

## Indonesian Public School Productivity

**Bachtiar H. Simamora<sup>1\*</sup>, Bahtiar Saleh Abbas<sup>2</sup>, Nayan Deep S. Kanwal<sup>3</sup> and Engkos Achmad Kuncoro<sup>1</sup>**

<sup>1</sup>Management Department, BINUS Business School Undergraduate Program, Bina Nusantara University, Jakarta 11530, Indonesia

<sup>2</sup>Industrial Engineering, Faculty of Engineering, Bina Nusantara University, Jakarta 11530, Indonesia

<sup>3</sup>International Research Institute, Mont Kiara, Kuala Lumpur 50480, Malaysia

### ABSTRACT

Productivity measures are the foremost indicators of the performance of an economy, i.e., how efficiently resources are used to generate outputs and income. They provide warning signs and also give feedback to help the government take required measures to improve its performance. In the public sector, it is difficult to measure the output as services provided do not have a price which would indicate their value to the community. Outputs, such as education services, are provided free or at a subsidized price. One of the public sectors in Indonesia which is very important to be measured for its productivity is public schooling. This study is one of the first efforts in looking at the feasibility of constructing productivity measures for Indonesian public schools. The method and model used in measuring Public

School productivity is modified. Data used are secondary data available from several government sources. The study has been positive and has produced some interesting and meaningful results. Public school productivity in Indonesia has improved overall since 2011 and the improvement is getting better still, since 2014. But these improvements are not enough and are still lagging behind several ASEAN countries. The policies and programs need to be analyzed and evaluated in such a way that there is improvement in the overall education productivity and education

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#### E-mail addresses:

bsimamora@binus.edu (Bachtiar H. Simamora)

bahtiars@binus.edu (Bahtiar Saleh Abbas)

nayan.kanwal@gmail.com (Nayan Deep S. Kanwal)

eak@binus.edu (Engkos Achmad Kuncoro)

\*Corresponding author

quality. It is important that measures will be improved by involving stakeholders in the productivity measurement study.

*Keywords:* Goods and services, government policies, inputs, productivity measures outputs, public sector outputs, resources

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## INTRODUCTION

Measuring productivity matters. Productivity measures are vital high-level indicators of the performance of an economy – how efficiently resources are used to generate outputs and income. They provide warning signs when things get tough for the community and the government, and they also provide feedback on measures governments could take to improve productivity performance. The public sector, however, is normally excluded from conventional productivity measures. This oversight is due to the difficulty in measurement, rather than a lack of importance. The public sector forms a large and growing portion of the economy. Output in the public sector is hard to measure because services provided do not have a price, which would indicate their value to the community. Output, such as education services, is provided free of cost or at a subsidized price. One of the public sectors in Indonesia, which is very important to be measured for its productivity, is public school.

### Indonesia Public Schools

Over the past few decades, Indonesia has made enormous strides toward ensuring that

most of its children get a basic education. Now the focus turns to quality and preparing them for life in the 21st century. President Joko Widodo made education a key part of his election campaign and, after taking office in October 2014, embarked on a series of reforms designed not only to make the education system more appropriate for contemporary Indonesia, but also to help the government meet its goal of raising per capita incomes from \$3500 in 2011 to \$14,250–15,000 by 2025.

Under a 2002 constitutional amendment, all levels of governments are required to spend at least 20% of their annual budgets on education. In practice, however, authorities have tended not to meet that target, with spending peaking at 18.1% in 2012 and declining to 17.5% in 2014, according to UNESCO. District authorities generally cover most of the costs of basic education, contributing 61% of spending at primary and junior high levels, while the central government pays 38% and the provincial authorities 1%, according to the World Bank. Indonesia has more than 250,000 schools, 2.6 million teachers and 50 million students. From June 2015 (the start of the school year in Indonesia), the government made it compulsory for all children to complete 12 years of schooling, starting at the age of 7 years (previously it was 9 years of compulsory schooling). Early learning remains exclusively private, which is, generally, the preserve of better-off Indonesians. The Indonesian Education System is shown in Figure 1.

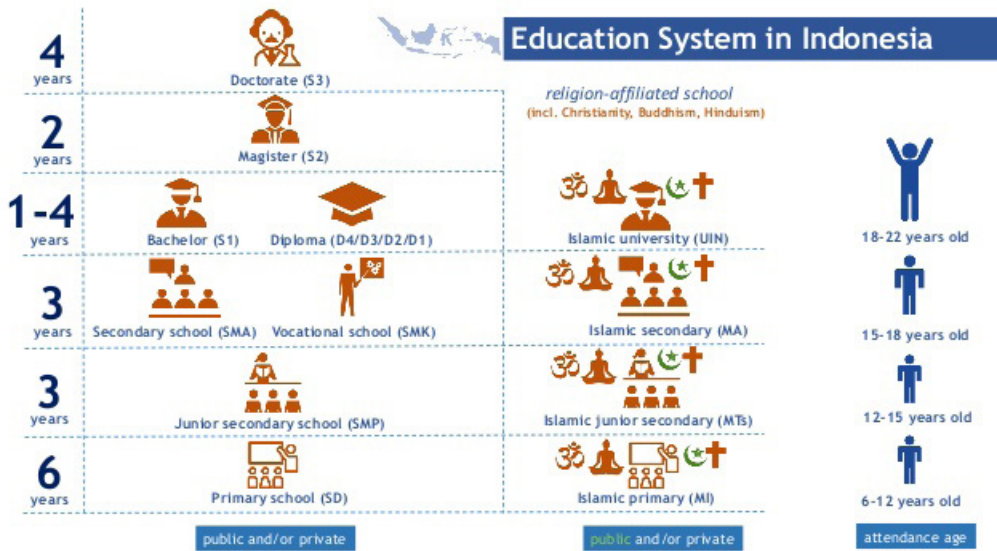


Figure 1. Education system in Indonesia

In the past 20 years, the school participation rate has increased from 94.4–98.6% for —7- to 12-year-olds in primary education, from 75.8–94.6% for 13- to 15-year-olds in junior high school and from 47.6–70.3% for 16- to 18-year-olds in high school. The literacy rate for all adults older than 15 years is now 92.6%, rising to 99.5% for those aged 15-24 years. However, the numbers mask stark regional differences, as well as a divide between urban and rural areas. While this has been gradually narrowing, further challenges are raised by the ethnic and linguistic diversity in the country, with Indonesia home to some 700 active languages, eight of which are considered major. Many children are not able to speak the national medium of instruction – Bahasa Indonesia – by the time they start school.

