J D E
Journal of Developing Economies

INVESTIGATING THE NEXUS OF CHILD MARRIAGE AND ECONOMIC GROWTH IN INDONESIA

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ABSTRACT

The issue of ending child marriage attracts global attention, especially in developing countries. However, the link between married children and economic growth remains in question. The purpose of this article is to utilize regional macroeconomic indicators to quantify the association between child marriages and the Indonesian economy. The analysis shows a negative relationship between marriage at a young age and the economy using panel regression and simultaneous equations model. The results also demonstrate that marriage at an early age might decrease economic growth, as it has an undesirable effect on health and education. Therefore, this paper delivers a suggestion related to the policy strategies, primarily educational policies and health, that support the Indonesian Government in ending child marriage.

Keywords: Child Marriage, Economic Growth, Health, Education

JEL: I15; I25; O11

Introduction

Child marriage is believed to be one of the most severe violations of human rights (UNICEF, 2023) as more and more countries are taking much concern on this particular issue. UNICEF reported that 20% of girls in emerging and developing countries married before 18 years old in 2021. Some say that having a marriage below 18 is also associated with poverty or even family welfare. Others believe it harms human capital, might harm mothers' health, and reduces women's decision-making power (Wodon et al., 2017). Therefore, ending child marriage by 2030 has been put as one of the Sustainable Development Goals (SDGs) (UNICEF, 2021).

Lately, extensive research has shown that child marriage may have an impact on teenagers' education. Teenagers who get married before turning 18 could alter their educational path in school. According to Field & Ambrus (2008), the likelihood that a girl will complete her secondary education may drop by 4 to 6% for every year she marries before turning

18 (Nguyen & Wodon, 2015). Aside from a change in the children's educational trajectory, child marriage may have an undesirable impact on educational attainment. Child marriage significantly reduces secondary school completion rates (Wodon et al., 2017). Marriage at 17 diminishes the chance of completing secondary education by 4.6%. The earlier a female marries, the more negative the consequences. In Sub-Saharan Africa, girls who marry before age 12 have a 12.3 % points lower chance of completing school compared to those who marry at 18 or older.

In addition, marriage at a young age also significantly affects health. Child marriage might harm the mother's health or even have an undesirable impact on the children's health. UNICEF (2020) reported that girls who marry under their 18th birthday 18 are between two and five times more likely to die from pregnancy-related complications compared to women in their twenties. This report also revealed that babies who are born from mothers who are married below 18 are less likely to survive well. These babies are also likely deprived of stunting in the future. The other literature also proves that life-threatening pregnancy and childbirth could be experienced by women who have early marriage compared to others as they could have a higher probability of maternal mortality. It is because early marriage women are connected with fewer prenatal checks and are less likely to have a medically supervised birth, leading to an increased likelihood of her children dying before the age of 18 (Cameron et al., 2023).

Health and education are the foremost human capital indicators in the growth model that determine economic growth. Barro (1991) demonstrated the link per capita economic growth to various macroeconomic indicators, including human capital, government consumption, and public investment. In assessing the growth model, there are some other determinant variables included in the growth model to expand economic growth, such as corruption (Mauro, 1995), income disparities (Gonzales et al., 2015) as well as social norms (Cole et al., 1992). Furthermore, an increasing concern on the issue of child marriage on economic growth, a growth model also induced this child marriage indicator. By eliminating possible endogeneity problems through the induction of health and education as channels in the removal of endogeneity problems, Mitra (Mitra et al., 2020) has demonstrated the relationship between child marriage and economic growth among countries.

Several studies have confirmed the growth model's connection between economic development and marriage among children. Expanding Sala-i-Martin et al.'s (2004) cross-country development model (Mitra et al., 2020) convincingly demonstrates the adverse association between child marriage and economic growth in 112 countries. The endogeneity problem will likely arise when assessing the association between child marriage and economic growth. However, it can be addressed by estimating the model using the three-stage least-squares method. Although there has been evidence across countries, more than sufficient confirmation of the link between child marriage and economic growth in particular countries might deceive the fact that early marriage has a pivotal role in economic growth.

