme audit offices (BPK), and local government will reduce the effectivity of BOS fund.

This paper researched after contemplating the previous studies and distinguishing itself in three major ways, first we conduct the evaluation not only in a specific region but at higher aggregate level, we believe our result will have higher external validity compared to previous research, second we used a fixed effect method to calculate the impact of BOS fund to school participation, considering fixed effect method is able to capture individual specific time-invariant factor that embedded in each urban non-urban area, so we don't need to control it. Third, the research is carried out with annual data over the period 2006 until 2013,

6 years of observation allowing us to extract much more observation, a total of 3808 observation are included and calculated to find the impact of BOS fund.

As per the result of the evaluation is statistically significant, every model shows a positive correlation between BOS fund and school participation not only for primary school but also for secondary school, additionally, our time varying control variable like government educational expenditure shows a negative effect toward primary school participation rate. While variables like corruption rate and political stability show mixed correlation to school participation rate, we believe an unstable political situation in Indonesia, plus a phenomenon like dividend corruption that frequently happened there make correlation among these control variables looks unclear.

Meanwhile, our treatment variable seems to shows the long term effect toward poverty rate, because BOS fund to elementary school and secondary schools are negatively correlated with poverty rate. The differences only located at the value, the secondary school has a better effect of reducing poverty rate. These differences reveal why acquiring a higher education is important because in the long term it might reduce poverty rate even further.

Despite the results explained above, there are several limitations that this paper wasn't able to tackle yet, hence it becomes our suggestion for future research. First limitation, we cannot find data in the period before the BOS fund was established, by having it we can conduct a before-after comparison using a difference in difference method, we believe this method could give a more accurate result to support this research. Second, some additional control variables could be included in the econometric calculation to improve the precision of the result, we thought of variables such as 'household per-capita expenditure' to be included unfortunately the data seems to be incomplete, that's why we decided to drop it. Third corruption rate and political stability variable have a different result for primary and secondary school, we suggest to include more than 15 years of observation to capture how this variable actually affecting school participation rate. Finally, newly established provinces are also not included in the research, preventing us from doing a national based regression of BOS funds, which could be an interesting topic for further investigation.

References

- Amiini, N. S. (2016). ANALISIS PENGELOLAAN DANA BANTUAN OPERASIONAL SEKOLAH MENENGAH ATAS (BOS SMA) DI SMA NEGERI JUMAPOLO KABUPATEN KARANGANYAR TAHUN 2013-2014 . Retrieved February 26, 2017, from <http://eprints.uny.ac.id/34419/>
- Angrist, J., Bettinger, E., Bloom, E., King, E., & Kremer, M. (2001). Vouchers for Private Schooling in Colombia: Evidence from a Randomized Natural Experiment. doi:10.3386/w8343
- Aziz, A. (2014, June 26). Analisis Efektifitas Bantuan Operasional Sekolah (BOS) Pada Departemen Pendidikan Nasional. Retrieved March 25, 2017, from <https://abdulazizbadankebijakanfiskal.wordpress.com/2014/06/27/analisis-efektifitas-bantuan-operasional-sekolah-bos-pada-departemen-pendidikan-nasional/>
- Bravo, D., Mukhopadhyay, S., & Todd, P. E. (2010). Effects of school reform on education and labor market performance: Evidence from Chile's universal voucher system. doi:10.3982/QE1
- Directorat Jendral Anggaran Kementrian Keuangan, 2015 KAJIAN EFEKTIVITAS PELAKSANAAN BANTUAN OPERASIONAL SEKOLAH (BOS) SEKOLAH MENENGAH ATAS . (2015). Retrieved March 6, 2017, from <http://www.anggaran.depkeu.go.id/content/Publikasi/Kajian%20dan%20artikel/Efektivitas%20Pelaksanaan%20BOS.pdf>
- Fauzan, F. (2014). Pengaruh Penerapan Good Corporate Governance Terhadap Perilaku Etis Dalam Pengelolaan Dana Bantuan Operasional Sekolah. Jurnal Ekonomi MODERNISASI, 10(3), 158. doi:10.21067/jem.v10i3.776
- Inani, S. (2016, January 30). How to do Fixed effect and random effect panel regression in Stata. Retrieved February 27, 2017, from <https://www.youtube.com/watch?v=vWpeIjyhOI>
- K. (2010). ANALISIS PELAKSANAAN BANTUAN OPERASIONAL SEKOLAH (BOS) DI MTs N EGERI WONOSARI GUNUNG KIDUL YOGYAKARTA. Retrieved March 10, 2017, from <http://digilib.uin-suka.ac.id/5534/1/BAB%20I%2C%20IV%2C%20DAFTAR%20PUSTAKA.pdf>
- K. (2016). Portal Bos. Retrieved March 17, 2017, from <http://bos.kemdikbud.go.id/index.php/salur>
- Kementrian Pendidikan dan Kebudayaan. Petunjuk Teknis Dana Operasional Sekolah. Penggunaan dan Pertanggung Jawaban Keuangan Dana Operasional Sekolah 2007, 1-43. Retrieved February 9, 2017.
- Kementrian Pendidikan dan Kebudayaan. Petunjuk Teknis Dana Operasional Sekolah. Penggunaan dan Pertanggung Jawaban Keuangan Dana Operasional Sekolah 2008, 20-58. Retrieved February 10, 2017.
- Kementrian Pendidikan dan Kebudayaan. Petunjuk Teknis Dana Operasional Sekolah. Penggunaan dan Pertanggung Jawaban Keuangan Dana Operasional Sekolah 2010, 3-15. Retrieved February 14, 2017.

