

Education in Indonesia: A White Elephant?



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SMERU WORKING PAPER

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The SMERU Research Institute

July 2018



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ABSTRACT

Education in Indonesia: A White Elephant?

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After successfully improving access to education in the early 1990s, with virtually universal primary school completion and similarly positive trends in senior secondary level, Indonesia began investing to improve learning outcomes since 2005. For almost a decade, the country has been spending about one-fifth of its public funds on education. Teachers have received significant salary increases through the certification program. In this paper, we provide a long-run overview of numeracy and literacy among 15-year-old Indonesians using an international test, spanning 2003–2015. We find that improvements in learning levels are too small to justify the significant investments that the country has undertaken. We also show that the government's major education policies have not produced expected results. We argue that without adding accountability measures that focus on learning outcomes, there is little chance for the investments to provide significant returns in the form of significantly improved learning outcomes.

Keywords: Education, learning outcomes, policy, Indonesia

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I. INTRODUCTION

In January 2018, President Joko Widodo stated that his government would start to focus on improving the country's human resources (Kompas daily, 3 January 2018).¹ He added that an improved human resources is a necessary condition to be able to take full advantage of Indonesia's demographic dividends and be globally competitive.

The president is spot on. Hanushek and Woessmann (2008) find that cognitive skills have large and causal relationships with earnings, distribution of income, and economic growth. In addition, Hanushek et al. (2017) find that returns to these skills are larger in faster growing economies. Since strong economic growth is usually a sign of a dynamic and rapidly changing economy, the authors state that their finding is consistent with the hypothesis that highly skilled individuals are better at adapting to and taking advantage of change.

The policy implication of the findings in previous paragraph is straightforward: countries must ensure that their labor markets are highly skilled. From a policymaker's perspective, it means that increasing the education attainment of their population is a necessity. And globally, countries have largely succeeded (Pritchett, 2001). World Bank's Edstats show that the average education attainment of adults globally has increased from 6.4 years in 1990 to 8.3 years merely two decades later.

The problem, however, is that learning levels remain low for many countries. Pritchett (2013) states that in India, over a quarter of fifth graders could not read a simple sentence, while only slightly more than half could do subtraction. Mullis et al. (2012) find that only 43 per cent of Indonesian 8th grade students have some knowledge of whole numbers and decimals, operations, and basic graphs. In contrast, 99 per cent of Singaporean 8th grade students have these knowledge. Therefore, the amount of learning produced by Indonesian and Singaporean education systems in the eight years of schooling are vastly different. In addition, there has been very little improvement among the weak performers. As an example, Suryahadi and Sambodho (2013) show that Indonesia's performance in 8th grade TIMSS mathematics have declined between 2003 and 2011. Hanushek and Woessmann (2008) conclude that merely increasing education attainment, without focusing on the amount of learning actually accrued by students, has no correlation with economic growth.

In this article, we examine numeracy and literacy levels among 15-year-olds in Indonesia and put them in a global perspective. We then conduct simple simulations on what it would mean for Indonesia to be globally competitive, as President Widodo wishes in his recent statement. Afterwards, we describe several major education policies that President Widodo and his predecessor, President Yudhoyono, have enacted. We also discuss the effects of these policies in terms of improving the skills of Indonesians, and whether they have the potential to make Indonesia globally competitive. This article focuses on primary and secondary education, and leaves early childhood, vocational, and tertiary education issues for other studies.

It is important to note that education is a slow moving sector, where the returns to investing in an education system and the impacts of policies could only be apparent after the beneficiaries complete their education and join the labor market. In addition, as we discuss below, many education policies enacted by President Yudhoyono are still in place, albeit some in different names. Therefore, comparing the success of President Widodo with President Yudhoyono in the education sector is in some sense too early and virtually impossible.

¹<https://nasional.kompas.com/read/2018/01/03/16514421/2018-jokowi-ingin-pemerintah-fokus-tingkatkan-sdm>.

The next section provides a brief overview of the Indonesian primary and secondary education system, including the amount of public funds allocated to the sector. Section III discusses the level of numeracy and literacy in Indonesia and undertakes some simulations. Section IV describes the current education policies in Indonesia and their impacts. Section V concludes.

II. THE INDONESIAN PRIMARY AND SECONDARY EDUCATION SYSTEM: A BRIEF OVERVIEW

Belonging in the top five most populous countries in the world, Indonesia's education system is equally large. The primary and secondary education sector, covering grades 1 to 12, has more than 266 thousand schools, where 45 million students are taught by 2.7 million teachers. Around 85 per cent of the students are enrolled in regular schools, which could be in the form of public, private non-religious, and private religious schools. The rest are in madrasas, Islamic schools that are largely privately operated.

