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Thia Jasmina

PhD Student of the Graduate Program of Policy Science, Ritsumeikan University & Lecturer of the Faculty of Economics and Business, Universitas Indonesia., ps0291ie@ed.ritsumei.ac.jp

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Public Spending and Learning Outcomes of Basic Education at the District Level in Indonesia ☆

Thia Jasmina^{a,*}

^aPhD Student of the Graduate Program of Policy Science, Ritsumeikan University &
Lecturer of the Faculty of Economics and Business, Universitas Indonesia

Abstract

Since 2009, the Indonesian government has fully allocated 20 percent of its budget on education. Though the increase of financial resources has led to an improvement of the access to education, challenges on the quality of education persist. By employing a cross-districts analysis in Indonesia during 2010–2015, this study aims to analyze the impact of government spending on the adjusted-national examination scores at the junior secondary education. This study shows that the central and local government spending have no significant impact on the scores. Whereas, the central government spending on teachers, and the socioeconomic factors such as poverty and health are significant determinants.

Keywords: Education; Government Spending; Learning Outcomes; District; Indonesia

Abstrak

Sejak 2009, Pemerintah Indonesia telah dapat mengalokasikan 20 persen anggaran untuk pendidikan. Peningkatan anggaran di sektor pendidikan yang signifikan di satu sisi telah meningkatkan akses pendidikan, tetapi di sisi lain masih terdapat tantangan terhadap kualitas pendidikan. Studi ini bertujuan untuk menganalisa dampak belanja pemerintah terhadap nilai ujian nasional SMP dengan menggunakan analisa cross-section di kabupaten/kota Indonesia pada tahun 2010–2015. Studi ini menunjukkan bahwa belanja pemerintah pusat dan daerah tidak mempunyai dampak yang signifikan terhadap nilai ujian nasional SMP. Akan tetapi, transfer pemerintah pusat untuk guru serta kondisi sosial ekonomi seperti kemiskinan dan kesehatan merupakan faktor yang signifikan.

Kata kunci: Pendidikan; Belanja Pemerintah; Hasil Pembelajaran; Kabupaten/Kota; Indonesia

JEL classifications: H75; I22

1. Introduction

The education system in Indonesia has significantly changed since early 2000 due to fiscal decentralization and enactment of the new national education law. Law no. 20 of 2003 on the National Education

System states that the government is responsible for provision of a nine-year basic education, and both central and local governments must allocate 20% of their budget to education. In addition, Law no. 32 of 2004 and Government Regulation no. 38 of 2007, which set out the overall framework for decentralization in Indonesia, state that the provision of primary and secondary education is shifted to the local government at the district level¹. The role of public provision of basic education is dominant in Indonesia. Based on data from the Ministry of Education and Culture of Indonesia (MoEC), in 2016,

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*Corresponding Address: 2-150 Iwakura-cho, Ibaraki, Osaka 567-8570, Japan. E-mail: ps0291ie@ed.ritsumei.ac.jp.

¹This law was recently amended by Law no. 23 of 2014, which established the authority of district local governments on primary and junior secondary education and the authority of provincial local governments on senior secondary education.

89.5% and 60.4% of schools at the primary and junior secondary levels are public schools, respectively². Therefore, the role of government spending in basic education, which is under the authority of the district government, is imperative.

Since 2009, the central and local governments of Indonesia have allocated 20% of their budget to education. Most of the central government spending has been transferred to the local governments at the district level to finance basic education. Despite the amount of spending on education, studies show that government spending has a little impact on enhancing education at the district level in Indonesia. Series of studies by the World Bank (2009, 2012a, 2013a), the MoEC (2013), and the Organization for Economic Cooperation and Development (OECD) and the Asian Development Bank (ADB) (2015) show that regardless of government spending, challenges in education in Indonesia persist, such as disparities in student access to education, distribution of teachers, quality of teaching, and a continuation of students from primary to junior secondary level.