Spending per student has shown steady growth, with primary-level expenditure

increasing from \$808.47 (in purchasing power parity terms) in 2007 to \$1291.29 in 2014, while at secondary level it has increased from \$667.88 in 2007 to \$1046.68 in 2014, according to the UNESCO<sup>1</sup>. However, despite the headline-grabbing 20% benchmark, Indonesia’s spending-to-Gross Domestic Product (GDP) ratio for education remains relatively small. Southeast Asia’s biggest economy spent 2.3% of GDP on non-tertiary education in 2012, only slightly more than Russia (2.2% of GDP) and less than South Korea’s 3.2% of GDP, according to the Organization for Economic Co-operation and Development (OECD). The proportion of spending relative to GDP is also lower than that of Indonesia’s regional peers. In Vietnam, education spending was 6.3% of GDP in 2012. The national budget

<sup>1</sup> Oxford Business Group. <https://oxfordbusinessgroup.com/overview/turning-it-around-through-substantial-investments-ministry-education-path-producing-more-educated>

Table 1

*Indonesian education budget (2010–2017)<sup>2</sup>*

Education Budget Components	2010 <i>APBNP</i>	2011 <i>APBNP</i>	2012 <i>APBNP</i>	2013 <i>APBNP</i>	2014 <i>APBNP</i>	2015 <i>APBNP</i>	2016 <i>APBNP</i>	2017 <i>APBNP</i>
1. Managed by Central Gov,	96.5	105.4	117.2	126.2	128.2	154.4	145.0	145.4
A. Managed by Ministerial of Institution	96.5	105.4	117.2	126.2	128.2	154.4	141.7	141.8
B. Managed by other ( <i>BA BUN</i> )	-	-	-	-	-	-	3.3	3.6
2. Budget transferred to Regional, District and Village	127.7	159.0	186.6	214.1	238.8	254.2	266.6	268.2
3. Budget by Project Cost	1.0	2.6	7.0	5.0	8.4	-	5.0	0.0
4. Total Education Budget	225.2	266.9	310.8	345.3	375.4	408.5	416.6	416.1
5. Total National Budget	1,126.1	1,320.8	1,548.3	1,726.2	1,876.9	1,984.1	2,082.9	2,080.5
Education Budget Ratio	20.0	20.2	20.1	20.0	20.0	20.6	20.0	20.0

Source: Indonesia Ministry of Education and Culture (2014, 2016).

for education since 2010–2017 is shown in Table 1 and Figure 2.

In Figure 2, we can see the portion of education budget increasingly more managed by regional and district government with the aim to boost local autonomy. Additional spending is available under the School Operational Assistance program introduced in 2005, with this coming directly from central government on a “per student” basis, as well as under district support programs.

Under the Teacher and Lecturer Law, implemented in 2005, professional teachers are those who hold a bachelor’s degree and pass a teaching competency test. Those who have the designated qualifications

would receive an additional allowance to effectively double their salary. The initiative proved successful in increasing the level of training, with the majority of the country’s 2.6 million teachers taking steps towards being equipped with professional status. However, a 2014 World Bank study concluded that the program did not significantly improve learning outcomes and made recommendations for increased

<sup>2</sup> Indonesia Education Budget (2010 – 2017) from The Management of National Education in 2014/2015 at a Glance. Division of Utilization and Services by Indonesia Ministry of Education and Culture (2014, 2016).

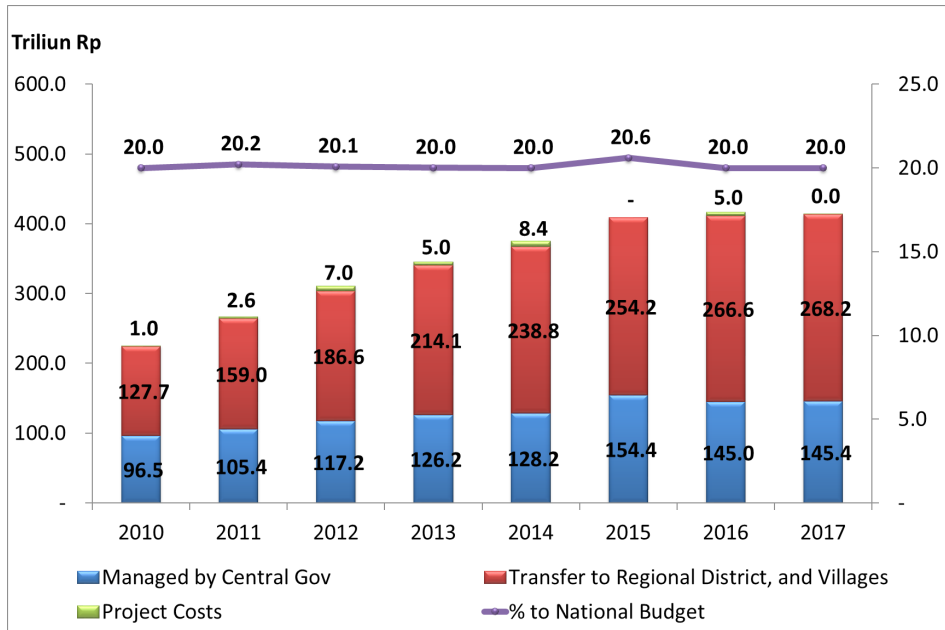


Figure 2. Education budget in Indonesia

monitoring across the teacher training program and improving teacher selection procedures.

This study examines the provision of education services at government schools. Primary and secondary schools are covered, but not tertiary institutions. As the private-sector involvement is excluded, the measures do not cover the whole school systems. Specific objectives of the study are to assemble key indicators to measure productivity, identify factors that may have contributed to productivity trends and recommend improvement in indicator gaps and data of Indonesian public schools.

## LITERATURE REVIEW

### Productivity and Measurement in the Business Sector

The methodology for measuring public-

sector productivity is meant to draw on, if not mimic, the principles of private-sector productivity measurement. An outline of productivity measurement in the private or business sector is therefore a good starting point. The OECD Productivity Manual provides detailed guidelines on business-sector productivity measurement (OECD, 2011).

Productivity is about the efficiency of production. It is the rate at which outputs of goods and services are produced from the inputs used in their production. Labor and capital (such as buildings, plant, and machinery) are the major inputs used in production. In some contexts, the use of intermediate inputs (components, materials and purchased services such as energy) is also included.

Improved production efficiency — productivity growth — can come about either by using fewer inputs to produce the same volume of output or by using the same volume of inputs to generate more output. Over the long term, the latter is more important as, for example, technological advances enable businesses to produce a lot more output without raising their use of inputs to the same degree.

While there are several ways to measure productivity, the ratio of outputs produced to inputs used is a simple way to capture the essence. That is:

$$\text{Productivity} = \frac{\text{outputs}}{\text{inputs}}$$

Outputs and inputs are measured in terms of quantity. The number of vehicles produced from a factory per person per hour worked and the number of tons of rice produced per hectare farmed are examples of quantity-based productivity measures.

But how is output measured across numerous firms and industries?

Statisticians use prices to add the different outputs. Price multiplied by quantity equals value and the value of vehicles produced can be added to the value of rice produced and so on (Statisticians also use price deflators to remove the effects of inflation, so that values become ‘quantity-like’, real or volume measures.)

The use of output prices means that the productivity measures cover the production of goods and services *of value*. Products with a higher price will receive a higher weight in adding together the production of different goods and services. However, if customers do not value a good or service,

it will effectively be excluded from a group output measure.

An improvement in the quality of goods and services that is valued by customers will also be reflected in a higher price. A producer will charge a higher price for a good or service of higher quality. If statisticians allow for quality improvement (not treating it as price inflation), higher quality will show up in the data as increased output.

In essence, and from a national point of view, productivity is ultimately about using resources in ways that generate more value to the nation, where value is expressed in terms of income.

Concerted efforts to measure public-sector productivity are quite recent. The Atkinson Review is a seminal study from 2005 (Atkinson, 2005). It provided a foundation for expanding the scope of national accounts estimates of national productivity to embrace the public sector (Dunleavy & Carrera, 2013; Office for National Statistics, 2016). Other studies have been directed at measuring the productivity of individual government agencies (Statistics New Zealand, 2010) and measuring productivity in the provision of major subsectors (Andrews et al., 2016).