The primary education level is overwhelmingly public, where 87 per cent of students go to public schools. The proportion between public and private is more balanced at the secondary level. Overall, 75 per cent of junior secondary and 58 per cent of senior secondary students are enrolled in public schools. Newhouse and Beegle (2006) find that at the junior secondary level, public schools benefit from positive selection—public school enrollment is positively correlated with household wealth and primary school test score. Therefore, it seems that public schools is the preferred school relative to private schools or madrasas. At the senior secondary level, Newhouse and Suryadarma (2011) find the same phenomenon: students with higher junior secondary test score and better educated parents appear to choose public schools.

Since 2001, the delivery of early childhood, primary and secondary education has been devolved to the local governments. Provincial governments are in charge of senior secondary level (grades 10–12), consisting of general and vocational schools. The district governments are in charge of early childhood education, and also primary and junior secondary level (grades 1–9).

According to data from the Ministry of Education and Culture, net enrollment rates in Indonesia are practically universal at the primary level at 93 per cent, around 81 per cent at the junior secondary level, and 60 per cent at the senior secondary level (Ministry of Education and Culture, 2016). Education transitions between levels have also continued to increase over time, and there are little gender differences (Suharti, 2013). In addition, Suharti (2013) notes that the gap in education attainment between children from poor and rich households is non-existent at the primary level and continues to narrow at the secondary levels. Therefore, while increasing access to senior secondary education should remain a priority, the government is increasingly turning to improving the quality of primary and junior secondary levels.

Figure 1 shows the amount of public spending on education from 2001 to 2014, classified by source—central, provincial, or district government. It is important to note, however, that the vast majority of provincial and district government spending on education comes from central government transfers.

As a proportion of total public spending, the government spent between 10 per cent and 15 per cent of its budget on education between 2001 and 2008. In 2005, the parliament amended the Constitution, requiring the government to spend 20 per cent of its budget on education. This was achieved for the first time in 2009, and the rate has remained around 20 per cent since.

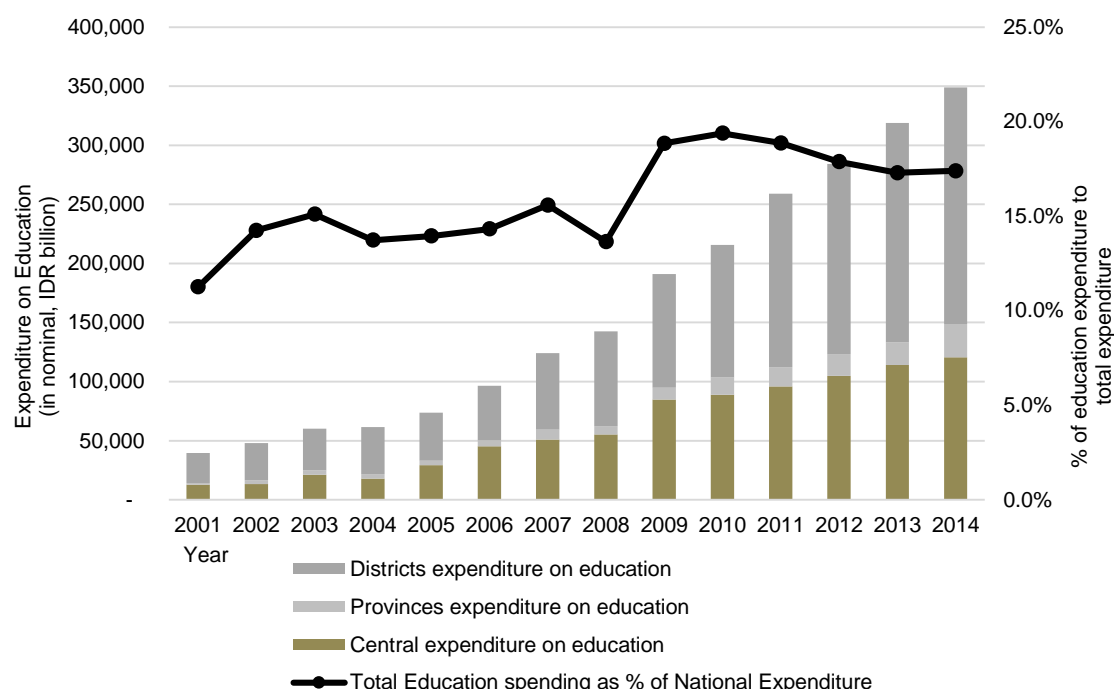


Figure 1. Education Spending in Indonesia, 2001–2014

Source: Yusrina et al. (2017).

Where has the money gone? Figure 1 shows that in 2014, 60 per cent of education spending was done by district and provincial governments, mainly to deliver primary and secondary education. In addition, the central government also provides direct transfers to primary and secondary schools in the form of school operational assistance grant (known as BOS). In 2014, the BOS transfer reached Rp 24 trillion (equivalent to USD2 billion).² Therefore, just looking at 2014, around 70 per cent of education spending was on primary and secondary education levels.

