The Limited Impacts of the One-Child Policy on Aggregate Fertility Decline in China

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Preliminary, please do not circulate

Abstract

What impact did China's One-Child Policy (OCP) have on aggregate fertility? We compare fertility in two provinces with the OCP, Guangdong and Fujian, with demographically similar bordering regions without the OCP, Hong Kong and Taiwan. Using micro-census data, these paired case comparisons show that the OCP did not decrease aggregate fertility, measured as birth likelihood and average number of siblings. Using data from cities in two other provinces, we also show the OCP was likely not binding on fertility levels because relaxing the OCP did not increase fertility rates in pilot cities compared to neighboring cities that did not relax the policy. Our findings emphasize the need to understand the limits of policy to affect national-level fertility rates.

Keywords: One-Child Policy; Aggregate fertility; Rural-urban difference

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The 1979 One-Child Policy (OCP) is one of the most famous fertility policies in recent history. Did the OCP accomplish its main purpose of decreasing fertility in China? The Chinese government claims that more than 400 million births were prevented by the OCP (1). Media reports frequently assume its effectiveness on fertility while also partly attributing adverse phenomena in China to the OCP, including the aging population (2) and shrinking workforce (3). In 2015 and 2021, the Chinese government relaxed the OCP to the Two-Child Policy and the Three-Child Policy, respectively, in hopes of increasing low fertility. But these attempts to increase fertility will only be successful if the OCP was binding on fertility to begin with.

Scholars have found mixed evidence of the policy's effectiveness. Domestically, empirical studies do find some evidence that people subject to more stringent OCP enforcement had lower rates of births (4; 5; 6; 7; 8; 9; 10). However, variation in enforcement and effectiveness does not necessarily mean that the OCP had a significant impact on the aggregate fertility in China (11). International comparative research on aggregate fertility provides both supportive (12) and contradictory evidence of the policy's aggregate impact (13; 14), ranging from "at best very small" effect (15) to causing an "astonishing population averted" (16) due to different comparison methods and different countries as control groups.

To address the problems inherent in cross-national comparisons, we focus on paired case studies in comparable geographic contexts. We compare Guangdong province with Hong Kong and Fujian province with Taiwan. Both Guangdong and Fujian provinces implemented the OCP in 1979 while Hong Kong and Taiwan did not. Unlike other cross nations comparison, each pair shares a border—land or water—and ethnic and cultural linkages. Specifically, 86% of the Hong Kong population originated from Guangdong province (17) and more than 73% of Taiwanese descend from immigrants from Fujian (18) and approximately 95% of the population in Hong Kong and Taiwan are ethnic Han (19; 20).

We use the individual-level census data for Mainland China (1990), Hong Kong (1981, 1986, 1991), and Taiwan (1990) to construct comparable fertility measures across regions for Han Chinese women. The primary fertility measurement is the birth likelihood after the first birth for each region-year. We use the census data to create a panel dataset of women's fertility, based on their children's year of birth. Birth likelihood is defined as the ratio of women of reproductive age (16-50 (21)) giving birth to the total number of women of reproductive age in corresponding region-years. Because the OCP did not directly restrict a woman's first birth, we restrict our sample to women who have at least one child, refining the birth likelihood measure as the likelihood of having another child. [1]

We also construct a second fertility measurement—average number of siblings for each birth cohort. In a world with an extremely effective and strict one child policy, the average number of siblings for the cohorts born after the policy should drop to zero. Our estimates will be most accurate for women who have completed their fertility window and will be less accurate for especially young women whose first child was born right before the census, as we cannot capture their entire fertility window. To ease this concern, we restrict the panel for the second measure to five years before the census.

Figure 1 shows the fertility trends of Guangdong and Hong Kong both before and after 1979. First, the parallel trends before 1979 support the comparability between the two regions. Second, despite Guangdong having a higher fertility level, fertility trends remain roughly parallel after the implementation of the OCP (1979) across both fertility measurements.

