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Economic Growth and Low Fertility Trap: A Comparative Study of China and the US from the Perspective of Childbearing Costs

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Abstract. The concomitant decline in fertility rates with economic growth has become a core issue hindering sustainable socioeconomic development globally. Based on classical fertility economics theories, this paper takes China and the United States as research samples to analyze the mechanisms of economic growth on fertility behavior, and compares the differential effects of four core economic variables—income level, housing costs, education expenditure, and social welfare—in the two countries, while sorting out the evolution and regulatory effects of their fertility policies. The study finds that economic growth suppresses fertility intentions by increasing the opportunity and direct costs of childbearing, rather than boosting fertility rates automatically. Both countries face sub-replacement fertility rates, but China is more severely affected by high housing prices and education costs, falling into an ultra-low fertility trap. In contrast, the US forms a fertility floor through tax credits and immigration policies, with a significantly higher fertility rate. This paper argues that alleviating the long-term impact of low fertility and providing demographic support for sustainable economic development requires a systematic fertility support system that integrates economic and social policies to reduce the costs of childbearing, childcare, and education.

Keywords: Fertility Rate, Economic Growth, Childbearing Costs, Demographic Policy

1. Introduction

The continuous decline in fertility rates has become a global demographic trend. According to the United Nations World Population Prospects 2024, the global total fertility rate (TFR) dropped from 5.0 in 1950 to 2.3 in 2023, with the average TFR in high-income economies at only 1.5, generally below the 2.1 population replacement level [1]. This forms a prominent "demographic-economic paradox": economic growth is accompanied by persistent fertility decline, and fertility rates rarely recover spontaneously, becoming a core topic in population economics.

As the world's two largest economies, China and the US represent emerging and developed economic models respectively, both experiencing fertility decline amid growth but with notable differences in decline magnitude and policy responses. China's per capita GDP rose from $156 in 1978 to $12,700 in 2023, while its TFR plummeted from 2.72 to 1.01 [2]; the US, with a 2023 per

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capita GDP of $81,600, saw its TFR fall from 1.84 in 1980 to 1.62 in 2023, remaining above China and most East Asian and European developed economies [3]. Existing studies mostly focus on single-country economic-fertility relationships, and systematic China-US comparative analysis needs deepening [1, 3]. Based on this, this paper sorts out the theoretical mechanisms of economic growth on fertility, compares the performance of core economic variables and fertility policies in the two countries, and extracts conclusions and policy implications to support China's construction of a fertility-friendly society.

2. Theoretical foundation and core pathways of economic growth affecting fertility rates

2.1. Core theoretical foundation

The analytical framework of this paper is based on the classical fertility theory of the New Home Economics, the core of which is Becker's quality-quantity trade-off model of children and the cost-benefit analysis framework of fertility decision-making. This theory holds that household fertility decisions are the result of a rational trade-off between the costs and benefits of childbearing, and economic growth systematically changes both ends of this trade-off.

On the one hand, economic growth significantly increases the cost of childbearing, including direct costs and opportunity costs. Direct costs refer to the direct monetary expenditure on child rearing, education, and housing, while opportunity costs specifically refer to the career development opportunities and income that parents (especially women) give up due to childbirth and childcare. The more developed the economy, the higher the education level and labor force participation rate of women, and the higher the opportunity cost of childbearing. At the same time, economic modernization drives parents' increasing preference for investment in the "quality" of their children, which in turn pushes up the cost of raising a single child. Families tend to replace "quantity" with "quality", ultimately reducing the number of births.

On the other hand, economic growth weakens the benefit attribute of childbearing. In traditional agricultural societies, children are the core labor force and old-age security carrier of the family, and the long-term benefits of childbearing are significant. With economic development, the social security system is continuously improved, and systems such as pensions and public medical care have gradually replaced the old-age security function of children. The economic benefits of childbearing continue to weaken, further reducing the fertility intention of families.

2.2. Income level and economic development

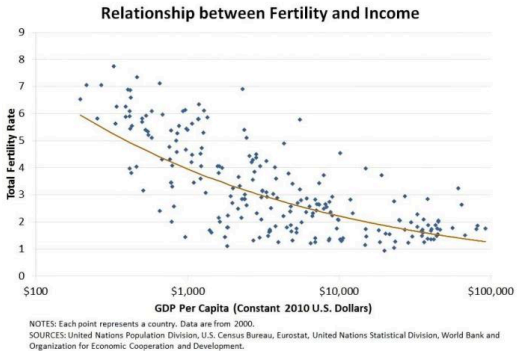

Figure 1. Relationship between fertility and income [4]

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Macro-level cross-country data show a significant negative correlation between income level and fertility rate: TFR generally falls below 2.0 when per capita GDP exceeds $10,000, while low-income countries with per capita GDP below $1,000 have a female average fertility of over 3 [5]. This law is verified in both China and the US but with differentiated characteristics.