Al-Samarrai and Cerdan-Infantes (2013) find that teachers have benefited the most from the increase in education spending. As an example, about half of the US\$ 7 billion increase between 2006 and 2009 (in 2009 constant prices) went to hiring more teachers—which has resulted in Indonesia having one of the lowest student to teacher ratio in the world—and increasing teacher salaries—which we discuss further in Section IV. At the district level, 80 per cent of the salaries went to teachers. From the BOS allocations, about 16 per cent are allocated to teachers (Artha, 2017).

In summary, the Indonesian government invests a significant amount of resources into the education sector. In proportional terms, spending on education has increased from around 10 per cent of national expenditure in 2001 to 20 per cent in 2009 and remained at that rate since. Most of the spending goes to primary and secondary education, especially to hiring more teachers and increasing teacher salaries. In the next section, we show whether the increased spending has resulted in higher learning.

²http://www.djpk.depkeu.go.id/attach/pmk-nomor-201pmk-072013/PMK_BOS_2014_optimize.pdf.

III. NUMERACY AND LITERACY IN INDONESIA

We use data from the Programme for International Student Assessment (PISA), a triennial international survey that tests the skills and knowledge of 15-year-olds. Administered by OECD (Organisation for Economic Cooperation and Development), PISA started in 2000 and until 2015 has been undertaken six times. Countries participating in the PISA includes OECD and non-OECD countries. In total, 88 countries and economies (for example, China and Shanghai participate separately) have participated at least once.

The tests are conducted in the national language of the countries. The skills and knowledge tested by PISA are on numeracy, science, reading, collaborative problem solving, and financial literacy. However, only the numeracy, science, and reading tests have been undertaken since the first PISA. The focus of PISA is on the application of knowledge and skills for tasks relevant in adult life, as opposed to memorization.³ Since we are interested in how the education system provides skills relevant for adult life, including in the labor market, PISA is appropriate.

Indonesia has participated in PISA since 2000. Therefore, we could use these PISA rounds to see the trend in skills of Indonesian 15-year-olds and compare them with other countries participating in PISA. In this paper, we use the 2003, 2006, 2009, 2012, and 2015 PISA tests, specifically the mathematics and reading tests.

Figure 2 shows the mathematics skills of Indonesian 15-year-olds over time, relative to two metrics: the 25th percentile score and the 75th percentile score. The former represents low level of skills, and the latter represents the level skills that could be considered to be globally competitive.

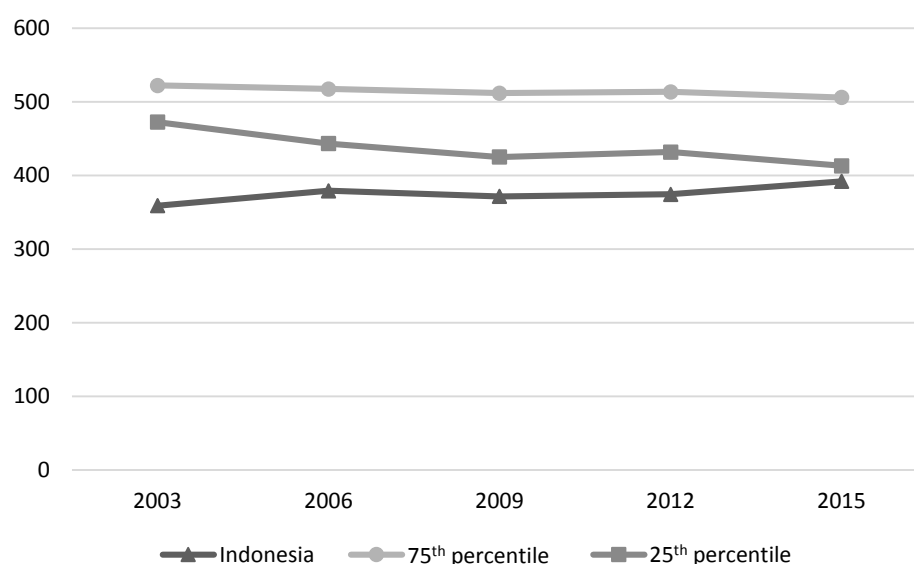


Figure 2. PISA Mathematics, 2003–2015

We observe three facts about the mathematics skills of 15-year-olds. First, Indonesia is below the 25th percentile globally. This is true up to the latest PISA round in 2015. Second, Indonesia has been catching up. The gap between Indonesia's performance and the 25th percentile continued to

³<http://www.oecd.org/education/school/2960581.pdf>.

decline, from more than 113 points in 2003 to around 20 points in 2015. Similarly, the gap between Indonesia and the 75th percentile has also narrowed, from 163 points to 114 points over the period that we observe. Therefore, Indonesia is close to catching up with the 25th percentile, but is still far from being globally competitive.

