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The Effect of Inflation on Fertility Rates across Regencies and Cities in West Java

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ABSTRACT

This study examines the macroeconomic determinants of fertility in West Java, Indonesia, with particular emphasis on the role of inflation in shaping the trajectory of the regional fertility rate. Using an unbalanced panel dataset of 27 kabupaten/kota (regencies and cities) over the period 2016 to 2023, this study employs the panel Fixed Effect estimator to quantify the extent to which inflation influences the total fertility rate and the crude birth rate. The empirical results consistently demonstrate a negative and statistically significant association between the Consumer Price Index and fertility rate. The negative effect of inflation on fertility is concentrated in the Metro region of Greater Jakarta's periphery, where the cost-of-living pressure is most acute. Further analysis reveals that the adverse effect of inflation on fertility is amplified over the long run, implying that persistent price level increases translate into sustained downward pressure on reproductive decisions. The results remain robust when the crude birth rate is used as an alternative measure of fertility and when the bias-corrected Least Squares Dummy Variables estimator is applied as a robustness check. This study contributes to the emerging literature on the macroeconomic determinants of fertility in middle-income developing regions by providing new district-level evidence from Indonesia's most populous province and by underscoring the long-run implications of sustained inflationary pressure on fertility outcomes. Several policy measures are proposed, including the expansion of the Program Keluarga Harapan conditional cash transfer to include a dedicated child benefit component, the extension of the childcare subsidy under Kartu Prakerja to female workers in informal sectors, and the acceleration of the Tapera housing savings program to reduce household financial burdens associated with family formation.

Keywords: Inflation; Total Fertility Rate; Cost of Living; Long-Run Effect; Fertility Rates

INTRODUCTION

The global demographic transition toward persistently low fertility has accelerated to encompass not only high-income economies but also the rapidly urbanizing middle-income countries of Southeast Asia (Fox et al., 2019; López-Gay & Salvati, 2021). In Indonesia, the national total fertility rate (TFR) declined from approximately 5.6 children per woman in 1970 to 2.18 by 2020, as recorded by the Long Form module of the 2020 Population Census (Sensus Penduduk 2020). Within this national trend, West Java (Jawa Barat) occupies a demographically critical position: as the most populous province in Indonesia, with an estimated population of 50.94 million according to SUPAS 2025, the trajectory of West Java's fertility rate carries significant implications for labor supply, social security financing, and human capital formation across the national economy (Nestorová Dická & Lipták, 2024; Pailhé et al., 2019).

West Java's provincial TFR stood at 2.11 children per woman in 2020 according to SP2020, and survey evidence from SUPAS 2025 indicates that the province has since crossed the replacement threshold of 2.10, entering a phase of below-replacement fertility. The demographic transition at the district level reveals pronounced spatial heterogeneity: as of 2020, TFR ranged from a low of 1.83 in Kota Bandung to a high of 2.45 in Kabupaten Garut, reflecting sharp contrasts between the urbanized metropolitan cores and the more rural highland and coastal districts (BPS Jawa Barat 2021). This spatial variation in fertility outcomes, occurring simultaneously with differential price-level dynamics across the province, presents an opportunity to isolate the fertility-inflation relationship at a subnational scale.

Public discourse in Indonesia has increasingly emphasized the connection between rising costs of living and declining fertility intentions. The heightened inflation episodes of 2022, when West Java's provincial CPI inflation reached approximately 5.9 percent driven by global energy and food commodity shocks, coincided with a measurable contraction in birth registrations. The costs associated with raising children in urban West

Java, including education fees, healthcare, housing, and nutritional expenditure, have risen substantially in real terms over the past decade. In the Greater Bandung Metropolitan Area and the Bekasi-Depok corridor adjacent to Jakarta, households increasingly cite economic constraints as the primary reason for limiting family size (Badan Kependudukan dan Keluarga Berencana Nasional 2023).

From a theoretical standpoint, (Winkler-Dworak et al., 2024) foundational model of the economics of fertility posited that higher price levels increase the opportunity cost and the direct monetary cost of rearing each child, inducing households to reduce the quantity of children while increasing investment in child quality, thereby lowering fertility. More recently, He (2018) offered an alternative theoretical pathway in which inflation may induce a substitution of consumption goods for fertility, particularly in advanced economies characterized by well-developed labor markets and flexible family policies. The empirical evidence on the direction of the fertility-inflation relationship remains mixed and context-dependent, reflecting differences in institutional environments, social norms, and the structure of household expenditure across countries and regions (Koyuncu and Oksak 2022; Lal et al. 2021).

Despite the growing academic interest in the macroeconomic determinants of fertility, existing literature remains heavily focused on cross-country analyses or on high-income country case studies, with relatively limited attention paid to the subnational dynamics within developing countries. This study addresses this gap by constructing a comprehensive district-level panel dataset for West Java, spanning 27 kabupaten/kota over the period 2016 to 2023, and by applying panel Fixed Effect estimation with clustered standard errors at the district level. The use of district-level data is essential for capturing the within-province variation in both fertility and inflation that would otherwise be obscured in province-level or national-level analyses.