China's income growth from rapid economic growth is highly synchronized with fertility decline, driven by rapid urbanization and rising female labor force participation. From 1990 to 2023, China's female higher education gross enrollment rate rose from less than 5% to 59.6%, with female labor force participation rate remaining above 60% for a long time [2], significantly increasing childbearing opportunity costs. Economic growth also drives young people to prioritize career development, with China's female average first marriage age rising to 28.67 in 2020, compressing the childbearing window [2]. Short-term economic fluctuations also impact fertility: China's TFR dropped from 1.3 to 1.09 during the 2020-2022 COVID-19 pandemic due to weak income expectations [2], similar to the US's TFR decline from near 2.1 to 1.87 after the 2008 financial crisis, with no significant rebound post-recovery [3]. This proves negative economic shocks have long-term, irreversible inhibitory effects on fertility [2, 6, 7].

2.3. Housing prices and housing costs

Housing costs affect fertility through the wealth effect (asset appreciation for homeowners boosting fertility) and cost squeeze effect (rising prices raising living costs for non-homeowners, inhibiting fertility) [6]. This mechanism is fully verified in the US: a $10,000 increase in housing value raises homeowners' fertility rate by 5% and reduces non-homeowners' by 2.4%, with a weighted net 0.8% increase, supported by the US's high homeownership rate and mature rental market offsetting the squeeze effect [7].

In China, the squeeze effect of high housing prices far outweighs the wealth effect, becoming a core factor suppressing fertility. From 2016 to 2021, China's urban housing price index rose by 54%, while the crude birth rate dropped by 45% from 13‰ to 7.52‰ [2], with a significant causal relationship confirmed by academic quasi-natural experiments [6]. The core reasons are that urban housing is tightly bound to education and medical public services, making real estate a threshold for high-quality educational resources [6]; young groups face high down payment and mortgage pressure, with mortgages accounting for over 40% of household disposable income, squeezing childcare expenditure and forcing families to postpone or abandon childbearing plans [2].

2.4. Education costs and child-rearing expenses

Economic growth raises labor market human capital requirements, driving parents to increase education investment, pushing up single-child rearing costs and strengthening the quality-quantity substitution effect, a core driver of fertility decline [8]. This effect is particularly prominent in China: urban families spend over 600,000 yuan on raising a child to undergraduate graduation (over 1 million yuan in first-tier cities), with education expenditure accounting for over 40% of annual household income [2]. "Involutionary" education competition spawns the "intensive parenting" model, requiring massive monetary and time investment, reducing multi-child willingness. The 2016 comprehensive two-child policy's short-lived effect is mainly due to high education cost pressure [2].

US education costs are also high but with a different impact mechanism: free public K-12 education reduces basic education rigid expenditure, with family education spending concentrated in higher education [3], and a complete grant, scholarship and student loan system alleviates one-time

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expenditure pressure [3]. However, high student debt inhibits young people's marriage and fertility: US youth under 30 have over $1.5 trillion in student loans, with indebted groups showing significantly lower marriage and fertility probabilities [3].

2.5. Social welfare and security system

The social welfare system affects fertility in two opposite directions: universal pension and medical security replace children's old-age security function (inhibiting fertility), while childbearing-specific welfare support reduces costs (boosting fertility). The net effect depends on how the welfare system is set up [9].

China and the US have distinct welfare system characteristics: China's social security system has achieved full coverage in recent decades, weakening the traditional "raising children for old age" motivation, but childbearing-specific welfare was long absent [2]. Only after the 2021 three-child policy did regions introduce childcare subsidies and inclusive childcare policies, with problems such as low standards, limited coverage and regional differences, failing to form a systematic support system [2]. The US's market-oriented social security system has a lower public pension replacement rate than China, with higher family dependence on children for old age [3]. Meanwhile, the US has built a mature family support system through the tax system, including Child Tax Credit (CTC), Child and Dependent Care Tax Credit (CDCTC) and Earned Income Tax Credit (EITC) [10]. Since 2018, each US child under 17 has a maximum annual $2,000 tax credit (temporarily increased to $3,000-$3,600 in 2021), covering 10%-20% of middle-income family childcare costs . Empirical studies show a $1,000 increase in annual child tax benefits raises married women's fertility probability by about 10% [10]. However, the US lacks federal-level paid parental leave (only unpaid maternity leave) and sufficient inclusive childcare support, limiting further fertility improvement [3].

3. Evolution and regulatory effect comparison of fertility policies in China and the United States

3.1. Evolution of China's fertility policy: from family planning to pro-natalist incentives

China's fertility rate changes have undergone significant policy interventions, with two core evolution stages: the family planning stage (1970-2015) and the pro-natalist incentive stage (2013-present) [6]. The 1970s "late marriage, spaced childbearing, fewer births" policy reduced China's TFR from 6.1 to 2.7 by 1980 [6], and the 1980 nationwide one-child policy, combined with economic growth, pushed China's TFR below the replacement level in the 1990s and to around 1.6 in 2000 [6, 8]. Facing aging and low fertility pressure, China relaxed birth restrictions step-by-step: the 2013 selective two-child policy, 2016 comprehensive two-child policy and 2021 three-child policy, shifting to systematic pro-natalist incentives [2]. Local governments have launched cash subsidies, maternity leave extensions, public service support and housing/education preferential policies for multi-child families [2]. However, these policies have not reversed fertility decline due to insufficient intensity and fragmentation, failing to offset high housing and education cost pressure [2].