Thirdly, note that the reduction in gap between Indonesia and the 25th percentile is to some extent caused by the decline in the performance of the 25th percentile. In 2003, the gap between the 25th and 75th percentile is quite small at 50 points. In 2015, the gap has almost doubled to 93 points. And the main cause appears to be reduction in the performance of the 25th percentile, rather than the increase in the 75th percentile. Thus, inequality in mathematics skills is rising globally, caused by a decline in the worst performers rather than an increase in the top performers. While beyond the scope of this paper, one cause of this could be the ever increasing access to education, where children—mostly from poor families—who previously could not attend schools are now in school. However, it also shows that education systems could not deliver quality education for all. Returning to Indonesia, then, it appears that the way Indonesia is narrowing the gap with the 75th percentile in the context where the 75th percentile is moving further away from the 25th percentile is a positive outcome.

Figure 3 shows the trend in PISA reading tests. Overall, the three observations from Figure 2 remain. Indonesia started off quite far behind in 2003, and has since closed the gap with both the 25th percentile and the 75th percentile. However, the decline in reading gap has been slower than in mathematics. Proportionally, the gap in math between Indonesia and the 75th percentile narrowed by 30 per cent between 2003 and 2015. The decline in reading over the same period was 26 per cent.

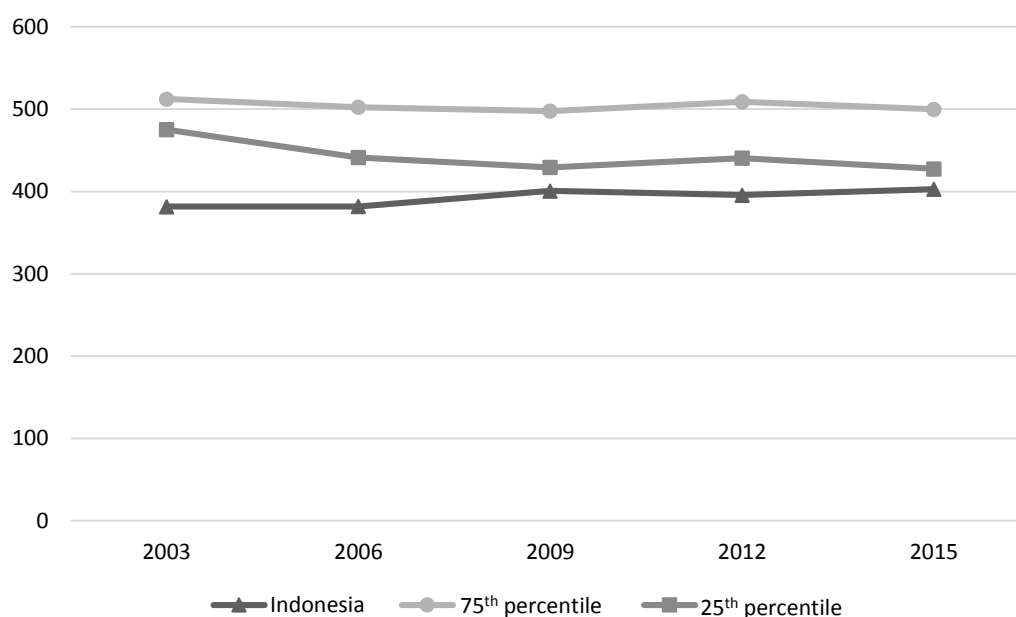


Figure 3. PISA Reading, 2003–2015

Overall, the gap between Indonesia and the 75th percentile, what could be considered as globally competitive, has declined in both mathematics and reading. Next, we ask two further questions. First, given the long-term trends, how long would it take for Indonesia to catch up to the 75th percentile and be globally competitive, as President Widodo wishes? Second, if Indonesia wants to catch up faster or to take advantage of the demographic dividends in 2030, what mathematics and

reading skills trend should Indonesian children have, compared to the ones we observe in Figures 2 and 3?

To address these questions, we conduct simple data extrapolation using the PISA data, extending Beatty and Pritchett (2012). Table 1 shows the results. If we assume that the long-term decline in gap between Indonesia and the 75th percentile from 2003 to 2015 persists, then Indonesia would need 28 years to catch up to the 75th percentile in mathematics performance, and 35 years for reading performance (Column 5). Since these children would be 15-year-olds, then assuming that some would start working after completing senior secondary school and others after four-year university, Indonesia would be globally competitive around 2060. Therefore, while the mathematics and reading skills of Indonesian 15-year-olds have improved between cohorts, the improvement is too small for Indonesia to be globally competitive anytime soon. By 2060, the demographic dividends would have been long past.

Table 1. Years Needed for Indonesia to Reach the 75th Percentile in PISA

| | Gap in 2003 (points) | Gap in 2015 (points) | Decline in Gap, 2003– 2015 (points) | Average Annual Decline in Gap (points) | Years Needed for Gap to Reach Zero (years) |
|---------|----------------------------|----------------------------|---|---|--|
| | (1) | (2) | (3) | (4) | (5) |
| Math | 163 | 114 | 49 | 4 | 28 |
| Reading | 131 | 97 | 33 | 3 | 35 |

The second question is how much improvement is needed to the overall education system, especially before individuals reach the age of 15, in order for Indonesia to be in the 75th percentile faster? From Table 1, we find that the average annual reductions in gap between Indonesia and the 75th percentile in mathematics and reading are four and three points respectively. Table 2 shows different improvements in mathematics and reading skills annually to catch up to the 75th percentile. Suppose we would like Indonesia to have a skilled labor force by at the height of the demographic dividends in 2030, then Indonesia must reach the 75th percentile around 2023–2027; 10 years from 2015. Column 3 in Table 2 shows that for this to happen, the gap must be reduced by 11 and 10 points annually for mathematics and reading respectively starting from 2015. Correspondingly, Column 10 shows that the education system must increase its performance by 178 per cent for mathematics and 248 per cent for reading.

