ANALYSIS OF SOCIOECONOMIC FACTORS INFLUENCING EARLY MARRIAGE AMONG WOMEN AGED 20–24 IN THE KALIMANTAN ARCHIPELAGO

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Abstract

Early marriage remains one of the social problems that affects the quality of human resources and economic development in various regions of Indonesia, including the island of Kalimantan. This phenomenon is often associated with the socio-economic conditions of the community. However, empirical studies that specifically analyze the influence of macroeconomic factors on early marriage in this region are still limited. This study aims to analyze the effect of the Human Development Index (HDI), open unemployment rate, percentage of poor population, and inflation on the proportion of women aged 20–24 who were married before the age of 18 in Kalimantan Island. This research employs a quantitative approach using panel data from five provinces on Kalimantan Island during the 2018–2024 period, sourced from Statistics Indonesia (Badan Pusat Statistik). The analysis was conducted using panel data regression with the Fixed Effects Model (FEM) approach. The results indicate that the Human Development Index, open unemployment rate, and percentage of the poor population have a negative effect on early marriage. Meanwhile, inflation does not have a significant effect on early marriage. These findings suggest that improving the quality of human development and enhancing the economic conditions of society play an important role in reducing the practice of early marriage.

Keywords: Early Marriage, Human Development Index, Poverty, Unemployment, Panel Data

INTRODUCTION

Early marriage remains a serious social development issue in many developing countries, including Indonesia. The United Nations Children's Fund (UNICEF, 2020) defines early marriage as a marital union, whether formal or informal, involving one or both partners under the age of 18. Although many countries have adopted policies to curb this practice, the prevalence of child marriage remains high. Indonesia ranks tenth globally, with approximately 34 percent of women marrying before the age of 18. This condition indicates that early marriage continues to pose a structural challenge to national human development.

In response to this issue, the Indonesian government revised the legal framework through Law No. 16 of 2019 on Marriage by raising the minimum legal age of marriage to 19 years for both men and women. This policy was intended to ensure physical, psychological, and social readiness before entering marital life. However, a number of studies suggest that the regulatory change has not been fully effective in reducing early marriage rates. Mursyid and Yusuf (2022) and Yetta et al. (2024) explain that applications for marriage dispensation are still frequently submitted and approved, particularly in rural areas, due to strong cultural norms, economic pressure, and weak institutional oversight. This situation indicates that a regulation-based approach is insufficient without parallel improvements in socioeconomic conditions and transformations of deeply rooted social norms.

Table 1.
Number of Early Marriage Cases among Women Aged 20–24 Years Who Married Below the Age of 18 in Kalimantan Provinces, 2018–2022

Province	Year					Total
	2018	2019	2020	2021	2022	
West Kalimantan	114	101	139	131	95	580
East Kalimantan	333	296	406	381	276	1692
Central Kalimantan	95	85	116	109	79	484
South Kalimantan	210	186	255	239	174	1064
North Kalimantan	200	177	243	229	166	1015
Total	952	845	1159	1089	790	–

Source: Reports of the Department of Population Administration, Women's Empowerment, and Child Protection (DKP3A) of Kalimantan Provinces; Statistics Indonesia (BPS), processed by the author (2026).

The Kalimantan Archipelago is one of the regions that continues to face a relatively high prevalence of early marriage, with considerable variation across provinces. Data from the Department of Population Affairs, Women's Empowerment and Child Protection and Statistics Indonesia presented in Table 1 show that during the 2018–2022 period, the proportion of women aged 20–24 who married before the age of 18 fluctuated, peaking in 2020 and declining in 2022. Spatially, East Kalimantan recorded the highest number of cases, while Central Kalimantan and West Kalimantan were at relatively lower levels. This pattern reflects differences in demographic characteristics, economic structures, and human development achievements across regions. Areas with high concentrations of young

populations and intense economic dynamics tend to experience greater social vulnerability, whereas regions with limited access to education and basic services face persistent risks of early marriage (Kok et al., 2023; Fitria et al., 2024).

Previous studies have identified a strong association between early marriage and socioeconomic factors. Household economic pressure often encourages families to view child marriage as an adaptive strategy to reduce financial burdens (Nurhayati & Kurniasari, 2020; Psaki et al., 2021). Belachew et al. (2022) and Sharper et al. (2025) demonstrate that poverty and limited access to education increase women's vulnerability to early marriage, particularly in disadvantaged regions. Inequalities in human development and disparities in access to education across regions also weaken efforts to sustainably reduce child marriage (Malhotra & Elnakib, 2021).

