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THE EFFECT OF SMART INDONESIA PROGRAM (PIP) ON THE RISK OF SCHOOL DROPOUT: A PROPENSITY SCORE MATCHING ANALYSIS BASED ON NATIONAL DATA

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ABSTRACT
Research Originality — This study provides new empirical evidence on the effectiveness of the Smart Indonesia Program (Program Indonesia Pintar, or PIP), a cash transfer program specifically targeting education, in reducing the risk of school dropout among low-income students during the second year of the COVID-19 pandemic. Unlike previous studies, it focuses on the differential impact across education levels using nationally representative post-pandemic data.
Research Objectives — The research aims to evaluate the impact of PIP on reducing school dropout rates among students aged 6-21 years from low-income households in Indonesia. It also seeks to identify at which educational level the program has the most pronounced effect.
Research Methods — This study employed the propensity score matching (PSM) method using the March 2022 National Socioeconomic Survey (SUSENAS) data. The approach controls for selection bias in estimating the causal impact of PIP on educational outcomes.
Empirical Results — The findings showed that PIP significantly reduced the risk of dropout across all education levels. The most substantial impacts were observed at the junior and senior high school levels, where PIP recipients showed a lower risk of dropout than non-recipients by 2.11 and 2.04 percentage points, respectively. At the elementary level, the risk of dropout decreased by 0.34 percentage points.
Implications — These results underscore the importance of expanding PIP coverage and establishing a robust monitoring system for fund utilization to enhance the program's effectiveness in promoting educational participation among poor households.

Keywords: Cash transfer, dropout, education, propensity score matching (PSM), Indonesia Smart Program (PIP)
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INTRODUCTION

Access to equal and quality education is one of the main goals of the Sustainable Development Goals (SDGs). This is stated in the fourth goal of the SDGs, which is to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". One of the key targets of this goal is that "by 2030, ensure that all girls and boys complete free, equitable, and quality elementary and secondary education, that leads to relevant and effective learning outcomes" (Kementerian PPN/BAPPENAS, 2017).

Approaching a decade of the target achievement of SDGs goals in the field of education, Indonesia continues facing challenges of ensuring the optimal completion of elementary and secondary education. An indication of this suboptimal achievement can be seen in the trend of dropout rates. The dropout rate trend is the ratio between the number of students who do not continue their education before graduating from a certain level of education (elementary to secondary) and the total number of students who are still in school at the same level of education in the previous academic year (BPS, 2023). Although there has been a downward trend in the dropout rate in recent years, this trend tends to level off during the 2021/2022 to 2022/2023 school years (BPS, 2023). Based on the Basic Education Data (Dapodik) of the Ministry of Education, Culture, Research and Technology (Kemendikbudristek), 76,834 students dropped out of school

at all levels of elementary to secondary education in the 2022/2023 school year. The dropout rate increased by 1.26% from the previous school year (Kemendikbudristek, 2023).

APPLICATIONS FOR PRACTICE

- PIP has a significant impact on reducing dropout rates.
- In poor households, PIP recipients have lower dropout rates compared to non-recipients at every primary and secondary education level.
- To improve elementary and secondary education outcomes, PIP should continue in the future, as well as increase the coverage of beneficiaries, increase the amount of cash assistance, and develop a monitoring system for the use of funds by program recipients.

The COVID-19 pandemic, which lasted from late March 2020 to mid-June 2023, has increased the dropout rates in Indonesia, especially at the elementary school level. The Basic Education Data of the Ministry of Education, Culture, Research and Technology shows that the number of students dropping out of school at the elementary school level during the COVID-19 pandemic increased significantly compared to pre-pandemic period. In the 2021/2022 academic year, the number of elementary school students who dropped out increased by 16.38% compared to that of the 2018/2019 academic year (Kemendikbudristek, 2019, 2022). At the secondary education level, including junior high, senior high, and vocational schools, the COVID-19 pandemic showed a downward trend in dropout rates at all levels.

One of the most significant changes in education during the COVID-19 pandemic period was the implementation of an online distance learning system in the teaching and learning process, which was mandated by Circular Letter No. 4/2020 on the Implementation of Education Policies During the Emergency Period of COVID-19 Pandemic. Obstacles that arose during the implementation of this system had a significant impact on school participation at every level of education. Major barriers for students included limited infrastructure, technology, internet access, parents' readiness to support their children's learning process, a non-conducive learning environment, and mental and physical health challenges (Indrawati et al., 2020). These obstacles increase the risk of dropping out of school during the COVID-19 pandemic.

The COVID-19 pandemic has worsened the economic condition of the poor, forcing them to neglect the need for proper education for children. Although school enrollment rates showed a positive trend at every level of education, there was a large gap between low- and high-income populations. The gross participation rate for the low-income population was much lower than that of the middle-income population, especially at the junior high and senior high school levels (BPS, 2022). This indicates obstacles to the poor accessing proper elementary and secondary education.

One policy that aims to reduce obstacles for the poor to access education and improve educational attainment is the cash transfer program. This policy has been implemented in many countries, especially in developing countries. Cash transfer programs began to be implemented by several countries in the late 1990s, initiated by Mexico with *Progresa*, Brazil with *Bolsa Escola*, and Bangladesh with the *Female Secondary Stipend and Assistance Program* (FSSAP) (García & Saavedra, 2022). In the last two decades, there has been widespread adoption of cash transfer policies in various countries. In fact, by 2020, 87 cash transfer policies were identified in 50 countries around the world, and most of them were implemented by countries in Latin America, Asia and Africa (García & Saavedra, 2022).

Although the main focus of cash transfers is poverty reduction, the policy program also emphasizes on improving the quality of human capital, both in terms of health and education, including elementary and secondary education. In fact, more than half of the 2020 education cash transfers targeted school-aged children in elementary and secondary education (García & Saavedra, 2022). In the short term, cash transfer policies aim to reduce poverty. In the long term, these interventions are expected to increase human capital accumulation, thereby breaking inter-generational poverty (Fiszbein & Schady, 2009; Ibarrarán et al., 2017).