Table 2. Improvement Needed to Reach 75th Percentile, Various Targets

| | Gap in 2015 (points) | Annual Decline in Gap Needed for Indonesia to be in the 75 th Percentile (points) | | | | Increase in Education Sector Performance Needed (%) | | | |
|---------|----------------------------|--|----------|----------|----------|--|----------|----------|----------|
| | | 5 years | 10 years | 15 years | 20 years | 5 years | 10 years | 15 years | 20 years |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Math | 114 | 23 | 11 | 8 | 6 | 455.0 | 177.5 | 85.0 | 38.7 |
| Reading | 97 | 19 | 10 | 6 | 5 | 595.6 | 247.8 | 131.9 | 73.9 |

Such improvement demand is very challenging for an education system. Education has received a significant increase in investments over the past decade but have only improved marginally. Since investments have reached 20 per cent of government expenditure, as shown in Figure 1, the

government may not be able to afford further significant increases by very much. Therefore, the only way to improve skills is by improving the productivity of the education system. It must achieve more with the same level of investment.

Before moving to the next section, we note that children from low socioeconomic status households perform much worse than children from high socioeconomic status, and in numeracy, the gap has not narrowed (Al-Samarrai and Cerdan-Infantes 2013). Therefore, while the enrollment gap between children from poor and rich households has narrowed, as we mention in the previous section, the condition is less encouraging in terms of numeracy. This may indicate that children from poor households are enrolling in inferior schools.

In the next section, we discuss education policies that the Yudhoyono and Widodo governments have enacted. The reason for focusing on both presidencies is because the effect of education policies on learning outcomes tend to materialize in the long run, if at all. For the policies that have been evaluated, we provide the impact estimates. For those that are relatively new and not have been evaluated, we provide a discussion of their potential impacts, especially whether they have the potential to significantly improve the productivity of the education system.

IV. EDUCATION POLICIES AND THEIR IMPACTS ON LEARNING OUTCOMES

In this section, we describe six main education policies implemented in Indonesia since 2004, the start of Yudhoyono presidency. We exclude the scholarship program for children from poor families, *Bantuan Siswa Miskin* (during Yudhoyono's presidency) and *Kartu Indonesia Pintar* (during Widodo's presidency), because they are considered as a social protection program, with the aim of getting children to school or keep them from dropping out. As such, the program is not relevant to the quality of education, which is the topic of this paper. For the same reason, we also exclude the government's conditional cash transfer program, *Program Keluarga Harapan* and *PNPM Generasi*, where school participation is a conditionality for program receipt. Finally, we also sidestep district-level education policies because many of them focus on providing more allowance for teachers and have virtually no effects on learning (Bima and Yusrina, 2018).

The first two policies that we discuss are those that take up a significant amount of education budget: the teacher certification and school operational assistance. Afterwards, we discuss the teacher competence test, the new teacher in-service development program, the new pre-service teacher training program, and the computer-based testing.

4.1 A Brief Review of the Correlates of Student Learning Outcomes

Many of the policies we discuss below have not been rigorously evaluated or are relatively new. Therefore, with the exception of the teacher certification program, there is not yet any estimation of the impacts of these policies on learning outcomes. For this reason, we believe that it would be informative to provide a brief review of the correlates of education quality in Indonesia, usually

proxied by student test scores in various subjects. The evidence would allow us to determine whether the education policies could be expected to have much impact.

Examining the correlation between teacher characteristics and student performance, Suryadarma et al. (2006), using survey data from 100 primary schools across Indonesia, find that teacher absenteeism rates have a statistically significant and negative correlation with mathematics performance. In addition, teacher with other occupations, teacher with permanent (civil servant) status, and female teachers are all negatively correlated with mathematics performance. In a survey of 360 primary and junior secondary schools in 20 districts that match students with their teachers, World Bank (2016) finds that teachers with formal qualifications such as having a bachelor's degree are only moderately better. Also, the study finds that paying teachers more does not make them teach better. Finally, the study finds that teacher content knowledge is very important in determining student performance. This is especially important since many teachers in Indonesia still have very low content knowledge. However, Popova, Evans, and Arancibia (2016), in their systematic review of 26 in-service teacher training programs around the world with rigorous impact evaluations, find that there is little detail on teacher training interventions. While they find that programs that provide complementary materials, focus on a specific subject, and include follow-up visits tend to show higher gains, overall there is little evidence on the kinds of training programs that may produce large gains.