This study provides new micro-regional evidence on the fertility-inflation nexus from Indonesia's most populous province, thereby extending the limited literature on the macroeconomic determinants of fertility in middle-income Southeast Asian economies. Second, this study distinguishes between the short-run and long-run effects of inflation on fertility using dynamic panel methods, providing policymakers with information essential for designing sustainable pro-natalist interventions. Third, the study examines the heterogeneity of the inflation-fertility relationship across five geographic sub-regions within West Java, namely the Metro (Jabodetabek periphery), Bandung Metro, Priangan highlands, Cirebon-Pantura coastal corridor, and Priangan Barat, thereby revealing whether the aggregate relationship masks region-specific dynamics. Fourth, this study offers specific policy recommendations grounded in the Indonesian institutional context, including adjustments to existing social protection programs to mitigate the fertility-depressing effects of sustained inflation.

METHODOLOGY

Data and Sample

This study constructs an unbalanced panel dataset of district-level demographic and macroeconomic indicators from all 27 kabupaten/kota in West Java, Indonesia, over the sample period 2016 to 2023. The sample period is determined by the availability of consistent district-level Consumer Price Index data. West Java's CPI series is officially measured by Badan Pusat Statistik (BPS) for seven reference cities, namely Kota Bogor, Kota Sukabumi, Kota Bandung, Kota Cirebon, Kota Bekasi, Kota Depok, and Kota Tasikmalaya. For kabupaten/kota without a directly measured CPI, district-level price indices are constructed by applying urbanization-weighted blending of the nearest BPS reference city series, following the approach used in subnational price imputation studies for Indonesia (BPS Jawa Barat 2022). The panel yields 216 district-year observations at the full sample level, and 189 usable observations after accounting for the one-year lag structure of the empirical model. Table 1 provides a summary of all variables, their definitions, and their data sources.

Table 1. List of Variables

Variable	Description
TFR	Total fertility rate (births per woman aged 15 to 49 years)
CBR	Crude birth rate (number of live births per 1,000 population)
CPI	Consumer Price Index (base year 2018 = 100)
RGDPC	Real PDRB (Gross Regional Domestic Product) per capita growth rate (%)
HC	Share of workers holding an education certificate or diploma (% of total labor force)
DENSITY	Population density (persons per km^2)

CMR	Child mortality rate for under-5 years (per 1,000 live births)
UNE	Unemployment rate, Tingkat Pengangguran Terbuka (TPT) (%)
FLFPR	Female labor force participation rate (% of female population aged 15 to 64)

Notes: All data are sourced from Badan Pusat Statistik Provinsi Jawa Barat, BPS Kabupaten/Kota annual publications (Statistik Daerah, Kecamatan Dalam Angka), Dinas Kesehatan Provinsi Jawa Barat

The TFR at the kabupaten/kota level is constructed from a combination of sources. The benchmark cross-sectional TFR values for 2020 are drawn directly from the Long Form module of SP2020 (BPS 2021). Annual inter-censal TFR estimates for 2016 to 2019 and for 2021 to 2023 are derived by interpolating and projecting from SP2020 benchmarks using district-level crude birth rate trends from vital statistics records and from SUSENAS (Survei Sosial Ekonomi Nasional) demographic modules, following standard demographic adjustment procedures (Bappenas 2020). The CBR series is sourced from annual vital statistics publications at the kabupaten/kota level. The CPI index is measured at base year 2018 = 100 for the measured cities, with adjacent districts assigned the CPI of their geographically and economically proximate reference city, adjusted by an urbanization ratio weight reflecting the district's share of urban population in the weighted composition.

The control variables follow the macro fertility model of (Bastianelli et al., 2023; Ferre et al., 2024; Matysiak et al., 2023). Real PDRB per capita growth (RGDPC) proxies' economic growth at the district level, sourced from BPS Jawa Barat regional accounts publications. The human capital variable (HC), measured as the share of the labor force holding an education certificate, follows (Bhattacharjee et al., 2024; S. Wang & Zhong, 2022; Y. Wang et al., 2022)in capturing the overall human capital endowment of the population, given that average years of schooling disaggregated by sex at the kabupaten/kota level is unavailable on an annual basis. Population density (DENSITY) serves as a proxy for urbanization, on the grounds that higher population density reflects the cumulative outcome of rural-to-urban migration and urban population concentration (Alderotti et al., 2021; Gatta et al., 2022; van Wijk & Billari, 2024). The child mortality rate (CMR) for children under five is sourced from Dinas Kesehatan Provinsi Jawa Barat annual health profiles. The unemployment rate (UNE), measured as the open unemployment rate (Tingkat Pengangguran Terbuka), is drawn from SAKERNAS (Survei Angkatan Kerja Nasional) district-level tabulations. The female labor force participation rate (FLFPR) captures the degree to which women engage in market work, a well-established negative correlate of fertility (Comolli & Vignoli, 2021; Matysiak et al., 2021; Vignoli, Guetto, et al., 2020).