From a macroeconomic perspective, inflation and economic instability further exacerbate household vulnerability. Rising prices of basic necessities and declining purchasing power increase economic pressure on families, encouraging short-term decision-making, including early marriage (Corno & Voena, 2023). High unemployment rates worsen these conditions by increasing income uncertainty and social risk within households (Khan et al., 2024). Meanwhile, low human development index scores, which reflect the quality of education, health, and welfare, are consistently correlated with a high prevalence of early marriage (Shukla et al., 2024).

Although research on early marriage has expanded considerably, most studies still focus on cultural, educational, or economic factors in isolation. This leaves a research gap in studies that simultaneously examine the influence of key socioeconomic indicators—such as the human development index, unemployment rate, poverty, and inflation—at the interprovincial level, particularly in the Kalimantan region. The novelty of this study lies in its empirical approach, which integrates social and macroeconomic factors within a single analytical framework to explain variations in early marriage decisions among women aged 20–24 across the five provinces of Kalimantan.

Based on this background, the present study aims to analyze the effects of the human development index, unemployment rate, poverty, and inflation on early marriage among women aged 20–24 in Kalimantan. The findings are expected to contribute academically to the development economics literature and to serve as a foundation for more comprehensive policy formulation by both central and local governments in preventing early marriage through strengthened education, economic empowerment, and sustainable social protection.

REVIEW OF LITERATURE

The Effect of the Human Development Index on Early Marriage

The Human Development Index (HDI) represents the quality of human development through three main dimensions: education, health, and a decent standard of living. From the perspective of human capital theory, improvements in education and health quality increase individuals' incentives to invest in the future and to delay decisions that may reduce long-term welfare, including early marriage (Marphatia et al., 2025). Higher levels of education play a role in raising aspirations, improving awareness of reproductive health risks, and expanding women's economic opportunities, thereby

reducing the tendency to marry at a young age. The capability approach proposed by Wahyuningsih et al. (2025) emphasizes that human development expands individuals' freedoms to make life choices, including decisions related to marriage. Regions with low HDI levels generally face limited access to education and health services, which reinforces traditional norms and constrains women's range of choices. Empirical evidence presented by Fitria et al. (2024) and Kharisma et al. (2024) shows that regions with lower levels of human development tend to have a higher prevalence of early marriage. Based on these arguments, improvements in HDI are expected to reduce the practice of early marriage.

H_1: The Human Development Index has a negative effect on early marriage.

The Effect of Unemployment on Early Marriage

Unemployment reflects limited employment opportunities and instability in household income. From the perspective of labor market theory, weak labor market conditions reduce the expected returns to investment in education, leading individuals and families to favor short-term decisions, including early marriage (Wachter, 2020; Purmini et al., 2025). Household risk-coping theory explains that economic uncertainty caused by unemployment encourages households to adopt adaptive strategies to reduce financial risk, one of which is child marriage (Trinh & Zhang, 2021). Empirical evidence from Krafft and Assaad (2020) as well as Abdallah et al. (2024) indicates that high unemployment rates increase families' vulnerability to early marriage practices. Based on this theoretical framework and empirical evidence, rising unemployment is expected to have a positive effect on early marriage.

H_2: The unemployment rate has a positive effect on early marriage.

The Effect of Poverty on Early Marriage

Poverty reflects limited household economic resources that influence short-term decision-making (Lestianpuri & Arif, 2025; Gai et al., 2026). Within the framework of household economic theory, poor families tend to prioritize survival strategies with the lowest costs, including marrying off daughters at a young age to reduce household consumption burdens and to obtain economic security from the spouse's family (Asare & Forkuor, 2024). Intergenerational poverty theory explains that structural poverty encourages practices that reproduce poverty across generations, one of which is early marriage that hinders the accumulation of women's human capital (Purmini et al., 2025). Empirical evidence presented by Corno and Voena (2023) and Gelchu Adola et al. (2025) shows that low-income households face a higher risk of child marriage. Therefore, an increase in poverty levels is expected to raise the prevalence of early marriage.

H_3: The poverty rate has a positive effect on early marriage.

The Effect of Inflation on Early Marriage

Inflation reflects a general increase in prices that reduces purchasing power and real household welfare, particularly among low-income groups. Within the framework of macroeconomic vulnerability theory, rising price pressures weaken household economic resilience and encourage short-term, socially risky decisions (Dietrich et al., 2022). Economic shock theory explains that macroeconomic shocks, including inflation, increase the social vulnerability of poor groups and accelerate the emergence of adaptive strategies such as early marriage (Corno & Voena, 2023). Empirical evidence from Asnaashary et al. (2024) and Azzam et al. (2024) indicates that persistent economic pressure increases the

probability of early marriage among adolescent girls. Thus, inflation is expected to increase the practice of early marriage through a decline in household economic welfare.
H_4: Inflation has a positive effect on early marriage.

