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The Conflicted Legacy of China's Population Policies

Key Takeaways

China's One-Child Policy was only a limited factor in reducing the country's fertility rate, which had fallen dramatically as China's economy developed.

China's population policies contributed to a startling increase in the sex ratio, threatening social stability.

The demographic effects of China's population control efforts have long-term social and economic consequences and will be difficult, if not impossible, to reverse.

1970 – 6

2016 – 1.6

Total fertility rate across a woman's lifetime in China fell from around 6 births in 1970 to 1.6 in 2016.

China's One-Child Policy had surprisingly little to do with lowering fertility rates, but it did lead to a severe imbalance in the sex ratio — with consequences that are likely to haunt the country for years.

From 1979 to 2015, China's One-Child Policy was the world's most stringent attempt at population control. Now, in the face of serious demographic challenges — including an aging population, a stubbornly low fertility rate, and a heavily skewed sex ratio — the Chinese government has relaxed the policy to two children and is tentatively moving to end all birth restrictions. The immeasurable moral, ethical and human costs of the policy to the Chinese society over its 36 years of implementation are widely documented and beyond doubt.

Yet the true social and economic consequences of China's population policies remain unclear. The Chinese government claims that the One-Child Policy prevented 400 million births and contributed to an increase in GDP per capita. But scholars have debated whether rapid economic development may have reduced fertility on its own, without the need for draconian policies. They also point to concerns about a shrinking workforce, difficulty caring for an elderly population, a surplus of unmarried men, the wellbeing of only children, and the tragic legacy of as many as 30 million "missing girls" through sex-selective abortion, neglect, and abandonment.

To what extent are these challenges the result of China's harsh population control measures, including the One-Child Policy? How effective will current policy reversals be in attenuating these trends? Or can they be altered at all?

China's 45-year effort to reduce its population – starting with the "Later, Longer, Fewer" (LLF) campaign in the 1970s, then the more severe and well-known "One-Child Policy" in 1979 – has been assumed to be largely responsible for the dramatic drop in China's fertility rate. Total fertility rate across a woman's lifetime fell from around 6 births per woman in 1970 to 1.6 in 2016, well below replacement levels. The Chinese government now hopes that relaxing previous restrictions might reverse the low fertility rate and help address the challenges facing the country.

Stanford University scholars Hongbin Li and Grant Miller argue, however, that fertility trends could take generations to reverse, if they can be altered at all.

Their research demonstrates that, ironically, China's aggressive One-Child Policy played a less significant role in achieving its goal of lowering China's fertility rate than previously thought. China's fertility rate had already declined dramatically during the 1960s and 70s and before the introduction of severe restrictions under the One-Child Policy.

120 male to 100 female births in China, 2000.

The two professors show that China's population policies, coupled with economic and medical advances, had a stark, unintended effect on the sex ratio at birth, contributing to the world's most skewed ratio of 120 male to 100 female births in 2000. They not only provide evidence that these policies influenced prenatal sex selection (sex-selective abortions), but also find evidence of postnatal sex selection (neglect, abandonment, and in the extreme, infanticide).

Rather than preventing a population explosion that threatened to outstrip China's economic development, the One-Child Policy may have been, in the words of professor Li, "the world's largest social experiment." As a result, China faces years of daunting demographic, social, and economic challenges.

Population Policy and Fertility Rates

MALTHUSIAN CATASTROPHE
Named after economist Thomas Robert Malthus (1766 – 1834), a Malthusian catastrophe occurs when population growth outpaces agricultural production, causing population to be limited by famine.

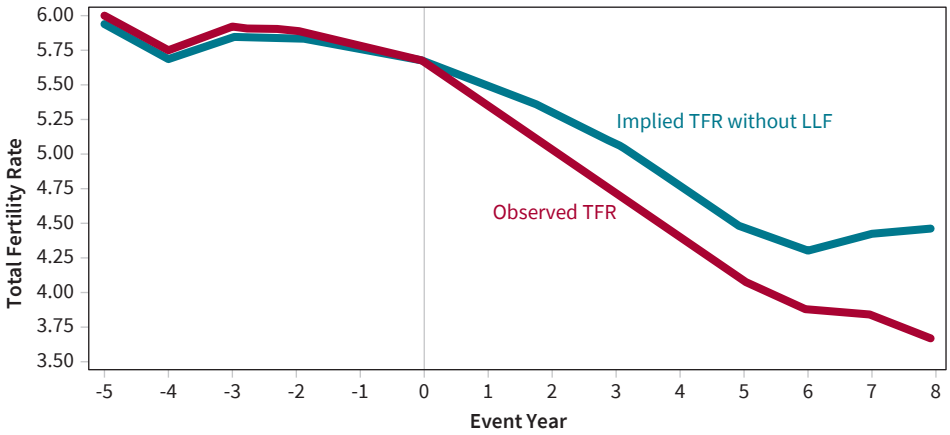
Professor Li notes that at the end of the Cultural Revolution in 1976, China's leadership was shocked to learn that while grain production in 1977 had stagnated to 1955 levels, the country's population had increased from 614 million in 1955 to 949 million in 1977. Fear of a Malthusian catastrophe prompted China's leaders to adopt increasingly radical birth control policies.