At the cross-countries level, similar studies show mixed results on the relationship between government spending and education outcomes. For example, Gupta, Verhoeven & Tiongson (2002) empirically show that increasing public spending on education in developing and transition countries may improve educational attainment. Rajkumar & Swaroop (2008) conclude that public spending on primary education effectively increase educational attainment in countries with good governance. However, there are studies that show little or no impact of government spending on education outcomes. An earlier study by Hanushek (1986) using US data, concludes that there is no strong relationship between school expenditure and student performance in the country. A study by Mingat & Tan (1998) finds that a higher budget allocation to education has a relatively small contribution on the increase of educational resources. Another study by Hanushek (2002) using cross-countries data shows that there is limited evidence for a consistent relationship between education resources and student performance.

Some studies on the relationship between govern-

²Statistic of Education 2016, Ministry of Education and Culture of Indonesia.

ment spending and education in Indonesia have been conducted. For example, Kristiansen & Prati-kno (2006) suggest that in order to enhance education outcomes, the government must allocate more funds to primary and secondary education. Arze del Granado et al. (2007) show that government spending in Indonesia positively affect enrollment rates. Zufri & Gardiner (2012) show that the school operational assistance program has a significant and positive impact on education outcomes, whereas local government spending does not have a significant impact. Suryadarma (2012) shows that local government spending on education was more effective in improving education outcomes in less corrupt districts.

Despite the above-mentioned studies, there are few studies that analyze the impact of central and local government, concurrently or separately, on learning outcomes of basic education at the district level in Indonesia. As the total government spending on education at the district level in Indonesia is comprised of different sources and types of spending, aggregating all the spending is important to know the size of total government spending on education at the district level. Jasmina & Oda (2018) apply a cross-sectional analysis to analyze the impact of government spending on the change of the net enrollment ratio of primary and junior secondary education at the district level. They find that combining both local and central government spending on education has no significant impact on the change of the net enrollment ratio of primary and junior secondary education. However, by disaggregating the spending, the local government spending has a negative impact on the enrollment ratio, whereas the central government spending has a positive impact on the enrollment ratio.

This paper extends the analysis by Jasmina & Oda (2018) by empirically analyzing the relationship between government spending and learning outcomes of basic education at the district level in Indonesia. It is important to not only examine the impact of government spending on the net enrollment ratio, which reflects the quantity of education, but also the impact of government spending on learning outcomes, which reflects the quality of education³. This paper

³Issues regarding measurement of quantity and quality of education are pointed out in several studies such as Barro & Lee (2001), Hanushek (2002, 2013), and Rajkumar & Swaroop (2008).

is structured as follows: Section 2 briefly describes government spending and education outcomes in Indonesia. Section 3 lays out the methodology of the analysis. Section 4 presents empirical results and discussions. Finally, the last section concludes.

2. Descriptive Analysis

Government spending on education in Indonesia has significantly increased due to the government commitment to allocating 20% of the national budget to education. From 2009 to 2016, the national budget on education more than doubled from IDR225.2 trillion to IDR419.2 trillion⁴ of which about 60% on average has been transferred to the local governments mainly in the form of a general allocation fund (*Dana Alokasi Umum-DAU*), a special allocation fund for education (*Dana Alokasi Khusus-DAK*), additional allowances for teachers (*Tunjangan Profesi Guru-TPG*)⁵, and the school operational assistance program (*Bantuan Operasional Sekolah-BOS*). In addition to the central government spending, the district governments have spent a significant share of their budget on basic education. Based on the data from the Ministry of Finance of Indonesia (MoF), the total spending of district governments on education increased from IDR100.9 trillion in 2010 to IDR188.3 trillion in 2015⁶. On average, around 33% of the district government spending is allocated to basic education⁷.

In line with the government spending, education outcomes at the national level, especially access to basic education, have gradually improved data from

2010 to 2016. Based on data from the National Socioeconomic Survey of Indonesia (SUSENAS)⁸, the net enrollment ratio of primary education improved from 94.76% in 2010 to 96.82% in 2016. During the same period, the enrollment ratio of junior education improved from 67.73% to 77.95%. Although an improvement is apparent, the provision of a nine-year basic education as stipulated in the law has not been achieved. The mean of schooling has slightly improved from 7.46 in 2010 to 7.95 in 2016. As the net enrollment ratio of six-year primary education has nearly reached 100%, the net enrollment ratio of three-year junior secondary education remains behind. A closer look at the district level highlights the disparities among districts. In 2015, 40.2% of the districts had a net enrollment ratio below the national level for primary education, and nearly 52% of the districts had net enrollment ratios below the national level for junior secondary education. As for the mean years of schooling, around 50% of the districts still fell below the national level.

