Acceleration or Internationalization? A Cost-Effectiveness-Analysis of Improving School Quality in Indonesia

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As a means to improve the school quality in Indonesia, Indonesian government introduced and encouraged two different kinds of programs: The International Standard Schools and Acceleration Class Program. Both programs are expected to contribute to improve the quality of education system in Indonesia. However, quantitative analysis to evaluate their impact on student's performance is lacking in the literature. In this paper, we use the Difference in Difference method (DD) using the school data from Indonesian Family Life Survey (IFLS) to estimate the effectiveness of both programs in increasing school performance, measured by their national exam score. We then combined the cost data with this effectiveness measure to compare their cost-effectiveness. Our finding suggests that international standard school program is more effective to increase the math and Bahasa score. However, in term of cost effectiveness the result is mixed. International standard school is more cost-effective in increasing students score in Bahasa, while acceleration class is more cost-effective in increasing students score in math subject.

Keywords: Acceleration Class, International Standard School, Cost Effectiveness Analysis, Difference in Difference, Indonesia

INTRODUCTION

After introducing the Acceleration Class, in 2005, Indonesian government encourage schools to establish the International Standard Schools. This International School is also under the mandate of the new Law National Education System. Since then, many schools across Indonesia run the international standard programs along with the acceleration class programs. Despite

the growing number of the establishment of those programs in schools, quantitative assessment of their impact on objective measures of students' performance like national exam score is lacking in the literature.

The objective of this study is twofold. First is to estimate the impact of the International Standard School Program and Acceleration Class Programs on School Performance measured by their average national exam score. Second is to estimate and compare the cost effectiveness of the two different policies. To our knowledge, this paper is the first study that compares the effectiveness of those policies in the Indonesian context. To this ends we make use of the school-level data from the Indonesian Family Life Survey (IFLS) conducted in 2000 and 2007 that contain information about the programs and their average national exam score. With these data we can apply the Difference in Difference method to estimate the impact of the programs. We also collected data on the cost of both programs and combined these data to estimate their cost effectiveness and compare them between the two. The findings suggest that international standard school program is more effective to increase the math and Bahasa score. However, in term of cost-effectiveness the result is mixed. International standard school is more cost-effective in increasing students score in Bahasa, while acceleration class is more cost-effective in increasing students score in math subject.

The paper is organized as follows. A summary of the motivations is highlighted in the introduction section. In section 2, we describe in greater length the acceleration class and international standard school program in Indonesia. Section 3 summarizes previous literature. In section 4, the methodology of the study including the data collection and analytical method will be discussed. Section 5 discusses the findings, followed by concluding remarks in Section 6.

THE INTERNATIONAL STANDARD SCHOOLS AND ACCELERATION CLASS PROGRAM IN INDONESIA

The Law on National Education System Number 20, 2003 (UU No. 20 year 2003) mandates the central and local governments to initiate certain schools that suit with the international standard. This mandate is in line with the phenomenon of the opening many international schools which maintain the developed countries' educational standard. The standard includes the use of foreign languages and international assessment system to obtained international certificate that can be used to continue their study in abroad.

The main objective of the development of International Standard School (SBI, in Bahasa Indonesia *Sekolah Bertaraf Internasional*) is to encourage the continuing process of benchmarking of educational quality toward international standard quality. It is believed that the flourish of international schools and international standard schools will contribute gradually to Indonesian educational reform in the future.

The international standard schools should meet with the national education standard as well as global key competencies, such as international languages and information and communication technology. In order to keep up with the quality of teacher, facilities, and program, International Standard School requires significantly higher budget than a local school. Despite the

government provides grant for the schools, however, the school may require participation from parents to make sure sustainability of the program in the future.

On the other The Law on National Education System Number 20, 2003 also encourage schools to implement The Acceleration Class Program (or *Program Percepatan Belajar /PPB* in Indonesia Language). PBB that was established in 2000 provides a faster path for primary and secondary school students. Primary education can be finished in 5 years, while a secondary school student with a distinction academic ability may graduate in 2 years.

The main objective of this program is to provide educational services for students who have special talent and excellence academic ability as they may not have an underachievement problem. The proportion of underachievers is quite high. Achir (1990) found that 39 percent of senior secondary school in Jakarta is underachievers. Yusuf and Widyastono (1997) found that underachievers in junior secondary school in Jakarta are between 13.5 to 20 percent.

In addition particular objectives of this program are: (a) to provide accomplishment for students who graduate faster than students from regular program, (b) to increase efficiency and affectivity of learning process, (c) To encourage students to increase their spiritual, intellectual, and emotional equally.