In an effort to encourage access to elementary and secondary education for children from poor families, the government of Indonesia has implemented education-related cash transfer policies, such as *Program Indonesia Pintar* (Smart Indonesia Program (PIP)) and *Program Keluarga Harapan* Family Hope Program (PKH). In addition, during the COVID-19 pandemic period, the government also launched an assistance program in the form of the provision of internet quotas for students and educators in 2021. This program was an in-kind education assistance (social transfer in kind) that was ad hoc only in 2021 and served to support access to public education amid the implementation of an online distance learning system during the COVID-19 pandemic.

PIP is a cash assistance program that has been available annually since 2014. This program is an expansion of the Poor Students Assistance (BSM) program that was initiated in 2008. PIP is implemented based on Presidential Instruction No. 7/2014 on the Implementation of the Prosperous Family Saving

Program, Smart Indonesia Program, and Healthy Indonesia Program to Build Productive Families. The main objective of PIP is to increase school enrollment rates and prevent students from dropping out of school at the elementary to secondary education levels. This program is expected to alleviate the cost of education, allowing students from poor households to complete their education. The PIP funds are managed by two ministries: the Ministry of Education, Culture, Research, and Technology (*Kemendikbudristek*) and the Ministry of Religious Affairs (*Kemenag*), according to the education units under the coordination of each ministry. Although every year the government also provides regular cash assistance to the poor through PKH, PIP, which has the largest funding, is specifically aimed at meeting the educational needs of children from poor households. In 2022, PIP funding reached IDR 10.93 trillion, with 20.26 million students from primary to secondary levels receiving the funding (Kemenag, 2024; Kemendikbudristek, 2023).

Providing cash transfers to poor households will increase total household income. The additional income can replace the income contribution from working school-aged household members. Thus, recipient households can allocate more time for school-aged children to attend school, which can eventually increase school enrollment at every level of elementary to secondary education. Recent data shows thatschool dropout rates have leveled out at each level of education over the past few years, indicating a gradual increase in school enrollment. In addition, there is a significant gap in school enrollment between low-income and middle-income groups. The economic recession during the pandemic has exacerbated this condition by increasing the barriers for poor households to access elementary and secondary education. Therefore, the effectiveness of PIP as an education-specific cash transfer program is considered as less significant in improving access to elementary and secondary education for children from poor families, especially during the crisis caused by the COVID-19 pandemic.

Empirical research on education economics mainly focuses on the causal relationship between treatments, such as education-related policies, and outcomes in the form of educational attainment. However, other factors outside the treatment may also affect the outcome, causing endogeneity problems. In this context, regression or correlation analysis methods will potentially produce biased estimates. Propensity score matching (PSM) is an analytical method that can reduce bias, especially from observable variables (Schwerdt & Woessmann, 2020). Government program interventions are generally not distributed randomly. This is because the determination of participants in the program is often purposive, and there is self-selection by individuals into the program based on observable characteristics, unobservable characteristics, or both. This can lead to selection bias in impact evaluations (Khandker et al., 2010).

A number of empirical studies have examined the impact of PIP on educational outcomes at the elementary and secondary levels. Previous studies found that PIP significantly increased student school participation (Caniago et al., 2021; Ulfa & Rezki, 2024) and decreased the risk of students dropping out (Listiyanto & Qibthiyyah, 2022; Setyadharma, 2018). However, all of these studies were conducted before the COVID-19 pandemic, while empirical studies during the pandemic are very limited. Existing studies show that in the first year of the pandemic, PIP only significantly reduced the risk of dropout at the junior and senior high school levels, while at the elementary school level, there was no significant impact (Samalo & Jasmina, 2024). This may have been one of the reasons for the spike in the number of dropouts at the elementary school level in the 2020/2021 school year. In this school year, the number of dropouts at the elementary school level increased by 33.81% compared to the pre-pandemic condition, particularly in the 2018/2019 school year (Kemendikbudristek, 2019, 2021).

There is limited research on the impact of PIP during the COVID-19 pandemic, and existing studies generally focus on the beginning of the pandemic in Indonesia. In addition, low school enrollment rates among the poor and limited access to education underscore the importance of PIP in supporting children from poor households to continue their education. However, there are indications of stagnation in the achievement of educational outputs at the elementary and secondary levels during the COVID-19 pandemic, which can be seen from the increasing number of dropouts. Therefore, a more in-depth analysis is needed to assess the effectiveness of PIP during the COVID-19 pandemic, especially in the second year of the pandemic in Indonesia. This study will contribute to the literature on the effectiveness of PIP on educational attainment at the elementary and secondary levels, especially during the pandemic period. This study aims to analyze the impact of PIP on the risk of dropout among students from poor households at the elementary and secondary education levels in the second year of the COVID-19 pandemic in Indonesia (in 2022).

LITERATURE REVIEW

Human Capital Investment in Household

To create quality human capital, household investment in education is required. According to Skoufias (2005), human capital investment in households through education requires inputs in the form of time, which includes the time of school-aged children and parents, and inputs in the form of educational goods and services from the market. In addition, investment is also influenced by several exogenous factors, such

as observable characteristics of school-aged children (such as gender and birth order), children's biological factors (such as innate ability level and health level), parents' characteristics (such as education level), community characteristics (such as distance to education facilities), environmental factors, and the level of family knowledge about human capital investment in children (Skoufias, 2005). In the investment decision process, households often face with allocation decisions between education investment for their children and household consumption. Inputs of time for children's education will affect total household income, due to changes in income contribution from children if their time is allocated to work.

Increasing children's time allocation to school is an outcome of education policy from the demand side. Demand interventions are carried out through increasing household income and reducing education costs (Glewwe et al., 2020). Some policies to increase education demand are cash transfer policies, both conditional and unconditional, school fee reductions, merit-based scholarships, information-based interventions, and other household-based policies. Of the several education demand policies, income transfers through cash transfer policies may directly increase household income. Thus, households will have additional flexibility in allocating time for schooling and other household consumption.

Apart from the demand side of education, education output can be improved through interventions on the supply side. Some policies that can be implemented from the supply side are increasing the quantity of educational services, including increasing the number of school buildings or increasing the capacity of existing schools; improving the quality of educational services, including teaching materials and educational technology; and providing other educational service inputs such as nutrition and health services for students (Glewwe et al., 2020).