RESEARCH METHOD

This study aims to analyze the effect of socioeconomic factors—namely the Human Development Index (HDI), the Open Unemployment Rate (OUR), the percentage of the poor population (PPP), and inflation (INF)—on early marriage among women aged 20–24 years in Kalimantan Island. The study adopts a quantitative approach using panel data regression analysis. Baltagi (2021) explains that panel data combine time-series data and cross-sectional data, enabling the analysis to capture changes over time as well as differences in characteristics across regions, thereby producing more efficient and informative parameter estimates.

The time-series data cover the period from 2018 to 2024, while the cross-sectional data include five provinces in Kalimantan, namely West Kalimantan, Central Kalimantan, South Kalimantan, East Kalimantan, and North Kalimantan. With this structure, the total number of observations in this study is 35. The dependent variable is the proportion of women aged 20–24 years who were married before the age of 18. The independent variables consist of the Human Development Index, the Open Unemployment Rate, the percentage of the poor population, and inflation. All data were obtained from official publications of Statistics Indonesia (BPS) as well as reports from relevant local governments. Detailed operational definitions of the variables are presented in Table 2.

Table 2.
Variables and Measurements

Dimension	Variable	Measurement	Source
Early Marriage	Proportion of Early Marriage among Women	Percentage of women aged 20–24 years who were married before reaching the age of 18 (%).	Statistics Indonesia (BPS).
Human Development	Human Development Index	A composite index representing achievements in education, health, and a decent standard of living (index points).	Statistics Indonesia (BPS).
Labor Market Conditions	Open Unemployment Rate	Percentage of the working-age population who are unemployed and actively seeking employment (%).	Statistics Indonesia (BPS).
Household Socioeconomic Conditions	Percentage of Poor Population	Percentage of the population whose per capita expenditure is below the poverty line (%).	Statistics Indonesia (BPS).
Macroeconomic	Inflation	Annual percentage change in	Statistics

Stability		the Consumer Price Index (CPI) (%).	Indonesia (BPS).

The analytical model employed is panel data regression with three estimation approaches: Pooled Least Squares (PLS), the Fixed Effects Model (FEM), and the Random Effects Model (REM). Model selection is conducted using the Chow test to compare PLS and FEM, and the Hausman test to determine the choice between FEM and REM. The selected model is then used as the basis for inferential analysis. Hsiao (2005) emphasizes that this model selection procedure is necessary to obtain consistent and efficient parameter estimates. The estimation equation used in this study is specified as follows:

$$PEM_{it}=\beta_0+\beta_1 HDI_{it}+\beta_2 OUR_{it}+\beta_3 PPP_{it}+\beta_4 INF_{it}+\varepsilon_{it} \quad (1)$$

Where PEM denotes the proportion of women aged 20–24 years who were married before the age of 18 (in percent), HDI is the Human Development Index, OUR is the Open Unemployment Rate (in percent), PPP is the percentage of the poor population, INF is the inflation rate (in percent), β_0 is the constant term, β_1 to β_4 are regression coefficients, and ε represents the error term.

After determining the best model, the F-test is used to assess the simultaneous effect of the independent variables on early marriage. The null hypothesis in the F-test states that the Human Development Index, Open Unemployment Rate, percentage of the poor population, and inflation jointly have no effect on early marriage. The null hypothesis is rejected if the probability value of the F-statistic is less than the 1 percent significance level.

The t-test is applied to examine the partial effect of each independent variable on early marriage, assuming the other variables remain constant. The null hypothesis in the t-test states that the regression coefficient of each variable is equal to zero. The alternative hypothesis posits that the Human Development Index has a negative effect on early marriage, while the Open Unemployment Rate, percentage of the poor population, and inflation have positive effects on early marriage. The testing criteria are based on the probability values of the t-statistics at significance levels of 1 percent, 5 percent, and 10 percent.

In addition to significance testing, the coefficient of determination (R^2) is used to evaluate the model's ability to explain variations in early marriage. The R^2 value indicates the proportion of variation in early marriage among women aged 20–24 years that can be explained by all independent variables included in the model. A higher R^2 value reflects a better model performance in explaining variations in early marriage in Kalimantan. In panel data regression, the coefficient of determination serves as a general indicator of the model's goodness of fit in explaining the relationship between independent and dependent variables (Semykina & Wooldridge, 2013).

RESULTS AND DISCUSSION

Empirical Results

The results of panel data estimation using the Pooled Least Squares (PLS), Fixed Effects Model (FEM), and Random Effects Model (REM) approaches, along with the results of model selection tests, are presented in Table 3.

