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Regional Variation of Lineage Culture and Fertility Transition in Rural China

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中国农村生育转变的类型与宗族文化的区域差异

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Abstract

By linking the decline in the total fertility rate since the 1970s and the emergence of an unbalanced sex ratio at birth in different regions, this article defines two main types of fertility transition in rural China—a smooth and balanced fertility transition versus an obstructed and unbalanced fertility transition—and analyzes their regional distribution. The distribution of these two types is related to the regional variation in lineage culture. For historical reasons, village communities of different regions have different social networks and norms associated with lineage institutions. The regional variation with regard to these two types clearly impacts the population planning policy's degree of control over fertility. It also constitutes the main factor behind different fertility behavior of the villagers of different regions. Mutual interaction of these two factors produces a very interesting spatial distribution of fertility transition in rural China. In the cultural region encompassing South China and the Central Plains, the decline in the fertility rate has lagged behind other regions and a severely unbalanced sex ratio at birth has appeared within the context

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of a strong lineage culture impacting fertility transition. On the other hand, the Northeast and Southwest China as well as most of the Yangzi River Valley, where the history of the villages is short and lineage culture is weak, have taken the lead in achieving a relatively low fertility rate while maintaining a balanced sex ratio at birth.

Keywords
fertility transition, total fertility rate, sex ratio at birth, regional variation, lineage

摘要
本文根据 20 世纪 70 年代以来总和生育率下降与出生性别比失衡在不同区域的组合，将中国农村生育转变归纳为“阻滞—失衡型”生育转变和“平滑—均衡”型生育转变等两种类型。生育转变类型与宗族文化的区域差异有关，不同区域村庄社区内部宗族社会网络与宗族规范因为历史原因而存在差异，这两个因素交织在一起，使得中国农村生育转变存在十分有趣的空间分布：在华南以及中原等文化区，在宗族文化及其社会结构的作用下，生育率下降相对滞后，同时出现严重出生性别比失衡；而在村庄历史比较短暂、宗族文化薄弱的东北、西南、长江流域的大部分地区，率先达到较低的生育水平，出生性别比大致保持平衡。

关键词
生育转变、总和生育率、出生性别比、区域差异、宗族

Demographic transition theory is the most influential theory in describing and explaining the process of change of the world's population in modern times. However, that different world regions, which have different histories and cultures, are diverse with regard to the type of population change, especially with regard to the type of fertility transition, poses an important challenge to this theory. In his reassessment of the theory four decades ago, Ansley Coale demonstrated that there is significant regional variation among seven hundred European provinces/regions with regard to the type of fertility transition. Interestingly, the regional distribution of fertility transition resembles the regional distribution of European languages and cultures (Coale, 1973; Freedman, 1979). For instance, the distribution of fertility rates among different Spanish provinces virtually matches the distribution of different Spanish dialects (Leasure, 1962). On this ground, Ronald Freedman argued that culturally and linguistically similar regions have similar levels of fertility even if their levels of economic development are dissimilar. Asian regions sharing a common culture often have similar types of fertility transition and variation among them very probably stems from differences within Asian culture (Freedman, 1979). The research of scholars of Europe has clearly indicated that fertility behavior is deeply embedded in culture and that cultural differences often lead to notable differences in fertility behavior.

Does China, a country with a surface area that is roughly equal to the entire European continent and with regional subcultures that are clearly diverse both

historically and linguistically, demonstrate clear regional variation with regard to fertility transition that is similar to what scholars have observed in Europe? Our own fieldwork as well as the field research conducted by our colleagues (in the Center for Rural China Governance at Huazhong University of Science and Technology in Wuhan, China) over the last decade has found that within the process of fertility transition in rural China, not only the number of children couples prefer to have but also its pace of change varies regionally. More surprisingly, the spatial map of the preferred number of children and the spatial map of the transformation of the preference of the sex of the children are hugely similar. Thus the question is whether we can explain this diversity of fertility transition in China. Inspired by the work of scholars like Coale and Freedman, this article attempts to provide an analytical framework to explain regional variation of fertility transition in China from the perspective of the lineage 宗族 culture and social structure of villages of different regions by linking the language, history, and culture of different regions. In our fieldwork, we found that the regional variation of the fertility transition is related to the regional variation of lineage culture. This article seeks to explain the diversity of fertility transition based on the regional variation in village social structure and lineage culture.

Theoretically speaking, we attempt to integrate the theory of fertility transition of the field of demography and the theory of social structure of the field of sociology in order to describe and explain the analytical framework of the diversity of fertility transition in China. While we describe the regional variation of fertility transition in China by using the theory of fertility transition, we refer to the theory of social structure in order to analyze the impact of lineage culture on the fertility behavior of villagers. By doing so, we avoid a simplistic cultural determinism that may posit a direct relationship between culture and the pattern of fertility. We suggest that villagers' fertility behavior is embedded in the social structure of the village. Differences in lineage culture create differences in structural power (the density and cohesiveness of the social network of the lineages, i.e., the lineage network and its power to support informal norms/standards) and normative power (which involves concepts like "the more sons, the more happiness" and carrying on one's ancestral line) within the village. This in turn creates discrepancies in the pattern of the fertility behavior of the villagers and the practice and performance of the national population policy at the micro-level. Also, the impact of fertility behavior at the micro/individual level is translated into a regional variation of fertility transition at the macro-level.

Below we first combine the sample data taken from the population censuses of 1982, 1990, and 2000 in order to summarize the regional variation with regard to the type of fertility transition in China at the macro-level. Second, we inte-

grate the literature on Chinese lineages (which has been conducted within the fields of linguistics, literature, and the history of migration) in order to demonstrate that the historical development of lineage structures has been different in different regions. Finally, by operationalizing two different perspectives (of structural power and normative power) and analyzing two concrete mechanisms (fertility behavior and the application of the family planning policy), we establish the relationship between lineage culture and fertility transition.

Regional Categorization of the Fertility Transition in China

The fertility transition since the 1970s constitutes an important part of population change in China. The fertility transition in rural China has two prominent characteristics. First, the fertility rate has fallen quickly in response to the national family planning policy. Second, the sex ratio at birth has remained unbalanced since the 1980s. In the classical theory of population change, the magnitude of the decrease in the fertility rate indicates the degree of completion of fertility transition. However, within the background of a strong preference in rural China for sons, the completion of the fertility transition includes a change of the sex ratio of children because fertility involves a three-dimensional preference: the number of children, the timing of births, and the sex of the children (Gu, 1992). Therefore, in academic discussions, China's fertility transition is usually defined as a two-staged process. First is the change in the number of children who are born, which essentially involves how many children couples want to have. Second is the change in the sex ratio at birth, which essentially involves a change in the couples' preferences with regard to the sex of their children (Li et al., 2011). In this article, our principal aim is to portray the regional diversity of fertility transition in China since the 1970s by focusing on the change in the number of children who are born and the change in the sex ratio at birth.

We use the sample data taken from population censuses and the ARCGIS geographic information system in order to describe the regional diversity of fertility transition in rural China. Below we summarize the regional categorization of the fertility transition in China at the macro-level. First of all, we summarize the number of births and sex ratio at birth at specific time points by using the sample data derived from the population census of 2000. The prefectural-level city is the unit of analysis in this sample data out of consideration for the sample scale.[1] After that, we sort out the times series data of total

[1] Taking the county as the unit of analysis is very desirable for two main reasons. On the one hand, the county has been a very stable cultural and administrative unit throughout Chinese

fertility rate (TFR) and sex ratio at birth (SRB) between 1965 and 2000 by using the sample data derived from the population censuses of 1982, 1990, and 2000. This enables us to portray the diversity of fertility transition from a historical perspective.

Regional Variation of the Type of Fertility at the Time of Census

We use the prefectural-level data on the fertility rate and sex ratio at birth taken from the fifth national population census published in 2000. By utilizing the GIS (Geographic Information System), we systematically draw data from 400 prefectural-level cities which demonstrate the distribution of the number of children who are born and the sex ratio at birth. The scholarly community has acknowledged that calculating the total fertility rate by using the census data of 2000 is obviously problematic (Guo, 2010; Wang, 2004). For this reason, when we measure the fertility rate, we take the average number of male and female children of women between the age of 35 and 50 because women at the age range of 15 to 34 have not yet completed the fertility process. Also, using data on sex ratio at birth taken from prefectural-level cities can reflect the regional differences with regard to the degree of son preference.

The results are shown on Maps 1 and 2. They can be analyzed from two different—holistic and regional—perspectives. From a holistic perspective, first of all, regions having similar fertility rates and sex ratios at birth seem interconnected since they are *not* distributed irregularly to every region all over the country. These interconnected prefectural-level cities constitute fairly large regions: within each such region fertility rates are more or less consistent and the boundaries between regions are clear.

Second, many provinces often contain sub-regions that are entirely different from other sub-regions with regard to fertility rate and sex ratio at birth. This

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history. On the other hand, only a sample of a certain size can achieve the scale that is required to calculate the fertility rate and sex ratio at birth by maintaining basic stability and avoiding large fluctuations. The original sample data from the censuses of 1982 and 1990 include approximately 12 million samples. China has approximately 2,500 county-level units. Therefore, approximately 4,800 samples were taken from each county. It is appropriate to take the county as the unit of analysis in this case. Prefectural-level cities are too big to be taken as the unit of analysis. Regions having different cultures would be located in the same prefectural-level city. Moreover, the prefectural-level city as an administrative unit has been subject to constant alteration in China. Therefore, data from different years are hardly comparable. Also, the township and the village are too small to be taken as units of analysis. The number of births and the sex ratio at birth can easily produce fluctuations at that micro-level. The sample database of the year 2000 has approximately 1.2 million samples. Since calculating statistical indexes such as the fertility rate and the sex ratio at birth requires a large sample size, the county as a unit of analysis is too small.

indicates that many of the previous studies which took the province as the unit of analysis probably could not capture these sub-provincial differences. Those studies also led to misguided policies because in many provinces different regions having different types of fertility were subject to a uniform fertility policy. Clearly, regional variation of the family planning policy in China can hardly explain the regional variation of fertility types. Moreover, the regional variation of fertility types appears as a key explanatory variable.

Finally, although these prefectural-level cities have similar fertility rates and sex ratios at birth, they have highly different levels of economic development. Thus theoretical approaches based entirely on the level of economic development can hardly explain the regional variation of fertility types.

From a regional perspective, the outline and the form of many regions shown in Maps 1 and 2 roughly coincide with each other. This indicates that the regional distribution of the number of births and the sex ratio at birth is highly similar.

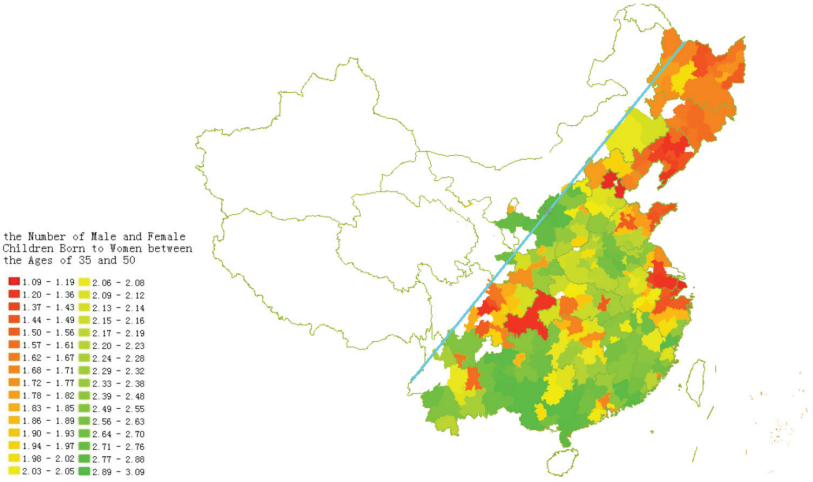
Distribution of the Number of Births

Map 1 shows that when we look at the national level, among the regions to the east of the Aihui-Tengchong Line,[2] those with a very high number of births are Jiangxi, Guangdong, Fujian, and western Guangxi. These four provinces constitute South China. The North China Plain (which roughly encompasses the entire province of Henan and Huaihe Plain [which is made up of the northern parts of Jiangsu and Anhui provinces], a small portion of southwest Shandong as well as a small portion of southern Henan) is a region that has a relatively high fertility rate. This zone roughly corresponds to the Central Plains of ancient China. The number of births is high in parts of eastern Hubei and southern Hunan. The fertility rate is also very high in Yunnan and Guizhou.

Moreover, regions having a low number of births lie more or less at the center of the map, covering the area from the lower reaches of the Yangzi River Valley (including southern Jiangsu, southern Anhui, and northern Zhejiang) to

[2] In 1935, famous Chinese geographer Hu Huanyong (1901-1998) formulated the concept of the Aihui-Tengchong Line (also known as the "Heihe-Tengchong Line") as an imaginary line dividing China into two parts of roughly equal geographic size but entirely different population densities. The line stretches from Aihui district in Heihe city, Heilongjiang province, in the north, to Tengchong county in Baoshan city, Yunnan province, in the south. The area east of the line has a very high population density and that to the west of the line has a low population density. The concept of the Aihui-Tengchong Line has gained an important place in the fields of geography (especially in population geography and human geography) and demography. Since the overwhelming majority of the Chinese population lives to the east of Aihui-Tengchong Line, we focus on this part of the country in this article.