Cash Assistance Policy in Indonesia

The cash transfer programs in Indonesia began with the Social Safety Net (JPS) program to mitigate the impact of the 1997-1998 economic crisis on the poor and the crisis-affected poor (Kementerian PPN/BAPPENAS, 2014). After the 1997 economic crisis, the JPS was continued with social protection programs consisting of social assistance programs and social security programs. In the field of education, the government of Indonesia implemented social assistance for schools at the elementary and secondary levels through the School Operational Assistance (BOS), assistance for elementary and secondary school students from poor households through the Poor Students Assistance (BSM), and assistance for university students from poor households through the Tuition Fees for Poor Students with Excellent Academic Performance Program or *Bidikmisi* (Kementerian PPN/BAPPENAS, 2014). Cash assistance for education of school-aged children at elementary and secondary levels is also covered by the Family Hope Program (PKH), which is integrated with assistance in health and social welfare (TNP2K, 2018). Along with economic and political dynamics, in 2014 the government implemented the Smart Indonesia Program (PIP) as an improvement of the Poor Students Assistance (BSM). PIP is "cash assistance, expansion of access, and learning opportunities from the government provided to students and university students who come from poor or vulnerable families to finance education" (Kemendikbud, 2020). The purpose of PIP at the elementary and secondary levels is to increase access to education for children aged 6-21, support the 12-year compulsory education initiative, prevent dropouts due to economic difficulties, and encourage dropouts to return to school (Kemendikbud, 2020). The cash assistance allocated to elementary school students is IDR 450,000 per year, while for junior high school students it is IDR 750,000 per year, and for senior high school students it is IDR 1,000,000 per year (Setjen Kemendikbudristek, 2022).

Previous Research

Various studies in numerous countries have shown that cash transfers improve access to education for beneficiaries, both in the short and long term (Baird et al., 2014; Millán et al., 2019). The first three cash transfer programs implemented in Bangladesh, Brazil, and Mexico had a positive impact on educational attainment. The FSSAP program in Bangladesh played a significant role in improving women's education. FSSAP demonstrates a significant positive impact on enrollment, grade attainment, and completion rates at the secondary level (Khandker et al., 2021). The *Bolsa Escola* program in Brazil also has significant positive impacts on educational outcomes, such as increased enrollment, grade promotion rates, school completion rates, and decreased dropout rates (Glewwe & Kassouf, 2012; Peruffo & Ferreira, 2017). Similarly, the *Oportunidades* program, which is a continuation of the *Progresa* program in Mexico, has led to an increase in enrollment rates, graduation rates, and a decrease in dropouts at the secondary education level (Araujo et al., 2021; Behrman et al., 2012).

Apart from cash transfer programs in Bangladesh, Brazil and Mexico, cash transfer programs in several other countries have also had a positive impact on education. Cash transfer programs, such as the *Social Cash Transfer Program* (SCTP) in Malawi, *Juntos* in Peru, *Pantawid Pamilyang Pilipino Program* (4Ps) in the Philippines, *Cambodia Education Sector Support Program* (CESSP), a scholarship program in Cambodia, *Niños, niñas y adolescentes trabajadores* (NNAT) in Costa Rica, *Benazir Income Support Program* (BISP) in

Pakistan, and *China School Subsidy Program* (SSP) in China, have been shown to have a positive and significant impact on enrollment rates (Catubig & Villano Villano, 2017; Churchill et al., 2021; Ferreira et al., 2017; Filmer & Schady, 2014; Gaentzsch, 2020; Kilburn et al., 2017; Meza-Cordero, 2023; Zhou et al., 2020, 2017; Churchill et al.). The SCTP program in Malawi, BISP in Pakistan, *Asignación Universal por Hijo* (AUH) in Argentina, and cash transfer programs in rural China significantly reduced the dropout rates (Churchill et al., 2021; Edo & Marchionni, 2019; Kilburn et al., 2017; Mo et al., 2013). In addition, cash transfer programs also significantly boost school attendance, the likelihood of continuing to higher education levels, number of years of schooling, and out-of-pocket spending on education (Evans et al., 2023; Filmer & Schady, 2014; Gaentzsch, 2020; Giang & Nguyen, 2017; Mostert & Vall Castello, 2020; Sabates et al., 2019).

Previous research examining the effect of cash transfer policies on education outcomes in Indonesia produced mixed findings. Sparrow (2007) and Cameron (2009) evaluated the impact of JPS on education outcomes and found that JPS had a significant impact on reducing dropout rates, especially at the junior high school level. In addition, the JPS reduced child employment and increased school attendance (Sparrow, 2007). After the economic crisis in 1998, JPS was followed by various education assistance programs, such as BOS, BSM, *Bidikmisi*, and PKH, all of which had various impacts on educational achievement in Indonesia. The BOS program was shown to increase students' test scores (Sulistyaningrum, 2016). In addition, research by Kartasasmita and Sulistyaningrum (2021) concluded that students who benefitted from the BOS program when they were in elementary school were more likely to continue their education at the senior high school level. The BSM program significantly reduces the risk of dropouts at the elementary and secondary education levels (Yulianti, 2015), and significantly increases school participation (Wardani et al., 2022; Wardani & Baryshnikova, 2019). *Bidikmisi* is positively associated with university student achievement as measured by the grade point average (Mulyaningsih et al., 2022). PKH has a positive impact on education, with a significant increase in school enrollment rates for children aged 7-15 years and an increase in student attendance rates at the primary school level (Cahyadi et al., 2020).

PIP significantly increases student attendance in school at every level of education, from elementary to senior high school (Caniago et al., 2021; Ulfa & Rezki, 2024). Students who are recipients of PIP have a tendency to attend school at a rate 11.41% higher than those who are not recipients of PIP (Ulfa & Rezki, 2024). In addition, PIP is proven to significantly reduce the risk of dropping out of school for students from poor families at every level of education (Listiyanto & Qibthiyyah, 2022; Setyadharma, 2018). PIP recipients have a 1.9% reduced dropout rate compared to non-recipients at the elementary school level, 5.1% lower at the junior high school level, and 2.8% lower at the senior high school level (Listiyanto & Qibthiyyah, 2022). All of these studies examine the impact of PIP on elementary and secondary education attainment in the period before the COVID-19 pandemic, when socioeconomic conditions were relatively normal. However, studies analyzing PIP during the COVID-19 pandemic show more mixed results. Research analyzing the impact of PIP in the first year of the COVID-19 pandemic found that PIP only had a significant impact on reducing dropout rates at the secondary education level (Samalo & Jasmina, 2024).

