PER CAPITA INCOME, FEMALE LABOR FORCE PARTICIPATION, AND HUMAN DEVELOPMENT INDEX: AN ANALYSIS OF FERTILITY RATE IN INDONESIA

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ABSTRACT
This study aims to analyze the effects of per capita income, female labor force participation, and the human development index on fertility rate in Indonesia during the period 2000–2024. The study employs a quantitative approach using time-series data sourced from the Central Statistics Agency (BPS), analyzed via multiple linear regression using the Ordinary Least Squares (OLS) method. The results indicate that, simultaneously, all independent variables have a significant effect on fertility rate in Indonesia. Partially, per capita income has a positive and significant effect, meaning that an increase in income tends to be followed by a rise in fertility rate. Conversely, female labor force participation has a negative effect, suggesting that increased female involvement in the workforce leads to a decline in fertility rate due to opportunity costs. Meanwhile, the human development index has a significant negative effect, indicating that improvements in the quality of education, health, and living standards drive a decline in the fertility rate. The model explains approximately 85 percent of the variation in the fertility rate, demonstrating strong explanatory power. These findings confirm that the dynamics of the fertility rate in Indonesia are influenced by the simultaneous interaction of economic, social, and human development factors.

Keywords: Fertility Rate, Per Capita Income, Female Labor Force Participation, Human Development Index

INTRODUCTION

Economic development of the country cannot be separated from demographic dynamics. Behind economic growth figures and various welfare indicators lies a demographic measure that often signals the direction of societal change: the fertility rate. This figure not only reflects the number of fertilitys during a given period but is also linked to population growth, the age structure of society, and the potential availability of the labor force in the future.

The International Monetary Fund (IMF) noted in 2022 that a decline in fertility rates can have ripple effects on demographic composition and the long-term sustainability of economic development, potentially leading to an increase in the elderly population and posing challenges for the economy and social security systems.

In Indonesia, according to a report by the Central Statistics Agency (BPS), there has been a gradual decline in the fertility rate from 2015 to 2024. Data shows that the fertility rate was around 2.3 children per woman from 2015 to 2017, then dropped to about 2.2 children per woman from 2018 to 2021, and fell again to 2.1 children per woman from 2022 to 2024. This

shift reflects changes in society's views on family and decisions regarding childbearing. Social and economic factors appear to be playing an increasingly significant role in shaping households' choices regarding the desired number of children.

Demographic studies in developing countries such as Indonesia reveal that economic conditions often influence families' decisions regarding family planning. An increase in per capita income can enhance households' ability to meet their basic needs, but at the same time it can also alter decisions regarding family size.

A study by Maisyaroh et al. (2025) shows that per capita income has a significant negative correlation with fertility rates. These findings suggest that improvements in economic well-being and women's education tend to be accompanied by a decrease in the number of children per family. Under these circumstances, families prioritize quality of life and investment in their children over having more children.

The quality of human development is also a factor that cannot be ignored, improvements in education and living standards, as reflected in the Human Development Index (HDI), expand public access particularly for women to information on health and employment opportunities. Research by Sari et al. (2024) indicates that an increase in the HDI contributes to a decline in fertility rates in Indonesia, as improvements in education, health, and access to family planning services expand the public's knowledge regarding reproductive health.

Meanwhile, research conducted by Taqwin et al. (2025) using data from the Indonesian Demographic and Health Survey (IDHS) shows that increased women's empowerment including women's participation in the workforce plays a significant role in shaping preferences and decisions regarding childfertility in Indonesia. This suggests that women's empowerment also strengthens women's autonomy in making reproductive and family planning decisions.

Based on the background described, this study aims to analyze the effects of per capita income, female labor force participation rates, and the Human Development Index on fertility rates using a time-series econometric approach. Unlike many previous studies that focused on only one or two factors, the novelty of this study lies in its approach, which simultaneously integrates economic, social, and human development dimensions to explain the dynamics of fertility rates.

LITERATURE REVIEW

Family Economics Theory

This theory explains that the decision to have children is viewed as part of a household's economic choices. This theory illustrates that families not only consider the desire to have children but also calculate the various economic consequences that accompany it. As income increases, families are often faced with the choice between having more children or improving the quality of life for their existing children.