Notably, child marriage has been observed across several low-income countries. Studies have primarily focused on the main reason for child marriage, as well as specific socioeconomic indicators in global trends. However, a previous study analyzed the lives of women and men who married young in Indonesia and discovered that child marriage is linked to lower academic achievement and wages for both boys and girls (Cameron et al., 2023). Furthermore, they argue that moms below the age of 18 are less likely to go through a clinically supervised prenatal, so their children have greater chances of dying or performing poorly on cognitive assessments. Although some researchers have looked into evidence of child marriage, the association between child marriage and economic growth remains unclear.

In addition, regarding the significant role of investing human capital in female youngsters, investing in girls' education yields substantial returns. Research from the World Bank shows that a girl's additional year of secondary education increases her earnings by 15–25% (Psaki et al., 2021). In Indonesia, addressing child marriage would not only enable more girls to access education but would also help create a more skilled and economically productive workforce. Although determining the ideal structure for a growth model is difficult, we can reasonably assume that child marriage is correlated with critical factors that influence growth, such as health and education.

Therefore, this study examines the potential association between economic growth and child marriage in Indonesia. It employs panel data across 30 provinces. This study begins by explaining the study's background, examining the literature and its strategy, and concluding by enlightening the results and concluding in the last section of the study. In short, our study discovered a negative association between child marriage and economic growth, applying a three-stage least-squares approach to address the issue of endogeneity.

Literature Review

Child marriage is described as a marriage that takes place before the age of 18 years (UNICEF, 2020). The Central Statistics Agency defines child marriage as a union that contravenes civil law, religious norms, or customary practices and may occur with or without official registration or approval, involving one or both partners who are under 18 years of age (Hakiki et al., 2020). Child marriage is a violation of children's rights and is considered a form of violence against them. Children who are forced to get married prior to the age of 18 are more at risk in terms of their ability to attend college, their quality of health, their chances of experiencing violence, and their chance of living in poverty (Hakiki et al., 2020).

UNICEF (2021) noted that in 2018, around 650 million girls were married before the turn of 18. Their report noted that in 2018, around 1,220,900 girls married before they turned 18. It made Indonesia the 10th country with the highest absolute rate of child marriage in the world. So, it might become a serious problem if the Indonesian Government does not stop child marriages soon, as child marriages have adverse impacts on individuals or even the economy.

Although both girls and boys can suffer from the adverse effects of child marriage, the majority of cases are girls, and young women experience its adverse implications. Their gender as females renders them more vulnerable, raising their chances of getting married young (Natanael et al., 2013). The vast majority of the research on child marriage is based on empirical investigations of girls in poor nations. In terms of gender equality, child marriage is not prevalent among boys. It could be related to conventional beliefs and practices, in which girls are frequently found as leverage to protect the family from financial strain through child marriage (Natanael et al., 2013). Currently, research on child marriage primarily focuses on girls and the consequences they face as a result of this practice, as marriage at a young age for girls has many consequences for females, especially starting with physical conditions related to health, fertility, status, and power in the family (Jensen & Thornton, 2003).

Many factors encourage child marriage in developing countries. Several previous studies grouped the interrelated factors driving child marriage into several groups, namely poverty and economic factors, lack of opportunity, social norms and attitudes, girls' lack of agency in the family, and lack of information regarding sexual health (Psaki et al., 2021; Razu, 2018; Faroque et al., 2016; Paul, 2020). Another study about child marriage concluded that factors driving high numbers of child marriages include social and cultural norms and low

levels of income, education, and family and community health (Mitra et al., 2020). Most of these studies were conducted in developing countries such as Bangladesh, Nepal, and India, where rates of child marriage remain high.