An often-ignored aspect related to teachers and principals that matter is incentives. Kurniasih, Utari, and Akhmadi (2018) find that the Indonesian Constitution views education as a way to build character. Bjork (2006) finds that in Indonesia, schools were viewed as a way to instill patriotism. A particularly striking example from Bjork (2006) is the observation that no teachers were absent during the Monday flag-raising ceremony, but some left the school immediately after the ceremony was finished. Panjaitan (2017) finds rampant cheating in national school examinations in Indonesia and that teachers and principals, rather than attempting to teach well and not needing for the students to cheat, are complicit in these practices. These anecdotes show that the incentives for teachers and principals are not aligned with ensuring that students learn. Therefore, policies that do not consider the incentives faced by teachers or other education personnel would have little chance of succeeding.

On school-level characteristics, Suryadarma et al. (2006) find that that quality of school facilities predict better performance. Well-functioning toilets are especially important for girls' performance. The authors find that student-teacher ratio has a concave relationship with performance, with optimal ratio appears to be at 25 students per teacher. World Bank (2018) finds that relevant and accurate student assessments, both formative and summative, would significantly improve learning outcomes.

A particularly relevant aspect for Indonesia, given the large public investment in education, is the correlation between the amount of funds allocated to education and student performance. Suryadarma (2012) finds no correlation between district-level spending and student performance. At the school level, Suryadarma et al. (2006) find zero correlation between amount of school fees and student performance in mathematics or dictation tests. One reason could be corruption, but another reason is that the funds are not spent on things that matter for education quality. The latter could happen when teachers and principals are not incentivized to care about learning, which appears to be the case in Indonesia.

4.2 Major Education Policies in Indonesia since 2004

Teacher Certification. The main purpose of the policy is to ensure that teachers have sufficient skills. World Bank (2016) states that the motivation for the program comes from Indonesia's low performance in the 2000 PISA. Policymakers felt that teacher quality has been inadequate, and must be upgraded. To gain buy-in, the policy promises a significant increase in remuneration for certified teachers. With the certification allowance being equivalent to base pay, certified teachers essentially receive a doubling of income. While there are various estimations with regards to the cost of this policy, ranging from USD5.6 billion (Fahmi, Maulana, and Yusuf, 2011) to virtually all of the public education budget (Al-Samarrai & Cerdan-Infantes, 2013), it is clear that this policy is very expensive.

In order to be certified, the initial policy design required teachers to obtain a bachelor's degree, pass a written competency test, classroom observation, and a portfolio of past training and experience. The original idea was that teachers without these qualifications would have a clear financial incentive to upgrade their skills (World Bank, 2016). In practice, however, the initial design was significantly watered down due to pressure from teacher union. Only the portfolio assessment, experience, and bachelor's degree requirement were retained (Chang et al., 2013). Suryahadi and Sambodho (2013) note that there are also other channels to receive certification, such as through passing the in-service teacher development program (see further below in this section) or having a masters or doctoral degree.

The certification program started in 2006, and have certified around 20,000 teachers annually. The aim was to have all teachers certified by 2015. While detailed data on the proportion of teachers certified is not available, it seems that this target has been missed.

Teacher certification is one of very few government education policies in Indonesia whose impact has been rigorously evaluated. Given the watering down of certification requirements, lack of conditionality on receiving the allowance, and the finding that formal qualification by itself has very small effects on learning outcomes, there is little hope that the certification program has any effect on learning outcomes. De Ree et al. (2017) indeed find that the certification program improve teacher satisfaction and reduce the incidence of teachers holding outside jobs. However, there is no improvement to student learning outcomes across the whole distribution of test scores. Fahmi, Maulana, and Yusuf (2011) arrive at the same conclusion despite using a different research methodology. Kusumawardhani (2017) finds that the certification policy does not improve teacher content knowledge or attendance.

School Operational Assistance. The program, known by its Indonesian acronym as BOS, is a direct per-student grant from central government to schools. The government began implementing the program in 2005 as part of compulsory education, where school fee was removed, and to support school-based management (World Bank, 2015). The grant is provided to both public and private schools at primary and secondary levels, and can be used on an approved list of expenditure, ranging from administration to teacher allowance.

As of 2014, BOS covered 43 million primary and junior secondary school students annually, costing around USD2 billion or equivalent to 7 per cent of total education budget. Artha (2017) finds that the top three BOS spending are on buying school supplies, paying for student extracurricular activity, and teacher salary, which consist of both providing additional teacher allowance and hiring more teachers. These three areas make up 48 per cent of BOS spending in 2015.