Table 3.
Panel Data Estimation Results

Variable	Coefficient		
	PLS	**FEM**	**REM**
C	97.029	317.129	182.662
HDI	−1.111	−3.941	−2.328
OUR	1.113	−1.520	0.402
PPP	−1.521	−2.197	−0.757
INF	−0.307	−0.162	-
R^2	0.546	0.910	0.611
Adjusted R^2	0.486	0.883	0.573
F-statistic	9.033	32.943	16.218
Probability (F-statistic)	0.000	0.000	0.000
Model Selection Tests: 1. Chow Test Cross-section F (4, 26) = 26.338; Probability (4, 26)= 0.000 2. Hausman Test Cross-section Random χ^2 (3) = 48.145; Probability = 0.000			

Source: Statistics Indonesia (BPS), processed by the author using EViews (2026).

Note: In the Random Effects Model estimation, the inflation coefficient could not be obtained due to a near-singular matrix issue caused by the number of cross-sectional units being equal to or exceeding the number of independent variables. This condition is technical in nature and does not indicate the absence of a relationship between inflation and the dependent variable.

The Chow test is used to determine the most appropriate estimation model between the Pooled Least Squares (PLS) and the Fixed Effects Model (FEM). The null hypothesis (H_0) in the Chow test states that the appropriate model is the Pooled Least Squares (PLS), while the alternative hypothesis (H_a) states that the appropriate model is the Fixed Effects Model (FEM). The null hypothesis is accepted if the p-value, which represents the empirical significance of the F-statistic, is greater than the level of significance (α). Conversely, the null hypothesis is rejected if the p-value is less than or equal to α.

Based on the results of the Chow test in Table 3, the p-value of the F-statistic is 0.000, which is smaller than the significance level α = 0.01. Therefore, the null hypothesis is rejected. The conclusion of this test indicates that the most appropriate estimation model is the Fixed Effects Model (FEM).

The Hausman test is used to select the appropriate estimation model between the Fixed Effects Model (FEM) and the Random Effects Model (REM). The null hypothesis (H_0) in the Hausman test states that the appropriate model is the Random Effects Model (REM), while the alternative hypothesis (H_a) states that the appropriate model is the Fixed Effects Model (FEM). The null hypothesis is accepted if the p-value, which represents the

empirical significance of the χ^2 statistic, is greater than the level of significance (α). Conversely, the null hypothesis is rejected if the p-value is less than or equal to α.

The results of the Hausman test in Table 3 show a p-value of the χ^2 statistic of 0.000, which is smaller than the significance level α = 0.01; therefore, the null hypothesis is rejected. The conclusion of this test indicates that the appropriate estimation model is the Fixed Effects Model (FEM).

Based on the results of the Chow test and the Hausman test, the Fixed Effects Model (FEM) is determined to be the best estimation model in this study. The complete estimation results using the Fixed Effects Model (FEM) are presented in Tables 4 and 5.

Table 4.
Summary of Fixed Effects Model (FEM) Estimation Results

$PEM_{it} = 317.129 - 3.941HDI_{it} - 1.520OUR_{it} - 2.197PPP_{it} - 0.162INF_{it}$ (0.000)* (0.020)** (0.052)*** (0.436)
$R^2 = 0.910$; F-statistic = 32.943; Probability (F-statistic) = 0.000.

Source: Statistics Indonesia (BPS), processed by the author using EViews (2026).
Notes: * significant at α = 0.01; ** significant at α = 0.05; *** significant at α = 0.10. Values in parentheses indicate the probability of the t-statistic.

Based on the estimation results in Table 4, the probability value of the F-statistic is 0.000, which is smaller than the significance level α = 0.01; therefore, the null hypothesis is rejected. This condition indicates that the Fixed Effects Model (FEM) estimation is statistically significant. Thus, the Human Development Index (HDI), the open unemployment rate (OUR), the percentage of the poor population (PPP), and inflation (INF) simultaneously have a significant effect on the proportion of early marriage among women aged 20–24 years in Kalimantan Island.

The coefficient of determination (R^2) of 0.910 indicates that 91 percent of the variation in the proportion of early marriage among women aged 20–24 years in Kalimantan Island can be explained by the Human Development Index (HDI), the open unemployment rate (OUR), the percentage of the poor population (PPP), and inflation (INF). The remaining 9 percent of the variation is explained by other variables outside the scope of this research model.

Table 5.
Partial Significance Test Results for the Fixed Effects Model (FEM)

Variable	t-value	Sig. t	Significance Criterion	Conclusion
HDI	−3.941	0.000	< 0.01	Negative effect at α = 0.01
OUR	−1.520	0.020	< 0.05	Negative effect at α = 0.05
PPP	−2.197	0.052	< 0.10	Negative effect at α = 0.10
INF	−0.162	0.436	> 0.10	No effect at α = 0.10

Source: Statistics Indonesia (BPS), processed by the author using EViews (2026).

