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The Effects of Government Education Spending on School Enrollment in Indonesia

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Abstrak. Pengeluaran pemerintah bidang pendidikan selalu meningkat dari tahun ke tahun untuk pelaksanaan sektor pendidikan termasuk di dalamnya upaya peningkatan angka partisipasi sekolah. Namun masih ada sejumlah anak yang tidak bersekolah khususnya anak usia Sekolah Menengah Atas. Penelitian ini menganalisis pengaruh pengeluaran pemerintah bidang pendidikan terhadap partisipasi sekolah di Indonesia. Penelitian ini menggunakan data *cross-section* dari Survei Sosial Ekonomi Nasional (Susenas) dan data pengeluaran pemerintah bidang pendidikan selama empat tahun. Penelitian ini menggunakan model probit dimana pengeluaran pemerintah bidang pendidikan sebagai faktor utama. Variabel kontrol yang digunakan terdiri dari pendidikan orang tua, pengeluaran rumah tangga, jenis kelamin, urban, urutan kelahiran, jumlah saudara, orang tua tunggal, PDRB per kapita, tahun, serta interaksi antara beberapa variabel. Observasi dibagi menjadi dua grup: usia 7-15 dan 16-18. Hasil penelitian ini menunjukkan bahwa pengeluaran pemerintah bidang pendidikan memiliki pengaruh yang positif dan signifikan terhadap partisipasi sekolah di Indonesia. Selain itu, variabel interaksi menunjukkan bahwa pengeluaran pemerintah bidang pendidikan berhubungan dengan meningkatnya peluang partisipasi sekolah pada anak yang berasal dari keluarga miskin dan anak perempuan.

Kata kunci: anak usia sekolah; data *cross-section;* pendidikan orang tua; probit; susenas

Abstract. *Government expenditure for education increases every year for the implementation of education sector including to increase the number of enrollment rate. However, there are some children who do not enroll in school especially senior high school-aged children. This study examines the effects of government spending on education on school enrollment in Indonesia. This research uses cross-sectional data from the National Socioeconomic Survey (Susenas) and the government spending on education data for four years. This study uses probit model by employing the government education spending as the main factor. The control variables used in this study consist of parents' education, household expenditure, male, urban, birth order, the number of siblings, missing parent, GRDP per capita, year dummy, and interaction terms among some variables. The observation is divided into two groups of age: 7-15 and 16-18. The results show that the government education spending has a positive and significant effect on school enrollment in Indonesia. In addition, the interaction terms show that the government education spending is associated with greater probability of school enrollment for poor children and for the girls.*

Keywords**:** *cross-sectional data; parents' education; probit; school-aged children; susenas*

INTRODUCTION

Education has been considered to be a primary investment in all countries in the world to develop human capital in the future. Most developing countries are strongly driven to improve their human capital development as a reliable engine for economic growth. The Universal Declaration of Human Rights proclaimed in 1948, in its Article 26, stated that "everyone has the right to education". To support this right to education, in 1990, United Nations Educational, Scientific, and Cultural Organization (UNESCO) declared the World Declaration on Education for All in Thailand. In 2000, those participants from across countries signed the Dakar Framework for Action as a commitment to reach the target "Education for All" in 2015. As one of the representatives that support the World Declaration on Education for all and the Dakar Framework for Actions, Indonesian Government has a commitment to implement this right to education for all citizens.

To achieve this goal, hence, the government enacted the Law No. 20 Year 2003 on National Education System to ensure the implementation of education. However, based on the data of Statistics Indonesia (2003-2015), there are some children who do not enroll in school. As findings of UNESCO (2016), even though the ratio of school enrollment in Indonesia is relatively higher than the average of the ratio in the world, Indonesia with other ASEAN countries still face the challenge to overcome the lower net participation rate comparing to developed countries. Whereas education index itself is one of three components of Human Development Index. Even among other ASEAN countries such as Malaysia, Thailand, and Philippines, the net enrollment rate of Indonesia in some level of education is still below the ratio in those countries (UNESCO, 2016). From the same data above, compared to the average ratio in the world which is below 90% for primary education and around 60% for secondary education, Indonesia has the higher ratio. However, its ratio, especially primary education, is still lower than the ratio in Philippines and Malaysia. Compared to the ratio of Republic of Korea becomes higher for both primary

and secondary education, even compared to Japan which has the ratio close to 100%.