If the OCP was effective in reducing aggregate fertility, we should expect a drop or a downward kink of fertility after 1979. We do see a slight drop immediately after policy implementation in 1980—largely the result of unusually high fertility in 1979—but a reversion to the trendline shortly thereafter, providing little evidence for an immediate effect of the OCP. The continued parallel trend during the 1980s provides some evidence refuting the hypothesis that the effects of OCP became salient over the 1980s. In Guangdong, each year after the OCP, eight to twelve percent of fertility-aged mothers had an additional child (Figure 1, panel (a)). Moreover, the average number of siblings for children born between 1979 and 1985 in Guangdong was around 1.5. This is far from the expected zero siblings that would result from a high-impact policy. In sum, fertility decreased in Guangdong, but this decrease existed before the OCP. Additionally this trend is roughly parallel to that in Hong Kong, providing no evidence of a substantial effects on aggregate fertility decline in 1980s in Guangdong.

These findings are repeated in Fujian province when compared with Taiwan. Fertility trends in the two regions are depicted in Figure 2. Unlike the cases in the Hong Kong-Guangdong comparison, fertility trends in Fujian were not parallel with those in Taiwan before the OCP. Before policy implementation, Fujian had a faster rate of fertility decline than Taiwan across both measures. Interestingly, however, the fertility trends in the two regions became parallel after 1979, despite some fluctuation of fertility in Fujian during early 1980s. Namely, Fujian's fertility rate declined at a slower rate in 1980s compared with the pre-OCP period. This pattern

[1]The appendix provides a detailed discussion of our fertility measurements.

is repeated across both measures in Figure 2. Although we cannot claim that the OCP slowed down the fertility decline in Fujian, these patterns do not provide support for the argument that the OCP led to a significant drop of fertility in 1980s in Fujian.

The geographic and cultural proximity of Hong Kong and Taiwan to mainland China make them natural comparison groups to examine the effects of the OCP. However, there may still be concerns that Hong Kong and Taiwan had different economic growth experiences compared to Guangdong and Fujian. Specifically, in 1980s, Guangdong and Fujian began at much lower levels of economic development and experienced much faster economic growth compared to Hong Kong and Taiwan (22; 23; 24). Since economic growth may further decrease fertility, the faster economic growth in regions with OCP makes the minimal-if-any impact of the OCP we document an upper-bond estimation.

To further evaluate fertility trends without a reliance on non-mainland regions, we present evidence from cities that piloted a policy relaxation in the 1980s that allowed a second child. If the OCP was effective and binding in restricting aggregate fertility, we should expect fertility rates to increase in cities that piloted the policy revision compared to neighboring cities that did not. We focus on the policy relaxation in the 1980s when birth planning policy was still relatively new. This isolates the direct effect of the policy before possible socialization and internalization of propaganda favoring single-child families created an indirect effect.

The first pilot city we examined is Chengde in Hebei province. Chengde allowed second children in 1983 while the nearby cities such as Zhangjiakou, Tangshan, and Qinhuangdao did not relax the policy. The second pilot city, Enshi in Hubei province, allowed second children in 1985 while the nearby cities of Yichang, Shiyan, and Jinzhou did not have such relaxation. Panel (a) and (b) of Figure 3 show the fertility trend of Chengde and Enshi compared to their nearest non-pilot cities. In each figure, the first vertical line marks the start of the OCP and the second line marks the policy relaxation. First, similar to our previous analysis, there is no clear drop in fertility after OCP implementation.

Second, if the OCP was firm and binding, we would expect the pilot cities of Chengde and Enshi to have similar trends as their surrounding cities after OCP implementation, but for their fertility trends to diverge after the policy relaxations in 1983 and 1985, respectively. In both panels, the fertility trends of pilot cities and nearby cities are quite similar to each other throughout the 1980s with overlapping fertility trends. Compared to the nearby cities without fertility relaxations, we cannot detect a clear increase in fertility in the pilot cities with the relaxation.

In sum, we conducted four separate paired comparisons which varied in birth planning policies. The four comparison groups use data from four different provinces with different economic development stages across northern, central, and southern China. None of the comparisons provided support for the hypothesis that the OCP had a significant impact on aggregate fertility. Taken together, the weight of evidence supports the argument that the OCP had a negligible impact on aggregate fertility during 1980s.

