WEP Warwick Evans Publishing

International Journal of Global Economics and Management

ISSN: 3005-9690 (Print), ISSN: 3005-8090 (Online) | Volume 3, Number 3, Year 2024
DOI: https://doi.org/10.62051/ijgem.v3n3.42
Journal homepage: https://wepub.org/index.php/IJGEM/index

The Demographic Transition in China: The Evidence from Survey Data

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ABSTRACT

Using the CGSS, we estimate the fertility rate in the Chinese mainland and stratified the eleven groups by year of birth, the four groups by hukou and five groups by education levels. Our study shows that the first demographic transition to replacement level happened in the 1980s, the second to low fertility rate of 1.5 took place in around 2000. There are different patterns of demographic transition among people with different hukou or education levels. Permanent residents in urban regions and people with college degrees have irreversible fertility rate of about 1.0. The policy implication is that the government should concentrate resources and support the people with the higher fertility intention.

KEYWORDS

Demographic Transition; Low Fertility; Survey Data

1. INTRODUCTION

The rapid decline of the fertility rate is one of the most fundamental social changes that happened in China. The fertility decline began around the 1970s, with the TFR falling from about 6.1 children per woman in 1970 to less than 3.0 in 1980s. It took the Chinese mainlandonly aboutten years to finish the first demographic transition before the introduction of the onechild policy (Roser, 2014). In 1991, the fertility continued to fall to 1.9, below replacement level, and then stabilized, ranging between 1.5 and 1.8, for over two decades before it started to other long-run decline again in 2018, reaching a low of 1.20 in 2023 (World bank, 2024) . Low fertility is not unique to the Chinese mainland but common in middle and higher regions, especially the Confucian regions. Now, the Confucian regions have very low fertility rates can yield labor shortages and economic stagnation: the Chinese mainland (1.00), Japan (1.21), the South Korea (0.72), Taiwan (0.87), Singapore (0.94), Hong Kong (0.72) and Macao (0.66) (UN, 2024).

In this paper, we wish to address one research questions: How high is fertility in today's China? It appears to be a simple fact that could be answered by government statistics. Unfortunately, this is not true for China. For a variety of complicated reasons, ranging from politics to practical difficulties, government statistics on Chinese fertility have been questioned for their accuracy (Hvistendahl, 2013). This concern is exacerbated by the long-standing concealment practices of China's National Bureau of Statistics (NBS), responsible for constructing and releasing government data on China, such that

no original micro-level data are accessible to any independent researcher that could be used to corroborate the macro-level statistics it releases. What is the true level of fertility in today's China? Scholars continually and heatedly debate this question (Chen, 2011; Guo et al., 2009). In this paper, we contribute to this debate by computing estimates of the fertility rate using a newly available nationally representative survey, the Chinese General Social Survey (CGSS).

2. DATA

The CGSS is the earliest national representative continuous survey project run by academic institution in the Chinese mainland. CGSS is aimed to systematically monitor the changing relationship between social structure and quality of life in both urban and rural China. The first wave of survey was carried out in 2003. Ten additional surveys took place in 2006, 2008, 2010, 2011, 2012, 2013, 2015, 2017, 2018 and 2021, respectively. The survey covers most provinces in the Chinese mainland. The targeted population of the CGSS are civilian adults aged 18 and above.

The key variable of the research is the total number of biological children born in a lifetime for women. There is only three waves of survey, 2017, 2018 and 2021, including this information. The 2017 wave of survey covered 28 provinces, the 2018 wave included 29 provinces, and the 2021 survey encompassed 19 provinces because of the COVID-19 interruption. The primary sample was created by consolidating three sub-samples collected from the three surveys. The participants are women aged 40 and above. Although women below 50 are still capable of having children, it is very unlikely to have children after the age of 40 in low-fertility age. After data cleaning, the sample size is 12544.

The stratified variables are birth cohort, education level and hukou. Hukou is a household registration system that identifies a person as a local resident. Previously, China's hukou was mainly divided into agricultural and non-agricultural hukou, but in recent years, many areas have implemented a new hukou system, that is, agricultural and non-agricultural hukou abolished, in the registration of hukou, the unified registration as a resident hukou.

Birth cohort is defined using year of birth, a interval every five years except the lowest and highest. As to education level, the participant in CGSS was asked 13 items question on education level. We categorized education level, recorded as highest grade attained, into five groups: illiteracy, primary school, junior school, senior school, college and above. The abbreviations are ill, pri, jun, sen and col, in order. The question of Hukou has seven items and is reduced to 4 groups: agriculture, non-agriculture, resident shifted from agriculture and resident shifted from non-agriculture. The abbreviations are agr, nagr, ragri, rnagri, in order. Table 1 presents the contingency table of age cohort in respect to hukou and education level.