## METHOD

### A Broad Framework

Figure 3 displays a framework for assessing performance in the public sector that circumvents the lack of prices.<sup>3</sup> The figure shows, as expected, productivity as the relationship between inputs and outputs

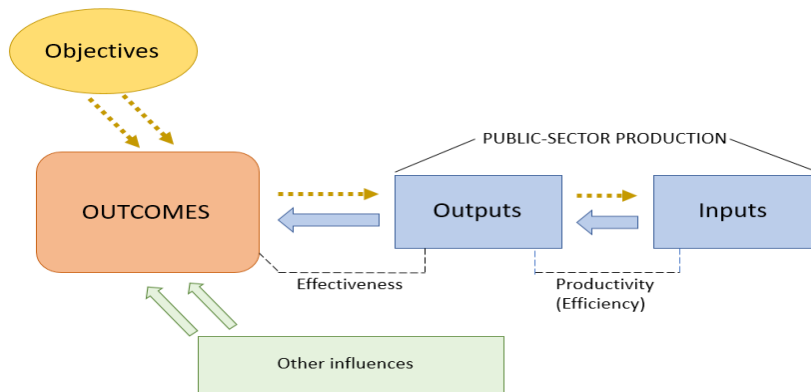


Figure 3. The framework for measuring public-sector productivity

of public-sector goods and services. Other important relationships, beyond inputs and outputs, help to incorporate notions of value.

First, there are the outcomes or consequences of the public-sector outputs. For hospitals, for example, the outputs might be surgical operations, while the outcomes might be improved quality of life and longer life expectancy.

Second, desired outcomes are defined in reference to broader community objectives. They might include, for example, aiming for a healthy, safe and educated community. Objectives can have economic, social and environmental dimensions.

Third, the outputs to be considered in the productivity analysis are the ones that have the most relevance to achieving desired outcomes. Because value is related to improvements in desired outcomes, this brings an element of value into consideration of productivity.

As shown in Figure 3, the productivity analysis should start from community objectives, which determines the nature of the desired outcomes that are most relevant to the public-sector services under consideration. The desired outcomes then determine the most relevant outputs to be included in the analysis.<sup>4</sup>

Fourth, other factors, and not the public-sector activity alone, influence outcomes.

The public sector has full control over its outputs but, often, not over changes in outcomes. Productivity, therefore, usually provides a stronger basis for the performance assessment and accountability. It should be mentioned in passing that productivity measurement is not the end of performance assessment of the public sector. Effectiveness in achieving desired outcomes (see the ‘Effectiveness’ link in Figure 1) can also form a part of the assessment (New Zealand Productivity Commission, 2017).<sup>5</sup>

<sup>3</sup> The figure is an adaptation of a framework set out in many papers and reports, including Atkinson (2015) and Australian Government Productivity Commission (2017)

<sup>4</sup> The importance of working backwards from objectives, through desired outcomes to identify relevant outputs was stressed by Dunleavy and Carrera (2013).

The Australian Productivity Commission (APC) presents a range of indicators under major headings of headings of 'Efficiency', 'Effectiveness' and 'Equity' (Parham, 2013).

## Measuring Output Growth

**Identifying Outputs.** The public sector delivers many different outputs that make progress on desired outcomes. For example, improved health outcomes will require a mixture of preventative health care, remedial care and emergency treatment. Hospital services can include out-patient services, emergency treatment, trauma care, maternity care, surgery and other specialist treatment of various conditions.

It is not necessary to separately identify all outcome-improving outputs. In fact, Atkinson (2005) suggested a small number of measures.

Outputs of specific services can be grouped when they have similar production characteristics, as indicated by their unit costs of production. If possible, output groups should remain separate where they have very different unit costs of production. When summing up growth in all outputs (Equation 1), total output growth will then take into account the different input

of different services. Similarly, the analysis can take into account the compositional shifts towards outputs that are costlier or cheaper to produce.

In practice, the number of outputs that can be separately identified will depend on the availability of cost data on each individual service or group of services. As will be shown in the following, costs of production of each identified output or output group are required to form a measure of total output growth – that is, growth in sector output (output of all services delivered).

According to Robano (2016), the services identified by national statistical offices in the area of schools are as follows:

- pre-primary education;
- primary education;
- general secondary education; and
- technical and vocational secondary education.

**Measuring Outputs.** Measuring public-sector outputs is difficult, as has been discussed. They are often not well defined, and their value is indistinct. Fortunately, measurement for productivity purposes is made easier by the need to capture output *growth* and not the *level* of output. If the output measure—whatever it is—grows at the same rate as 'true' output, true output growth is accurately represented by growth in the selected measure. If a constant value is created from each service delivered, the growth in true output will be the same as the growth in the number of services delivered.<sup>6</sup> The number of services delivered is a direct volume measure, not requiring any deflation.

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<sup>5</sup> In most formulations of the Figure 1-type framework, 'effectiveness' is portrayed as a relationship between inputs and outcomes. This does not seem to allow for the presence of other influences on outcomes. Here, following the [NZPC], effectiveness is taken to be the effect that outputs have on outcomes. The NZPC takes the relationship between inputs and outcomes to be 'cost-effectiveness' (New Zealand Productivity Commission, 2017).



The way forward then becomes measuring output by a direct volume measure and to check for, and handle, any quality changes. Quality change is discussed in the following. Many countries have implemented measures of education services. Output indicators commonly used or recommended for schools are (Robano, 2016):

- number of pupils; and
- number of pupil hours.

The numbers of students is a gross output measure. That is, the production of the service includes the use of intermediate inputs. The alternative is a value-added measure of output, where value added is gross output less intermediate input usage. Only labor and capital are considered to generate value added.

It is important to include the use of intermediates and their costs, wherever possible, when a gross output measure is used. Otherwise, a shift in the degree of outsourcing can show up as a step change in productivity. For example, labor use would decline if activities previously performed in-house were contracted out. But, since output would remain essentially the same, labor productivity would rise to a large degree, because of fewer employees engaged in-house, which would be spurious from a production efficiency point of view.

**Aggregating Growth in Different Outputs – Output Cost Shares.** Growth in total or aggregate output is formed as a weighted sum of growth in outputs of identified services. For example, the growth in school outputs could be formed as a weighted sum of growth in the number of students enrolled in primary school and growth in the number of secondary school students.

The weights for the aggregation reflect the relative costs of providing a unit of each of the service outputs. They are calculated as the share of each output activity in the total cost of production across all outputs. This is a departure from the private-sector case, where prices form the basis for the weights and reflect the relative value generated by outputs. The cost-based weights used for the public sector do not reflect the relative values generated.

To illustrate the aggregation for the case of three outputs A, B, and C, total output growth ( $\hat{Y}$ ) is given by:

$$\hat{Y} = s_A \cdot \hat{Y}_A + s_B \cdot \hat{Y}_B + s_C \cdot \hat{Y}_C \quad (1)$$

where,  $\hat{Y}_A$ ,  $\hat{Y}_B$  and  $\hat{Y}_C$  refer to the growth in outputs of A, B, and C; and  $s_A$ ,  $s_B$  and  $s_C$  refer to the costs of producing the outputs of A, B and C as a proportion of total costs of production. They are called as output cost shares.

