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## China's Population Policy at the Crossroads: Social Impacts and Prospects

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### Abstract

China's total fertility rate fell below replacement level in the 1990s. From the 1970s the fertility rate declined dramatically, mainly as a consequence of the national population policy whose aim has been to limit birth numbers, control population growth and boost economic growth. Having achieved such a low fertility rate, how will China's population policy evolve in the future? This paper first reviews the history of China's population policy since 1970 in terms of three stages: 1970-1979; 1980-1999; and after 2000. We explore the impacts of China's population policy, including relief of pressure on China's environment and resources, fertility decline, the unexpectedly high male-biased sex ratio at birth (SRB), the coming shortage of labor force, and the rapid aging of the population. We also investigate ethical issues raised by the implementation of the policy and its results. Finally we introduce the controversy over potential adjustment of the policy, acknowledging the problems faced by western countries with low fertility and countermeasures they have taken. We offer some suggestions that might be appropriate in the Chinese context.

### Keywords

Population policy; fertility; sex ratio at birth (SRB); aging; ethical issues

## INTRODUCTION

Since the 1970s, China's total fertility rate has decreased dramatically. After a period of fluctuation around replacement level in the 1980s, it dropped below replacement level in the 1990s. The transition of fertility in China since the 1970s has been a demographic revolution. Analysis of the 2000 census reveals that by 2000 the total fertility rate of China

had dropped to 1.4-1.6 (Morgan et al., 2009). Preliminary results of the 2010 census reveal that the total fertility rate is 1.18, well below the replacement level (PCO, 2012). The dramatic decline in fertility rate is at least to a certain extent attributable to China's population policy, which is known as the one child policy. From the original strict control of population growth, to stabilization of a low fertility level in the 2010s, and to “upholding and improving” the current population policy, China's population policy has undergone a series of changes, which have also affected the nation's economy and social development.

After 1949, China instituted some regulations concerning population policy, but the number of children per woman was not controlled. In the early 1950s, the policy against abortion was in fact pronatalist, as a result of which, the total population increased rapidly (White, 2006). However, in the 1970s, the government recognized the impact that the rapid population growth was having on the economy and began to develop systematic policy responses. After the CPC Central Committee delivered An Open Letter to All Members of the Communist Party and Communist Youth League-on the Issue of Controlling the Population Growth in 1980, the government succeeded in dramatically decreasing the fertility level. The strict population policy during the subsequent 30 years, and the low fertility level for the past 20 years, have had broad effects on the nation's economy and social development, as well producing such unforeseen side-effects as the high male-biased sex ratio at birth (SRB) and rapid aging.

China's population policy has instigated considerable controversy, especially since fertility dropped below replacement, and many scholars suggest that the population policy needs to be adjusted. Now with the reshuffling of China's ministries and the merging of China's Population and Family Planning Commission into the new Public Health and Family Planning Commission, China's population policy has stirred up further debate. In this paper the development of the population policy is reviewed, and the impact of the population policy on society is discussed. We analyze the implementation of the population policy and related ethical issues and explore controversies over potential adjustment of this policy as well as the experience of other low fertility countries and the countermeasures they have taken. We conclude with some suggestions related to the nation's demographic and economic sustainability.

## EVOLUTION OF CHINA'S POPULATION POLICY

Following the foundation of the PRC in 1949, the Chinese government's policy and propaganda encouraged families to have several children (White, 2006). The first census results, issued on November 1<sup>st</sup>, 1954, showed that the population had increased very quickly. In this phase, both The Instructions on the Issue of Population Control issued by the central government in 1955 and *A Report on the Recommendations of Developing Economy* in the Second Five-year Plan proposed at the eighth Peoples' Congress suggested that control of fertility was necessary (Yang, 2003). However, as Mao Zedong reversed his attitude toward fertility policy, scholars such as Ma Yinchu, who advocated birth control and expressed opinions as to how birth control might be achieved, were considered as anti-Party, anti-socialist, and right-wing during the Anti-Rightist Campaign. As a result, development of a population policy was halted (White, 2006).

In December 1962, the CPC Central Committee and State Council issued The Instructions on the Serious Promotion of Family Planning, which required that birth control in urban and densely populated rural areas be promoted (Yang, 2003). Some densely populated provinces and cities dispatched small teams of family planning cadres to the countryside, factories, and residential areas to carry out activities supporting birth control (Yang, 1987). In February 1965, the Family Planning Commission of the State Council held a “field experience-sharing” conference in Wendeng County of Shandong Province, and the slogan “one is not less, two are perfect and three are more” emerged. Population policies during the 1950s and 1960s were affected by the Great Leap Forward and the Cultural Revolution, during which there was a hiatus in family planning activities (Chang, 1992).

The subsequent development of China's population policy occurred in three phases: 1970-1979, during which population control was not very strict; 1980-1999, during which a policy of strict population control was implemented; after 2000, during which the policy has been to maintain a low birth rate.

### The First Phase

In 1970, China's Central Political Bureau realized that population growth and its control had to be tightly integrated into economic planning (Scharping, 2003). In July 1973, the State Council re-organized the leading teams administering family planning and many local governments began to re-organize or establish family planning divisions in order to promote planned childbearing in cities as well as in suburban areas all over China (Yang, 2003). In December 1973, The State Council Leading Group Office of Family Planning held a national family planning “work reporting” meeting in Beijing, which promulgated the “later, longer, fewer” family planning policy. “Later” represented control of childbearing age; “longer” stood for control of childbearing intervals; and “fewer” meant control of family size. To be specific, a couple was allowed to have two children at most (Yang, 2003). In 1978, the CPC Central Committee approved A Report on the First Meeting of Family Planning of State Council Leading Group, which required that divisions above the county level had to establish family planning offices, and each Commune had to appoint full-time family planning officers. The requirement in 1978 that family planning offices should be built in divisions above the county formed the administrative basis for the strict population policy of the 1980s. In addition, policies concerning urban housing, rural food rations, and private land allocation, for example, had to be aligned with family planning policies (Yang, 2003).

### The Second Phase

In the late 1970s, Deng Xiaoping set a goal of quadrupling annual per capita income by 2000, and emphasized the potential contribution of limiting population growth to that goal (Greenhalgh and Winkler, 2005). In 1980, the CPC Central Committee delivered An Open Letter to All Members of the Communist Party and Communist Youth League on the Issue of Controlling the Population Growth, which stated that couples should have only one child, referred to as “one-child-per-couple”, or “one-child” policy for short. *The Letter* asked all party members and cadres, especially leaders at all levels, to respond to the call of the State,

to set an example to the people, to promote the policy, and to aggressively push ahead with family planning work.

In urban areas, admission to nursery schools, enrollment in schools, medical care, recruitment in factories, housing, and social welfare, etc. were allocated by the government. As a result, it was easier for urban administrations to accept the state's restriction and over 90% of families in the urban areas were persuaded to have only one child (Kane and Choi, 1999). Those who agreed to have one child would receive a "one-child certificate" that entitled them to receive government awards, including cash, more convenient access to public nurseries, more educational opportunities for their children, subsidies for medical care, better housing and additional food (Wang, 1996; White, 2006). In rural areas, large families with many sons were the favored family structure. Since farmers had no savings or pensions, in their old age they had to rely on children for support, which produced opposition to the one-child policy (Kane and Choi 1999). This resistance to the one-child policy in rural areas in China led to less strict implementation. In 1984, demographic statistics indicated a looser implementation of the policy compared with the early 1980s (Hesketh and Zhu, 1997). Subsequent modifications of the policy gradually gave rise to the current policy, namely one-child in the urban areas and a "1.5 children policy" (rural couples whose first child was a girl were permitted to have another child) in most rural areas, with even fewer restrictions in minority areas and in other special situations (Gu et al., 2007). As Greenhalgh (2008) points out, "China's one-child-per-couple policy is one of the most troubling social policies of modern times" and "was out of touch with Chinese realities".

