

**Policy Paper**

# 12-Years Compulsory Education Policy and Education Participation Completeness Evidence from Indonesia

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## ABSTRACT

Indonesia is facing a problem with education outcomes, both in access and quality. To increase education access and participation, the President of Indonesia committed to implementing a 12-years compulsory education policy. As a result, upper secondary education's completion rate has increased significantly in districts that implement 12-years compulsory education rather than in districts that did not implement it. Strategies attached to the policy also considerably affect the completion rate, except for providing community learning centers. However, in every model, the implementation of 12-years compulsory education always significantly affects upper secondary education's completion rate. The district government that implemented 12-years compulsory education has achieved this condition because of the innovative effort to reach this target.

**Keywords:** 12-years compulsory education policy, education conditional cash transfer (KIP), increasing school classrooms, policy, strategies

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## 1. Introduction

Indonesia is a developing country that still faces challenges in education performance. The challenges come from two sides, low education quality and lack of education access. In Indonesia, 3.8 million school-age children are not attending school, reflecting the lack of access to education. This is a significant number compared to the 58 million school-age children globally who are not in school (UNESCO, 2015).

Education participation is not a straightforward problem because it is associated with a country's other developmental issues. For example, Hayami and Godo (2005) wrote that the critical sector that needs to increase to accumulate intangible capital is a formal schooling system. Formal schooling systems have been shown to boost economic growth by increasing formally educated individuals' opportunities to earn an income. Therefore, the Indonesian government needs to take serious action to improve formal education completion.

Education performance is fundamental to developing the country (Wicesa & Setyanti, 2021); therefore, the President of Indonesia is concerned about this issue. After being elected President in 2015, Joko Widodo quickly committed to implementing a 12-year compulsory education policy. He promised that everyone in Indonesia could complete at least an upper secondary level of education. The President's commitment is relevant to the spirit of Sustainable Development Goal 4, which is that no one is left behind regarding access to quality education.

### 1.1 Compulsory Education Policies History in Indonesia

Indonesia declared independence in August 1945. Only seven presidents have led the country since then: President Soekarno (1945–1967), President Soeharto (1967–1998), President BJ Habibie (1998–1999), President Abdurahman Wahid (1999–2001), President Megawati Soekarnoputri (2001–2004), President Susilo Bambang Yudhoyono (2004–2014), and the current leader, President Joko Widodo. Since becoming independent, Indonesia has been committed to ensuring that its people are educated by providing access to quality education (preamble to the constitution of Indonesia, 1945). However, it is difficult for developing countries to catch up with developed countries on education participation. The government needs to take specific actions to increase education participation in Indonesia.

In 1950, President Soekarno committed to trial a six-year compulsory education policy in some regions. However, education participation did not significantly increase because there was no significant increase in the number of schools. In 1984, the succeeding President, President Soeharto, committed to implementing six-year compulsory education for all regions. The Indonesian government subsequently implemented the Sekolah Dasar INPRES program, which was developed to increase the number of primary schools. This resulted in a significant expansion in education participation (Duflo, 2001). In 1994, President Soeharto declared that Indonesia needed more commitment to implementing a 9-year compulsory education policy.

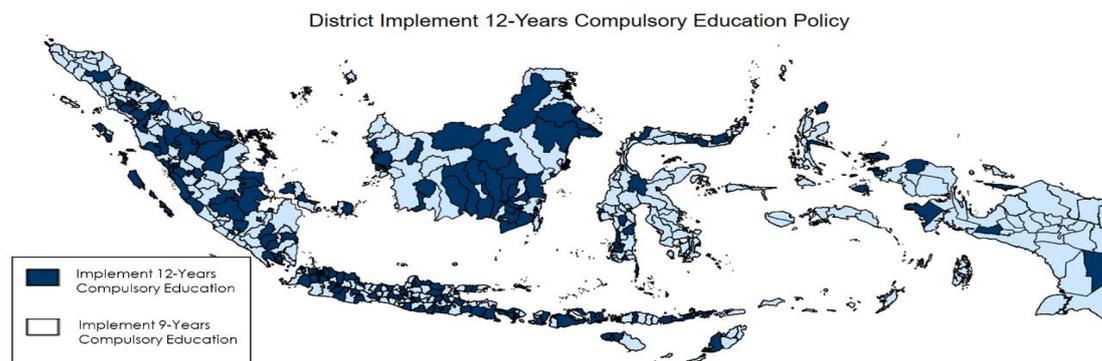
### 1.2 12-Years Compulsory Education Policy in Indonesia

The government maintained its commitment to education until President Susilo Bambang Yudhoyono's era. Although the results were good in that the policy increased education participation, especially in primary and lower secondary education, the policy did not significantly impact upper secondary education completion. This non-significant effect is plausible because the Government of Indonesia focused more on primary and lower secondary education access and less on upper secondary education. However, labor market demand began to focus on people who finished upper secondary education and above. Therefore, to boost the national wealth, the Indonesian government needed to improve human resources, especially with regard to education.