The Laspeyres formulation, which is used in this study, uses base period weights. To illustrate, Equation (1) is implemented with the growth between years 1 and 2 weighted by the cost share in year 1. One alternative would be to use the Paasche

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<sup>6</sup> The same applies to measurement errors. Measurement errors only matter if their significance changes over time

formulation, which uses end-period (year 2) weights.<sup>7</sup>

The use of output cost shares means outputs that are more numerous or are costlier to produce a greater weight.<sup>8</sup>

### Quality

As noted earlier, the nature of the study is to measure output by a direct volume measure and to check for and handle any quality changes. Incorporating quality into public-sector performance assessment is a much discussed and debated topic. It is fair to say that different agencies and individuals have adopted different approaches in certain respects and a firm consensus on how to proceed has not yet emerged.

**Nature of Quality Indicators.** Quality is mostly related in the literature to the effects of public-sector products on outcomes. They capture elements of value. A weakness of performance assessment is that the outcomes are open to influences, aside from the public-sector activities being examined.

On the other hand, in practice, some indicators that are used relate to the quality of the outputs generated and these indicators do not necessarily or strongly reflect value.

This suggests the use of two types of indicators:

- output quality indicators: to what standard are outputs delivered?
- outcome indicators: what outcome changes can be identified?

**Integrating Quantity and Quality Indicators.** There is a debate about whether

quality indicators should be explicitly integrated into output measures—that is, to downgrade or uplift output growth depending on whether there has been a decline or rise in quality. Some have done it (Office for National Statistics, 2016), but others have kept quality measures separate. European Union (2016) and others have suggested keeping quality indicators separate because an unanimous way of integration has not been reached. It is difficult to arrive at an appropriate weight to give a quality uplift or downgrade to apply against a quantity change.

In this study, quality indicators have been kept separate from measures of the quantity of growth in output. The question asked, then, is whether there has been any change in quality that would qualify the measure of growth in output in either a positive or a negative direction.

### Measuring Input Growth

**Labor Input.** Labor input in public schools is perhaps the easiest to measure. For private-sector productivity measurement,

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<sup>7</sup> The Laspeyres index approach appears common in measuring public-sector productivity. In measuring private-sector productivity, many national statistical offices use geometric averages of base- and end-period weights, in the form of Tornqvist or Fisher indexes.

<sup>8</sup> The use of cost shares also means that the growth in total output as calculated from Equation (1) will not be equal to the growth in the total number of services.

labor input is normally measured by hours worked. If an hours-worked measure is not available, a numbers-employed measure generally is. An alternative measure would be to take labor costs, adjusted by a suitable deflator such as a general wage cost deflator.

While a numbers-employed or hours-worked measure is commonly used, it does not take into account the different skill levels of different groups of employees. For example, schools employ administrators, staff and teachers. They have different skill levels that are not accounted for by simply adding up the numbers employed, or hours worked. This can be overcome by specifying the growth in total labor input as a weighted sum of growth in numbers employed or hours worked in the different employment groups and setting the weights equal to the share of total labor costs incurred by each group. The relationship is similar in form to Equation (1).

Similarly, if labor inputs are measured for different services and labor cost data are available, the growth in total labor input would be the weighted sum of growth in labor inputs for the identified services, where the weights are the shares of the identified services in total labor costs.

**Capital Input.** The measure of capital input is meant to represent the flow of services from the available capital stock. The flow is usually assumed to be proportional to the stock. In private-sector measurement, the stock is mostly measured through the

perpetual inventory method, whereby real investments are additions to the stock and depreciation and retirements are deductions from the stock.

While capital expenditure data is often recorded for public-sector organizations, data on the real or volume stock of capital, net of depreciation and retirements, rarely is.

Consequently, some other proxy measure is usually required. The consumption of fixed capital would be the most suitable. The amount of depreciation recorded in a year is a close substitute and has been used in several studies. These measures must be deflated to form real or volume measures. Since capital information has been very difficult to obtain, basic measures have been used for this study. For schools, the number of classrooms or number of schools has been used to indicate the growth in capital used.

### Intermediates Input

The use of intermediate inputs can be measured from data on procurement costs. They should be adjusted by a general production deflator, such as the GDP price deflator.

**Aggregating Input Growth – Input Cost Shares.** A total inputs measure is needed to calculate Multi Factors Productivity (MFP). The growth in combined inputs ( $\hat{I}$ ) is a weighted sum of growth in labour ( $\hat{L}$ ), capital ( $\hat{K}$ ) and intermediates ( $\hat{N}$ ):

$$\hat{I} = c_L \cdot \hat{L} + c_K \cdot \hat{K} + c_N \cdot \hat{N}$$

where the weights are the shares of the different inputs in the total costs of production—that is,  $c_L$  is the labour cost

share,  $c_K$  is the capital cost share and  $c_N$  is the intermediates cost share.

As with output growth, base-period weights are used.

### Forming Productivity Measures

Following the procedures above, one can generate estimates of annual growth in inputs and outputs. These are easily used to form index number series. A base period is selected and set equal to 100. The growth rate over the next year is applied to that base value to calculate the index value in the next year. The next growth rate is applied to that value, and so on. In symbols,

$$X^{t+1} = X^t \cdot (1 + g^{t+1})$$

where  $X^{t+1}$  is the value of a variable,  $X$ , 1 year after year  $t$ ,  $X^t$  is the value in year  $t$  and  $g^{t+1}$  is the growth in  $X$  between years  $t$  and  $t+1$ .

The calculation of productivity indexes is straightforward, once the output and input indexes have been formed.

$$\text{Labour productivity index} = \frac{\text{Output index}}{\text{labour Input index}} \times 100$$

$$\text{Capital productivity index} = \frac{\text{Output index}}{\text{capital Input index}} \times 100$$

$$\text{Multifactor productivity index} = \frac{\text{Output index}}{\text{Combined Input index}} \times 100$$

**Proceeding without Complete Information.** It may not be possible to calculate an MFP index because of the absence of capital input data or complete cost data (for the calculation of input cost shares). In such cases, labour productivity may be the only measure that can be calculated.

This would be a reasonable measure of efficiency so long as the degree of contracting out was small or stable over the period measured. As noted earlier, a shift towards more contracting out can have effects on labor productivity that do not represent improvements in production efficiency. The number of services delivered could remain the same, while the labor input from the public sector declines due to contracting out.

Dunleavy (2016) recommended persisting with MFP measures in the absence of capital cost information. He suggested that shares should be calculated from other costs, apart from capital costs.

### Inferring Something about MFP Growth.

It is also possible to infer something about MFP growth when there is no cost information to calculate input cost shares. MFP growth ( $\widehat{MFP}$ ) is a weighted sum of labor productivity growth ( $\widehat{LP}$ ), capital productivity growth ( $\widehat{KP}$ ) and intermediates productivity growth ( $\widehat{NP}$ ), where the weights are the input cost shares:

$$\widehat{MFP} = c_L \cdot \widehat{LP} + c_K \cdot \widehat{KP} + c_N \cdot \widehat{NP}$$

In this case, the input cost shares are unknown. Nevertheless, MFP growth must be between the lowest and the highest rate of growth in the partial productivities. The range can be narrowed down if something is known, or can be inferred, about the structure of production. For example, the rate of MFP growth will be closer to the rate of labor productivity growth, the more labor-intensive production is.

