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**Fertility prospects in China**

*Baochang Gu and Yong Cai*

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## PREFACE

In December 2009, the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat convened an Expert Group Meeting on Recent and Future Trends in Fertility at United Nations Headquarters in New York. The purpose of the meeting was to discuss recent changes in fertility trends in the major regions of the world and in selected countries as well as their determinants. Such a discussion set the stage for the consideration of a new approach to the projection of fertility in the preparation of the official United Nations population projections.

The meeting took place from 2 to 4 December 2009. Its agenda and list of participants can be found on the website of the Population Division ([www.unpopulation.org](http://www.unpopulation.org)). The papers prepared by experts participating in the meeting will be issued as part of the newly launched Expert Paper series available as downloadable PDF files and accessible on the Population Division website ([www.unpopulation.org](http://www.unpopulation.org)).

This paper reviews fertility trends in China, technical issues involved in accurately estimating trends in fertility and the socio-economic, demographic and policy context underlying the fertility decline to below replacement level in China. The paper also discusses the implications of China's low fertility for the country and the world.

The Expert Paper series aims at providing access to government officials, the research community, non-governmental organizations, international organizations and the general public to overviews by experts on key demographic issues. The papers included in the series will mainly be those presented at Expert Group Meetings organized by the Population Division on the different areas of its competence, including fertility, mortality, migration, urbanization and population distribution, population estimates and projections, population and development, and population policy.

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## A. INTRODUCTION

An accurate assessment of China's fertility level is important not only for a better understanding of China's demographic future but also for accurate estimates of global population numbers. In *World Population Prospects: The 2008 Revision* (United Nations, 2009) China's 2005-2010 level of total fertility is estimated as 1.77 children per woman. This estimate is "...based on official estimates of total fertility through 1990. Official estimates for 1991-2007 were also considered." The official estimates, presumably provided by the National Population and Family Planning Commission of China ((NPFPC), formerly the State Family Planning Commission (SFPC)), are higher than the estimates provided by the National Bureau of Statistics (NBS) of China and estimates from several scholars and organizations such as the United States Census Bureau and the Population Reference Bureau. This paper begins with a systematic review of fertility trends in China, a country that has experienced a fundamental decline in fertility. The paper then addresses the reasons behind this decline, both from a socio-demographic perspective and from a technical standpoint, and concludes by discussing the implications of China's low fertility for China and the world.

## B. WHAT IS THE CURRENT FERTILITY LEVEL IN CHINA?

Two decades of research on China's fertility have reached a new consensus that China has experienced a tectonic shift in its fertility regime: not only were there delays in marriage and childbearing, but more importantly there were fundamental changes in Chinese family values. Almost two decades have passed since China's fertility dipped to below-replacement level. Chinese fertility is now amongst the lowest in the world. A popular perception is that China's low fertility is mostly a result of a restrictive policy, but the ultra low fertility observed in China also reflects a silent revolution in Chinese society. While China's birth planning policy limits families' reproductive choices, more people now voluntarily choose to have only one child even when they have the option of having more children. For many Chinese families, their focus is now more on the quality than quantity of children.

Understanding China's fertility decline requires a brief review of China's fertility policy. The most prominent and controversial aspect of China's fertility is its birth planning policy, commonly referred to as the "one-child" policy. However, the introduction of the one-child policy was not the starting point of China's fertility transition or its population control efforts (Peng, 1991; Scharping, 2003). As a part of efforts to emancipate women, the newly founded People's Republic of China set women's legal age at marriage at 18 in 1950, a great departure from the Chinese tradition that favored early marriage and that must have had a direct impact on fertility. Calls to control China's population growth emerged at least as far back as the early 1950s. In the wake of the Great Leap Forward Famine of 1959-1961, the Chinese Government started programmes to promote contraceptive use and late marriage, especially in urban areas. China's population control efforts came into full scale in the 1970s. The "later, longer and fewer" campaign in the 1970s is probably the most successful fertility reduction programme in China. By encouraging people to marry later, to have longer intervals between births and to have fewer children, the programme lowered Chinese total fertility more than 50 per cent in less than a decade, from 5.81 children per woman in 1970 to 2.72 children per woman in 1978 (Coale, 1984; Gu, 1996; Peng, 1991).

Launched in 1980 as an emergency measure to control population growth for the sake of economic development, the Communist Party of China made the petition to its members to voluntarily limit their family sizes in an open letter published on September 25, 1980. The petition soon became a compulsory measure that required the majority of Chinese citizens to limit their fertility to one child per couple. The introduction of the one-child policy met resistance however, especially in rural areas. Facing a backlash from the public, some compromises were reached by adjustments in policy implementation.

Taking into consideration local culture and family needs, local governments, particularly at the provincial level, expanded and formalized exceptions that would allow some couples to have more than one child (Gu and others, 2007). In general, the birth policy is more restrictive for urban residents than rural residents, and more restrictive for the Han majority than ethnic minorities. The three largest groups who are allowed to have two (or more) children are: 1) those whose first child is a girl in most rural areas, except in Jiangsu and Sichuan provinces, 2) those who are a member of ethnic minorities, and 3) those who live in a few small pockets of experimental areas where a second child is generally allowed for rural couples. According to an exercise examining China's fertility policies based on local regulations and population size from the 2000 census, if all Chinese fully followed the local birth control regulations, more than 60 per cent of Chinese couples would end up with only one child. The overall fertility targeted by the Government's fertility policy for China as a whole would be at 1.47, which is far below replacement level (Gu and others, 2007).

The adjustments and compromises in the implementation of China's one-child policy reflect an inherent contradiction in the policy: the policy was deemed politically necessary but socially unachievable even for the most optimistic policymakers. In particular, the policy was introduced at the time when China just started its economic liberalization and began to relax its control over most aspects of social life in the late 1970s and early 1980s. Thus, the policy was a countercurrent for a society with increasingly diversifying needs and individual freedoms. One way to respond to government control was to hide births and children from government officials, especially when economic and social liberalization provided more opportunities for doing so. These responses led to the suspicion of birth underreporting and the deterioration of population statistics, although Chinese population and fertility data had been previously hailed for their high quality.