The foundation for such a policy is Malthus's theory; the nation did not have enough land or natural resources to support the growing population. In the 1970s, after Mao Zedong demolished sociology and demography in China, there were few qualified demographers<sup>1</sup>. The Chinese missile scientist Song Jian employed equations to model population control on a fictional island. He projected that the total population would peak at 4 billion in 2080, although without any basis in reliable data. According to his projection, China's population could reach 1.5 billion by 2020, which was viewed as a disaster that could be avoided only by quickly adopting a one-child policy (Greenhalgh and Winkler, 2005). The 2000 population target that would allow Deng's economic goal to be attained was about 1.2 billion, which also required a one-child policy (Greenhalgh and Winkler, 2005). Deng Xiaoping was worried that population growth would affect the implementation of economic reform policies and felt that for China's economic development and improvement of living standards, population growth had to be controlled. Song's astonishing projection wowed Chinese leaders, propelling them toward the one child policy (Hvistendahl, 2010). Actually in the An Open Letter to All Members of the Communist Party and Communist Youth League-on the Issue of Controlling the Population Growth issued in 1980, the government was already aware of a total fertility rate of 2.2, slightly above the replacement level, and of a projected peak of 1.5 billion for the population around 2020 (as stated 'in forty years' from 1980). But in order to accelerate economic development, the one-child policy was instituted.

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<sup>1</sup><http://cn.wsj.com/gb/20110429/bch102327.asp>

Even in 2006, China's population size, the first target of population policy, was projected to peak at 1.5 billion with a total fertility rate of 1.8 by the *National Population Strategy*, but the preliminary results of the 2010 census indicate a size of only 1.339 billion (for mainland China). It is projected to peak at 1.4 billion at most, and will then steeply decline (United States Census bureau, 2009). The potential negative growth momentum following the decline has not garnered much attention.

### The Third Phase

In 2000, the CPC Central Committee and State Council issued A Decision on Strengthening Population and Family Planning Work and Stabilizing a Low Fertility Rate, which stated that after the successful transformation to low fertility, the first priority of work in the population and family planning administration was to maintain the low birth rate and to improve the population "quality". In 2002, China began to carry out Population and Family Planning Law of the People's Republic of China that codified the policy and previous regulations, and transformed the family planning policy from Party demands to the status of law. Either in principle or in implementation, these reforms have not been completed, but they represented a major improvement over the previous situation and allowed for formal planning of a future population policy (Winckler, 2002). In general, reduction of population growth as well as promotion and implementation of the one-child rule became the responsibility of each province, which would be in charge of making its own policies. In January 2006, the national population and family planning conference announced that the 'Eleventh Five' period was crucial for stabilizing low birth rates to address population issues and to continue the nation's socio-economic development. Once again the importance of stabilizing low birth rate was stressed. However, both State Councilor Hua Jianmin of the Population and Reproductive Policy Forum of the State Council on August 30, 2004, and director Zhang Weiqing of the Population Experts Conference on January 24, 2006, stressed the importance of intensified research on fertility policy (Gu, 2010).

An important feature of China's current population policy is that the formulation and implementation of the policy is localized. Under instruction from the central government, the planning and operation of the policy is under the control of local governments, especially provincial governments. In order to meet the social, economic and cultural conditions of different regions, local governments are relatively flexible when carrying out the national policy. If the present policy were to be rigorously implemented, the average number of children per woman would be 1.465 (Gu et al., 2007).

In March 2013, China decided to reshuffle its ministries, removing the Population and Family Planning Commission and merging it into the new Public Health and Family Planning Commission. Despite the official announcement of continuation and consistency in the implementation of the current population policy, the removal of the Population and Family Planning Commission may indicate a potential modification of the policy in the near future.

## SOCIAL IMPACTS

China's population policy has clearly played a major role in decreasing the fertility level; however, it has also had many side effects (Wu et al., 2008). Already in the middle 1980s, far-sighted demographers predicted that if the one-child policy were to achieve complete success, these side effects would become much more serious (Bongaarts and Greenhalgh, 1985; Greenhalgh and Bongaarts, 1987). The 1980 Open Letter refuted concerns about some side effects, such as possible shortfalls in manpower, rapid population aging, and distortions in sex ratios (Greenhalgh and Winkler, 2005). However, after 30 years of implementation, with elimination of 100 million to 400 million births according to different estimates (Cai, 2010), the one-child policy, initiated during Deng's administration, has created vast social difficulties and human suffering (Greenhalgh and Winkler, 2005).

### Relief of the Population Pressures on the Environment and Economy

Before we introduce side effects, we do acknowledge that the policy did have positive effects. The purpose of China's population policy has been to reduce family size, in order to increase per capita GDP and other measures of economic development. In rural areas, more and more people understand that more children represent a heavier burden. It is argued that China's family planning policy has averted the births of hundreds of millions of people, relieving pressures on resources of local communities, of the nation, as well as on the environment (Kane and Choi, 1999).

The low fertility level has relieved some of the pressure on peoples' livelihood, on education, on job hunting and on medical care, and in turn has saved the nation and families the resources that would have had to be expended on education. The primary beneficiaries of the population policy have been mothers and children: for children, especially girls in one-child families, can receive more of the family's resources since there is no competition from brothers; for mothers, frequency of childbearing is reduced, which reduces maternal morbidity and mortality. Also, women have more time to work, become more independent, and elevate their social standing (Hesketh and Zhu, 1997).

Decreased fertility plays a positive role in economic growth in the early stages of the demographic transition. Low fertility can effectively change the investment model of human capital; it can improve the development and quality of human capital. The early stages of a low fertility regime stimulate the demographic dividend that facilitates economic development. Analysis of China has shown that since reform and opening up, the contribution of the decline in the dependency ratio to the savings rate is around 7.5%, which has contributed more than 25 percent of the country's economic growth. If we take the future demographic dividend into consideration, the population transition may contribute 1/3 to China's economic development (Wang et al., 2004).

### Decline of the Fertility Level

There was a spontaneous decline of fertility in the late 1960s and early 1970s, even earlier in some areas. In the mid-1970s, population policy accelerated the decline of fertility (Wu, 1986). But this fertility decline should not be attributed solely to the administrative

population policy; at least part of the decline resulted from economic development (Tien, 1984). Even the relationship between state population policy and socio-demographic change remains unclear; it is generally believed that the birth control program and socioeconomic development exerted equal influence in the 1970s and 1980s, but that the program's influence declined in the 1990s and 2000s (Greenhalgh and Winkler, 2005). Changes in the total fertility rate are tracked in Figure 1

It is agreed that from the early 1990s, the total fertility rate was below replacement level, even though no official estimate was issued. The National Population and Family Planning Commission (NPFPC) claimed a total fertility rate of 1.8, unchanged for quite a long time. From the 1990 census to the 2000 census, China's population grew 11.7% (1.07 per cent annually). From the 2000 census to the 2010 census, preliminary results indicate that the total population grew 5.8% (0.57 per cent annually), from 1.27 billion to 1.34 billion, in which case the total fertility rate would have fallen below 1.5 children per couple (Hvistendahl, 2011).

Investigations in different areas in China have shown that increasing emphasis has been placed on socio-economic development in bringing down the fertility level (Cai, 2010). A survey of desired fertility and fertility behavior showed the popularity of the low fertility behavior pattern. No one in the survey preferred more than two children and the average ideal number was 1.34. The low fertility rate in China is no longer the result of the government's birth control policy, but is due a change in people's desired fertility and childbearing behavior (Cai et al., 2010). After many years of implementation of the policy and with socio-economic development, people's fertility attitude and behavior have changed; their desired fertility is close to that set by the policy (Gu et al., 2007). Because of the commercialization and monetization of daily life caused by economic emancipation, rising education costs and the higher cost of child rearing, China's fertility rate would remain below replacement level even if the government were to give up the current birth policy (Merli and Morgan, 2010). In 2020, the total fertility rate is projected to fall below 1.4 (Morgan et al., 2009), and China may fall into the category of lowest low fertility—a total fertility rate of 1.3 or below (Hvistendahl, 2011). China has had a low fertility for about 20 years, and now it is time to be alert to the low fertility trap that has affected Europe and South Korea (Lutz et al., 2006; Lutz, 2008), because it is quite difficult to reverse the downward trend once it falls below 1.5 (McDonald, 2006), even though some demographers are optimistic of a future return to a higher fertility level after a certain point of development (Myrskylä et al., 2009; Tuljapurkar, 2009).