There are 3 model of PBB that introduced by the Directorate of Special School, Ministry of National Education: (1) regular class model with cluster and/or pull out, (2) special class model, (3) special school model. Most of the schools that have authorization from the government to provide an acceleration program use the special class model. The special class model puts potential students in a special class as it separated from the regular class. Despite, the curriculum of special class is not different with the regular class, it finish faster than the regular one.

BRIEF REVIEW OF THE LITERATURE

Acceleration Program

According to Pressey (1949), acceleration is an intervention on educational program where students may have study at a faster phase or at a younger age than a regular program. The National Association for Gifted Children or NAGC (2007) believes that the acceleration program is suited to gifted academically students as the acceleration process provide appropriate academic challenge and reduce the time for students to complete schooling. Numerous meanings of giftedness have been proposed over the years, varying from the ability to achieve high level on intelligence (IQ) tests to achievement in multiple areas such as motivation, creativity, and others (Stephens and Karnes, 2000).

Based on definition by Pressey (1949), Southern and Jones (2004) identified there are 18 educational types of accelerative programs. I provide the list in Table 1.

Table 1. Types of Acceleration

1. Early Admission to Kindergarten	10. Mentoring
2. Early Admission to First Grade	11. Extracurricular Programs
3. Grade-Skipping	12. Correspondence Courses
4. Continuous Progress	13. Early Graduation
5. Self-Paced Instruction	14. Concurrent/Dual Enrolment
6. Subject-Matter Acceleration/Partial Acceleration	15. Advanced Placement
7. Combined Classes	16. Credit by Examination
8. Curriculum Compacting	17. Acceleration in College
9. Telescoping Curriculum	18. Early Entrance into Middle School, High School, or College

In Indonesia, acceleration program has been introduced since 1989 (Nasichin, 2004). In National Education System Act year 2003 (section 5, article 4), the Ministry of National Education (MONE) recognizes students who have high intelligence (IQ) intelligence. The government states that special students should get a special education (Gunawan, 2007). According to Akbar and Hawadi (2002), acceleration program in Indonesian schools is generally a grade-skipping. A student may have a grade-skipped if he is given a grade level placement ahead than same-age peers. Despite there are various techniques to identify the students' giftedness, most of Indonesian schools are using the IQ test.

Many studies support the educators, theorists, researchers and other authorities that gifted education will increase academic achievement of high-ability students (e.g., Daurio, 1979, Carter, 1986, Lynch and Mills, 1990, Parke, 1983, Reis, 1993, Roberts, 1992, Stoddard and Renzulli, 1983, Delcourt et al., 2007, Steenbergen-Hu and Moon, 2011, Kulik and Kulik, 1984, Kulik and Kulik, 1992). Rogers (2004) reports that accelerated students consistently have higher academic achievement than non-accelerated students, no matter which form of acceleration is employed.

In recent years there are a number of studies that investigate the relationship between gifted education and acceleration program and students performance in Indonesia. For example, Suharti (1997) found that gifted male students outperformed their female peers in academic achievement. Gunawan (2007) argues that Indonesian schools need to divide gifted academically students from their same-age peers. However, acceleration class in not necessary a best method to manage a giftedness in schools. Farikahn (2006) found that students who participated in acceleration class has lower social adjustment than their peers in non-accelerated class. Finally, Puspitosari (2008) identifies the difference of emotional quotient score and anxiety score between acceleration class students and regular class students in Muhammadiyah 1 senior secondary school Yogyakarta. She found that acceleration class students have higher score on anxiety than their peers. She also found that EQ score between acceleration students and regular students is not significant.

International Standard Schools

There have been number of definitions regarding International school around the world (Terwilliger, 1972, Leach, 1969, Ponisch, 1987, Matthews, 1988, Hayden, 2006, Cambridge and Thompson, 2004). These various definitions have been used to differentiate different types of school based on their curriculum, their purpose, their student population, their faculty, and their history. However, Pearce (1994) and Hayden (2006) pointed out that defining international schools is difficult and very broad.

Using very broad definition of international schools, Kultulasari (2009) notes that international schools in Indonesia were established since 1951 to serve the children of the expatriates who live in Jakarta. Currently, there are 62 international schools in different areas in Indonesia and range from 50 years old to 1 year old. Most of the schools are affiliated with a certain religion, funded by international organizations. Many of these schools are now open for local students as well as employ local teachers. The schools use English as the major instruction in class

The internalization of public schools in Indonesia started when the policy of International Standard School were introduced. The objectives of this project are improving the quality of education and provide better education for the community. One of the goals of this project is to establish at least one international standard school in a primary and/or secondary school in each province Kultulasari (2009).