3.2. U.S. fertility policy system: market-oriented family support

The US has never implemented birth limitation policies, with fertility rates regulated indirectly by the economic environment and family support policies, centered on market-oriented tax incentives

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[9, 10]. Its core policy system includes a tax credit system (CTC, CDCTC, EITC) that covers different income-level families and reduces actual childcare costs [9], and supporting public services (free public K-12 education, Medicaid children's free medical care for low-income families) [3]. Limitations include insufficient federal paid parental leave and high market-oriented childcare costs [3]. In addition, the US's open immigration policy forms an important fertility floor: immigrant women have a significantly higher TFR than native-born women, with immigrant families accounting for over 23% of 2022 US new births [3], supplementing the childbearing age population and delaying fertility decline.

4. Comparative analysis of economic growth models and fertility evolution in China and the United States

4.1. Core differences in fertility evolution trends

China and the US show distinct fertility trajectories: China's TFR was about 6.0 in the 1950s (an extremely high level), and under family planning and economic growth, it fell below the replacement level in 1990, to 1.3 in 2020 and 1.01 in 2023, entering the world's ultra-low fertility range [2]. The US's fertility rate changed gently: a post-WWII "baby boom", gradual decline from the 1960s, 1.8-2.1 TFR from 1980 to 2008 (near replacement level), and a 2023 TFR of 1.62 (still above China, Japan, South Korea and most European countries) [3]. Notably, China fell into the ultra-low fertility trap (TFR≈1.0) at the middle-income stage (per capita GDP≈$10,000), while the US maintained a TFR above 1.6 at the high-income stage (per capita GDP≈$80,000) [7-9], proving economic growth is not the only determinant of fertility rates.

4.2. Core causes of fertility differences

First, economic growth model differences: China's growth is accompanied by rapid urbanization, surging housing and education costs, with growth dividends failing to transform into fertility support [6, 2]; the US's stable growth, completed urbanization and reasonable housing price-to-income ratio, plus tax system tilts to childbearing families, alleviate fertility inhibition [7, 3]. Second, welfare and support system differences: the US has a unified national tax credit-based family support system , while China's late-starting, fragmented pro-natalist policies lack a national institutional framework [2]. Third, demographic and immigration policy differences: the US's open immigration policy supplements the childbearing age population [3], while China's natural fertility-dependent population growth is aggravated by aging and a shrinking childbearing age population [3]. Fourth, cultural and family concept differences: China's traditional "more children, more blessings" concept has weakened, with rising individualism and delayed marriage/childbearing [2]; the US's family or religious culture supports marriage and childbearing, with high social tolerance for diverse family models (over 40% non-marital childbirth) [3], while China's childbearing is tightly bound to marriage, with unmarried rate rising directly reducing fertility [2].

5. Conclusion

Based on China-US comparative experience and China's national conditions, four policy implications are proposed: First, build a unified national institutional fertility support system: draw on the US tax credit experience [10], upgrade fragmented local subsidies to a national personal income tax child special additional deduction, implement gradient deduction for multi-child families and cash refunds for low-income families. Second, resolve the high housing and education cost

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squeeze: coordinate fertility policies with housing/education policies; provide housing preferential treatment for multi-child families, promote compulsory education burden reduction, develop inclusive preschool education and incorporate it into the compulsory education system [2]. Third, improve the childcare service system and protect female employment rights: accelerate inclusive childcare service construction, implement paid parental leave, promote shared parental leave, establish enterprise fertility cost sharing mechanisms and crack down on gender employment discrimination [2]. Fourth, create a fertility-friendly social and cultural environment: improve equal rights protection for children born out of wedlock, tolerate diverse childbearing models, guide away from "intensive parenting" and build a social atmosphere respecting childbearing [2].

Based on China-US comparative experience and China's national conditions, four policy implications are proposed: First, build a unified national institutional fertility support system: draw on the US tax credit experience [10], upgrade fragmented local subsidies to a national personal income tax child special additional deduction, implement gradient deduction for multi-child families and cash refunds for low-income families. Second, resolve high housing and education cost squeeze: coordinate fertility policies with housing/education policies, provide housing preferential treatment for multi-child families, promote compulsory education burden reduction, develop inclusive preschool education and incorporate it into the compulsory education system [2]. Third, improve the childcare service system and protect female employment rights: accelerate inclusive childcare service construction, implement paid parental leave, promote shared parental leave, establish enterprise fertility cost sharing mechanisms and crack down on gender employment discrimination [2]. Fourth, create a fertility-friendly social and cultural environment: improve equal rights protection for children born out of wedlock, tolerate diverse childbearing models, guide away from "intensive parenting" and build a social atmosphere respecting childbearing [2].

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