While China's One-Child Policy is often credited with dramatically cutting the country's population growth, studies by Li and Miller suggest that's not the case.

The Chinese government had actually been worried about China's population outstripping its food supply even as far back as the early 1960s. In 1971, the government launched a massive campaign, LLF, which encouraged couples to marry later, have longer intervals between births, and have overall fewer children. Provincial and local governments established birth planning offices and designated local birth planning officers. Birth quotas, while technically voluntary, would be tied to incentives for households and career advancement for officials.

In a study released in 2019, Professor Miller and his colleagues established that during the LLF policy period the country's overall fertility rate fell by more than 50%, from approximately six births per woman in 1970 to 2.75 in 1980 – one of the most rapid sustained declines in global history. Miller and his colleagues estimated that LLF by itself, disregarding other factors, reduced China's total fertility rate by about 0.8 births per woman and accounted for 26.7% of China's overall fertility decline before 1979, when the One-Child Policy began.

Figure 1. Change in TFR associated with LLF: 0.8 births per woman, or 26.7% of overall decline



Change in TFR associated with LLF: 0.8 births per woman, or 26.7% of overall decline

Source: Babiarz, Ma, Song, & Miller (2019)

However, it remains unclear what factors in addition to LLF lowered China's fertility rate before China adopted its One-Child Policy.

"That's the million dollar question of fertility decline in the 1970s," says Miller. "One factor could be the big reduction in infant mortality during part of that period." The theory is that fewer infants were needed because more survived. "But I'd like to study that issue," he adds.

"It will be a complex topic," says Li, "because there were different conditions at different times." Fertility rates fell, rose and fell again in China's turbulent 1960s, as China endured Mao's Great Leap Forward, then the Cultural Revolution.

By the time the One-Child Policy was launched, China's fertility rate was already at 2.75. It would take another two decades of draconian rules under the One-Child Policy for fertility rates to decrease to the current rate of 1.6.

In 2016, there were 33.6 million more men than women.

A Lopsided Sex Ratio

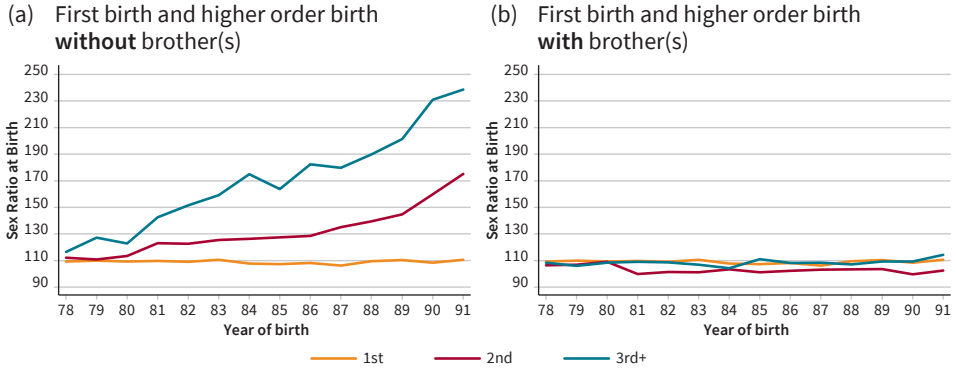
The decline in China's fertility rate has been accompanied by a massive sex imbalance. Sex ratio at birth soared from about 1.06 males to females in 1978 to 1.20 in 2000, the highest in the world. In 2016, there were 33.6 million more men than women. While the One-Child Policy is correctly seen as the primary culprit, Li and Miller point out several complications.

To start, Miller notes that sex selection (and the resulting imbalance in the sex ratio) happened before ultrasound technology was commonly available in China. Couples who wanted sons could have used two different sex selection strategies. First, couples could continue to have children until the desired number of sons was born, otherwise known as son-preferring fertility stopping rules. However, this would not alter overall sex ratios at birth (mathematically, each child still has the same probability of being a boy.)