Child Marriage and Economic Conditions

The high rate of child marriage has numerous consequences. Many previous studies have looked at the impact of child marriage, and it affects many aspects, including economic, social, and health status (Parsons et al., 2015). The impact of child marriage on economic conditions has been analyzed through 4 channels, namely engaging and choice-making, educational achievement, participation in the workforce, violence, and health (Parsons et al., 2015). Other studies measure child marriage's impact on economic growth. There are several channels through which child marriage can affect growth. Research identifies five main channels: health, education, fertility, labor force participation, and decision-making (Wodon, 2018; Mitra et al., 2020). Mitra (2020) suggested combining those five channels into health, education, and labor force participation channels to avoid overlapping on estimation. According to the analysis, prohibiting child marriage will greatly boost economic growth. Reducing child marriage now would result in a 1.05% rise in overtime real per capita GDP growth in developing and emerging nations.

The first channel through which child marriage affects economic growth is education. Girls who marry young frequently stop attending formal schooling and education, which means they stop learning lifelong skills and information to help them be useful members of their families and communities (Parsons et al., 2015). According to Nguyen & Wodon (2015), the likelihood that girls will complete secondary education can drop by 4–6 percentage points for every year of early marriage before the age of 18, with the number of years of early marriage sometimes having an effect. Reduced incomes and productivity are two ways to quantify the economic effects of girls' lower educational achievement. Limiting a girl's access to education hinders her employment opportunities and skill development (Parsons et al., 2015).

The second channel is health. Child marriages have a terrible effect on the health of the women involved. Child brides are more prone to engage in forced sexual intercourse because they lack self-worth and a sense of control over their bodies (Singh, 2017). Pregnancy, labor, and the health of the children are all significantly impacted by child marriage. Women who marry as children typically give birth to their first kid more than three years before other women. As a result, they become pregnant and have more kids (Cameron et al., 2023).

The third one is labor force participation. A reduction in the expected returns from engaging in paid work due to lower educational attainment and an increase in the relative value of unpaid household work due to higher lifetime fertility are two ways that child marriage may affect female labor force participation (Klasen & Pieters, 2012). In addition to the long-term effects on women and their families, low labor force participation may also negatively impact the overall economic prosperity of communities (Chaaban & Cunningham, 2011; Smith & Haddad, 2015).

Child marriage is very highly associated with inequalities and poverty. It was found by Wodon (2018) that if child marriage ended by 2030, the 106 EMDC groups would save an average of $300 billion annually from 2015 to 2030, or $75 billion, due to reduced population growth. Every year, children's health improves. They also estimated that EMDCs would gain an average of 1% of household income through increased wages and benefits by 2030. Child marriage also contributes to rising poverty rates in the United States (Dahl, 2010). This statement is supported by a study conducted by the International Centre for Women's Studies of the World Bank (Wodon et al., 2017). The increase in the poverty rate due to early marriage

is due to the decrease in women's work due to family care and care work, which leads to them being employed at low wages and unstable working conditions. In addition to increasing poverty, child marriage also affects family income levels and family well-being. Child marriage can limit women's income and productivity through higher birth rates and lower levels of education (Abdullah et al., 2015; Singh, 2017).

Data and Research Methods

This study aims to examine the nexus between child marriage and economic growth in Indonesia. From 2015 to 2021, it will investigate an Indonesian province. The investigation employed provincial panel data to examine the association between youth marriage and economic growth. This study uses Central Bureau of Statistics (BPS) data. Table 1 summarizes all of the factors used in this research.