When China observed below-replacement fertility at the national level for the first time in its National Fertility Survey of 1992, the data quality was seriously questioned: the results were regarded as too low to be true. According to the survey, Chinese fertility experienced a sudden and sharp decline around 1990: from a total fertility rate (TFR) of 2.24 children per woman in 1989 to 2.04 in 1990 to 1.65 in 1991 and 1.52 in 1992. The drop from 1990 to 1991 was particularly acute, a reduction of almost 20 per cent in just one year, and thus raised suspicions of underreporting (Feeney and Yuan, 1994; Zeng, 1996). Since then the controversy about China's fertility level and the reasons behind its swift drop has been a central topic in the field of Chinese demography.

The suspicion of underreporting was based on three assumptions. First, previous examples of below-replacement fertility were all observed in developed countries. That China's fertility would reach such a low level given its development level and large agriculture-based economy at the time seemed questionable. Second, the low fertility reported in the 1992 survey was unexpected as Chinese fertility stayed, and almost stagnated, at the level above replacement throughout the 1980s, even with the full implementation of the one-child policy. The challenging experiences of implementing the one-child policy in the 1980s support the first assumption and suggest that Chinese fertility may have reached a level that would be very difficult to lower even further. Third, an institutional tightening of China's birth planning policy implementation not long before the 1992 survey was considered to exacerbate the problem of underreporting: the central Government intensified its birth control efforts in 1991 by making chief officers at each administrative level and unit directly responsible for meeting birth planning targets in their jurisdictions (called "one-veto rule"), and thus provided strong incentives for local officials to hide or underreport births from the official quota. The suspicion was also supported by widespread anecdotal stories and evidence, including one survey conducted by the SFPC in two provinces with an underreporting rate of 37.3 per cent of newborns. Although the underreporting of births was neither a peculiar nor a new problem in Chinese population data, an underreporting level of 37.3 per cent was substantial. If more than one third of births went undercounted in the survey, Chinese fertility in 1991-

1992 was “most likely to have been at or slightly below replacement level” after adjusting for underreporting (Zeng, 1996).

In retrospect, the accumulation of empirical data and demographic exercises indicate that while underreporting was indeed a severe problem in the 1992 survey, it is unlikely to be at such a high level of 37.3 per cent (Zhang and Zhao, 2006). For example, total fertility for 1992 is 1.57 children per woman according to the 1997 fertility survey, 1.59 children per woman according to the 2001 fertility survey and 1.67 or 1.68 children per woman based on the 2000 census (NBS & EWC, 2007; Retherford and others, 2007; Guo, 2004). In other words, the low fertility observed in the 1992 survey, while it was suppressed by underreporting, did reflect a real decline in Chinese fertility: Chinese fertility dropped to a below-replacement level in the early 1990s. The decline continued in the 1990s and 2000 onward.

Figure 1 depicts the fertility trend for China from 1950 to 2008. Two government agencies in China, NPFPC and NBS, provide official fertility estimates. Figure 1 includes three lines of fertility estimates for the years of 1991-2008: the unadjusted observations, NPFPC’s adjusted estimates and NBS’s adjusted estimates. The year 1991 was chosen because observed fertility prior to that year was generally regarded as reliable. A line for a total fertility of 2.1, or replacement fertility, is shown for reference. In response to underreporting in their data, both NPFPC’s TFR and NBS’s crude birth rate are adjusted, but no information on assumptions or procedures for the adjustments is provided. NPFPC provides period TFR estimates based on its own assessment of fertility surveys and other sources. Although NBS does not give direct estimates of TFR, it publishes the crude birth rate (CBR) and age-specific fertility rates (ASFR) based on censuses and annual population surveys<sup>1</sup> in its annual publications *China Statistical Yearbook* and *China Population Statistical Yearbook*. With information on CBR and ASFR and the population age structure, a simple demographic exercise provides the corresponding TFR (Goodkind, 2008).

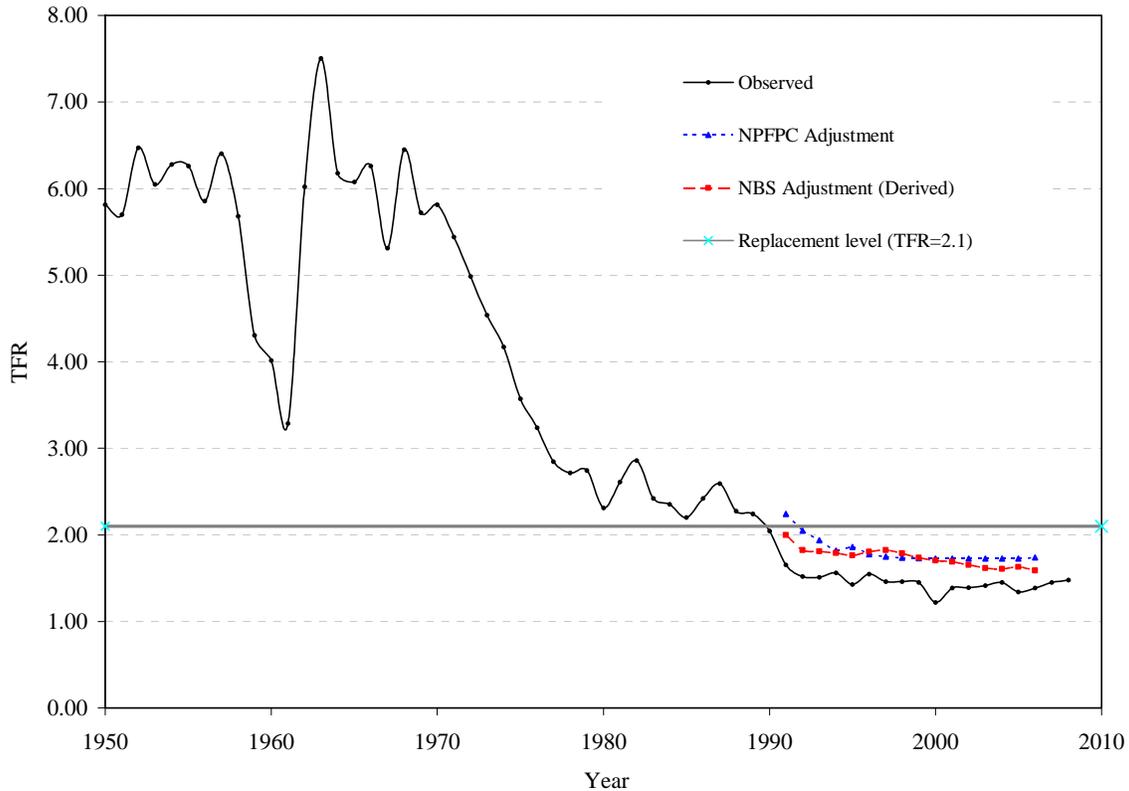
Figure 1 shows that China’s fertility decline happened in two distinctive stages. The first stage started not too long after the recovery of the Great Leap Forward Famine of 1959-1961. China’s fertility experienced a sustained rapid decline in the 1970s. The decline stopped around 1980 as the TFR rebounded and then fluctuated around 2.5 children per woman in the 1980s. The second stage of decline started in the late 1980s with another speedy decline and then continued at a slower but steady pace. Figure 1 shows that even after accounting for underreporting, China’s fertility has declined to a level that is well below replacement. The adjustments made by NPFPC and NBS do not change the overall trend of declining fertility in China, especially when viewed from a historical perspective.