As the enrollment ratios and years of schooling describe the access of education, learning outcomes are more difficult to portray. In defining learning outcomes, we refer to Burtless (1996), who states that learning outcomes can be measured while the students are still in schools and after the students graduate and enter the labor market. This study refers to the first measurement by looking at the students' standardized test results. At the international level, the Trends in Mathematics and Science Study (TIMSS) by the International Association for Evaluation of Educational Achievement (IEA) and the Programme of International Student Assessment (PISA) by the OECD are the most accepted measurement for comparing learning outcomes among countries. Unfortunately, a measurement for comparing learning outcomes among regions in Indonesia has not yet been established⁹.

The nationwide, comparable standardized test that is commonly used to measure learning outcomes of

⁴Approximately USD17 billion to USD32 billion, as of mid-June 2017 with USD1 equals around IDR13,300.

⁵In 2005, to assure a standard performance and adequate welfare of teachers, the central government issued a teachers' certification program in accordance with the Law no. 14 of 2005 regarding teachers and lecturers. The law sets minimum competency standards and provides additional allowances equivalent to basic salary for certified teachers and teachers who work in remote areas.

⁶Approximately USD7.6 billion to USD14 billion, as of mid-June 2017. Calculated from the Directorate of Fiscal Balance, the Ministry of Finance of Indonesia (www.djpk.go.id).

⁷Based on the number of districts in 2010, excluding spending of the provincial governments and the capital city of Jakarta. This spending includes the general allocation fund transferred from the central government, which the local government has the discretion to spend.

⁸The National Socioeconomic Survey (*Survei Sosial Ekonomi Nasional-SUSENAS*) is an annual, nationwide socioeconomic survey conducted by the Statistics of Indonesia (*Badan Pusat Statistik-BPS*). From 2010 to 2015, on average, the surveys covered a sample of about 287,000 households and 1,117,000 individuals.

⁹In 2016, the MoEC of Indonesia conducted a longitudinal survey that assessed students' performance on mathematics, reading, and science called the Indonesia National Assessment Programme (INAP). However, the results at the district level are not available yet.

education in Indonesia is the national examination. The national examination is the standard evaluation system of primary and secondary education coordinated by the MoEC to evaluate performance of students in Indonesia. The nationwide, comparable scores of the national exam are for junior and senior secondary levels because the exam is fully developed by the MoEC. As for the primary education, the exam is mostly developed by the local governments at the district level, so that the exam scores are not comparable among districts. The national exam scores at the junior secondary education level are considered the learning outcomes for the nine-year basic education.

Based on available data in 2015, the average national exam scores of students at the junior secondary education level was 61.2 with a standard deviation of 9.6. To assure the reliability of the exam scores, since 2015 the MoEC has introduced the national exam integrity index¹⁰. The index, ranging from 1 to 100, indicates trustworthiness of the implementation of the test, with a higher index score indicating better trustworthiness of the exam. In 2015, the average index score was 72.4, the lowest was 26.2, and the highest was 89.7.

3. Methodology

There has been a significant number of studies on the impact of government spending on education outcomes. This paper applies the model by Lee & Barro (2001), which extends the analysis of Hanushek & Kimko (2000) to analyze the determinant factors of schooling quality in a broad number of countries. They use the education production function, which relates the output of education to its inputs at the macro level. A key reference on the study applying the education production function was by Hanushek (1986). A theoretical literature review on the education production function

¹⁰The national exam integrity index (*Indeks Integritas Ujian Nasional-IIUN*) was developed by the MoEC of Indonesia in 2015, when the Computer Based Test national exam was first introduced. The index aims to assure honesty of students and schools in answering the national exam. The index is constructed by looking at answering patterns and seating arrangements of the students during the exam. Data on the index at the school level can be retrieved from the Center for Educational Assessment Center of the MoEC (*Pusat Penilaian Pendidikan*: <https://puspendik.kemdikbud.go.id>).

was presented by Leclercq (2005). Furthermore, a comprehensive literatures on the impact of government spending on education outcomes in developing countries among others are discussed by Channa (2015) that focused on the impact of decentralization on the quality of education; and Glewwe & Muralidharan (2015) that focused on the government policies to improve school education outcomes in developing countries.