**RESULTS AND DISCUSSION**

**Output**

Output as number of enrolment, growth for elementary, secondary, and middle high has been mostly increasing, especially since 2014 where the current government of President Joko Widodo started functioning as shown in Table 2 and Figure 4. Data used in this analysis for all levels of schooling for output and all inputs are very much available. Output as number of enrolment, growth for elementary, secondary, and middle high has been mostly increasing, especially since 2014 where the current government of President Joko Widodo started functioning. It is also evident that the rate of growth also improved since 2014, except for secondary school down and up again parallel with elementary and middle high.

**Inputs**

All input (labor, capital, and intermediates) costs have been deflated using inverse of inflation rate during 2011 to 2016.

**Labor**

Labor costs cover all employees. Labor input has been decreasing since 2011, but began to change direction upwards since 2014, again this is where the new government started with the new policy (Table 3 and Figure 5).” Labor costs cover all employees. Labor input has been decreasing since 2011, but began to change direction upwards since 2014, again this is where the new government started with the new policy.

**Capital**

Capital cost used has been deflated based on opposite of historical inflation since 2010, as shown in Table 4 and Figure 6.

Table 2

*Output*

<i>Number of services delivered (index, 2011 = 100)</i>						
	2011	2012	2013	2014	2015	2016
Elementary	100	97.52	96.72	96.07	97.53	99.44
Secondary	100	102.13	102.92	107.30	102.75	104.76
Middle High	100	102.65	102.97	102.81	102.09	104.09
Total	100	99.74	99.63	100.24	99.60	101.55

<i>Number of services delivered (Millions)</i>						
	2011	2012	2013	2014	2015	2016
Elementary	30.78	30.04	29.79	29.60	30.05	30.65
Secondary	12.17	12.43	12.53	13.09	12.56	12.81
Middle High	9.28	9.53	9.56	9.54	9.48	9.67

Source: Indonesia Central Bureau of Statistics (2017)

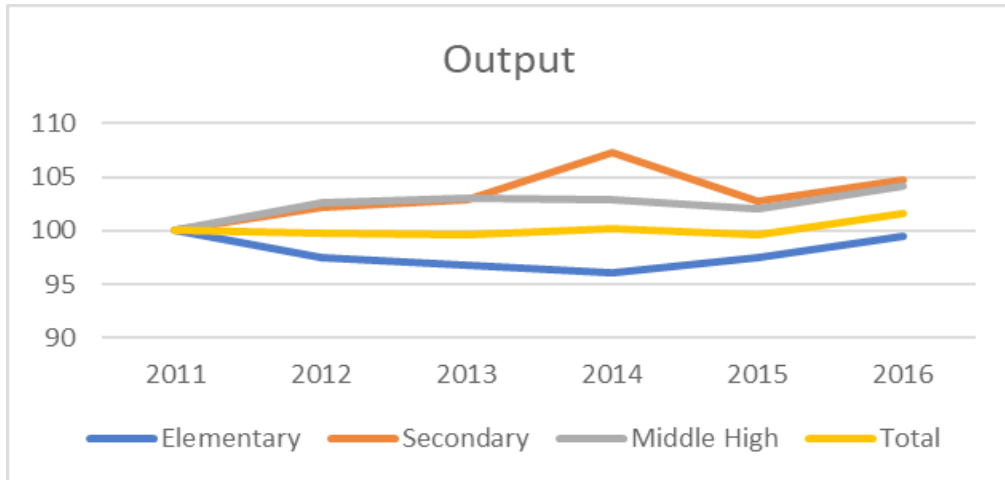


Figure 4. Output

Table 3

Labor

Labour input costs (index, 2011 = 100)						
	2011	2012	2013	2014	2015	2016
Elementary	100	109.56	105.52	115.61	107.67	109.82
Secondary	100	110.46	108.68	133.44	113.15	115.41
Middle High	100	111.69	118.07	147.55	119.33	121.72
Total	100	110.25	110.53	128.89	112.05	114.29
Labour input costs (Trillions)						
	2011	2012	2013	2014	2015	2016
Elementary	35.05	15.51	28.30	25.44	32.80	36.08
Secondary	13.19	10.04	10.98	17.90	24.42	26.87
Middle High	15.17	14.60	15.75	19.66	33.95	37.34
Total	63.42	40.15	55.02	62.99	91.17	100.29

Source: Indonesia Central Bureau of Statistics (2017)

Capital cost has been calculated from data provided as total budget minus labor and intermediate. Capital cost used has been deflated based on opposite of historical inflation since 2010. Capital costs cover new building and facility, upgrading and maintaining all facilities. Capital growth

has been almost flat since 2011, but began to increase since 2014, again this is where the new government started with the new policy.

**Intermediates.** Intermediates growth for all indices has been steadily increasing since 2011, as shown in Table 5 and Figure

7 Intermediates growth for all indices has been steadily increasing since 2011.

increasing, except for middle high. This is due to the deflation adjustment, shown in Table 6 and Figure 8.

**Total Inputs.** Total inputs are somewhat decreasing although the actual budget is

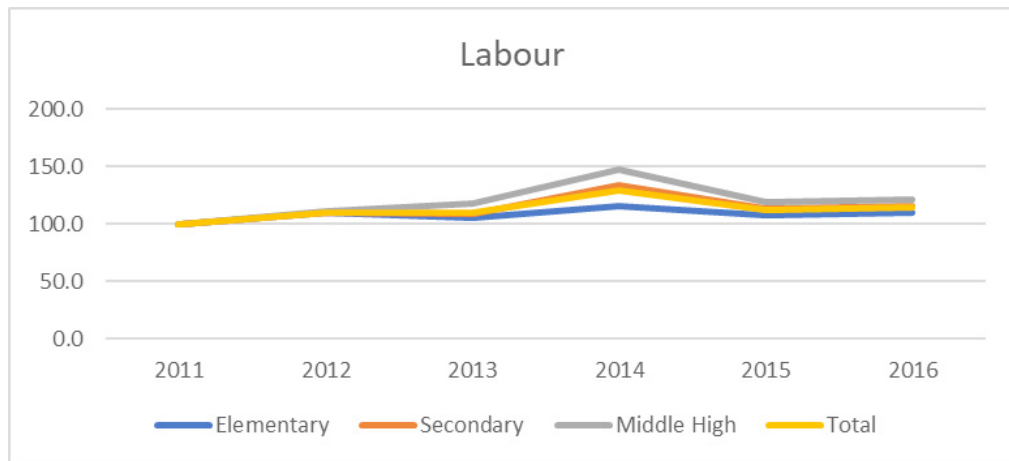


Figure 5. Labor

Table 4

Capital

Capital input cost (index, 2011 = 100)						
	2011	2012	2013	2014	2015	2016
Elementary	100	98.47	92.59	88.02	84.40	84.11
Secondary	100	101.53	96.84	94.74	87.65	87.34
Middle High	100	100.32	100.52	98.03	89.02	88.71
Total	100	100.32	89.90	81.28	64.39	63.72

Capital input costs (Trillions)						
	2011	2012	2013	2014	2015	2016
Elementary	25.48	25.83	25.79	25.78	25.72	26.24
Secondary	12.23	12.78	12.94	13.31	12.82	13.07
Middle High	10.00	10.33	10.99	11.27	10.65	10.86
Total	47.71	48.94	49.72	50.36	49.18	50.17