Map 1. Distribution of the Number of Male and Female Children Born to Women between the Ages of 35 and 50 in Prefectural-Level Cities, 2000



Source. 2000 0.95% Population Sample Survey original data.

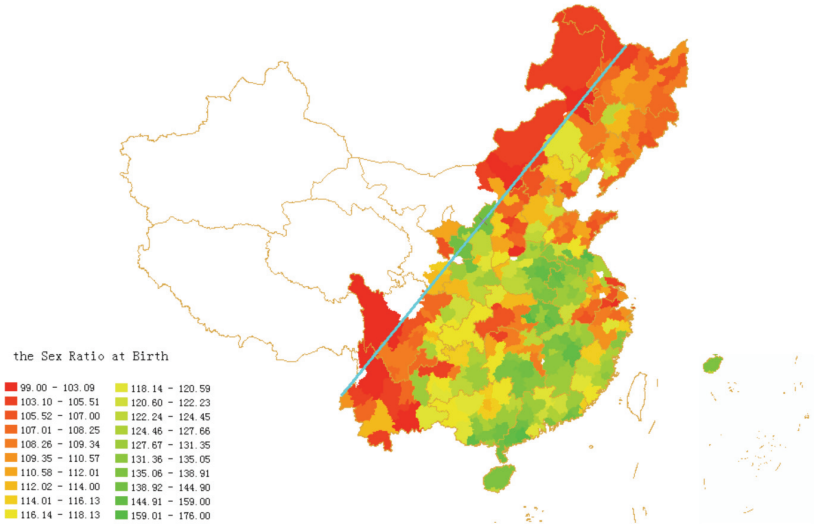
its middle reaches (the Jianghan Plain and the Lake Dongting Plain) and upper reaches (western Hubei as well as the Chengdu Plain).[3] These areas constitute a single zone with a very low fertility rate. Furthermore, the Shandong peninsula, most of Hubei, and three northeastern provinces make up a zone with a relatively low fertility rate.

Regional Distribution of the Sex Ratio at Birth

The region described in China studies overseas as "South China," which mainly consists of the provinces of Guangdong, Guangxi, Jiangxi, and Fujian, has a very unbalanced sex ratio at birth. The sex ratio at birth is also quite unbalanced in eastern Hubei and western Hunan. Aside from these regions, Henan, northern Anhui, northern Jiangsu, southwest Shandong, and southern Hebei also constitute a macro-region having an unbalanced sex ratio at birth. On the other hand, three northeastern provinces, the lower reaches of the Yangzi River Valley, the Jianghan Plain, the Lake Dongting Plain, and the Chengdu Plain have a

[3] For purposes of our discussion, the Yangzi River Valley excludes eastern Hubei, in which the number of births is high and the sex ratio at birth is very unbalanced. For the convenience of narration, we call the region made up by the plains in the lower reaches of the Yangzi River, the Two Lakes Plain, and the Chengdu Plain the "Yangzi River Valley."

Map 2. Distribution of the Sex Ratio at Birth in Prefectural-Level Cities, 2000



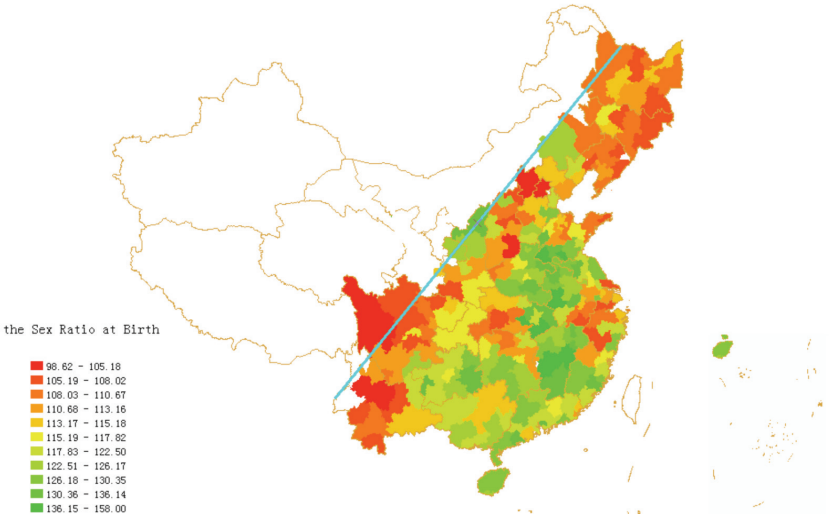
Source. County-level data, fifth census, 2000 (from the website of the National Bureau of Statistics of China).

fundamentally balanced sex ratio at birth. In other words, with the exception of eastern Hubei, the entire Yangzi River Valley has a basically balanced (or only slightly unbalanced) sex ratio at birth. In addition, the Shandong peninsula, Shanxi, and Hebei (except for southern Hebei) form a region with a balanced sex ratio at birth. In other words, when we compare Maps 1 and 2, we find that at the time of the census of 2000, in most of the regions located to the east of the Aihui-Tengchong Line, the regional distribution of the number of births and the sex ratio at birth basically coincide with each other. Table 1 displays this consistency.[4]

In brief, regions to the east of the Aihui-Tengchong Line shown on Maps 1 and 2 almost entirely overlap with each other. To put it simply, regions having a very high fertility rate also have a very unbalanced sex ratio at birth. Also,

[4] As discussed below, some regions (mainly Yunnan and Guizhou) do not fit in this general picture because the family planning policy has been laxly implemented there, mainly because of the high presence of ethnic minorities in these provinces. Also, we have not found an answer yet to the question of why the fertility rate is high but the sex ratio at birth is basically balanced in Shanxi.

Map 3. Distribution of the Sex Ratio at Birth in Prefectural-Level Cities, 2010



Source. County-level data, sixth census, 2010 (from the website of the National Bureau of Statistics of China).

Note. The spatial distribution of the sex ratio at birth for 2000 and for 2010 are entirely consistent. This indicates that the data on the sex ratio at birth provided by the two censuses are quite reliable. It also reflects that the regional variation in the sex ratio at birth is an objective social reality.

regions with a low fertility rate are the regions with a fundamentally balanced sex ratio at birth.

Regional Variation in the Type of Fertility Transition

In order to develop a long-term perspective on the regional variation of the type of fertility transition in four macro-regions of China (South, North, Northeast, and the Yangzi River Valley), we calculated the TFR and SRB of each region by using the original data from the censuses of 1982, 1990, and 2000.

Figure 1 shows that the TFR of each region was more or less equal (around 7) in the early 1970s (South China was slightly higher than the others).[5] Since the

[5] TFR of each region between 1967 and 1992 is calculated by using the original census data of 1982. We made the same calculation for the period between 1983 and 1990 by using the original census data of 1990. The term "Central Plains of China" refers to the Huanghuai Plain, which includes Henan, northern Jiangsu, and northern Anhui. Due to limitations of the sample scale

Table 1. Regional Comparison of Types of Fertility in China, 2005

Region / Variable	South China	Central Plains and Shaanxi	Northeast China	Shandong Peninsula	Northern Hebei	Yangzi River Valley			Eastern Hubei	Central and Southern Hunan	Yunnan, Guizhou, Shanxi
						Lower	Middle	Upper			
Number of births	High	High	Low	Low	Low	Low	Low	Low	High	High	High
Sex ratio at birth	High	High	Low	Low	Low	Low	Low	Low	High	High	Low

Source. 2005 1% Population Sample Survey database.

adoption of the family planning policy in the 1970s, South, North, Central, and Northeast China all have experienced declining fertility rates but the process of fertility transition has nevertheless varied largely among different regions. In the Yangzi River Valley and the Northeast, fertility rates dropped very quickly following the policy implementation, as is evident in a steep decline

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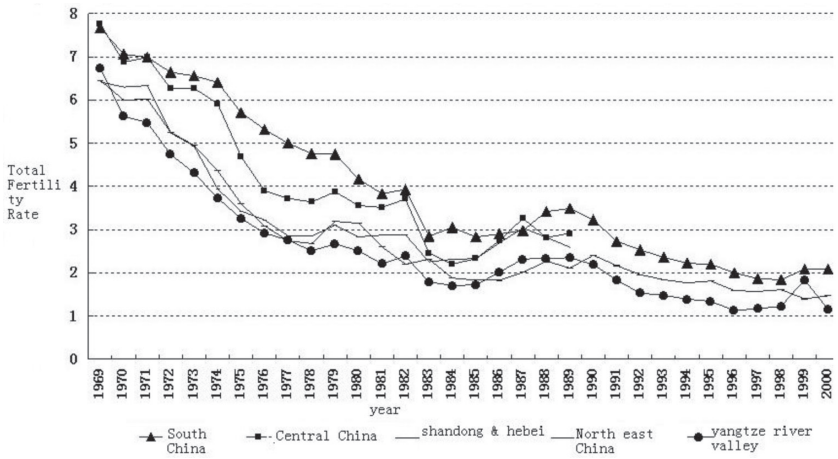
in the census of 2000, we did not calculate the annual TFR for the Central Plains, Shandong, and Hebei. South China mainly includes the provinces of Jiangxi, Fujian, Guangdong, and Guangxi. Data on the Yangzi River Valley are very complicated. The natural boundaries of the Yangzi River Valley mainly encompass the Chengdu, Jianghan, and Lake Dongting plains as well as the middle and lower reaches of the Yangzi River. Its administrative boundaries changed considerably between 1980 and 2000. According to the 1982 census, it mainly includes, in Sichuan: Neijing and Mianyang (prefectural-level) cities, Neijiang prefecture, and Leshan prefecture; in Hubei: Jingzhou prefectural-level city, Xiangfan district, Yunyang district, and Yichang prefecture; in Hunan: Yiyang prefecture, Changde prefecture, and Xiangtan prefecture; in Jiangsu: Yangzhou prefectural-level city, Nantong prefecture, Zhenjiang prefecture, and the Suzhou area; in Anhui: Anqing prefecture, Huizhou district, Chaohu prefecture, Xuancheng prefectural-level city, and Luan prefecture. The administrative borders of the Yangzi River Valley remained unchanged between 1990 and 2000. It mainly includes, in Sichuan: Chengdu, Dujiangyan, Zigong, Deyang, Mianyang, Neijiang, and Leshan; in Hubei: Yichang, Xiangfan, Jingmen, Jingzhou, and Suizhou; in Hunan: Zuzhou, Xiangtan, Changde, Zhangjiajie, and Yiyang; in Anhui: Wuhu, Maanshan, Tongling, Anqing, Huangshan; in Jiangsu: Nanjing, Wuxi, Changzhou, Suzhou, Nantong, Yangzhou, and Zhenjiang. We and our colleagues who have conducted field research covering the counties and cities of four big regions of rural China during the last decade have a solid grasp of the notion of fertility and fertility behavior of the villagers of these four big regions as well as regions such as Yunnan and Guizhou. Furthermore, eastern Hubei and southern Hunan belong to South China while northern Anhui and northern Jiangsu belong to North China. Due to limitations of the sample data, especially the sample data from the 2000 census, here we omit these micro-regions. When calculating the curve of the sex ratio at birth by region, our statistical standards for different regions are the same. We thank Dr. Yu Huang of the Chinese Academy of Science for helping us use the C++ program to calculate the annual TFR of each region, all of which are derived from the original census data.

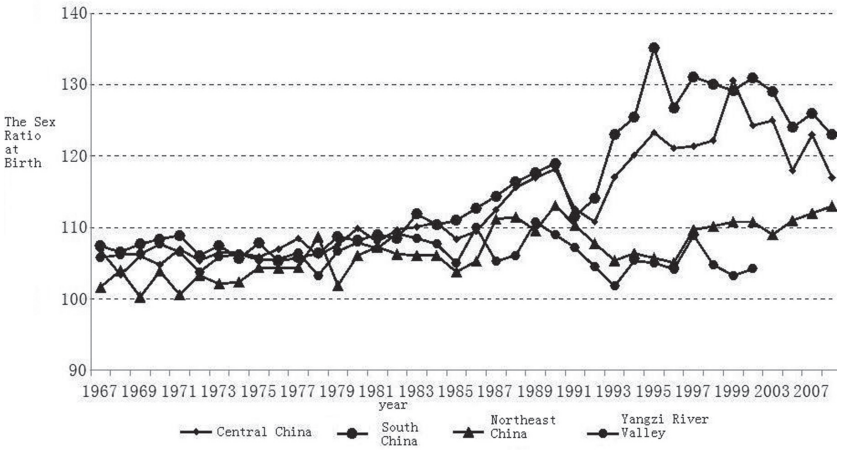
Figure 1. Regional Variation in the Fertility Rate in Five Major Chinese Regions, 1970-2000



Source. For 1967-1982: calculated from the 1982 census (1% population sample); 1983-1990: calculated from the 1990 census (1% population sample); 1991-2000: calculated from the 2000 census (0.95% population sample); 2001-2009: calculated from the 2010 census.

in the fertility rate curve between 1970 and 1980. The Yangzi River Valley had basically completed its fertility rate transformation in the 1980s and become a low fertility region. In contrast, in South China, the fertility transition has been quite slow and has lagged behind other regions. The decline in the number of births has been a very long process, which is illustrated by an almost flat declining fertility curve. To take the year 1975 as an example, the Yangzi River Valley and the Northeast had already approached level of 3 but South China still maintained a level around 5. In 1982, the Yangzi River Valley and the Northeast approached a very low level (2.1) but South China's level was still around 4. From the 1970s to the 1990s, the fertility rate in South China was far above the level of the Yangzi River Valley and the Northeast. In 1990, South China reached the level that was attained by the Yangzi River Valley almost a decade earlier. In North China, the pace of the decline in the fertility rate was extremely fast. However, its fertility rate fluctuated back and forth and with the coming of the 1980s, clearly surpassing the level of the Yangzi River Valley and the Northeast. As a whole, North China's pace of the decline of the fertility rate lies somewhere between that of South China and the Yangzi River Valley and the Northeast.