NPFPC’s adjustment implies an average annual underestimate of 25 per cent of total fertility between 1991 and 2006, ranging from 15 per cent to 41 per cent. NPFPC’s adjustment sets Chinese total fertility virtually unchanged from 1998 to 2006 with TFR around 1.73-1.74. NBS’s adjustments show a slow but steady fertility decline since 1991, with TFR gradually declining from about 2.0 children per woman in 1991 to slightly below 1.6 children per woman in 2006, implying an average annual underestimate of 20 per cent, ranging from 11 per cent to 39 per cent. However, there is evidence suggesting that the Chinese Government’s official adjustments, especially NPFPC’s numbers, have overestimated current fertility in China (Goodkind, 2008; Guo, 2009).

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<sup>1</sup> China conducts censuses in the years ending at 0, one-percent population sample survey (mini-census) in the years ending at 5, and population change sample survey with a sample rate of about one per thousand in other years.

**Figure 1. Fertility trends in China, 1950-2008**

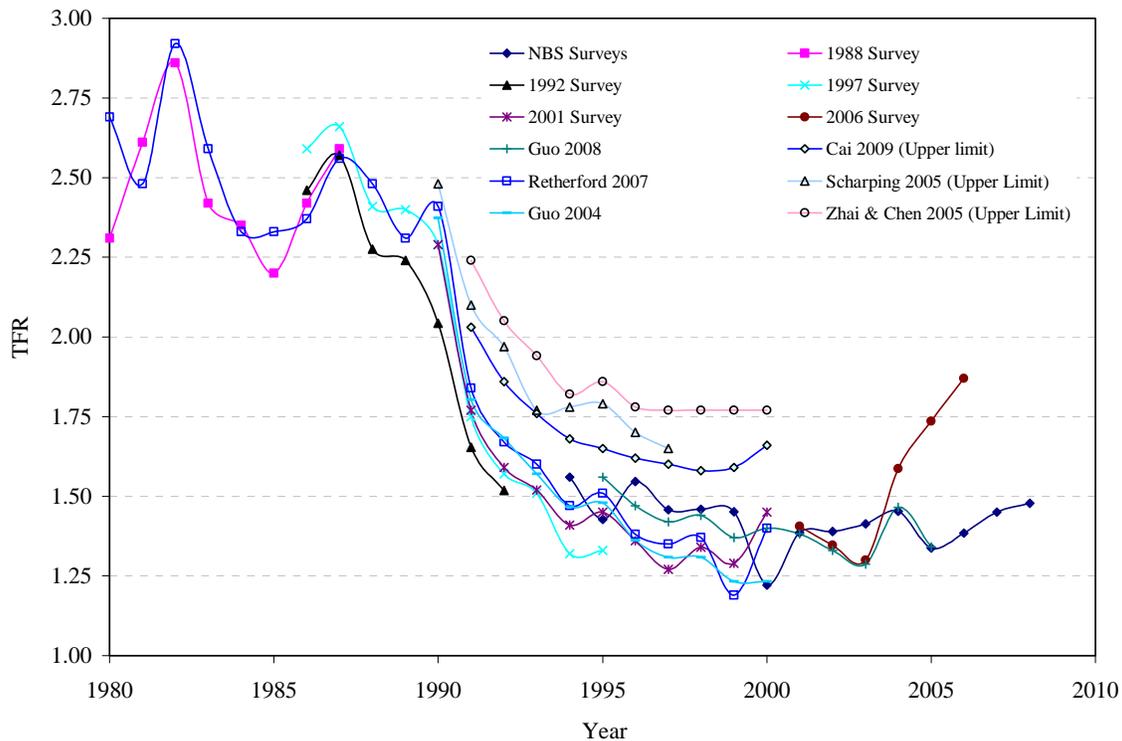


*Sources:* Observed TFR for 1950-1981 from 1982 Survey; 1982-1987 from 1988 Survey, 1988-1992 from 1992 Survey; 1993 from 1997 Survey; 1994-2008 from sum of ASFRs published by NBS in China (Population) Statistical Yearbook 1995-2009. NPFPC adjustments from NPFPC 2007. NBS adjustments are derived by Goodkind (2008).