How should we reconcile our conclusion with impressions that the OCP lead to sizable fertility decline in China? First, the general consensus holds that fertility was declining in China between 1970 and 1990. The implementation of the OCP during a period of fertility decline led to the assumption that correlation implied causation. Second, there are salient effects of the OCP in regions with more stringent enforcement. Uneven implementation of the OCP is undeniable and distributional consequences were born by some groups more than others. The effectiveness of OCP on certain subgroups of population was not enough to drive the average fertility of the whole population down by a meaningful degree.

We use the division of urban and rural populations in Guangdong as an example of how variation in enforcement and aggregate fertility interact. Implementation of the OCP was easier and more stringent in urban China where residents were penalized for extra births through their urban employers (25). Figure 4 shows our fertility measures broken down by the urban and rural populations. Before 1979, the fertility dynamics in urban Guangdong is almost superimposable with that in Hong Kong in both panels (a) and (b). After 1979, however, there is a salient drop in fertility in urban Guangdong. This pattern suggests that the OCP indeed limited the fertility in urban Guangdong. In contrast, there is no detectable drop of fertility in rural Guangdong right after the implementation of the OCP. Urban Guangdong, however, represents a small fraction of the total population. In the early 1980s, urban populations constitute less than twenty percent of the total population in Guangdong. Rural populations, the majority of the population and thus the drivers of aggregate fertility, did not see commensurate declines in fertility.

While our evidence presents a unified picture of a minimal impact of the OCP on fertility rates, our results should be interpreted with caution. Our methodology and the construction of our measures mean our results only speak to the effects of the 1979 OCP. These results cannot be expanded to all birth planning policies in China because of the complicated and uneven nature of the policy as a whole over the last fifty years. Second, our paper focuses on the short-term effects of the 1979 OCP during the 1980s. The OCP could have affected fertility in China through longer-term mechanisms. It is entirely possible that, in the long run, people internalized OCP propaganda and willingly choose to reduce births, leading to an indirect effect (26). We cannot capture the potential effects of increased enforcement after 1990. Third, our findings imply limited impacts of 1979 OCP on aggregate fertility in China after 1979. This does not negate other impacts of the OCP such as distributional impacts and population restructuring found in existing research. Fourth, our findings do not mean previous papers using OCP as an exogenous shock for causal identification are wrong. Research utilizing variation in policy strictness or levels of enforcement to identify the causal effect of the family size do not necessarily contradict with our main findings. Fifth, although investigating the reasons behind the fertility decline in China after 1979 is beyond the scope of this paper, a widespread of researchers point to the effects of China's economic growth and women progress on fertility decline (11; 27; 13). Our paper is consistent with them in the sense that we rule out the significant effects of OCP, the most famous alternative explanation other that socioeconomic developments.

As low fertility becomes an increasing concern in China, it is even more important to understand the impact of fertility policies. Many believe that eliminating fertility constraints would resolve low fertility problems. However, the negligible impacts of the OCP found here suggests that relaxing the fertility constraint would be far from enough to solve the problem. Although providing alternative solutions to the low fertility concerns is beyond the scope of this paper, our results suggests that it is crucial for the China's government to also identify other solutions in addition to eliminating fertility constraints.

