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Fertility Decline in Rural China: A Comparative Analysis

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Abstract

Many models have been proposed to explain both the rapidity of China's fertility decline after the 1960s and the differential timing of the decline in different places. In particular, scholars argue over whether deliberate policies of fertility control, institutional changes, or general modernization factors contribute most to changes in fertility behavior. Here the authors adopt an ethnographically grounded behavioral-institutional approach to analyze qualitative and quantitative data from three different rural settings: Xiaoshan County in Zhejiang (East China), Ci County in Hebei (North China), and Yingde County in Guangdong (South China). The authors show that no one set of factors explains the differential timing and rapidity of the fertility decline in the three areas; rather they must explain differential timing by a combination of differences in social-cultural environments (e.g., spread of education, reproductive ideologies, and gender relations) and politico-economic conditions (e.g., economic development, birth planning campaigns, and collective systems of labor organization) during the early phases of the fertility decline.

Keywords

fertility decline; spatial variation; comparative ethnography; behavioral-institutional approach; China

Models of China's Fertility Decline

China's rapid fertility decline between about 1970 and 2000 is one of the most significant events in world demographic history. China's total fertility rate went from 5.94 in the 1965–1970 interval to 1.77 in the 2000–2005 interval and projected for 2006–2010.¹

Many explanations have been given for this rapid and startling decline, and more to our purposes here, for spatial variation in the extent and timing of the decline. What all these explanations have in common is that they look for spatial variation in timing and extent, propose a single factor (or in a few cases, a combination of factors) that correlates with the variation in fertility decline, and then posit that this factor explains or causes the variation across space in the speed and timing of declining fertility. In this article, we first enumerate

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the most frequently cited spatial patterns of variation and the most frequently proposed causal factors. We then examine our own ethnographic and local survey data, collected in three widely spaced rural areas where fertility decline occurred about a decade apart. These data show that no single factor can account for the variation between our three sites, and we propose a combination of causal factors that seems to account for the variation between our three sites but suggest also that if more sites were included, additional variables might have to be taken into account.

Previous accounts invoke three kinds of spatial patterns: a simple rural–urban dichotomy, empirical observation of spatial variation without a systemic pattern, and a local-systems model of hierarchical regional space. As causal factors they propose differential modernization, differential institutional economic structures leading to differential value of children, and differential implementation of population control policies. We summarize this intersection of three spatial models and three causal variables in Table 1.

Greenhalgh's, Lavelly and Freeman's, and Li's models operate on a basic rural–urban dichotomy, arguing that the incentives for continuing or stopping fertility were very different in urban and rural China during the decades of rapid fertility decline. Greenhalgh began with the justifiable assumption that before the momentous institutional changes brought about by the Communist revolution in China, fertility incentives had been high everywhere. All families needed descendants for labor, old-age security, and carrying on ancestral rites. Fertility fell faster in urban areas when China set up a state socialist economy, which provided state-funded pension systems to provide for old-age security, and reduced the value of children's labor in a wage economy. In rural areas, by contrast, fertility fell more slowly in an economy of collective agriculture, because people continued to need children for labor and for security in old age. Lavelly and Freedman proposed a somewhat similar explanation, with added emphasis on the availability of fertility limitation technologies in urban areas. According to their model, fertility decline happened earlier in urban areas not only because the desired number of children fell in response to a modernizing socialist economy before there were any official programs to limit fertility but also because voluntary birth control and abortion services were available; while in the rural areas there was no incentive to limit fertility until the state implemented its first, semicoercive policy of *wan, xi, shao*, or “late, sparse, and few” beginning in 1971. At this time, even though rural people might still have desired more children, state policy forced their hand and required them to limit births. Li attributes urban–rural (or worker–peasant) differences to a combination of differential quotas and differential severity of penalties for noncompliance.

Other authors, including Short and Zhai, and Kaufman et al., showed that there was considerable variation *among* rural areas, demonstrating that timing of fertility decline in these areas varied according to whether and when local authorities emphasized family planning as a primary goal, and according to the types and magnitudes of incentives—positive ones such as benefits for pledging to stop at a single child or negative ones such as fines for over-quota births—instituted as part of their birth planning campaigns. These authors were less concerned with any spatial *patterning* of fertility decline differences; rather they were primarily interested in showing that these differences existed, and in finding covarying factors.

In an important 2000 article in *Social Science History*, G. William Skinner, Mark Henderson, and Yuan Jinhua attempted to systematize thinking on the spatial variation in fertility decline, replacing earlier simple rural–urban dichotomies with what they call “hierarchical regional space,” or HRS, a hybrid model combining the level of a place on an urban–rural continuum with its place in a series of core–periphery zones. They used the

example of the lower Yangtze macroregion² to show that fertility declined first in the more urban core zones of the HRS model, and the decline diffused through the more peripheral zones over a period of decades. In this model, there was high fertility and relatively low variance before 1960; expanding variance starting in the late 1960s, when the core regions began a decline in fertility; contracting variance after 1980; and low fertility and also relatively low variance after 1985, as a relatively uniform pattern of low fertility prevailed over all of China (Skinner et al. 2000). In their model, four possible kinds of factors influenced fertility decision making differentially through the zones of HRS: the spatiotemporal patterning of birth planning policy and practice; the level of socioeconomic development; changes in traditional family system norms; and the space–time dynamics of the spread of sex-selective abortion.³ Each of these factors took hold first in the core regions and spread to the periphery over time.

We find the spatial aspect of this model much more satisfactory than a simple dichotomy of urban and rural zones. At the same time, a macroanalysis of regional variation of the type performed by Skinner et al. does not tell the entire story; there is local variation among communities in exactly the same place in the regional model. Factors that influence fertility decisions not only do not dichotomize to urban and rural sectors of society; they follow the finer spatial gradations of HRS only as a broad pattern. There are specific factors in specific places, which also influence fertility decision making.

As researchers who have looked at the history of fertility in specific rural areas, we are dissatisfied with the analyses that have appeared so far, and here we use comparative analysis of three localities where we have conducted research to develop a more complete model of the local variations in the process of fertility decline. Since all three areas were rural and primarily agricultural during the period of the rapid fertility decline, the rural–urban dichotomy does not explain the differential timing of fertility decline in the three areas. Similarly, while our locality with the earliest fertility decline is much more centrally located in the HRS system than are the other two, those two occupy very similar HRS positions, but the fertility decline in one of them happened about ten years earlier than in the other. So we must look not only at the particular occurrence of factors mentioned by authors cited in Table 1 but also at other factors not mentioned by them, to determine the reasons why our three rural populations experienced China’s fertility decline at such different times.

Study Sites and Research Methods

None of us began our research intending to carry out a comparative study such as this. For this reason, not every measure pertaining to fertility decline or its causative factors is available in identical form for our three research areas. Nevertheless, our data are similar enough to conduct a comparative analysis, and the differences in the speed and timing of the fertility transition in the three areas are striking enough to raise important comparative questions. Here we briefly introduce our three study areas and our research there.

Xiaoshan district (formerly county), Zhejiang

Xiaoshan lies on the south bank of the Qiantang River in Zhejiang province on the east coast of China. Xiaoshan’s proximity to the metropolis of Hang-zhou to the north, and particularly to the administrative and cultural center of Shaoxing to the east, has made Xiaoshan itself a center of elite culture as well as a flourishing center of commerce.⁴ Recently, Xiaoshan has become one of the “five tigers of northern Zhejiang,” with industrial and urban development, rising incomes, substantial in-migration from poorer provinces, very little out-migration, and a boom in large and extravagant private homes and luxury apartment complexes. Superhighways and interprovincial rail trunk lines serve many parts of the county. Xiaoshan thus represents one of the wealthiest and most developed regions of China.

At the same time, however, agricultural crops such as rice, vegetables, rapeseed, tobacco, and tea, as well as commercial livestock raising, still contribute heavily to the rural economy.