Moreover, couples might treat sons and daughters differently after birth (i.e. post-natal selection). For female infants that could mean adoption, abandonment, neglect, and even infanticide. “The latter was a well-documented practice in Imperial China,” says Miller. He points out that the sex ratio imbalance emerged during the 1970s, earlier than generally recognized and before the availability of ultrasound machines. Among couples with multiple children but without a son, sex ratios rose as high as 115-121 to 100 by the end of the 1970s. Thus, LLF policy may have had a direct impact on sex selection practices and imply post-natal neglect.

After 1978, the sex ratio became dramatically more lopsided under the One-Child Policy. Economic development and the availability of ultrasound reduced barriers to sex selection, and millions of parents chose to have sex selective abortions. As found by several of Li’s papers, the distortion of the sex ratios was focused on the second- and higher-birth parities, because parents risking the fertility sanction to have more than one children are more likely to practice gender-selective abortion. Still, research into sex selection requires disentangling the impact of economic development and One-Child Policy enforcement.

Figure 2. Sex Ratio at Birth by Parity and Sex of Older Sibling(s) over Time



Source: Chen, Li, & Meng (2013)

Because the One-Child Policy initially applied only to the Han Chinese but not to minorities, Li and his coauthors were able to identify a large causal impact of the One-Child Policy on the rise of male to female sex ratios. Essentially, Han becomes a treatment group and minorities are a control group in this “natural experiment.” Comparing the change of sex ratios for Han women after 1979 to the change of minority women, Li and his coauthors find that enforcement of the One-Child Policy accounted for about 94% of China’s total increase in sex ratios for birth cohorts in the 1980s and for over half of the total increases in sex ratios for the 1991–2005 birth cohorts, respectively.

Li and his colleagues have also used new data sources to understand how sex selection technology matters. For example, ultrasound machines (an expensive piece of equipment in the 1980s) were introduced gradually in China. By combing through local records and chronicles, they can determine what year a county first received an ultrasound machine, and make comparisons to the sex ratio. They find that 40% to 50% of the increase in the sex ratio can be explained by this diffusion of ultrasound technology, especially for second births in rural areas.

40-50% INCREASE

A 40 to 50% increase in the sex ratio can be explained by the introduction of ultrasound technology.

Land reform also played a surprising role. In a study published in 2019, Li and his colleagues note that rural land reform in the 1980s unleashed rapid growth in farm output and a reduction in poverty, but also dramatically increased the sex ratio. They discovered that sex ratios for second births following a firstborn girl increased from 1.1 to 1.3 in the four years after reform, and surprisingly, was even more lopsided for rural families with higher education and income. They suggest that with rising farm incomes, families saw even more benefit to sons. They could use their newfound income to travel on the growing rail network to urban areas with ultrasound machines and ensure a male child.

Long-term Consequences

China's population policies have had severe direct demographic consequences, with an aging population and skewed sex ratio. However, the economic and social consequences have only relatively recently become clear, including slower growth and higher spending on welfare and pensions. In addition, Stanford researchers have found some unexpected consequences: increased crime and decreased innovation.

In a study published in 2013, Li and his collaborators found a substantial link between sex ratios for 16-25 year old's and crime. Between 1988 and 2004, criminal offenses in China rose at an annual rate of 13.6%. Previous explanations for this dramatic rise in crime have included economic reforms, rising inequality, and weakened social control. But Li and his colleagues proposed another explanation – "surplus men." They point out that during that same 16-year period, the 16-25 sex ratio rose from 1.02 to 1.06, implying a tripling of "surplus men."

13.6%
INCREASE

Between 1988 and 2004, criminal offenses in China rose at an annual rate of 13.6%.

"That young, unmarried men are the most crime-prone is a truism in criminology," Li and his colleagues write, "and China is no exception." In 2000, men made up 90% of arrestees. Young men aged 16-25 accounted for more than two-thirds of violent crimes and property crimes. Controlling for other social and economic factors, they find that sex ratio differences may explain roughly one seventh of the overall rise in crime.

Another key consequence may be a decline in innovation, says James Liang, founder of the travel service Ctrip and PhD recipient from the Graduate School of Business. In his 2018 book, *The Demographics of Innovation,* Liang argues that the size of a country's population, especially its young population, is critical for innovation. By 2030 to 2040, Liang says China's aging population will cause it to hit what he calls a "speed bump" when it comes to innovation.