During the COVID-19 pandemic, there have been significant changes in the teaching and learning process, such as the implementation of an online distance learning system to reduce the spread of COVID-19. In this study, the impact of PIP on school dropout at elementary and secondary education levels is analyzed during the second year of the COVID-19 pandemic (2021). This study proposes the following hypothesis: individuals from poor households who are recipients of PIP have a reduced risk of dropping out of school compared to students from poor households who are not recipients of PIP, both at the elementary and secondary school levels.

METHODS

Propensity score matching (PSM) is a quasi-experimental methods to analyze the causal impact of a treatment on an outcome. This method reduces the bias of estimating the impact of a treatment caused by the randomness of the treatment variable. Bias is minimized by matching treated units with untreated units based on propensity scores. The matching methods that can be used are nearest-neighbor, radius caliper, kernel, and local linear. Propensity score is the probability of a unit receiving treatment, which is calculated based on observed characteristics or covariate variables. Propensity score is estimated through probit regression or logistic regression between treatment variables and covariate variables. In this study, propensity score is estimated through probit regression with the following equation:

$$\Pr(PIP = 1|X) = \beta_0 + \beta_i X_{ij} + \varepsilon_j \quad \text{.....(1)}$$

where:

- X_i is the *i-th* covariate variable,
- β_i is the *i-th* slope,
- β_0 is intercept, and
- ε_j is residual.

In this study, the treatment that is analyzed is PIP, while the outcome that is the focus of the research is dropout. The equation model in this study is

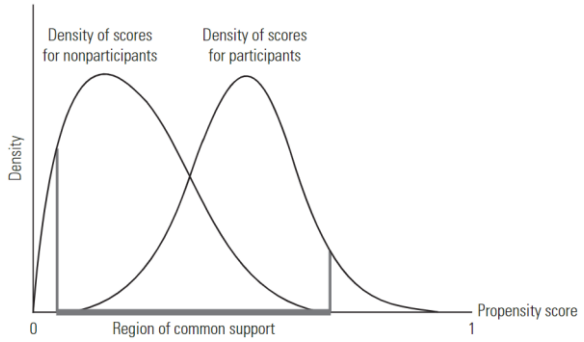
$$Y_i = D_i Y_{1i} - (1 - D_i) Y_{0i} \quad \text{.....(2)}$$

where D_i is a treatment in the form of a dummy variable that is assigned the value of 1 if the individual is a recipient of PIP and the value of 0 if the individual is not a recipient of PIP. Y_i is the outcome variable in the form of a dummy variable that is given the value of 1 if the individual drops out and the value of 0 if the individual does not drop out. Y_{1i} is the expected outcome (potential outcome) by the *i-th* individual who is a recipient of PIP (D_i= 1). Y_{0i} is the expected outcome (potential outcome) of the *i-th* individual who is not a recipient of PIP (D_i= 0). The impact of the treatment (PIP) on the outcome (dropout) was estimated through the average treatment effect on the treated (ATT) value, which is the difference between the estimated value of the potential outcome of individuals who are recipients of PIP$E[Y_{1i}|D_i = 1]$ and the estimated potential outcome of individuals who are not recipients of PIP .$E[Y_{0i}|D_i = 0]$

$$ATT = E[Y_{1i}|D_i = 1] - E[Y_{0i}|D_i = 0] \quad \text{.....(3)}$$

In PSM, there are two main assumptions, namely conditional independence and common support. Conditional independence assumes that the participation of individuals in the program (treatment) is only based on observable characteristics, and the common support assumption states that each individual program recipient has a comparison observation based on adjacent propensity score values (Khandker et al., 2010). The common support assumption is identified from the overlap condition in the propensity score distribution of the treatment group and the control group as shown in Figure 1. PSM can be applied if the two groups are balanced, meaning that both have similar propensity scores based on the same covariate variables (Khandker et al., 2010).

Figure 1 Common Support



Source: Khandker et al. (2010)

This study used data from the National Socioeconomic Survey (SUSENAS) conducted in March 2022 sourced from the Central Bureau of Statistics (BPS). The unit of analysis in this study was individuals aged 6-21 years from poor households. They either attended school or no longer enrolled, with the level of education being or having been from elementary school to high school. The determination of the individual age range was based on *Permendikbud* No. 10/2020 on the Smart Indonesia Program, which stipulates that PIP is intended for children aged 6-21 years. In this study, poor households are defined as households with average monthly per capita expenditure lower than the district or city poverty line in 2022. The poverty line threshold varies between districts or cities.

Processing the collected data began with determining the research variables. In this study, research variables were classified into three types: outcome variables, treatment variables, and covariate variables. The outcome variable was the dropout status of the individual, in the form of a dummy variable that is assigned the value of 1 if dropping out of school and 0 if not dropping out of school. An individual was a dropout if the individual was still attending school in the 2020/2021 school year but did not attend school in the following school year or 2021/2022; therefore, the dummy variable is 1. If the individual attended school in both school years consecutively, the individual was not a dropout, and the dummy variable is 0. In analyzing the impact of cash transfers, dropout is one of the outcome variables commonly used as a measure of educational attainment (García & Saavedra, 2022).

The treatment variable in this study was individual participation in PIP, which was a dummy variable given a value of 1 if the individual was a PIP recipient and 0 if the individual was not a PIP recipient. Covariate variables were used as the basis for forming treatment and control groups. The selection of covariate variables was based on the study of Khiem et al. (2020), which used indicators representing children, parents, and household characteristics as covariate variables in a study on the participation of

children from poor families in education. In this study, the variables used to represent child characteristics were gender and age. The characteristics of parents were represented by the variables of gender, age, number of years of schooling, and number of working hours during the week of the household head. The characteristics of household conditions were represented by the variables roof type, floor type, number of household members, number of children attending school (maximum age being 21 years), per capita expenditure, and location of residence (urban or rural area).