Table 1: Explanatory Variables

Variables	Descriptions
GDP real	Real GDP in PPP terms
Child Marriage	Proportion of women aged 20 to 24 who marriage earlier than the age of 18 (in percentage).
Human Development Index	measured through four indicators, namely the human development index, life expectancy, literacy rate and adjusted real expenditure per capita.
Life Expectancy	Women's life expectancy
School Participation Rate	the pure high school enrolment rate
Government Expenditure	Total government expenditure
Household Consumption	Household consumption expenditure refers to how much money individuals spend on goods and services for their own personal consumption.
Investment	inventory controlled by the producing unit for use in further processes, sale, or giving to other parties, or use in other ways.
Net Export	Level of export minus import

This study's analysis is divided into several stages. First, it investigates the link between child marriage and the improvement of the economy. Second, it examines the interdependence of child marriage and economic growth determinants.

In this study, Mitra's (Mitra et al., 2020) empirical approach was used to inspect the association between marriage at a young age and economic growth, employing the child marriage index as a control variable in the economic growth equation. Considering that quantitative analysis between child marriage and growth has yet to be widely conducted, this study exemplifies Mitra's economic model of child marriage. The economic growth model used in this study is the Bayesian economic growth model by Sala-i-Martin et al. (2004), which aims to overcome the possibility of causality bias in the estimates that arise. The equation used is as follows:

$$G_{t,T+t} = \theta_0 + \theta_1 \ln(y_t) + \theta_2 CM_t + \gamma X_t + \varepsilon_t \qquad (1)$$

where $G_{t,T+t}$ is economic growth in year t; y_t is real GDP per capita in year t; CM_t is the number of child marriages in year t; X_t and is another control variable that affects the level of economic growth in year t. The control variables used in the economic growth equation are also related to the Bayesian model averaging by Sala-i-Martin et al. (2004). *Bayesian Model Analysis* is a Bayesian method identifying which variables impact economic growth most.

The second analytical task of this study is to identify the mutual relationship between child marriage and economic growth factors. As discussed in the prior section, the relationship between early marriage and economic development can be explained in five ways: transportation, education, birth, labor participation, and decision-making. However, Mitra combined the five channels into two channels: the health channel and the education channel. Health and fertility are closely related, as are educational and employment opportunities. Moreover, another study found that while early marriage reduces household income and well-being, it has little effect on women's labor market participation (Wodon, 2018). Here, the latter is more appropriate to the educational level of the girl. Health affects decision-making (e.g., HIV/AIDS) and education (Mitra et al., 2020).

Considering the endogeneity problem that may arise by incorporating the child marriage incidence variable directly into the economic growth equation, this study also estimates the relationship between the two variables using the three-stage least squares method. The estimation model used refers to previous studies (Mitra et al., 2020; Wodon et al., 2017), namely:

$$G_{t,T+t} = \alpha_0 + \alpha_1 \ln(y_t) + \alpha_2 CM_t + \alpha_3 Educ_t + \alpha_4 AHH_t + \alpha X_t^1 + \varepsilon_t^1 \tag{2}$$

$$CM_t = \beta_0 + \beta_1 Educ_{t-h} + \beta_2 AHH_{t-h} + \beta X_t^2 + \varepsilon_t^2 \tag{3}$$

$$Educ_{t-h} = \gamma_0 + \gamma_1 CM_{t-2h} + \gamma_2 AHH_{t-2h} + \varepsilon_t^3 \tag{4}$$

where $G_{t,T+t}$ is economic growth in year t; y_t is real GDP per capita in year t; CM_t is the number of child marriages in year t; X_t and is another control variable that affects the level of economic growth in year t; $Educ_t$ is high school enrolment rate; dan AHH_t is woman life expectancy in Indonesia.

In contrast to previous studies, which used the Human Development Index as a proxy for the education variable, the education variable in this study is proxied by the pure high school enrolment rate. It refers to the 12 years compulsory education policy in Indonesia, stated in Universal Secondary Education (PMU), known as the '12 years compulsory education initiative'. The target of universal secondary education is every citizen aged 16 (sixteen) to 18 (eighteen) years, which means that every citizen aged 7-18 years is required to attend primary education up to high school (Siswanto, 2017). Meanwhile, as a proxy variable for health is women's life expectancy. Women's life expectancy was chosen rather than total life expectancy, considering that women are the subjects and parties most affected by child marriage (Natanael et al., 2013).