President Joko Widodo realized the importance of improving human resources to develop the country, which led him to commit to a 12-year compulsory education policy. However, there are still many education achievement disparities between districts. Based on the Law of The Republic of Indonesia (2014), districts have the right to choose their preferred policy. Thus, President Joko Widodo allowed district governments the flexibility to select a 12-year or a 9-year compulsory education policy, depending on their capacity. Figure 1.2.1 shows the distribution of districts that implemented 9-year (light blue) and 12-year (dark blue) compulsory education policies. Our analysis categorized districts that implemented 12-year compulsory education as the treatment group and districts that implement 9-year compulsory

education as the control group.

Figure 1.2.1. Distribution of District Implemented 12-Year Compulsory Education Policy



In most countries, 12-year compulsory education means that everyone can access free education through the upper secondary education level. The government guarantees this condition and punishes families whose children do not attend school. However, these conditions are not fully applied in Indonesia, even in districts that implemented a 12-year compulsory education policy. Families of children who do not attend school are not punished by the district government, but the central government punishes the district government leader if the district does not perform well. Therefore, district governments work hard to achieve the target by accelerating access to education and encouraging families to ensure that their children attend school.

President Joko Widodo took serious action to achieve equal education access for all children by committing to Midterm National Development Planning 2015–2019 and encouraging district leaders to include it in their midterm Regional Development Planning with optimistic targets. This required ensuring that everyone in Indonesia had free access to upper secondary education, especially in districts that implemented this policy.

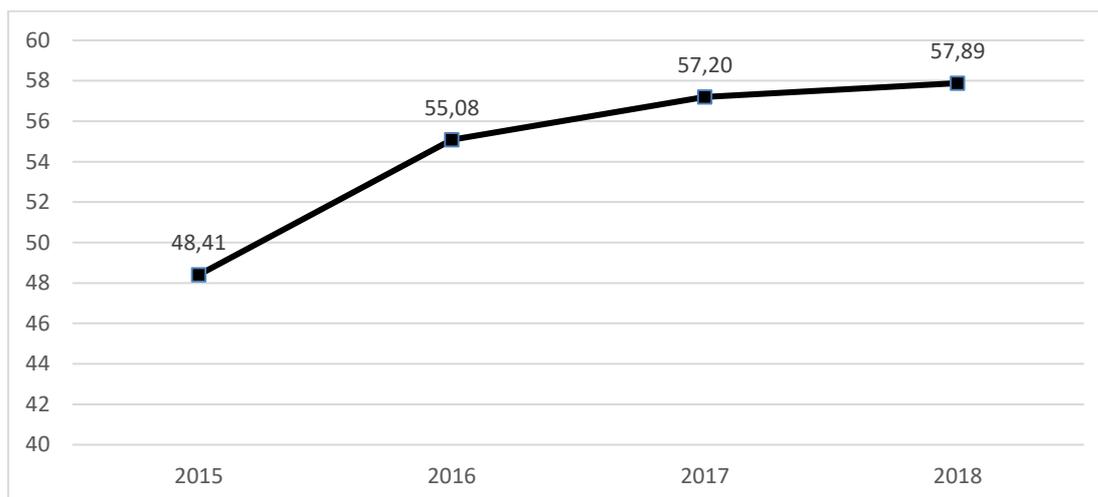
Strategies to implement a 12-year compulsory education policy as described in the Mid Term National Development Planning 2015–2019 (BAPPENAS, 2014) included:

1. Providing Education Conditional Cash Transfer (Kartu Indonesia Pintar/KIP)  
Kartu Indonesia Pintar (Indonesia Smart Card) provides school-age children in the 40% poorest income condition with cash transfers to eliminate education barriers faced by the poor because they lack school equipment and transportation to the school. This strategy is relevant with the recent study that found conditional cash transfer give significant impact on schooling (Behrman et al., 2009) as relevant as a study in Indonesia about the effects of remittances on children educational outcomes (Hapsari, 2019)
2. Providing Community Learning Centers  
Community learning centers are the center of education at the village level and provide adult literacy programs and informal education, especially for adults. This informal education helps to equalize education for adults and people in rural areas who were left behind. This strategy is relevant to the recent study about the significant contribution of CLCs to personal and community centers (Le, 2018)
3. Constructing a New School Program  
Constructing a new school program is an acceleration program for building new schools, especially in rural areas, which aims to provide enough schools to cover educational access for all children in that area. This strategy is relevant with the study of Duflo in 2001, which conclude that acceleration of building primary education school (INPRES Program) have increase education participation in Indonesia.
4. Constructing New Classrooms in Existing Schools  
Constructing new classrooms in existing schools is an acceleration program for building new classrooms in schools that lack sufficient classrooms to cover all children in the area. The objective is to provide access to people who could not be accommodated in the previous cohort. This strategy is relevant with the recent study about the effect of building classroom increase education participation (Berlinski et al., 2009)

### 1.3 Completion Rate in Upper Secondary Level of Education

The Indonesian government needs to measure the success of its 12-year compulsory education policy. Upper secondary education completion rates were measured. The completion rate was calculated as the percentage of individuals who were 3 to 5 years above the intended age for the last grade of the upper secondary education level who completed that grade (UNESCO, n.d.). In Indonesia, the final upper secondary education grade is typically completed by age 18, so the included age group was 19–23 years old. The upper secondary education completion rate is the best outcome to represent the impact of the policy, which aimed to elevate education completion from nine years (lower secondary education level) to twelve years (upper secondary education).