We conducted ethnographic and survey two areas within Xiaoshan: Changhe and Yiqiao. Changhe,⁵ on the south bank of the Qiantang, is the wealthier area. Served by the Zhe-Gan and Xiao-Hang railways, Changhe is thriving economically and booming socially, with new suburbanization policies. A new bridge has shortened the driving time from Changhe to Hangzhou to fifteen minutes.

Han Hua supervised our Changhe research, consisting of ethnographic fieldwork on family, fertility, and marriage, plus a survey of 500 families of the influential Lai extended patrilineage, which accounted for 14.7 percent of the district population in 2002. There are two subgroups of Lais in Changhe. The rural Lais mostly live in two villages (formerly production brigades)—Chang'er and Changhe. They are agriculturalists, growing cotton and hemp in the sandy areas close to the river, while double-crop rice, taro, and sugarcane predominated in the southern areas, and tea and bamboo in the hills farther south. Other crops include wheat, rapeseed, silkworms, berries, soybeans, cotton, and tobacco.

Other Lais live in the Old Town, a prosperous commercial neighborhood with small shops providing services and products such as cooking ingredients, dried food, sedan chairs, clothing, furniture, and religious objects. The socioeconomic ties between the Old Town and its neighboring villages helped sustain families in both places until the economic reforms of the 1980s.

In Changhe, the importance of traditional subsistence farming has receded since the reforms of the 1980s, and many families have found industrial or commercial wage employment, or started small businesses. The amount of arable land has decreased due to industrialization and more recently commercial housing development. Although they have clearly lost their importance in the local economy, rice farming and vegetable gardening still provide food and supplementary income for some families, as well as work opportunities for old people who usually cannot find jobs otherwise.

Wang Yuesheng supervised research in Yiqiao Township, in the interior of Xiaoshan district, about 12.5 kilometers to the south of downtown Xiaoshan. In traditional times, Yiqiao was an important center of water transport, lying near the conjunction of the Fuchun, Puyang, and Upper Qiantang Rivers. The population density in the area is extremely high for a rural district: when fields were redistributed in 1980, households received only 0.4 mu (c. 0.027 ha.) per person of irrigated land. In 1998, the mostly rural population of Yiqiao Township was slightly over 19,000. Today, Yiqiao seems more industrialized but less commercialized than Changhe, and the elaborate and costly houses found in Chang'er are barely to be seen in the villages of Yiqiao. Topographically, Yiqiao is mostly plains, and its villages are but a short walk from one another. About 70 percent of the villagers living in the central part of the township belong to the Han extended patrilineage, whose largest branch provided the majority of our convenience sample of 500 survey respondents subjects, mostly living in Paixuan, Houtan, and Xiashantou villages, with a few households each from Maoshantou, Langpeng, and Shanhou villages.

Ci County, Hebei

Ci County lies at the extreme southern tip of Hebei Province, bordering on Henan in the South, and not far from Shandong and Anhui (see Figure 1). Geographically and culturally, it belongs to the North China macroregion. It lies far from any major urban center, about halfway between the medium-sized cities of Handan to the north and Anyang to the south.

Despite its almost totally rural character, Ci County is not remote or isolated. China's most important railway, the Beijing-Guangzhou line, passes through Ci County, and before 1949 the Fuyang River was an important transport waterway linking southern Hebei to the great port city of Tianjin.

Ci County lies at the juncture of the Taihang Mountains in the West and the North China Plain in the east, and about equal thirds of its territory are taken up by mountainous, hilly, and plains areas. The population in the mountain and foothill areas is sparse, but the plains are densely populated. Before 1949, most farmers in the plains depended on rainfall agriculture for their subsistence. The summer monsoon climate with extreme year-to-year variability around a mean of only 500 millimeter rainfall meant that while droughts were common, floods also happened occasionally, so that poorer farmers, especially in the hilly areas, were often reduced to traveling to more favored areas to beg for food, and they regularly worked in the more prosperous plains villages as agricultural laborers.

The main crops in the area are winter wheat, corn, and millet, with some soybeans, sweet potatoes, and cotton. In contrast to Xiaoshan, there was little commercial agriculture in the plains areas, and almost no industry or long-distance trading activity. After the PRC was established, land reform and collective agriculture contributed some stability to farmers' lives. From the post-famine stabilization of collective agriculture 1962 until the collective system was dissolved in the late 1970s, primary responsibility and accounting for agriculture remained at the level of the production team. In the 1970s, a combination of irrigation pumps, chemical fertilizers, and improved seed varieties caused a tripling of grain yields,⁶ so that basic livelihoods are now well assured in the area. Despite these improvements, however, there was little industrial or commercial activity even into the 1990s. Before the Land Reform, average agricultural land per person was about 3 mu (c. 0.2 ha). By the middle of the 1960s, it had declined to 2 mu (c. 0.13 ha), and at present is only about 1 mu (c. 0.07 ha). Because grain yields have increased, crops are sufficient to support farmers' livelihoods, but they are unable to increase income with so little land, and many rural laborers have to leave the area to look for jobs.

Our survey work in Ci County, supervised by Wang Yuesheng in 1999, was all concentrated in seven villages in Shicun and Jiangwu townships, both located in the plains. Questionnaires concerning fertility and marital history, along with changes in household composition over time, were filled out for a stratified convenience sample of 545 women. This sample was constructed so as to avoid duplicating information on elder generations, by interviewing the wife of only one descendant of a common paternal grandfather. Within this limitation, we attempted to interview as many women as possible over fifty-nine years old in 1999.

Yingde county-level city (formerly County), Guangdong

Famous for its fragrant black tea leaves, Yingde lies in the northern "hilly regions" of the southern coastal province of Guangdong.⁷ Today, Yingde includes some of the poorest rural areas of Guangdong, and sits between the core and periphery of this province and of the wider macroregion of Lingnan, whose core zone lies further south in the city of Guangzhou and the Pearl River Delta region (see Figure 1). But like equally peripheral Ci County, the Yingde area is by no means remote or isolated. The Beijing-Guangzhou railway line passes through Yingde, and before 1949 the North River was an important transport waterway linking Northern Guangdong to the Pearl River Delta and to North China.

Our research in Yingde is focused on a Cantonese-speaking rural township we call "Brightpath," located in a particularly deprived mountainous area of west Yingde, away from major waterways. In 2005, Brightpath had a population approaching 50,000

individuals and an area of 200 square kilometers. The township includes some 20 rural administrative areas (former brigades), more than 150 villages (mostly single-lineage villages), and a small market town with the township government and a periodic market held every 5 days. Within Brightpath, our research concentrated on a small but fairly representative single-lineage village of about 800 residents that we call “Harmony Cave,” where Gonçalo Santos has been undertaking field research since 1999. In addition to long-term participant observation, data were collected through extensive semi-structured interviews and a family history survey (completed in 2001) targeting the village’s 110 official households.

The township of Brightpath was founded during the Ming dynasty, but most local communities were settled in the early Qing (seventeenth and eighteenth centuries). Besides double crop rice, local people have traditionally cultivated sweet potato, peanut, soybean, millet, taro, cassava, bamboo, and other crops. Population was rather sparse by Guangdong standards when the Communists first arrived, and most families were assigned as much as 0.8 to 1 mu (c. 0.053–0.067 ha) of irrigated land per person during the land reforms. During the 1950s and 1960s, the total area of irrigated land increased significantly, but so did the local population. As a result, when the land was redistributed in the early 1980s, most families would only receive 0.6 mu (c. 0.04 ha) of irrigated land per person.