Figure 2. Change in the Sex Ratio at Birth in Four Major Chinese Regions, 1967-2007

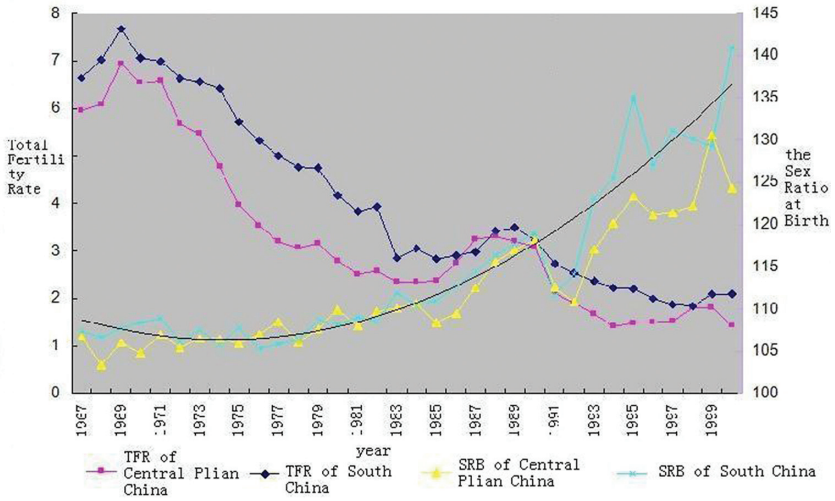


Source. For 1967-1982: calculated from the 1982 census (1% population sample); 1983-1990: calculated from the 1990 census (1% population sample); 1991-2000: calculated from the 2000 census (0.95% population sample); 2001-2009: calculated from the 2010 census.

Figure 2 shows the curve of the change in the sex ratio at birth of each region since the early 1970s. This change indicates whether or not son preference has weakened. Looking from this angle of measurement, we can see that the Northeast and the Yangzi River Valley do not have any clear tendency of a rising sex ratio at birth since the 1970s. They can be regarded as the first regions to have completed the transition away from son preference. In contrast, the same transition has been slow in the countryside of North and South China. Within the process of an uninterrupted decrease in the number of births, son preference first declined in these regions. However, within the uninterrupted upward trend of the sex ratio at birth since the 1980s, the transition away from an unbalanced sex ratio at birth has been very slow in these two regions. However, the sixth census, conducted in 2010, demonstrates that these two regions have already returned to the track of transition away from son preference.

Since an unbalanced sex ratio at birth has accompanied the declining fertility rate, here we combine the declining curve of the fertility rate and the changing curve of sex ratio at birth in order to analyze the type of fertility transition in different regions, which is concretely illustrated in Figures 1 and 2. We find that there are two main types of fertility transition in rural China.

Figure 3. Obstructed and Unbalanced Fertility Transition in North and South China, 1967-1999



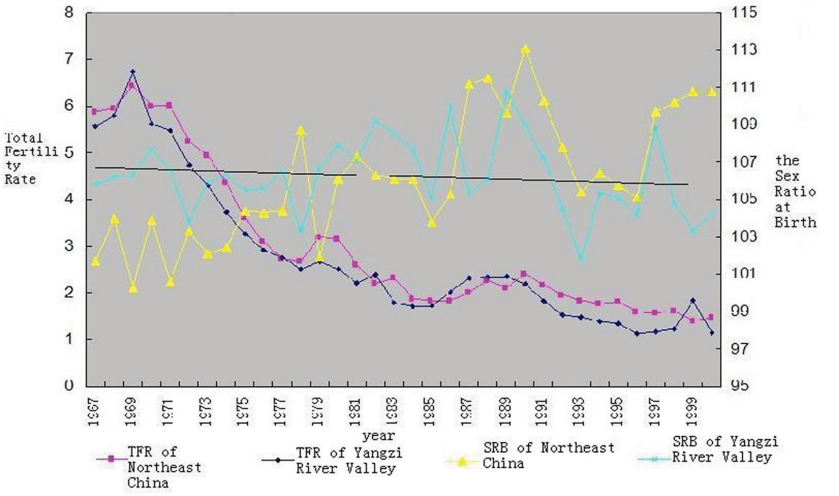
Source. The source of annual data on TFR and fertility rate is the same as the data source of Map 3. The source of annual data on the sex ratio at birth is the same as the data source of Map 4.

South China and the Central Plains represent the first type of fertility transition. During the fertility transition, the pace of decline of the fertility rate has been relatively slow and has lagged behind other regions. At the same time, the sex ratio at birth has been extremely high. South China has the most unbalanced sex ratio at birth in the country. This type of fertility transition can be characterized as "obstructed and unbalanced fertility transition." Figure 3 illustrates the basic characteristics of this type of fertility transition.

The Yangzi River Valley and the Northeast represent the second type of fertility transition. The basic characteristic of this type is a rapid decline in the fertility rate without any notable change in the sex ratio at birth.[6] As Figure 4 illustrates, the sex ratio at birth in the Yangzi River Valley has remained stable, fluctuating above and below the level of 105 since the 1980s, without any notable rise. The situation in the Northeast is more or less the same. We characterize this type of fertility transition as "smooth and balanced fertility transition."

[6] Li Shuzhuo et al. suggest that the decline in the sex ratio at birth happens through three stages. SRB rises at first, then fluctuates at that high level, and finally declines and achieves a balance (Li et al., 2011).

Figure 4. Smooth and Balanced Fertility Transition in the Yangzi River Valley and Northeast China, 1967-1999



Source. The source of annual data on TFR and fertility rate is the same as the data source of Map 3. The source of annual data on the sex ratio at birth is the same as the data source of Map 4.

When we look at the sequential order of the completion of the fertility transition, we see that regions with a "smooth and balanced fertility transition" lead in decreasing the number of births and sex ratio at birth, while the same process has been very slow in regions of "obstructed and unbalanced fertility transition." Currently these latter regions have already reduced the number of births but they will still need a long time to reduce their currently high sex ratio at birth. Put differently, Northeast China and the Yangzi River Valley completed their fertility transition earlier than North China, which completed its transition slightly earlier than South China. We find that it is impossible to establish a relationship between the time sequence of the fertility transition and the level of economic development in rural China. It cannot be said that the most economically developed regions completed their fertility transition first. This finding presses us to search for key variables other than economic development in order to explain the fertility transition.

Why does the type of fertility transition exhibit such a regional variation? The scholarly community has already confronted this question. However, there is no previous study that makes an integrated analysis and regional comparison simultaneously. Since the existing studies are still not capable of analyzing

the type of fertility transition and instead keep looking at the regional variation of the fertility rate and the sex ratio at birth separately, we will analyze them first and then introduce our explanatory framework.

We start by looking at the existing explanations of the variation in the fertility rate among different provinces. The academic literature has taken the level of economic development and fertility policy as the primary explanatory variables. The conclusion can be summarized as follows: while political factors associated with the family planning policy are primarily responsible for the change in the fertility rate between the 1970s and the 1980s, the gradual domination of market forces in the economy and society is primarily responsible for the revolutionary transformation of the fertility rate in the 1990s.

Gu Baochang's 1987 study is still the most important work on the relationship between economic variables and the fertility rate. In his investigation of China's fertility rate using provincial-level data and a path analysis, he concluded that the level of socioeconomic development and family planning directly impact China's fertility rate (Gu, 1987). In their analysis of the correlation coefficient of comprehensive economic development and the fertility rate between the 1950s and the 1990s, Peng Xizhe and Huang Juan found a significant correlation between the two. Although Peng and Huang also attempted to explain fertility rate differences among different provinces by their level of economic development, their analytical rigor prevented them from arriving at simplistic conclusions such as the level of economic development decides the level of the fertility rate (Peng and Huang, 1993a, 1993b).

Building upon the works of scholars like Gu and Peng, Chen Wei took a step forward to investigate the independent impact of economic development and family planning on the decline in the fertility rate by combining the horizontal and longitudinal data of each province (Chen, 1995). Chen concluded that the impact of socioeconomic development increased while the impact of family planning decreased from the 1970s to the end of 1990s. In 1980, the impact of family planning was much larger than the impact of socioeconomic development. This fact supported the common belief that family planning was the most important factor behind the decline in the fertility rate in China in the 1970s. The relative impact of the two factors achieved equilibrium by the 1990s: the beta value of socioeconomic development and family planning policy were almost the same. During the 1980s, the impact of economic reform was growing, meaning that economic reform was changing the social structure and slightly weakening the mechanism of family planning. The economy, society, and value systems were transformed during the 1990s. After fluctuating in the 1980s, the fertility rate started to decline in the 1990s. Both socioeconomic

development and family planning have had a significant impact on the fertility rate. However, the data from 2000 indicate that the equilibrium between two factors ended in favor of socioeconomic development.

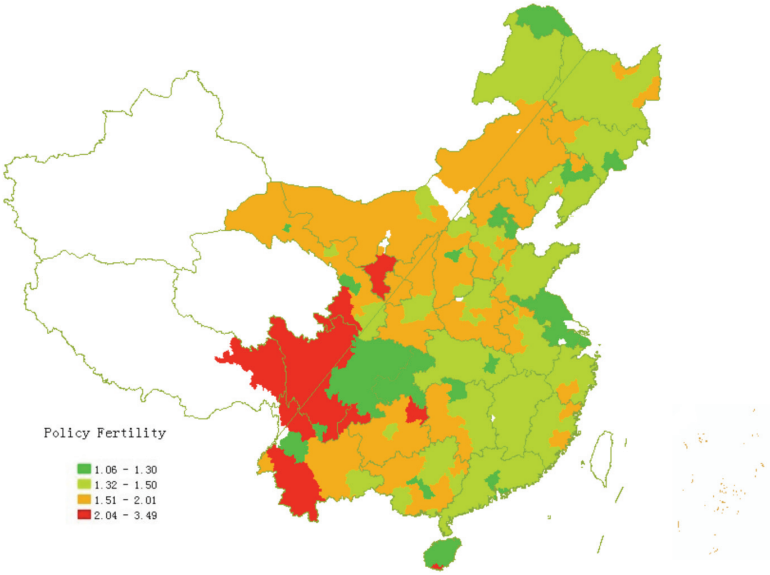
We first take a look at the flaws of the argument based solely on economic development. Incorporating this variable is certainly necessary since economic development has operated as a push factor in the decline of the fertility rate at the national level. However, precisely because the majority of the existing theories of fertility transition depend almost entirely on economic development, they are incapable of explaining the different paths taken by regions that are not economically but culturally different. It has been well established that fertility rates start to decline after the level of economic development achieves a certain stage. However, this only shows that the theory of fertility transition is a more or less correct theory but does not necessarily mean that it is capable of explaining the diversity of the paths of fertility transition. In fact, this theory is incapable of establishing a strict correspondence between the level of development and the process of fertility transition. If we attempt to explain the contrast between these explanatory frameworks and the regional distribution of the fertility rate as seen in Map 1, we find that it is impossible to establish a strict correlation between the level of economic development and the ups and downs of the fertility rate. If we take the case of the East Coast, which has been the vanguard of economic development for the last three decades, we see that there are clear sub-regional differences within this macro-region: the fertility rate of Shandong, Jiangsu, and Zhejiang has been quite low, but Guangdong, Fujian, as well as the coastal areas of Guangxi have the highest fertility rates of the entire country. When we compare the east coast with Central and Western China, we, again, come to an interesting conclusion: the level of economic development of regions such as Guangdong, Fujian, and Guangxi is much higher than other regions but the fertility rate in the central and western regions (such as the Chengdu Plain, the Jianghan Plain, and the Lake Dongting Plain) is much lower than in South China. Focusing solely on the differences in the level of economic development does not appear to be a fruitful approach for explaining the regional variation with regard to fertility rates.

Turning to the argument based on fertility policy, works of scholars like Gu Baochang, Zhang Erli, and Guo Zhigang have demonstrated that fertility policy is not uniform across China. They constructed the concept of "policy fertility" to measure the regional variation of the fertility policy (Guo et al., 2003). Hence, we need to ask whether it is possible to establish a direct association between "policy fertility" and the fertility rate. In other words, will the fertility rate fall if family planning policy becomes stricter?