Figure 1.3.1 Upper Secondary Level of Education Completion Rate



Source: *Statistics Indonesia (2015-2018)*

As shown in Figure 1.3.1, the national completion rate for upper secondary education rapidly increased after the government implemented the policy in 2015 (the policy's effect began in 2016), jumping from 48.41% in 2015 to 55.08% in 2016. The upper secondary education completion rate continued to increase until 2018 but less dramatically. The initial rapid increase may have been affected by district governments' eagerness to prove their capabilities to the President. The government might further improve informal education access by providing package C (an assessment that allows individuals to obtain an upper secondary certificate). However, the possible effects of providing package C have not yet been statistically tested.

Figure 1.3.1 also shows that the completion rate increased year by year, but whether this was driven by the effects of business as usual intervention trends or the 12-year compulsory education policy has not been tested. We need to carefully distinguish between natural trends and trends driven directly by the 12-year compulsory education policy. Fortunately, as mentioned in the previous chapter, Indonesia has a decentralization policy (*Law of The Republic of Indonesia, 2014*) that allows each district to determine its education policy. Since some districts committed to a 9-year compulsory education policy and some committed to a 12-year compulsory education policy, we can examine outcome differences in these two groups to determine whether the 12-year compulsory education policy enhanced education participation more than the 9-year policy. This study also examined which policy strategies had a significant impact on Indonesia's education completion rate.

### 1.4 Contribution of the Study

Several studies have examined the impact on education participation of education cash transfers, increasing the number of classrooms and schools, and providing community learning centers. For example, *Ersoz and Kasa (2016)* analyzed the pros and cons of 12-year compulsory education but focused on the system and how teachers responded to the policy. No previous research has discussed the effects of implementing a 12-year compulsory education policy on upper secondary completion rates. Therefore, this study examined the impact of 12-year compulsory education on education participation and completion while controlling for the strategies attached to the policy.

Zhang (2018) analyzed the impact of a 9-year compulsory education policy on education attainment. However, strategies attached to a 9-year compulsory education policy may differ from strategies associated with a 12-year policy because the policy targets differ. Zhang focused on trends that changed after policy implementation compared to before the policy was implemented, but our study analyzed a different factor, potential interactions between strategies and policy.

### 1.5 Research Objective

This study focused on the impact of 12-year compulsory education on education completion in Indonesia while controlling for strategies attached to the policy. In exploring multicollinearity and relevance among independent variables, I expected the total number of classrooms to correlate with the total number of schools. This is plausible because when the government builds a school, the number of classrooms increases. Therefore, in addition to investigating the impact of the 12-year compulsory education policy on education completion, I also examined:

- the effect of the Indonesia Education Cash Transfer Program on education completion in Indonesia
- the impact of adding a new classroom to an existing school on education completion in Indonesia
- the impact of community learning centers on education completion in Indonesia

## 2. Data and Methodology

### 2.1 Data Source

The relevant data needed to analyze the impact of the 12-year compulsory education policy, including the Social and Economic Survey 2015–2018, Village Potency Data 2014 and 2018, and Basic Education Data 2015 and 2018. In addition, Midterm Regional Development Planning also facilitated examining compulsory education's commitment at the province/district level.

#### 2.1.1 Social Economic Survey

The Social Economic Survey is conducted annually by the National Statistics Office of Indonesia to capture geographical conditions, family members, educational information, health situation, household economic situation, and individual access to ICT. The sample size is approximately 300,000 households, and results are released in March of the following year. The survey contains individual-level data that can be aggregated at the district, province, and national levels.

I used the Social Economic Survey from 2015 to 2018, which spans from the beginning of 12-year compulsory education until the latest available data. I calculated the upper secondary education completion rate and the percentage of education cash transfer recipients at the district level. The amount of the education cash transfer is the same among districts or socioeconomic conditions. In the case of upper secondary education, each student got Rp.1.000.000 per year.

#### 2.1.2 Basic Education Data

Basic Education Data is updated by school administrations and reported annually by the Ministry of Education and Culture in Indonesia. The data set contains information on all schools in Indonesia, including geographical conditions, school conditions, teacher conditions, classroom conditions, and laboratory conditions.

I used the Basic Education Data from 2015 to represent the pre-12-year compulsory education era and Basic Education Data from 2018 to represent the era from three or four years after 12-year compulsory education was implemented, calculating the number of schools and the number of classrooms between 2015 and 2018 at the district level.

#### 2.1.3 Village Potency Data

The Village Potency survey is conducted every four years by the National Statistics Office of Indonesia, and the data contain information about village conditions, such as geographical information, general information, demography and employment, housing and environment, disaster and disaster mitigation, education, and health.