Like Ci County, the Brightpath area did not have any major industries or long-distance trading activities during the pre-Communist era. With the reforms of the 1980s, villagers increasingly participated in money-oriented activities away from the fields, leading to the growth and diversification of the local economy. A dominant economic strategy—in clear contrast with Xiaoshan—is to engage in “temporary labor migration” to the highly industrialized suburban areas of major Southern cities like Guangzhou, where people find precarious unskilled jobs in factories, or grow and sell vegetables near major distribution markets. In the last two decades, these novel forms of livelihood have led to an overall increase in cash income. But it was only in the late 1990s—when the Bright-path region was officially singled out for the development of tourism—that good roads linked Brightpath to major provincial and interregional highways, reducing the average driving time to Guangzhou from 6–7 to 3 hours.

Like Xiaoshan’s, Yingde’s rural landscape is dominated by lineage villages. Although the state suppressed local lineage rituals and institutions during the Maoist period, they were never completely eradicated and were thus “revived” during the 1980s and 1990s, as a newly emerged local petty bourgeoisie started to invest heavily in rebuilding lineage ancestral halls destroyed during the Cultural Revolution. This phenomenon of “lineage revival” echoes what has been going on in other parts of rural Guangdong⁸ and makes Yingde look more like Xiaoshan than like Ci County. This convergence notwithstanding, lineage organization in Yingde (as observed in the Brightpath area) is less outward oriented in terms of network building than in Xiaoshan.

Fertility Decline in the Three Areas

Fertility has declined in all three areas from similarly high levels in the prerevolutionary period to similarly low levels (Brightpath is somewhat higher, but nevertheless below replacement) at present. The shape of the transition is similar in Xiaoshan and Ci County, but much more precipitous in Yingde. And the timing of the transition has been very different, with Xiaoshan about ten years earlier than Ci County, and Ci County about ten years earlier than Yingde. This can be illustrated with a variety of cohort-based measures derived from our three survey projects.

Average Numbers of Children and Parity Progression

We first examine a simple comparison of average numbers of children born per woman in the three areas.

Figure 2 shows that the average numbers of children borne by women born before 1930 differs little between Xiaoshan and Ci County (the numbers for Brightpath are too small to allow comparison of those cohorts) and that the variation is probably random and accounted for by the small *N*s in both surveys. These cohorts would have experienced most of their fertility by 1960 or at the very latest during the 1960s. When we come to the cohorts born in the 1930s, however, we see a decline in the Xiaoshan figures, a decline that does not show up in the Ci County figures until a cohort about ten years younger (again, the Brightpath numbers are too small to draw accurate comparisons). Average number of children born, however, tells us little about the pattern of fertility of individual women. For this we turn to parity progression ratios, beginning with the cohort born in the 1920s (see Table 2).

We see immediately from the PPR figures for the cohort born in the 1920s that there is essentially no difference between the Xiaoshan and Ci County populations; both probably approach something that in the Chinese context we might call premodern fertility patterns.⁹ Rates for Yingde (Brightpath) are also probably very similar; again small numbers preclude any definite conclusions.

When we turn to the cohorts born in the 1930s, however, we already find an interesting divergence. Ci County's PPRs do not differ significantly from the 1920s to the 1930s mothers' cohorts, but in Xiaoshan, we already see changes. The progression from third to fourth births drops with the 1935–1939 cohort, reflecting the beginning of the fertility transition in the late 1960s. In addition, the families of these women are making decisions about higher order births based on the sex of the earlier births. Table 3 shows the PPR from second to third and from third to fourth births, disaggregated by the sex of the previously born children (we have these data only for Xiaoshan).

For mothers born in the late 1930s, the likelihood of progressing from birth two to birth three is not affected by the sex of the first and second children. But the likelihood of progression to birth four is strongly affected. A mother with three children including at least one son has a probability of about .5 of having a fourth child, while a woman with three daughters has a probability of a fourth birth over .8. In other words, most women in this cohort in Xiaoshan had three children; only those with three daughters, as a rule, continued to a fourth birth.

The fertility of the next cohorts, whose childbearing extends from the 1960s into the 1980s looks different still: Looking back at Table 2, we can see that these are the cohorts with whom, fertility in Ci County began to drop: mothers born 1940–1944 show slight declines in the progression from third to fourth births, confirmed by the numbers of children born, shown in Figure 2. In fact, the 1940–1944 cohort has PPRs very similar to those of Xiaoshan's 1930–1934 cohort, showing the familiar ten-year delay. Mothers born in 1945–1949 begin to show a drop in progression to *third* births in both places, certainly reflecting the pressures of the *wan, xi, shao* campaign in the 1970s. For higher order births, Xiaoshan is again ahead of Ci County: fourth and higher order births are quite rare there, while in Ci County, despite the fertility limitation campaign, still around 50 percent bore a fourth child. But we see no such fertility drop in these cohorts in Yingde: almost everyone has a third child, and even fourth children are still quite common until the cohort of women born in the 1960s; that is, the first decade of planned birth programs seems to have had little or no effect in Brightpath.

Unfortunately, we are missing the data that would allow us to compute the PPRs by sex of previous children for Ci County or Yingde. But Table 3 shows that for Xiaoshan's 1945–1949 cohort of mothers, few of whom had four children, the likelihood of a *third* birth becomes strongly sex dependent, with a probability of only .38 to .52 if at least one of the first two children is male, but a probability of .89 if the first two children are both daughters. Most women born between 1945 and 1949 in Xiaoshan bore only two children, but if the first two were girls, most of them went on to have a third child.

For the last cohorts we will analyze, the PPR trend looks dramatically different (see Table 2). For these women, whose fertility potential extended into the 1990s, the pattern of the three areas diverges further. Ci County women in the 1950–1954 cohort actually had higher parities than Xiaoshan women in the 1945–1949 cohort; and there is little change from the previous cohorts in Ci County with regard to second and third births. It is not until the cohorts born in the 1960s that we see a sharp decline in third births in Ci County, although fourth and fifth births did fall off considerably, and there were no sixth births. In Xiaoshan second births, previously almost universal, had fallen to about three-quarters of all women in the 1950–1954 cohort, and to less than half of the women in the 1955–1959 cohort. There were no fifth births in our Xiaoshan sample beginning with the 1950–1954 cohort, and virtually no third or fourth births beginning with the cohort born in 1955–1959. In Yingde, again, we see a much later drop-off. Fourth births became somewhat less common starting with the cohorts born in the late 1950s. However, third births were basically universal through the 1960s cohorts, and declined only with the 1970s cohorts, whose fertility began in the 1990s, the very decade when the birth control policy started to become tighter in the Brightpath area.¹⁰

In sum, fertility declined at about the same rate in Xiaoshan and in Ci County, but the decline in Xiaoshan began in the 1960s, while it did not start in Ci County until the inception of the *wan, xi, shao* campaign in the 1970s, and in general proceeded through the same stages about a decade later. In Yingde, the decline did not really begin until the late 1970s or early 1980s, and it was not until the 1990s that women commonly had fewer than three children.

Factors Influencing Differential Fertility Decline

As stated above (see Table 1), we concentrate here on three possible factors that might have contributed to the differential speed of the fertility decline in our three study areas: economic development or modernization, differential policy implementation, and different economic institutions, in this case collective work compensation systems. We will examine each in turn.

Economic Development or Modernization

It is tempting to explain fertility decline simply as a process that goes hand in hand with economic development: the positive value of each child goes down, and at the same time the cost of rearing each child goes up; John Caldwell has conceptualized this as a shift in the direction of intergenerational transfers of wealth. As living standards rise, mortality declines, and not as many children are necessary to provide insurance for old age or spiritual support after death. Families can save more, and states typically provide more welfare benefits, further lowering the value of having many children. As livelihoods shift from farming, where children can help out early in life and do not need skills conferred by formal education, to salaried work, where children require schooling or other kinds of formal training, children begin to contribute to the family income later in life, and require more educational expenses to be able to contribute at all. Parents begin to emphasize “quality”

over quantity and tend to invest more in each child rather than investing less per child in more children.¹¹

We might look first, then, at differences in economic development to explain the differential timing of fertility decline in Xiaoshan, Ci County, and Yingde (Brightpath). There are, however two problems with economic development as an explanation: One is that there was little economic differential between Ci County and Yingde, even though the fertility decline in Ci County came much earlier. They also occupy similar positions on the core-periphery zone dimension in Skinner's HRS model, with Ci County in about zone 7 or 8 of the range from 1 (most central) to 17 (most peripheral), and Yingde in zone 10, while Xiaoshan falls in zone 2.¹² The second problem is the fact that Xiaoshan, with the earliest fertility decline, might have been wealthier than the other two areas, but did not experience the kind of economic shift associated with fertility decline—changes in the basis of livelihood—until after the fertility decline began.