From the total number of SUSENAS sample of 1,237,946 individuals (household members), individuals who were still enrolled in school or no longer enrolled in school were selected. Individuals who were no longer enrolled in school because they graduated from school were excluded, resulting in 436,375 individuals. Among the selected individuals, those whose highest level of education was elementary school or its equivalent during the survey and the 2020/2021 academic year, and who came from poor households, totaled 14,322 units of analysis at the elementary school level. Applying the same selection criteria—education level during the survey and the 2020/2021 academic year, and poor household status—resulted in 4,304 units of analysis at the junior high school level and 2,999 at the senior high school level. The selected analysis units from each education level were then grouped into two groups: the control group and the treatment group (Table 1). Individuals who were recipients of PIP were in the treatment group, while those who were not recipients of PIP were in the control group.

Table 1 Number of Research Analysis Units

Education Level	Group		Total
	Control Group	Treatment Group	
Elementary School	11,424	2,898	14,322
Junior High School	3,348	956	4,304
Senior High School	2,541	458	2,999
Total	17,313	4,312	21,625

Source: Processed by author

As shown in Table 1, in PSM, individuals who were recipients of PIP in the treatment group were matched with individuals who were not recipients of PIP in the control group based on observed characteristics represented by covariate variables (Khandker et al., 2010). As explained earlier, all covariate variables were transformed into propensity score which was the likelihood of an individual becoming a recipient of PIP. Furthermore, based on the propensity score value, matching was conducted between individuals who were PIP recipients (treatment) and individuals who were not (control) using the radius caliper method (0.01). The impact of PIP on the risk of dropout was estimated from the average treatment effect on the treated (ATT), which was the difference in potential outcomes in the form of the risk of dropout from the treatment and control groups.

RESULTS AND DISCUSSION

Based on the results of the probit regression estimation in the propensity score model, for individual's participation in PIP in Table 2, the variables of floor type, per capita expenditure per month, and location of residence significantly predicted individual's participation in PIP at all three levels of education. The variables of children's age, roof type, and the number of children aged 21 years and under who were enrolled in school were significant in the model for elementary and high school levels participation in PIP at all three levels of education. The variables child age, roof t The variables of the household head's number of years of schooling and the number of working hours during the week were significant at the elementary and junior high school levels. The variable of sex of the child was only significant at the elementary school level. The variables of sex of household head, age of household head, and number of household members were only significant in the model for senior high school levels.

From the estimation of the average treatment effect on the treated (ATT) in Table 3, it is evident that PIP had a significant impact on reducing the dropout rates of students from poor households at all education levels. At the elementary school level, PIP recipients showed a dropout rate lower than that of non-recipients by 0.34 percentage point. At the junior high school level, PIP recipients exhibited a dropout rate that was lower than that of non-recipients by 2.11 percentage point. At the senior high school level, PIP recipients showed a reduced risk of dropping out compared to non-recipients by 2.04 percentage point.

The results of this study indicate that cash transfer programs in the education sector can improve the welfare of households that were recipients of these programs by generating additional income from cash transfers, leading to a higher level of satisfaction in household consumption of goods and services. Thus, households can increase their investment in education by allocating more time for school-aged household members to pursue education (Skoufias, 2005). School enrollment will increase as the likelihood of dropout

Table 2 Propensity Score Model of PIP Participation

Covariate Variable	Treatment variable: PIP Recipient (1: Yes; 0: No)		
	Model 1 (Elementary School)	Model 2 (Junior High School)	Model 3 (Senior High School)
Sex of the child	-0.0502**	0.0009	-0.0485
(1: Male, 0: Female)	(0.0240)	(0.0428)	(0.0565)
Child age (years)	0.0820***	-0.0339	-0.0510*
	(0.0077)	(0.0248)	(0.0260)
Sex of HoH	0.0264	-0.0620	0.2652***
(1: Male, 0: Female)	(0.0424)	(0.0736)	(0.0980)
Age of HoH (years)	-0.0003	0.0013	0.0067**
	(0.0013)	(0.0024)	(0.0033)
Number of years of schooling of HoH (years)	-0.0129***	-0.0111**	-0.0074
	(0.0032)	(0.0056)	(0.0072)
Number of working hours per week (hours)	0.0023***	0.0020*	0.0005
	(0.0007)	(0.0012)	(0.0015)
Roof type	0.1458***	0.1386	0.2699*
(1: tile/zinc/asbestos/concrete, 0: others)	(0.0557)	(0.1130)	(0.1564)
Floor type	-0.0817***	-0.0963*	-0.1212*
(1: tile/marble/ceramic/parquet/vinyl, 0: others)	(0.0298)	(0.0519)	(0.0688)
Number of household members	0.0019	0.0051	-0.0606***
	(0.0083)	(0.0146)	(0.0194)
Number of children attending school (<=21 years old)	-0.0409***	0.0201	0.0890***
	(0.0130)	(0.0220)	(0.0284)
Monthly per capita expenditure (ln)	-0.2700***	-0.2683***	-0.4533***
	(0.0492)	(0.0886)	(0.1159)
Location of residence (1: *urban*, 0: *rural*)	0.2769***	0.1746***	0.2548***
	(0.0291)	(0.0512)	(0.0654)
Constant	1.7464***	2.9364**	5.0347***
	(0.6424)	(1.1980)	(1.5847)
Number of observations	14.322	4.304	2.999
LR $\chi^{(2)}$ (12)	278.23	33.28	55.96
Prob. > χ^2	0.0000	0.0009	0.0000
Pseudo R^2	0.0193	0.0073	0.0218
Balancing Property	*satisfied*	*satisfied*	*satisfied*

Description:
HoH: Head of Household
Standard error in parentheses ()
*** p-value<0.01, ** p-value<0.05, * p-value<0.1

Source: Processed by researchers

decreases. According to Casco (2022), cash transfers can influence household decisions, where households tend to prefer that their children participate in school activities rather than working.

The findings of this study are in line with the results of research on the impact of PIP on educational attainment in the period before the COVID-19 pandemic conducted by Setyadharma (2018) and Listiyanto and Qibthiyyah (2022), which found that PIP had a significant impact on reducing dropout rates. The results of this study are also consistent with findings on the impact of cash transfers on dropout reduction in Argentina, Malawi, China, and Pakistan (Churchill et al., 2021; Edo & Marchionni, 2019; Kilburn et al., 2017; Mo et al., 2013). However, the results of this study slightly disagree with the findings of studies at the beginning of the COVID-19 pandemic, which showed that PIP only significantly reduced the risk of dropout in secondary education (Samalo & Jasmina, 2024). In contrast, the results of this study showed that in the second year of the pandemic, PIP also significantly reduced the risk of dropout at all levels of education, including elementary school.