We used Village Potency Data from 2014 to represent the beginning of the 12-year compulsory

education policy and Village Potency Data from 2018 to represent the era after the policy was implemented. We used geographical information and education information to obtain information about access to community learning centers.

**2.1.4 Midterm Regional Development Planning**

Midterm Regional Development Planning is five-year regional planning developed by Indonesian district or province governments to set the policy direction for the district government’s agency to perform their tasks. The plan is approved by the Mayor or the regent and legislation system in the district. Midterm Regional Development Planning contains policy, strategies, and targets, including the budget estimation for every strategy planned by the government.

I read nearly 500 Midterm District Development Plans and 34 Midterm Province Development Plans to obtain information about a district/city or province’s policies in that period, especially policies pertaining to implementing 12-year compulsory education or 9-year compulsory education. This information was used to construct the intervention and control groups.

**2.2 Methodology**

**2.2.1 Variable Calculation Method**

Two indicators/variables needed to be calculated to analyze this topic: upper secondary education completion rate and percentage of education cash transfer recipients at the district level. The variables were calculated as follows:

**Calculation of upper secondary education completion rate**

$$\text{Completion rate} = \frac{\text{people age 19– 23 who finished upper secondary education}}{\text{all people age 19– 23}}$$

**Calculation of percentage of education cash transfer recipient**

$$\text{Education Cash Transfer Recipient} = \frac{\text{children 16– 18 who received cash transfers}}{\text{all children age 16– 18}}$$

**2.2.2 Estimation Model**

The analysis used the district level as a unit analysis. Indonesia comprises 514 districts/cities (416 districts and 98 cities). Therefore, this level of data is sufficient to be analyzed as a normal distribution. We used data from 2015 and 2018 to examine the impact of policy implementation on education completion. The main coefficient of interest was from the dummy variable (d1i), where d11 = 1 means that the local government committed to a 9-year compulsory education policy, and d11 = 0 otherwise; and d12 = 1 means that the local government committed to a 12-year compulsory education policy, and d12 = 0 otherwise. Therefore, these two variables represented the control group (9-year policy) and the intervention group (12-year policy).

We used several models to analyze the data. 2015 represented the before implementation time frame, and 2018 represented the after implementation time frame. We used a fixed-effect model to analyze the data.

$$Y_{jt} = \delta_1 d_{1jt} + \alpha_j + \lambda_t + \epsilon_j \dots \dots \dots (1)$$

In Model (1), the independent variable of interest was d1jt, representing a 12-year compulsory education policy in district-j at time-t, where 1 meant the district implemented a 12-year compulsory education policy and 0 meant the district implemented a 9-year compulsory education policy. The dependent variable was upper secondary education completion rate in district-j at time-t. To control for endogeneity, I used district fixed effects and time fixed effects.

$$Y_{jt} = \delta_1 d_{1jt} + \alpha_j + \lambda_t + \sum_{i=1}^3 \beta_i X_{ijt} + \epsilon_j \dots \dots \dots (2)$$

The Model (2) analysis was the same as that used for Model (1), except that I controlled for one of the strategy variables represented by X1jt, which denoted the percentage of people who received education cash transfers in district-j at time-t. X2jt represented the logarithm of the total number of upper secondary classrooms in district-j at time-t. X3jt represented the percentage of villages with community

learning centers in district-j at time-t. This model included the impact of the policy’s strategies because it could be the most affected variable in the model, surpassing the dummy variable representing the 12-year compulsory education implementation.

$$Y_{jt} = \delta_1 d_{1jt} + \alpha_j + \lambda t + \sum_{i=1}^3 \beta_i X_{ijt} + \beta_4 d_{1jt} * X_{1jt} + \beta_5 d_{1jt} * X_{2jt} + \beta_6 d_{1jt} * X_{3jt} + u_{jt} \dots \dots \dots (3)$$

Model (3) examined the impact of an interaction between 12-year compulsory education policy implementation and the strategy.  $d_{1jt} * X_{1jt}$  represented the interaction between the policy and the education cash transfer strategy.  $d_{1jt} * X_{2jt}$  represented the interaction between the policy and the strategy to increase the number of classrooms.  $d_{1jt} * X_{3jt}$  represented the interaction between the policy and the strategy to provide community learning centers. This model has been used by [Card and Krueger \(1994\)](#) to analyze the impact of minimum wage on employment.

**2.2.3 Summary Statistics**

As mentioned before, the summary statistics’ unit of observation was the district/city level. However, some data were not available for some districts; therefore, 484 of the original 514 districts/cities were included in the analyses. The total district reduction resulted from area expansion or incomplete data in a district.