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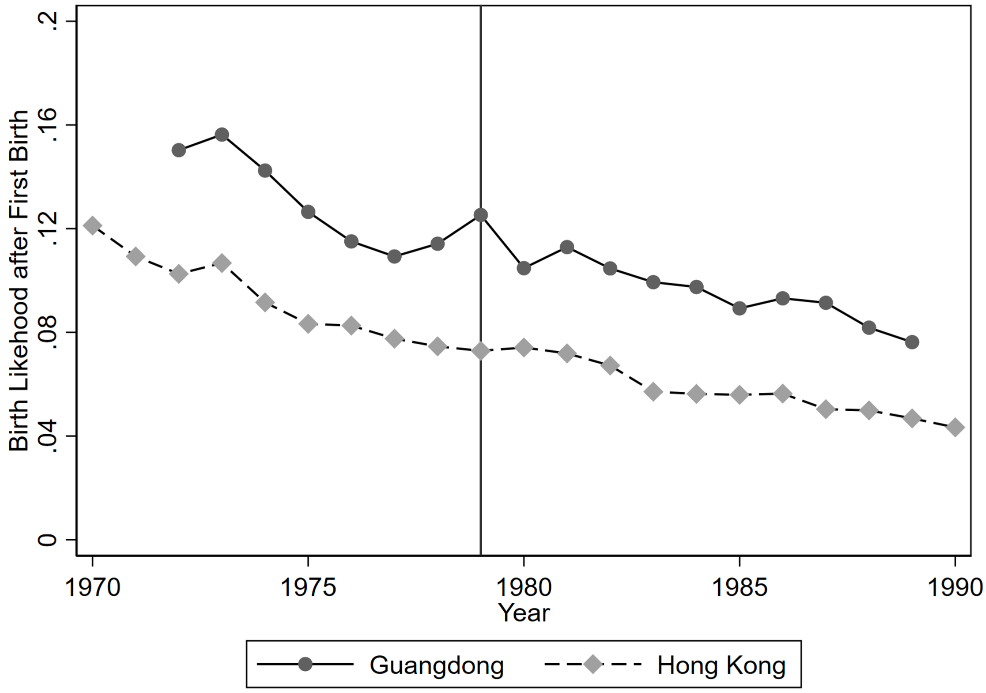
Figure 1: Fertility Trends in Hong Kong and Guangdong