Source: Indonesia Central Bureau of Statistics (2017)

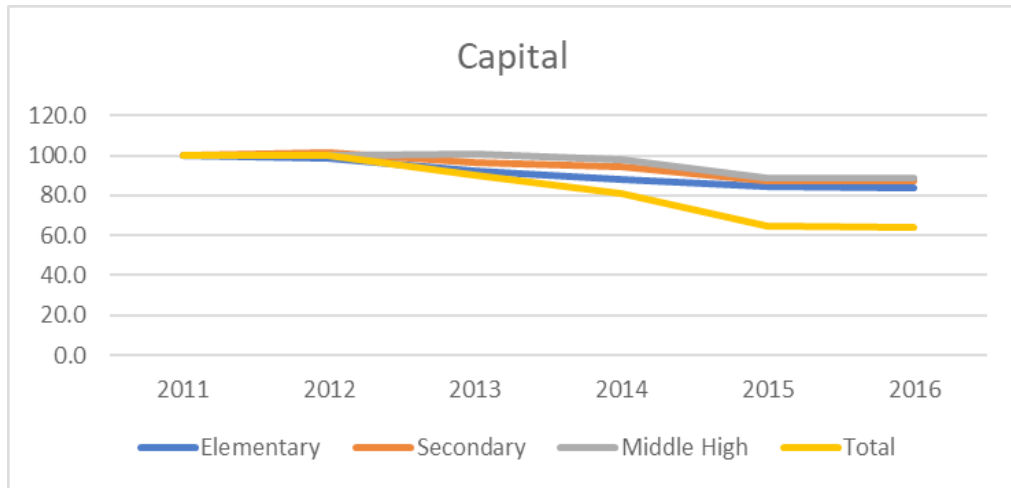


Figure 6. Capital

Table 5

*Intermediates*

Intermediates input costs (index, 2011 = 100)						
	2011	2012	2013	2014	2015	2016
Elementary	100	98.47	92.59	88.02	84.40	84.11
Secondary	100	101.53	96.84	94.74	87.65	87.34
Middle High	100	100.32	100.52	98.03	89.02	88.71
Total	100	99.64	95.34	91.84	86.20	85.90

Intermediates input costs (Trillions)						
	2011	2012	2013	2014	2015	2016
Elementary	12.74	12.92	12.90	12.89	12.86	13.12
Secondary	6.11	6.39	6.47	6.66	6.41	6.54
Middle High	5.00	5.16	5.49	5.63	5.32	5.43
Total	23.86	24.47	24.86	25.18	24.59	25.08

Source: Indonesia Central Bureau of Statistics (2017)



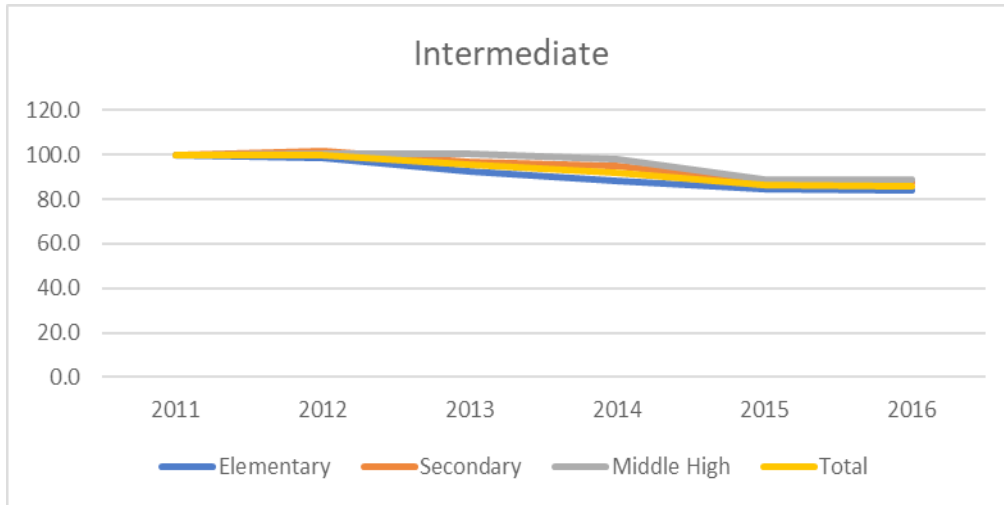


Figure 7. Intermediates

Table 6  
Total input (trillion)

Total inputs	2011	2012	2013	2014	2015	2016
Labour	63.42093	40.14758	55.02357	62.99189	91.17054	100.2876
Capital	47.71	48.94	49.72	50.36	49.18	50.17
Intermediates	23.85673	24.46985	24.86175	25.18128	24.5924	25.08425
Sum	134.9911	113.5571	129.6088	138.5357	164.9477	175.5403

Total input (index, 2011 = 100)	2011	2012	2013	2014	2015	2016
Elementary	100.0	103.8	98.3	99.4	94.3	94.9
Secondary	100.0	105.3	101.5	108.4	96.4	97.3
Middle High	100.0	106.0	109.1	121.0	103.4	104.7
Total	100.0	114.9	108.9	130.6	94.8	97.6

Source: Indonesia Central Bureau of Statistics (2017)

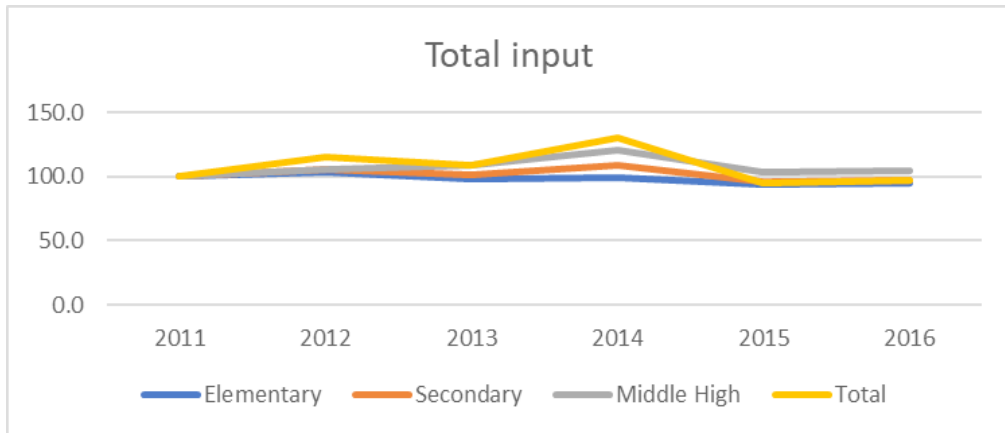


Figure 8. Total input indices

### Productivity and Quality

#### Productivity

Multifactor productivity (Figure 9) was decreasing for almost all indices until 2014, after which it had been increasing for all indices and the total shows very clear significant improvement. These coincided with the new policy implemented since 2014

by the current President Joko Widodo’s government.

Figure 10, labor productivity, showed decreasing for all indices up to 2014, then began to show an increasing trend direction.

Figure 11, capital productivity, shows steadily increasing trend since 2011.