China's population and family planning commission “euphorically claims that its birth planning policy is a great success and boasts that the policy has prevented 400 million additional births” (Cai, 2010). With a total fertility rate of 1.5, the population size for a generation will decline by 25 percent compared with the preceding generation. Such a decline in births has had some effect on elementary schools. In 2009, there were 280,200 elementary schools, 16.37 million new enrollments, and 100.71 million students in all. In contrast, in 2000 there were 553,600 elementary schools, 19.46 million new enrollments, and 130.13 million students in all<sup>2</sup>.

## Sex Ratio at Birth and Bare Branches

China's sex ratio at birth (SRB) stirred debate as early as the release of the 1982 census results, and the SRB has increased steadily with the decline in the fertility rate.

This phenomenon is not exclusive to China with its strict family planning policy; it has also happened in countries where there is a less stringent population policy or even without such policy, such as in Taiwan, South Korea, or India. As a result, some argue that it is not attributable to China's population policy. However, in 2000 the sex ratio at birth in areas of China that carry out a one-child policy was 111.6; in areas that allow two children it was 109.0; in areas with a one and a half children policy it was 124.7; which is 15.7 percentage points higher than that in the two-children policy areas, suggesting a direct relationship (Gu et al., 2007).

Recently optimism about China's SRB is centered on an apparent decline. Based on data from census and intercensal samples, some researchers claim that a decrease in SRB in China is on the way or has already happened, as in South Korea (Das Gupta et al., 2009; Guilмото, 2009). Whether the SRB will decline or continue to increase, or remain at a high level, around 120, is currently uncertain. The SRB for 2000 was 116.9, from the census short form, while that from the long form was 119.9, a statistic cited more often but less reliable (Goodkind, 2011). The SRB from preliminary results of 2010 census stands at 118.6, a rise compared with the more reliable estimate of 116.9 from the 2000 census.

The increasing SRB has led to an unbalanced sex structure in the population and the phenomenon of “missing women”. As a consequence, many men cannot find a mate, and after 2010, China will experience a male marriage squeeze that will last several decades (Tuljapurkar et al., 1995). There are quite a lot of factors contributing to the marriage squeeze, such as SRB, migration, gender differentials in mortality, changes in birth cohort sizes over time, and age gaps between spouses (Beiles, 1994). But for the population as a whole, the most basic factors are the numbers of marriageable males and females. This, according to Goodkind (2006), is not only due to the sex ratio imbalance but also to the changing age structure (Goodkind 2006). Without decomposing the influences of age structure and gender structure on the marriage squeeze, Jiang et al. (2011), with an adjusted sex ratio of potential marriage partners, finds that the proportion of excess males fluctuate around 16 percent from 2015 to 2045, and annually there are one million more excess males.

With women choosing to migrate in order to make better marriages, surplus males, labeled as “bare branches”, are more concentrated in poor areas. In many poverty-stricken remote rural areas of several provinces, the numbers of bare branches have increased and “bare-branch villages” have formed (Jiang and Sánchez Barricarte 2013). A bare-branch class, consisting of 40 million to 50 million males, will come into being at the lowest strata of Chinese society (Chen 2006). These bare branches, already at a disadvantage and having little stake in the generally accepted system, may be readily inclined to take collective action to improve their own situation and status, with violence and crimes if necessary (Hudson and den Boer, 2004).

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<sup>2</sup>Data from annual Communique of the Ministry of Education



## Coming Shortage of Labour Force

Very low fertility leads to serious future labor shortages, especially a shortage of young skilled workers at a time when populations are aging rapidly (McDonald, 2006). China's family planning policy is claimed to have averted the increase in population of some hundreds of millions of people, and at the same time has eliminated hundreds of millions of potential laborers. In the short term, the fall in the fertility rate has lowered the youth dependency ratio and increased the working-age share of total population, thus raising income per capita. China's dramatic decline in fertility and number of births has realized the window of opportunity--the so called demographic dividend. The benefit of this demographic dividend is estimated to have accounted for 15 to 25 percent of China's economic growth between 1980 and 2000 (Wang, 2011). However, China has largely exhausted its demographic dividend, as the labor supply has changed. If the labor force participation rate remains the same, at an annual economic growth rate of 8% there will be a gap between the total demand and supply of labor. In 2003, the shortage of migrant workers began to affect China's southeastern coastal areas; in 2004, this was felt mainly in the Pearl River Delta in Guangdong Province and Fuzhou and Xiamen in Fujian Province. In 2005, the shortage began to spread to the Yangtze River Delta and the northern coast. Even Hunan and Jiangxi, which are big provinces that export a lot of labor, suffered from recruitment difficulties. The shortage of migrant workers indicates that surplus labor in the rural areas of China is becoming limited (Wang et al., 2006).

China's comparative advantage is still embodied in labor-intensive low-end commodities; timely and sufficient supply of a skilled labor force is vital if China is to sustain its economic growth (Cai and Wang, 2006). Recently, especially since the 2008 global economic crisis, China's real economy has remained stagnant, and the development pattern relying on input of cheap labor now has encountered great difficulty, as the era of abundant supply of inexpensive labor that enabled China to become the world's largest manufacturing center in the last two decades will soon be exhausted. The trends in population structure and demand for and supply of labor require an economic transition from an inputs-driven growth pattern to a productivity-driven one (Cai and Wang, 2010). However, due to lack of substantial promotion of the human capital, such a transition is not yet in sight. On the contrary, with the economic crisis and recession and increasing labor costs, many factories have closed down. As a result, massive urban unemployment tends to stir up social unrest and raise the possibility of political destabilization (Solinger, 2007; Cai and Chan, 2009).

## Aging

Although the rapid aging of China's population is partly related to increased life expectancy, the decline in births under the family planning policy has resulted in a decrease in the child population and subsequently in the working-age population, which is a more important factor (Wu et al., 2008). The demographic shift is not only the result of socioeconomic development, but also an important result of implementation of the rigid family-planning program; these have made the transition not only the world's largest, but also the world's fastest (Cai, 2007).

The aging of its population is one of China's most crucial problems; it will affect the standard of living, the pattern of savings and the ability of the government to implement comprehensive social security. Rapid increase in the proportion of the elderly will lead to a shortage of old age support and care in the future (Wang and Mason, 2007). With the one-child family, there is a 4-2-1 family structure, i.e. a family consists of paternal and maternal grandparents, a couple and one child. In the absence of formal social insurance, this places tremendous pressure on the family. This new family structure is a serious challenge to the government's financial planning for the future demographic structure of the country (Flaherty et al., 2007).

An additional insecurity for the elderly population is the possibility of losing an only child. With the full implementation of China's birth control policy and the continuing low fertility, the total number of single children shows continuous and rapid growth. Yang and Wang (2007) estimate the number of only children between the ages of 0 and 17 reached 95.47 million by the end of 2000, and in 2005, the number of only children aged 0 to 30 is estimated at 158.41 million (Wang, 2011). Using China's life tables from the 2000 census, our estimate of Chinese male's (usually the household head) possibility of losing their child when the former enter old age is shown in Figure 3. At 60, a father faces a probability of over six percent of losing his child, and at 90, it is over ten percent. This will leave many parents with no living child when they enter old age.

On June 5th 2012, over 80 parents who lost their only child gathered at the National Family and Birth Planning Commission of P.R.C. expressing their vulnerability after losing their only child, and their hope for financial reimbursement from governments, and more importantly, the hope of establishing a corresponding department to which those who complied with the national family planning policy but now unfortunately have lost their only child could turn to when needed<sup>3</sup>.

Not having a living child will cause psychological pressure, but even worse is the economic burden. China's decline in its labor pool, and the aging process, are occurring much faster than expected. How will China support its old age security systems as the old age dependency ratio increases steeply?