(a) Birth Likelihood after First Birth



(b) Sibling Number

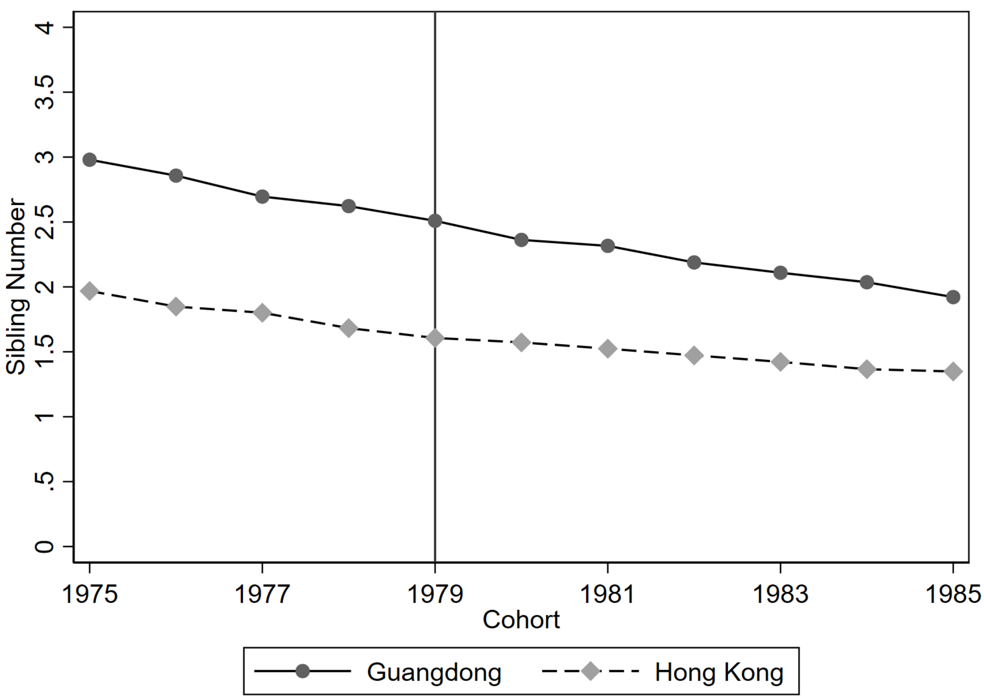
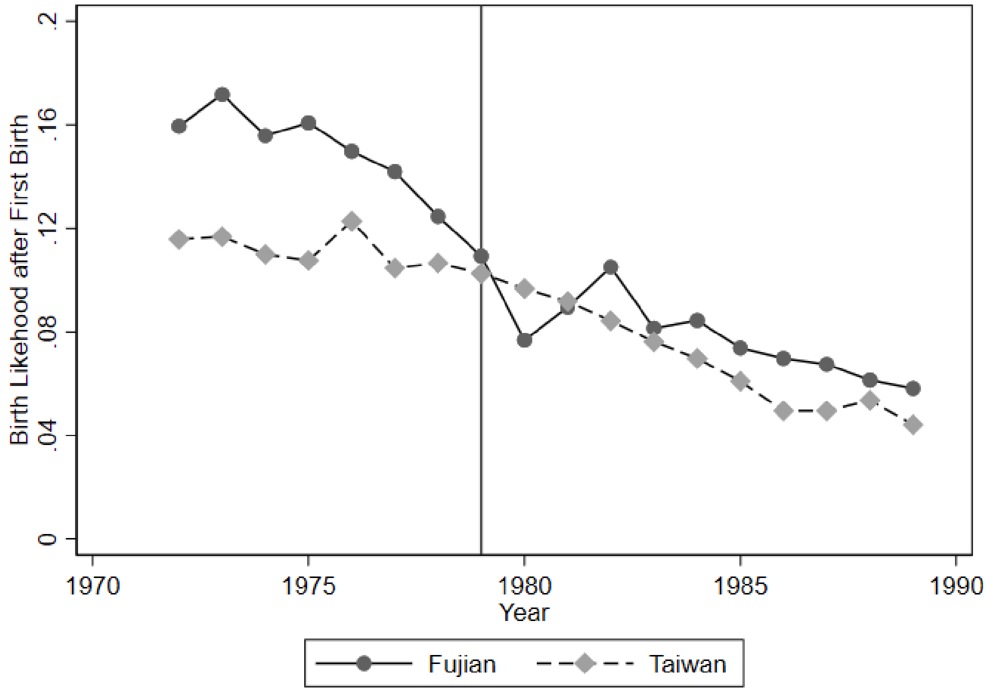