> **"The majority of China's fertility decline had nothing to do with its birth control policies, so eliminating them won't bring back fertility rates."**
>
> — Hongbin Li

Stubborn Trends

Professors Li and Miller stress that China's lower fertility and male-biased sex ratios will be difficult to reverse, and so will their consequences. While the One-Child Policy was abandoned in 2015, they argue it won't work.

"The majority of China's fertility decline had nothing to do with its birth control policies, so eliminating them won't bring back fertility rates," says Li.

Moreover, as China's economy continues to improve, fertility rates are more likely to decline further than they are to rise.

Hongbin Li is the James Liang Director of the China Program at the King Center and a Senior Fellow at the Stanford Institute for Economic Policy Research (SIEPR).

Grant Miller is an Associate Professor of Medicine at the Stanford University School of Medicine, a Core Faculty Member at Stanford Health Policy, and a Senior Fellow at the Freeman Spogli Institute for International Studies (FSI) and the Stanford Institute for Economic Policy Research (SIEPR).

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"It's partly about opportunity cost," says Li. "If you're a woman with a higher education, you want to work. But if you have children you may lose a few years in the labor market. So as women's education and wages improve, their opportunity costs to have children become higher."

Indeed, fertility rates among educated women in China are among the lowest in the world. So, are there policies China could adopt to increase fertility rates?

"There has been a mixed bag of pro-natalist policies in other countries, such as better maternity leave, child-care benefits," says Miller. Some countries have expanded day care services, allowed flexible work hours for pregnant and breast-feeding women, more generous welfare for single parents, and more accessible in vitro services. Some of these policies may have worked in Scandinavian countries, but less well elsewhere. It's an area Professor Miller says he's interested in studying more.

But, he adds, "What we've seen," says Miller, "is that population control strategies have human costs and unforeseen consequences."

References

Almond, D., Li, H., & Zhang, S. (2019) "Land Reform and Sex Selection in China" *Journal of Political Economy*, 127(2): 560-585.

Babiarz, K.S., Ma, P., Song, S., & Miller, G. (2019). "Population Sex Imbalance in China before the One Child Policy." *Demographic Research*, 40(13): 319-358.

Babiarz, K.S., Ma, P., Miller, G., & Song, S. (2018). "The Limits (and Human Costs) of Population Policy: Fertility Decline and Sex Selection in China under Mao." NBER Working Paper No. 25130.

Chen, Y., Ebenstein, A., Edlund, L., & Li, H. (2015). "Girl Adoption in China—A Less-known Side of Son Preference." *Population Studies*, 162(2): 161-178

Chen, Y., Li, H., & Meng, L. (2013). "Prenatal Sex Selection and Missing Girls in China: Evidence from the Diffusion of Diagnostic Ultrasound." *Journal of Human Resources*, 48(1): 36-70

Edlund, L., Li, H., Yi, J., & Zhang, J. (2013). "Sex Ratios and Crime: Evidence from China." *Review of Economics and Statistics*, 95(5): 1520-1534.

Guo, R., Li, H., Yi, J., & Zhang, J. (2018). "Fertility, Household Structure and Parental Labor Supply: Evidence from Rural China." *Journal of Comparative Economics*, 46(1): 145-156.

Li, H., & Zheng, H. (2009). "Ultrasonography and Sex Ratios in China." *Asian Economic Policy Review,* 4(1): 121-137.

Li, H., & Zhang, J. (2007). "Do High Birth Rates Hamper Economic Growth?" *Review of Economics and Statistics*, 89(1): 110-117.

Li, H., Yi, J., & Zheng, J. (2011). "Estimating the Effect of the One-Child Policy on Sex Ratio Imbalance in China: Identification Based on the Difference-in-Differences." *Demography*, 48(4): 1535-1557.

Liang, J. (2018). *The Demographics of Innovation: Why Demographics is a Key to the Innovation Race*. Wiley.

Liang, J. (2019). James Liang: Want More Working Women to Have Babies? State With Promoting Equality. Caixin Media. *https://www.caixinglobal.com/2019-03-07/james-liang-want-more-working-women-to-have-babies-start-with-promoting-equality-101389024.html*

Liang, J., Wang, H., & Lazear, E. (2016) "Demographics and Entrepreneurship." NBER Working Paper No. 20506

Liang, J., Wang, H., & Lazear, E. (2018). "Demographics and Entrepreneurship." *Journal of Political Economy*, 126(51): S140