Table 2.2.1. Summary Statistics of 2015 District Data

Variables	Obs.	Mean	Std. Dev.	Min	Max
Upper secondary education completion rate	484	47.58	15.18	10.99	88.16
District implemented 12-year compulsory education	484	-	-	-	-
Percentage of children in the district who received education cash transfers	484	-	-	-	-
Total upper secondary classrooms	484	298.3	323.5	6	2879
Percentage of villages in the district with community learning centers	484	24.19	16.15	-	96

Source: *Statistics Indonesia (2015-2018)*, *(Statistics Indonesia, 2014-2018)* and *(Ministry of Education and Culture of Indonesia, 2015-2018)*

Table 2.2.1 shows the 2015 district summary statistics. On average, the completion rate in Indonesia was 47.58%, with a standard deviation of 15.18, indicating significant variability between districts, with some showing good performance and others showing less optimal performance. Between-district variability was also evident in the minimum and maximum completion rates (10.99% and 88.16%, respectively).

Table 2.2.1 also shows that no districts implemented 12-year compulsory education in 2015, which is plausible because the central government first announced the policy in 2015. This condition also applies to the percentage of children receiving an education cash transfer because Joko Widodo announced this program as a president’s promise.

The variability in the number of classrooms and the percentage of villages with community learning centers by the district is also shown in Table 2.2.1. The minimum number of classrooms was six, and the maximum was 2879, demonstrating extreme variability across districts. The minimum percentage of villages within a district with community learning centers was 0%, and the maximum was 96%, reflecting a huge gap. The disparity in the number of classrooms and access to community learning centers indicates that some districts had deficient access to both formal and informal education.

Table 2.2.2. Summary Statistics of 2018 District Data

Variables	Obs.	Mean	Std. Dev.	Min	Max
Upper secondary education completion rate	484	57.19	14.28	13.6	91.54

Variables	Obs.	Mean	Std. Dev.	Min	Max
District implemented 12-year compulsory education	484	0.38	0.49	-	1.00
Percentage of children in district who received education cash transfers	484	15.00	8.60	-	60.16
Total upper secondary classrooms	484	334	369	6	3286
Percentage of villages in the district with community learning centers	484	21.20	14.78	-	93.15

Source: *Statistics Indonesia (2015-2018)*, *(Statistics Indonesia, 2014-2018)* and *(Ministry of Education and Culture of Indonesia, 2015-2018)*

Table 2.2.2 shows that the completion rate increased on average in 2018 compared to 2015, from 47.58% to 57.19%. However, diversity among districts remained high, with upper secondary completion rates ranging from a minimum of 13.6% to a maximum of 91.54%. The gap across districts remained high after four years, although the national level rates showed an increase.

The disparity was also evident in the percentage of villages with community learning centers and the number of upper secondary classrooms in districts. On average, 21.2% of a district's villages had a community learning center. However, villages in some poorer districts did not have access to community learning centers. Districts had an average of 334 classrooms, but poorer districts did not have any access to classrooms, indicating that children in those districts did not have any education access.

Table 2.2.2 also shows that some districts implemented the 12-year compulsory education policy, with 38% announcing that their district planned and implemented 12-year compulsory education. At the national level, conditional education cash transfers were implemented by the central government. On average, 15% of children benefited from the conditional cash transfer program.

Table 2.2.3. Summary Statistics for Changes with the 9-Year Implementation 2015 and 2018

Variables	2015	2018	Change
Upper secondary completion rate	47.99	56.25	8.26
Percentage of children in the district who received education cash transfers	0	15.89	15.89
Total upper secondary classrooms	244	273	29
Percentage of villages in the district with community learning centers	21.32	18.94	-2.38

Source: *Statistics Indonesia (2015-2018)*, *(Statistics Indonesia, 2014-2018)* and *(Ministry of Education and Culture of Indonesia, 2015-2018)*

Table 2.2.3 compares the before and after summary statistics for districts that implemented the 9-year compulsory education policy. The completion rate increased by 8.26 percentage points from 47.99% to 56.25%. The percentage of children receiving education cash transfers increased to 15.89% from 0 because the central government implemented this program after implementing the 12-year compulsory education policy. Education cash transfers were also implemented in districts that had not implemented a compulsory education policy, which is why the completion rate may have increased in the absence of a compulsory education policy.

Table 2.2.3 shows that, on average, the number of classrooms increased by 29 units from 244 to 273, indicating that districts implementing the 9-year compulsory education policy also worked to provide increased education access. However, this effort did not extend to providing community learning centers, which decreased from an average of 21.32% to 18.94% per district. Decreasing access to community learning centers decreased access to education for adults and people in rural areas.

Table 2.2.4. Summary Statistics for Changes with the 12-Year Implementation 2015 and 2018

Variables	2015	2018	Change
Upper secondary completion rate	47.03	58.50	11.47
Percentage of children in the district who received education cash transfers	0	13.76	13.76
Total upper secondary classrooms	372	419	47
Percentage of villages in the district with community learning centers	28.15	24.31	-3.84

Source: *Statistics Indonesia (2015-2018)*, *(Statistics Indonesia, 2014-2018)* and *(Ministry of Education and Culture of Indonesia, 2015-2018)*

Table 2.2.4 compares the before and after summary statistics for districts that implemented the 12-year compulsory education policy, showing that the completion rate increased by 11.47 percentage points from 47.03% to 58.50%, which is a greater completion rate increase than was found in districts that implemented the 9-year compulsory education policy.