The results of the partial significance test in Table 5 using the Fixed Effects Model (FEM) approach show that the Human Development Index (HDI), the open unemployment rate (OUR), and the percentage of the poor population (PPP) have a negative effect on the proportion of early marriage among women (PEM). Meanwhile, the inflation variable (INF) does not show a significant effect on the proportion of early marriage among women

(PEM). This pattern indicates that early marriage among women is more closely associated with structural socioeconomic conditions than with short-term macroeconomic changes.

The coefficient of the Human Development Index (HDI) is negative at −3.94. This value indicates that a one-point increase in HDI will reduce the proportion of women aged 20–24 years who married before the age of 18 by 3.94 percent, assuming other variables remain constant. This result confirms that improvements in the quality of human development, particularly in education, health, and living standards, play an important role in reducing the practice of early marriage in Kalimantan Island.

The coefficient of the open unemployment rate (OUR) is negative at −1.52. This value indicates that a one-percent increase in the open unemployment rate will reduce the proportion of early marriage among women aged 20–24 years by 1.52 percent, assuming other variables remain constant. This pattern suggests that increased economic uncertainty due to unemployment is associated with households' tendency to postpone marriage decisions at a young age.

The coefficient of the percentage of the poor population (PPP) is negative at −2.20. This value indicates that a one-percent increase in the percentage of the poor population will reduce the proportion of early marriage among women aged 20–24 years by 2.20 percent, assuming other variables remain constant. This condition suggests that household economic constraints are associated with lower financial readiness to establish a new household, leading to delays in early marriage.

Table 6.
Regional Effects and Provincial Constants on the Island of Kalimantan

Province	Regional Effect	Constant
West Kalimantan	−9.948	307.181
Central Kalimantan	−2.085	315.044
South Kalimantan	−4.271	312.857
East Kalimantan	18.899	336.028
North Kalimantan	−2.595	314.533

Source: Statistics Indonesia (BPS), processed by the author using EViews (2026).

The constant values for each province in Kalimantan Island are presented in Table 6. East Kalimantan Province has the highest constant value of 336.03. This value indicates that, after controlling for the effects of the Human Development Index (HDI), the open unemployment rate (OUR), the percentage of the poor population (PPP), and inflation (INF), East Kalimantan Province tends to have a higher proportion of early marriage among women compared to other provinces in Kalimantan Island. The provinces with the next highest constant values are Central Kalimantan and North Kalimantan.

The lowest constant value is found in West Kalimantan Province at 307.18. This condition indicates that, after considering all independent variables in the model, West Kalimantan Province tends to have a lower proportion of early marriage among women compared to other provinces in Kalimantan Island. The province with the next lowest constant value is South Kalimantan.

Discussion

The results of this study indicate that early marriage among women aged 20–24 years in Kalimantan is significantly influenced by the Human Development Index (HDI), the Open Unemployment Rate (OUR), and the percentage of the poor population (PPP), while inflation (INF) does not show a significant effect. This pattern confirms that decisions regarding early marriage are more strongly shaped by structural socioeconomic factors and the quality of human development than by short-term macroeconomic pressures.

The negative effect of HDI on early marriage confirms Hypothesis 1; therefore, H_1 is accepted and is consistent with human capital theory and the capability approach. An increase in HDI reflects improvements in education, health, and living standards, which simultaneously expand women's life choices and strengthen incentives to delay marriage. Higher levels of education encourage greater aspirations, increased awareness of reproductive health risks, and broader opportunities for labor market participation, thereby positioning marriage no longer as the sole strategy for achieving economic security. These findings are in line with Rumble et al. (2018) and Fitria et al. (2024), who show that human development functions as a protective factor against the practice of early marriage. Within the framework of the capability approach (Wahyuningsih et al., 2025), improvements in HDI expand women's substantive freedoms in determining the timing and conditions of marriage, so that marriage decisions are viewed as rational, well-planned, long-term choices. Therefore, these results reinforce the argument that human development is a strategic policy instrument for reducing the prevalence of early marriage.

Contrary to the initial hypothesis, the open unemployment rate has a negative effect on early marriage; thus, Hypothesis 2 is rejected. This finding indicates that rising unemployment does not encourage early marriage but instead leads to the postponement of marriage decisions. From an economic perspective, marriage is understood as a decision that requires income readiness and economic stability. When employment opportunities decline and income uncertainty increases, individuals and families tend to delay the formation of new households. This pattern is consistent with the findings of Van Wijk et al. (2021) as well as Oktavia and Sitorus (2025), who show that job instability is correlated with an increase in the age at first marriage, particularly among young women. These results also suggest that risk-adjustment strategies in response to unemployment are not manifested through early marriage, but rather through the postponement of long-term life decisions until economic conditions improve.