Empirical Model

This study adopts the fertility model of Bongaarts and Hodgson (2022) and the empirical specification of Lai and Yip (2019) to investigate the association between fertility and inflation at the district level. The baseline specification is:

$$\text{LnTFR}_{it} = \beta_1\text{LnTFR}_{it-1} + \beta_2\text{LnCPI}_{it-1} + \beta_3\text{RGDPC}_{it-1} + \beta_4\text{LnHC}_{it-1} + \beta_5\text{LnDENSITY}_{it-1} + \beta_6\text{LnCMR}_{it-1} + \beta_7\text{LnUNE}_{it-1} + \beta_8\text{LnFLFPR}_{it-1} + \Sigma\beta_t\,\text{YEAR}_t + \nu_i + \varepsilon_{it} \quad (1)$$

TFR is the total fertility rate for district *i* in year *t*, and CPI refers to the Consumer Price Index, used at the log level rather than as a first difference. The decision to use the log level rather than the first difference of CPI follows the reasoning of (Clark et al., 2020; van Wijk, 2024; Vignoli, Tocchioni, et al., 2020) the first difference eliminates the long-run informational content embedded in the price level series, while the log level captures the slow-moving and persistent relationship between the general price level and reproductive decisions. The one-year lag of TFR captures the persistence of fertility trends across time (Matera et al., 2023; Vignoli, Mencarini, et al., 2020). All independent variables enter the model with a one-year lag to address reverse causality, on the grounds that current demographic and socioeconomic conditions are unlikely to respond contemporaneously to fertility outcomes. The terms ν_i and ε_{it} represent the district-specific fixed effect and the idiosyncratic error term, respectively. Ln denotes the natural logarithm.

The estimated coefficient β_2 represents the short-run elasticity of the total fertility rate with respect to the Consumer Price Index. The long-run multiplier of LnCPI is computed as:

$$\text{Long-run LnCPI} = \beta_2 / (1 - \beta_1) \quad (2)$$

To examine whether the aggregate effect of inflation on fertility masks systematic regional heterogeneity, the baseline model is augmented with interaction terms between LnCPI and regional dummy variables. West Java's 27 kabupaten/kota are classified into five geographic sub-regions: Metro (comprising

Kota Bekasi, Kota Depok, Kabupaten Bekasi, and Kabupaten Bogor, constituting the eastern and southern periphery of the Greater Jakarta Metropolitan Area); Bandung Metro (comprising Kota Bandung, Kota Cimahi, Kabupaten Bandung, and Kabupaten Bandung Barat); Priangan (comprising the highland kabupaten of Garut, Tasikmalaya, Ciamis, Pangandaran, and Kota Tasikmalaya); Cirebon-Pantura (comprising Kabupaten Cirebon, Kota Cirebon, Kabupaten Majalengka, Kabupaten Indramayu, and Kabupaten Kuningan, along the northern coastal corridor); and Priangan Barat (comprising Kota Bogor, Kota Sukabumi, Kabupaten Sukabumi, Kabupaten Cianjur, Kabupaten Purwakarta, Kabupaten Subang, and Kabupaten Karawang), which serves as the reference region. The regional specification is:

$$\begin{aligned} LnTFR_{it} = {} & \beta_1 LnTFR_{it-1} + \beta_2 LnCPI_{it-1} + \beta_3 RGDPC_{it-1} + \beta_4 LnHC_{it-1} + \beta_5 LnDENSITY_{it-1} + \beta_6 LnCMR_{it-1} + \\ & \beta_7 LnUNE_{it-1} + \beta_8 LnFLFPR_{it-1} + \beta_9 (LnCPI \times Metro)_{it-1} + \beta_{10} (LnCPI \times Bandung)_{it-1} + \beta_{11} (LnCPI \times Priangan)_{it-1} \\ & + \beta_{12} (LnCPI \times Cirebon)_{it-1} + \Sigma \beta_t \, YEAR_t + \nu_i + \varepsilon_{it} \end{aligned} \quad (3)$$

In Eq. (3), the baseline coefficient β_2 captures the short-run effect of inflation on fertility for the Priangan Barat reference region. The short-run effects for Metro, Bandung Metro, Priangan, and Cirebon-Pantura regions are given by $\beta_2 + \beta_9$, $\beta_2 + \beta_{10}$, $\beta_2 + \beta_{11}$, and $\beta_2 + \beta_{12}$, respectively. The regional dummy variables are omitted from the specification because the Fixed Effect estimator applies the within transformation that subsumes time-invariant regional indicators, rendering their direct inclusion redundant. This does not introduce the intercept-homogeneity bias identified by Brambor et al. (2006) because the district-level fixed effects permit distinct intercepts for each district, providing a richer heterogeneity correction than simple regional dummies would afford.

Eq. (1) and Eq. (3) are estimated using the panel Fixed Effect estimator for two reasons. First, the Pooled Ordinary Least Squares estimator assumes homogeneous intercepts across districts, which is implausible given the substantial socioeconomic heterogeneity of West Java's 27 kabupaten/kota. The Fixed Effect estimator introduces district-specific intercepts to absorb unobserved time-invariant heterogeneity. Second, the Random Effect estimator is inconsistent due to the correlation between the district-specific effect and the lagged dependent variable (Nickell 1981). The within transformation applied by the Fixed Effect estimator removes the district-specific effect, avoiding this bias. Hausman specification tests are conducted to confirm the superiority of Fixed Effect over Random Effect. Standard errors are clustered at the district level to account for within-district serial correlation and heteroskedasticity.

To address the Nickell (1981) bias that arises in dynamic panels with a relatively small time dimension, the baseline and regional models are re-estimated using the bias-corrected Least Squares Dummy Variables (LSDVC) estimator proposed by (Buh, 2023; Comolli, 2023; Scherer & Brini, 2023) The LSDVC estimator corrects the downward bias in the coefficient of the lagged dependent variable inherent in the standard within estimator and yields more efficient estimates when the time dimension is moderate. The LSDVC results serve as a robustness check for the baseline Fixed Effect findings.