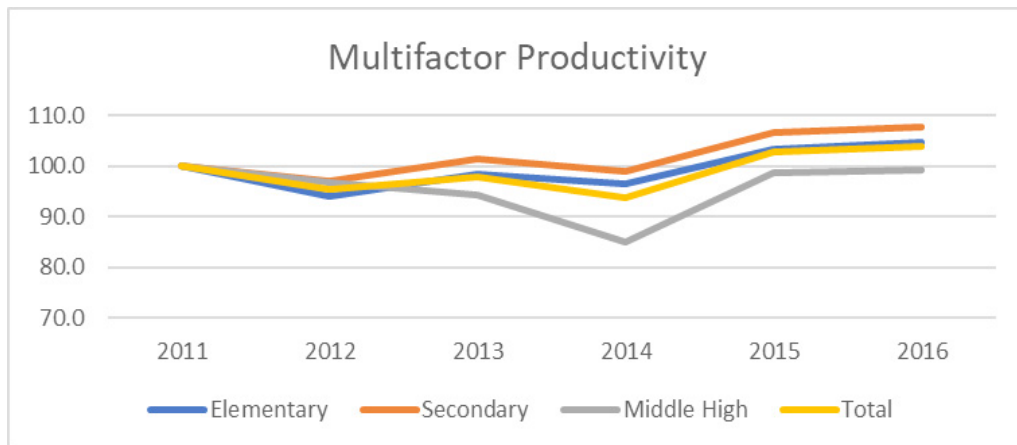


Figure 9. Public school multifactor productivity growth

Indonesian Public School Productivity

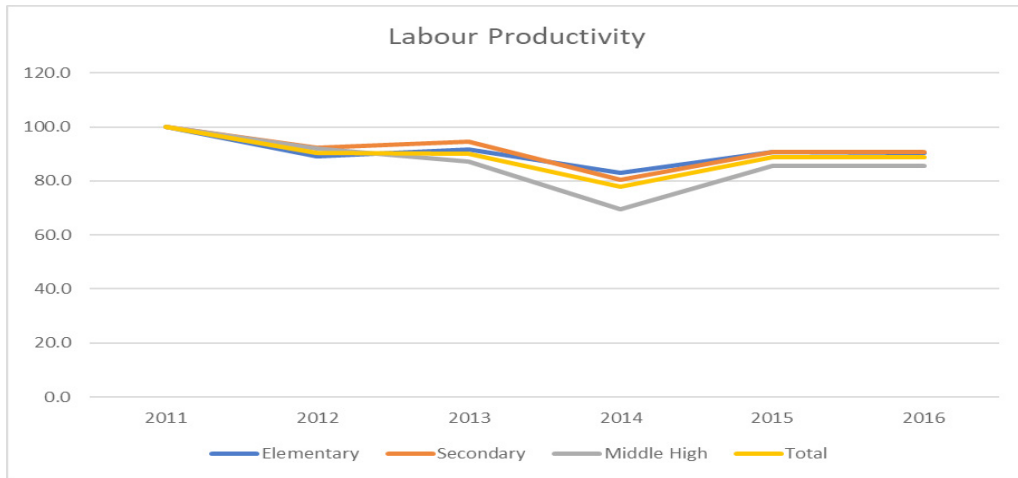


Figure 10. Public school labor growth

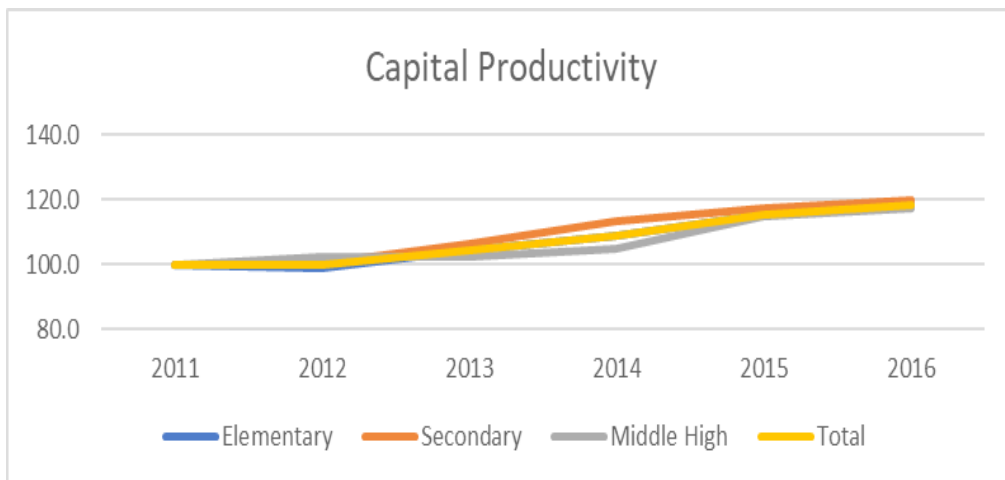


Figure 11. Public school capital productivity

Figure 12, intermediates productivity, shows steadily increasing trend since 2011.

Labor productivity, in general, was decreasing up to 2014, then started increasing. Capital and intermediates productivity had been steadily increasing.

The measures used for input and output, have shown good and credible trends for multifactor productivity for elementary, secondary, middle high, and the total.

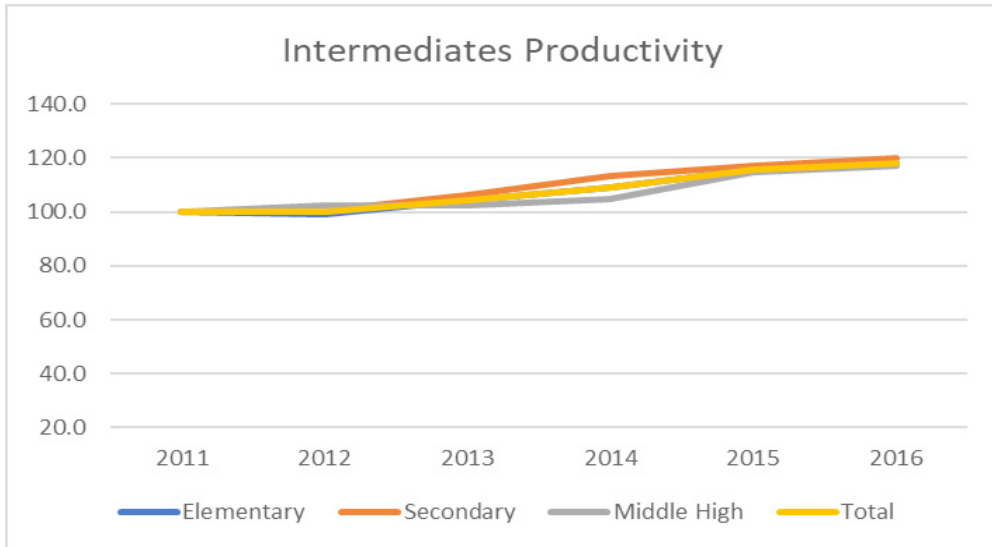


Figure 12. Public school intermediate growth

### Quality

The quality measures presented for level of schooling show that *no school, not finish elementary* and *secondary* overall good result. However, elementary and middle high have not shown good improvement.

Figure 14 shows the steady improvement since 2011 of school participation for all indices.

Figure 15 shows the steady improvement (decreasing) since 2011 of illiteracy rate for all indices.