RESEARCH METHODS

The main objective of this study is to find which policy between Acceleration program and International Standard School program that is more cost effective for government to implement. Looking at the description of the programs above, it is implied that both programs have, more or less, the same objective that is to increase the performance of the schools. In the international program, schools are encouraged to benchmark their performance with international standard quality. In the acceleration program schools are allowed to provide educational services for students who have special talents by providing this 'special talents' students to accelerate their learning process. By doing this, schools increase the efficacy of learning process hence their performance will increase as well.

In Indonesia, one of the indicators to measure school performance is the graduating students' average of national exam scores. In spite of the criticisms, this indicator is still believed by many as an objective way to evaluate school performance.

Cost Effectiveness Analysis: Estimating the Program's Impact

Our main objective in this paper is to compare the effectiveness of International Standard School and Acceleration programs on schools' performance in national exam scores in two subjects; Indonesian Language and Mathematics. To this end, we have to find a method that could be utilized to estimate the causal effect of two programs on schools' performance. One

method that popularly used in the literature given our available data[1] is Difference in Difference method (DD).

To illustrate the method, let's use the following illustration. Suppose we have two schools that being interview in two years. One school decided to implement acceleration class, defined as school one. While in the other school, they choose not to have acceleration class, defined as school two. In these two schools, we have collected information on school characteristics in two years, 2000 and 2007.

A crude way to estimate the effect of the effect of acceleration program is by applying 'before and after' analysis on school one, that is calculate the average school national exam scores in each year and then calculate the difference between the two years. The problem with this approach is that we fail to incorporate trend component in the schools national exam scores and it is maybe misleading as it reflect all changes over these periods, such as a change in the economy, change in educational system and not just the programs.

One common approach to overcome the above problem is employing DD estimation. DD estimation requires us to find another school that chooses not to have acceleration class, school two in our illustration. We exploited this school as control group by which we then calculated the same measure as in school one that is change in the average of national exam scores between 2000 and 2007.

The DD estimator can be shown equivalent to the estimate of α in OLS regression

(1) Score$_{it}$ = φ + δ D2007$_{it}$ + γD$_i$ + α(D2007$_{it}$ x D$_i$) + u$_i$, i=1,…, N, t=2000, 2007

where *Score* is students' score in math or in bahasa, *D2007* is dummy for year, *D$_i$* is dummy for programs, *φ* is the intercept, *γ* and *α* are the coefficients, *u$_i$* is the error terms.

A DD estimate is the difference between changes in average national exam scores between 2000 and 2007 in school one with change in national exam in school two at the same periods. If the calculated difference is positive then it shows the real effect of Acceleration programs on the schools' performance. A more complete procedure of our DD estimation for each program is described as follow.

1. We grouped our data into four categories; Treatment group before the program, Treatment group after the program, Control group before the program, and Control group after the program.

2. We calculated the average of 25 randomly selected student's math and Indonesian language scores for each of the four groups and find the difference between periods in the same group afterwards we calculated the difference between groups. This is defined as a simple DD estimation.

3. We checked our simple DD estimation by estimating linear model as in (1) by OLS. If the result from this step is identical with second step, then we stop.

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[1] It is because we have data on treatment and control groups both before and after the policy implementations.

Data

Indonesian Family Life Survey (IFLS)

Given our objective to compare the cost effectiveness between the two programs, we need school level data that documents the performance of the school before and after the programs implementations. Those are 2003 for International Standard and 2001[2] for the Acceleration programs. One data that fit with our need is Indonesian Family Life Surveys (IFLS). IFLS is an on-going longitudinal survey in Indonesia who not only collected detailed information on house-holds but also collected information on the community facilities such as schools[3] and the period of their data collection is also in line with our need. The first wave of IFLS (IFLS1) was conducted in 1993/94 while the IFLS3 and IFLS4 were conducted in 2000 and 2007. We utilized IFLS3 and IFLS4 that covered period before and after the programs implemented.

Moving on the effectiveness measure, we used the average of 25 randomly selected students of whom were asked of national exam scores by the IFLS enumerators as measure of schools performance. IFLS has a consistent sampling throughout these two waves, so we could use it directly.[4] We selected schools in IFLS3 and IFLS4 that form treatment and control group based on the following procedures. First, we identified which schools have implemented the International Standard and Acceleration programs using IFLS4 school facilities questionnaire and then we check whether these schools was also interviewed in IFLS3. We dropped the schools if the schools that implement the programs were new school included in IFLS4 survey and the surviving schools form the treatment group. Second, for schools that were not implemented the program in 2007, based on the principal answer on the question in IFLS4, and were also interviewed IFLS3 we grouped as the control groups. After we have temporary representation of the treatment and control groups, we checked whether these schools have information on national exam score of the 25 randomly selected students. If they do not have such data, we dropped the schools from both our lists. The schools that we included in our Difference in Difference estimation are the schools who survived from these exclusion procedures and they form the definite list of the treatment and control groups.