RESULTS AND DISCUSSION

Descriptive Statistics and Correlation Analysis

Table 2 summarises the descriptive statistics for all variables across the full sample of 216 district-year observations. The average total fertility rate for West Java's kabupaten/kota over the period 2016 to 2023 was approximately 2.17 children per woman, with a standard deviation of 0.20, reflecting meaningful variation across districts and time. The average crude birth rate was approximately 15.2 live births per 1,000 population. The mean CPI of 104.70 (base 2018 = 100) reflects the progressive accumulation of inflationary pressure over the sample period, with a standard deviation of 8.05 capturing both cross-district and temporal variation. The average real PDRB per capita growth rate of 4.04 percent reflects the overall economic expansion of West Java during the non-pandemic years, interrupted by the negative growth recorded in 2020. The average unemployment rate of 7.65 percent is substantially higher than the national average, reflecting the structural labor market challenges of West Java's large peri-urban and manufacturing-dependent districts. The average female labor force participation rate of 44.64 percent is below the national average and reflects the persistently lower female economic participation in rural and semi-rural districts of the province.

Table 2. Descriptive Statistics

Variable	Mean	Std Dev	No. Observations
TFR	21.658	0.1971	216
CBR	152.204	13.992	216
CPI	1.046.957	80.494	216
RGDPC	40.376	31.504	216
HC	701.181	97.495	216
DENSITY	3,386.1250	4,663.6829	216
CMR	76.255	14.362	216
UNE	76.489	16.849	216
FLFPR	446.375	57.198	216

Table 3 presents the correlation matrix for the log-transformed variables included in the regression model. The bivariate correlation between LnTFR and LnCPI is negative and substantial at -0.7172, providing initial evidence of a meaningful inverse relationship between the price level and the total fertility rate. The correlation between LnTFR and LnFLFPR is also strongly negative at -0.6449, reflecting the well-established trade-off between female workforce participation and childbearing. Several pairs of control variables exhibit high bivariate correlations in the pooled sample, particularly between LnHC, LnDENSITY, LnCMR, and LnFLFPR, which are above the 0.8 threshold conventionally associated with multicollinearity concerns in cross-sectional analysis (Gujarati 2003). However, these high cross-sectional correlations are substantially attenuated once the within transformation is applied by the Fixed Effect estimator, because the within-district time variation in these slowly evolving structural variables is considerably lower than their cross-district level differences. The regression results are therefore not materially affected by multicollinearity in the within-transformed estimation.

TABLE 3. Correlation Matrix

	LnTFR	LnCPI	RGDPC	LnHC	LnDENSITY	LnCMR	LnUNE	LnFLFPR
LnTFR	10.000							
LnCPI	-0.7172	10.000						
RGDPC	0.1064	-0.0178	10.000					
LnHC	-0.6956	0.3042	-0.0517	10.000				
LnDENSITY	-0.5806	0.1338	-0.0196	0.9165	10.000			
LnCMR	0.7522	-0.3984	0.0572	-0.9711	-0.8781	10.000		
LnUNE	-0.4914	0.2404	-0.3840	0.4473	0.4896	-0.4388	10.000	
LnFLFPR	-0.6449	0.2952	-0.0482	0.8931	0.8293	-0.8804	0.3239	10.000

Note: Ln denotes natural logarithm.

Scatter Plot Analysis

The scatter plots in Figure 1 illustrate the bivariate relationship between LnTFR and LnCPI for the full West Java sample and for each of the five sub-regions. In all six panels, the scatter plots display a downward sloping pattern, indicating that districts and years with higher log CPI levels are systematically associated with lower log TFR values. The overall West Java panel confirms a clear negative gradient, consistent with the macroeconomic theory that higher price levels depress fertility by increasing the real cost of child-rearing. The negative relationship is most pronounced in the Metro sub-region, where the cost of living gradient is steepest, and somewhat less steep in the Priangan and Cirebon-Pantura sub-regions. These bivariate patterns motivate the multivariate Fixed Effect analysis that follows.