The findings also show that the percentage of the poor population has a negative effect on early marriage; therefore, Hypothesis 3 is rejected. This relationship indicates that the link between poverty and early marriage is not linear. Under certain conditions, economic constraints may actually delay marriage because families face limited resources to establish new households. In addition, the presence of social assistance programs, expanded access to education, and social protection policies plays a role in reducing short-term economic pressures that previously encouraged early marriage practices. These findings are consistent with Psaki et al. (2021) as well as Priebe and Sumarto (2025), who emphasize that public policy interventions are capable of transforming the traditional relationship between poverty and child marriage. Thus, poverty does not always function as a direct driver of early marriage, particularly when social protection systems operate effectively.

Meanwhile, inflation does not show a significant effect on early marriage; therefore, Hypothesis 4 is rejected. This lack of significance suggests that short-term price fluctuations are not strong enough to influence marriage decisions, which are structural and long-term in nature. Marriage decisions are more strongly affected by education, social norms, household-level economic readiness, and future expectations than by temporary macroeconomic conditions. These findings are consistent with Azzam et al. (2024) as well as Putri and Handayani (2021), who argue that macroeconomic variables such as inflation play a limited role in determining age at first marriage. Therefore, although inflation control policies are important for economic stability, they are not the primary instruments for reducing the practice of early marriage.

CONCLUSION

This study is motivated by the persistently high prevalence of early marriage among women aged 20–24 years on the island of Kalimantan, despite regulatory reforms and the implementation of various prevention programs at both the national and regional levels. This condition reflects disparities in human development as well as differences in socioeconomic conditions across provinces, which have the potential to hinder improvements in human capital quality and long-term economic development in the region. On this basis, the study analyzes the effects of macro-level socioeconomic factors—namely the Human Development Index, the open unemployment rate, the percentage of the population living in poverty, and inflation—on the proportion of early marriage among women.

The results indicate that the Human Development Index, the open unemployment rate, and the percentage of the poor population have a negative and significant effect on the proportion of early marriage among women, while inflation does not have a significant effect. These findings suggest that decisions regarding early marriage are more strongly influenced by structural conditions related to human development and household economic resilience than by short-term macroeconomic dynamics. Variations in effects and intercepts across provinces further highlight the role of local characteristics, such as access to education, employment opportunities, and prevailing social and cultural norms, in shaping differences in early marriage practices across Kalimantan.

The policy implications of these findings underscore the importance of development strategies that focus on improving the quality of women's education and health, expanding inclusive employment opportunities, and strengthening the economic capacity of low-income households as key efforts to reduce early marriage practices. Such policies not only contribute to the protection of women's rights and the improvement of family welfare, but also play a strategic role in enhancing human capital quality, increasing labor force participation, and supporting sustainable economic development on the island of Kalimantan.

This study has several limitations. The analysis focuses on macro-level socioeconomic indicators and does not fully accommodate social and cultural factors, household characteristics, or psychosocial aspects that may influence decisions regarding early marriage. In addition, the limited geographic coverage—restricted to five provinces—and the relatively short observation period constrain the study's ability to explain long-term dynamics and broader interregional variations. Based on these limitations, future research is

recommended to expand both the geographic scope and the observation period, as well as to incorporate social, cultural, and institutional variables in order to achieve a more comprehensive understanding of the determinants of early marriage. The use of methodological approaches that combine quantitative and qualitative analyses is also necessary to explore social mechanisms in greater depth, thereby enabling the formulation of more targeted and effective policy recommendations.

Overall, this study affirms that early marriage is not merely an individual or cultural issue, but also reflects structural inequalities in human development and socioeconomic conditions. Therefore, addressing early marriage requires integrated, sustainable, and regionally sensitive policy responses to support inclusive economic development and enhance the quality of future generations on the island of Kalimantan.

REFERENCES

Abdallah, A. S. R., Mohammed, M. O. M., & Mohamed, A. A. A. (2023). Early marriage and its association with the socioeconomic and sociocultural factors of women in Sudan: A predictive model. *The Open Public Health Journal*, 16(1), 1–7. https://doi.org/10.2174/18749445-v16-e230505-2022-167

Adilkhanova, M., & Aliyev, K. (2024). Macroeconomic determinants of marriage and divorces in Azerbaijan. *Economics & Sociology*, 17(4), 145–158. https://doi.org/10.14254/2071-789X.2024/17-4/8

Asare, L. A., & Forkuor, J. B. (2024). The social consequences of climate change: A qualitative analysis of early girl child marriage as an informal adaptation strategy among rural communities in Northern Ghana. *Cogent Social Sciences*, 10(1), 2319703. https://doi.org/10.1080/23311886.2024.2319703

Asnaashary, M., Farzanegan, M. R., Feizi, M., & Gholipour, H. F. (2024). Economic determinants of child marriage: Evidence from the Iranian provinces. *Children and Youth Services Review*, 159, 107518. https://doi.org/10.1016/j.childyouth.2024.107518