Figure 2 shows fertility estimates since 1980 from different sources to highlight both the declining trend and current fertility levels. These sources can be classified into three categories. First, unadjusted survey results from the 1988, 1992, 1997, 2001 and 2006 surveys conducted by SPFC/NPFPC, which provide both retrospective and current fertility measures; second, population censuses and surveys conducted by NBS, which provide only current fertility measures; and third, indirect estimates based on demographic exercises, including estimates by Retherford and others (2005) using the 1990 and 2000 censuses, estimates by Guo (2004, 2008) using the 2000 census and 2005 mini-census, and three estimates by Cai (2009), Scharping (2005) and Zhai and Chen (2005) based on school enrollment data.

There is more consistency than disagreement across different data sources and estimation methods, especially among estimates based on survey data. By any measure, China's fertility experienced a drastic reduction around 1990. While underreporting and sample bias are problems to be aware of in Chinese data, there is an unmistakable declining trend in Chinese fertility over the last two decades. With the accumulation of empirical evidence and careful scrutiny of data quality, a reasonable conclusion is that China's fertility has indeed fallen to a level well below replacement even after discounting for underreporting.

**Figure 2. Fertility trends in China, 1980-2008 based on various sources**



Sources: 1988, 1992, 1997, 2001, 2005 Surveys by SFPC/NPFPC; NBS surveys/censuses 1994-2008; Guo 2004, 2008; Zhai and Chen, 2005; NBS & EWC, 2007; Cai, 2009; Scharping, 2005.

Figure 2 shows that the three school enrollment-based estimates are generally higher than other estimates, and estimates based on 2006 survey data display an upward trajectory from 2003 to 2006. As Cai's (2009) study shows, caution must be taken when using school enrollment data to estimate fertility. Not only structural factors, such as economic incentives and increases in migration, have led to inflated enrollment numbers, but also a combination of changes in China's education system and population age structure lead to an overestimation of cohort size if those factors were not taken into account. The estimate from Cai (2009) is the upper limit for fertility in the 1990s. Special attention should also be devoted to the 2006 survey. The upward trajectory seen in the 2006 survey is, in fact, a result of a biased sample. As Guo (2009) showed, the survey over-sampled women who were married, lived in rural areas or had a lower level of education. After appropriate adjustment, total fertility in 2006 is 1.4 (Guo, 2009; Morgan, Guo and Hayford, 2009), which is similar to the estimates based on the NBS surveys.

Other studies also show variation in estimates of recent fertility levels in China. Zhang and Zhao (2006) concluded that fertility "probably fell to around 1.6 in the year 2000." Retherford and others (2005), using the own-child and birth history reconstruction methods to estimate Chinese fertility, found that fertility for the four years between 1997 and 2000 was 1.46. Using the variable-r method, Cai (2008) estimates that fertility in the 1990s was in the range of 1.5-1.6. Similar conclusions were also reached by Guo (2004), Guo and Chen (2007), Guo (2009) and Morgan, Guo and Hayford (2009). While questioning some of the assumptions used in the studies by Cai (2008), Guo (2004), and Zhang and Zhao (2006), Goodkind (2008) reached a similar conclusion that NBS's CBR numbers have over-adjusted the underreporting factor. The United States Census Bureau puts China's current fertility at 1.53 (United States Census Bureau, 2009) and the Population Reference Bureau estimates China's fertility at 1.6 (PRB, 2009). NBS officially acknowledged that China's fertility reached 1.6 by 2005 (NBS, 2007). But NPFPC maintains that total fertility in China is still around 1.8 children per woman (Jiang, 2006; Xinhua 2009).

### C. WHY FERTILITY IS SO LOW IN CHINA

Although China's fertility decline is closely related to its birth planning policy, the relationship between the fertility policy and the fertility level is complicated for several reasons. First, the history of China's one-child policy has shown clear limits of what a restrictive government policy can achieve, even when it is backed by a strong bureaucracy. The policy did not bring down fertility to its desired level during its most intensive period of implementation in the 1980s. Second, in addition to the restrictive fertility policy, other important social forces that are commonly associated with fertility decline must have also played a role in China's fertility transition. In the last three decades, China has experienced rapid and drastic social changes that would encourage low fertility. Third, China's "one child per couple" policy is written and implemented based on cohort fertility. The ultra low fertility observed in China is partly an effect of tempo distortion—delays in marriage and childbearing—that will lead to period-based fertility measures that are lower than cohort based ones.

While it is undeniable that China's birth planning policy played an important role in its fertility transition, evident with the great success of the "later, longer and fewer" policy in the 1970s, the contribution from other factors commonly associated with fertility reduction, such as socio-economic development and ideational change, should not be ignored. The demographic transition theory predicts fertility decline when socio-economic development first brings down mortality, especially infant mortality. The social changes commonly associated with development—structural changes like industrialization and urbanization, institutional changes like the weakening of traditional marriage and family arrangements, and ideational changes like the rise of materialism and individualism—all induce couples and individuals to plan and limit their family size. Family planning programmes that provide reproductive information and services and encourage the use of effective contraceptive methods are most successful when there is a strong "unmet need" for fertility control. Although demographic transition theory has been criticized from many different angles, the negative relationship between socio-economic development and fertility is supported with strong empirical evidence, both at macro and micro levels (Bryant, 2007; Jones and Tertilt, 2008) and specifically in the case of China (Chen and others, 2009; Poston and Gu, 1987; Poston, Kincannon and Yoon, 2009).

China has experienced probably one of the most dramatic and rapid socio-economic transformations over the last three decades, mostly in the direction that would encourage people to limit their fertility: the development of a market-oriented economy that intensifies competition; an increase in social mobility, social inequality and economic uncertainty; and opening up to global influence with the rise of individualism. The effects of socio-economic development followed on the success of population control in the 1970s (i.e., the fertility level at the end of 1970s was already not too far above the replacement level). A similar process has been repeated many times across the world: as soon as the fertility transition gets started, fertility reduction is very difficult to reverse before hitting its bottom. In fact, China's fertility decline trajectory shares similarities with Thailand's trajectory, though there has been no restrictive birth control policy in Thailand. The disruption of China's fertility reduction process in the early 1980s was largely an accident caused by a combination of the sudden tightening of birth control with the introduction of the one-child policy without support from other social and institutional changes at the time, such as changes in marriage law and the loosening up of economic control at the beginning of the reform. Chinese fertility resumed its declining trend in the late 1980s.