The BOS grant can affect education participation and learning through three channels: increased funding and reduced household burden; direct support to poor students; and strengthened school-

based management. World Bank (2015) finds little effect of BOS on reducing household education spending. Instead, as discussed in the previous paragraph, a large proportion of the grant is used to hire more teachers. However, the report finds that junior secondary enrollment among poor households appear to benefit from BOS, although there is no impact on transition rate to senior secondary. Finally, there is no impact on school-based management. In summary, out of the three potential channels, only the one on direct support to poor students appears to have worked. Therefore, there is little surprise that there is no statistically significant effect of BOS allocation on national examination scores at the primary or junior secondary level (Artha, 2017).

Teacher Competence Test. As part of the teacher certification program, the government introduced a teacher competence test (known by its Indonesian acronym as UKG). After much pushback from teacher unions, the first teacher competence test was administered in 2012, covering pedagogical knowledge and content knowledge. In total, just above one million teachers participated in the first test. The result, with an average of 47 (out of 100), was discouraging. The government had set the passing threshold at 65.

Although controversial and subjected to criticism by many parties—from those who do not believe teachers should be tested to those who think that the test is not actually measuring skills which matter for teachers, for the first time the government has a mapping on teacher level of knowledge. As a diagnostic tool, the competence test is invaluable.

In-service Teacher Professional Development. With the UKG results in hand, the government has the ability to map teacher weaknesses, down to the individual level. To improve the quality of in-service teachers, the government implements an in-service teacher professional development program called *Guru Pembelajar* (Teacher Learner), which has now been renamed as *Pengembangan Keprofesian Berkelanjutan* (Continuing Professional Development). This program started in 2014, and still continues.

To participate in this program, teachers should be a member of a teacher community, such as Primary Teachers' Working Group (KKG) and Secondary School Subjects Teachers' Working Group (MGMP). The Center for Teacher and Education Personnel Development and Empowerment (P4TK) is the technical unit at the Ministry of Education and Culture that is responsible for managing and supervising PKB program and UKG post-test.

The current setup of the program is that (i) teachers undertake face-to-face training in the modules of UKG that they failed; (ii) each module is around 60 hours, consisting of 30 hours of training, 10 hours of on-the-job mentoring, and 20 hours of review/feedback/sharing workshop; and (iii) upon completion of the 60 hours, a teacher needs to sit in another UKG related to the specific modules that they have failed. Anecdotal stories say that the pass rate in this UKG post-test is 100 per cent.

We are not aware of any rigorous evaluation of the program, either on the quality of implementation or with regards to its impact on teacher knowledge, teaching practice, or student learning outcomes.

One-year Professional Training for Pre-service Teachers. This brand new program, called *Pendidikan Profesi Guru* (PPG, Teacher Professional Education) and started in September 2017, is aimed at increasing the quality of teacher candidates. It is a one year program modeled after other professional programs for aspiring doctors, lawyers, or psychologists. After finishing a 4-year degree, Indonesians who want to pursue a career in teaching could enroll in the PPG program. To widen the pool of high quality teachers, PPG program is open to both graduates from teacher colleges and non-teacher colleges. The PPG is arguably the government's main vehicle to improve

teacher quality in Indonesia. For this reason, part of the PPG program is subsidized by the government.

According to discussions with the Ministry of Research Technology and Higher Education, which is responsible for higher education including teacher colleges, this additional year toward teaching, in theory, would improve the quality of teacher candidates. The first channel is through the selection process. The PPG applicants need a minimum GPA of 3.0/4.0 to pass the first screening. Afterwards, these applicants go through a series of online standardized tests which assess their professional, pedagogic, social, and personal competencies. They also go through a psychological test to determine whether the applicant is talented and interested in teaching. The selected PPG students will study in selected LPTK across the country. During the program, PPG students will sit through various teaching workshops and practice classroom teaching (microteaching). This is the second channel of how PPG increases teacher quality, through high quality teaching workshops and microteaching.

Despite the rigorous selection process and few changes in curriculum, the program is still too recent to be evaluated. However, the reliance on a selective admission system is encouraging. If strictly enforced, it could indeed have the potential to improve teaching quality, and eventually result in better learning outcomes.

Computer-based Testing. A feature of the Indonesian education system is the high stakes national examination at the end of junior secondary and senior secondary levels. Students must pass these examinations in order to graduate. In addition, district governments regularly use national examination pass rates as measure of education quality. The result is rampant cheating. Panjaitan (2017) documents the extent of this practice and finds that teachers and principals, under pressure from district officials and parents, are active participants in the scheme. The government has attempted to address this issue. In 2016, the Ministry of Education and Culture removed performance in the national examination as a condition for graduation. Instead, school-based examinations determine whether a student graduates. While this policy effectively turns the national examination to a diagnostic (formative assessment) tool rather than a summative evaluation tool, cheating in the national examination remains rampant.

The problem with cheating is that the results do not reflect the true amount of learning that students accrue. Therefore, it cannot be used as a diagnostic tool or be used to measure the impact of particular policies or practices.

In 2013, the Ministry of Education and Culture piloted computer-based testing (CBT) in two schools. Practically, CBT means that each student receives a unique test, as the items are randomly drawn from a centralized item bank. There are several ways that cheating becomes more difficult with CBT: a) each student receives a unique exam, so students cannot copy answers from other nearby students; b) teachers cannot supply students with answers to the test because there are virtually infinite tests; and c) the test is retrieved online and has a time limit, so it is impossible to prepare answers before the test is taken.