Since Yingde and Ci County experienced economic development at roughly the same time, and living standards in the two places today are roughly similar, we cannot invoke these factors to explain the much later fertility decline in Yingde. In fact, a case can be made that Yingde experienced more economic growth during the collective era and was considerably wealthier by the 1970s than was Ci County, whose fertility decline occurred earlier.

Traditionally, Yingde farmers could harvest two crops of rice per year in addition to other produce like sweet potato, and could get yearly rice yields as high as 500 jin per mu (3.7 metric tones per ha) under favorable weather conditions. In addition to farming, many families would devote themselves to various supplementary petty capitalist activities aimed mostly at the local markets. In Brightpath, this was not enough to avoid the experience of hunger, but it was enough—despite frequent epidemics and widespread looting and inter-village warfare—to prevent famines. With the Communist Revolution, the local farmers' security and incomes started to improve significantly due to various efforts to raise agricultural productivity and to expand the area of irrigated land. These improvements and above all a naturally well-endowed agricultural ecosystem help explain why the Great Leap Forward Famine (1959–1961) did not affect the Brightpath area as severely as it did Ci County. With the introduction of chemical fertilizers and improved seed varieties in the 1970s, the local yearly rice yields started to climb again reaching their current level of 1,500 jin of rice per mu (11.2 metric tons per ha) in the 1980s, the very decade when the negative effects of the Maoist baby boom started to become more visible.¹³

In Ci County, economic improvements came more slowly than they did in Yingde. In this area of rain-fed subsistence agriculture, natural disasters were frequent and severe, especially in the mountain and hill areas, and although the plains were ordinarily not as hard hit, starvation was known even there, and they had the added burden of accommodating refugees from even poorer areas. Collective agriculture, along with improved varieties and increased irrigation, assured a minimal living for Ci County's farmers. But the rapid population increase during the early years of the People's Republic in effect canceled out the effect of increased yields, and Ci County remained poor, displaying somewhat lower living standards than our Yingde sample, whose fertility decline occurred later.

The second problem with economic development as an explanation for the timing of fertility decline is that although the fertility decline in Xiaoshan occurred earlier than it did in Ci County, it is not at all clear that the levels of development of the two areas were very different *at the time the fertility decline in Xiaoshan began*, that is in the middle and late 1960s. As explained above, Xiaoshan is naturally much better endowed than Ci County, and somewhat better than Yingde, and it is much richer now. But during the collective period,

none of our counties' rural economy industrialized to any degree—almost all our subjects remained farmers during that time. And according to their own reports, during that period they did not cross the kind of economic threshold that would lead to spontaneous declines in fertility.

Our interviews in both Yiqiao and Changhe revealed memories of not having enough to eat during the period of collective agriculture (1958–1981) or of being able to eat only rice gruel for at least one meal a day. Some men in Changhe, for example, reported that they were forced to marry out of their families uxorilocally, so that they would have enough to eat in their wives' households, which had more grain available. Even in relatively wealthy Xiaoshan, parents had not begun to invest heavily in children's education or in consumer goods for their children or for themselves, and children still provided field labor from age twelve or thirteen on. In other words, the shift in the direction of intergenerational wealth transfers, posited by Caldwell as the primary cause of fertility decline, does not seem to have happened in Xiaoshan until after its fertility had already begun to decline.

Education

Another aspect of “modernization” that has been suggested as crucial in bringing about fertility decline in culturally Chinese societies is education of women.¹⁴ It is not always clear exactly how education for women lowers their fertility, but we can suggest a number of possible mechanisms. Most obviously, women who are still in school at what would otherwise be a marriageable or childbearing age are less likely to marry or to bear children. Another possibility is that more educated women are more likely to take paying jobs outside the home, and thus be less likely to assume the double burden of child rearing and paid employment. A third possibility is that more educated women are more likely to understand appeals from governments or other agencies to reduce fertility. A fourth possibility is that women's education is a proxy for the sort of economic modernization examined in the previous section. Families with higher incomes and higher expectations for their children, who will alter their calculations of the cost-benefit ratio of children, are the same families in which women are more educated. Let us examine the data on women's education from our surveys in Xiaoshan, Ci County, and Yingde to see whether we can detect any differences in women's education that might account for the differential timing of the fertility decline in the three areas:

Table 4 does not appear to reveal any significant differences in women's education between Xiaoshan and Ci County, despite the greater wealth of Xiaoshan. In both places, women's illiteracy drops sharply beginning with cohorts born after 1935, and secondary education begins to increase dramatically with the cohort born in 1960; if anything, women in Ci County were more likely to get a middle school or higher education than those in Xiaoshan. But in neither place was the level of education high enough to keep women in school in the childbearing years, and we know that almost all women went to work in the agricultural collectives after they came of age, so that employment was not available as an alternative to childbearing. Other factors must be more important than female education in explaining the Xiaoshan–Ci County difference.

Our Yingde sample, by contrast, shows significantly lower levels of female schooling, and this seems to have been an important structural factor behind its remarkably late fertility transition. Traditionally, female illiteracy was nearly universal in mountain townships like Brightpath, and the rates of female schooling only started to increase to a level higher than 20 percent with the cohort born in 1970–1979. The fact that this was also the cohort responsible for the region's precipitous fertility transition during the 1990s makes us suspect that the rise in women's education was an important factor in the fertility transition when it finally began to happen.

There may, however, be indirect effects due to the education not of women but of their husbands. Despite no apparent differences in the educational levels of Xiaoshan and Ci County women in our surveys, there are very strong differences in male educational levels. In Xiaoshan, there are essentially no illiterate males born after 1920; only 2.53 percent of a sample of over 200 male survey respondents reported illiteracy, and these were not concentrated in the earlier cohorts. In Ci County, by contrast, 48.9 percent of the males born between 1920 and 1929 were illiterate, and 36 percent of those born in the thirties (the cohort whose wives began the fertility decline in Xiaoshan) were illiterate. Eleven percent of those born in the 1940s reported illiteracy as well. It is not completely clear what effect differences in male literacy might have had on the fertility behavior of these two study sites, but perhaps the higher numbers of males born between 1920 and 1949, who were literate made Xiaoshan more receptive than Ci County to the arguments made for birth limitation.

If male education does have an indirect effect on fertility, it might also help to explain the late transition in Yingde (Brightpath). Even though education was an almost exclusively male affair there, as late as 2001, over 20 percent of village males were still illiterate. Moreover, the average levels of education amongst literate males were low: over 60 percent had not moved beyond elementary school and a mere 8 percent had reached senior high (none had reached university). Although these extremely low levels of literacy are insufficient to explain people's fertility behavior by themselves, they clearly stand out as an important structural factor behind the village's remarkably late fertility transition.