The use of lags in the Education and health variables in equations (3) and (4) shows the assumption that improvements in Education and health levels in the previous period can indicate improvements in the incidence of marriages before turning 18 (Mitra et al., 2020). Thus, this method can also overcome the endogeneity problem in the simultaneous model. Equations 2-4 are estimated using the three stages least squares method (3SLS). The structural equation is one of the equations stated in the system when using 3SLS estimation. The dependent variable is typically interpreted as a left-hand side variable in an equation with a disturbance term. All dependent variables are expressly assumed to be endogenous to the system and are handled as connected with disturbances in the equation system. The three-stage-least square method is estimated through the following stages:

Step 1. Develop instrumented values for all endogenous variables. These instrumented values can be considered as the predicted values resulting from a regression of each endogenous

variable on all exogenous variables in the system (Zellner & H. Theil., 1962). This stage is identical to the first step in 2SLS and is critical for the consistency of the parameter estimates.

Step 2. Determine instrumented values for all endogenous variables. These instrumented values are essentially the expected values from a regression of each endogenous variable on all exogenous variables in the system (Zellner & H. Theil, 1962). This stage is the same as the first step in 2SLS and is essential to the consistency of parameter estimations.

Step 3. Use the covariance matrix produced in the second stage for a generalized least squares estimation with the instrumented values replacing the right-hand-side endogenous variables.

Finding and Discussion

As shown in Table 2, the authors descriptively assessed the data image before estimating the model. The total number of observations used was 239 from 34 Indonesian provinces. The period of this study is from 2015 to 2021.

Table 2: Descriptive Statistics

Variable	Mean	Std. Deviation
Economic Growth	2.785	4.216
Life Expectancy	71.634	2.626
School Participation Rate	76.848	6.288
Human Capital Index	70.268	4.017
Child Marriage	11.886	4.664
Household Consumption	1.62e+08	2.57e+08
Government Expenditure	2.45e+07	3.61e+07
Investment	9.55e+07	1.41e+08
Net Export	1.50e+07	7.01e+07

We use growth models to estimate the connection between marriages at a young age and the economy, as presented in Table 3. First, we estimate the growth model by inducing only child marriage (GM1). The second model evaluates the nonlinearity effect on the growth model by including the square value of child marriage (GM2). In the third model, we estimated a growth model motivated by the Sala-i-Martin et al. (2004) growth model and included some additional variables as a control (GM3). In the fourth model (GM4), we estimate a model that induces child marriage in the Sala-i-Martin growth model.

Table 3: Growth Model with Child Marriage

Variables	GM1	GM2	GM3	GM4
log of the per capita GDP	-1.015*	-1.139**	-1.753*	-2.169**
Child Marriage	-0.616	-5.023*		-8.645**
Child Marriage (squared)		1.211*		2.182**
Human Capital Index (IPM)			-0.01	-0.107
Life expectancy (ahh)			0.174	0.225
School Participation Rate (apm_sma)			0.014	0.068
Government expenditure (gov_exp)			0.009**	-0.001**
Household Consumption (con_rt)			-0.006	-0.009
Investment (Modal)			0.003**	0.005**
Net Export (n_exp)			0.001*	0.001**

Note: GM1: Child marriage as the only control: GM2: Child marriage and its squared value as control: GM3:Growth model with control from Sala-i-Martin (2004);M4: Child marriage and growth factor as control. *P<0.10;**P<0.05

Looking at the results of some models, although the significance of child marriage in the first regression (GM1) was found to be insignificant, the relation among all models is consistent, a negative sign, which might indicate that the practice of child marriage might reduce economic growth. The first and second estimations try to estimate the relationship between child marriage and growth; from that estimation, it seems that child marriage (cm) and growth have a nonlinear correlation. It is because in the second estimation (GM2), a model that includes a squared form of child marriage (cmsq), child marriage negatively influences growth. It was found to be significant as well. Nonetheless, the R-square in the GM2 is relatively small, at only 0.03. A small number of R-squares associated with this have been omitted, and some vital variables in the model have been omitted as it only considers the child marriage variable in the model.