In their model, Barro & Lee (2001) defined learning outcomes as a cognitive achievement of students that among others can be measured by standardized test scores. The students' performance is affected by resources available to the students in schools and non-school factors, such as family background and socioeconomic factors. School resources can be measured by the student-teacher ratio, teacher salary, teacher educational level, and educational expenditure per student. It is expected that better school resources will improve learning outcomes. At the macro level, the family factors are defined as socioeconomic factors within the countries, which include income per capita and adult educational level. Students' performance is expected to be better in a supportive socioeconomic environment, such as a socioeconomic environment with a higher income per capita and a higher educational level of the population.

In applying the method at macro level, in addition to Barro & Lee (2001), this study refers to previous cross-countries studies by Gupta, Verhoeven & Tiongson (2002) that analyzed the impact of an increase of public spending on the improvement of outcomes in education and health; and by Rajkumar & Swaroop (2008) that empirically analyzed the impact of government spending on education at countries level. The following section empirically examines the relationship between government spending on education and the national exam scores of junior secondary education students at the district level. Due to availability of data, the analysis uses 458 districts in Indonesia during 2010 to 2015¹¹.

¹¹As a special region, Jakarta is excluded from the analysis because the decentralization is at the provincial level. The districts employed in this study are based on the number of districts in 2010. Due to the proliferation of districts in Indonesia, the number of districts has increased from 497 in 2010 to 514 in 2015. Outliers in the dataset are excluded from the analysis.

3.1. Data and Variables

A cross-section regression is performed to analyze the impact of government spending on learning outcomes of basic education at the district level in Indonesia from 2010 to 2015. The explanatory variable is the adjusted district level national exam scores of students at the junior secondary level in 2015. Applying the national exam score by itself can be misleading in comparing students' learning outcomes among districts in Indonesia. Thus, it is proposed to adjust the average exam score in each respective district with its integrity index. The adjusted national exam score for each district is calculated as follows:

Adjusted exam score =

$$\text{exam score} \times \left(\frac{\text{exam integrity index}}{100} \right) \quad (1)$$

The mean value of the adjusted-exam score is significantly lower and less diverse compared to the mean value of the original exam score (t -test = 43.3). The average original national exam score is 61.2 with a standard deviation of 9.6, whereas the average adjusted-exam score is 43.9 with a standard deviation of 7.7. Nationwide data on the average of national exam score and its integrity index at the school level is publicly available from the database of the Center for Educational Assessment Center of the MoEC (*Puspendik Kemendikbud*). The available school level data is then compiled to construct a set of district-level data.

The government spending on education is categorized into central government and local government spending on education. The budget allocated by the central and local government to education is used as a proxy of government spending on education. The total government spending on education in a district is the sum of central and local government spending on education in the respective district. The central government spending on education is constructed by aggregating the main central government spending on education that is transferred to districts, which are: (i) the school operational assistance program (BOS), (ii) a special allocation fund for education (DAK), and (iii) additional allowances for teachers (TPG). The local government spending is defined as the spending of which the district

governments have discretion¹².

In addition, analysis of the impact of government spending for teachers on learning outcomes will also be performed. Because there is no exact data on the government spending for teachers, data on government spending for teachers at the district level is estimated as follows. The central government spending for teachers is defined in two forms: (i) central government transfer for teachers' allowances (TPG), which is the transfer from the central government to the local government at the district level for certified teachers; and (ii) 15% of the school operational assistance program (BOS), which is the maximum share of the program that can be allocated to pay for teachers' salaries¹³. The local government spending for teachers is estimated to be around 70% of the local government spending on education, which aligns with some previous studies that show approximately 70% of local government spending is used to pay teachers' salaries (see, for example, Al-Samarrai & Cerdan-Infantes (2013), the World Bank (2013a), and Jasmina (2017)).