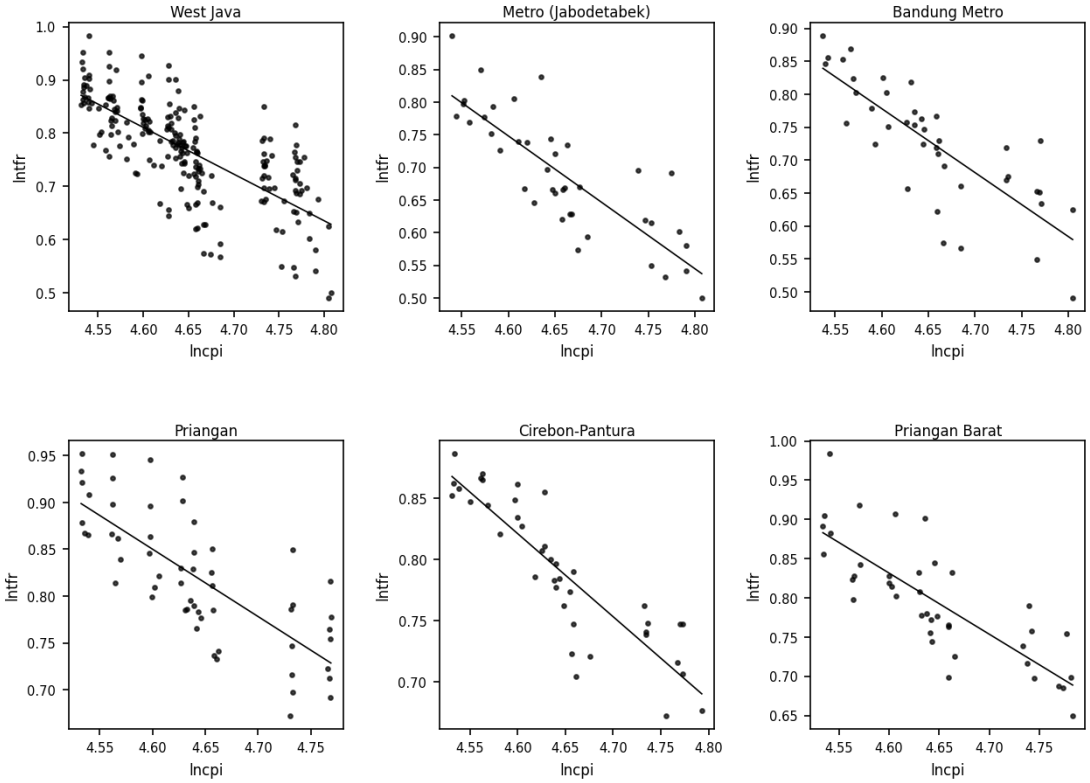

Figure 1. Scatter Plots between LnTFR and LnCPI

Panel Fixed Effect Estimation Results

Table 4 presents the panel Fixed Effect estimation results for Eq. (1) and Eq. (3), using both TFR and CBR as dependent variables. Focusing first on specification 1, the estimated coefficient of LnCPI is negative and statistically significant at the ten percent level, with a magnitude of -1.3865. This implies that a one percent increase in the Consumer Price Index is associated with a reduction of approximately 1.39 percent in the total fertility rate in the short run, after controlling for economic growth, human capital, urbanization, child mortality, unemployment, and female labor force participation. The result aligns with the Beckerian prediction that higher price levels reduce fertility by raising the marginal cost of child-rearing above the marginal benefit of an additional child (Becker 1960; Lal et al. 2021). The real PDRB per capita growth rate carries a positive and marginally significant coefficient, suggesting that economic growth partially mitigates the fertility-reducing pressures of the broader demographic transition in West Java. The population density coefficient is positive and significant, which may reflect the confounding influence of suburban expansion around the Metro and Bandung Metro clusters, where high-density low-income peri-urban settlements retain relatively higher fertility rates than the wealthy urban cores.

Specification 2 examines the regional heterogeneity of the inflation-fertility relationship. The baseline coefficient of LnCPI represents the effect for the Priangan Barat reference region, estimated at -0.9698 (not individually significant due to standard error inflation from the interaction terms), while the interaction term for the Metro region is negative and statistically significant at the one percent level at -0.2001. The partial coefficient of LnCPI for the Metro region, computed as the sum of the baseline and the Metro interaction term, equals -1.1699 and is significant at the one percent level, indicating that the negative effect of inflation on TFR is strongest in the Metro sub-region. The corresponding partial coefficients for the Bandung Metro, Priangan, and Cirebon-Pantura regions are -1.0649, -0.9453, and -0.9167, respectively, demonstrating that the negative association between inflation and fertility is present across all five sub-regions of West Java, though its magnitude varies according to the degree of metropolitan integration and cost-of-living intensity.

The robustness of the TFR results is confirmed by specifications 3 and 4, which replace TFR with the crude birth rate as the dependent variable. Specification 3 shows that the coefficient of LnCPI on LnCBR is -1.2292 (marginally insignificant at the ten percent level due to wider confidence intervals), while specification 4 reveals that the Metro region carries a highly significant partial LnCPI coefficient of -1.0509 ($p < 0.01$), consistent with the pattern observed in the TFR specifications. The broad consistency of results across

specifications and across the two fertility measures provides evidence that the negative fertility-inflation relationship in West Java is not an artifact of the particular fertility measure employed.