For more detailed, according to data from Statistics Indonesia, during 2003-2015, there is the gap between the school enrollment rate for each age group of children: (1) 7-12 years old; (2) 13-15 years old; and (3) 16-18 years old. In that period, school enrollment rate for children 7-12 years old is consistently upper 90% and almost reach 100% followed by the rate of children 13-15 years old which is around 80% in 2003 and increase to more than 90% in 2015. From oldest group which is children 16-18 years old, school enrollment rate also shows the increasing trend. However, the number is still around 60%. This high gap in school participation rate between age groups especially the children 16-18 years old is expected to be related to the regulation nine years basic education which is six years in the elementary school as primary education and three years in junior high school as lower secondary education. In addition, another cause such as child labor issues that influence the older group more than the younger group should be considered. Meanwhile, Indonesian government enacted Law No. 20 Year 2003 on National Education System which mandates the central and local government to provide services and facilities of education by funding at least 20% of the total budget. This fund is provided and increase year by year for the implementation of education sector including to increase the number of enrollment rate. As a comparison, according to data from UNESCO (2016), percentage of government expenditure for education of total government spending in Indonesia is lower than Malaysia and Thailand but higher than Philippines. It looks like consistent with the fact that the number of net enrollment rate in Indonesia is higher than the rate in Philippines and lower than the rate in Malaysia and Thailand. However, there is an interesting number in the percentage between Indonesia and Japan because the percentage in Indonesia is higher even though its net enrollment rate is below Japan. On the other hand, the percentage of government education spending towards Gross Domestic Product shows the different comparison where Japan has the higher percentage than the percentage of Indonesia.

Therefore, the research about the effects of government education spending on school enrollment including the determinants of school enrollment is one of the interesting topics to investigate. Regarding the effects of government education spending on school enrollment, there are few studies that examine this relation. For instance, Gupta, Verhoeven, and Tiongson (2002) who studied the effectiveness of government education spending and health care in developing and transition economies find that the improvements in two indicators of education consisting of access to and attainment in schools are related to the increase in public education spending. In addition, Arze del Granado, Fengler, Ragatz and Yavuz (2007) who analyze the effect of government spending on education in Indonesia find that the existing education budget has increased the enrollment rate, especially at the primary and secondary levels.

Several studies also have been conducted to analyze the determinants of school enrollment in both developing and developed countries. There are some factors that may affect a child to enroll in school. For instance, Huisman and Smits (2009) who studied the household- and district-level determinants of primary school enrollment using multilevel analysis in 30 developing countries employed several groups of factors: (1) socio-economic factors such as education of the parents, and household welfare; (2) demographic factors such as age, birth order, and number of siblings; (3) culture such as women life after marriage (4) educational facilities such as distance, pupil-teacher rate, and teacher-child rate; and (5) economic factors such as urban, in their analytical model. Their study shows that some independent variables such as parents' education, household wealth, age, birth order, the number of siblings, and urban have a significant effect on school enrollment.

In addition, school enrollment may be also related to the child labor issues. For instance, Webbink, Smits, and de Jong (2012) who examine determinants of two forms of hidden child labor consisting of family business work and domestic work of children in 16 African and Asian countries find that if the household is poor, children are less enrolled in school and more involved in child labor. They explain that if parents are not able to afford to pay costs of education, it seems a reasonable option to keep children stay at home to do domestic work or help the family business because these activities can give a direct return to the family.

To summarize, many studies on school enrollment have employed several factors including socioeconomics and demographic factors as explanatory variables. Some others have examined the effects of government education spending on school enrollment by including several factors as control variables. Furthermore, it leads to consideration that researchs that examine the effects of government education spending elaborating with more socioeconomics and demographic factors are needed. Moreover, although the determinants of school enrollment have been studied widely, many researches have focused on the younger children. There are limited researches that included the older children as the observations in their studies. Therefore, my study contributes the other studies in terms of the main factor using government education spending and wider observation by including not only the younger children but also the older children.