On the whole, our conclusion is that differential living standards alone cannot explain the differential timing of the fertility transition. The fertility decline in Xiaoshan occurred precisely at that one time in history when the living standards and educational levels of Xiaoshan were somewhat closer to those of Ci County and Yingde than at any time before or after. Before socialism, gentry culture and business both flourished in Xiaoshan, while Ci County and Yingde were almost pure peasant societies. This enabled Xiaoshan to have a higher fertility. In the early stages of socialism, the disasters of the Great Leap Forward hit Ci County much harder than they did Xiaoshan or Yingde. As a result, both Xiaoshan and Yingde had higher levels of fertility during this period. Jumping over the period of stable socialist collective agriculture, since the end of the collective economy, Xiaoshan has boomed, and its rural folk have taken part in the urban consumer economy of reform-era China; as such they have reasons to limit fertility. But during the period of high socialism, the very time when Xiaoshan's transition began, these differences were muted. Collective agriculture kept peasants in the rich area of Xiaoshan on the edge of hunger most of the time, families were still dependent on children's labor, and any rise in parental investment per child was yet to happen. The fact that the fertility behavior of these three places diverged quite significantly during the period suggests that living standards and economic modernization are not sufficient to explain people's fertility behavior. The situation is somewhat different in regard to schooling. In both Xiaoshan and Ci County, the communist educational policies brought basic schooling to girls and yet, the fertility behavior of these two places presented significant differences. At the same time, the extremely low levels of literacy in our Yingde sample may help us explain why its fertility transition came so late.

Differential Implementation of Population Policy

Another possible factor contributing to the differential timing of the fertility decline in the three areas is differences in population policy or its implementation. Skinner et al. state that the strictness and timing, or the timing of strictness, in applying population policy, was spatially distributed according to their hierarchical regional space model.¹⁵ Other writers, including Kaufman and her colleagues and Short and Zhai, suggest that the strictness of policy implementation varied greatly, though they do not posit a spatial pattern for this variation.¹⁶ Whether such a general core-periphery gradient applies or not, however, it is

clear from comparing our three study areas that implementation was more thorough in Xiaoshan than in Ci County or in Yingde.

Until 1971, there were no *requirements* to limit fertility in any of our three study sites. At that time, *wan, xi, shao* (later, more widely spaced, and fewer), became the national norm. In the three places, this was expressed with little rhyming jingles about the number of children such as:

Yige bu shao, Liangge zheng hao, Sange duo liao

One is not too few, Two are just right, Three are already a lot

As we have seen from our figures above, fertility began to decline before *wan, xi, shao* became policy in Xiaoshan and declined even more steeply when the policy was implemented; in Ci County and Yingde, it stayed high even after the policy was promulgated. In Xiaoshan, even before the *wan, xi, shao* campaigns, many couples began voluntarily limiting their fertility. According to our survey, already in the cohort born in 1920–1929, whose fecundability would have been just about over by the time of the implementation of *wan, xi, shao* in 1971 (the youngest members of the cohort would have been forty-two), fourteen of thirty-five women interviewed, or 29 percent of the total, stated that they had used some form of fertility limitation, including traditional measures such as stopping sexual activity, inducing abortion, or taking drugs to stop ovulation, as well as modern contraceptives that began to be available in the 1960s.¹⁷ With the 1930–1934 cohort, the proportion of birth control users rises to 50 percent and to 81.4 percent in the 1935–1939 cohort, though many of those women would have been forced to use birth control after 1971.

In addition to these forms of birth control, many women in the 1960s availed themselves of abortion or sterilization services, which had recently become available in the area. In 1964, the Health Bureau and the Birth Planning Committee of Zhejiang sent seventy doctors to Xiaoshan to train local health personnel and to carry out abortion and sterilization operations. In 1963, there were very few local hospitals that could provide fertility surgery, but by 1964, one-third of the township clinics in the county were equipped to offer those services.

It is clear, then, that fertility control services were available in Xiaoshan well before the *wan, xi, shao* policy made them compulsory. But the fact remains, that in the absence of compulsion, acceptance of services requires some motivation other than escaping punishment. Many Xiaoshan women in the late 1960s clearly *wanted* to limit their fertility. It did not require any compulsory program to get them to avail themselves of the available services.

In Ci County birth control also began to be advocated in the mid-1960s, before the onset of the *wan, xi, shao* policy. However, it only reduced the fertility of local cadres, workers (of which there were very few), and teachers. Farmers still followed traditional fertility practices. Certainly, due to a decrease in infant mortality, breastfeeding times and hence birth intervals were prolonged, and average numbers of children ever born began to decline, as shown in Figure 2 above. But most rural women in this period had no desire to limit fertility voluntarily. At the same time, some women who had more than four children and had achieved their ideal family size might have wanted to use contraception if it had been available. Once local government advocated family planning and provided services, fifth and later births were greatly reduced, and mean numbers of children began to drop with the cohort of mothers born in 1940–1944. But they were still much higher than Xiaoshan levels.

In Yingde, official advocacy of birth control started with the *wan, xi, shao* campaigns, but these campaigns would only have immediate effects in some parts of the county. In mountain townships like Brightpath, the campaigns contributed to a minor drop in the overall levels of fertility, basically by reducing fourth births somewhat and reducing fifth and later births substantially (see Table 2). Contraceptives and sterilization began to be available in the 1970s, even though the overall quality of the township's birth control services remained low. Most of our interviews with local villagers suggest that the 1970s and 1980s were still strongly marked by the influence of traditional reproductive ideologies postulating a minimal acceptable offspring set of two sons and one daughter. This core ideal—two sons and one daughter—was probably widespread in many parts of China during the traditional period,¹⁸ but it was also subject to significant variations according to ethnicity, class, regional space, speech group, and other factors. Drawing on data from the 1 percent household sample of the 1990 census, G. W. Skinner found significant differences in the reproductive behavior of two Southern Chinese speech groups (Cantonese and Hakka) and one of their non-Han neighbors (the Yao), showing that these differences were correlated to particular features of the family systems of these three groups.¹⁹ Skinner's conclusions regarding the "traditional" Cantonese family system apply to the village folks of Brightpath in the 1970s and 1980s: a highly patriarchal family system with markedly pronatalist and male biased reproductive ideals.

The enduring power of local traditional reproductive ideologies—just as a more radical nationwide birth planning program was gaining momentum—was no doubt linked to poor policy implementation. In Brightpath, in clear contrast to our two other study areas, and also to other more central and affluent rural areas in Guangdong²⁰ (Potter and Potter 1990, chap. 11; Ku 2003, chap. 13), it was only in 1988—when Yingde was integrated in the prefecture-level city of Qingyuan—that the official Birth Planning Policy (the "one-child policy") started to be enforced more strongly on the ground. Even then, however, the actual work of policy implementation was put in the hands of lower level officials, who were not insensitive to the demands of their fellow villagers, so that the local "one-child policy" ended up as a very flexible two-to-three child policy.²¹

There were four basic stages of policy implementation, each adding a new form of coercive pressure to reduce fertility. From 1988 to 1991, local couples were allowed to give birth to a maximum of three children, after which the husband or the wife would have to undergo sterilization unless all three children were girls. From 1991 to 1993, the number of children per couple was reduced to a maximum of two, and a system of penalty fines for any extra birth was introduced. Again, the only exception was when all previous children were girls. In the third stage (1993–1999), the penalty fines increased exponentially. Couples were still allowed a maximum of two children, but now a four-year interval between births was required or else the parents would have to pay an additional fine. In the fourth stage, beginning in 1999–2000, the guidelines of the policy remained unaltered, but the township's birth planning office took over the work of policy implementation and introduced more effective mechanisms of inspection and control. For example, parents had to present birth permits and inspection certificates issued by the birth planning office in order to register children in school.

Looking back at Figure 2, it is apparent that it was only when significant coercive pressures to reduce fertility were introduced in the village—starting in the early 1990s—that its overall fertility levels started to drop below those of a fertility regime with universal third births. These data clearly show that significant differences in the timing of policy implementation between our Yingde sample and our two other study sites are important parts of any explanation of their different fertility trajectories. However, if the study of the process of policy implementation in Brightpath can help us explain the precipitous drop in

fertility that occurred in the early 1990s, it does not help us explain why the village's fertility levels remained so high during the collectivist period despite the introduction of various radical Communist reforms that should have resulted in important challenges to traditional patterns of reproductive strategizing. It seems that the late fertility decline of villagers in Yingde, who did not change their fertility behavior as the reforms progressed, until they were coerced to change, supports the Lavelly and Freedman model where policy is the key factor in fertility decline.