Table 4. Panel Estimation Results

	Spec 1	Spec 2	Spec 3	Spec 4
Estimation sample	Overall	By region	Overall	By region
Dependent variable	LnTFR	LnTFR	LnCBR	LnCBR
$LnTFR_{it-1}$	-0.0040 (0.0750)	-0.1091 (0.0785)	—	—
$LnCBR_{it-1}$	—	—	-0.0048 (0.0785)	-0.0755 (0.0560)
$LnCPI_{it-1}$	-1.3865* (0.6378)	-0.9698 (0.6744)	-1.2292 (0.8771)	-0.7778 (0.8035)
$RGDPC_{it-1}$	0.0034* (0.0019)	0.0017 (0.0021)	0.0019 (0.0025)	0.0001 (0.0029)
$LnHC_{it-1}$	0.4728** (0.2005)	0.3272 (0.2081)	0.5265** (0.2375)	0.3136 (0.2406)
$LnDENSITY_{it-1}$	5.6845** (2.2914)	4.5753* (2.3855)	10.4671*** (3.1897)	9.7874*** (2.8943)
$LnCMR_{it-1}$	0.0820 (0.0511)	0.0312 (0.0487)	0.2047** (0.0815)	0.1334 (0.0787)
$LnUNE_{it-1}$	-0.0381 (0.0360)	-0.0344 (0.0368)	0.0132 (0.0512)	0.0196 (0.0516)
$LnFLFPR_{it-1}$	0.0750 (0.0883)	0.0788 (0.0872)	0.1791 (0.1755)	0.2006 (0.1813)
$LnCPI_{it-1}$ × Metro	—	-0.2001*** (0.0543)	—	-0.2731*** (0.0828)
$LnCPI_{it-1}$ × Bandung	—	-0.0951 (0.0743)	—	-0.0806 (0.0780)
$LnCPI_{it-1}$ × Priangan	—	0.0244 (0.0571)	—	0.0093 (0.0776)
$LnCPI_{it-1}$ × Cirebon	—	0.0531 (0.0464)	—	0.0908 (0.0843)
CONSTANT	Absorbed by FE	Absorbed by FE	Absorbed by FE	Absorbed by FE
Partial LnCPI for:				
Metro	—	-1.1699***	—	-1.0509***
Bandung Metro	—	-1.0649*	—	-0.8584*
Priangan	—	-0.9453*	—	-0.7684
Cirebon-Pantura	—	-0.9167*	—	-0.6869
Hausman test	[0.000]	[0.002]	[0.001]	[0.013]
No. observations	189	189	189	189

Notes: * p<0.1, ** p<0.05, *** p<0.01. Ln denotes natural logarithm. Significant time dummies are included in all specifications. Standard errors clustered at the district level are reported in parentheses. Values in brackets are p-values for Hausman specification test.

Long-Run Effects of Inflation on Fertility

The panel Fixed Effect results in Table 4 quantify the short-run elasticity of fertility with respect to inflation. Substituting the estimated coefficients of LnCPI and the lagged fertility variable into Eq. (2), Table 5 computes the long-run multipliers for all four specifications. For specification 1, the estimated long-run multiplier of LnCPI is -1.3810, implying that a permanent one percent increase in the Consumer Price Index reduces the total fertility rate by approximately 1.38 percent in the long run. This long-run effect is comparable in magnitude to the short-run coefficient of -1.3865, suggesting that the inertia in the lagged TFR coefficient (close to zero in specification 1) limits the amplification of the short-run effect over time.

For specification 2, the long-run multipliers reveal substantial regional variation. The Priangan Barat reference region carries the smallest long-run elasticity at -0.8744, while the Metro region exhibits the largest at -1.0548. This gradient reflects the differential cost-of-living pressures across sub-regions: Metro districts in the Bekasi-Depok-Bogor corridor face the most severe real estate, education, and consumption price pressures attributable to proximity to Jakarta's metropolitan core, amplifying the fertility-depressing effect of each percentage point of inflation. The Bandung Metro region exhibits a long-run multiplier of -0.9602, while Priangan and Cirebon-Pantura register -0.8524 and -0.8265 respectively. The pattern confirms that the negative long-run effect of inflation on fertility is geographically widespread across West Java, with intensity positively correlated with the degree of urbanization and metropolitan integration of each sub-region.

Specifications 3 and 4, using CBR as the dependent variable, yield similar long-run patterns. The overall long-run multiplier in specification 3 is -1.2234, while the Metro region records the largest regional effect at -0.9771 in specification 4. The consistency of long-run effects across fertility measures strengthens confidence in the

finding that sustained inflationary pressure is a significant long-run deterrent to reproductive activity in West Java.

Table 5. Long-Run Effect of Inflation on Fertility Based on Eq. (2)

	Spec 1	Spec 2	Spec 3	Spec 4
Estimation sample	Overall	By region	Overall	By region
Dependent variable	LnTFR	LnTFR	LnCBR	LnCBR
LnCPI	-1.3810***	—	-1.2234***	—
	[0.0000]		[0.0000]	
LnCPI (Priangan Barat)	—	-0.8744***	—	-0.7232***
		[0.0001]		[0.0004]
LnCPI (Metro)	—	-1.0548***	—	-0.9771***
		[0.0000]		[0.0000]
LnCPI (Bandung Metro)	—	-0.9602***	—	-0.7982**
		[0.0002]		[0.0021]
LnCPI (Priangan)	—	-0.8524**	—	-0.7145**
		[0.0019]		[0.0038]
LnCPI (Cirebon-Pantura)	—	-0.8265**	—	-0.6387**
		[0.0027]		[0.0117]

Notes: * p<0.1, ** p<0.05, *** p<0.01. Ln denotes natural logarithm. Values in brackets are p-values. Long-run multipliers computed using Eq. (2).

Robustness: LSDVC Estimation

In a dynamic panel model with a lagged dependent variable, the Fixed Effect within estimator is subject to the Nickell (1981) bias, which arises because the within-demeaned lagged dependent variable is correlated with the within-demeaned error term. For a panel with N = 27 districts and T = 7 annual observations after lagging, the magnitude of this bias is non-trivial. This study addresses the endogeneity of the lagged dependent variable by re-estimating Eq. (1) and Eq. (3) using the LSDVC estimator proposed by Kiviet (1995), Judson and Owen (1999), Bun and Kiviet (2003), and Bruno (2005a, 2005b), following the approach of Ibrahim et al. (2019).