In rural China, the majority of older adults who had lived as peasants or worked in certain informal sectors when they were young and continued to work when older until becoming unable to do so, have had little access to social security (Randel et al., 1999). Recently, China has begun to establish social security retirement systems in rural areas. However, in the foreseeable future, such systems will not cover all of the rural population, and the pension that these rural residents receive will be far from sufficient to support them in their old age, especially with inflation as high as it is now. Even in the cities, the old-age social security system fails to cover all older people; furthermore, nursing institutions for older adults are inadequate.

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<sup>3</sup>[http://news.ifeng.com/shendu/ndzk/detail\\_2012\\_07/17/16083719\\_0.shtml](http://news.ifeng.com/shendu/ndzk/detail_2012_07/17/16083719_0.shtml)

Aging puts pressure on government finances through the growing burden of pensions, but eventually also on the labor force that has to support the rising number of pensioners. The financial health of the system, which is largely financed through payroll taxes paid by current workers in a pay-as-you-go manner, is sensitive to the ratio of dependents to workers. The government has several choices to make both ends meet, such as raising the retirement age or reducing the benefits of retirees. But such measures have produced protests and social unrest in other societies<sup>4</sup>. One possible way is to raise the tax rate on the working age population, but if the old-age dependency ratio increases by a factor of six, such a measure would not be enough to bridge the financial gap. Even worse, China's social security retirement system operates with empty personal accounts. In the 1990s, the potential pension liability was already 1,917.6 billion RMB, taking up 46 to 69 percent of GDP (World Bank, 1997). Now the potential pension liability is generally estimated at 3,000 billion RMB (Wang, 2008). As the aging process accelerates, solvency of the old age security systems is in great doubt and may drag down the whole economy, causing social disharmony and instability.

### Extinction of Racial and Cultural Diversity

Since the strict implementation of population policy, China's total fertility rate has dropped steeply (Figure 1). Many studies point out that the TFR is affected by many factors, such as delayed childbearing, and hence distorts and underestimates the actual fertility level exaggerating the fertility decline (Bongaarts and Feeney, 1998; Lutz et al., 2003). Even so, China's actual fertility decline is astonishing. Unfortunately, this remarkable decline in fertility appears to have affected small ethnic groups. Although families from small, endangered ethnic groups in remote regions are permitted to have two or more children, for some ethnic groups no limitation was imposed (Gu et al., 2007). The lack of social welfare for these groups in rural China is a disincentive to have large families, exacerbating the population decline and leading to more rapid population decreases for these groups, which may soon face the risk of extinction (Cao and Wang, 2010).

According to the China Statistics Bureau, 48 of the 55 minority ethnic groups have attained below-replacement level fertility of 2.1 children per couple. Their problem will be exacerbated by distorted sex ratios and rural-to-urban migration (Cao and Wang, 2010), especially the marriage migration of marriageable females. Recently, a township of Yao ethnic people in southern Guizhou province issued a notice saying that young Yao males who marry non-Yao brides will be awarded 1,000 to 3,000 yuan, because about 50 percent of Yao females married out and many of the remaining males are forced to stay single. The Yao people, abiding by the tradition of not marrying non-Yao females, have to adopt non-Yao females<sup>5</sup>.

### ETHICAL ISSUES

China's one-child policy addresses the macro concerns of population and economics, but neglects the social impact on individual families. The extremely strict fertility policy places

<sup>4</sup><http://news.163.com/photoview/00A00001/10791.html#p=6G28U1H400A00001>

<sup>5</sup><http://news.sina.com.cn/s/2010-11-17/021821482405.shtml>

too much emphasis on the national interest, and too little on the interest of the family. In addition, the economic incentives and penalties associated from the beginning with the fertility policy have meant huge losses for those families with births outside the program (Nie and Wyman, 2005). Family planning staffs are encouraged to apply both incentives and penalties: rewards go to young couples who adhere strictly to the policy requirements, while those who do not comply with the policy are punished (Short et al., 2000). Some feminists have expressed concern about the side-effects of contraception on women's health, and have questioned the ethical validity of population goals and material incentives in the government's fertility policy (Blanc and Tsui, 2005).

The ambitious population goals of the central government are often taken extremely seriously by local officials whose aim is to demonstrate their organizational capacity and political commitment. Under pressure to achieve specific short-term goals, direct enforcement measures have been key tools in the policy implementation in many places (White, 1994). If a woman gives birth, she is forced to use an IUD and if she has two children, she is often required to undergo sterilization. To achieve the fertility target, some women are forced to have an abortion and the family planning staff usually encourages couples who have used up their fertility quota or have more than one child to accept sterilization. Although some studies have emphasized that sterilization is voluntary, others have found that, in order to achieve their targets, family planning cadres who are under great pressure have forced women to be sterilized (Short et al., 2000).

In rural areas, the household contract responsibility system was completed in the early 1980s and the disintegration of the collective economy made the work of rural family planning cadres more difficult. They loosened the strict control on farmers that they had under the collective economy. The power balance between cadres and farmers was altered with the change in economic structure. Farmers were no longer as vulnerable as they had been, and when they felt mistreated, they were now prepared to vent their anger or hostility on cadres. This situation has changed the implementation of one-child policy and as a result of rising tension between cadres and the people, some family planning cadres were even worried about their personal safety (Greenhalgh, 1990; White, 1994).

In 1991, the government introduced the “one-vote veto” policy which connected family planning achievements to the cadre's promotion chances. The first rank of cadres in the party and government would “take personal charge of family planning work and take overall responsibility”, and the target management responsibility system was also introduced. If the population control program goals were not met, local department cadres and their party and government leaders were not able to participate in program appraisal, receive awards and promotions or other benefits. Conflict developed between local stresses in enforcing the law and meeting performance criteria. As a result, false population statistics were produced to avoid confrontation and to give the impression of excellent performance and achievements. This not only encouraged local leaders to falsely report low fertility rates in their administrative units, but incited other false data reports, which led to the collapse of the birth registration system (Scharping, 2003). In order to pass “examinations”, local leaders would delay reports on new births in their areas, or even conceal or omit some sector of the local population, especially girl babies and unplanned births (Zhang and Zhao, 2006). To match

the set quotas, local cadres manipulated the data while the higher cadres had no motive to find flaws in the data; therefore, the false data would be reported upward through the bureaucratic hierarchy (Bongaarts and Greenhalgh, 1985).

Many Chinese have a strong preference for sons and when the number and sex of children are in conflict and if there is a possibility of prenatal gender determination, farmers will choose the gender of their children at small psychological cost. The fertility policy has strengthened realized son preference which has increased the rate of abortion and concomitantly increased the risk to women's health (Chu, 2001). In fact, the government's 1.5-child policy is actually telling farmers that the value of a girl is not as great as that of a boy. The 1.5-child policy has stimulated son preference and prenatal sex identification, which have produced seriously abnormal sex ratios (Zeng, 2007). In addition, girl babies have a higher mortality rate and even female baby infanticide occurs under extreme conditions. This phenomenon is rooted in the traditional son preference, but exacerbated by the one-child policy (Hesketh and Zhu, 1997).

A one-child family faces the risk of losing its only child. Suppose there are 150 million one-child families. Then the number of these that lose their child is huge even with China's relatively low mortality rates, and will become a serious social problem. Other harmful effects of the one-child policy relate to the population's age structure, relations within families, social and psychological characteristics of only children and widespread gender inequality. However, these problems are just the tip of an iceberg. The one-child policy has changed the social structure of the Chinese people and has ruined the ability of families to support their aged members. In addition, it has prevented creation of an industrialization miracle such as occurred in Japan after the Second World War. Some of these problems were in the culture before, but if the one-child policy were to achieve complete success, the problems described above would become much more serious (Bongaarts and Greenhalgh, 1985).