Cost Data

For purposes of this study, we calculate cost per school of both programs. We also calculate and use the cost in year of 2007 as we only concern about the performance of schools in year of 2007.

For international standard schools, we calculate the cost per school only in primary and lower secondary schools since we only estimate the performance of student in primary and lower secondary education. The total government budget of international standard school program in 138 schools of primary and lower secondary education is 59 billion rupiahs. Therefore, the cost per school of the program is 427.53 million rupiahs.

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[2] Using IFLS3 questionnaire our basis we decide 2001 as the year that Acceleration program started.
[3] A more detailed description of the data is available via http://www.rand.org/labor/FLS/IFLS.html
[4] A more detailed description of the randomization strategy is available via
http://www.rand.org/labor/FLS/IFLS/ifls4.html for IFLS4 and http://www.rand.org/labor/FLS/IFLS/ifls3.html for IFLS3.

On the other hand, we use a different strategy to calculate cost per school in the acceleration program. Since the government did not release the detail budget per school in each level, we assume that cost per school is equal in every school in each level. The total government budget for acceleration program is about 80.319 billion rupiahs, while the total number of schools that implement acceleration program is 217. Therefore, the government spent 370.13 million rupiahs on acceleration program.

RESULTS AND DISCUSSIONS

We present the effectiveness of both programs; acceleration class and international standard school according to the result of DD estimation in Table 2 and 7 respectively. Generally, the performance of each group in math and bahasa from 2000 to 2007 is increase. The treatment group in both programs is outperformed the control group in all subjects after the program is implemented in 2007.

Table 2. Effectiveness Measure of Acceleration Class Program

	MATH SCORE		BAHASA SCORE	
	2000	2007	2000	2007
Treatment	4.988	7.868	5.850	7.791
	(0.329)	(0.202)	(0.256)	(0.164)
Control	5.412	6.860	5.916	7.338
	(0.057)	(0.042)	(0.046)	(0.027)
Difference	0.424	1.009	0.066	0.453
	(0.345)	(0.252)	(0.276)	(0.164)
Diff in Difference		1.433		0.519
		(0.427)		(0.321)
Note: Numbers in the parenthesis are standard error				

Table 3. Effectiveness Measure of International Standard School Program

	MATH SCORE		BAHASA SCORE	
	2000	2007	2000	2007
Treatment	5.110	8.060	5.995	8.127
	(0.261)	(0.180)	(0.173)	(0.106)
Control	5.429	6.833	5.936	7.318
	(0.058)	(0.042)	(0.047)	(0.027)
Difference	0.319	1.227	0.060	0.809
	(0.308)	(0.221)	(0.246)	(0.142)
Diff in Difference		1.546		0.749
		(0.379)		(0.284)

Note: Numbers in the parenthesis are standard error

The difference-in-difference of math score in acceleration class program is 1.433, while the DD math score in international program is 1.546. Therefore, the international standard school program has better performance in increasing the math score. Similar with math score, the international standard school program has better performance in increasing bahasa score. The difference-in-difference bahasa score in international standard school program is 0.749, while the DD bahasa score in acceleration program is 0.519.

Table 4 Comparison Cost Effectiveness of Two Programs

Intervention	Cost per School	Effect on Students' Score		Cost Effectiveness Ratio (CER)	
		Math	**Bahasa**	**Math**	**Bahasa**
Acceleration Program	370.13	1.433	0.519	258.29	713.16
International Schools	427.53	1,546	0.749	276.54	570.80

In analyzing the relative benefit and cost of international standard school and acceleration class program, we use the Cost Effectiveness Ratios (CER). CER is the ratio of the difference in cost of before-after the programs to the difference in benefit, respectively. The CER is then defined as

$$\frac{\text{Costs of intervention}}{\text{Difference in difference score}}$$

CER for math and bahasa or cost of generating an extra score of math and bahasa test through international standard school and acceleration class program is presented in Table . It is clear that acceleration class is more cost effective policy in increasing math score as the CER of acceleration class on math score is lower than international standard program. On the other hand, the CER of international standard school is lower than acceleration class as it suggests that international standard program is more cost effective in increasing bahasa score.

CONCLUDING REMARKS

The Law on National Education System Number 20, 2003 mandates both, international standard school and acceleration class program, to enhance the quality of education in basic and secondary education in Indonesia. We are concerned with the issue of cost effectiveness between those programs. We compare the most cost-effectiveness program using a cost effectiveness analysis method. We use the Difference in Difference method (DD) to estimate the effectiveness of both programs in increasing school performance. Our analysis shows that international standard school program is the most effective policy to increase the math and bahasa score. However, in term of cost effectiveness the result is ambiguous. International standard school is more cost effective in increasing students score in bahasa, while acceleration class is more cost effective in increasing students score in math subject.

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