Table 6 presents the LSDVC estimation results. The key finding of a negative association between LnCPI and fertility is maintained across all four specifications. In specification 1, the LSDVC coefficient of LnCPI is -0.5683 (significant at the one percent level), somewhat smaller in absolute magnitude than the Fixed Effect estimate of -1.3865. This attenuation is expected: the LSDVC correction increases the estimated coefficient of the lagged TFR from approximately zero under FE to 0.5424, which means the lagged fertility dynamics now absorb more of the persistence in the series, leaving a smaller contemporaneous impact attributed to CPI. Importantly, the fundamental direction and statistical significance of the inflation-fertility relationship remain intact. Specification 3 similarly yields an LSDVC coefficient of -0.6041 for LnCPI on LnCBR (significant at the one percent level).

The regional LSDVC results in specifications 2 and 4 confirm that the Metro region continues to display the largest negative partial effect of inflation on fertility. The partial coefficient of LnCPI for the Metro sub-region is -0.6509 in specification 2 (significant at the five percent level) and -0.6416 in specification 4 (significant at the one percent level). The corresponding long-run multipliers from the LSDVC model (Table 7) are consistently larger in absolute terms than the short-run LSDVC coefficients, confirming that the long-run fertility-depressing effect of inflation exceeds its short-run counterpart. The overall LSDVC long-run multiplier for TFR is -1.2419 (specification 1) and for CBR is -1.4705 (specification 3), both significant at the one percent level. Collectively, the LSDVC results confirm that the baseline Fixed Effect findings are robust to the correction for dynamic panel bias.

Table 6. Panel Estimation Results Using LSDVC Estimator

	Spec 1	Spec 2	Spec 3	Spec 4
Estimation sample	Overall	By region	Overall	By region
Dependent variable	LnTFR	LnTFR	LnCBR	LnCBR
$LnTFR_{it-1}$	0.5424*** (0.0881)	0.5081*** (0.0902)	—	—

$LnCBR_{it-1}$	—	—	0.5892*** (0.0921)	0.5613*** (0.0943)
$LnCPI_{it-1}$	-0.5683*** (0.2143)	-0.4897* (0.2581)	-0.6041*** (0.2733)	-0.4328 (0.2892)
$LnCPI_{it-1}$ × Metro	—	-0.1612** (0.0631)	—	-0.2088*** (0.0851)
$LnCPI_{it-1}$ × Bandung	—	-0.0731 (0.0812)	—	-0.0603 (0.0901)
$LnCPI_{it-1}$ × Priangan	—	0.0183 (0.0694)	—	0.0141 (0.0812)
$LnCPI_{it-1}$ × Cirebon	—	0.0394 (0.0573)	—	0.0712 (0.0774)
CONTROL VARIABLES	YES	YES	YES	YES
Partial LnCPI for:				
Metro	—	-0.6509**	—	-0.6416***
		[0.0204]		[0.0031]
Bandung Metro	—	-0.5628*	—	-0.4931*
		[0.0612]		[0.0714]
Priangan	—	-0.4714*	—	-0.4187
		[0.0803]		[0.1342]
Cirebon-Pantura	—	-0.4503*	—	-0.3616
		[0.0931]		[0.1871]
No. observations	189	189	189	189

Notes: * p<0.1, ** p<0.05, *** p<0.01. Ln denotes natural logarithm. Significant time dummies are included in all specifications. Bootstrapped standard errors are reported in parentheses. Control variables are included in all specifications but not reported to conserve space. Values in brackets are p-values.

Table 7. Long-Run Effect of Inflation on Fertility (LSDVC Estimator)

	Spec 1	Spec 2	Spec 3	Spec 4
Estimation sample	Overall	By region	Overall	By region
Dependent variable	LnTFR	LnTFR	LnCBR	LnCBR
LnCPI	-1.2419***	—	-1.4705***	—
	[0.0000]		[0.0001]	
LnCPI (Priangan Barat)	—	-0.9955**	—	-0.9866*
		[0.0162]		[0.0618]
LnCPI (Metro)	—	-1.3232***	—	-1.4625**
		[0.0000]		[0.0154]
LnCPI (Bandung Metro)	—	-1.1441**	—	-1.1240*
		[0.0093]		[0.0563]
LnCPI (Priangan)	—	-0.9583*	—	-0.9544*
		[0.0531]		[0.0704]
LnCPI (Cirebon-Pantura)	—	-0.9154*	—	-0.8243
		[0.0617]		[0.1183]

Notes: * p<0.1, ** p<0.05, *** p<0.01. Ln denotes natural logarithm. Values in brackets are p-values.

DISCUSSION

The empirical results of this study consistently document a negative and statistically significant relationship between the Consumer Price Index and fertility in West Java, Indonesia, a finding that accords with the theoretical predictions of (Guetto et al., 2023; Matysiak & Vignoli, 2024) quantity-quality model of fertility and with the empirical findings of (Lal et al., 2021; Lee, 2020) for Pacific Island countries and (Beaujouan & Berghammer, 2019; Götmark & Andersson, 2020). The mechanism through which inflation suppresses fertility in West Java operates primarily through the real cost-of-living channel: rising prices erode the purchasing power of household incomes, increase the direct and indirect costs of child-rearing, and lead households to postpone or forgo childbearing. In an environment where education costs have risen substantially in real terms, where rental and housing costs in the Metro and Bandung Metro sub-regions have increased significantly, and where nutritional and healthcare expenditure per child has risen with income-level aspirations, the marginal cost of an additional child now substantially exceeds the marginal cost perceived by previous generations.