## PROSPECTS FOR FUTURE POPULATION POLICIES

### Debate on Current Policy

China is the only country that has a strict birth control policy and people have debated this policy and its high social and political cost from the very beginning of its implementation. Some Chinese social scientists were strongly against the policy on the grounds that it would cause micro-individual frustration of fertility aspirations and macro-demographic distortions of age structure (Greenhalgh and Winkler, 2005). Many Western scholars believe that there are too many problems caused by the one-child policy and that an easily accepted replacement policy that will reduce the potential problems due to the one-child policy should be sought. They advocate the two-child and birth spacing policy as a replacement policy for the current strict fertility policy, which could also achieve the Chinese government's population goals (Bongaarts and Greenhalgh, 1985; Greenhalgh and Bongaarts, 1987). Zeng and Vaupel (1989) and Vaupel and Zeng (1991) concluded that two children with delayed childbirth would be the best replacement for the one-child policy and would avoid the problems of rapid growth of the total population and of the elderly sector. Unfortunately these proposed replacement policies have not been considered.

At the present time, China's population planners face new challenges and choices. Should the current fertility policy be modified and when and how to modify it have become hot topics in academic circles. Professor Cheng Enfu, an economist and a deputy to the People's Congress and the president of the Marxist department of the Chinese Academy of Social Sciences (CASS), advocates that the current fertility policy should become an even stricter one-child policy. He proposes rigorous implementation of the one-child policy, which is "one child for urban and rural areas; two children for special families; three children is seriously prohibited; and families with no children should be rewarded".

Li Xiaoping, from the Institute of Population and Labor Economics of the CASS, is against to any two-child policy reforms; he advocates that great efforts should be made to encourage more families to have only one child in order to accelerate attainment of zero population growth.

On the other hand, more scholars suggest a less strict policy. In 2004, many demographers in China signed and submitted Suggestions on Alteration of China's Population Policy to the National Population and Family Planning Commission. They proposed a gradual adjustment program, and in 2009, they resubmitted the proposal (Gu, 2010). In March 2007, during the National People's Congress and CPPCC, Ye Tingfang, a CPPCC National Committee member and Chinese Academy of Social Sciences researcher, submitted a proposal together with other members that appealed for abolition of one-child policy as soon as possible; the president of the Chinese People's University, Ji Baocheng, a member of NPC, submitted suggestions four years consecutively in 2008, 2009, 2010, and 2011, that the population policy should be changed to "one child is encouraged, two children are allowed, three children are forbidden and no child is rewarded"; in March 2010, at the third session of the CPPCC National Committee, CPPCC National Committee members, Wang Ming, a professor at Tsinghua University, Liu Dajun, a professor at Shangdong University, and others proposed that the one-child-policy-dominated family planning policy has accomplished its goals, and one child should be advocated and two children permitted. In March 2011, they submitted a similar proposal. In March 2011, the Phoenix TV Station held an oral debate entitled Will China's Population Boom if the Population Policy is Terminated, in which some deputies of the National People's Congress and scholars participated. The majority of scholars insist that in order to mitigate the negative effect that the decline in fertility level might exert on economic and social development, the population policy should be altered.

As far as the government is concerned, the significance of maintaining low fertility was emphasized once again both in Decisions on Reinforcing Population and Family Planning Policy and Stabilizing Low Fertility Level issued by the Central Committee of the CPC and the State Council in 2000, and in Decisions on the overall Reinforcement in Population and Family Planning and the Resolution of Population Problem issued in 2006. On March 1, 2011, when the director of the National Population and Family Planning Committee inspected family planning work in Huizhou City, Guangdong Province, she gave instructions that the low fertility level should be stabilized and should not be relaxed<sup>6</sup>. On

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<sup>6</sup>[http://www.chinadaily.com.cn/dfpd/guangdong/2011-03-03/content\\_1914769.html](http://www.chinadaily.com.cn/dfpd/guangdong/2011-03-03/content_1914769.html)

April 26, 2011, President Hu Jintao addressed the collective study conference of the Political Bureau of CPC Central Committee and stated that the current family planning policy should be stabilized and improved. But how to improve it remains ambiguous. In March 2013, the Population and Family Planning Commission was removed as an independent ministry, and it remains to be seen what will happen to the current population policy.

### Lessons learned from other Countries

We can learn from the experience of other low fertility countries that have experienced corresponding social and economic problems. The fertility level in Russia was above replacement the late 1980s, but it has dropped to around 1.3 at present. This decline, due to factors that have been specific to the nature of reform in Russia's political system, has led to a population crisis that is recognized nationally and internationally. Russian President Putin pointed out in the *State of the Union* in 2000 that the population in Russia was declining annually and if this trend were to continue, the existence of Russian people would be endangered. In order to encourage childbearing, at the beginning of the 21<sup>st</sup> century, the Putin government issued a new population policy and established a series of measures that encourage childbearing. He asked the government to set up a Social Population Problems Committee to study and formulate population policy. To date, however these policies have had no obvious effect.

Decline in fertility in Europe has been mainly due to cultural changes in desired family structure. In 2005, among 41 countries whose data were available, 11 had total fertility level below 1.3, 20 were below 1.4, 28 were below 1.5 and 35 were below 1.8 (Frejka et al., 2008). Rapid aging and decline of population size is a great threat to economies, labor markets, social welfare systems and infrastructure in European society (Sobotka, 2007). Continued low fertility will lead in the long run to a significant drop in the relative size of the working-age population. Without substantial adjustments in labor force participation or migration policies, the potential negative repercussions on the European economy are large (Bloom et al., 2009). In 40 years, the working-age population in European countries will decrease by 40%, economic growth in Europe will suffer a dramatic decline, and the social welfare systems will break down because of the increased dependency ratios (Longman, 2004). The Green Paper of the European Commission in 2005 noted that low fertility is a major challenge, and the need to shift to population growth is one of the three most important problems facing the EU (Sobotka, 2007).

Japan began to implement a fertility policy to control population growth in the 1950s. Initially, the decrease in its fertility was due to this policy, but with the development of its economy, the fertility decline began to reflect people's changed desired number of children. Long-term low fertility in Japan has led to negative population growth since 2005. If fertility were to remain constant at the current level, each successive generation would decline at a rate of approximately 40 percent (Ogawa, 2007). This sharp decrease in population will cause problems for its industrial economy and social welfare systems. The Japanese government is worried that the decrease in fertility will decrease the vitality of the Japanese economy and that it will be difficult for the country to support its social security system (Ogawa and Retherford, 1997). When Japan's fertility rate dropped to 1.57 in 1989, there

were dramatic reactions. From that time, the Japanese government began to encourage increased fertility, but many years of great effort by the government has not led to a clear increase in Japan's total fertility rate.

The Republic of Korea carried out a population policy to control population growth in the 1960s, with a family planning program that was considered to be one of the most successful in the world. Fertility reached replacement level in 1983 and by 2005 the total fertility rate was 1.08. Having realized the seriousness of low fertility problems, Korea implemented *Laws on Low Fertility and Population Aging* in May 2005 and set up the Low Fertility Level and Population Aging Committee with the president as the chairman. The committee consisted of 20 relevant ministers and experts who were in charge of evaluating important political issues concerning low fertility and population aging (Cho, 2005). In the afternoon of June 9<sup>th</sup>, 2009, more than 1,000 people from the South Korean government, religious, economic, and social organizations, including President Li Mingbo and major government department leaders, gathered in Seoul to discuss the problem of how to encourage childbearing. Although Korea has adopted many measures, scholars do not believe that such policy alternatives are able to solve the problem.

### Our Proposal

Low fertility rate is becoming a global phenomenon, and the downward trend in fertility is no longer confined to developed countries, but has extended to developing countries. For more than 20 years, the fertility rate of China has been below replacement level, and as the country goes through an accelerated aging phase, in the near future there will be negative population growth. The one-child policy has been implemented continuously for the past 30 years, but policy makers have not considered that the number of children desired by the average family has also changed during this time (Cai et al., 2010).