All the variables of government spending are shown in terms of ratio to the gross regional domestic product (GRDP) of each district. In order to better represent the government spending on junior secondary level, the spending is then adjusted by the proportion of the number of junior secondary students to the total students at basic education level in the respective districts. Based on the available data of the districts during 2010 to 2014, on average the junior secondary students covered of 26.2% to the total students at basic education level. Furthermore, in order to obtain a smooth pattern of government spending during the five-year period and to avoid annual fluctuation in spending, this study employs data on the average government spending from 2010 to 2014. Specific data on allocation of the central government budget to education are available by request from the MoEC and MoF, whereas data on the local government budget for education are

¹²Hence, the local government spending here excludes the central government transfers within the local government budget, such as the special allocation fund for education (DAK) and additional allowances for teachers (TPG) but includes the general allocation fund (DAU). The school operational assistance program (BOS) is transferred to the provincial government, so it is not a part of district government local budget.

¹³See the regulation of MoEC no. 8 of 2017 on the school operational assistance program.

publicly available from the MoF. Data on number of students is available from the respective Districts in Figures of the Statistics of Indonesia (BPS).

In addition, there are variables that represent socioeconomic factors in the districts: (i) poverty headcount ratio to capture welfare within the district; (ii) adult literacy ratio to represent education level in the district; and (iii) the share of households living in an urban area. Data of the variables are obtained from the National Socioeconomic Survey 2010 and the Districts in Figures 2010 of Statistics Indonesia (BPS). The summary statistics of all variables are presented in Table 1.

3.2. Model Specification

This study applies a cross-sectional regression analysis as in Barro & Lee (2001), Gupta, Verhoeven & Tiongson (2002), and Rajkumar & Swaroop (2008) with some adjustment due to availability of data at the district level in Indonesia. As the government spending on education likely affects the outcomes after certain periods, lags are employed. The estimated regression with subscript i represents a district is as follows:

$$\text{EXAM}_i = \alpha + \beta' \mathbf{R}_i + \gamma' \mathbf{F}_i + \epsilon_i \quad (2)$$

The dependent variable is EXAM_i , which denotes the adjusted average national exam scores at the junior secondary level for district i in 2015. The explanatory variable \mathbf{R}_i is a set of variables representing schools resources that consists of (i) the average of government spending on education, both combined and disaggregated, as a percentage to gross domestic regional product of district i in 2010–2014 and (ii) the average of government spending for teachers, both combined and disaggregated, as a percentage to gross domestic regional product of district i in 2010–2014. The second set of explanatory variable, denoted as \mathbf{F}_i , represents socioeconomic factors, which consist of (i) poverty ratio in 2010, (ii) share of households living in an urban area in 2010, and (iii) life expectancy ratio in 2010. The poverty ratio is preferred in this study instead of income per capita, as previous studies such as those of Gupta, Verhoeven & Tiongson (2002), Arze del Granado et al. (2007), Rajkumar & Swaroop (2008), and Suryadarma (2012) find

a significant relationship between poverty and education outcomes. In addition, adding a regional dummy variable for the western and eastern parts of Indonesia is applied in the regression with 1 representing districts in the eastern part of Indonesia (East Nusa Tenggara, Maluku, North Maluku, Papua, and West Papua) and 0 representing others. Vector coefficients of β' and γ' show the impact of the explanatory variables on the adjusted-national exam scores at district i , and the term ϵ_i denotes the error term in the regression.

A cross-sectional ordinary least-squares regression (OLS) is performed to estimate the model. As stated in Lee & Barro (2001), Barro & Lee (2001), Gupta, Verhoeven & Tiongson (2002), and Rajkumar & Swaroop (2008), one shortcoming of the model is the possibility of endogeneity, as some unmeasured district-specific factors may affect both the dependent and explanatory variables. However, a Durbin-Wu-Hausman test confirms that an endogeneity problem does not exist in the model. Furthermore, the diagnostic test shows that there is no heteroscedasticity in the model, so the standard errors in the OLS estimations are robust.

4. Results and Analysis

Table 2 presents the regression results. The first two regressions show the results for the impact of total government spending on the adjusted-exam scores (I), and the impact of central and local government spending, separately, on the scores (II). The last two regressions show the impact of total government spending for teachers on the adjusted-exam scores (III) and the impact of the central and local government spending for teachers on the adjusted-exam scores (IV), respectively.