The percentage of children receiving education cash transfers increased by 13.76 percentage points in districts that implemented the 12-year compulsory education policy; however, districts that implemented the 9-year policy showed a greater increase (15.89 percentage points). Notably, the central government implemented the education cash transfers, which differs from the other analyzed factors that were implemented by districts.

Table 2.2.4 shows that the 12-year policy group had a greater increase in the number of classrooms than the 9-year policy group. Since classrooms were not solely provided by the central government (depending on the district), it is possible that the 12-year policy group put more effort into increasing school classrooms than the 9-year policy group. However, further analysis was required to assess the impact of increasing classrooms in the 12-year policy group compared to the 9-year policy group.

Both groups showed a decrease in the percentage of villages with a community learning center. Decreased availability of community learning centers might reduce the effectiveness of compulsory education programs in both the treatment and control groups because the number of children who need informal education is saturated. However, it is still necessary to carefully analyze the impact of these programs on increasing the completion rate.

### 3. Result and Discussion

This section explains the regression model results. I used a difference-in-difference (DID) model to analyze the impact of 12-year compulsory education on education completion in Indonesia.

The first model used regression without interaction to examine the direct impact of 12-year compulsory education without controlling for strategies attached to the policy. I wanted to ensure that the district-implemented 12-year compulsory education policy directly impacted education completion, despite that the policy also controlled the attached strategies.

The second model used regression without interaction to examine the direct impact of 12-year compulsory education by controlling strategies attached to the policy. I wanted to ensure that the district-implemented 12-year compulsory education policy directly impacted education completion but was controlled by the attached strategies without interaction.

The third model used regression with interaction to examine the direct impact of 12-year compulsory education while controlling for the impact of an interaction between the dummy variable and the strategy. This model also examined how the districts' strategy implemented 12-year compulsory education more effectively than the districts that did not implement it.

#### 3.1 Difference-in-Difference: Before and After the Nationwide Policy Announcement

Table 3.1.1 shows the difference-in-difference model results that describe the change in the 12-year and 9-year policy groups' completion rates before and after the 12-year compulsory education policy was announced.

Table 3.1.1. Difference-in-Difference: Upper Secondary Education Completion Rates in the Treatment and Control Groups Before and After Policy Announcement

Variable	12-year compulsory education (treatment group) (1)	9-year compulsory education (control group) (2)	Difference: treatment-control (3)
Completion rate increase before law change (2010 to 2014)	10.60 (8.23)	12.93 (11.91)	-2.33
Completion rate increase after law change (2015 to 2018)	11.07 (10.54)	7.98 (10.48)	3.09
Completion rate increase, after-before the law change	0.47 (13.28)	-4.95 (17.21)	5.42

Source: *Statistics Indonesia (2015-2018)*

Result (1) showed a change in the upper secondary education completion rate in districts that implemented a 12-year compulsory education policy before and after the policy was announced nationwide, where the completion rate increased by 10.60 percentage points from 2010 to 2014 in the treatment group. After the law change in 2015, the upper secondary education completion rate increased by 11.07 percentage points, showing a difference of 0.47 percentage points in the treatment group before and after the policy was announced.

Result (2) showed a changed upper secondary education completion rate in districts that implemented a 9-year compulsory education policy before and after the policy was announced nationwide. The completion rate increased by 12.93 percentage points from 2010 to 2014, before the policy was implemented. After the policy was implemented nationwide, districts that implemented 9-year compulsory education increased only 7.98 percentage points from 2015 to 2018, indicating a negative completion rate change (4.95 percentage points) before and after nationwide policy implementation.

Result (3) showed a difference in completion rate increases between districts that implemented 12-year compulsory education and districts that implemented 9-year compulsory education. Before the policy was announced, the difference between the control and treatment groups was negative 2.33, indicating that the control group completion rate was more progressive than the treatment group completion rate before the policy was announced. After the policy was announced, the difference between the control and treatment groups' completion rates was positive (3.09), indicating that after the policy was promoted nationwide, the treatment group completion rate was more progressive than the control group completion rate. As shown in Table 3.1.1, applying this policy had a larger effect in districts that implemented 12-year compulsory education than in districts that implemented 9-year compulsory education. The trend data reflecting before and after policy implementation showed that the policy had a higher impact on districts that committed to the 12-year policy.

### 3.2 Estimation Result of Regression Model without Interaction

Table 3.2.1 shows the results of the regression analysis model without interaction effects. Result (1) used the pooled cross-sectional model without controlling the time fixed effect and state fixed effect. Result (2) directly examined the impact of 12-year compulsory education without controlling for strategies attached to the policy. Result (3) examined the impact of 12-year compulsory education controlling for one strategy. Results (4) and (5) examined the impact of 12-year compulsory education controlling for two strategies and three strategies, respectively.