The government does not want to loosen restrictions in its birth policy because it is worried about the possibility that the fertility rate will rebound once they stop birth control. But will the fertility rate of China reach replacement level with an unrestricted policy? The one-child policy and the 1.5-child policy in rural areas have been implemented for one generation, which is sufficient time to allow personal preferences regarding children to develop in line with national policy. Because of the commercialization and monetization of daily life caused by economic emancipation, rising education costs and the higher cost of child rearing, China's fertility rate would remain below replacement level even if the government were to give up the current birth policy (Merli and Morgan, 2010). Scholars who advocate easing the current birth policy warn that once a low fertility norm is generally accepted, even encouragement of increased fertility will not change the trend to low fertility as can be seen from the countries mentioned above (Peng, 2007). A survey on desired fertility and fertility behavior showed the popularity of low fertility behavior pattern in Jiangsu, a prosperous southern province (Cai et al., 2010). No one in the survey preferred more than two children and the average ideal number was 1.34. This number is reported according to the current birth policy that permits two girls in one family. And similarly low fertility intention and behavior has been observed in some other national and regional surveys (Yang, 2011). Low fertility behavior and the related fertility policy show that the low fertility rate in China is no



longer the result of the government's birth control policy, but is due to a change in people's desired fertility and childbearing behavior (Cai et al., 2010). After many years of implementation of the policy and socio-economic development, people's fertility attitudes and behaviors have changed; their desired fertility is close to that set by the policy (Gu et al., 2007). Preliminary results of the 2010 census indicate the proportion of Chinese aged 14 and under has fallen to 16.6%, compared with 22.9% in the 2000 census, and the total fertility rate fallen below 1.5 children per couple (Hvistendahl, 2011). The fertility policy has become a part of people's normal fertility behavior (Nie and Wyman, 2005). Actually, the one-child policy is already obsolete (Hvistendahl, 2010).

This suggests that modification of the fertility policy is inevitable. There are three proposed modifications. The first is a slight modification and natural transition. If one or two members of a couple are from a one-child family, the couple should be permitted to have two children and the current 1.5-child policy in rural areas would not change. Actually, if two spouses are both only children, then currently the couple is permitted to have two children. The second is to release or abolish the fertility interval that is part of the 1.5-child policy and change gradually to a two-child policy. The third is a gradual transition to a general two-child policy in urban and rural areas (Zeng, 2007). These options are flexible and adaptable, and by taking advantage of the newly developed environment in China, we propose that the birth policy should be a universal two-child policy in both urban and rural areas in the coming years and any institutional birth control be removed in coming decades.

## CONCLUSIONS

The one-child policy is perhaps the most ambitious family planning policy in the world. It connects population growth control and economic modernization. The Chinese government stands firmly behind controlling population growth and plays a leading role in the implementation of the policy. In implementing the population policy, education is a priority, while incentives and penalties play an important role. The particularly strict one-child policy in China has been widely criticized around the world, including by some international allies, and has damaged China's international image (Zeng, 2007).

At the beginning of the implementation of the fertility policy in China, the government encouraged the one-child family with economic and administrative incentives, punishing couples who had more children and cadres who didn't meet the fertility targets. This reduced the benefits of the program, and because of the implementation of a veto, if a cadre couldn't achieve the fertility goals, he would suffer from the pressure of lower wages or dismissal (Rutherford et al., 2005). As a result, the policies were resisted strongly in rural areas during the early period of the policy implementation. In order to ease the conflict, in 1984, the Government loosened the policy and introduced the 1.5-child policy: if the first child is a girl, the couple is allowed to have a second (Zeng, 2007). The current fertility policy requires about 63% of families to have only one child (Gu et al., 2007).

The original purpose of the population policy was to control population growth and to promote economic development, and the policy has fulfilled those tasks. China's 2010 census reveals that the total population grew 5.8% since 2000, from 1.27 billion to 1.34

billion, compared with a rate of 11.7%, almost double, from 1990 census to 2000 census (Hvistendahl, 2011). The population policy has led to economic growth and has played a positive role in alleviating environmental and economic pressures. It also has helped children's education and women's health and has improved women's social status. However, these benefits have had a high social and political cost; for example, the high sex ratio, sex imbalance in the marriage market and rapid aging. These are far worse than originally expected and have become serious social problems.

The policies also have ethical problems, such as the relation between population goals and material incentives, enforced abortions, the strained relationship between cadres and the people during the implementation period, the data system failure because of false data, and abortion for sex selection. All of these problems influence social development. The one-child policy has changed the fabric of Chinese culture.

Although China is not yet ready to give up its current birth policy, administrative control of personal decisions will generate an increasing array of problems. Less restrictive policies are realistic alternatives whose consequences are likely to be socially and economically positive for the nation. Does the current fertility policy need modification? When and how should it be modified? Many scholars estimate that the current fertility rate is between 1.4 and 1.6, and may drop to 1.4 in 2020 (Morgan et al., 2009). From international experience, when the fertility rate is below 1.5, it is very difficult to affect the trend to low fertility. White (2006) refers to China's birth planning as the "longest campaign" in her book *China's Longest Campaign—Birth Planning in the People's Republic, 1949–2005*, and Jiang (2012) points out in his review of White's (2006) book that "China has been obsessed with campaigns, and one may speculate whether the birth planning campaign will be followed by a long pro-natalist campaign in the foreseeable future".

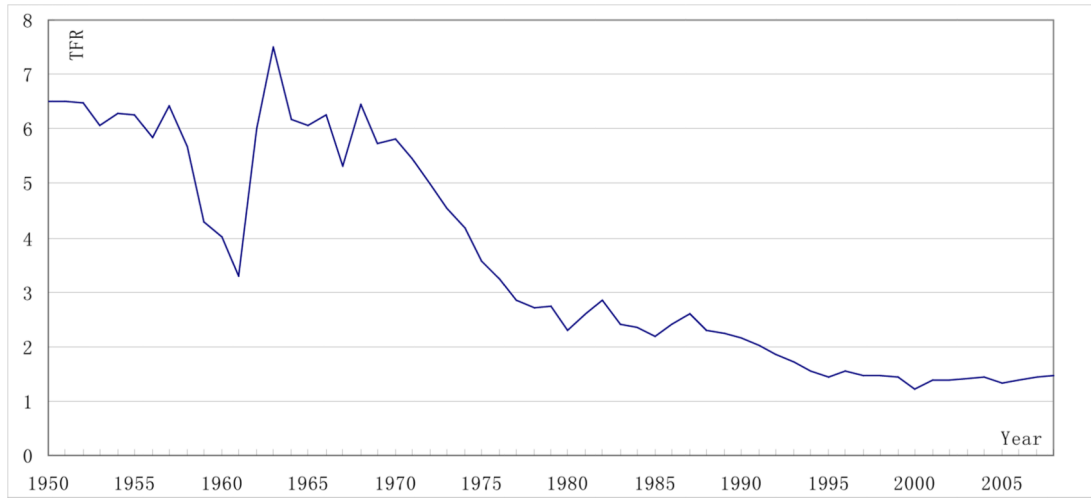
## References

- Beiles A. A buffered interaction between sex ratio, age difference at marriage, and population growth in humans, and their significance for sex ratio evolution. *Hereditary*. 1994; 33(2):265–78.
- Blanc, Ann K.; Tsui, Amy O. The dilemma of past success: Insiders views on the future of the international family planning movement, *Studies in Family Planning*. 2005; 36(4):263–276. [PubMed: 16395944]
- Bloom, DE.; Canning, D.; Fink, G.; Finlay, JE. [May 7, 2011] The cost of low fertility Europe.. NBER Working Paper No. 14820. 2009. <http://www.nber.org/papers/w14820>.
- Bongaarts J, Greenhalgh S. An alternative to the one child policy in China. *Population and Development Review*. 1985; 11(4):585–617.
- Bongaarts J, Feeney G. On the quantum and tempo of fertility. *Population and Development Review*. 1998; 24(2):271–291.
- Cai F, Wang M. Challenge facing China's economic growth in its ageing but not affluent era. *China & World Economy*. 2006; 14(5):201–31.
- Cai F. Pay-back time for China's one-child policy. *Far Eastern Economic Review*. 2007; (5):58–61.
- Cai F, Chan KW. The global economic crisis and unemployment in China. *Eurasian Geography and Economics*. 2009; 50(5):513–531.
- Cai F, Wang M. Growth and structural changes in employment in transition China. *Journal of Comparative Economics*. 2010; 38:71–81.
- Cai Y. China's below-replacement fertility: Government policy or socioeconomic development. *Population and Development Review*. 2010; 36(3):419–440. [PubMed: 20882701]