Map 4 illustrates the regional distribution of policy fertility. According to average policy fertility rates of 420 regions from all over the country provided by Guo et al., the lowest policy fertility rate is around 1.060 and the highest reaches up to 3.50. In other words, the policy fertility of the highest region is three times that of the lowest region. For the sake of simplicity, Guo et al. divide policy fertility into four regional categories: Type 1: policy fertility between 1.10 and 1.13, roughly corresponding to regions that attach utmost importance to the one child policy; Type 2: policy fertility between 1.13 and 1.15, roughly corresponding to regions that have a mix of the one child policy and "if you only have a daughter you can have a second child" policy; Type 3: policy fertility between 1.15 and 2.10, roughly corresponding to regions whose policy is a mix of "if you only have a daughter you can have a second child" policy and the policy allowing two children; Type 4: policy fertility is 2.10 or above, corresponding to regions with a policy allowing two or more children.

According to the regional distribution of policy fertility shown on Map 4, it is hard to establish a relationship between fertility policy and the fertility rate. In regions such as Jiangsu, Sichuan, and Chongqing where a strict fertility policy

Map 4. Regional Distribution of Policy Fertility, 1999



has been implemented, the fertility rate is indeed quite low.[7] Nevertheless, we observe very different fertility rates in regions (such as the three provinces of the Northeast, the Shandong peninsula, Hubei, Jiangxi, and Guangdong) that have implemented a "one-and-a-half child policy" and that have a policy fertility of 1.3-1.5. Guangdong and Jiangxi have the highest fertility rate of the entire country. Moreover, the central and western parts of Hubei, the Northeast, and the Shandong peninsula are the regions with the lowest fertility rate in the entire country. Similarly, within Hubei province, which has uniformly implemented a "one-and-a-half child policy," the fertility rates of the Jianghan Plain (in central and western Hubei) and eastern Hubei are entirely different. Similar examples can be found elsewhere. In short, it is difficult to establish a correlation between fertility policy and the fertility rate.

Regarding the existing explanations of the regional variation of sex ratio at birth, currently there are two kinds of explanations of the principal factors behind this variation. According to first explanation, fertility policy determines the regional variation of sex ratio at birth. According to second, geographical environment is the determinant.

First Explanation: Fertility Policy Determines the SRB

Mainstream demographers believe there is a close relationship between the regional variation of fertility policy and the regional variation of sex ratio at birth. Scholars such as Zhang Erli (2005), Guo Zhigang (Guo Zhigang et al., 2003), Chen Wei (2002), and Song Yueping (2009) argue that regions that have implement the "one-and-a-half child policy" have a higher (i.e., more unbalanced) sex ratio at birth than other regions. However, Map 2 clearly shows that among regions that have implemented a "one-and-a-half child policy," there are regions that have a balanced sex ratio at birth. For instance, in Hubei province, which has thoroughly implemented the "one-and-a-half child policy," while the sex ratio at birth is severely unbalanced in the eastern part of the province, it is basically balanced in the central and western parts. Similarly, Map 2 demonstrates that stricter birth control policy does not necessarily lead to a higher sex ratio at birth. Although the one child policy has been implemented in Jiangsu as a whole, the sex ratio at birth is entirely different in the

[7] State policy is not the main reason behind the low fertility rates in these regions. As discussed later in this article, there is a profound social basis behind their ability to achieve low fertility rates.

northern and southern parts of the province. It is easy to find similar examples in many other regions. This indicates that fertility policy is not a key factor behind the sex ratio at birth.

Second Explanation: Geographical Environment Determines the SRB

According to some views, the sex ratio at birth is related to the geographical environment (elevation/altitude) and ambient temperature. It is also speculated that ambient temperature not only affects impregnation but also the hormone level of the parents, which in turn affects the natural selection of the sex ratio of the population (James, 2001). Kang Guoding and Xiao Pengfeng conducted quantitative research in order to determine the relationship between geographical and environmental characteristics (especially elevation/altitude) and the SRB within the Chinese population at the age of 0-4 by utilizing the GIS. They found that most of the counties with a high sex ratio at birth within the population at the age of 0-4 in 1990 and 2000 were located to the east of Aihui-Tengchong Line. Kang and Xiao also found that there is a strong negative correlation between the elevation/altitude and the SRB of the population at the age of 0-4. The sex ratio at birth is extremely high in counties located at an elevation of less than 100 meters. Above the elevation level of 3,200 meters, the sex ratio at birth starts declining to its normal range. This declining trend continues along with the rising elevation (Kang and Xiao, 2010).

However, this can hardly explain the SRB at low elevations. Many plains of China have maintained a balanced sex ratio at birth. The Northeast Plain, the Sichuan Plain, the plains of Hubei and Hunan, and the plains on the lower reaches of Yangzi River Valley are examples of this phenomenon. This kind of explanation not only fails to establish a plausible relationship between elevation/altitude and sex ratio at birth but also is incapable of explaining the mechanism that links elevation/altitude with the sex ratio at birth.

Distribution of the Chinese Dialects and the Regional Variation of Lineage Culture

Our study has found that the regional distribution of the type of fertility transition resembles the regional distribution of Chinese dialects.[8] We have already mentioned that the works of Coale, Leasure, and Freedman point out that

[8] In developing our arguments about the relationship between Chinese dialects and fertility transition, we benefited from our discussions with Wu Hailong.

many linguistically and culturally similar regions demonstrate similar types of fertility even though they have different levels of economic development. They referred to several cases in Asia in which regions sharing a common culture often have similar types of fertility. Leasure's study showed that the regional distribution of fertility types in Spain is almost identical with the regional distribution of Spanish dialects (Leasure, 1962). This suggests that there is a correlation between fertility types and factors such as language and subculture.[9] In our study, we have found that with the exception of a few regions,[10] there is a striking consistency between the regional distribution of the number of births and the sex ratio at birth on one side and the regional distribution of major Chinese dialects on the other. In order to explain this puzzle, we have drawn Map 5, which shows the regional distribution of Chinese dialects based on the county-level data on regional dialects provided by the journal *Fangyan* (Dialect).

It can be seen that the regional distribution as well as the scope of Chinese dialects (Map 5) and the regional distribution of fertility rate and the sex ratio at birth (Map 1 and Map 2 respectively) are largely consistent. To understand why, we must explore the historical relationship between dialects and fertility in China.

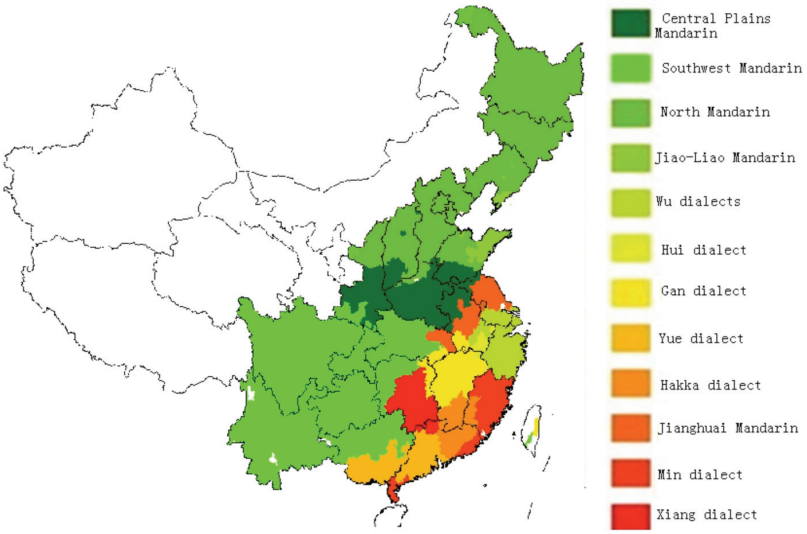
The Region of the Southern Dialects

The southern dialects are found in Guangdong, Fujian, Jiangxi, and southern Guangxi where Cantonese, Min, Gan, and Hakka are spoken, respectively. This macro-region lags behind other regions with regard to the decline in the fertility rate and sex ratio at birth. We therefore classify it as a region of "obstructed and unbalanced fertility transition." The Xiang (Hunan) dialect region also belongs in this category. What is particularly interesting is that the regional distribution of the Cantonese, Xiang, and Gan dialects resembles the regional distribution of the sex ratio at birth. Within the region of the Southern dialects, only the region of the Wu dialect, spoken in the lower reaches of the

[9] Our analysis below indicates that this kind of correlation does not necessarily mean that language has a direct impact on people's fertility preferences and choices. It rather means that language operates as a kind of cultural property. Language and subcultural properties, such as family culture, of different regions are both probably influenced by the same historical events. Family culture, son preference, and fertility choices are closely related.

[10] The history of migration, population reproduction, and lineage development that we discuss below will help us to explain the factors that underlie this sort of discrepancy.

Map 5. Regional Distribution of Ten Major Chinese Dialects, ca. 1987



Source. Zhongguo shehui kexue yuan, 1987.

Yangzi River Valley, has a low fertility rate and balanced sex ratio at birth. We will discuss below the historical reasons behind this difference.

North Mandarin and Southwest Mandarin

The most recent dialect among all Chinese dialects is Mandarin 官话. Mandarin mainly consists of Northeast Mandarin, Ji-Lu (Hebei and Shandong) Mandarin, Liaoning Mandarin, Central Plains Mandarin, Lan-Yin (Lanzhou-Yinchuan) Mandarin, and Southwest Mandarin. Since the Jin dialect spoken in Shanxi and North Shaanxi was in fact derived from Mandarin, we also classify it under the category of Mandarin. For the convenience of mapping, we combine Northeast Mandarin, Ji-Lu Mandarin, and the Jin dialect since these three Mandarin-speaking regions have a smooth and balanced fertility transition and a basically balanced sex ratio at birth.

The Southwest Mandarin region occupies large areas lying south of the Yangzi River, which are divided into central and western Hubei, the entire province of Sichuan and Chongqing, Yunnan and Guizhou, northern Guangxi, the Yuanshui watershed in Hunan as well as the southwestern horn of Shaanxi. With the exception of a small part, most of the Southwest Mandarin region

has a normal sex ratio at birth. The number of births is also relatively low in this region except in Yunnan and Guizhou, where it is high because of lax fertility policies implemented in these provinces due to the high presence of ethnic minorities.

Within the entire Mandarin-speaking region, Central Plains Mandarin (whose geographical scope is simply the Central Plains of ancient China including most of Henan, Jiangsu, and the Huaihe Plain of Anhui, and southwestern Shandong) presents a special case. This region is the core of ancient China. The change in the number of births in this region has lagged behind many other regions and the sex ratio at birth has been relatively high. If we look at this region from the perspective of population reconstruction and lineage development, which were started especially by the so-called Great Migration of Hongwu in the early Ming period, the reason there is a notable difference between this region and North China (Shandong, Shanxi, and Hebei) with regard to the type of fertility transition is a question worth further thought. According to our fieldwork, the fundamental reason is that the traditional Confucian code of ethics, which lies in the historical background of this region, is still strong.

Why is the spatial distribution of the Chinese dialects and the types of fertility similar?[11] Can we explain the secret of the regional variation of Chinese culture and the type of fertility transition on this basis? The history of language formation in different Chinese regions can give us some clues about the relationship between these two. As we have noted, our research has found that the regional distribution of dialects and types of fertility are more or less similar. In fact, regional differences with regard to history and lineage culture lie behind this similarity. Is it not true that what lies behind different languages are their historical differences, which in turn are related to differences with regard to the period of the development of lineage cultures? Regions of ancient Chinese dialects are also the places where lineage organizations developed early. In contrast, the history of the Mandarin-speaking regions is shorter and their lineage culture is weaker. This applies to the regions of Northeast Mandarin, Eastern Mandarin (excluding Central Plains Mandarin), and Southwest Mandarin. Since different regions have different levels of lineage culture, couples' preference regarding the number of children and the strength of son preference are also different, which, as a whole, creates regional variation in types of fertility transition. We can summarize the causal chain this way: language formation and its historical characteristics > history of migration > history of

[11] We define below the various linguistic regions, such as Central Plains Mandarin and the Wu dialect region.

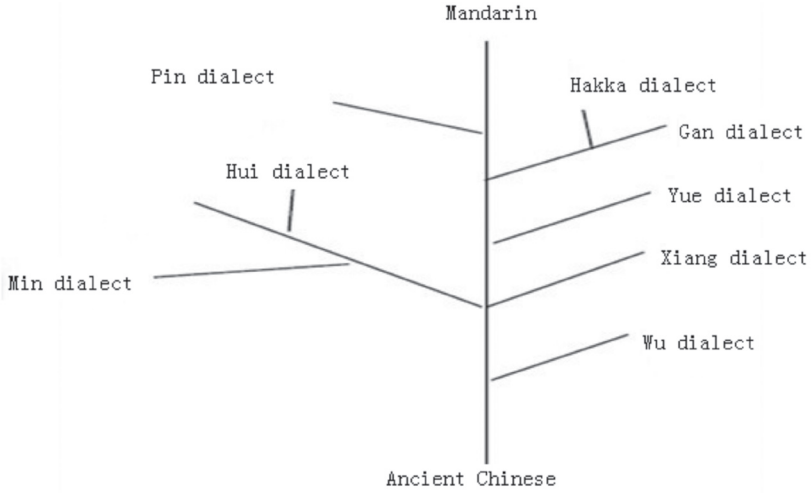
lineage formation and development > structural and normative power of the lineage > fertility behavior at the micro-level > fertility transition.