The social aspects of the continued fertility decline in China are well documented with some revolutionary changes of attitudes and behaviours within the Chinese family system. First, there has been a general change in fertility preferences. In contrast to traditional views that the Chinese prefer large families, partly as a cultural tradition and partly as an economic necessity for an agriculture-based economy and for old age support, Chinese people now put more emphasis on the quality of children than

the quantity. Second, people are making rational decisions in their reproductive choices in conjunction with self-fulfillment, as well as other personal and family goals. Third, the delay of marriage and childbearing creates a tempo distortion that leads period-based fertility measures to be somewhat lower than cohort-based measures. Fourth, the availability of modern contraceptives and acceptance of family planning make fertility control easier to achieve with little or no social stigma attached. Government-subsidized contraceptive services and low levels of social controversy and social stigma associated with abortion reduce both the financial and psychological costs of fertility control.

Empirical research indicates that there have been some fundamental changes in Chinese fertility desires. Even with a biased sample that included more tradition-oriented women, a 2006 fertility survey reported a nationwide average ideal family size of 1.73 children (NPFPC, 2007). Similar results have been seen in other samples (Zheng, 2004). In more developed regions, the number is even lower. For example, the average ideal family size reported by a survey in Shanghai was only 1.25-1.38 children (Merli and Morgan, 2010). The Jiangsu Fertility Intention and Behavior Study (JFIBS), a study specifically designed to understand the relationships between birth planning policies, socio-economic development, fertility desire and fertility behaviour, presents a comprehensive picture of the low fertility situation in China. The key findings from this study are summarized below in the next two paragraphs based on Zheng and others (2009).

JFIBS was conducted in six selected counties along the east coast of Jiangsu province, one of the most developed areas in China. The study reported an average ideal family size of 1.44 children with 99 per cent of respondents choosing either one or two as the ideal number of children. The low value of ideal family size reflects changes in Chinese family values more than pressure from the one child policy because even among those who are allowed to have two children, ideal family size is just as low as among those who are only allowed to have one child. Moreover, while childbearing is still regarded as an important life course obligation, with the majority of respondents still assigning a very high value to having children in their lives, it has become more an altruistic behaviour than one motivated by old-age security: over 90 per cent of respondents agreed with the statement that “watching children growing up is the greatest happiness in life” and nearly 70 per cent agreed with the statement that “those with no children live an empty life”. The majority of respondents also disagreed with statements such as “children’s education is a great investment for parents”. More concrete evidence on the revolutionary changes in China’s fertility regime is in the change of behaviour among those who are allowed to have two children. Among those who were allowed to have two children, only one third said that they would consider having a second child, and only one tenth took advantage of the policy exceptions. Among those who went on to have a second child, more did so because of special circumstances, such as their second child was from a second marriage or because their first child was disabled or had died. A three-year follow-up study of those who were allowed to have a second child and stayed with their first marriage found that only four per cent had a second child.

Why do many young women and couples in China not want to have a second child, even when the policy provides exceptions that allow them to have a second child? Concerns over an uncertain future and the cost of having children are the most commonly mentioned reasons by respondents for not wanting to have another child. According to the JFIBS, the most common answer was “one child is enough” followed by “raising children costs too much”. Of all respondents eligible to have two children according to the local fertility policy, over 70 per cent mentioned these as reasons for not wanting to have a second child. Such a concern over the cost of raising children, however, does not mean that the young couples are poor. To the contrary, in this part of China, families have seen their lives vastly improved over the last two decades. Nor is it due to the lack of energy among couples to raise another child. Only one-fifth of all respondents chose “not enough energy” as a reason for not wanting to have another child. While the fertility policy was still a real constraining factor for those who are eligible to have one child, only 42 per

cent mentioned it as a reason. Regression analyses show that economic conditions are indeed the most important factors in consideration for having more children.

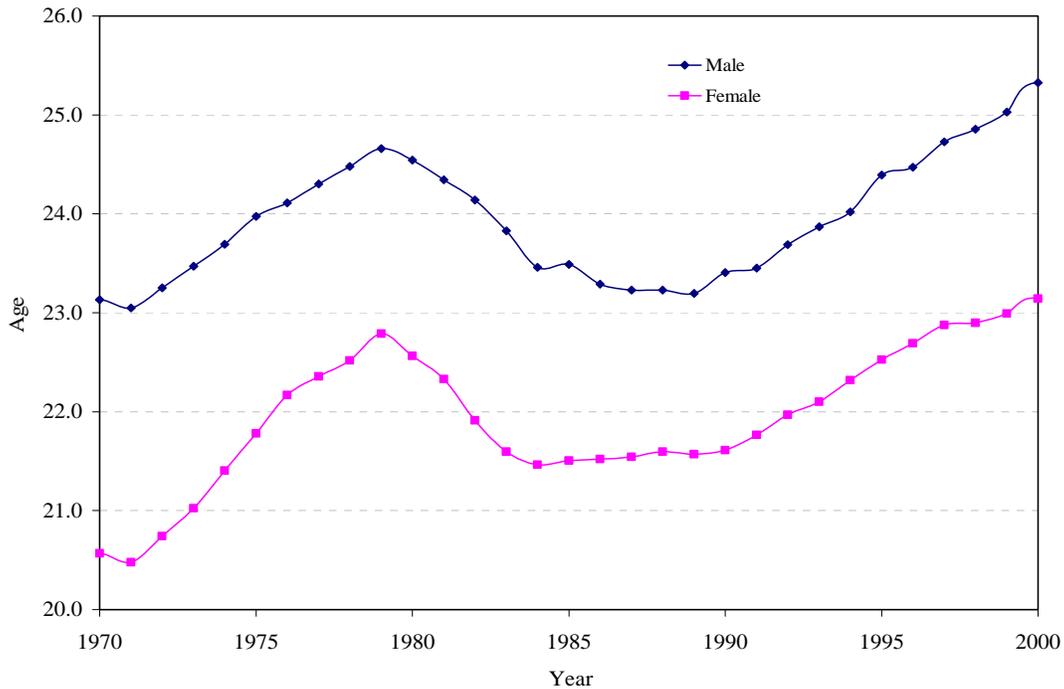
The results from the JFIBS survey are just a snapshot of drastic social and cultural changes that have happened over the last three decades in China. Surveys and interviews in other areas of China present a similar picture. The traditional Chinese family system that was built on thousands of years of agricultural civilization is being eroded by large-scale industrialization, urbanization and globalization. At the beginning of China's economic reform, China was primarily an agricultural society. Today, about half of the Chinese population lives in rural areas and even less work in agriculture. In this process, families face pressures to adapt to a new social environment that can be unfriendly to reproduction, with increased inequality and uncertainty, rising demand for human capital and retrenchment of public support.