Azzam, A., Jasmine, L., & Wati, R. R. (2024). Marital economics: Relationship between inflation and age of first marriage among Indonesian youth. *Jurnal Keluarga Berencana*, 9(1), 38–50. https://doi.org/10.37306/kkb.v9i1.274

Baltagi, B. H. (2021). *Econometric analysis of panel data (6th ed.)*. Springer. https://doi.org/10.1007/978-3-030-53953-5

Belachew, T. B., Negash, W. D., Kefale, G. T., Tafere, T. Z., & Asmamaw, D. B. (2022). Determinants of early marriage among married women in nine high-fertility sub-Saharan African countries: A multilevel analysis of recent demographic and health surveys. *BMC Public Health*, 22(1), 2355. https://doi.org/10.1186/s12889-022-14840-z

Corno, L., & Voena, A. (2023). Child marriage as informal insurance: Empirical evidence and policy simulations. *Journal of Development Economics*, 162, 103047. https://doi.org/10.1016/j.jdeveco.2023.103047

Dietrich, S., Meysonnat, A., Rosales, F., Cebotari, V., & Gassmann, F. (2022). Economic development, weather shocks, and child marriage in South Asia: A machine learning approach. *PLOS ONE*, 17(9), e0271373. https://doi.org/10.1371/journal.pone.0271373

Fitria, M., Laksono, A. D., Syahri, I. M., Wulandari, R. D., Matahari, R., & Astuti, Y. (2024). Education role in early marriage prevention: Evidence from Indonesia's rural areas. *BMC Public Health*, 24(1), 3323. https://doi.org/10.1186/s12889-024-20775-4

Gai, A. M., Apriyanto, G. A., & Burhan, M. (2026). The effect of local revenue, capital expenditure, and expenditure on education and health functions on the poverty rate: A study in regencies/cities in East Nusa Tenggara (NTT) from 2019–2024. *Indonesian Interdisciplinary Journal of Sharia Economics (IIJSE)*, 9(1), 877–892. https://doi.org/10.31538/iijse.v9i1.7756

Gelchu Adola, S., Wirtu, D., & Dheresa, M. (2025). Poverty and large family size are pivotal risk factors for child marriage in Ethiopia: Evidence from a matched case-control study. *Frontiers in Sociology*, 10, 1544169. https://doi.org/10.3389/fsoc.2025.1544169

Hsiao, C. (2005). Why panel data? *The Singapore Economic Review*, 50(2), 143–154. https://doi.org/10.1142/S0217590805001937

Isbahi, M. B., Zuana, M. M. M., & Toha, M. (2024). The Multi-Social Relation of the Cattle Industry in the Plaosan Subdistrict Animal Market of Magetan Regency. *Malacca: Journal of Management and Business Development*, *1*(1), 31–46. https://doi.org/10.69965/malacca.v1i1.51

Khan, M. N., Khanam, S. J., Khan, M. M. A., Billah, M. A., & Akter, S. (2024). Exploring the impact of perceived early marriage on women's education and employment in Bangladesh through a mixed-methods study. *Scientific Reports*, 14(1), 21683. https://doi.org/10.1038/s41598-024-73137-w

Kharisma, B., Wardhana, A., & Fauzy, M. Z. (2024). Early marriage and human development index in Indonesia. *Jurnal Ekonomi Kuantitatif Terapan*, 17(2), 201–224. https://doi.org/10.24843/JEKT.2024.v17.i02.p03

Kok, M. C., Kakal, T., Kassegne, A. B., Hidayana, I. M., Munthali, A., Menon, J. A., … Van der Kwaak, A. (2023). Drivers of child marriage in specific settings of Ethiopia, Indonesia, Kenya, Malawi, Mozambique, and Zambia: Findings from the Yes I Do! baseline study. *BMC Public Health*, 23(1), 794. https://doi.org/10.1186/s12889-023-15697-6

Krafft, C., & Assaad, R. (2020). Employment's role in enabling and constraining marriage in the Middle East and North Africa. *Demography*, 57(6), 2297–2325. https://doi.org/10.1007/s13524-020-00932-1

Lestianpuri, A., & Arif, M. (2025). Urban poverty (Case study of East Java from 2018–2022). *Indonesian Interdisciplinary Journal of Sharia Economics (IIJSE)*, 8(2), 2854–2867. https://doi.org/10.31538/iijse.v8i2.6022

Malhotra, A., & Elnakib, S. (2021). Twenty years of the evidence base on what works to prevent child marriage: A systematic review. *Journal of Adolescent Health*, 68(5), 847–862. https://doi.org/10.1016/j.jadohealth.2020.11.017