In the third and fourth estimation, in GM3 we estimate the determinant variable of economic growth in some other variable especially for Sala-i-Martin economic growth model. According to the result of estimation in GM3, it shows that some macroeconomic variable that such as per capita GDP (lnPDRBcap); government expenditure (gov_expn), investment (modal) and net export (n_exp) are significant to influence the economic growth. Different to those variables, the consumption in the regional level seems to have insignificant impact on growth. However, some variable related to human capital like human capital index (IPM), life expectancy (ahh_pr), and School Participation Rate (apm_sma) are fond insignificant in this model. In the GM4, we investigating the relation of child marriage (cm and lncmsq) in the Sala-i-Martin growth model. The result is also consistent to previous estimation GM1 and GM2, child marriage has a negative and considerable impact on economic progress. Furthermore, a macroeconomic determinant variable seems to be significant to influence the economic growth excluding some variable related to human capital which is consistent insignificant to influence economic growth.

In this stage, the coefficient of child marriage has a consistent nonlinear relationship with economic growth. However, these results could be an endogeneity problem as the connection between child marriage to poverty and inequality is encircled direction (Mitra et al., 2020). Although having a small economic growth associated with higher poverty and inequality may cause a higher child marriage, investing in people in poorer communities might combat child marriage and increase economic growth. Mitra et al. (2020) suggest that, in tackling the likelihood of the endogeneity problem, inducing human capital indicators through education and health indicators in the model and applying a lag of years in the human capital indicator might solve the indignity problem. Following Mitra et al. (2020), we also estimate the nexus of child marriage on economic growth and its fundamental growth factors. By employing the There-stage least square method and using instrument variable (IV), that corrects potential correlation in the estimation strategy following previous literature (Mitra et al., 2020; Wodon, 2018).

The result of the simultaneous method using 3SLS (Table 4) also confirms that the occurrence of child marriage in Indonesia has a nonlinear relationship, as the first coefficient of child marriage is negative and the squared value of child marriage is positive. The connection between child marriage and growth is U-shaped. This nonlinear relationship demonstrates the complex relationship between child marriage and economic growth. Several studies have discovered a U-shaped link between marriage among children and economic growth. This nonlinear link can be investigated by examining various stages of economic growth, how they affect societal behaviors, and the repercussions of child marriage.

Table 4: Simultaneous Equations Result

Growth(t, t+T)		Child Marriage (t)		Education (t-h)	
Gdpcap	-2.182**	Life expectancy	-0.047	Child Marriage	-0.741***
Child marriage (t)	-8.789**	School participation rate	-0.504***	Life expectancy	0.305*
Child marriage squared	2.204**	Gov. expenditure	-3.20e-08		
Life expectancy	0.176	Investment	-5.58e-09		
School participation	0.050	Household consumption	2.00e-09		
Gov. expenditure	-1.48e-07***	Net export	2.65e-09		
Investment	5.36e-08***				
Household consumption	-1.05e-08				
Net export	-1.45e-08*				
Intercept	17.735	Intercept	46.850***	Intercept	49.295***
p-value	0.042	p-value	0.0000	p-value	0.0000
r-squared	0.0965	R-squared	0.3393	R-squared	0.1980

Note: The columns give the results of 3sls simultaneous equation based on equation (2) (3) (4). While h is lag horizon.
***$p<0,01$; **$p<0.05$; *$p<0.1$

In the initial stage, numerous incidents of child marriage might arise due to economic constraints and traditional norms. Families may marry off their children to ease financial pressures and conform to societal conventions that encourage early marriage. After early marriage, brides tend to drop out of school and have barriers to entry into the labor market, limiting their economic contribution (Dietrich et al., 2022). As economies expand and develop, structural improvements, legal reforms, and improved socioeconomic conditions diminish child marriage rates, promoting additional economic growth. This dynamic highlights the vital need to tackle child marriage as part of overall economic development efforts (Pourtaheri et al., 2023).