Similar phenomena are also observed in the areas where a two-child policy has generally been implemented since the mid-1980s (Gu and Wang, 2009). In 2005-2006, a series of case studies were conducted in the areas where a two-child policy had been implemented as early as the mid-1980s such as Jiuquan Prefecture of Gansu Province, Chengde Prefecture of Hebei Province, Yicheng County of Shanxi Province and Enshi Prefecture of Hubei Province. When compared to areas under more restrictive policies but with similar socio-economic and cultural backgrounds, the areas with a two-child rule can be viewed as natural experiments of the effect of the birth planning policy on fertility. If low fertility in China was indeed solely the result of the restrictive birth planning policy, one would expect to see higher fertility in areas where the policy is less restrictive. In all the areas with a two-child policy, the fertility levels were similar or even lower than their nearby comparable counterparts but with a "1.5" child policy. In other words, a more relaxed policy did not necessarily translate into a higher level of fertility. Moreover, a relaxed birth planning policy was associated with more balanced sex ratios at birth and among children.

The costs of having children and the concerns over an uncertain future are shared features in many low fertility countries, especially in East Asia. McDonald (2009) attributes the low fertility in East Asia to a shared cultural orientation that emphasizes children's education and success. Wang and others (2008) examine below-replacement fertility in the much broader social and political context of globalization by arguing that low and very low fertility are a feature of the capitalist economic expansion under globalization, characterized by a free market ideology at the macro level and individualism at the micro level. Such a combination drastically increases social inequality at both the global and the national levels, creating a motivated yet squeezed middle class faced with the high opportunity cost of marriage and childbearing. It has also undermined the traditional support from family for childcare and reduced support from state institutions.

Economic pressure and uncertainty often lead to a delay of marriage and childbearing. Figure 3 displays mean age at first marriage by sex in China from 1970 to 2000, based on data collected in the 2000 census (long form). After a brief interruption due to changes in marriage law, mean age at first marriage resumed its ascending trend in the late 1980s. As discussed earlier, one important component of China's successful family planning campaign in the 1970s was to encourage later marriage, which pushed the female mean age at first marriage from about 20.6 in 1970 to 22.8 in 1979. A similar trend is also found in the male mean age at first marriage. A marriage law in 1980 set minimum ages for marriage at 22 for males and 20 for females, and a downward shift in mean age at marriage followed over the next few years (Gu and Yang, 1991) and was part of the reason for a fertility spike in the early 1980s (see figure 3). Marriage age resumed increasing around 1987 and fertility resumed its declining trend (Zhang and Gu, 2007). Of course, the postponement of childbearing can distort period-based fertility measures (Bongaarts and Feeney, 1998, 2000). Guo (2004) found that tempo effects associated with delays of marriage and childbearing depressed the period TFR of China in the 1990s by as much as 0.3 when compared with the expected completed fertility.

**Figure 3. Mean age at first marriage by sex, China, 1970-2000**



*Source:* Calculated using the 2000 census data, 1/1000 micro sample

Guo (2008) and Morgan, Guo and Hayford (2009) examined the contribution of different factors to account for the gap between intended and observed fertility in China using a low-fertility proximate determinants model, based on a conceptual model of low fertility that was first proposed by Bongaarts (2001). The postponement of childbearing has played a key role in the gap between intended and observed fertility and will likely continue. Several other factors deserve special attention. First, because of the wide availability and social acceptance of contraception and abortion, the proportion of fertility that is “unwanted” is especially low in China. Second, while strong son preference in traditional settings tends to lead to higher fertility, the strategy to achieve an ideal composition of children has switched from having more children to sex-selective abortion. Third, the infecundity and sub-fecundity estimates used in the model are likely to be conservative. In sum, the models in Guo (2008) and Morgan, Guo and Hayford (2009) suggest that China’s low fertility is very much like low fertility observed in other countries. It results from a combination of multiple factors, including socio-economic changes, cultural and ideational shifts, as well as tempo effects because of delays in marriage and childbearing. While the arrival of below-replacement fertility in China and its continued downward shift seemed to have occurred earlier than expected, they should not be viewed as surprising after two decades of consistent observations, especially in the context of other revolutionary changes occurring in China.