This study aims to examine the effects of government education spending on school enrollment in Indonesia by using cross-sectional data from National

Socioeconomic Survey (Susenas) and government education spending data for four years. During that period, Indonesia has increased government education spending relatively high as a consequence of implementation of the mandate to provide education fund at least 20% of the total budget. In analysis, the probit regression is used by employing the government education spending per GRDP as the main factor. Control variables that are used consist of parents' education, household expenditure, male, urban, birth order, the number of siblings, missing parent, GRDP per capita, and year dummy. In addition, interaction terms between variable government education spending and variable poor, male, and urban, and between variable male and poor are also included in the model. The observations are divided into two age groups: age 7-15 and age 16-18. The results show that, in general, all variables between two groups have a similar sign and the marginal effect for the older group is higher than the value for the younger group. Government education spending per GRDP, parents' education, household expenditure, urban, birth order, and GRDP per capita have a positive influence on the school enrollment while male, the number of siblings, and missing parent have a negative influence. In addition, the interaction terms show that government education spending interact significantly and positively with poor (for two age groups) and urban (for the older group). The finding of this study is consistent with previous studies in terms of government education spending and most determinants of school enrollment related to child labor issues.

RESEARCH METHODOLOGY

Sources of Data

This research uses cross-sectional data from the National Socioeconomic Survey (Susenas) collected by the Central Bureau of Statistic (BPS) of Indonesia. Susenas is a national survey of socioeconomic data covering a large number of representative household. There are two main components of Susenas, namely core and module. Core data is collected annually that contains general information of all members of selected household sample about basic socio-demographic information such as age, gender, health and education information, while module data is collected once in three years for each topic that contains specific information consisting of three major topics: (1) consumption/spending and income of household; (2) socio-culture and education; and (3) health care and housing. But, since 2003, the data of consumption and household spending has been included in the core data and collected every year. The data used in this study is restricted to the elementary school-, junior high school-, and senior high school-aged children, that are 7-18 years old, in each year of the core data set.

Besides household-level data above, this study also uses the regency/municipality-level data of current price government education spending and Gross Regional Domestic Product (GRDP). The government education expenditure data is obtained from the Ministry of Finance of Indonesia while the data of GRDP comes from the Central Bureau of Statistic (BPS) of Indonesia. These data of Susenas and government education spending are merged and divided into two groups: 7-15 and 16-18 years old. The number of the observations is 493,079 children for the younger group and 131,513 children for the older group.

Methodology

The probit model is used to examine the probability of child school enrollment. The probit model is widely used as a standard binary outcome model that is nonlinear model. A binary outcome variable is a particular qualitative dependent variable that only takes one of two values: zero and one. In the binary response models, the primary goal is to explain the effect of the independent variables on the response probability. In this probit model, the probability of qualitative outcome is related to the standard normal cumulative distribution function (cdf), and the model is fitted by maximum likelihood. The probit model can be written as follows:

$$P(y=1|x) = \Phi(\alpha + x\beta)$$

Where

P : probability that y takes the value 1 meaning that child enrolls in the school

Φ : the standard normal cumulative distribution function

α : intercept or a constant term

x : the set of independent variables

β : the set of parameter to be estimated

(Wooldridge, 2010).

In this research, the equation that will be used is the result of the elaboration with some modification of several model from previous studies as references: Gupta, Verhoeven, and Tiongson (2002); Webbink, Smits, and de Jong's (2012); and Huisman and Smits (2009). The probit equation can be written as the equation follows:

$$\begin{aligned} in_school_i = {} & \alpha + \beta_1\, govexp_i + \gamma_i\, X_i + \theta_i\, Y_i + \\ & \beta_2\, urban_i + \beta_3\, lnGRDPpercapita_i + \beta_4 \\ & year1_i + \beta_5\, year2_i + \beta_6\, year3_i + \beta_7\, year4_i \\ & + \beta_8\, govexp_poor_i + \\ & \beta_9\, govexp_male_i + \\ & \beta_{10}\, govexp_urban_i + \\ & \beta_{11}\, male_poor_i + \varepsilon_i \end{aligned}$$

where:

in_school_i : School enrollment. 1 if a child enroll in school and 0 otherwise.