Summarizing our findings so far, we find that

1. Our wealthiest and most economically modern site, Xiaoshan, shows the earliest fertility decline. However, that decline began before the area entered into the regime of high parental investment and low economic value of children, combined with high levels of female education, which usually drives declining fertility.
2. While Xiaoshan's fertility decline began before the implementation of any large-scale fertility control programs, the availability of fertility control may have speeded the decline there, and the advent of fertility control programs brought upon further rapid decline. In Ci County and Yingde, substantial fertility decline did not happen until the programs were strictly implemented, in the 1970s in Ci County and not until the 1990s in Yingde.

We can thus posit that the primary factor in the *early stages* of fertility decline in Yingde and Ci County, and in a slightly *later stage* in Xiaoshan, were the semi-coercive and then the coercive state programs. And in the *current state* of low fertility, it is clear that a calculus of the costs and benefits of increasingly expensive children is operating.²¹ So we are almost there. The only thing we need to account for now is the early stage, the 1960s in Xiaoshan. To account for this, we propose to examine the different regimes of compensation for agricultural labor during the collective period in the three areas.

Differential Systems of Collective Compensation

We suggest here a previously understudied way in which the institutions of socialism altered the cost-benefit ratio of having children changed the early period of collective agriculture in Xiaoshan but not in Ci County or Yingde. After the short-lived period of experimentation with extreme communist forms beginning in 1958, by late 1962 most parts of China had implemented a work point system through which production teams, collectives of twenty to forty households, distributed income to their member households on the basis of a combination of population and labor points.²³ For the first few years of this collective agriculture system, there was a fertility bounce after the mortality-induced fertility drop of the post Great Leap Forward famine.²⁴ But by about 1965, this bounce was over, and families returned to a kind of calculus of fertility, similar to the one that guided them in earlier periods. And this is where an important difference between Xiaoshan and our two other study sites comes in.

In our field studies, we examined carefully the details of the work point systems used in the collective era in our three study areas. In Ci County, the system was relatively simple. All labor inputs of all family members were recorded by a team accountant, and totaled at the end of the harvest season each year. Part of the total harvest of the collective was paid to the state as an agricultural tax, retained for next year's seed, saved for an emergency famine-relief fund, put aside for investments in machinery or other capital inputs, or put into a welfare fund for families who had insufficient labor power. What was left over, including money income from a portion sold to the state at officially set procurement prices, was then distributed among the families in the collective. It was usually distributed according to the ratio of "people 8, labor 2" or "people 7, labor 3," meaning that 80 or 70 percent of the

collective income in kind was distributed per capita according to the population of each family, and the other 20 or 30 percent according to the proportion of the collective's total work points generated by that family's members.²⁵ In this system, as farmers in Ci County have told us, there was great incentive to continue having children. Although a child would not contribute any work points, he or she would not eat much, either, and the result was that in the short run the family had more per person to eat. By the time the child was consuming a significant portion of the family's food allocation, chances are he or she would be contributing labor, at least on the family's private plot, and soon thereafter on the collective lands, thus earning work points commensurate with his or her consumption, and whatever debt had been accumulated while the child was small could be returned to the collective. The positive economic value of children under this system actually differed little from what it had been under the traditional system of individually owned or leased farms, demonstrating Greenhalgh's point that collective agriculture still meant positive value for more children.²⁶

Under this system, fertility in Ci County stayed high through the cohorts of mothers born between 1935 and 1944, who were bearing children well into the 1970s, because the combination of the long-term security of having children and the short-term gain in grain distribution outweighed in people's minds the medium-term decline in the ratio of work points to household population.

The Yingde system was quite similar in both shape and practice to that of Ci County. In Bright-path, this system also resulted in rewarding population over actual labor—a fact that contributed to the reinforcement of traditional reproductive ideologies and that can help us understand the local high levels of fertility during the 1960s and 1970s, if not the 1980s. In the village of Harmony Cave, the system was first implemented in 1961–1962, after the disasters of the Great Leap Forward. Five production teams, each corresponding to a previously existing lineage or lineage branch, became the main accounting units of the village. As in Ci County, each production team became responsible for distributing income to its member households on the basis of a combination of population and work points that clearly favored population (the ratio was 70 percent on the basis of population to 30 percent on the basis of work points).

In addition, this shift to the production team involved a process of redistribution of land and other resources that was calculated on the basis of the total population (children included) of each collective. Cadres first calculated the land/people ratio and then calculated the total area of land owed to each team on the basis of its total population (this number included children despite the fact that they worked much less than adults). Final adjustments in terms of land area were then made in proportion to the total population of each production team. Under this method of distributing resources, children have a clear positive economic value. This link was only potentially broken in the late 1980s and 1990s when it started to become obvious—no doubt under the direct influence of a tighter birth control policy—that the income generated by land, even when coupled with other money-oriented activities, was insufficient to justify having a large number of children.

Xiaoshan's system of collective distribution of income was considerably more complex than the one of either Ci County or Yingde, and it clearly introduced a radically new element in the way people calculated the costs and benefits of childbearing. After each team recorded its total harvest, it sold a predetermined quota amount to the state. Out of the money that the team received for these compulsory sales, they deducted production costs, saved part, and distributed part to the families in the team, strictly according to the work points they had accumulated. So *monetary* income depended entirely on work points. Then whatever grain was left over after compulsory sales and keeping back next year's seed was divided into two

kinds: “basic grain” (*jiben kouliang*) and “overproduction grain” (*chao chan liang*). The basic grain was distributed not on a strict per capita basis, as in Ci County, but rather according to a complex system of different amounts for different ages and genders, differing slightly from Yiqiao to Changhe, but based on the same principle, that people of different ages and sexes consume different amounts of food (see Table 5).

The overproduction grain was to be distributed according to different formulas adopted by different production teams. One of the formulas is referred as “3–3–4,” 30 percent on the basis of the number of livestock raised by the family, 30 percent on the basis of the number of cartloads of fertilizer (mixed manure, straw, and other materials) contributed by the family to the collective, and the final 40 percent according to work points. Thus the family’s in-kind income came from a variety of sources—the age formula, livestock and fertilizer contributions (which depended on labor power as well as numbers of people and domestic animals), and work points. Their cash income came entirely from work points. This system should have two influences on income that differentiate it from the simpler systems practiced in Ci County or in Yingde (Brightpath). First, since cash income was higher in Xiaoshan, and all cash income was distributed according to work points, work points (earned fully only by adults and partially by adolescents) contributed a higher overall proportion of a family’s income. Second, and probably more important, the meager rations given for young children, coupled with the long wait until those children earned any work points, made the addition of a young child to a family a marginal loss of per capita income, rather than a marginal gain as in Ci County or in Yingde. Villagers whom we interviewed in Xiaoshan were very cognizant of this fact, and many of them told us that they limited their fertility in the collective period accordingly; they “could not afford to raise” (*yang bu qi*) additional children when times were already hard.

Analysis and Implications

Our detailed analysis of the data from our three field sites provides, we believe, a more nuanced and detailed explanation of why fertility in China declined where it did, when it did. As such, it also enables us to assess the validity of both the causal factors and the spatiotemporal distribution of fertility decline proposed by previous authors. Figure 3 lays out the specific factors that were important over time in our three sites.

When fertility decline first began, in Xiaoshan, the women in cohorts born between 1930 and 1945 were faced with both a collective compensation system that lowered the value and raised the cost of children, and newly available birth control services, neither of which was the case in Ci County or Yingde (Brightpath). In terms of the three types of proposed causal factors, birth control services are an aspect of development or modernization, and the work point system is an institutional difference from Xiaoshan to the other sites, of the type proposed by Greenhalgh, but one differentiating *among* rural areas rather than between rural and urban areas.