#### D. THE IMPLICATIONS OF CHINA’S LOW FERTILITY

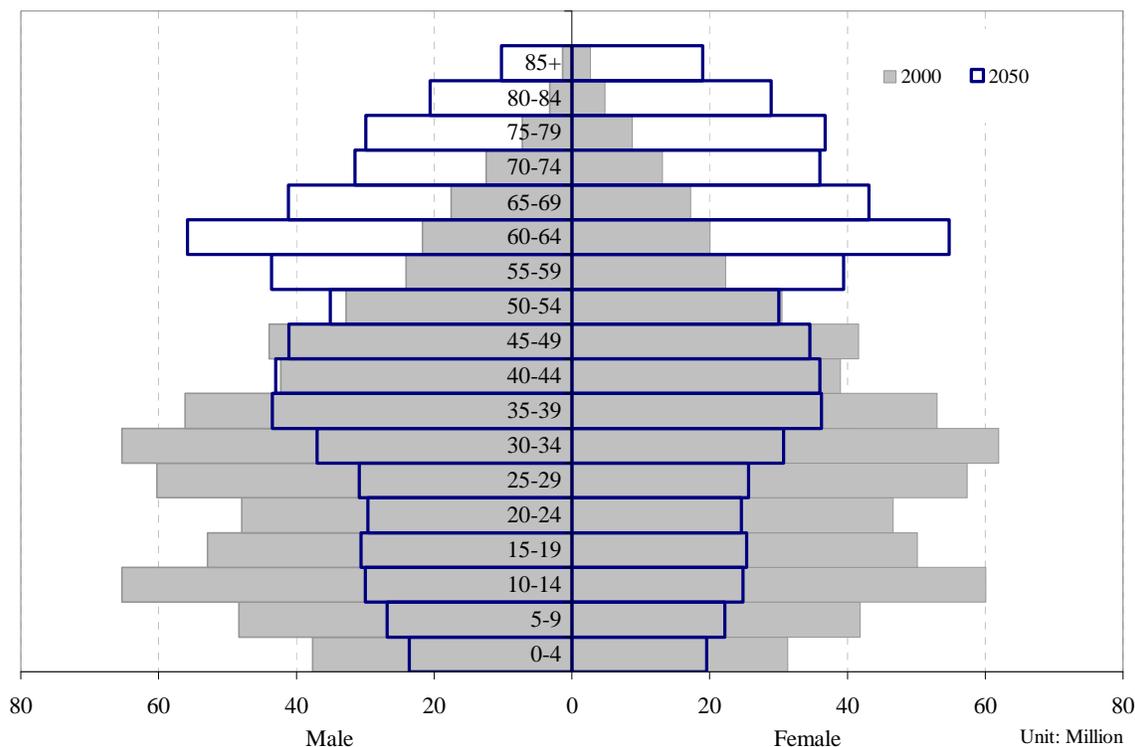
Low fertility has a tremendous impact on China’s society. The foremost impact is population ageing. Population ageing is a demographic consequence of fertility decline and improvements in life expectancy. When fertility declines more rapidly, ageing will occur more rapidly as well. According to the 2000 census, China’s population aged 60 or over was more than 10 per cent of the total population, and the population aged 65 or over was more than 7 per cent, an indication that China has quickly become

an ageing society. More recent data from the 2005 one-percent national population sample survey show that China's population aged 60 or over has increased to 11 per cent of the total population and aged 65 or over to 8 per cent of the total population. The number of elderly people has also increased to 144 million people aged 60 or over and about 100 million people aged 65 or over. "Unlike the case in the developed countries however, population ageing occurs in China far before the realization of its modernization." (Gu and Peng, 1992)

Assuming China's fertility stayed at a TFR of 1.6, by the mid-21st century more than one third of China's population would be aged 60 or over and one quarter of China's population would be aged 65 or over, with more than 100 million people aged 80 or over. This means that less than two young adults will have to support one old person. Figure 4 compares population pyramids of 2000 and of 2050 (projected) for China and shows that in a few decades China's population structure will turn from a pyramid to a pillar shape. What challenges Chinese society will face with such an ageing population structure is still a significant question to be answered. It will depend on how the Chinese government and society adapt to such a tectonic demographic change. To be sure, services for the elderly will be urgently needed, people will have to reduce their consumption and increase their savings in order to pay for old age medical costs, and the labour supply will begin to shrink.

Support of the elderly is an acute social issue to be addressed, particularly in China's rural areas. Traditionally, rural people tend to rely heavily on their children for support in old age, but with the sharp reduction in number of children, the practice is becoming less feasible. At the same time, the coverage of the social security programme for the rural population will continue to be limited in the near future. Moreover, because of accelerated population movement triggered by the market-oriented economy, more young people tend to leave villages for cities. As a result, while rural fertility is higher than urban fertility, the degree of population ageing is higher in rural areas than in urban areas. The proportion of elderly aged 65 or over in urban areas increased from 4.5 per cent in 1982 to 6.4 per cent in 2000, while in rural areas it increased from 5.0 per cent to 7.5 per cent (Gu, 2006). Population ageing is more than just an issue of a growing proportion of the population at older ages; population ageing implies an overall transformation of society via changes in social institutions and structures.

**Figure 4. Population structure of China, 2000 (shaded) and 2050**



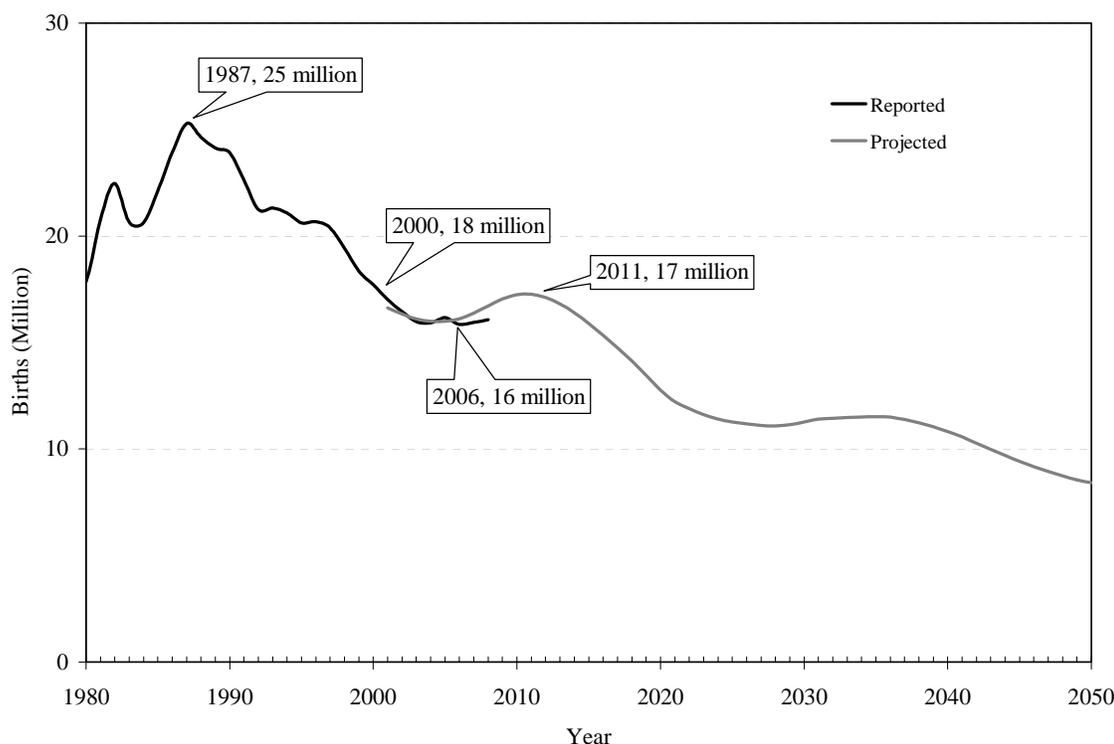
*Sources:* 2000 population sex-age structure is from the 2000 census; 2050 population age structure is from a cohort component projection based on population sex-age structure data from the 2000 census, empirical life tables for 1999-2000 from Banister and Hill (2004), with the following assumptions: fertility stays at TFR=1.6 with the same age pattern observed in 2000, sex ratio at birth stays at 120 (males per 100 females), life expectancy gradually increases from 69.80 for males and 72.76 for females in 2000 to 75 for males and 79 for females in 2050.