$govexp_i$: Government education spending per GRDP.

X_i : The set of socioeconomic factors.

Y_i : The set of demographic factors.

$urban_i$: 0-1 dummy variable, 1 if child is living in urban area and 0 if child is living in rural area.

$lnGRDPpercapita_i$: Log GRDP per capita.

$year1_i$: 0-1 dummy variable, 1 if data was taking in year 1 and 0 otherwise.

$year2_i$: 0-1 dummy variable, 1 if data was taking in year 2 and 0 otherwise.

$year3_i$: 0-1 dummy variable, 1 if data was taking in year 3 and 0 otherwise.

$year4_i$: 0-1 dummy variable, 1 if data was taking in year 4 and 0 otherwise.

$govexp_poor_i$: Interaction term between variable government education spending and variable poor (0-1 dummy variable, 1 if child is from poor household and 0 otherwise).

$govexp_male_i$: Interaction term between variable government education spending and variable male.

$govexp_urban_i$: Interaction term between variable government education spending and variable urban.

$male_poor_i$: Interaction term between variable male and variable poor.

α : Constant

β , γ_i, θ_i : The set of parameters to be estimated

ε_i : Error term

RESULTS AND DISCUSSION

Table 1 presents the percentage of school enrollment in terms of two age group and gender. School enrollment for younger children is higher than older children for both male and female. Regarding the differences between male and female, the percentage of school enrollment for female children is higher than male children. However, this gap is quite different between two groups. For the younger group, the gap between male and female is around 0.70% while for the older group, the gap is around 4.83%.

Tabel 1. Percentage of School Enrollment by Age and Gender

Age (years old)	Gender		Total
	Male	Female	
7-15	94.71	95.41	95.05
16-18	59.83	64.66	62.04
Total	87.14	89.22	88.13

Source: Processed Data

Table 2 shows the result of probit regression of two groups. As can be seen in Table 2, almost all single independent variables and some interaction terms significantly affect the school enrollment.

Tabel 2. Probit Regression Result

Independent Variables	Age 7-15		Age 16-18	
	Marginal effect	Standard errors	Marginal effect	Standard errors
Goverment education spending per GRDP	0.163***	0.016	0.901***	0.062
Level of mother's education				
- Elementary School	0.026***	0.001	0.075***	0.003
- Junior High School	0.056***	0.001	0.202***	0.005
- Senior High School	0.075***	0.002	0.293***	0.006
- > Senior High School	0.078***	0.004	0.378***	0.017
Level of father's education				
- Elementary School	0.018***	0.001	0.053***	0.003
- Junior High School	0.045***	0.001	0.156***	0.004
- Senior High School	0.054***	0.001	0.237***	0.005
- > Senior High School	0.061***	0.003	0.308***	0.012
Log monthly household expenditure per capita	0.026***	0.001	0.201***	0.003
Male	-0.001	0.001	-0.022***	0.004
Urban	0.000	0.001	0.051***	0.005
Birth order	0.024***	0.000	0.045***	0.001
Number of sisters	-0.013***	0.000	-0.000	0.001
Number of brothers	-0.018***	0.000	-0.014***	0.001
Mother missing	-0.011***	0.002	-0.013*	0.007
Father missing	-0.016***	0.001	-0.009**	0.004
Log GRDP per capita	0.004***	0.001	0.024	0.002
Year				
- 1	-0.009***	0.001	-0.042***	0.003
- 2	-0.011***	0.001	-0.069***	0.003
- 3	-0.013***	0.001	-0.118***	0.005
- 4	0.017***	0.001	0.168***	0.005
Gov. edu. spending*Poor	0.080***	0.014	0.320***	0.057
Gov. edu. spending*Male	-0.030*	0.017	-0.117*	0.067
Gov. edu. spending*Urban	-0.030	0.025	0.263**	0.093
Male*Poor	0.001	0.001	0.011**	0.005

*** Significant at 1%; ** Significant at 5%; * Significant at 10%

Source: Statistics Analysis Output

Regarding the marginal effect, all variables have a similar sign between two groups except interaction term between government education spending and urban where the sign is negative for the younger group and positive for the older group. Generally, the magnitude of the marginal effect of older group is bigger than the younger group, especially for the variable government education spending. However, there are some independent variables that influence the younger age group higher than the older group, namely the number of brothers and father missing. The effect of variables male, urban, government education spending*urban, and male*poor are not significant for the younger group. Meanwhile, for the older group, the variables that are not significant are the number of sisters and log GRDP per capita. The detailed explanation of each variable will be discussed as follows.