Figure 2: Fertility Trends in Fujian and Taiwan

(a) Birth Likelihood after First Birth



(b) Sibling Number

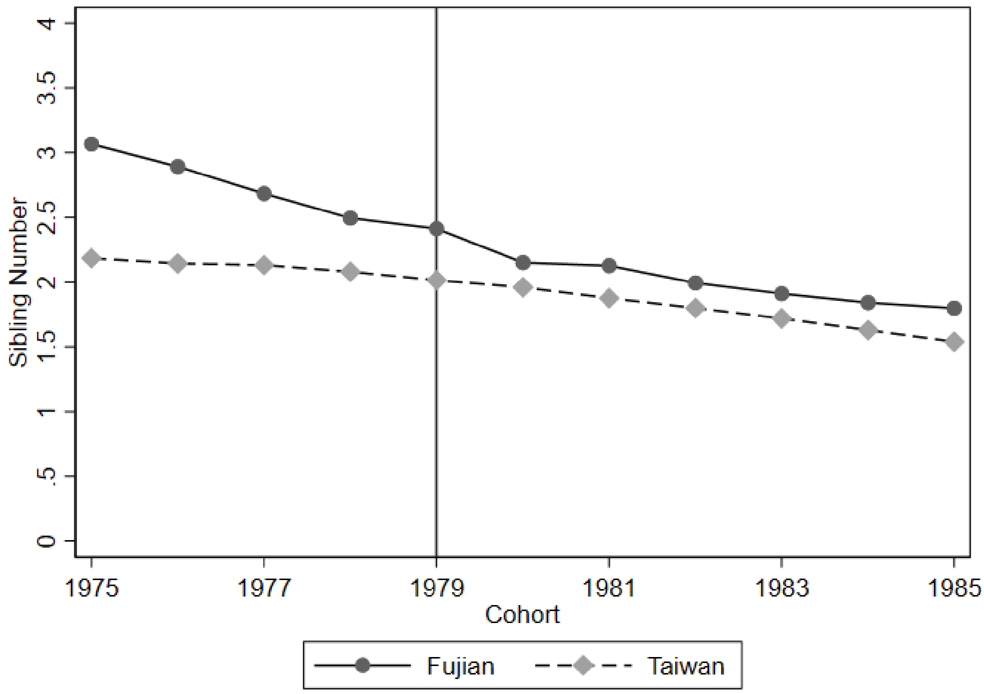
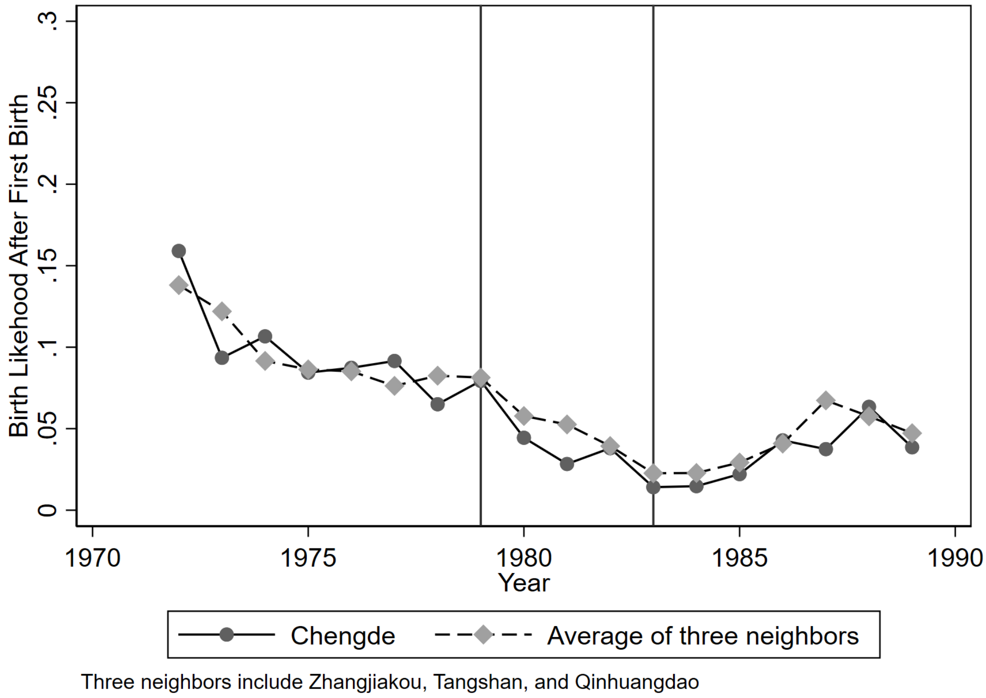


Figure 3: Fertility Trends in Pilot Cities and Nearby Cities

(a) Chengde (Birth Likelihood after First Birth)



(b) Enshi (Birth Likelihood after First Birth)