The result also enlightens the role of education in reducing child marriage. The model of child marriage shows that health quality, represented by life expectancy, and education, represented by school participation rate, have decreased the increment of child marriage. Previous studies argue that a longer life expectancy suggests improved general health and access to healthcare (Dietrich et al., 2022). Child marriage rates are usually lower in regions with better health outcomes. Better health and longevity change cultural priorities away from early marriage and toward long-term investments in education and job development. Moreover, higher school enrolment and retention rates are directly related to lower child marriage rates. Education broadens females' economic prospects, making early marriage less attractive economically and socially.

The education equation shows the effect of child marriage on growth through the education channel. From the estimation result, we can see that the decrease in the incidence of lagged child marriage impacts growth through its effect on education later, as the coefficient is significant and negative. The effect of health on growth is smaller than that of education and is transmitted through the effect of health on education. Lagged health (life expectancy)

is significantly and positively correlated with education (school participation rate) (see Table 4). It means that improved child survival rates will lead to more child marriages (Mitra et al., 2020). It may be due to the absence of policy changes that improve income levels, education, and cultural values.

Conclusion

Child marriage has significant socioeconomic repercussions and is common in many emerging and developing nations. Its detrimental effects on incomes, health, education, population growth—and, more generally, poverty alleviation and economic inequality—have been well studied.

By using data from 34 provinces in Indonesia, we can see that child marriage is still a problem in Indonesia. A simultaneous equation model is applied to investigate the nexus between growth and child marriage. From the estimation result, reducing child marriage can improve economic growth. Child marriage affects economic growth in two ways: education and health. The result shows that better health quality, represented by life expectancy and school participation rate, has decreased the increment of child marriage. Different from a previous study, the nexus of child marriage incidence and economic growth is nonlinear. This nonlinear link can be explored by looking at different stages of economic growth and how it affects societal practices and consequences related to child marriage.

This study provides evidence that the government might use to develop strategies to reduce the number of child marriages in Indonesia. The estimation result shows that education policy must be a priority when developing strategies to lower the incidence of child marriage in Indonesia, as the interdependence relationship between education and child marriage is strong. Health policy is also essential to decrease child marriage levels in Indonesia, though indirectly, which is emphasized by the importance of better health outcomes in raising education and economic growth.

However, significant limitations must be acknowledged when interpreting the outcomes of this study. First, we analyze the relationship between early marriage and economic growth with pooled data and ignore time variance. In addition, the use of lag in model estimation does not go through a robustness check stage; it is only based on the author's trials, so it cannot be ascertained whether the lag variable is a good instrument variable. Third, the research period must capture the link between marriage among children and economic development. As a result, future studies can be supplemented with better data and some robustness checks in data analysis to understand the association between child marriage and economic growth.

Declaration

This research was fully supported by the Department of Economics, Faculty of Economics and Business, Airlangga University, Indonesia. Green Living Support, an environmental protection organization in East Java, is also a discussion partner organization.

Conflict of Interest

The authors declare that there are no financial or personal relationships that could be perceived as a conflict of interest in conducting and presenting this research. The Department of Economics at Airlangga University and Green Living Support have supported this study to advance knowledge and promote sustainable practices without any influence on the research outcomes.

Availability of Data and Materials

Authors' Contribution

MSR, RD and NFR conceptualized the study. NFR and MSR created the methodology. MSR, RD, and NFR wrote, reviewed, and edited the manuscript. MSR and NFR wrote the original draft.

Funding Source

Acknowledgment

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