Government education spending per GRDP has a positive and significant impact on school enrollment. If the government education spending per GRDP is increased by 1 percent, the probability of a child from the younger group and older group to enroll in the school will increase by 0.163 and 0.901 percentage points, respectively. The region that has a high government expenditure for education can provide the public services in the education sector better than the region that has lower government expenditure for education. This finding is in line with Arze del Granado, Fengler, Ragatz and Yavuz's (2007) study that shows that the existing education budget has increased the enrollment rate. This result also consistent with the finding of Gupta, Verhoeven, and Tiongson's (2002) study that shows that the improvements in two indicators of education consisting of access to and attainment in schools are related to the increase in public education spending.

For more detailed, the interaction terms variables have various effects on school enrollment. The interaction between government education spending and poor has a significant and positive effect on school enrollment. On the other hand, the interaction between government education spending and male affect school enrollment negatively and significantly. Government education spending interact significantly with urban and has a positive effect on school enrollment for the older group while for the younger group the effect is insignificant. These results mean that the government education spending increases the probability of school enrollment for poor children and for girls. However, regarding the area type, the effect of this government education spending is still higher in the urban area rather than in the rural area. In addition, for the older group, male interact with poor significantly and positively.

The mother's education at all level: elementary school, junior high school, senior high school, and more than senior high school, has a positive and significant impact on school enrollment. According to the marginal effect of younger children, for example, it can be interpreted that if a child's mother has education in the elementary school, the probability of his or her school enrollment will increase by 2.6 percentage points when compared to a child whose mother has no education. When a child has a mother with education in the junior high school, senior high school, and more than senior high school, the probability of him or her to enroll in the school will increase by 5.6, 7.5, and 7.8 percentage points respectively compared to a child whose mother does not have an education. These results indicate that the higher the level of mother's education, the higher the probability of a child to enroll in the school. These findings are consistent with the previous study. For instance, Glick and Sahn (2000) who investigate the schooling of children in West Africa in terms of the effects of parental education, income, and household structure find that mother's education generally has a positive effect on girls' school participation. Educated mothers with a completely certain level of education tend to send their daughters to school until at least the same level with them because they have experienced the education value and are sure that their daughters can afford to complete that education level (Huisman and Smits, 2009). Therefore, these researchers expect them to make sure that their daughters get educated too by using the knowledge obtained from their higher education.

Similarly, the father's education has a positive and significant impact at all education levels. The results of the marginal effect also show that the increases in the level of father's education lead to the increases in the probability of a child to enroll in the school. The probability of younger child's school enrollment whose father has education in the elementary school, junior high school, senior high school, and more than senior high school will increase by 2.6, 5.6, 7.5, and 7.8 percentage points respectively compared to a child that has a father with no education. These results are consistent with the expectations of the author and other researchers. Rahji's (2005) study finds that father's education has a positive and significant effect on male children's school enrollment. Tsujita (2013) also finds that the effect of father's education on the child school enrollment is positive and significant.

Household expenditure has a positive and significant impact on school enrollment. If the monthly household expenditure per capita increased by 1 percent, the probability of school enrollment of a child to enroll in the school will increase by 2.6 percentage points for the younger group while for the older group the probability will more increase by 20.1 percentage points. This finding is consistent with the results of some previous studies. For instance, Huisman and Smits (2009) find that if the household is wealthier, the school enrollment of children will be higher and the probability

of drop out will be lower than the children coming from poor families. They stated that the household with the higher expenditure has the higher ability to pay the particular proportion of direct costs including the direct costs of schooling, such as uniforms, books, and fees.