Chinese Dialects and the History of Migration

According to the classification in the *Language Atlas of China* (Zhongguo shehui kexue yuan, 1987), at the first level, the Chinese language is divided into ten major dialects: Mandarin, Jin (Shanxi), Wu (Shanghai), Hui (southern Anhui), Min (Fujian and Taiwan), Cantonese (Guangdong), Xiang (Hunan), Gan (Jiangxi), Hakka, and Pinghua (spoken primarily in Guangxi Zhuang Autonomous Region). Each of these dialects has its own history, and from the history of each we can see different starting points of population reproduction and lineage formation in different regions. Figure 5 provides a hierarchical diagram roughly corresponding to the formation period of each major dialect.

Wu: Among the major dialects, Wu formed the earliest. Large numbers of migrants from the north entered the Wu area mainly during the Three Kingdoms, Jin (Eastern and Western Jin), and the Song (Northern and the Southern Song) period. Dialects brought by successive generations of migrants from the north were increasingly blended with each other and finally formed the Wu dialect of today (You and Zou, 2009). However, today's Wu dialect region was severely hit by the Taiping Rebellion, which caused the local population

Figure 5. Hierarchical Diagram of the History of the Chinese Dialects



Source. You and Zou, 2009.

to drop by almost 70 million and nearly erased the original social structure and lineage culture of the area. The levels of lineage clustering and lineage power were weakened significantly, especially compared to most of South China (Cao, 1997).

Min: Han people who first entered Fujian mostly came from the Wu areas during the late Han and the Three Kingdoms periods as well as the first one hundred years of the Jin period. Finally, during the Tang and Song periods, Min emerged as a distinct dialect.

Xiang (*Hunan*): Xiang sprang from an ancient dialect spoken in Hunan and Hubei. During successive dynasties, especially after the mid-Tang period, it came under attack by both the dialects carried by migrants coming from the north and chaos and war in Hubei and Hunan. Today the ancient Xiang dialect is spoken mainly in southern Hunan (You and Zou, 2009).

Gan and Hakka: The core area of the Gan and Hakka dialects is Jiangxi and adjacent areas in eastern Fujian and northern Guangdong. A vast number of migrants came from the north to Jiangxi early in the Tang period. Gan was originally formed as a result of contact with the dialect spoken by these migrants and the ancient dialect of Jiangxi. During the mid- and the late-Tang period, Gan developed further as migrants coming from the north entered northern Jiangxi and moved further into southern Jiangxi. Hakka people who came from the north at first settled in the Gan dialect region. During the Song and Yuan periods, they moved to the south, toward western Fujian and northern Guangdong. The Gan dialect that they originally spoke and the dialects of southwest Jiangxi and west Fujian as well as the dialect of the aboriginal people of northern Guangdong were all blended into each other and formed the Hakka dialect of today.

Cantonese: Due to the attack of the Liao and Jin dynasties against the Song dynasty, vast numbers of Han people took refuge in Guangdong. These people were called "clients" 客户. According to the *Treatise of the Nine Regions from the Yuanfeng Reign* (*Yuanfeng jiuyu zhi*, an imperial geography from the Northern Song period, 960-1126), clients coming from the north constituted 39 percent of Guangdong's total population at that time. Northern dialects carried by the migrants from the Song dynasty finally laid the foundation of today's Cantonese (You and Zou, 2009).

The dialects mentioned above constitute dialects a in a narrow sense. They do not belong to the category of Mandarin (*guanhua*). Looking from the perspective of studies on dialects, these ancient dialects basically formed before the Northern and Southern Song period. Their history of the reproduction of the existing population structure and villages is very long. People who migrated before the Song period belonged to large lineages and aristocratic families who migrated as entire communities. As a result, the original lineage structure and cultural tradition were maintained in their new settlements, a situation favorable for lineage development. At the same time, they represented the Central Plains culture, the most traditional culture of China. Dialects of these regions kept a large part of ancient Chinese language while cultural beliefs of the villages maintained a large part of the traditional lineage culture from the north. In addition, the villages speaking these Chinese dialects formed early. Hence their social structure matured early and sustained a profound lineage culture. Today they still have a strong lineage tradition and lineages remain powerful. It can be said that the requirements of lineage culture and norms probably led to a strong son preference and high fertility rates in the region of the Southern dialects.

Compared to the Southern dialects, Mandarin has a short history, which started mainly after the Song period (see Figure 5). In all Mandarin-speaking regions the traditional lineage culture of the Han people was weak and village society was formed late. This is highly related to Chinese history because before the Ming and Qing periods, all migrants in China moved from the north to the south. Grassland lineages of the north constantly moved southward. A large part of the original Han population finally moved to South China, hence the south maintained much of the culture of the Qin, Han, Tang, and Song periods.

For example, Southwest Mandarin was formed during the Song period but it diffused mostly following the migration to the south during the Ming-Qing era. The Southwest Mandarin region of today was formed mainly during the Hongwu period of the Ming dynasty as well as the Qing dynasty. There are three main reasons for this: First, several battles were fought there after the Mongols' attacked Southern Song from Sichuan. As a result, toward the end of the Southern Song and in the early years of the Yuan dynasty, Sichuan's population fell by 70 million. After the foundation of the Ming dynasty, a significant number of imperial soldiers were transferred from Nanjing, Jiangxi, and Anhui to the southwest. Second, Zhang Xianzhong, the leader of the peasant revolt in the late Ming period, slaughtered many people after capturing Sichuan. If we add to this picture the armed rebellion of Wu Sangui against the

newly established Qing dynasty, we can see that the chaos of war continued in Sichuan for almost sixty years. Finally, crops that can be produced in high quantities in mountainous regions, such as corn and sweet potatoes, entered into China from overseas during the Qing era and caused a sudden rise in the population. People started migrating to mountainous areas. At the same time, a massive number of people coming from Hubei and Hunan (especially from Hubei) filled Sichuan. Hence villages were formed quite late in Southwest China. Moreover, army units, single families, and independent households constituted the bulk of those migrants. This pattern is historically different from three big migrations that took place out of the chaos of war during the pre-Song period, which mostly involved the movement of entire extended families, lineages, and aristocratic families. The diffusion and extension of Southwest Mandarin more or less corresponds to areas where migration from Hubei and Hunan to the southwest took place. This is why the Southwest Mandarin region matches up with the region where a cultural tradition based on lineages is weak, son preference is low, and the sex ratio at birth is basically normal. Regions of Northeast Mandarin, Ji-Lu Mandarin, and Jiao-Liao Mandarin, which have relatively short histories, also belong to the regional category of "smooth and balanced fertility transition."

From the perspective of the history of population migration and lineage clustering of different regions, it is clear that whether the patterns of population movement and population clustering in each region were formed early or late, whether the level of lineage clustering is high or low, and whether the level of lineage power strong or weak are all closely interrelated. This is because the reproduction of a population and the formation of a lineage take time. That a population has been settled in an area for a very long time is conducive to the reproduction of a single and relatively large lineage community. Conversely, a community with a much shorter history is unlikely to form a developed lineage. Therefore, early post-migration settlement generally leads to stronger lineages; conversely, later settlement creates generally weaker lineages.

The South China region was formed through migrations mostly during the pre-Song period. This involved migration of extended families, lineages, and aristocratic families as entire communities. The migrants largely maintained the lineage structure and cultural tradition they brought with them. Furthermore, that villages in most of these Han dialect regions were formed early meant that there was sufficient time for the formation of single communities of enormous scale. In contrast, regions that were formed through migrations after the Song dynasty have a relatively short history. These regions include North, Northeast, and Southwest China (Sichuan and Yunnan). North China

was formed through migrations during the "Great Migration of Hongwu" in the early Ming period in which people left Gongtong in Shanxi; Northeast China was formed after the late Qing period; and Sichuan was formed before the Qing era. Moreover, in stark contrast to the migration of entire communities that we see in the background of settlement in the south, migrations after the Song period generally involved people who were quite individualistic. Their pattern of settlement was based on small families or individuals; hence the formation of lineages was uncommon and lineage culture was much weaker than in the south (Wang, 2007). Moreover, there was not any significant population settlement on the Jianghan Plain and Lake Dongting Plain on the lower reaches of Yangzi River Valley because of the very unstable ecological conditions due to the constant problem of flooding. Large numbers of people settled in these plains after the construction of dykes in the early Ming period solved the flooding problem to a certain extent. Late population settlement gave very little time for lineage development in the region.

The weakness of lineage traditions led to the weakening of the concept of carrying on the ancestral line through generations. The Northeast Plain, the Chengdu Plain, and the Jianghan Plain are basically in this category. The Chinese General Social Survey (Zhongguo zonghe shehui diaocha) database for 2006 (CGSS2006 hereafter) confirms this point. This large-scale survey, carried out jointly by the Chinese University of Hong Kong and Renmin University, involves 10,000 samples taken from 300 villages. The scale of lineages is larger in rural areas of South China's provinces of Guangdong, Jiangxi, Fujian, and Guangxi than in the north (see Table 2). Also, the scale of lineages in North China is much larger than in the Northeast, Sichuan, and the Southwest.

As the spatial scope widens, the proportion of single surname communities within the total population probably loses its capability to measure the level of lineage development. For instance, a survey conducted at the county level has a greater chance to capture people with identical surnames but having different ancestors than a survey conducted at the village level. We see instances in history in which people having less-common surnames in a region adopted more-common surnames for security purposes. In order to measure the level of lineage development at the national level, we use the data regarding surnames in the original sample survey data in the 2005 census, which sampled one percent of the population.[12] We have calculated the combined weight of surnames at the level of prefectural-level cities. Since data at the county level

[12] These data include 2.5 million samples. We take the rural portion of this sample to calculate the concentration level of surnames.

Table 2. Regional Levels of Lineage Development, 2006

Province	Number of households with the most common surname	Number of households with the second most common surname	Number of households with the third most common surname	Number of villages
Guangdong	565	170	97	15
Fujian	271	126	60	12
Jiangxi	302	127	52	12
Guangxi	376	153	89	15
Shaanxi	149	73	51	12
Gansu	165	83	38	10
Hebei	188	77	49	22
Shanxi	301	108	49	8
Northern Jiangsu	258	108	72	30
Northern Anhui	243	136	88	24
Shandong	153	43	21	32
Henan	197	87	45	36
Central and western Hubei	98	50	31	24
Hunan (excluding southern Hunan)	122	50	29	20
Chongqing city	95	64	44	4
Chengdu Plain	79	48	37	24
Guizhou	192	83	40	18
Inner Mongolia	81	57	47	8
Liaoning	163	122	115	18
Jilin	105	37	22	4
Heilongjiang	47	30	19	6

Source. Chinese General Social Survey, 2006 (CGSS 2006).

or below are not available, we measured the level of lineage development by calculating the proportion of identical surname communities within the total population at the level of prefectural cities. As mentioned above, as the spatial scope widens, the proportion of identical surnames loses its capacity to measure the level of lineage development. Therefore, compared to an analysis that can take the county and the village as units of analysis, the measurement used here is relatively limited.

On the other hand, the rationale behind the use of prefectural-level cities as the unit of analysis for measuring the level of lineage development is that since this sort of measurement method has a large spatial scope, it can capture much older processes of lineage development. For instance, within the spatial boundaries of a county, a community having an identical surname could have moved to different locations and establish two different communities sharing an identical surname. If we widen our temporal scope, for example if we trace back five hundred years, we can see that these two communities have the same ancestors although the fission of the original lineage led to the formation of two different lineages. Since different prefectural-level cities have different total populations, the absolute number of people having identical surnames in these regions would be entirely different but their proportion within the total population would probably be similar. Also, different prefectural-level cities would have entirely different periods of lineage development. In order to overcome this problem, we calculate both the absolute number of people with identical surnames and their proportion within the total population.

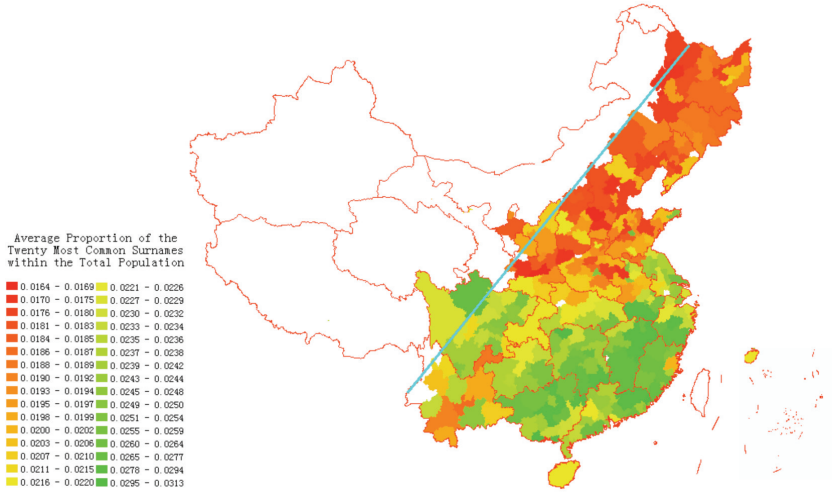
As Tables 2 and 3 and Maps 6, 7, and 8 demonstrate, the degree of concentration of the distribution of surnames resembles the distribution of the type of fertility transition and the dialects.[13] More specifically, the region of Southern dialects has a distinct characteristic. Regardless of the degree of concentration of the surnames, the macro-level data from prefectural-level cities demonstrate that South China has the highest figures not only in terms of the degree of con-

[13] Within the scope of a prefectural-level city, the four most common surnames often have an enormous scope and hence occupy a very high proportion among the total population. For this reason, on Map 6, we removed the first four surnames in order to reduce the bias related to the size of the unit of analysis.