Even though PIP significantly reduced the risk of dropout at all levels of education, the significance of the impact varied across levels. Based on the ATT values in Table 3, the ATT for elementary school was lower compared to the ATT for junior high and senior high schools, indicating that the impact of PIP on dropout rates at the elementary school level is relatively small. The impact of PIP during the second year of the COVID-19 pandemic was found to be slightly better than that during the first year of the COVID-19 pandemic. The work of Samalo and Jasmina (2024) showed that PIP did not have a significant impact on the risk of dropout at the elementary school level in 2021. Based on *Dapodik* data, in the 2021/2022 school year

Table 3 Average Treatment Effect on the Treated (ATT)

Education Level	*Treated*	*Controls*	ATT	*Standard error*
Elementary school	0.0000	0.0034	-0.0034***	0.0005
Junior high school	0.0042	0.0253	-0.0211***	0.0035
High school	0.0000	0.0204	-0.0204***	0.0033

Description:
*** p-value<*0*.01, ** p-value<*0*.05, * p-value<*0*.1

Source: Processed by the author

there was a decrease in the total dropout rate (from elementary school to senior high school or vocational school) by 9.37% compared to the 2020/2021 school year. The decrease even reached 13.03% at the elementary school level, although the number of dropouts in elementary schools was relatively large, reaching 38,716 students (Kemendikbudristek, 2021, 2022).

Compared to a similar program, which was BSM, from the previous period, the results of this study showed that the pattern of the impact was not significantly different. There was a tendency that the higher the level of education, the greater the impact of the program on dropout rates. Yulianti (2015) in her study on the impact of BSM on dropout rates found that BSM significantly reduced dropout rates in elementary, junior high, and senior high schools by 0.4 percentage points, 1.1 percentage points, and 2.5 percentage points, respectively. The study by Listiyanto and Qibthiyyah (2022) shows that the impact of PIP on dropout rates in junior and senior high school tends to be greater than the impact at the elementary school level.

The results of this study indicate that the government should pay greater attention to all levels of education, from elementary to secondary levels, ensuring that the positive impact of PIP can be optimized to increase school participation and reduce overall dropout. The positive impact of PIP implementation on educational attainment can be optimized by expanding the coverage of PIP beneficiaries, namely by increasing the number of students receiving assistance and increasing the amount of cash assistance provided to students. In addition, it is crucial to develop a system to monitor and evaluate the use of cash assistance by program beneficiaries to ensure that cash assistance is used as intended.

CONCLUSION

The PIP policy has both significant and negative impacts on the risk of children dropping out of school. PIP recipients have a lower risk of dropout compared to individuals who are not enrolled in the program, at the elementary, junior high, and senior high school levels. Therefore, the government should continue the program to ensure that educational attainment at the elementary and secondary levels can be improved.

The use of SUSENAS data in March 2022 in this study allows for an in-depth exploration of the impact of PIP during the COVID-19 pandemic in Indonesia. The findings on the impact of PIP on the risk of dropout in this study only apply to this period. Significant different results may be found if the analysis is conducted in other periods, especially during normal periods, both before and after the COVID-19 pandemic. In addition to PIP, the government of Indonesia also implemented other assistance programs during the COVID-19 pandemic, such as PKH and internet quota assistance. However, the impact of these programs was not analyzed in this study. These limitations have been minimized through the use of propensity score matching (PSM), which reduces the confounding effect of other factors outside the focus of the study. While PSM can only reduce bias from observable characteristics, bias from unobservable characteristics has not been eliminated. Thus, the results of the estimation of the impact of PIP on school dropout are closer to the true effect of the program.

Future research could analyze the impact of PIP after the COVID-19 pandemic and compare the impact of PIP between periods. To produce better impact estimates with minimal bias, it is recommended to explore other quasi-experimental methods, such as difference-in-differences (DID), a combination of propensity score matching with difference-in-differences (PSM-DID), instrumental variables (IV), and regression discontinuity design (RDD). To obtain a more comprehensive picture of the impact of PIP, future research could use other educational attainment variables, such as the propensity to continue education to a higher education level, household expenditure on education, grades, children's participation in work, as well as other social variables such as early marriage and teenage birth rates. The impact of PIP should be analyzed more closely by considering gender, area of residence (urban or rural), region (Java and outside Java), and its impact on educational achievement at the tertiary level.

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REFERENCES

Araujo, M. C., Martinez, M. A., Martinez, S., Perez, M., & Sanchez, M. (2021). Do larger school grants improve educational attainment? Evidence from urban Mexico. *Journal of Development Effectiveness*, *13*(4), 405-423. https://doi.org/10.1080/19439342.2021.1968933

Baird, S., Ferreira, F. H. G., Özler, B., & Woolcock, M. (2014). Conditional, unconditional and everything in between: a systematic review of the effects of cash transfer programs on schooling outcomes. *Journal of Development Effectiveness*, *6*(1), 1-43. https://doi.org/10.1080/19439342.2014.890362

Behrman, J. R., Gallardo-García, J., Parker, S. W., Todd, P. E., & Vélez-Grajales, V. (2012). Are conditional cash transfers effective in urban areas? Evidence from Mexico. *Education Economics*, *20*(3), 233-259. https://doi.org/10.1080/09645292.2012.672792

BPS. (2022). *Education Statistics 2022*. Central Bureau of Statistics (BPS).

BPS. (2023). *People's Welfare Indicators 2023*. Central Bureau of Statistics (BPS).