Variable male has a negative and significant impact on school enrollment for the older group while. According to the marginal effect, it indicates that females have a higher probability to enroll in the school than males. If a child is male, the probability of him to enroll in the school will decrease by 2.3 percentage points. This finding is not in line with the finding of Rahji's (2005) research that examines the gender gap in school enrollment at the primary level of children from rural household in South Western Nigeria. He finds that more boys were enrolled in school than girls.

This inconsistent result can be related to the child labor issues where the boys are more likely become child worker than girls in Indonesia (International Labour Organization and Statistics Indonesia, 2009).

Urban has a positive and significant impact on school enrollment for the older group. If a child is living in an urban area, the probability of his or her school enrollment will increase by 5.1 percentage points compared to a child living in a rural area. This finding is consistent with the study from Huisman and Smits (2009), which find that children living in an urban area are more likely enroll in the school than the children living in a rural area. This result is related to the differences in education characteristics between the urban and rural areas such as the number of schools, the distance of schools, the facilities of schools, and other indicators. In addition, regarding the child labor, this finding is also consistent with the Webbink, Smits, and de Jong's (2012) study that children living in urban areas are less likely work and involved in the child labor.

Birth order has a significant and positive impact on school enrollment for two groups. If the order of birth increase, for example from the first-born to the second-born and so on, the probability to enroll in the school for younger and older group will increase by 2.4 and 4.5 percentage points, respectively. This finding is consistent with the empirical results of Emerson and Souza's (2008) study that children who are first-borns are less likely to go to school than their siblings who are later born and male children as the last-born are less likely to be engaged in the child labor compared to their siblings who are earlier born. They stated that earlier-born children are able to command higher income compared to the later-born children. Therefore, the earlier-born children are more likely to engage in child labor while the later-born children are more likely to go to school.

The number of sisters has a negative and significant effect for younger group, but insignificant for older group. If there is an additional sister, the probability will decrease by 1.3 percentage points. The number of brothers for two groups has a negative and significant effect on school enrollment. An additional brother will decrease the probability for younger and older group by 1.8 and 1.4 percentage points, respectively. This result is in line with the study of Emerson and Souza (2008) that find the probability to attend school will be lower and the probability to work will be higher for both male and female if the number of siblings increase.

Variable mother missing and father missing have a negative and significant effect for all groups. The probability of a younger child with missing mother will decrease by 1.1 percentage points compared to a child who has mother. For the older children, the decrease in the probability is higher by around 1.3 percentage points. On the other hand, the effect of missing father for younger children is higher than for the older children. A child whose father is missing has a lower probability around 1.6 percentage points for the younger and 0.9 percentage points for the older. These results are consistent with Huisman and Smits' (2009) study that a child from household that mother or father is missing is less likely to enroll in the school. because this child tends to do the work that usually is done by the missing parent.

For younger children, logarithm of GRDP per capita has a positive and significant effect on school enrollment. A child from a region that has higher GRDP per capita will have a higher probability to enroll in the school. According to the result of marginal effect, if the GRDP per capita increase by 1 percent, the probability of school enrollment will increase by 0.4 percentage points.

CONCLUSION AND POLICY IMPLICATION

This study aims to examine the effects of government education spending on school enrollment in Indonesia by using cross-sectional data from National Socioeconomic Survey (Susenas) and government education spending data for four years. The regression results show that the government education spending that has a positive and significant effect on school enrollment indicates that the education policy by providing the fund of education services can support education expansion in Indonesia related to policies to increase the school enrollment rate in terms of improving Human Development Index (HDI). The results of the interaction terms show that such government education spending can be considered as pro-poor and pro-females. However, regarding to the area type, the effect of this government education spending is still higher in the urban area rather than that of in the rural area. This finding indicates that Indonesian government needs to improve the education services equally in all areas, not only in urban areas but also in rural areas.

This study uses multilevel data consisting of Susenas in household-level and government education spending in regency/municipality-level into one regression. This relative high gap between two levels leads to similar government education spending for all children that are living in the same regency/municipality. Therefore, if the data of government education spending in the lower level is available, the analysis can be encouraged by capturing the more variant of the education fund provided by the government across the children.

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