Regarding Map 7, finding the real frequency requires serious consideration of the sampling ratio. The 2005 sample survey data cover one percent of the population. When drawing Map 7, we use a sample that is equal to one-fifth of the sample survey.

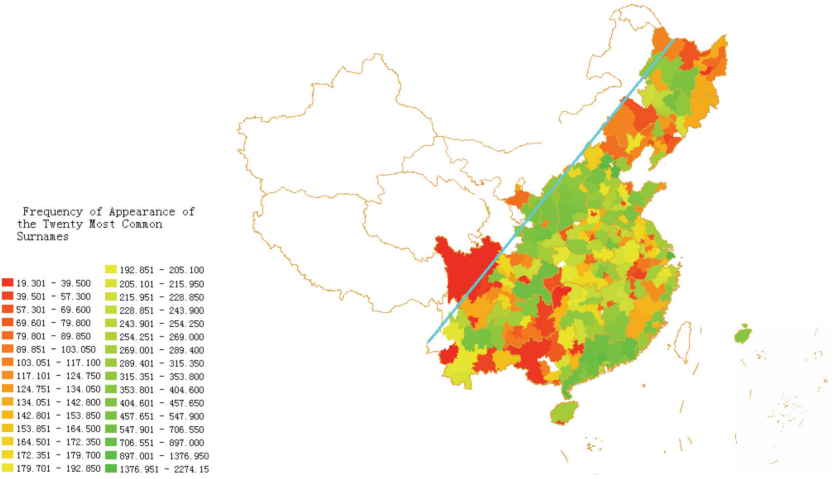
Map 7 shows that surnames are highly concentrated in Guangdong. On the other hand, as Map 8 shows, the proportion of the population having the most common surname within the total population is very low. This is probably because of the impact of the floating population.

Map 6. Average Proportion of the Twenty Most Common Surnames within the Total Population of Prefectural-Level Cities, 2005



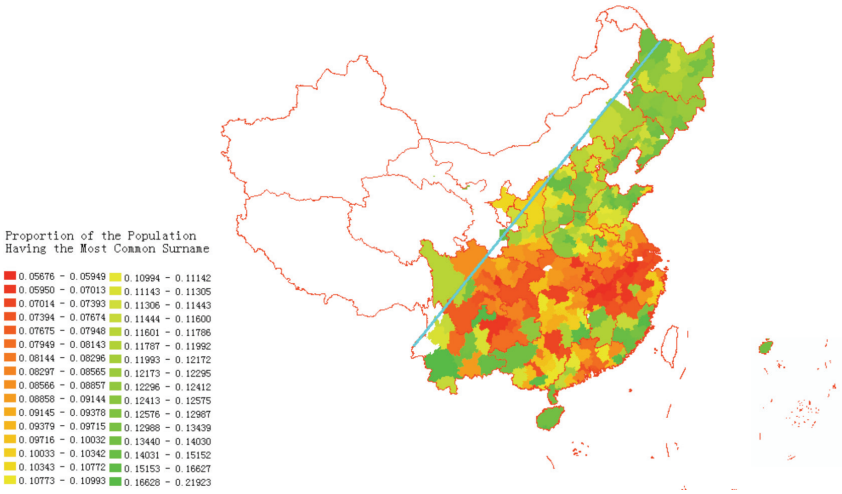
Source. 2005 1% Population Sample Survey database.

Map 7. Frequency of Appearance of the Twenty Most Common Surnames in Prefectural-Level Cities, 2005



Source. 2005 1% Population Sample Survey database.

Map 8. Proportion of the Population Having the Most Common Surname within the Total Population, 2005



Source. 2005 1% Population Sample Survey database.

centration but also in terms of the absolute number of surnames in the country. This indicates that South China's existing population structure probably has the earliest starting point and longest history of reproduction in China.

Many different surnames are found in the North and Northeast Mandarin regions. However, in terms of the absolute number of surnames, the concentration of surnames in North China is significantly higher than in the Northeast. This indicates that the reproduction of North China's population had a much earlier starting point. The distribution of surnames in southern Anhui is especially interesting. Here the degree of concentration of surnames is very high in terms of the relative proportion of the distribution of surnames but not very high in terms of the absolute number of surnames. This is mainly related to the chaos of the Taiping Rebellion, which caused a large fall in the local population, as well as post-conflict migrations. The Yangzi River Valley, a late-developed region in Chinese history, has also been hit by many wars and conflicts throughout history. Lineage culture has always been weak. By looking at the proportion of the population with the most common surnames within the total population (see Table 3 and Map 8), we take a further step in demonstrating the Yangzi River Valley's characteristic of a very low degree of concentration of surnames.

To sum up, in contrast to the migrations that laid the foundation of population settlement in South China, migrations that took place after the Song period and laid the population settlement pattern in Mandarin-speaking regions did not involve the movement and settlement of entire lineages. In North China, the settlement pattern was based on small families or individuals; there was little lineage clustering. This resulted in the weakness of lineage power and of the notion of carrying on the ancestral line. The Northeast Plain, Chengdu Plain, and Jianghan Plain all belong to this category.

Earlier research has substantiated several basic characteristics of villages in South China (Freedman, 2000; Kulp, 1966; Lin, 1974, 2000; Qian and Xie, 1995; Xiao, 2010; Zheng, 1992; see also He, 2012). First is the residential clustering according to blood relationships, which laid the foundation of a developed lineage structure with strong norms and regulations. Lineages based on blood relationships became the basis of the maintenance of the social order in villages. A typical lineage organization in rural South China has possessed four key constituents: an ancestral hall, a genealogy, a lineage chief, and lineage land (He, 2012). Second, lineages in the south have been more normative (rule-based) and have played a more active role in daily life than those in the north (Feng, 2005).

Village communities in North China, in comparison, have been much less developed, less complex, and smaller (Huang, 1985, 1990; Du, 2004; Wang, 2006a, 2006b). Also, lineages in the north, unlike many in the south, have not

Table 3. Spatial Distribution of the Degree of Concentration of Surnames and the Absolute Number of People in the Same Community, 2005

Region / Variable	South China	North China	Northeast China	Southern Anhui	Yangzi River Valley			Southeast Hubei	South-Central Hunan	Yunnan and Guizhou
					Lower	Middle	Upper			
Degree of concentration of the surnames (proportion)	High	Low	Low	High	Very low	Very high	Low	Very high	High	High
Absolute number of single surname communities	High	High	Low	Low	Very low	Very low	Low	Very high	High	Low

Source. 2005 1% Population Sample Survey database.

possessed substantial amounts of property. They have also lacked a common lineage consciousness; in other words, lineage organizations as an integrating and unifying entity have not existed in the villages of the north (Du, 2004: 62-64). However, this does not mean that family organization was not effective in North China; here "in village affairs that concern all villagers, the most basic unit of participation was the family or faction that had the same surname, due to the fact that its members have a common ancestor; hence it possessed the character of a bloodline organization" (Du 2004: 62-64). In other words, instead of big lineages, small kinship groups 小亲族 have been common in North China. Precisely because of this lack of strong ties, properties operated by lineages, ancestral worship, and big family rituals, lineage organization in the north has been much weaker than in the south. Traditions in rural North China have been inevitably less resilient and tenacious than those in the south. The north has lacked a moral community of the lineages which could maintain a relatively cohesive community based on traditional elements.

Turning to the Chengdu Plain, the Two Lakes (Hunan and Hubei) Plain, the Yangzi River Delta, Northeast China, Yunnan, and Guizhou—all settled within recent centuries by migrants—we note that these regions with a relatively short history also could not develop a strong lineage culture or strong traditional family norms. Villages were yet to grow mature family norms before they came under the attack of modernity in the twentieth century (He, 2012; Fei, 2005; Yan, 2002).

In short, regional differences in the history of language and migration led to differences in lineage culture, particularly with respect to son preference. In turn, differences in lineage culture contributed to differences in the type of fertility transition, a subject to which we now turn.[14]

The Impact of Lineage Culture on Fertility Transition

Theoretical Framework

One might object that asserting a direct causal link between the two macrophenomena of regional variation in lineage culture and the type of fertility transition is an unwarranted leap. This is precisely the problem involved in

[14] This section only aims to point out the compatibility between the literature based on case studies and our quantitative analysis regarding the regional variation in lineage culture. For this reason, we do not deal with the issue of son preference here.

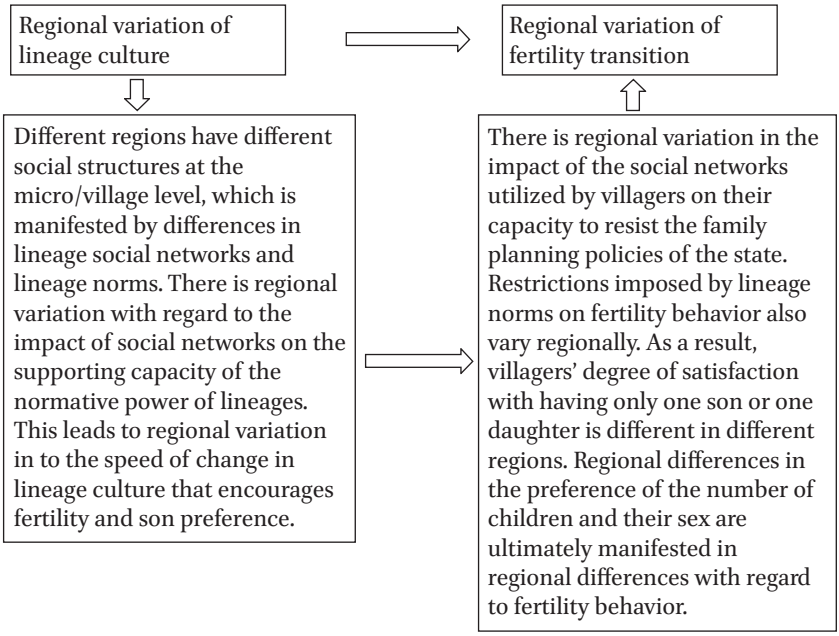
holistic methodology, namely the neglect of the social systemic level, especially the neglect of the individual level. Therefore, James Coleman (1990) advocated using the actions of different components of the social system (such as the individual, community, organization, and the system) to explain the action of the social system. Any theory which is based on individual actions and which interprets systematic actions is necessarily composed of three parts. First, explaining change from the macro- to the micro-level: this proposition takes social characteristics as the independent variable and individual characteristics as the dependent variable. Second, explaining individual action and interpersonal interaction at the micro-level: this proposition argues that individual characteristics constitute both the independent and the dependent variable. Third, explaining change by going from the micro- to the macro-level: this proposition takes individual characteristics as the independent variable and social characteristics as the dependent variable. Thus, both the starting and the end point of the theory are at the macro-level but in the process of reasoning they are reduced to the individual level. Coleman's paradigm has inspired us to attempt to operationalize the impact of lineage culture on fertility transition and to establish a framework of lineage culture's impact on fertility transition. Our analysis is summarized in Figure 6.

The constraints imposed by lineage norms on the fertility behavior of villagers differ from region to region. Similarly, the pressure of public opinion on families that do not have a son differs from region to region. Both of these are ultimately manifested as differences in fertility behavior.

From Figure 2 we can clearly see that when in establishing the relationship between lineage culture and fertility transition at the micro-level, we can draw on the village social structure as an analytical concept at that level. We use the village social structure at two levels: the structural (social network) and the normative (the concept of "the more sons, the more happiness" and the practice of carrying on the ancestral line). Differences in the level of lineage development result in differences in the structural and normative power of the lineage.

Before going into the analysis, we will first map out the sociological research on social structure. There are two approaches to the social structure in the academic tradition. The first stresses its relational aspect. Spencer's organic theory of society, Durkheim's explanation of the collective relationship and related themes, Simmel's essay on how society is possible, Tonnies' distinction between society and the community as well as anthropologist Alfred Reginald Radcliffe-Brown's study of kinship systems all embody this approach (López

Figure 6. Relational Mechanisms between Lineage Culture and the Fertility Transition



and Scott, 2000). The second approach stresses systemic (or regular) aspects. We see this approach in Durkheim's analysis of collective representations and the structural functionalism developed by Talcott Parsons (1937) and his followers such as Robert Merton, Samuel Barber, Kingsley Davis, and Marion Joseph Levy Jr., which stresses culture and the system. Theoretical works of neo-functionalists such as Jeffrey Alexander and Niklas Luhmann also stress the importance of institutional structure (López and Scott, 2000). In his discussion of the duality of structure in an attempt to make a comprehensive reconstruction of structure and action, Anthony Giddens (1984) suggested that there is a two-dimensional relationship between structure and rules. According to Giddens, both are related to the reflection of the system or the rules of the system. Also, within the social capital theory that has had a great influence in the most recent decades, these two levels of social structure are operationalized in order to analyze social networks and informal standards. The social capital theory of Coleman (1990), Nee and Ingram (1998), and Putnam (2000) also explains this relationship. These scholars stress the contribution of dense networks of social relations and community cohesion to the maintenance of the

binding power of informal standards on action. As Lily Tsai puts, a higher density of social networks leads to stronger cohesiveness which in turn contributes to the maintenance and functioning of informal standards (Tsai, 2002; 2007).