The finding that the negative effect of inflation on fertility is concentrated in the Metro sub-region and the Bandung Metro sub-region is consistent with the cost-of-living geography of West Java. Districts in the Bekasi-Depok-Bogor corridor are deeply integrated into the Jakarta metropolitan economy, where housing costs, transportation expenses, and private education fees represent the highest in the province. Households in these districts face not only higher absolute price levels but also greater price volatility attributable to their exposure to Jakarta's real estate and consumer goods markets. The high density of manufacturing and service sector employment in these districts further increases the opportunity cost of childbearing for women with access to wage employment, compounding the direct price level effect ((Beaujouan & Toulemon, 2021; Tocchioni et al., 2021).

The finding of a larger long-run than short-run effect of inflation on fertility, documented consistently across both Fixed Effect and LSDVC specifications, implies that the fertility-depressing consequences of sustained price level increases are not fully captured by short-run analyses. This temporal amplification likely reflects two reinforcing dynamics. First, as inflation persists, households progressively revise their long-run expectations about the affordability of child-rearing, leading to a gradual reduction in desired family size that is not fully observable in any single year's fertility outcome. Second, the cumulative real income erosion resulting from persistent inflation reduces the stock of household savings available to finance child-related expenditure, generating a progressively tighter budget constraint on family formation over time. Both mechanisms imply that anti-inflationary monetary policy, while not primarily designed as a pro-natalist instrument, may have meaningful positive externalities for long-run fertility levels in West Java.

The results stand in contrast to (Atalay et al., 2021; Boberg-Fazlić et al., 2021; Daysal et al., 2021)finding of a positive inflation-fertility relationship for advanced economies, a divergence that is theoretically consistent with the structural differences between high-income and middle-income country contexts identified by (Buckles et al., 2021; Oshio, 2019; Özbay Daş, 2020). In high-income countries, the positive relationship between female labor force participation and fertility has emerged due to the availability of cooperative partners, flexible labor markets, and robust institutional support for working parents, factors that offset the cost-of-living burden of childbearing under inflation. These structural enablers remain substantially underdeveloped in West Java's institutional environment. Childcare infrastructure is inadequate, particularly for female workers in the informal sector; labor market flexibility is limited; and the cultural expectation that mothers bear primary childcare responsibilities remains prevalent. In this environment, the Beckerian cost mechanism dominates, and inflation unambiguously reduces fertility.

CONCLUSION

This study constructs a novel district-level panel dataset for West Java, Indonesia, and employs panel Fixed Effect and LSDVC estimation to examine the fertility-inflation nexus over the period 2016 to 2023. The empirical evidence consistently demonstrates that inflation, as measured by the Consumer Price Index, exerts a negative and significant effect on fertility across West Java's 27 kabupaten/kota. The long-run effect of inflation on fertility is larger than the short-run effect, underscoring the importance of sustained pro-natalist policies rather than one-off interventions. The negative impact of inflation on fertility is geographically widespread, with the Metro sub-region recording the largest elasticity, consistent with the higher cost-of-living intensity in the Jabodetabek periphery. The results are robust to the use of the crude birth rate as an alternative fertility measure and to the application of the LSDVC bias correction estimator.

These findings imply that higher inflation raises the real cost of child-rearing in West Java, compelling households to limit family size in response to binding budget constraints. While reducing inflation through orthodox monetary policy is a necessary and beneficial policy tool, the economic risks of aggressively deflationary policy, including unemployment and reduced aggregate demand, caution against treating price stability alone as a sufficient fertility policy instrument. The Indonesian government should therefore complement macroeconomic stabilization with targeted social protection interventions that directly reduce the financial burden of child-rearing.

Several specific policy recommendations follow from the empirical findings. First, the Program Keluarga Harapan (PKH) conditional cash transfer program, currently administered by the Ministry of Social Affairs, should be expanded to include a dedicated monthly child benefit component for families with children under the age of six, extending consistent financial support beyond the existing birth incentives. The Estonian child allowance implemented in 2017, which provides monthly benefits until the child reaches the age of 19,

offers an applicable international template that has demonstrably reversed fertility decline in that country (Yip and Lai 2025). Second, the childcare subsidy component of Kartu Prakerja and related social assistance programs should be extended to encompass women employed in the informal sector, who currently receive lower wages and bear the highest relative burden of childcare costs. Exclusion of informal sector workers from childcare support programs disproportionately discourages childbearing among precisely those households most vulnerable to inflation-driven real income erosion. Third, the Tapera housing savings program, which facilitates earmarked savings for housing purchases, should be accelerated and broadened in scope to include a child-linked co-matching mechanism, analogous to Singapore's Child Development Account, whereby government contributions to a savings account match parental deposits earmarked for education, childcare, and medical expenses for children under the age of twelve. A compound savings mechanism of this type reduces the fiscal pressure on annual budget allocations while providing families with a growing real resource buffer against child-rearing costs.

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