Table 1. The sample characteristics

Birth cohort	Hukou				Education level				
	agr	non-agr	res-agr	res-non-agr	ill	pri	jun	sen	col
(1920,1930]	34	28	4	19	46	24	6	5	4
(1930,1935]	137	88	37	73	186	85	30	14	20
(1935,1940]	245	127	68	99	241	152	61	56	29
(1940,1945]	438	183	104	115	303	274	141	78	44
(1945,1950]	759	256	136	185	388	497	268	127	56
(1950,1955]	1037	382	157	262	632	526	444	173	63
(1955,1960]	859	350	131	255	410	363	346	407	69
(1960,1965]	1183	371	153	241	285	513	609	421	120
(1965,1970]	1232	339	162	164	262	627	609	217	182
(1970,1975]	914	344	155	143	155	444	515	231	211
(1975,1980]	330	128	57	60	30	125	215	89	116

3. THE DECLINE OF FERTILITY RATE

We divide the primary sample into nine groups by age. Table 2 shows the fertility rate grouped by birth cohort. This table is quite revealing in several ways. First, it is apparent that a long-run decline in fertility rates. The cohort born prior to 1930, there is 3.4 children per woman, however, there is only 1.58 children per women born after 1975. Second, contrary to expectations, the total number of children for the early birth cohort is below 4. We believe the estimates for the first few birth groups are downward biased. The Part four will discuss the cause. Third, we find that demographic transition from the fertility rate of 3 to 2 happen in 1970s, corresponding to the birth cohort born between 1940 and 1950. From this point of view, one child policy implemented in 1979 is not necessary. The second demographic transition, which the fertility rate approached 1.5, took place in about 2000, Corresponds to the timing of births for cohort born in the post-1970s. Because the primary samples do not cover the cohort born after 1980, Table 2 do not provides the most recent estimates on fertility rate. Undoubtedly, in recent decade, the fertility rate of has dropped below 1.5.

Table 2. The fertility rate stratified by birth cohort

Birth cohort	Fertility rate
(1920, 1930]	3.4(1.75)
(1930, 1935]	3.61(1.69)
(1935, 1940]	3.36(1.63)
(1940, 1945]	2.99(1.39)
(1945,1950]	2.46(1.22)
(1950, 1955]	2.03(1.02)
(1955, 1960]	1.78(0.95)
(1960, 1965]	1.74(0.87)
(1965, 1970]	1.63(0.81)
(1970, 1975]	1.55(0.76)
(1975, 1980]	1.58(0.69)
Notes: Standard deviations are in parentheses.	

Due to large social and economic gap between urban and rural regions in the Chinese mainland, we distinguish between fertility rates in different hukou system, as shown in Table 3. What is interesting about the data in this table is the large gap in fertility rate between urban and rural regions. The farmers including the agriculture and the resident shifted from agriculture have fertility rate above 1.5, far higher than the urban equivalent. Second, people including the non-agriculture and the resident shifted from non-agriculture have a very low fertility rate approaching to 1.0. At last, the fertility rate for the birth cohort born after 1975 is recovering. One possible explanation is the stimulus from the two child policies. Because of the lack of samples covering the participants born after 1980, it's not clear whether the recovery is a long-term or short-term.

Table 3. The fertility ratestratified by birth cohort and hukou

Birth cohort	agr	non-agr	res-agr	res-non-agr
(1920, 1930]	3.41(2.02)	3.18(1.68)	3.75(1.5)	3.63(1.46)
(1930, 1935]	4.07(1.88)	3.14(1.42)	3.65(1.58)	3.3(1.45)
(1935, 1940]	3.88(1.8)	2.96(1.4)	3.22(1.47)	2.67(1.03)
(1940, 1945]	3.38(1.43)	2.61(1.27)	3(1.1)	2.12(1.06)
(1945, 1950]	2.89(1.2)	1.8(0.98)	2.46(1.06)	1.62(0.75)
(1950, 1955]	2.48(0.98)	1.46(0.76)	1.72(0.69)	1.27(0.7)
(1955, 1960]	2.22(0.97)	1.22(0.55)	1.73(0.87)	1.11(0.41)
(1960, 1965]	2.06(0.87)	1.22(0.55)	1.52(0.8)	1.14(0.47)
(1965, 1970]	1.85(0.83)	1.27(0.62)	1.3(0.65)	1.09(0.46)
(1970, 1975]	1.78(0.78)	1.25(0.59)	1.27(0.58)	1.06(0.51)
(1975, 1980]	1.73(0.72)	1.34(0.54)	1.51(0.63)	1.28(0.61)
Notes: Standard deviations are in parentheses.				