Marphatia, A. A., Wells, J. C., Reid, A. M., Bhalerao, A., & Yajnik, C. S. (2025). Like mother like daughter: The role of low human capital in intergenerational cycles of disadvantage—The Pune Maternal Nutrition Study. *Frontiers in Global Women's Health*, 5, 1174646. https://doi.org/10.3389/fgwh.2024.1174646

Mursyid, S., & Yusuf, N. (2022). Changes in marriage age limits and marriage dispensations: A study of causes and impacts on the religious courts in North

Sulawesi. *Samarah: Jurnal Hukum Keluarga dan Hukum Islam*, 6(2), 975–996. https://doi.org/10.22373/sjhk.v6i2.12439

Nurhayati, S. F., & Kurniasari, I. (2020). Analisis pernikahan usia dini ditinjau dari sudut pandang ekonomi, sosial, dan religi: Studi pada Kecamatan Purwodadi Kabupaten Grobogan. *Profetika: Jurnal Studi Islam*, 21(1), 17–26. https://doi.org/10.23917/profetika.v21i1.11645

Oktavia, E., & Sitorus, J. R. H. (2025, December). Faktor-faktor yang memengaruhi penundaan perkawinan wanita usia dewasa awal di Pulau Jawa tahun 2024. In *Seminar Nasional Official Statistics* (Vol. 2025, No. 1, pp. 467–476). https://doi.org/10.34123/semnasoffstat.v2025i1.2396

Priebe, J., & Sumarto, S. (2025). Reducing child marriages through CCTs: Evidence from a large-scale policy intervention in Indonesia. *Journal of Public Economics*, 242, 105306. https://doi.org/10.1016/j.jpubeco.2025.105306

Psaki, S. R., Melnikas, A. J., Haque, E., Saul, G., Misunas, C., Patel, S. K., … Amin, S. (2021). What are the drivers of child marriage? A conceptual framework to guide policies and programs. *Journal of Adolescent Health*, 69(6), 13–22. https://doi.org/10.1016/j.jadohealth.2021.09.001

Purmini, P., Nopiah, R., Hutapia, H., & Ramah, N. M. (2025). Economic consequences of early marriage: Correlation with women's employment and education mobility. *Journal of Economics and Business Letters*, 5(5), 96–112. https://doi.org/10.55942/jebl.v5i5.969

Rumble, L., Peterman, A., Irdiana, N., Triyana, M., & Minnick, E. (2018). An empirical exploration of female child marriage determinants in Indonesia. *BMC Public Health*, 18(1), 407. https://doi.org/10.1186/s12889-018-5313-0

Semykina, A., & Wooldridge, J. M. (2013). Estimation of dynamic panel data models with sample selection. *Journal of Applied Econometrics*, 28(1), 47–61. https://doi.org/10.1002/jae.1266

Sharper, S., Evans, C. S., Mwiya, M. S., Bowa, M., Mutengo, E., & University, K. N. (2025). The effects of early marriages on academic performance of marginalized girls in secondary schools of Central Province in Zambia. *BMC Public Health*, 25(1), 2815. https://doi.org/10.1186/s12889-025-24089-x

Shukla, S., Upadhyay, A. K., & Tiwari, S. (2024). Effects of educational and socio-economic factors on child marriages in India: A statistical analysis. *Indian Journal of Human Development*, 18(2), 224–241. https://doi.org/10.1177/09737030241288699

Trinh, T. A., & Zhang, Q. (2021). Adverse shocks, household expenditure, and child marriage: Evidence from India and Vietnam. *Empirical Economics*, 61(3), 1617–1639. https://doi.org/10.1007/s00181-020-01907-2

United Nations Children's Fund. (2020). *Child marriage*. https://www.unicef.org/protection/child-marriage

Van Wijk, D. C., de Valk, H. A., & Liefbroer, A. C. (2021). Temporary employment and family formation: An income or insecurity effect? *European Sociological Review*, 37(4), 641–658. https://doi.org/10.1093/esr/jcab007

Wachter, T. V. (2020). The persistent effects of initial labor market conditions for young adults and their sources. *Journal of Economic Perspectives*, 34(4), 168–194. https://doi.org/10.1257/jep.34.4.168

Wahyuningsih, S., Widati, S., Puspitasari, N., Salim, L. A., & Azkiya, M. W. (2025). Exploring adolescent girls' involvement in decision-making processes regarding child marriage: A systematic review. *Narra J*, 5(1), 1656. https://doi.org/10.52225/narra.v5i1.1656

Yetta, Y., Rajafi, A., & Subeitan, S. M. (2024). Understanding the implications of marriage law amendments: Marriage dispensation cases in Indonesian religious courts. *Al-Istinbath: Jurnal Hukum Islam*, 9(1), 121–136. https://doi.org/10.29240/jhi.v9i1.8979