In 2015, the Ministry of Education and Culture piloted CBT in 556 junior and senior secondary schools across the country. The pilot revealed a significant reduction in test scores in schools that participated in CBT. The decline in test scores was larger in schools that initially had a lower integrity index, suggesting that this was at least partially the result of reduced cheating, rather than student difficulty with navigating the new test format. In 2016, 4,382 junior and senior secondary schools participated in CBT, while in 2017, the number had increased to 30,577 (Ministry of Education and Culture, 2017). The Ministry of Education and Culture plans to roll out CBT in 70 per cent of junior secondary schools and 100 per cent of senior secondary schools by 2018.

While the CBT is not implemented with an explicit aim to improve teaching or learning outcomes, the severely diminished prospect of cheating, together with the still-high-stakes nature, has the potential to incentivize teachers to actually teach better. With the easy way of cheating removed, teaching properly is the only way their students could perform well in the examination. Therefore, while there is yet to be an evaluation of the impact of CBT on teaching and student learning outcomes, the potential is there.

Table 3 presents a summary of the policies we discuss in this section, and some of their characteristics. Out of six policies, four address the issue of low teaching skills. Therefore, it appears that the government realizes that teaching skills or teacher knowledge is the most important constraint to address. However, the main lesson from the two most expensive policies, teacher certification and BOS, is that unconditionally providing resources would not lead to any learning gains. Therefore, while there is yet to be evaluations of the in-service or pre-service training programs, these programs must be combined with conditions directly tied to student learning outcomes. Simply providing training would not lead to any learning gains, let alone gains that are large enough for Indonesia to quickly catch up to the other countries.

Table 3. Summary of Central Government Education Policies in Indonesia

| Policy | Year Started | Constraint the Policy Aims to Alleviate | Provide Incentives Directly Tied to Learning (Yes/No) | Impact on Learning |
|--|--------------|---|---|--|
| Teacher certification | 2005 | Low teaching skills | No | Statistically not different from zero |
| School Operational Assistance | 2005 | School-level resources; support for children from poor families; weak school-based management | No | Statistically not different from zero |
| Teacher Competence Test | 2012 | Lack of information on teacher knowledge | No | N/A because this is a diagnostic tool, although World Bank (2016) finds positive correlation between teacher knowledge and student performance |
| <i>Program Keprofesian Berkelanjutan</i> (In-service Teacher Professional Development program) | 2014 | Low teacher knowledge | No | Unknown |
| <i>Program Pendidikan Guru</i> (One-year Pre-service Teacher Training) | 2017 | Low teaching skills | No | Unknown |
| Computer-based Testing | 2015 | Inaccurate assessment of student learning | Yes, unintended | Unknown |

V. CONCLUSION

President Widodo views human resources as a necessary condition for Indonesia to be globally competitive. This view is supported by evidence, either globally or from Indonesia, that highly skilled individuals not only earn more, they also cope better, even thrive, in a rapidly changing environment.

In this paper, we find that Indonesia is indeed on a positive long-term trajectory with regards to producing skilled individuals. However, the trajectory is not sufficiently steep to achieve significant improvements in the medium term. Making simple out-of-sample projections using Indonesia's performance in PISA mathematics and reading from 2003 to 2015, we find that the country would only reach the global 75th percentile with regards to mathematics and reading skills in 2060. Given that Indonesia essentially doubled its public investment in education in this era, we observe that the returns to these increased investment has been very small.

Increasing the slope of mathematics and reading skills requires either a significantly more investment, or better returns on the investment. Indonesia does not have much room for the former, so it has to do the latter. We find that the education system must increase its productivity by 180 per cent in mathematics and 250 per cent in reading in order to have a globally competitive workforce by 2030, as opposed to 2060.

From our review of the central government's major education policies, we find that they are indeed quite expensive. The two most expensive policies, Teacher Certification and School Operational Assistance, have a combined cost that use up almost all of the public education allocation. These two policies, however, have no discernible effects on improving student learning outcomes. The main reason, as de Ree et al. (2017) and World Bank (2015) suspect, is because of lack of accountability. These programs are essentially unconditional transfers to teachers and schools.

Given that it would be virtually impossible to roll back these programs without suffering significant political costs, we recommend that the government add accountability measures to these policies, and also to all other education policies, that focus on learning as the ultimate performance indicator. In fact, we believe that the teacher certification and school operational assistance programs should be urgently reformed to incorporate such measures, whether by Joko Widodo or a different president, in 2019. Fundamentally, the government needs to start putting conditions that must be achieved before teachers and schools continue to receive these transfers, and one of those conditions must be observable progress in student learning outcomes that is commensurate with the cost of these policies. Without such accountability measures, Indonesia has little chance to be globally competitive anytime soon.

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