Soon thereafter, in both Xiaoshan and Ci County, women born after 1935 began to have some access to education, another aspect of development or modernization, and we can see a concomitant drop in Ci County’s fertility, while fertility in Xiaoshan continues to go down also. Women of these cohorts in our Yingde sample received little or no education, and fertility there remained high.

Beginning with the cohorts of mothers born after 1940, factors of policy implementation begin to enter the picture, as the *wan, xi, shao* campaign for later, more widely spaced, and fewer births was implemented effectively in both Xiaoshan and Ci County, coinciding with continued fertility decline in Xiaoshan and a sharp drop in fertility in Ci County, whereas in

Yingde the campaign was not strictly implemented, and once again there is little fertility drop in the 1940s–1960s cohorts of mothers there.

The period of the late 1970s and early 1980s, coinciding with the beginning of fertility for mothers born in the late 1950s and early 1960s, and the later years of fertility for mothers born in the 1940s, brought about two further changes, real economic modernization and the implementation of the Planned Birth Program (the “one-child policy”). These coincided with, and probably contributed to, further fertility decline in Xiaoshan and Ci County, although by this time fertility in Xiaoshan was already below replacement and heading for its current, very low levels. Children were becoming even more of a liability, we suspect, for Xiaoshan people who were turning from pure farming to participation in a wage economy, and the Planned Birth Campaign created strong pressure, often coercive, in both places. It was not until the late 1980s, however, that either participation in the wage economy or effective implementation of the Planned Birth Policy reached Yingde, and so fertility does not drop until the cohort of mothers born after 1965, though when the drop comes, it is dramatic, with the average number of children falling from 3.5 to less than 2.

We can thus see that factors of modernization, institutional structures, and policy implementation are all important in explaining the differential timing of fertility decline in our three sites. What about the spatial patterning? It is clear that fertility decline differentials are not simply a matter of an urban–rural dichotomy. A core–periphery dimension seems much more promising, as indeed Xiaoshan, which was ten years earlier in its fertility decline than either Ci County or Yingde (Bright-path), is located in the regional core of the Lower Yangtze macroregion, while both Ci County and Yingde are located in zones much farther toward the periphery. However, Yingde is not much more peripheral to its Lingnan region than Ci County is to its North China region. Yet both education for women and policy implementation happened much sooner in Ci County, a fact perhaps accounted for by the strength of patriarchal lineage culture, even in the face of revolutionary change, in the hills of northern Guangdong.

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Notes

1. United Nations Population Division. World Population Prospects: The 2008 Revision. <http://esa.un.org/unpd/wpp2008/index.htm>
2. For an explanation of the macroregional model, see Skinner, G. William. Regional Urbanization in 19th Century China. *The City in Late Imperial China*. Skinner, G. William. Stanford: Stanford University Press 1977:211–49.
3. Skinner, Henderson, Yuan. China's Fertility Transition. :646–47.
4. For descriptions of Xiaoshan and its geographic and economic role, see Elvin, Mark. *The Retreat of the Elephants*. New Haven: Yale University Press 2004:141–64.; and Schoppa, Keith. *Xiang Lake: Nine Centuries of Chinese Life*. New Haven: Yale University Press 1989.
5. Changhe is now administratively part of Binjiang District of Hangzhou City.
6. Smil, Vaclav. *China's Past, China's Future*. New York: Routledge Curzon; 2004. p. 158

7. Formerly a county under the jurisdiction of Shaoguan, the Yingde territory was integrated into the prefecture-level city of Qingyuan in 1988 and was reclassified as a county-level city in 1994.
8. See Potter, Jack; Potter, Sulamith Heins. *China's Peasants: The Anthropology of a Revolution*. CambridgeCambridge University Press1990; Aijmer, Gøran; Ho, VKY. *Cantonese Society at a Time of Change*. Hong KongChinese University of Hong Kong Press2000; and Ku HB. *Moral Politics in a South Chinese Village*. New YorkRoman and Littlefield2003.
9. Whether this represents some kind of natural fertility under harsh circumstances Wolf, Arthur P. Is There Evidence of Birth Control in Late Imperial China? *Population and Development Review*. 2001; 27(1):133–54. [PubMed: 19097324] or whether it represents a regime of selective birth limitation Lee, James Z.; Feng, Wang. *One Quarter of Humanity: Malthusian Mythology and Chinese Realities. :1700–2000*.CambridgeHarvard University Press1999; Lee, James Z.; Campbell, Cameron; Feng, Wang. Positive Checks or Chinese Checks? *Journal of Asian Studies*. 2002; 61(2): 591–607. is still a matter of debate.
10. Looking at the comparisons between Xiaoshan and the other two locations and remembering that our Xiaoshan sample includes some families in the Old Town of Changhe (about a fourth of our total sample), while the Ci County and Yingde samples are all rural, we might suspect that some of the differences in the timing of the fertility decline in the two counties are due to the presence of a lower fertility urban population as part of the Xiaoshan sample, which would support the urban–rural dichotomization favored by Greenhalgh's institutional model. To test this possibility, we have calculated the age-specific fertility rates and total fertility rates for the Xiaoshan sample showing rural women only, leaving out the hypothetically lower fertility population of the Changhe Old Town. The results suggest that there are no significant differences; we could as easily compare the rural women from Xiaoshan with the rural women from Yingde and Ci County as use the entire Xiaoshan sample. We thus retain the entire Xiaoshan sample in our comparisons.
11. Caldwell, John C. *Theory of Fertility Decline*. London: Academic Press; 1982.
12. Unfortunately, in the unpublished data set compiled by Skinner and his associates based on 1990 census data, values for Ci County are not provided, but bordering territories range from zone 10 (Linzhang) to zone 6 (the urban portions of Handan), with Wu'an at 7 and She County at 9. For Yingde, see also Skinner, G William. *Differential Development in Lingnan. The Economic Transformation of South China*. Lyons, Thomas P.; Nee, VictorIthacaCornell University East Asia Program1994:17–54..
13. See Santos, Gonçalo D. L'agriculture traditionnelle chinoise est-elle verte et jusqu'où? Comment les techniques transforment les sociétés (Cerisy 2-9 Juillet). 2009Faroult, Elie; Gaudin, ThierryParisL'Harmattanin press
14. See, for example, Thornton, Arland; Lin, Hui-Sheng. *Social Change and the Family in Taiwan (Population and Development Series*. ChicagoUniversity of Chicago Press1994:275–76..
15. Skinner, Henderson, Yuan. *China's Fertility Transition*. :647.
16. See Kaufman, et al. *Family Planning Policy and Practice*. and Short, Zhai. *Looking Locally*.
17. For traditional methods of birth limitation in Xiaoshan, see Han, Hua. *Under the Shadow of the Collective Good: An Ethnographic Analysis of Fertility Control in Xiaoshan, Zhejiang Province, China*. *Modern China*. 2007; 33(3):320–348..
18. While two sons (one per parent) meant old-age security and two additional patrilineal assets for the household and the extended family/lineage, one daughter represented additional household labor (at least until her out-marriage) and the possibility of a new affinal ally.
19. Skinner, G William. *Family and reproduction: A Comparison of Cantonese, Hakka and Yao*. *Asian Anthropology*. 2003; 2:1–47.
20. See Potter, Potter. *Chinese Peasants*. 11 and Ku. *Moral Politics*. 13.
21. For other examples showing a similar pattern in various parts of rural China, see Greenhalgh, Susan. *The Peasantization of the One Child Policy in Shaanxi. Chinese Families in the Post-Mao Era*. Davis, Deborah; Harrell, StevanBerkeley and Los AngelesUniversity of California Press1993:219–250.; also Kaufman, et al. *Family Planning Policy and Practice*. and Short, Zhai. *Looking Locally*.
22. For a parallel case in a village in Hubei, see Hong, Zhang. *From Resisting to "Embracing?" The One-Child Rule: Understanding New Fertility Trends in a Central China Village*. *China Quarterly*. 2007; 192:855–875..