Kementrian Pendidikan dan Kebudayaan. Petunjuk Teknis Dana Operasional Sekolah. Penggunaan dan Pertanggung Jawaban Keuangan Dana Operasional Sekolah 2011, 1-60. Retrieved February 18, 2017.

Kementrian Pendidikan dan Kebudayaan. Petunjuk Teknis Dana Operasional Sekolah. Penggunaan dan Pertanggung Jawaban Keuangan Dana Operasional Sekolah 2012, 10-22. Retrieved February 19, 2017.

Khandker, S. R., Koolwal, G. B., & Samad, H. A. (2010). Handbook on impact evaluation: quantitative methods and practices

Majewski, C., Ringoringo, A., Soeharno, R., U., Sumertajaya, I. M., & Fanciscus, J. H. (2013). ANALYSIS OF SCHOOL OPERATIONAL FUNDS (BOS). FREE BASIC EDUCATION STRATEGY DEVELOPMENT. Retrieved February 11, 2017, from <https://www.adb.org/sites/default/files/publication/176604/ino-analysis-school-operational-funds.pdf>.

Pgri, S. (2016, March 3). INI DIA PENYEBAB "DANA BOS" BELUM CAIR MERATA KE SEKOLAH. Retrieved Feb. & march, 2017, from <http://www.suarapgri.com/2016/03/ini-dia-penyebab-dana-bos-belum-cair.html>

Putra, D. F. (n.d.). Korupsi Dana BOS, Empat Kepala Sekolah Dicapot. Retrieved February 16, 2017, from <http://www.cnnindonesia.com/nasional/20150123155605-20-26904/korupsi-dana-bos-empat-kepala-sekolah-dicapot/>

Slameto, S. (2012). Monitoring Dan Evaluasi Program Bantuan Operasional Sekolah Di Kota Salatiga Dengan Menggunakan Analisis Kesenjangan Tahun 2011/2012 [Abstract]. *Satya Widya*, 28(1), 1. doi:10.24246/j.sw.2012.v28.i1.p1-12

Williams, R. (n.d.). Panel Data 4: Fixed Effects vs Random Effects Models. Reading. Retrieved March 11, 2017, from <http://www3.nd.edu/%7Erwilliam/>