Cahyadi, N., Hanna, R., Olken, B. A., Prima, R. A., Satriawan, E., & Syamsulhakim, E. (2020). Cumulative impacts of conditional cash transfer programs: Experimental evidence from Indonesia. *American Economic Journal: Economic Policy*, *12*(4), 88-110. https://doi.org/10.1257/pol.20190245

Cameron, L. (2009). Can a public scholarship program successfully reduce school drop-outs in a time of economic crisis? Evidence from Indonesia. *Economics of Education Review*, *28*(3), 308-317. https://doi.org/10.1016/j.econedurev.2007.09.013

Caniago, P., Elfindri, E., & Sari, D. T. (2021). Education cash transfer and high school enrollment in Indonesia. *Economics Development Analysis Journal*, *10*(2), 184-204. https://doi.org/10.15294/EDAJ.V10I2.43922

Casco, J. L. (2022). Household choices of child activities in the presence of cash transfers. *Journal of Economic Behavior & Organization*, *196*, 524-545. https://doi.org/10.1016/j.jebo.2022.02.017

Catubig, Ma. C. L., & Villano, R. A. (2017). Conditional cash transfers and school outcomes: An evaluation of the Pantawid Pamilyang Pilipino Program in Davao Oriental, Philippines. *Asian Economic Journal*, *31*(4), 403-421. https://doi.org/10.1111/asej.12137

Churchill, S. A., Iqbal, N., Nawaz, S., & Yew, S. L. (2021). Unconditional cash transfers, child labor and education: theory and evidence. *Journal of Economic Behavior & Organization*, *186*, 437-457. https://doi.org/10.1016/j.jebo.2021.04.012

Edo, M., & Marchionni, M. (2019). The impact of a conditional cash transfer program on education outcomes beyond school attendance in Argentina. *Journal of Development Effectiveness*, *11*(3), 230-252. https://doi.org/10.1080/19439342.2019.1666898

Evans, D. K., Gale, C., & Kosec, K. (2023). The educational impacts of cash transfers in Tanzania. *Economics of Education Review*, *92*, 102332. https://doi.org/10.1016/j.econedurev.2022.102332

Ferreira, F. H. G., Filmer, D., & Schady, N. (2017). Own and sibling effects of conditional cash transfer programs: Theory and evidence from Cambodia. *Research on Economic Inequality*, 25, 259-298. https://doi.org/10.1108/S1049-258520170000025008

Filmer, D., & Schady, N. (2014). The medium-term effects of scholarships in a low-income country. *Journal of Human Resources*, *49*(3), 663-694. https://doi.org/10.3368/jhr.49.3.663

Fiszbein, A., & Schady, N. (2009). *Conditional cash transfers: Reducing present and future poverty*.

Gaentzsch, A. (2020). Do conditional cash transfers (CCTs) raise educational attainment? An impact evaluation of Juntos in Peru. *Development Policy Review*, *38*(6), 747-765. https://doi.org/10.1111/dpr.12468

García, S., & Saavedra, J. (2022). *Conditional cash transfers for education* (NBER Working Paper No. 29758). https://doi.org/10.3386/w29758

Giang, L. T., & Nguyen, C. V. (2017). How would cash transfers improve child welfare in Viet Nam? *Children and Youth Services Review*, *82*, 87-98. https://doi.org/10.1016/J.CHILDYOUTH.2017.09.003

Glewwe, P., & Kassouf, A. L. (2012). The impact of the Bolsa Escola/Familia conditional cash transfer program on enrollment, dropout rates and grade promotion in Brazil. *Journal of Development Economics*, *97*(2), 505-517. https://doi.org/10.1016/J.JDEVECO.2011.05.008

Glewwe, P., Lambert, S., & Chen, Q. (2020). Education production functions: updated evidence from developing countries. In S. Bradley & C. Green (Eds.), *The Economics of Education: A Comprehensive Overview* (2nd ed., pp. 183-215). Academic Press. https://doi.org/10.1016/B978-0-12-815391-8.00015-X

Ibarrarán, P., Medellín, N., Regalia, F., & Stampini, M. (2017). *How conditional cash transfers work: Good practices after 20 years of implementation*. Inter-American Development Bank.

Indrawati, M., Prihadi, C., & Siantoro, A. (2020). *The Covid-19 pandemic impact on children's education in disadvantaged and rural areas across Indonesia. International Journal of Education (IJE)*, *8*(4), 19-34. https://doi.org/10.5121/ije.2020.8403

Kartasasmita, F. P., & Sulistyaningrum, E. (2021). *The impact of school operational assistance program implementation at school level on senior secondary education enrollment by households: Evidence from Indonesia in 2007 and 2014*. *Economics and Finance in Indonesia*, *67*(2), 163. https://doi.org/10.47291/efi.v67i2.846

Ministry of Religious Affairs. (2024). *Monitoring, reporting, and complaints service site for the implementation of the smart Indonesia program (PIP) for Madrasah students at the Ministry of Religious Affairs of the Republic of Indonesia Indonesia (SIPMA): National Disbursement for Fiscal Year 2022.* https://pipmadrasah.kemenag.go.id/home/nasional

Ministry of Education and Culture (2020). *Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 10 of 2020 on the Smart Indonesia Program*. Ministry of Education and Culture.

Ministry of Education and Culture (2021). *Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 1 of 2021 concerning Admission of New Learners in Kindergartens, Elementary Schools, Junior High Schools, Senior High Schools, and Vocational High Schools*.

Ministry of Education. (2019). *Education Data Overview 2018-2019*. Ministry of Education, Culture, Research and Technology.

Ministry of Education. (2021). *Education Data Overview 2020-2021*. Ministry of Education, Culture, Research and Technology.

Ministry of Education. (2022). *Education Data Overview 2021-2022*. Ministry of Education, Culture, Research and Technology.

Ministry of Education. (2023). *Education Data Overview 2022-2023*. Ministry of Education, Culture, Research and Technology.

Ministry of Education. (2024). *Indonesia Pintar Information System (SIPINTAR Enterprise): National Distribution in 2022.* https://pip.kemdikbud.go.id/penyaluran/nasional?tahun=2022

Ministry of National Development Planning/BAPPENAS. (2014). *Social Protection in Indonesia: Challenges and Future Directions*. Ministry of National Development Planning/National Development Planning Agency (BAPPENAS).

Ministry of National Development Planning/BAPPENAS. (2017). *Translation of the Global Goals & Targets of the Sustainable Development Goals (SDGs)*. Ministry of National Development Planning / Development Planning Agency (BAPPENAS).