Following these theoretical traditions of the study of social structure, when we explain the regional variation of fertility transition by the regional variation of lineage culture, we draw on the structural theory of society and suggest that lineage culture operates through its structural and normative power. Both types of power simultaneously influence villagers' fertility behavior. Concretely speaking, the variable of lineage culture influences villagers' fertility behavior by passing through the following two mechanisms and then impacts not only the regional variation in quantitative aspects of the fertility transition (i.e., the number of births) but also the speed and path of change in the gender structure of the newborn.

Since, on the one hand, the level of lineage development and lineage culture is different in different regions of China, in the process of social change, the speed of change in structural power (the cohesiveness of the network of lineage relationship within regions) and normative power ("the more sons, the more happiness," carrying on the ancestral line) of the traditional lineages are different. The power of lineage norms to constrain the fertility behavior of the villagers is therefore different. This rules out uniformity and generates significant regional diversity in China with regard to both the preferred number and the sex of children despite the national family planning policy. In several regions, the fertility rate quickly fell without leading to any imbalance in the sex ratio at birth following the family planning policy. In other regions, the decrease in the fertility rate was not only slow but also led to a severely unbalanced sex ratio at birth under the same policy framework.

On the other hand, since the national family planning policy has to deal with different social structures at the micro/village level, there is also regional variation in both the practical form and performance of the policy. In the countryside, the national family planning policy is implemented by local government. In parallel with the regional diversity in social structure, there is also regional variation in rural governance. Relationships between the local government and the village committee, village cadres and villagers, and the local government and villagers vary regionally. This leads to different degrees of success of the family planning policy. In regions having dense and cohesive social networks based on lineages, villagers supported by these networks can resist the national family planning policy and sometimes soften its rigidity. On the other hand, in regions lacking these networks, villagers can do little but capitulate to the policy. As a result, the number of births rapidly decreases in these regions.

In real life, these two mechanisms do not operate separately but interweave. In regions where lineage culture is very strong, the normative power of the lineage exerts a powerful influence on fertility behavior. Villagers can draw significant support from the social network of the lineage in resisting the family planning policy, and hence are inclined to have more children, especially more sons. In this type of region, not only has the decline in the fertility rate been very slow but also the sex ratio at birth has been unbalanced. On the other hand, in regions of weak lineage culture, the transformation away from high fertility rates and unbalanced sex ratios at birth has been relatively rapid.

Peng Yusheng once concluded that the stronger the lineage network in a village, the higher the fertility (Peng, 2010). In this study, we go a step further to verify this relationship between lineage and fertility. The focus of our analysis is the role of social networks in villagers' resistance to the national family planning policy in terms of their relative success in achieving their ideal number and sex of children instead of the success itself.

Based on our fieldwork and that of others over the past decade, we conclude that the impact of lineage norms on son preference has the following aspects: fertility norms (manifested in the belief of "the more sons, the more happiness" and the practice of carrying on the ancestral line), marriage norms (women live with their husbands' family after marriage), the norm of bringing up a son to be taken care of by him in old age, the norm of patrilineal inheritance, and others. The structural power of the lineage (social network) is different from its normative power. As Table 4 indicates, these norms have different levels of impact on fertility behavior.

Regression Analysis

The goal of our regression analysis is to measure the impact of the structural power (the level of lineage development) and the normative power of the lineage on son preference (hence, on the sex ratio at birth). Above we made a regional comparison of the relationship of the level of lineage development, the norm of carrying on the ancestral line, and the marriage form with son preference and sex ratio at birth in each region. Below we assess the validity of this comparison with a regression model. The dependent variable in our regression model is the sex ratio at birth, which is taken from the county-level, disaggregated data provided by the fifth census. Independent variables in the model are the level of lineage development and relevant concepts and practices, such as continuing the ancestral line, the son taking care of the elderly, and inheritance of family property. The data regarding these independent vari-

Table 4. The Impact of Lineage Culture and Its Norms on Son Preference

	Regions of strong lineage culture	Regions of weak lineage culture
Village history	Long	Short
Lineage development	Mature. In a long historical process communities with identical surnames settled and formed single surname villages. High proportion of people with identical surnames within total village population and high proportion of households with identical surnames within total number of households in a village.	Not mature. Due to specific pattern of settlement by migrants coming from all parts of China in the late Qing or even more recently, most villages are mixed/ multiple surname villages. Low number of people under each surname. This can also be measured by calculating the proportion of the population with the most common surname within the total village population.
Notion of carrying on the ancestral line	Strong	Weak
Notion of "the more sons, the more happiness"	Strong	Weak
Marriage system	Strict. Daughters leave home after marriage. The practice of inviting the groom to the bride's family does not exist. Sons being willing to assume the position of a son-in-law also does not exist and this practice can cause a family to lose face in the	Relatively loose and free. Men can live with their wives' families. Daughters can assume the duties of sons and vice versa. A man joining the wife's household can also become a member of its paternal line, which creates confusion in

Table 4 (*cont.*)

	Regions of strong lineage culture	Regions of weak lineage culture
	community. This rules out the development of a tradition of inviting the groom to live with the bride's family and maintains a strict boundary between in-laws and the lineage. It maintains the authenticity, stability, and cohesion of the patrilineal consanguinity.	consanguinity. For example, in the Jianghan Plain, within the most recent four generations more than 90% of households have the tradition of inviting the groom to live with the bride's family. This makes producing a coherent and condensing patrilineal consanguinity difficult.
Surname system	Surname is the sign of patrilineal lineage. A member of the same lineage is highly unlikely to change his surname. He is also not allowed to let outsiders to adopt his surname.	Surname has already lost the function of signifying bloodline. People cannot get acknowledged by others through their surnames. They also cannot trace back their ancestors or claim to be descended from an ancestor based on their surname.
Inheritance system	Strictly patrilineal inheritance. Daughters leave the family after marriage and are not qualified to inherit family or lineage property. Only sons can inherit family and lineage property. A family without a son is called a "vanished bank account."	No strict rule regarding inheriting property. Son, daughter, son-in-law all can inherit property. A wife can invite her husband to live with her family. Daughters and sons-in-law can inherit the property of bride's parents together.
Speed of change in lineage norms	Since the lineage is supported by a highly dense bloodline link, the pace of	Village is often organized by villagers having multiple surnames. Strong

Table 4 (*cont.*)

	Regions of strong lineage culture	Regions of weak lineage culture
	decline in the normative power of the lineage due to the attack of modernity is slow. Clan norms still have binding power, impacting fertility behavior as well as other kinds of behavior.	relationship based on a patrilineal bloodline does not exist. Lineage norms were quickly eliminated or weakened significantly under the attack of modernity. Hence the original lineage does not have any normative power to determine fertility behavior. There is a relatively large freedom of action.
Son preference and fertility behavior	Strong son preference. The main purpose of having a son is to carry on the ancestral line. Elderly people who have no son are called "solitary." Having a daughter does not have much value and having a son is more important than almost anything else. Sex ratio at birth is currently very unbalanced.	Having a son or a daughter has almost the same value. Carrying on the ancestral line does not have much value. Sons take care of their parents according to their capacity. Having a daughter can serve the same purpose by inviting the groom to live with the bride's family and therefore keeps the daughter home, which enables her to take care of her parents in old age. Males and females are equal; both can carry on the ancestral line. Sex ratio at birth is currently balanced.
Representative region	South China, Central Plains, eastern Hubei, southern Hunan	Northeast, lower reaches of the Yangzi River Valley, Jianghan Plain, Lake Dongting Plain, Southwest

ables are taken from the CGSS2005 and CGSS2006 datasets. After matching and filtering data, we obtained data from 381 villages located in 85 counties. On average, we have data from about 4 villages from each county. Each village has 10 samples. In other words, there are approximately 40 samples in each county reflecting the situation of the lineage and lineage norms within its borders. The number of households with one of the three most common surnames within a village measures the level of lineage development. The question "Do you agree with the statement that in order to carry on the ancestral line, you need to give birth to at least one son?" was asked to measure the notion of carrying on the ancestral line. The question "Who has the biggest responsibility of taking care of elderly parents, the son or the daughter?" was asked to measure the system of taking care of the elderly. The question "Who assumes the biggest role in taking care of the parents, who has [the right] to inherit family property, the son or the daughter?" was asked to measure the system of inheritance. We ran our regression tests after controlling for the variable of the level of economic development (per capita net income). Considering the argument of some scholars that topography has an impact on the sex ratio at birth, we separated each county and city according to the data on topography in the CGSS2006 dataset and used topography as a control variable integrated into the model of analysis. The results of the analysis are shown in Table 5.

Table 5 demonstrates that after controlling for the variables of per capita net income and topography, there is a positive correlation with the variable of surname structure (the number of households with the most common surnames), which represents the level of lineage development and the sex ratio at birth (Matrix 1). Also, after carrying out tests of significance, we found a positive correlation between the approval level of the concept of carrying on the ancestral line and the sex ratio at birth (see Matrix 2). In Matrix 3, we note the effect of the notion of continuing the ancestral line on the fertility rate and the level of approval of the notion of carrying on the ancestral line. The significance tests show that taking care of the elderly and inheritance are statistically significant variables. Matrix 3 implies that as the power of the norms such as the son being responsible for taking care of his parents in old age and only the son can inherit family property increases, the level of imbalance in the sex ratio at birth also increases. Conversely, as the degree of tolerance for daughters assuming responsibility for taking care of their parents in old age increases, the sex ratio at birth decreases.

In sum, Table 5 shows that there is a statistically significant correlation between the sex ratio at birth, the level of lineage development, and the normative power of the lineage. Furthermore, all variables can meet the require-

Table 5. Regression Analysis of the Level of Lineage Development, Lineage Norms, and Sex Ratio at Birth

Independent variable	Matrix 1 Beta	Matrix 2 Sig	Matrix 3 Beta	Sig	Beta	Sig
Per capita net income	-0.080	0.109	-0.073	0.706	-0.088	0.338
Topography (proportion of plains within the total area)	-0.102*	0.043	-0.140	0.172	-0.270	0.006
Number of households with the most common surname	0.177**	0.003	0.314**	0.003	0.195*	0.045
Number of households with the second most common surname	0.029	0.753				
Number of households with the third most common surname	0.129	0.175				
Level of approval of the notion of carrying on the ancestral line			0.180*	0.061	0.378**	0.001
Level of approval of the notion that sons should take care of their elderly parents					1.342*	0.006
Level of approval of the notion that both sons and daughters can take care of their elderly parents					-1.182*	0.013
Level of approval of the notion that both sons and daughters can inherit family property					-0.185	0.054
R	0.318	0.449	0.603			
R Square	0.101	0.202	0.364			

* (significant) <0.05
** (significant) <0.01

ments of statistical significance. After controlling for the per capita net income variable representing the level of economic development as well as the variable of geographical circumstances (topography) that are emphasized in the literature, the model still maintains a high level of explanatory power. The explanatory power of Matrix 3 is at the level of 36.4 percent. The analysis of the regression model indicates that as a region's level of lineage development increases, the power of norms such as carrying on the ancestral line, the responsibility of the son for taking care of his parents in old age, and the son's domination with regard to the inheritance of the family property also increases. As son preference intensifies, the sex ratio at birth gets more unbalanced.

Regional Variation of the Mechanism through Which Son Preference Impacts the Fertility Rate

This study suggests that an unbalanced sex ratio at birth is the main factor behind an unbalanced number of births. A few regions have a very rigid preference for sons, which in turn increases the imbalance in the number of births. For example, in case there is a son preference, if the first child is a girl, then the family would tend to decide to have a second child. If the first few children happen to be all girls, the number of births increases gradually. It is necessary to stress that having only a daughter does not compel a family to have a second child. Because of son preference, the willingness to have more children varies depending on the sex of the first child (or the first few children). Regardless of the specific circumstances, families that do not have a son are much more likely to have a second or a third child compared to families that have at least a son. Therefore, the former group of families often ends up having more children than the latter. This illustrates the fact that women's fertility rate goes up under the impact of son preference. This is in line with Chen Wei's conclusion based on his analysis of the sample survey database (Chen, 2002).

Within the framework of regional variation of the degree of son preference, we can infer that as son preference in a region increases, the link between the sex of the previous children and the number of births becomes stronger. As a region's son preference increases, families that do not have a son become more inclined to continue having more children. The increase in the son preference of a region leads to a similar increase in the fertility rate of its villagers. In order to assess the validity of this hypothesis, we draw on original census data of 1982, 1990, and 2000 by using the C++ Program. Our analysis of different regions, which is shown in Tables 6, 7, and 8, verified our hypothesis entirely.

The following conclusions can be drawn from Table 6.[15] First, in 1990, the proportion of women who previously did not have a son within the total number of women having three children (the third child was outside the radar of the official family planning policy) was generally higher than the proportion of women who previously had a son. This phenomenon existed all over the country. However, a regional comparison shows that as son preference increases in a region, the proportion of women having a third child also increases. The data for 1990 and 2000 confirm this conclusion. This is especially clear for 2000 when the proportion of women who previously did not have a son within the total number of women having a third child was 37.8 percent in South China and 27.9 percent in Henan but only 10.6 percent in the Northeast and 8 percent in the Yangzi River Valley.