Table 3.2.1. Estimation Result of Completion Rate without Interaction

Variables	Upper secondary education completion rate				
	(1)	(2)	(3)	(4)	(5)
Dummy 12 year compulsory education	5.849*** (1.297)	10.353*** (0.946)	4.700*** (0.938)	3.475*** (0.956)	3.531*** (0.96)
Education cash transfer recipient upper sec	0.233*** (0.053)		0.417*** (0.033)	0.321*** (0.039)	0.326*** (0.039)

Variables	Upper secondary education completion rate				
	(1)	(2)	(3)	(4)	(5)
Logarithm of total classrooms	2.259*** (0.536)			20.713*** (4.472)	20.546*** (4.481)
Percentage of villages with community learning centers	-0.058*** (0.032)				0.028 (0.042)
Constant	38.726*** (2.893)	50.447*** (0.34)	48.381*** (0.339)	-61.933** (23.818)	-61.718** (23.834)
State effects?	No	Yes	Yes	Yes	Yes
Time effects?	No	Yes	Yes	Yes	Yes
R-squared	0.081	0.604	0.212	0.163	0.164
N	968	968	968	968	968

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Result (1) used a pooled cross-section model and showed that districts that implemented 12-year compulsory education increased education completion more than districts that implemented 9-year compulsory education, although there were some control variables included in the model. However, the difference-in-difference model was needed to compare differences before and after the policy was implemented.

Result (2) directly regressed the policy on completion rates and showed that districts with 12-year compulsory education significantly increased completion rates more than districts with 9-year compulsory education, without controlling for other variables.

Result (3) included the control variable, education cash transfers, in the model and showed that 12-year compulsory education significantly impacted completion rates while controlling for education conditional cash transfers. Conditional cash transfers also showed a significant impact on completion rates.

Result (4) included the number of classrooms and showed that districts that implemented 12-year compulsory education significantly increased completion rates. Conditional cash transfers and increasing total classrooms also had significant effects on increasing completion rates.

Result (5) added community learning centers and showed that implementing 12-year compulsory education significantly improves completion rates, although strategies attached to the policy influence the completion rates. Conditional cash transfers and increasing total classrooms also had a significant impact on increasing completion rates. However, the strategy to provide community learning centers did not significantly affect completion rates. An explanation for this finding is that community learning centers primarily affect adults, and completion rates are only measured for upper secondary education level students.

### 3.3 Estimation Result of Regression Model with Interaction

The previous section explained the direct impact of 12-year compulsory education on completion rates. However, it is also necessary to control for interaction effects from implementing the policy and strategies themselves. This analysis explained how strategy from implementing the 12-year compulsory education policy significantly affected education compared with implementing the 9-year compulsory education policy.

Table 3.3.1 Estimation Result of Completion Rate with Interaction

Variables	Completion rate upper secondary education		
	(1)	(2)	(3)
Districts that implemented 12-year compulsory education=1 (d <sub>1</sub> )	7.464*** (1.014)	6.585*** (1.124)	6.187*** (1.145)
Percentage of people age 16-18 who received education cash transfers (X <sub>1</sub> )	0.464*** (0.035)	0.384*** (0.045)	0.386*** (0.045)

Variables	Completion rate upper secondary education		
	(1)	(2)	(3)
Interaction term between $d_1$ and $X_1$	-0.563*** (0.106)	-0.452*** (0.107)	-0.416*** (0.106)
The logarithm of total classrooms ( $X_2$ )		15.533*** (5.407)	15.458*** (5.416)
The interaction term between $d_1$ and $X_2$		-2.211** (0.764)	-2.299** (0.765)
Percentage of villages with community learning centers ( $X_3$ )			0.012 (0.04)
The interaction term between $d_1$ and $X_3$			0.105* (0.052)
Constant	48.146*** (0.224)	-34.536 (28.775)	-34.416 (28.821)
State effects?	Yes	Yes	Yes
Time effects?	Yes	Yes	Yes
R-squared	0.422	0.443	0.447
N	968	968	968

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Table 3.3.1 shows three results of the interaction model. Result (1) shows the interaction impact effect of conditional cash transfers alone. Result (2) shows the interaction effects of both conditional cash transfers and increasing total classrooms. Result (3) shows the full interaction effects for the policy with all attached strategies.

Result (1) showed that implementing the policy significantly increased completion rates while controlling for education cash transfers and the interaction term. This model also showed that education cash transfers affected completion rates, indicating that the interaction of 12-year compulsory education with education cash transfers significantly affects upper secondary education completion rates. However, the impact was negative, suggesting that education cash transfers increased completion rates more effectively in districts that implemented 9-year compulsory education.

Result (2) showed that the impact of 12-year compulsory education on completion rates remained significant when controlling for two variables with an interaction between them. The two variables significantly impacted the completion rate, similar to that described in the previous section. However, the interaction between policy and the strategy to increase classrooms increased classrooms in districts that implemented 12-year compulsory education to a lesser extent than in districts that implemented 9-year compulsory education.