According to the results presented in (I) and (II), the government spending on education, combined or disaggregated, has no significant impact on the adjusted-exam scores of students at the junior secondary education level. Similar results are depicted in the regression (III) by applying the total government spending for teachers. However, looking closely at the regression (IV), the central government spending for teachers shows a significant positive impact, whereas the local government spending for teachers shows no impact to the exam scores. A

Table 1: Summary Statistics of the Variables

Independent Variables	N	Mean	Standard Deviation	Min.	Max.
National exam of junior secondary education, 2015	466	61.172	9.565	40.442	87.076
National exam integrity index of junior secondary education, 2015*	463	0.724	0.101	0.262	0.897
Adjusted national exam of junior secondary education, 2015	463	43.868	7.677	20.267	75.360
Avg. total government spending to GRDP, 2010–2014	474	0.013	0.008	0.001	0.049
Avg. central government spending to GRDP, 2010–2014	474	0.004	0.003	0.000	0.016
Avg. local government spending to GRDP, 2010–2014	474	0.009	0.006	0.001	0.034
Avg. total government spending for teachers to GRDP, 2010–2014	474	0.011	0.007	0.001	0.041
Avg. central government spending for teachers to GRDP, 2010–2014	474	0.002	0.001	0.000	0.008
Avg. local government spending for teachers to GRDP, 2010–2014	474	0.009	0.006	0.001	0.034
Poverty headcount ratio, 2010	474	0.147	0.081	0.020	0.480
Share of households living in urban area, 2010	474	0.374	0.310	0.000	1.000
Life expectancy ratio 2010, 2010	469	68.385	3.753	53.500	77.370

Note: *The national exam integrity index is adjusted into the scale of 0 to 1
 Source: Author

Table 2: Regression Results

Dependent Variable \ Independent Variables	Adjusted National Exam Scores, 2015			
	(I)	(II)	(III)	(IV)
Avg. total government spending to GRDP, 2010–2014	-0.028 (0.440)			
Avg. central government spending to GRDP, 2010–2014		-2.885 (2.320)		
Avg. local government spending to GRDP, 2010–2014		1.207 (1.079)		
Avg. total government spending for teachers to GRDP, 2010–2014			-0.196 (0.506)	
Avg. central government spending for teachers to GRDP, 2010–2014				7.217* (4.124)
Avg. local government spending for teachers to GRDP, 2010–2014				-1.43 (1.074)
Poverty headcount ratio, 2010	-11.384** (4.946)	-10.556** (4.986)	-11.607** (4.935)	-12.247** (4.939)
Share of households living in urban area, 2010	7.418*** (1.228)	7.287*** (1.232)	7.472*** (1.224)	7.285*** (1.226)
Life expectancy, 2010	0.480*** (0.110)	0.502*** (0.112)	0.484*** (0.110)	0.445*** (0.112)
Dummy for remote districts	0.983 (1.143)	1.124 (1.147)	0.899 (1.134)	1.197 (1.145)
Constant	9.770 (7.603)	8.260 (7.692)	9.253 (7.605)	11.886 (7.743)
Adj R-squared	0.247	0.248	0.247	0.250
No. of observations	458	458	458	458

Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Standard errors in parentheses are standard errors.

The districts with literacy ratio lower than 65% are excluded.

Source: Author

significant increase of 1% of the central government spending for teachers to the GRDP of the districts might improve the students' exam scores by 7.2 points.

All the regressions show consistent results on the impact of socioeconomic factors on the exam scores. Poverty level has a significant, negative impact on the adjusted-exam scores, whereas the share of households living in an urban area and the life expectancy ratio have a significant, positive impact. As in (I), an increase of poverty level by 1 percent deteriorates the students' exam scores by around 0.11 points. The positive relationship between the share of households living in urban areas and the exam scores indicates that the more households living in urban areas (with a relatively better infrastructure), the better students' performance. Similarly, the positive impact of life expectancy ratio on the adjusted-exam scores implies that a better health condition of the respective districts, the better students' performance. Finally, adding a regional dummy variable for the western and eastern parts of Indonesia produces no significant results. This implies that there is no significant difference in the average adjusted-exam scores of students at the junior high school in the western and eastern regions of Indonesia.