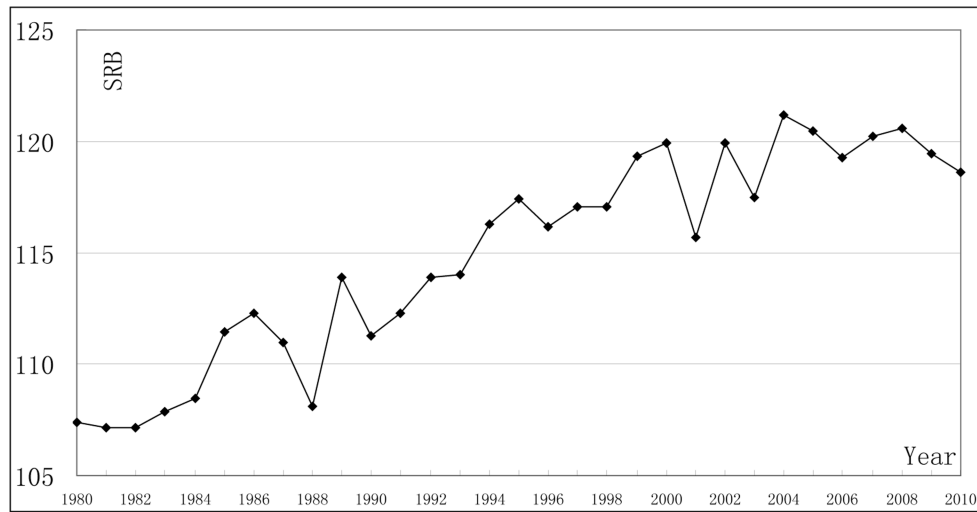
- Cai, Y.; Wang, F.; Zheng, Z.; Gu, B. Fertility intention and fertility behavior: Why stop at one-Factors behind China's below replacement fertility. Paper presented for Population Association of America Annual Meeting; Dallas-Fort Worth. April 15-17, 2010; 2010.
- Cao S, Wang X. Unsustainably low birth rates: A potential crisis leading to loss of racial and cultural diversity in China. *Journal of Policy Modeling*. 2010; 32:159–162.
- Chang, C. *Family Planning in Contemporary China*. Contemporary China Publishing House; 1992. p. 14-16.(In Chinese)
- Chen Y. A class of bare branches is forming. *Encyclopedia of Knowledge*. 2006; 28(5):52–53. (In Chinese).
- Cho, NH. Challenges of the population policy in the Republic of Korea. paper presented at Forum on Population and Development in East Asia; Beijing. May 16-17, 2005; 2005.
- Das Gupta M, Chung W, Li S. Evidence for an incipient decline in numbers of missing girls in China and India. *Population and Development Review*. 2009; 35(2):401–416.
- Flaherty JH, Liu ML, Ding L, Dong B, Ding Q, Li X, Xiao S. China: The aging giant. *Journal of the American Geriatrics Society*. 2007; 55:1295–1300. [PubMed: 17661972]
- Frejka T, Sobotka T. Frejka T, Sobotka T, Hoem JM, Toulemon L. Overview chapter 1: Fertility in Europe: Diverse, delayed and below replacement. *Childbearing trends and policies in Europe. Demographic Research, Special Collection 7*. 2008; 19:15–46. Article 3.
- Goodkind, D. Marriage squeeze in China: Historical legacies, surprising findings.. Paper presented at the 2006 Annual Meeting of the Population Association of America; Los Angeles. March 30 - April 1 2006; 2006.
- Goodkind D. Child underreporting, fertility, and sex ratio imbalance in China. *Demography*. 2011; 48:291–316. [PubMed: 21336689]
- Greenhalgh S, Bongaarts J. Fertility policy in China: Future options. *Science*. 1987; 235(4793):1167–1172. [PubMed: 3823877]
- Greenhalgh S. The evolution of the one-child policy in Shaanxi, 1979-88. *The China Quarterly*. Jun. 1990 122:191–229.
- Greenhalgh, S.; Winkler, E. *Governing China's Population--From Leninist to Neoliberal Biopolitics*. Stanford University Press; Stanford: 2005.
- Greenhalgh, S. *Just One Child-Science and Policy in Deng's China*. University of California Press; 2008.
- Gu B, Wang F, Guo Z, Zhang E. China's local and national fertility policies at the end of the twentieth century. *Population and Development Review*. 2007; 33(1):129–147.
- Gu, B. A journey of seven years—Study of China's fertility policy (2001-2008).. In: Zeng, Y.; Gu, B.; Guo, Z., editors. *China's Population and Economic Development under Low Fertility Level*. Social Science Academic Press; 2010. p. 159-191.(In Chinese)
- Guilmoto CZ. The sex ratio transition in Asia. *Population and Development Review*. 2009; 35(3):519–549.
- Guo Z. China's low fertility level and related demographic issues. *Academia Biometrics*. 2010; (1):5–25. (In Chinese).
- Hesketh T, Zhu WX. Health in China: The one child family policy: The good, the bad, and the ugly. *BMJ: British Medical Journal*. 1997; 314(7095):1685–1687. [PubMed: 9193296]
- Hudson, V.; den Boer, AM. *Bare Branches: The security Implications of Asia's Surplus Male Population*. The MIT Press; Cambridge, Mass.: 2004.
- Hvistendahl M. Has China outgrown the One-Child policy? *Science*. 2010; 329:1458–1461. [PubMed: 20847244]
- Hvistendahl, M. Declining Chinese birth rate could doom one-child policy.. *Science*. 2011. April 28, 2011. <http://news.sciencemag.org/scienceinsider/2011/04/declining-chinese-birth-rate.html>
- Jiang Q, Sánchez Barricarte JJ, Li S, Feldman MW. Marriage squeeze in China's future. *Asian Population Studies*. 2011; 7(3):177–193.
- Jiang Q. A Review of China's Longest Campaign-Birth Planning in the People's Republic, 1949-2005. *Canadian Studies in Population*. 2012; 39(3-4):142–144.