The relationship between fertility and education is important in fertility literature. The contingency table for education level is listed in Table 4, which shows that there are different patterns of demographic transition among participants with different education levels. More educated participants are likely to have more children. The illiterates born after 1970 have the fertility of 2.08 near to replacement level, however, the participants with college degrees born after 1940 have less than two children. The negative relationship between fertility and education is clear. Compared to developed countries, the negative relationship weakened or disappeared (Ahn & Mira, 2002; Doepke, 2023).

Table 4. The fertility rate stratified by birth cohort and education level

Birth cohort	ill	pri	jun	sen	col
(1920, 1930]	3.46(1.76)	3.62(1.69)	3.5(2.07)	2.4(2.07)	2.5(1.29)
(1930, 1935]	3.92(1.78)	3.58(1.59)	2.97(1)	3(1.36)	2.2(1.11)
(1935, 1940]	3.79(1.82)	3.41(1.43)	2.67(1.26)	2.59(1.22)	2.41(0.78)
(1940, 1945]	3.34(1.51)	3.21(1.32)	2.57(1.17)	2.35(0.92)	1.77(0.83)
(1945, 1950]	2.96(1.27)	2.66(1.11)	2(1.05)	1.68(0.8)	1.18(0.64)
(1950, 1955]	2.5(1.01)	2.23(0.96)	1.48(0.76)	1.46(0.79)	1.13(0.68)
(1955, 1960]	2.26(1.06)	2.05(0.92)	1.59(0.87)	1.34(0.64)	1.13(0.38)
(1960, 1965]	2.18(0.97)	1.98(0.86)	1.72(0.8)	1.36(0.71)	1.11(0.41)
(1965, 1970]	2.1(1)	1.8(0.79)	1.56(0.73)	1.27(0.6)	1.08(0.5)
(1970, 1975]	2.01(0.91)	1.79(0.78)	1.52(0.69)	1.2(0.58)	1.12(0.49)
(1975, 1980]	1.87(1.01)	1.79(0.68)	1.69(0.7)	1.35(0.57)	1.23(0.48)
Notes: Standard deviations are in parentheses.					

It is also worth noting that the fertility rate of all cohorts is below replacement level of 2.1 since about 2000, and the fertility rate of the two cohorts with the highest education level is below 1.5, which is considered irreversible.

4. DISCUSSION

The low fertility rate in the Chinese mainland has been a social issue population ageing and shrinking. Many studies are required to describe and explain the persistence of low fertility rates. However, it is impossible for most scholars to access the data of national population census, which is conducted

every 10 years, and 1% national population sampling survey, which is conducted every 5 years. Consequently, we have to resort to national survey data.

Using the CGSS, our study gives crude estimates of fertility rate. The bias in the estimates of early birth cohort is downward. It is attributed to the questionnaire design. The CGSS gave two questions on total number of children per married women. The first is how many biological sons including the dead you have. The second is how many biological daughters including the dead you have. Lack of doctoral records from hospital, the answers to these questions are subjective. In the absence of effective guidance from questioner, the participants are likely to will ignore the children who died in infancy. The more scientific estimates should take account of sample design or perform a cross validation. Compared to CGSS, the Chinese health and nutrition survey collect more concise information on birth history. However, the CHNS is out-of-date, and the last wave of survey is carried out in 2015. As a result, the CGSS is better than the CHNS in the timeliness. Another limitation is small sample size of the 2021 survey data. When the primary sample is stratified, some figures of units of cross table are rather small that point estimates are unreliable.

5. CONCLUSION

In this article, we estimate fertility rate using the CGSS. Our present study shows that the Chinese mainland has finished two demographic transition, and recent fertility rate is below replacement level, as indicated in macro data. We found that permanent residents in urban regions, not migrated from rural regions, or people with college degrees had fertility rates approaching to 1.0 and fell into the so-called "low fertility trap". Compared to these people, the residents having agricultural hukou or with low education have higher fertility rates above 1.5. The policy implication is that the government should concentrate resources and support the people with higher fertility intention, for example, extension of paid leave, provision of cash grants and facilitating access to childcare and so on.

ACKNOWLEDGMENTS

This research was supported by a grant from Ministry of Education of the People's Republic of China (19YJCZH069).

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