Second, under the framework of the "one-and-a-half children" policy,[16] it is illegal for women whose first child is a boy to have a second or a third child. Having an additional child in this case is punished by the government. Nevertheless, as Table 6 demonstrates, the proportion of women who stop giving birth after having a son as their firstborn is far higher in the North, the Northeast, and the Yangzi River Valley than in Henan and South China, where illegal continuation of fertility despite already having a son is quite common. This conclusion can still be established well for the year 2000, substantiating that in regions with a developed cultural network of lineages, such as Henan and South China, villagers can make use of informal social networks to violate the family planning policy and hence realize their ideal with regard to the number and the sex of their children.

Table 7 demonstrates the link between the sex of the previous two children and the total number of children. The following conclusions can be drawn from Table 7. First, in 1982, the proportion of women who previously had two daughters within the total number of women who had four or more children was much higher than all other combinations regarding the sex of the children. Trying to have one son by several attempts was a general phenomenon all over

[15] We did not use the census data of 1982 to analyze the relationship between the sex of the children and the number of children because in 1982 it was very common for Chinese women to give birth to two or more children. In fact, having only one child was very uncommon. When we come to the period after 1990, China had already started entering the stage of a low fertility rate. The total fertility rate of women dropped below 2.1. This indicates that since 1990, after having their first child, a considerable number of rural women did not have a second child.

[16] When putting this conclusion forward, we must consider the regional variation in family planning policy. Since the "one-and-a-half child policy" was the leading policy all over the country, this conclusion can apply to the majority of the regions.

Table 6. The Impact of the First Child's Sex on the Total Number of Boys and Girls in Different Chinese Regions, 1990 and 2000

Region	Calculation based on 1990 census data (%)						Calculation based on 2000 census data (%)					
	Sex of first child	Total number of boys and girls			Total (%)	Number of cases	Sex of first child	Total number of boys and girls			Total (%)	Number of cases
		1	2	3 or more				1	2	3 or more		
Hebei and Shandong	Boy	29.2	47.1	23.6	100	75,946	Boy	52.6	37.8	9.5	100	11,789
	Girl	21.3	44.2	34.4	100	76,410	Girl	29	50.8	20.2	100	10,067
Northeast	Boy	39.1	41.2	19.7	100	39,873	Boy	68.5	28.4	3.1	100	5,612
	Girl	25.2	43.7	31.1	100	39,851	Girl	40.4	49.1	10.6	100	4,642
Yangzi River Valley	Boy	25.4	50.2	24.3	100	14,977	Boy	72.3	25.8	2	100	4,295
	Girl	19.1	46.2	34.6	100	15,809	Girl	50.9	41.1	8	100	3,410
Central Plains	Boy	20	43.8	36.3	100	29,316	Boy	41.6	44.1	14.4	100	5,981
	Girl	17.4	35.6	47	100	31,243	Girl	26.1	46.1	27.9	100	4,912
South China	Boy	13.9	40.5	45.5	100	40,701	Boy	30.8	44.6	24.6	100	8,426
	Girl	11.6	29	59.5	100	42,825	Girl	19.7	42.4	37.8	100	6,620

the country at the time of the census. However, this pattern was particularly strong in Henan and South China. The same phenomenon manifested itself in the census of 2000 as well, under the category of families having three or more children. Overall, evidently in regions such as Henan and South China, where lineage culture and norms are strong, it is hard for families that do not have a son to be socially accepted. In contrast, not having a son has been more socially acceptable in Northeast China and the Yangzi River Valley. Second, data shown in Table 7 substantiate that violation of the family planning policy by having three or four children has been a more common phenomenon in Henan and South China.

Finally, when we compare the North, Northeast, and Yangzi River Valley, we find that the North is slightly different from the latter two. Tables 6 and 7 both demonstrate that the impact of son preference on the number of births in North China lies somewhere between the Northeast and Yangzi River Valley on one side and South China on the other. As Table 7 demonstrates, in North China in 2000, the proportion of households that previously had two girls within the total number of households that had three children and four or more children was 37.6 percent and 10.2 percent respectively. These figures from North China are clearly higher than in the Northeast and the Yangzi River Valley and lower than in Henan and South China.

Table 8 demonstrates the relationship between the sex of the previous three children and the total number of births. We can draw the following conclusions from the table. First, the share of the households whose previous three children were all girls within the total number of households that had more than three children was still clearly higher in Henan and South China than in the North, Northeast, and Yangzi River Valley in both 1982 and 1990. Second, in 1982, the proportion of families that had all sons in the previous three births within the total number of families having four or more children was 43.5 percent in North China, 43.5 percent in the Northeast, 40.1 percent in the Yangzi River Valley, 54.3 percent in Henan, and 57.5 percent in South China. In 1990, the proportions were 25.4 percent, 24.3 percent, 22 percent, 30.8 percent, and 35.8 percent respectively. Overall, in the countryside of Henan and South China, people's pursuit of having many children was stronger than among the rural residents of the North, Northeast, and Yangzi River Valley in both 1982 and 1990.

After reviewing Tables 6, 7, and 8, we can make these general observations. First, compared to villagers in the North, Northeast, and Yangzi River Valley, those in Henan and South China have been more inclined to have many children precisely because they have maintained a strong son preference. This

Table 7. Sex of the Previous Two Children and the Total Number of Boys and Girls Born in Different Regions, 1982 and 2000

Region	Calculation based on 1982 census data (%)						Calculation based on 2000 census data (%)					
	Sex of the previous two children	Total number of children			Total (%)	Number of cases	Sex of the previous two children	Total number of children			Total (%)	Number of cases
		2	3	4 or more				2	3	4 or more		
Hebei and Shandong	Boy-boy	47.6	30.7	21.6	100	26,106	Boy-boy	79.7	17.4	2.9	100	26,106
	Boy-girl	44.7	31.2	24.1	100	25,427	Boy-girl	79.8	17.9	2.3	100	25,427
	Girl-boy	48.1	29.7	22.2	100	26,675	Girl-boy	86.1	11.9	1.9	100	26,675
	Girl-girl	29.1	34.3	36.6	100	23,790	Girl-girl	52.2	37.6	10.2	100	23,790
Northeast	Boy-boy	45	32.4	22.6	100	18,014	Boy-boy	90.4	8.7	0.8	100	18,014
	Boy-girl	43	31.9	25	100	17,843	Boy-girl	90.2	9.2	0.6	100	17,843
	Girl-boy	47.6	28.8	23.4	100	18,921	Girl-boy	95.2	4.4	0.5	100	18,921
	Girl-girl	27.8	32.8	39.4	100	17,119	Girl-girl	65.9	27.3	6.8	100	17,119
Yangzi River Valley	Boy-boy	48.5	31.5	20.1	100	14,456	Boy-boy	94	5.6	0.3	100	14,456
	Boy-girl	46.5	31.4	22.1	100	13,959	Boy-girl	91.9	7.6	0.5	100	13,959
	Girl-boy	50.1	29.3	20.7	100	14,937	Girl-boy	94.3	5.5	0.2	100	14,937
	Girl-girl	32.6	35.9	31.6	100	13,193	Girl-girl	69	26.8	4.2	100	13,193
Central Plains	Boy-boy	35.1	31.4	33.6	100	12,489	Boy-boy	74.3	23	2.7	100	12,489
	Boy-girl	33.7	31	35.2	100	12,013	Boy-girl	76.5	20.9	2.6	100	12,013
	Girl-boy	35.5	30	34.7	100	12,457	Girl-boy	81.7	15.9	2.3	100	12,457
	Girl-girl	21.2	29.9	48.9	100	10,787	Girl-girl	28.9	54.7	16.5	100	10,787
South China	Boy-boy	31.6	29.8	38.6	100	24,079	Boy-boy	65.8	26.8	7.4	100	24,079
	Boy-girl	28.7	30.1	41.2	100	23,766	Boy-girl	63	27.3	9.6	100	23,766
	Girl-boy	30.6	30.1	39.2	100	21,187	Girl-boy	69	23.3	7.8	100	21,187
	Girl-girl	22.4	27.9	49.7	100	94,954	Girl-girl	26.7	45.6	27.3	100	94,954

Table 8. Sex of the Previous Three Children Born and the Total Number of Boys and Girls Born in Different Chinese Regions, 1982 and 1990

Region	Sex of the previous three children	Calculation based on 1982 census data (%)					Calculation based on 1990 census data (%)				
		Total number of children			Total (%)	Number of cases	Total number of children			Total (%)	Number of cases
		3	4	5 or more			3	4	5 or more		
Hebei and Shandong	Boy-boy-boy	56.6	28.5	15	100	6,589	74.7	21.3	4.1	100	3,538
	Girl-girl-girl	34.1	37.5	28.4	100	7,490	45.7	40	14.3	100	6,971
Northeast	Boy-boy-boy	56.6	28.1	15.4	100	4,729	75.8	20.1	4.2	100	1,576
	Girl-girl-girl	32.9	35.3	31.8	100	5,699	44.1	39.7	16.2	100	3,844
Yangzi River Valley	Boy-boy-boy	59	26.6	14.5	100	3,517	78	18.7	3.3	100	758
	Girl-girl-girl	39.5	36.3	24.1	100	3,879	51.1	36.1	12.7	100	1,469
Central Plains	Boy-boy-boy	45.8	32.9	21.4	100	3,974	69.3	25.1	5.7	100	2,076
	Girl-girl-girl	26	35.8	38.3	100	3,815	38.4	42.5	19.1	100	3,676
South China	Boy-boy-boy	42.6	30.5	27	100	8,641	64.1	26.5	9.3	100	4,397
	Girl-girl-girl	27.3	32.4	40.3	100	7,133	25.1	38.2	36.7	100	7,589

Notes. 1) In this table, "Hebei" is southern Hebei; "Shandong" is southwest Shandong; "Central Plains" is all of Henan, northern Jiangsu, and northern Anhui. Due to the difficulty of calculation, we did not include southwest Shandong and southern Hebei in the Central Plains.

2) Having many children was still a widespread phenomenon in 1982 and 1990. Therefore, we compare the composition of the first three children in these two years. In 2000, the phenomenon of having many children was clearly much less common. Therefore, comparing 2000 with other years is not very meaningful.

phenomenon is especially notable for families that do not have a son. This conclusion suffices to substantiate that son preference is the key variable that pushes up the fertility rate in China. Second, regardless of the type of boy-girl combination, villagers in Henan and South China are more inclined to have more children than villagers in other regions. Finally, the possibility of the violation of the family planning policy is much higher in these two regions than in the North, Northeast, and the Yangzi River Valley. We have already pointed out that thanks to the support of lineage social networks, villagers in Henan and South China have been better able to resist and soften the implementation of the family planning policy and hence to have more children than allowed (Gong, 2013).

Conclusion

Analysis of the original census data reveals that there are two types of fertility transition in rural China. The first type, represented by South China and the Central Plains, is characterized by a slow decline in the fertility rate and a severely unbalanced sex ratio at birth. We call this "obstructed and unbalanced fertility transition." The second type, represented by the Yangzi River Valley and the Northeast, is characterized by a rapid decline in the fertility rate without any notable imbalance in the sex ratio at birth. We call this "smooth and balanced fertility transition."

We take the resemblance of the spatial distribution of the type of fertility transition and the Chinese dialects as the starting point of our theoretical explanation. We find that regional variation with regard to the type of fertility transition is based on the extent of the power of lineage culture. By drawing on the theory of social capital, we have empirically demonstrated that by making a strong impact upon the fertility behavior of villagers and the implementation performance of the national family planning policy, regional variation with regard to the structural and the normative power of lineages significantly impacts the type of fertility transition.

Following a two-dimensional analytical framework combining the factors of economic development and lineage culture,[17] we find that while economic development pushes the process of fertility transition forward all over China, lineage culture constrains and conditions this process. More specifically, eco-

[17] It makes sense to construct a three-dimensional analytical framework by adding the policy factor. However, we did not deal with this variable in detail in order to keep our analysis simple.

nomic development determines the path of fertility transition that China as a whole is bound to follow. Nevertheless, lineage culture determines that the specific trajectory of this process will be different in different regions. The regions with the weakest lineage culture started and completed the process of fertility transition first. In contrast, the regions with the strongest lineage culture have experienced the slowest fertility transition. Overall, regional variation with regard to the power of lineage culture has the following spatial distribution in a descending order (from the strongest to the weakest): South China > Central Plains > Shanxi and Shaanxi > North Hebei and Shandong > Yangzi River Valley, Northeast, and Southwest. The temporal sequence of the fertility transition has followed the opposite order: Northeast China and the Yangzi River Valley, which have the weakest lineage culture, completed the reduction in fertility rate first while maintaining a fundamentally balanced sex ratio at birth. Hebei, Shandong, Shanxi, Shaanxi, and Henan followed them in succession. Rural South China has lagged behind all other regions with regard to reducing the fertility rate and sex ratio at birth. Although it has basically completed the process of reducing the fertility rate, balancing the sex ratio at birth is still continuing in the region.

Finally, we want to point out a few issues that are not addressed in this article. The resemblance that we observe between the spatial distribution of the dialects and the spatial distribution of types of fertility transition is absent in a few regions. We did not discuss these cases in this article in order keep it a reasonable length. We also did not address the question of why within the Greater North China region, only the region of Central Plains Mandarin has lagged behind others in the fertility transition. Finally, we left the question of why differences exist with regard to lineage culture and norms within each region unanswered. Addressing these important questions requires further research and analysis.

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