In many situations, higher well-being actually drives a shift in preferences toward greater investment in the quality of children, resulting in a tendency to have fewer children. Research conducted by Listyaningsih et al. (2024) a case study on family size among low-income communities in Yogyakarta shows that families consider their economic capacity when determining the number of children and choose to limit fertilitys in order to maximize investment in the education and well-being of their existing children.

The Theory of Wealth Flow

This theory explains that fertility rates in a society are strongly influenced by the direction of the flow of economic resources between parents and children. In traditional societies, wealth typically flows from children to parents, as children play a role in supporting the family's economic activities and become a source of support in old age. In such situations, having many children is often considered economically advantageous.

However, as societies undergo modernization, this pattern shifts, parents instead become the primary bearers of investment in their children, particularly through education, healthcare, and basic living needs. This reversal in the direction of resource flow encourages families to be more cautious in determining the number of children they have, leading to a tendency for fertility rates to decline. Research by Bano et al. (2021) on the intention to have children in Indonesia shows that the decision to have children is related to household economic conditions and the economic incentives received by the family.

RESEARCH METHODS

This study employs a quantitative approach and utilizes secondary data from the Central Statistics Agency (BPS) covering the period from 2000 to 2024. The relationships between variables were analyzed using multiple linear regression with the Ordinary Least Squares (OLS) method, this method was used to measure the direction and magnitude of the effect of each independent variable on the dependent variable. The econometric model used is formulated as follows:

$$FR_t = \beta_0 + \beta_1 LOG(PCI_t) + \beta_2 FLFP_t + \beta_3 HDI_t + \varepsilon_t$$

In this equation, FR denotes the fertility rate, PCI represents per capita income, FLFP describes the female labor force participation rate, and HDI denotes the human development index.

To ensure the validity of the estimation results, the regression model was also tested using classical assumption tests, including a residual normality test, a multicollinearity test to detect strong relationships among independent variables, a heteroscedasticity test to assess the stability of residual variance, and an autocorrelation test, which is crucial in time-series data analysis (Wooldridge, 2016).

RESULTS AND DISCUSSION

To examine the relationship between socioeconomic changes and fertility rates in Indonesia, this study estimates a regression model using the Ordinary Least Squares (OLS) method on time-series data for the period 2000–2024. The estimation results are summarized in Table 1.

Table 1. Regression Results of Fertility Rate Determinants

Variable	Coefficient	Std. Error	t-Statistic	Probability
Constant	7.7233	0.8144	9.4832	0.0000
LOG(PCI)	0.000169	0.000043	3.8558	0.0009
FLFP	-0.015884	0.008441	-1.8818	0.0738
HDI	-0.075023	0.014434	-5.1976	0.0000

Source: Eviews 13 (processed data, 2026)

The results yield the following equation:

$$FR = 7.7233 + 0.000169PCI - 0.015884FLFR - 0.075023HDI$$

This equation indicates that each variable influences the fertility rate in a different direction. The R^2 value of 0.85 indicates that approximately 85 percent of the variation in the fertility rate can be explained by per capita income, female labor force participation, and the Human Development Index. The remainder is influenced by other factors outside the model, such as women's education, urbanization, family planning policies, and evolving social values within society.

F-Test

Simultaneously, the results of the F-test show a probability of 0.000 below the 5 percent significance level, indicating that all three variables collectively have a significant effect on fertility. This confirms that changes in fertility patterns do not occur in isolation but arise from the interplay of various economic and social dynamics.

This aligns with the research by Zhang et al. (2023), which shows that the decision to have children is influenced by a combination of income, the cost of children's education, and other economic incentives. The relationship between income and fertility can even vary depending on the economic context, confirming the existence of simultaneous interactions among the variables.

t-Test

The Effect of Per Capita Income on the Fertility Rate

In the partial analysis, the results of the t-test for the per capita income (PCI) variable with a coefficient of 0.000169 and a significance level of 0.0009 (significant at the 5 percent level) indicate that a one-unit increase in per capita income will increase fertility by 0.000169 points, ceteris paribus. Based on these results, it can be concluded that in Indonesia, an increase in income enhances households' economic capacity to bear the costs of child-rearing.

In the early stages of development, this condition may foster the belief that families possess the economic capacity to increase the number of children. This finding aligns with the perspective of family economic theory, which views the decision to have children as the result of a rational weighing of economic costs and benefits.