Results (3) showed that the previous Results (1) and (2) were similar. Result (3) included the strategy of providing community learning centers and showed that this did not significantly increase completion rates, similar to the results described in the previous section. However, this result does not extend to the interaction term. There was a significant impact when the community learning center strategy was applied in districts that implemented 9-year compulsory education but none in districts that implemented 12-year compulsory education. We assumed that in the district that implemented 9-years compulsory education, informal education is an effective strategy, while they do not have another effective strategy to increase the completion rate.

From these results, we concluded that implementing 12-year compulsory education significantly increases upper secondary education completion rates, although the increase of completion rate is also influence by strategies attached to the policy. The increasing classrooms and providing education conditional transfer strategies improve completion rates significantly. However, providing community learning centers did not have a significant impact on completion rates.

The interaction between strategy and policy had a significant negative impact, indicating that the strategy was more effective for increasing completion rates in districts that implemented 9-year compulsory education rather than districts that implemented 12-year compulsory education. However, this does not mean that the strategy was not effective under the 12-year compulsory education policy. Rather, it suggests that districts that implemented 12-year compulsory education provided additional efforts beyond the strategy. Extending strategies beyond the usual approach is very important for mayors who need to achieve a high goal after committing to implementing this policy. This requires creativity as well as increased spending of district resources to achieve that goal.

### 3.4 Advanced Strategies of 12-Year Compulsory Education District Implementation

Surabaya City is one of the districts/cities that implemented a 12-year compulsory education policy. Located in East Java, Surabaya City is the center of the economy in this province. Like in other metropolitan cities, people have economic problems, and some of their children needed to work or become buskers. This limits children's access to education.

As Mayor, Tri Rismaharini is responsible for ensuring that every child in Surabaya has access to education to prove her commitment to 12-year compulsory education. However, children not attending school pose a problem because they correlate with the economic condition. Therefore, the Mayor applied creative strategies rather than the usual strategies:

- The Mayor developed a Memorandum of Understanding with a company near Surabaya to ensure that children get a job there when they graduate from upper secondary education, and the company gives children a stipend to pay school fees.
- After establishing this agreement between the district government and the company, the Mayor encouraged children who were not attending school and children in the street to return to school.
- Another problem faced by the Surabaya government is that the upper secondary school is not available in all locations. Children must travel to access a school, and this requires funding. Therefore, the Surabaya government provides a school bus for these children.
- The last strategy, which is also very important to this creative action, is monitoring. The government needs to ensure that every child who is back in school stays until they graduate and the employment commitment from the company is fulfilled.

### Conclusion

A formal schooling system is the best way to elevate an economy, especially in developing countries, because a formal schooling system increases people's ability to generate income. Therefore, to catch up with those left behind, Indonesia must accelerate formal education—a strategy already related to millennium and sustainable development goals.

Indonesia still faces the challenge of achieving good quality and equity in education. To make education equitable for everyone, in 2015, the President of Indonesia committed to implementing a 12-year compulsory education policy. Before 2015, Indonesia had a 9-year compulsory education policy, which was implemented from 2015 until 2018. It was important to evaluate the impact of the 12-year compulsory education policy. However, not all districts implemented the policy, which provided a control group (9-year policy implementation) to compare with the treatment group (12-year policy implementation).

Using a difference-in-difference model, We found that districts that implemented 12-year compulsory education had more progressive upper secondary education completion rates than districts that implemented 9-year compulsory education when We compared before (2010–2014) and after (2015–2018) the nationwide policy announcement. The results indicate that 12-year compulsory education significantly increased education completion in Indonesia.

Furthermore, the 12-year compulsory education policy included strategies for providing education cash transfers, building new schools and new classrooms, and providing community learning centers. The results show that implementing a 12-year compulsory education policy enhanced education participation in Indonesia with or without controlling for other conditions and factors, except for the strategy of providing community learning centers, which did not increase completion rates in districts that implemented the 12-year policy. However, this result is still plausible because community learning centers primarily affect adults rather than the upper secondary students who are counted in the completion rates.

I also found that education cash transfers, increasing the number of classrooms, and providing community learning centers were effective in districts that implemented 9-year compulsory education. However, this does not mean that the strategies did not affect districts that implemented 12-year compulsory education. Those districts were likely to have implemented additional strategies beyond those attached to the policy to demonstrate their commitment to the government's 12-year compulsory education target.

## Recommendation

Implementation of 12-year compulsory education at the local level effectively increases education participation in Indonesia. For this reason, the implementation of the 12-year compulsory education policy must be intensified in every region in Indonesia because this can trigger regions to increase efforts to distribute education services in their respective areas. In addition, good practices at the regional level need to be studied more deeply and are expected to be replicated in regions that have similarities in sociological, anthropological, and geographical aspects. Thus, regions that have low educational participation can catch up.

Good efforts such as constructing new classrooms and providing education cash transfers that have been carried out so far must also be maintained. Then, with the commitment to implement the 12-year compulsory education, the local government hopes that these good efforts can be carried out more seriously. One of the efforts that will be carried out more optimally by the regional government, among others, is the provision of land for the construction of educational infrastructure and efforts to submit transfer funds to the central government and use regional funds.

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