- Jiang Q, Sánchez-Barricarte JJ. Socio-demographic risks and challenges of bare branch villages in China. *Asian Social Work and Policy Review*. 2013 In press.
- Kane P, Choi CY. China's one child family policy. *BMJ: British Medical Journal*. 1999; 319(7215): 992–994. [PubMed: 10514169]
- Li, S.; Jiang, Q.; Feldman, MW. *Gender Discrimination and Population Development*. Social Sciences Academic Press; Beijing: 2006. (In Chinese)
- Longman, P. *The Empty Cradle: How Falling Birthrates Threaten World Prosperity and What to Do About It*. Basic Books; New York: 2004.
- Lutz W, O'Neill BC, Scherbov S. Europe's Population at a Turning Point. *Science*. 2003; 299:1991–1992. [PubMed: 12663901]
- Lutz W, Skirbekk V, Testa MR. The low-fertility trap hypothesis: Forces that may lead to further postponement and fewer births in Europe. *Vienna Yearbook of Population Research* 2006. 2006:167–192.
- Lutz W. Has Korea's fertility reached the bottom? The hypothesis of a 'low fertility trap' in parts of Europe and East Asia. *Asian Population Studies*. 2008; 4(1):1–4.
- McDonald P. Low fertility and the State: The Efficacy of policy. *Population and Development Review*. 2006; 32(3):485–510.
- Merli, MG.; Morgan, SP. Below replacement fertility preferences in Shanghai, China.. Paper presented at PAA 2010. 2010. <http://paa2010.princeton.edu/download.aspx?submissionId=100445>
- Morgan SP, Guo Z, Hayford SR. China's below-replacement fertility: Recent trends and future prospects. *Population and Development Review*. 2009; 35(3):605–629. [PubMed: 20376285]
- Myrskylä M, Kohler H-P, Billari FC. Advances in development reverse fertility declines. *Nature*. 2009; 460:741–743. [PubMed: 19661915]
- Nie Y, Wyman RJ. The one-child policy in Shanghai: Acceptance and Internalization. *Population and Development Review*. 2005; 31(3):313–336.
- Ogawa N, Retherford RD. Shifting costs of caring for the elderly back to families in Japan: will it work. *Population and Development Review*. 1997; 23(1):59–94.
- Ogawa, Naohiro. The emergence of very low fertility in Japan: Changing mechanisms and policy responses.. Paper prepared for the International Symposium on Social Policy in Asia; Tokyo. 9-10 February 2007; 2007. <http://www.econ.hit-u.ac.jp/~kokyo/sympo-feb07/paper/ogawa-Social%20Policy%20in%20Asia-1.pdf>
- Peng, Xizhe. Fertility transition and its socioeconomic impacts in China. 2007. <http://hdl.handle.net/10086/14135>
- Population Census Office under the State Council(PCO). *Tabulation on the 2010 Population Census of the People's Republic of China*. China Statistics Press; Beijing: 2012. p. 1862-1878.
- Randel, J.; German, T.; Ewing, D. *The Ageing and Development Report: Poverty, Independence and the World's Older People*. Earthscan Publications Ltd; London: 1999.
- Retherford RD, Choe MK, Chen JJ, Li X, Cui HY. How far has fertility in China really declined? *Population and Development Review*. 2005; 31(1):57–84.
- Scharping, T. *Birth Control in China 1949-2000, Population Policy and Demographic Development*. Routledge Curzon; London and New York: 2003.
- Short SE, Ma L, Yu W. Birth planning and sterilization in China. *Population Studies*. 2000; 54(3): 279–291. [PubMed: 11640214]
- Sobotka, T. Fertility trends in Europe: Is below-replacement fertility an inevitable outcome of the Second Demographic Transition?. Paper presented at VUB Colloquium on "Demographic challenges for the 21st century"; Brussels. February 15-16; 2007.
- Solinger D. Labor discontent in China in comparative perspective. *Eurasian Geography and Economics*. 2007; 48(4):413–438.
- Sun W, Jin G. The effect of fertility rate in socio-economic development. *Population Research*. 1994; (6):10–21. (In Chinese).
- Tien HY. Induced fertility transition: Impact of population planning and socio-economic change in the People's Republic of China. *Population Studies*. 1984; 38(3):385–400. [PubMed: 11630980]

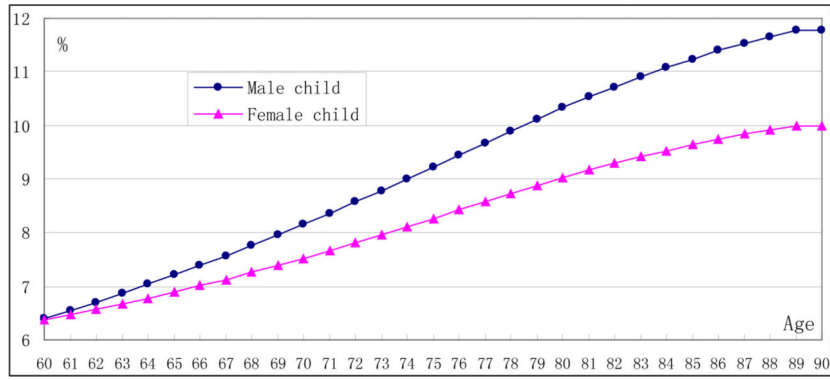
- Tuljapurkar S, Li N, Feldman MW. High sex ratios in China's future. *Science*. 1995; 267:874–876. [PubMed: 7846529]
- Tuljapurkar S. Demography: Babies make a comeback. *Nature*. 2009; 460:693–694. [PubMed: 19661903]
- United States Census bureau. China's Population to Peak at 1.4 Billion around 2026. US Census Bureau News CB09-191. Dec 15.2009
- Vaupel JW, Zeng Y. Population tradeoffs in China. *Policy Sciences*. 1991; 24:389–406.
- Wang D, Cai F, Zhang X. The saving effect and growth effect of population transition—The demographic factors of China's sustainable growth. *Population Research*. 2004; (5):2–11. (In Chinese).
- Wang, D.; Cai, F.; Gao, W. Globalization and the shortage of rural workers: A macroeconomic perspective. In: Nielsen, Ingrid; Smyth, Russell; Vicziany, Marika, editors. *Globalization and Labor Mobility in China*. MAI Press; 2006.
- Wang, F.; Mason, A. *Transition and Challenge: China's Population at the Beginning of the 21st Century*, edited by Zhongwei Zhao and Fei Guo. Oxford University Press; Oxford, UK: 2007. Population ageing: Challenges, opportunities, and institutions.; p. 177-196.
- Wang F. The future of a demographic overachiever: Long-term implications of the demographic transition in China. *Population and Development Review*. 2011; 37(supplement):173–190. [PubMed: 21280370]
- Wang, F. A decade of the one-child policy: Achievements and implications.. In: Goldstein, Alice; Feng, Wang, editors. *China: The Many Facets of Demographic Change*. West view Press; Boulder, CO: 1996. p. 97-120.
- Wang Y. The old age insurance system reform: Status quo and prospect. *Academics in China*. 2008; 23(2):280–284. (In Chinese).
- White T. Two kinds of production: The evolution of China's family planning policy in the 1980s. *Population and Development Review*. 1994; 20(S):137–158.
- White, T. *China's Longest Campaign: Birth Planning in the People's Republic, 1949-2005*. Cornell University Press; New York, NY: 2006.
- Winckler, Edwin A. Chinese reproductive policy at the turn of the millennium: Dynamic stability. *Population and Development Review*. 2002; 28(3):379–418.
- World Bank. *Old age security: Pension reform in China (China 2020 Series)*. World Bank; Washington, DC: 1997.
- Wu C. Theoretical explanation for China's rapid decline in fertility. *Population Research*. 1986; 10(2): 10–16. (In Chinese). [PubMed: 12159293]
- Wu, Z.; Schimmele, CM.; Li, S. Demographic change and economic reform.. In: Sweetman, Arthur; Zhang, Jun, editors. *Economic Transitions with Chinese Characteristics: Thirty Years of Reform and Opening Up*. McGill-Queen's University Press, Queen's Policy Studies Series; Montreal and Kingston: 2008.
- Yang, F. PhD Dissertation of Zhejiang University. 2003. *Historical Research on Family Planning of Contemporary China..* (In Chinese)
- Yang JH. Fertility intention, fertility behavior, and fertility level—the triple deviation. *Population Research*. 2011; 35(2):49–52. (In Chinese).
- Yang S, Wang G. A simple method of estimating the number of only children. *Chinese Journal of Population Science*. 2007; 21(4):58–64. (In Chinese).
- Yang, Z. *Family Planning in China*. Liaoning People's Publishing House; 1987. p. 38-39.(In Chinese)
- Zhang G, Zhao Z. Reexamining China's fertility puzzle: Data collection and quality over the last two decades. *Population and Development Review*. 2006; 32(2):293–321.
- Zeng Y, Vaupel JW. The impact of urbanization and delayed childbearing on population growth and aging in China. *Population and Development Review*. 1989; 15(3):425–445.
- Zeng Y. Options for fertility policy transition in China. *Population and Development Review*. 2007; 33(2):215–246.



**Figure 1.** Total fertility rate in China: 1950-2008. Data sources: data for 1950-1989 are from Sun and Jin (1994); data for 1990-2008 are from Guo (2010).



**Figure 2.** SRB from 1980 through 2010. Data sources; data before 2000 come from Li et al.(2006), Data after 2000 come from the annual one per thousand sample survey and the 2010 census.



**Figure 3.**  
Cumulative probability of losing a child.

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