Furthermore, a study by Nugraheni et al. (2022), using data from the Indonesia Family Life Survey (IFLS), found that economic factors, as represented by per capita income, have a significant impact on fertility rates in Indonesia. Furthermore, a study conducted by Hailemariam (2022) reinforces family economics theory by demonstrating that parents derive benefits from the number and quality of their children, so the decision to have children is strongly influenced by family income and economic resources.

The Effect of Female Labor Force Participation on the Fertility Rate

Female Labor Force Participation Rate (FLFP), with a coefficient of -0.015884 and a significance level of 0.0738 (significant at the 10 percent level), indicates that a 1 percent increase in the FLFP reduces fertility by 0.015884 points. These results suggest that in Indonesia, as women's involvement in economic activities increases, fertility rates tend to decline. When women actively pursue careers, the time and energy available for domestic roles become more limited, leading to opportunity costs that encourage delayed childbearing or a reduction in the number of children.

A study conducted by Anggia et al. (2025) reinforces these findings and demonstrates a dynamic relationship between women's labor force participation and fertility rates in Indonesia. In the long term, increased female labor force participation correlates with a decline in fertility, which is explained by role conflict between work and the household.

Furthermore, a study by Kolk (2023) which focused on developing countries, found that having more children significantly reduces women's chances of working, particularly among younger and less-educated groups.

The Effect of Human Development Index on the Fertility Rate

Human Development Index (HDI) also shows a significant negative effect on the fertility rate. With a coefficient of -0.075023 and a p-value of 0.0000 (significant at the 5 percent level), this implies that a one-point increase in the HDI reduces fertility by 0.075023 points, assuming all other variables remain constant. This indicates that in Indonesia, every improvement in the quality of education, health, and living standards tends to be followed by a decline in fertility rates. In societies with broader access to education and information, awareness of family planning increases and preferences shift toward smaller families.

A study by Sriwahyuni et al. (2025) also found that the Human Development Index (HDI) has a negative effect on fertility rates, with a coefficient of approximately -0.36. This means that improvements in human development including access to education and health

services significantly reduce fertility rates through increased contraceptive use and greater awareness of family planning.

A study by Wang (2024) found that each additional year of education for women significantly reduces the number of children born, through the mechanisms of delayed marriage, changes in preferred family size, and improved family planning.

These findings are consistent with the wealth flow theory, which explains that modernization shifts the distribution of economic benefits within families. Whereas in traditional societies children serve as a source of support for their parents, in modern societies they are increasingly viewed as a long-term investment requiring significant costs a shift that encourages families to choose to have fewer children with a higher quality of life.

Classical Assumption Tests

In addition to performing regression estimates, this study also assessed the model's validity through a series of classical assumption tests. This step is important to ensure that the estimation results are not biased and remain consistent with the principles of the OLS method.

The Jarque–Bera test for classical assumptions yielded a p-value of 0.5952, exceeding the 5 percent threshold, indicating that the residuals follow a normal distribution. On the other hand, the potential for multicollinearity among the variables also does not appear to be a concern, as reflected by all VIF values remaining below the critical threshold of 10 (Gujarati, 2009).

When variance stability was tested using the Breusch–Pagan–Godfrey test, the probability of 0.4056 was again above 0.05, indicating the absence of heteroscedasticity. A similar result was observed in the Breusch–Godfrey LM autocorrelation test, with a probability of 0.2109, indicating that the residuals do not exhibit systematic correlation (Wooldridge, 2016). Thus, based on the 5 percent significance criterion, this regression model has passed all stages of the classical OLS assumption tests, so the estimation results can be relied upon as the basis for analysis.

CONCLUSION

Changes in fertility rates in Indonesia result from the interplay of economic dynamics, women's social roles, and the quality of human development. These three variables have been shown to interact and collectively influence fertility rates in Indonesia. Per capita income has a positive impact on fertility rates in Indonesia. Conversely, female labor force participation and quality of life as measured by the Human Development Index (HDI) have a negative impact on fertility rates in Indonesia, leading families to choose to have fewer children.

These findings reinforce family economics theory and the wealth flow theory, while also demonstrating that the relationships among variables are interlinked in Indonesia's demographic transition process. Nevertheless, these results remain aggregate in nature and do

not yet capture regional diversity or cultural dimensions within Indonesia. Future research could expand its scope by incorporating additional variables and adopting a more dynamic approach to gain a sharper understanding of changes in fertility behavior.

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