Some previous studies found a similar result of limited impact of government spending on education outcomes, and pointed out the issues of efficacy of government in managing the public spending and transforming the spending into education resources. For example, Reinikka & Svensson (2004) found a negative and insignificant relationship between government spending and educational outcomes in developing countries due to low efficacy in transferring funds. A cross-countries analysis by Rajkumar & Swaroop (2008) showed that public spending on education is more effective in improving educational outcomes with good governance. Suryadarma (2012) found that local government spending in Indonesia had a negative impact on net enrollment ratio in districts with high corruption. Furthermore, a longitudinal study in selected districts of Indonesia by the Ministry of National Education¹⁴ (2010) and the World Bank (2013c) constructed an index that represents local governance on education named as the Indonesian Local Education

¹⁴Prior to 2014, the Ministry of Education and Culture was renamed as the Ministry of National Education.

Governance Index. The study shows a positive correlation between the index and education outcomes at the district level¹⁵.

Looking closely on the spending for teachers, the results show a significant positive impact of the central government spending for teachers, and no significant impact of the local government spending for teachers. The average central government spending for teachers in this study comprises of the additional allowances for teachers (TPG) by 91.2%, and teachers' salaries (as a part of the school operational assistance program-BOS) by 8.8%. This finding is not consistent with previous studies that specifically analyzed the impact of additional allowances for teachers on students' performance. For example, studies at teachers level by Fahmi, Maulana & Yusuf (2011), Pradhan & de Ree (2014), and de Ree et al. (2015) showed that increasing teachers' salaries through additional allowances does not improve students' performance. Suryahadi & Sambodho (2013), and Chang et al. (2014) conducted a descriptive analysis and concluded that allocating more allowances for certified teachers has increased attraction to the teaching profession, but there is no evidence that it has improved students' performance.

There are some aspects that might explain the difference between the finding in this study and the previous studies. One possible explanation is regarding the dataset and the definition of learning outcomes. This study applies specifically on the average of government spending for teachers at junior secondary level during the period of course of five years from 2010 to 2015 and its impact on the adjusted-national exam scores at the district level. By combining both the central government spending for teachers at primary and junior secondary level, the result shows no significant impact of the spending on the exam scores. Likewise, by applying the original national exam scores instead of the national exam scores that have been adjusted to their respective integrity indices, the result shows no significant impact of the spending for teachers to

¹⁵A preliminary result by Jasmina & Oda in their presentation shows that the impact of government spending on education at the district level in Indonesia prevails if the local government can effectively manage its spending (the paper was presented at the 2nd International Conference on Indonesian Economy and Development, Jakarta, 14–15 August 2017 with the title of "Does Local Government Capacity Hamper Improvement of Basic Education? An Analysis at the District Level in Indonesia.")

the exam scores¹⁶. None of the above-mentioned studies applied the national exam scores adjusted with the integrity indices.

Another possible explanation is that there has been an improvement of certified teachers' competency, especially at junior secondary level, during the period of 2010–2015, which might lead to the improvement of students learning outcomes. As mentioned by Tobias, Wales & Syamsulhakim (2014), the initial cohorts of teachers were certified in 2007 based on portfolio criteria of past experience, whereas the new generation of teachers have been certified based on a competency test for teachers introduced by the MoEC in 2012¹⁷. In 2015, the teachers' competency test (*Ujian Kompetensi Guru-UKG*) was conducted for all teachers as a baseline to develop a new teacher development program. The district data in 2015 shows that the adjusted-exam scores of the students at junior secondary level is strongly and positively correlated with the results of the teachers' competency test at the same year, with 0.47 correlation coefficient¹⁸. This data leads to a further question on the relationship between teachers' competency and students' learning outcomes, which should be elaborated for future research.

On the other hand, the finding shows no significant impact of local government spending for teachers on the exam scores. To further elaborate the analysis, field visits to selected districts in Indonesia were conducted¹⁹. Findings from the field supplement the results of this study. Most of the local government spending on education at the district level is allocated for teachers' salaries. At the early stage of decentralization, schools and local governments hired more teachers than needed. According to World

Bank (2012b), around 30% to 36% of the teachers at the primary and secondary level were hired by schools as non-permanent teachers²⁰. Most of these teachers were not recruited through formal procedures and standards and were mostly decided by personal judgement of school principals, school committees, or local education offices.