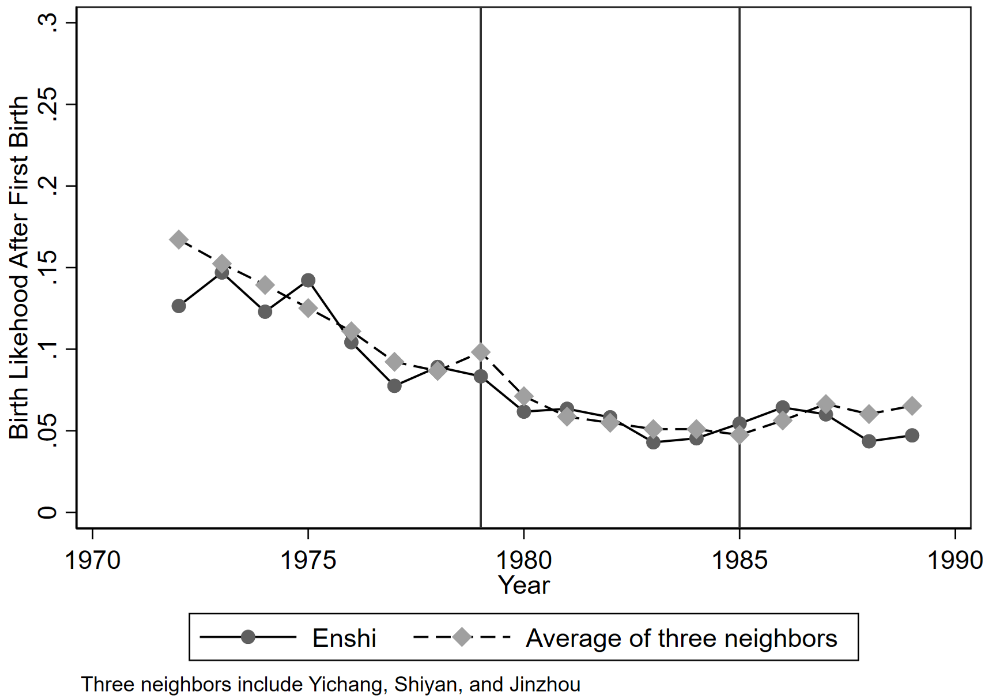
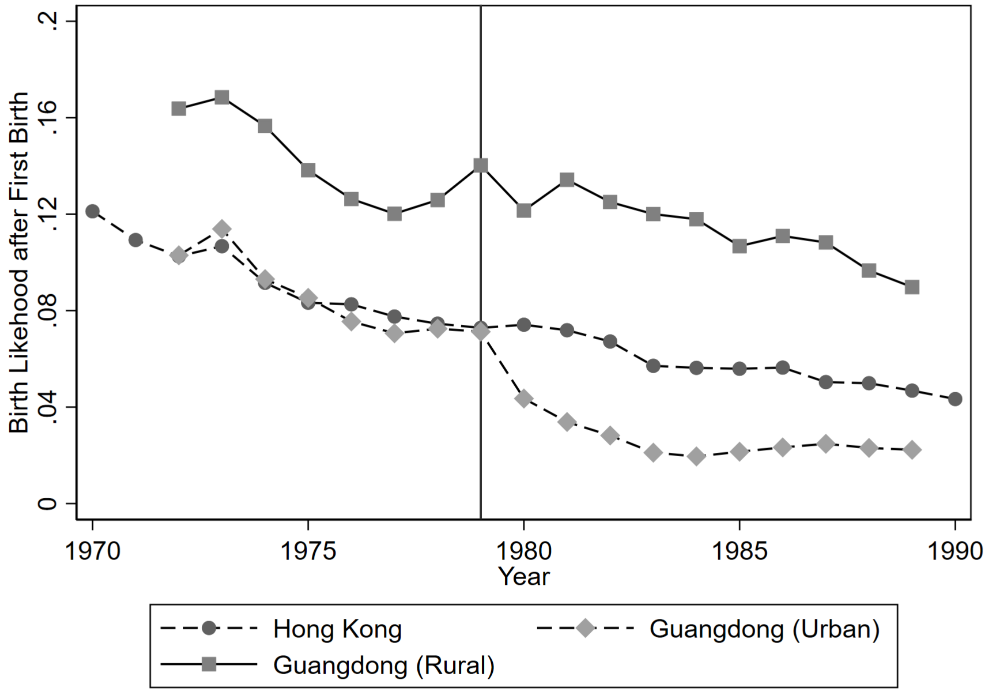
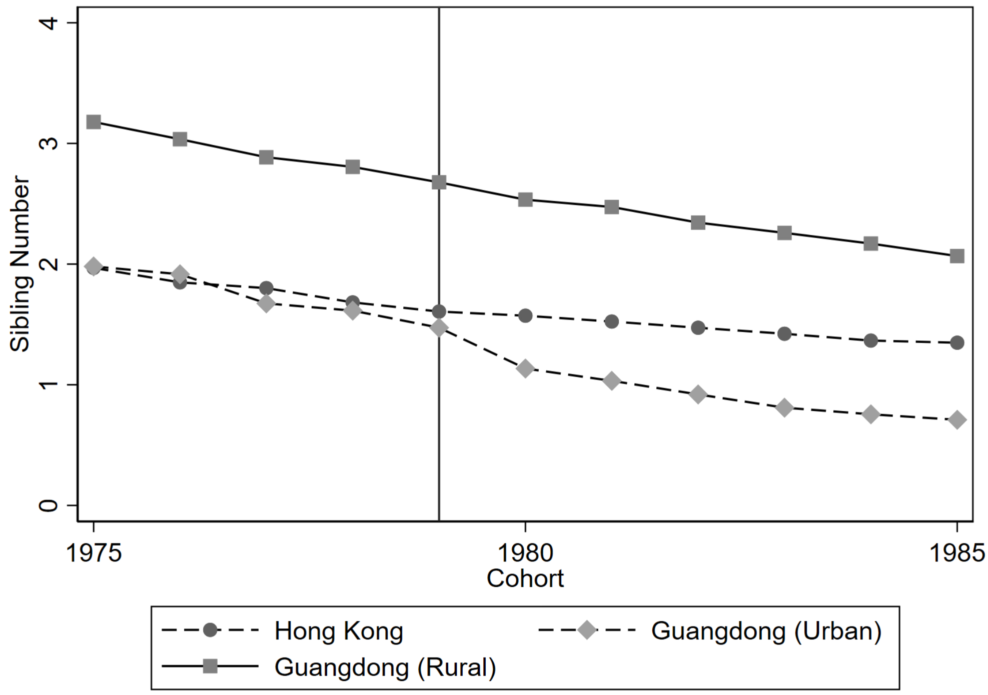