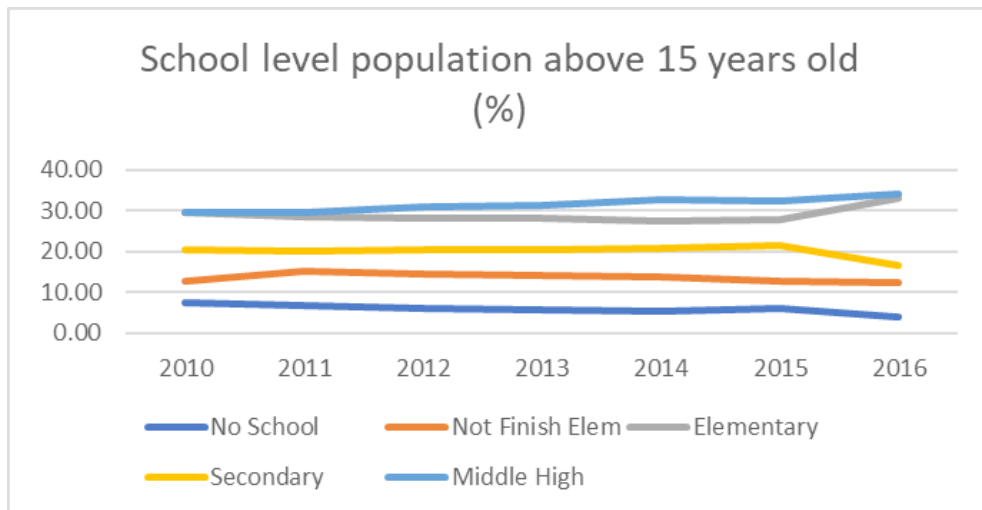


Figure 13. Public school quality

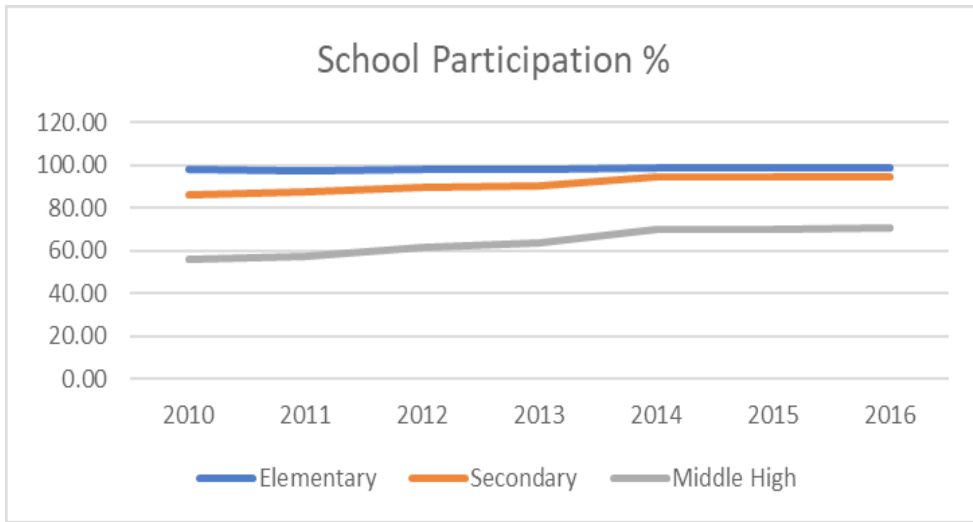


Figure 14. Public school participation

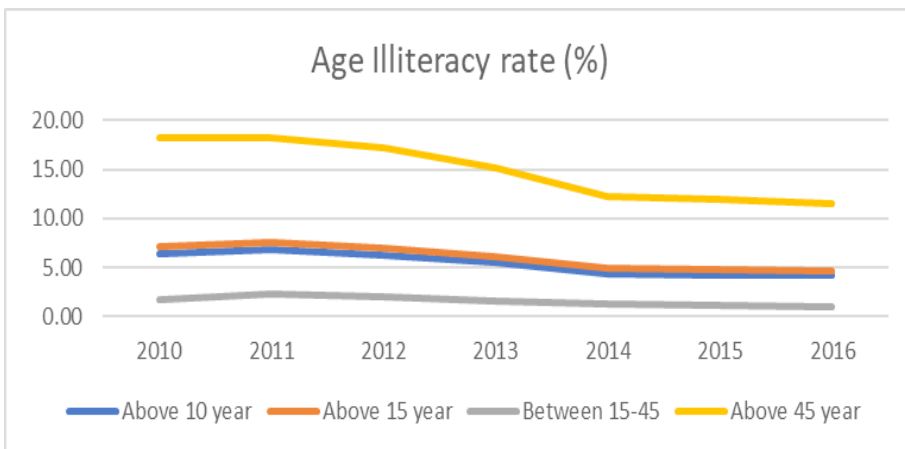


Figure 15. Public school age illiteracy rate (%)

The change in productivity appears to be because of policy changes, which has been continuously refocused from time to time.

### Improving Productivity Measures

By looking at Figures 13, 14 and 15, one

can suggest that schools' quality has not been totally improving. The continuing implementation of policy needs to be evaluated; to those that are working are to be continued, and those that are not, need to be replaced.

## **CONCLUSION AND RECOMMENDATION**

### **Conclusion**

This study should be viewed as a first step in trying the feasibility of constructing productivity measures for Indonesian public schools. From that point of view, the study has been positive. It has produced some interesting and meaningful results.

Public school productivity in Indonesia, overall, has been improving since 2011 and the improvement is getting better since 2014 when the new government began. However, these improvements are still far behind the stated goal in Sustainable Development Goals (SDGs) and behind several ASEAN countries. Therefore, the policy and program need to be evaluated for refocusing and realigning in such a way that will speed up the overall education productivity and education quality to achieve SDG and improve national competitiveness.

Even though Indonesia has made a great progress in reducing poverty – the proportion of the population living below the poverty line fell to 15.9% in 2012, according to the ADB – the costs associated with schooling remain a problem. Joko Widodo's government has attempted to address the issue through its Indonesia Smart Card initiative. One of its earliest policies launched, on taking office, the program provides fees and stipends to children from low-income backgrounds to ensure that they complete their schooling. The School Operational Assistance program has also helped millions of poor children stay in school by paying their fees – from

34.5 million in 2005 to 44.7 million in 2012. The government is also working closely with NGOs and corporate foundations to raise standards in Indonesian schools, especially for the most disadvantaged.

Indonesia has recognized the challenges posed by an education system that is struggling to equip its students for the fast-changing demands of the global economy. The adoption of the ASEAN Economic Community in 2016, theoretically enabling the free movement of labor, will increase the pressure on Indonesia to compete effectively, provide opportunities for its people and nurture human capital with the skills to feed its economy. In an archipelago of more than 17,000 islands and 250 million people, change will take time, but the country is on the right path.

### **Recommendation**

The quality of the measures could be improved over time, with concerted effort put into upgrading data collections. The data gaps in Indonesian Public-School productivity measures are data availability both in data quality and reliability and the data consistency used coherently throughout the government sectors and levels.

It is important that the process of improving measures be enhanced by involving stakeholders in the measurement study. They could suggest strengths and weaknesses in measures and additional data sources that could be tapped. Dunleavy and Carrera (2013) noted that the process of selecting outputs could itself lift productivity over time. It encourages public-

school agencies to think more about their objectives, their desired outcomes, what is core and what is peripheral in their activities and where they can focus their resources to achieve the most.

## ACKNOWLEDGEMENT

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