According to MoEC (2016), the average number of student-teacher ratio in junior secondary level is 16, which is lower compared to the ideal standard student-teacher ratio for primary and junior secondary education sets by the government of 20 (Government Regulation on Teachers no. 74 of 2008) and to the international average ratio of 25 (World Bank 2017). The low student-teacher ratio indicates an excess supply of teachers at the district level in Indonesia. Due to an excess supply of teachers, in 2016 around 81% of teachers at junior secondary education worked less than 24 standard hours a week (Jasmina 2017). Thus, in addition to salaries for teachers as local civil servants, the local governments have to allocate spending to pay the non-permanent teachers. Some districts have relied heavily on the school operational assistance program from the central government to pay the non-permanent teachers' salaries, which is allowed up to 15% of the allocated funds.

5. Conclusion

This study finds that there is no significant relationship between government, both central and local, spending on education and on the learning outcomes of junior-level students at the district level in Indonesia during the period of 2010–2015. The findings are in line with previous studies that show the limited impact of government spending on education outcomes in Indonesia. The issue of the efficacy of the local government in managing financial resources into publicly provided education services at the district level, which has been presented in some previous studies, may be a possible explanation for this finding. The findings imply that it is not only the size of government spending that matters, but also how the government effectively use the money.

²⁰According to the data of MoEC, in 2016 the non-permanent teachers comprises of 25 percent of teachers in public junior secondary schools.

¹⁶The regressions are not presented here.

¹⁷In line with the certification of teachers program in 2005, the MoEC has conducted the teachers' competency test to map teachers' pedagogical and professional competencies in Indonesia. The test was firstly introduced in 2012 as a baseline for the certification of teachers (*Ujian Kompetensi Awal-UKA*). The certification program was concluded at the end of 2015.

¹⁸The test scores of the teachers' competency test presented here is the overall scores for all levels of education with the national average score of the test is 56.7.

¹⁹The field visit to Indonesia was conducted in early and mid-2017 with interviews and discussions with the Ministry of Finance, the Ministry of Education and Culture, the Indonesian Teachers' Association, local planning agencies, and local education offices in four selected districts in Java. A thorough analysis from the field visit is presented in Jasmina (2017).

Moreover, this study shows that the central government spending on teachers might positively affect learning outcomes, whereas the local government spending on teachers have no significant impact on the learning outcomes. This finding shows that central government spending on teachers at junior secondary level, which is mostly in the form of additional allowance for certified teachers, after certain period time, might improve students' learning outcomes. On the other hand, local government spending on teachers, which is mostly for salaries of permanent local civil servant teachers and non-permanent teachers have no significant impact of the learning outcomes. There is an issue of an excess supply of teachers at the district level that might hinder the impact of government spending on learning outcomes. Though this paper does not measure the competence level of teachers, this study implies that not only increasing spending for teachers and hiring more teachers but also enhancing teachers' competency will positively affect learning outcomes.

Finally, analyzing the socioeconomic factors, this study indicates that lower levels of poverty, more households living in an urban area, and better health condition in the district positively affect students' performance. Hence, to improve learning outcomes across districts in Indonesia, specific government educational policies aimed at relatively poor districts must be intensified.

This findings presented in this study are still preliminary. Exhaustive reviews need to be done to apply the application of education production function at macro level. One major drawback in analyzing school resources at the district level is that resources at the school or classroom level may be unobserved and student or teacher characteristics may be overlooked. There are at several recommendations for future research. Firstly, in applying this model, a set of longitudinal panel data of learning outcomes at the district level should be applied as the longitudinal data provides better control for the student background effects. Secondly, as the basic education production function is applied to micro level analysis, an estimation at the micro level such as at the school or student level might give better results. An analysis at micro level can include other relevant school resources, such as classrooms and other school facilities. Thirdly, in measuring the learning outcomes, other measurements can be applied such as the adjusted national

exam scores by subject, or the standard deviation of the national exam scores. Lastly, an analysis on the relationship between teachers' competency, permanent and non-permanent, and students' learning outcomes should further be elaborated.

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