23. For examples, see Parish, William; Whyte, Martin King. *Village and Family in Contemporary China*. Chicago: University of Chicago Press 1978:62–71. and Chan, Anita; Madsen, Richard; Unger, Jonathan. *Chen Village: The Recent History of a Peasant Community in Mao's China*. Berkeley and Los Angeles: University of California Press 1984:90–93..
24. Feeney, Griffith; Yu, Jingyuan. Period Parity Progression Ratio Measures of Fertility in China. *Population Studies*. 41(3):77–102. [PubMed: 11612059] Bannister, Judith. *China's Changing Population*. Stanford: Stanford University Press; 1987. p. 245–46.
25. The 80 percent or 70 percent distributed according to population was not absolutely free; the total amount owed the family was actually calculated entirely according to its share of work points; if the “people” part of the distribution exceeded the family's share of work points, the family owed the balance to the collective. However, families were rarely forced to pay their debts to the collective, instead accumulating them year after year.
26. Greenhalgh. *Fertility as Mobility*.

Biographies

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Figure 1.
Geographic location of research sites.

Figure 2.

Average number of children ever born in three places, by mother's birth year cohort.^a

a. The count of children in Brightpath (Harmony Cave) did not include all children ever born but rather all children who survived the early years of childhood.

Figure 3.
Factors contributing to fertility decline over time.

Table 1**Causal Factors and Spatial Models in the Explanation of China's Fertility Decline**

Spatial Model	Urban–Rural Dichotomy	Variation among Randomly Selected Places	Hierarchical Regional Space
Causal factor			
Modernization	Lavelly and Freedman ^a		Skinner et al. ^b
Economic institutions	Greenhalgh ^c		Skinner et al.
Policy implementation	Lavelly and Freedman, Li ^d	Short and Zhai ^e Kaufman et al. ^f	Skinner et al.

^aWilliam R. Lavelly and Ronald Freedman, "The Origins of the Chinese Fertility Decline," *Demography* 27, no. 3 (1999): 357-61.

^bG. William Skinner, Mark Henderson, and Yuan Jianhua, "China's Fertility Transition through Regional Space Using GIS and Census Data for a Spatial Analysis of Historical Demography," *Social Science History*, 24, no. 3 (2000): 613-52.

^cSusan Greenhalgh, "Fertility as Mobility: Sinic Transitions," *Population and Development Review* 14, no. 4 (1988): 629-74.

^dJiali Li, "China's One-Child Policy: How Well Has it Worked? A Case Study of Hebei Province, 1979-88. *Population and Development Review* 21, no. 3 (1995): 563-85.

^eSusan E. Short and Zhai Fengying, "Looking Locally at China's One-Child Policy," *Studies in Family Planning* 28, no. 4 (1998): 373-87.

^fJoan Kaufman, Zhang Zhirong, Qiao Zinjian, and Zhang Yang, "Family Planning Policy and Practice in China: A Study of Four Rural Counties," *Population and Development Review* 15, no. 4 (1989): 707-29.

Table 2

Parity Progression Ratios by Mother's Birth Cohort

Mother's Birth Year	Xiaoshan				Ci County				Yingde (Brightpath)			
	PPR2	PPR3	PPR4	PPR4	PPR2	PPR3	PPR4	PPR4	PPR2	PPR3	PPR4	PPR4
1910–1919	1.00	1.00	1.00	1.00	.86	.86	.81	NA	NA	NA	NA	NA
1920–1929	1.00	.92	.86	.86	.97	.93	.89	1.00	1.00	1.00	.75	.75
1930–1934	.94	.97	.88	.99	.97	.97	.92	.91	.90	.90	.78	.78
1935–1939	.98	.93	.49	.94	1.00	.90	.90	.92	.91	.91	.70	.70
1940–1944	1.00	.81	.40	1.00	.93	.81	.81	.94	1.00	.82	.82	.82
1945–1949	.93	.60	.19	.94	.65	.50	.50	1.00	1.00	.50	.50	.50
1950–1954	.74	.14	.07	1.00	.70	.30	.30	.93	.93	.93	.85	.85
1955–1959	.47	.00	NA	.92	.76	.27	.27	.93	1.00	.71	.71	.71
1960–1964	.48	.01	.00	.94	.52	.13	.13	.95	1.00	.63	.63	.63
1965–1969	.28	.03	1.00	.42	.25	.00	.00	.95	.89	.59	.59	.59

Table 3

Sex-Specific Parity Progression Ratios in Xiaoshan, by Mother's Birth Cohort

Mother's Birth Cohort	Previous Births' Gender Composition													
	M	F	MM	MF	FM	FF	MMM	MMF	MFM	MFF	FMM	FMF	FFM	FFF
1910–1919	NA	1.00	NA	NA	1.00	1.00	NA	NA	NA	NA	1.00	NA	1.00	1.00
1920–1929	1.00	1.00	0.92	0.92	0.91	0.91	0.80	0.83	1.00	1.00	0.75	1.00	0.75	0.86
1930–1934	0.95	0.92	1.00	1.00	1.00	1.00	1.00	0.75	1.00	1.00	0.75	0.50	1.00	1.00
1935–1939	1.00	1.00	0.88	0.92	0.91	1.00	0.33	0	0.40	0.67	0.5	0.50	0.25	0.83
1940–1944	1.00	1.00	0.72	0.89	0.78	0.88	0	0.33	0.60	0.33	0	0	0.43	0.75
1945–1949	0.92	0.94	0.38	0.52	0.52	0.89	0	0	0.17	0.14	0	0	0	0.56
1950–1954	0.56	0.95	0.13	0.14	0	0.24	0.50	NA	0	0	NA	0	0	0
1955–1959	0.16	0.82	0	0	0	0								
1960–1964	0.04	0.90	0	0	0.03	0								
1965–1969	0.05	0.53	NA	0	0	0								
1970–1974	0.02	0.30	0	NA	0.25	0								

Table 4

Women's Illiteracy and Middle School Education

Birth Cohort	Percentage Illiterate			Percentage with Middle School Education or Higher		
	Xiaoshan	Ci County	Yingde	Xiaoshan	Ci County	Yingde
1910–1919	75.0	85.7	—	0	0	—
1920–1929	81.8	92.0	100.0	0	0	0
1930–1934	80.8	85.1	100.0	7.8	1.5	0
1935–1939	44.4	72.4	100.0	0	10.3	0
1940–1944	58.8	39.3	94.4	11.8	14.3	0
1945–1949	31.4	30.6	100.0	0	14.3	0
1950–1954	30.8	29.0	100.0	9.2	25.9	0
1955–1959	14.8	38.9	93.3	20.4	22.2	0
1960–1964	6.1	9.4	100.0	44.0	68.8	0
1965–1969	5.0	0	90.0	61.7	79.0	0
1970–1974	0	0	81.8	72.3	90.7	0

Table 5

Basic Grain Allocations by Age, Yiqiao and Changhe, Xiaoshan, 1966–1981

	Yiqiao			Changhe		
	Age	Yearly Grain (jin)	Age	Yearly Grain (jin)	Age	Yearly Grain (jin)
1	15	120	1–2	133	15–16 (M)	433
2	16	150		520	15–16 (F)	417
3	17	180	3–4	540	17–18 (M)	484
4	18	220		560	17–18 (F)	467
5	19–50 (M)	250	5–6	640	19–50 (M)	583
6	19–50 (F)	300		600	19–50 (F)	534
7	51–55 (M)	340	7–8	600	51–55 (M)	516
8	51–55 (F)	360		550	51–55 (F)	484
9	56–60 (M)	380	9–10	560	56–60 (M)	484
10	56–60 (F)	400		520	56–60 (F)	467
11	61–65 (M)	420	11–12	520	Over 60	450
12	61–65 (F)	440		480		
13	Over 65	460	13–14 (M)	480		
14		480	13–14 (F)			
				400		
				383		