Figure 4: Rural-Urban Comparisons

(a) Birth Likelihood after First Birth



(b) Sibling Number



A. Appendix

A.1. Data

We use the individual-level census data for Mainland China (1990), Hong Kong (1981, 1986, 1991), and Taiwan (1990) to construct comparable fertility measures across regions for Han Chinese women. Although the individual-level census for Mainland China (1982) is also available in IPUMS international, we do not use the 1982 wave due to following reasons: 1) the 1982 wave does not have precise information of birth year; 2) the 1982 wave does not know whether an individual lived in rural or urban area.

The primary fertility measurement is the birth likelihood after the first birth for each region-year. We use the census data to create a panel data set of women's fertility, based on their children's year of birth. Birth likelihood is defined as the ratio of women of reproductive age giving birth to the total number of women of reproductive age in corresponding region-years. Because the OCP did not directly restrict a woman's first birth, we restrict our sample to women who have at least one child, refining the birth likelihood measure as the likelihood of having another child.

One caveat of this measurement is that the census data can match mothers and their children only if the child was living in the same household as the mother when surveyed. Therefore, we can only get a reliable fertility history of women before their children leaving the household. In our main results, we only calculate the birth likelihood for each region within the 18 years before the survey time, with the underlying assumption that children do not leave their parents before age 18.

To partly avoid the assumption behind the birth likelihood measurement, we also construct a second fertility measurement—average number of siblings for each birth cohort. In a world with extremely effective and the most strict one child policy, the average number of siblings for the cohorts born after the policy should drop to zero. Two caveats worth mentioning about the second fertility measurement. First, the information of number of survival children is only included in the mainland China census. The census in Hong Kong (1991) and Taiwan (1990) do not include this question. Therefore, we also need to match children and their mothers to calculate sibling numbers for each observation in the Hong Kong and Taiwan samples. Namely, the second measurement in Hong Kong and Taiwan are also subject to the assumption that children do not leave their parents before age 18. Second, our estimates will be most accurate for women who have completed their fertility window and will be less accurate for especially young women whose first child was born right before the census, as we cannot capture their entire fertility window. To ease this concern, we restrict the panel for the second measure to five years before the census.

One may have concerns that we use three waves of data set in Hong Kong but only the 1990 census in Mainland China which lead to incomparability concern. To ease this concern, in Figure A.1, we decompose the fertility measurement in Hong Kong by the waves of the census data. Panel (a) shows the result for birth likelihood after first birth and panel (b) show the result for sibling numbers. As can be seen in Figure A.1, the fertility measurements we construct for each year based on different waves of Hong Kong census are quite similar to each other. And our conclusion of the negligible impacts of the OCP does not depend on which wave of Hong Kong census is used to compared with Guangdong.