Khandker, S. R., Koolwal, G. B., & Samad, H. A. (2010). *Handbook on Impact Evaluation: Quantitative Methods and Practices*. The World Bank. https://doi.org/10.1596/978-0-8213-8028-4

Khandker, S. R., Samad, H. A., Fuwa, N., & Hayashi, R. (2021). *The female secondary stipend and assistance program in Bangladesh: What did it achieve?* (ADB South Asia Working Paper Series No. 81). https://doi.org/10.22617/WPS210021-2

Khiem, P. H., Linh, D. H., Tai, D. A., & Dung, N. D. (2020). Does tuition fee policy reform encourage poor children's school enrollment? Evidence from Vietnam. *Economic Analysis and Policy*, *66*, 109-124. https://doi.org/10.1016/J.EAP.2020.03.001

Kilburn, K., Handa, S., Angeles, G., Mvula, P., & Tsoka, M. (2017). Short-term impacts of an unconditional cash transfer program on child schooling: Experimental evidence from Malawi. *Economics of Education Review*, *59*, 63-80. https://doi.org/10.1016/J.ECONEDUREV.2017.06.002

Listiyanto, H. A., & Qibthiyyah, R. M. (2022). The impact of school voucher program on school dropouts in Indonesia. *JPBM (Journal of Business and Management Education)*, *8*(2), 113-127. https://doi.org/10.17977/um003v8i22022p113

Meza-Cordero, J. A. (2023). Conditional cash transfers tools to combat child labor: Evidence from a randomized controlled trial in Costa Rica. *Review of Development Economics*, *27*(1), 220-246. https://doi.org/10.1111/rode.12949

Millán, T. M., Barham, T., Macours, K., Maluccio, J. A., & Stampini, M. (2019). Long-term impacts of conditional cash transfers: Review of the evidence. *The World Bank Research Observer*, *34*(1), 119-159. https://doi.org/10.1093/wbro/lky005

Mo, D., Zhang, L., Yi, H., Luo, R., Rozelle, S., & Brinton, C. (2013). School dropouts and conditional cash transfers: Evidence from a randomized controlled trial in rural China's junior high schools. *The Journal of Development Studies*, *49*(2), 190-207. https://doi.org/10.1080/00220388.2012.724166

Mostert, C. M., & Vall Castello, J. (2020). Long run educational and spillover effects of unconditional cash transfers: Evidence from South Africa. *Economics & Human Biology*, *36*, 100817. https://doi.org/10.1016/J.EHB.2019.100817

Mulyaningsih, T., Dong, S., Miranti, R., Daly, A., & Purwaningsih, Y. (2022). Targeted scholarship for higher education and academic performance: Evidence from Indonesia. *International Journal of Educational Development*, *88*, 102510. https://doi.org/10.1016/J.IJEDUDEV.2021.102510

Peruffo, M., & Ferreira, P. C. (2017). The long-term effects of conditional cash transfers on child labor and school enrollment. *Economic Inquiry*, *55*(4), 2008-2030. https://doi.org/10.1111/ecin.12457

Sabates, R., Bhutoria, A., Sabates-Wheeler, R., & Devereux, S. (2019). Schooling responses to income changes: Evidence from unconditional cash transfers in Rwanda. *International Journal of Educational Research*, *93*, 177-187. https://doi.org/10.1016/J.IJER.2018.11.011

Samalo, N. A., & Jasmina, T. (2024). The Effect of Educational Cash Transfer for Students From Low-Income Families on Students' Dropout Rate in Indonesia. *The Asian Conference on Education & International Development 2024 Official Conference Proceedings.* https://doi.org/10.22492/ISSN.2189-101X.2024.65

Schwerdt, G., & Woessmann, L. (2020). Empirical methods in the economics of education. In S. Bradley & C. Green (Eds.), *The Economics of Education: A Comprehensive Overview* (2nd ed., pp. 3-20). Academic Press. https://doi.org/10.1016/B978-0-12-815391-8.00001-X

Secretariat General of the Ministry of Education and Culture. (2022). *Regulation of the Secretary General of the Ministry of Education, Culture, Research, and Technology Number 14 of 2022 concerning Guidelines for the Implementation of the Indonesia Pintar Program for Primary Education and Secondary Education*. Secretariat General of the Ministry of Education, Culture, Research and Technology.

Setyadharma, A. (2018). Government's cash transfers and school dropout in rural areas. *JEJAK*, *11*(2), 447-461. https://doi.org/10.15294/jejak.v11i2.16125

Skoufias, E. (2005). *PROGRESA and its impacts on the welfare of rural households in Mexico (Research Report No. 139)*. International Food Policy Research Institute.

Sparrow, R. (2007). Protecting education for the poor in times of crisis: An evaluation of a scholarship program in Indonesia. *Oxford Bulletin of Economics and Statistics*, *69*(1), 99-122. https://doi.org/10.1111/j.1468-0084.2006.00438.x

Sulistyaningrum, E. (2016). Impact evaluation of the School Operational Assistance Program (BOS) using the matching method. *Journal of Indonesian Economy and Business*, *31*(1), 33. https://doi.org/10.22146/jieb.10319

TNP2K (2018). *Government Assistance Programs for Individuals, Families, and Disadvantaged Groups Towards Integrated Social Assistance*. National Team for the Acceleration of Poverty Reduction (TNP2K).

Ulfa, M. F., & Rezki, J. F. (2024). The impact of the Indonesia Pintar Program on school participation. *Economics Development Analysis Journal*, *13*(1), 140-151. https://journal.unnes.ac.id/sju/edaj/article/view/78953

Wardani, A. N., & Baryshnikova, N. V. (2019). *Impacts of Indonesian Bantuan Siswa Miskin (BSM) on senior secondary child schooling and working* (Working Paper No. 2019-8). https://media.adelaide.edu.au/economics/papers/doc/wp2019-08.pdf

Wardani, A. N., Baryshnikova, N. V., & Jayawardana, D. (2022). Do secondary school children stay in school and out of the labor market in the presence of an educational cash transfer? *Education Economics*, *30*(6), 612-623. https://doi.org/10.1080/09645292.2022.2027874

Yulianti, N. R. (2015). *The Functioning and Effect of a Cash Transfer Program in Indonesia* [Thesis, Erasmus University Rotterdam]. http://hdl.handle.net/2105/33409

Zhou, L., Jiang, B., & Wang, J. (2020). Do cash transfers have impacts on student academic, cognitive, and enrollment outcomes? Evidence from rural China. *Children and Youth Services Review*, *116*, 105158. https://doi.org/10.1016/J.CHILDYOUTH.2020.105158