When Individual Meets Megacity: How Personal-Structural Interactions Drive Ultra-Low Fertility in China

Topic

This study investigates how individual socioeconomic conditions interact with structural constraints to shape fertility decisions in China's megacities. Based on census data (1990-2020), 1% population sample surveys, and annual population change surveys, we find a dramatic fertility decline in Chinese cities: Total Fertility Rate (TFR) dropped from above replacement level (2.1) in 1990 to below replacement around 1995, reached very low fertility (approximately 1.5) by 2000, and remained at that level until 2016. Following the universal two-child policy in 2016, fertility briefly rebounded but then sharply decreased again after 2018, reaching ultra-low levels (around 1.0) in recent years.

Megacities (Beijing and Shanghai) show distinct patterns: fertility postponement and decline occurred earlier and more sharply; the household registration system (hukou) exerts powerful effects, with non-local hukou holders facing severe fertility constraints; and the gap between fertility intentions and actual behavior is significantly larger than in other cities. This study addresses three core questions: What factors constitute key constraints on fertility decisions in megacities? How do these factors interact? What heterogeneity exists between megacities and other cities?

Theoretical Focus

Building upon classical fertility transition theories—Demographic Transition Theory, Second Demographic Transition Theory, Becker's economic theory of fertility, and Easterlin's relative income hypothesis. We emphasize how megacities' unique structural characteristics (extremely high living costs, intense competition, strict hukou barriers, and limited public resources) moderate the effects of individual factors on fertility decisions.

Three core mechanisms are proposed: (1) Constraint Amplification—identical constraint factors produce more substantial fertility-suppressing effects in megacities; (2) Effect Reversal—factors that typically promote fertility (e.g., high education, high income) may become fertility-suppressing in megacities due to higher opportunity costs; (3) Dual Constraint—interactive effects between individual characteristics and urban structure

create compounded disadvantages. Additionally, we examine the discrepancy between fertility intentions and actual behavior through the Oaxaca-Blinder decomposition.

Data

This study uses four waves of Chinese General Social Survey (CGSS) data after the end of China´s “One-Child Policy”: CGSS 2017, 2018, 2021, and 2023. CGSS employs multi-stage stratified probability sampling across 31 provinces. Sample selection includes urban residents aged 18-49. Pooled sample: 11,947 individuals, with 2,087 (17.5%) from megacities. By childbearing status: approximately 4,500 childless and 7,400 with children.

Key variables include: (1) Dependent variables—ideal number of children, actual number of children, intention-behavior gap; (2) Independent variables—individual conditions (gender, age), economic status (income, housing ownership, housing area), social identity (education, hukou type, occupation), time constraints (working hours), cultural attitudes (gender role attitudes), spouse characteristics, and parental background; (3) City classification—megacities (Beijing, Shanghai) versus other cities.

Methods

This study employs a multi-level quantitative analysis strategy. We stratify samples by childbearing status (childless vs. with children) and estimate multiple regression models, including OLS, Ordered Logit, Poisson, and Logit, to identify the dominant factors affecting fertility intentions and actual fertility. Relative importance is assessed through standardized coefficients, Shapley value decomposition, and average marginal effects. Interaction effects are tested to examine synergistic constraints, including economic × time constraints, social identity × economic status, and spouse characteristic interactions. We construct a gap variable (ideal minus actual children) and use the Oaxaca-Blinder decomposition to attribute the intention-behavior gaps between megacities and other cities to endowment effects versus coefficient effects.

For contextual heterogeneity analysis, uniqueness tests employ full-sample regressions with megacity × factor interaction terms. Direction reversal tests use separate regressions for megacity and other city samples, comparing the signs and significance of the coefficients. Intensity gradient analysis compares standardized coefficients and calculates Effect Size Ratios to quantify the degree to which constraint effects are more potent in

megacities. Forest plots visualize differences in coefficients with confidence intervals. Robustness checks include alternative variable measurements used to test the results.

Expected Findings

Dominant Factors and Interactions. Economic constraints, particularly housing ownership, are expected to emerge as the strongest factors suppressing fertility intentions in megacities, followed by time constraints. Higher education may negatively affect fertility in megacities due to elevated opportunity costs. At the same time, non-local hukou status is expected to suppress fertility due to restricted access to public services significantly. The relative importance ranking of factors is likely to differ between childless and with-children groups. Interaction analyses are expected to reveal synergistic suppression effects, in which low income combined with long working hours produces a disproportionately more substantial fertility decline. Non-local hukou status intersecting with low income is anticipated to create compounded disadvantages.

Intention-Behavior Gap. Megacities are expected to show a substantially higher proportion of individuals whose actual fertility falls short of their stated intentions. Oaxaca decomposition is anticipated to reveal that this gap stems from both endowment effects—megacities having more expensive housing, smaller living spaces, and longer working hours—and coefficient effects, in which the same characteristics produce a more potent suppression of fertility realization in megacities. Principal gap drivers are expected to include insufficient housing area, excessive working hours, non-local hukou restrictions, and limited childcare services.

City Heterogeneity. Uniqueness tests are expected to identify factors that produce significantly stronger effects in megacities, particularly non-local hukou status, housing area constraints, and working hour pressures. Direction reversal is anticipated for certain factors: higher education may suppress fertility in megacities due to extreme opportunity costs while promoting fertility in other cities; similarly, higher income may show weak effects in megacities but demonstrate apparent promotional effects elsewhere. Intensity gradient analysis is expected to demonstrate that constraint factors operate substantially more powerfully in megacities.

Theoretical and Policy Implications. These findings are expected to provide empirical support for the "Structural Constraint Heterogeneity" framework, demonstrating that urban

context significantly moderates the influence of individual characteristics on fertility decisions. The three proposed mechanisms—constraint amplification, effect reversal, and dual constraints—are expected to be clearly evident in the data. From a policy perspective, results are expected to indicate that megacities require differentiated fertility support policies. Priority policy areas are likely to include reducing housing cost burdens, limiting excessive working hours, weakening hukou barriers, and substantially expanding accessible childcare services. These findings will contribute to understanding post-industrial metropolitan fertility dynamics and enrich discussions of theories explaining ultra-low fertility by analyzing non-Western contexts.