An increasingly fragile family is another emerging challenge that China will have to face as its population ages. The tragic event of the earthquake of May 2008 in Sichuan, in which thousands of families lost their only children, serves as a stark reminder of the high risk of a fragile family system. In such extreme situations of misfortune, parents lose their only children, and many parents are too old to replace their children who have died. The number of China's single children aged 0 to 30 is nearly 160 million (NBS, 2006) and over one third of Chinese households have only one child. Should the current birth control policy stay intact and the low fertility level persist, half of Chinese women aged 60 or over will have only one child by the middle of the current century. Such a large number of families with only one child not only poses great challenges for providing material and emotional support to elderly parents, but also presents serious social risks for Chinese families as well as for the whole society. Even with a low mortality level, some Chinese parents still face the unfortunate situation of their only children dying before they do.

With total fertility below replacement level for nearly two decades, the momentum of population decline has already been set in motion in China. Although China's population is still growing at a rate of 5 per thousand per year, it is really an effect of the age structure. China's intrinsic growth rate, which measures population growth based on fertility and mortality levels of the population and leaves out the effect of population age structure, has reversed from around 20 per thousand in the mid-1970s to about negative 20 per thousand in 2005 (Wang and others, 2008). In other words, China's population's growth potential has reversed itself from doubling every 30 years to halving itself every 30 years. The decline of

fertility and the build up of negative momentum are also visible in the number of children born in China every year. According to NBS (2009), the total number of births reached a historical low in 2006, with a total of only a little less than 16 million<sup>2</sup> born in that year, about two-thirds of the 1987 level. Even as the “boom cohorts” of those born in the mid-1980s come into their peak years of marriage and childbearing, China’s annual number of births will not exceed the level of 2000, and will be followed with a precipitous drop in the years to come if nothing is done to reverse the fertility trend (figure 5).

**Figure 5. Reported and projected number of births, China 1980-2050**



*Sources:* Reported numbers are from China Statistical Yearbook 1991 & 2009; projected numbers are from cohort component projection based on population sex-age structure data from the 2000 census, empirical life tables for 1999-2000 from Banister and Hill (2004), with following assumptions: fertility stays at TFR=1.6 with same age pattern observed in 2000, sex ratio at birth stays at 120 (males per 100 female), life expectancy gradually increases from 69.80 for male and 72.76 for female in 2000 to 75 for male and 79 for female in 2050.

The projections presented in figure 5 are based on an assumption that Chinese fertility would stay at a total fertility level of 1.6 children per woman. Even if China’s fertility level rises to replacement level within the next 30 years (by 2037), China’s population decline will continue for another half century or more. In the process, China’s total population size will be reduced by 220 to 300 million from its peak. The median age of the population will increase drastically from 30 years in 2000 to close to 50 years in the next four decades. Should China not be able to raise its fertility to the replacement level by the end of the current century, China will have a population size only about half of what it is now.

Rapid population ageing and sustained population decline in China have profound implications for China’s as well as the world’s economy. A smaller birth cohort will naturally convert into a smaller labour cohort in later decades. This is a less noticed implication of China’s changing demography. China’s economic boom over the last thirty years has relied on one crucial factor, namely a young and productive labour force. Such a labour force, a unique historical product due to the rapid demographic

<sup>2</sup> As argued previously in the paper, this is a high-bar estimate, as NBS tends to over-adjust fertility figures.

transition, was present fortuitously as the Chinese economy was about to take off. The benefit of such a demographic fortune, termed the “demographic dividend”, is estimated to have accounted for 15 to 25 per cent of China’s economic growth between 1980 and 2000 (Wang and Mason, 2008). For the most part, China has so far exhausted its demographic fortune measured by the first demographic dividend, or the change in the support ratio between effective producers and effective consumers (Wang and Mason, 2008). If current fertility continues, China will soon observe a rapid decline in its labour supply. The reduction of its size will be quite dramatic, a rate of reduction of 100 million working-age people per decade, or 10 million per year. And the labour force itself will be ageing as well (Guo and others, 2006). Labour shortages have been frequently reported in the Chinese mass media since the spring of 2004, even during the current economic recession. While with population ageing China is posed to gain a second demographic dividend, a dividend resulting from increased labour productivity due to capital investment, reaping that dividend requires a precondition of proper capital market that China still lacks.

Chinese economists have started to claim that China’s labour force has moved from a period of “abundant supply” to a period of “limited surplus” (Cai and Wang, 2006). As a result of China’s very low fertility over the last two decades, the era of many young and inexpensive labourers is soon to end. The number of young labourers aged 20 to 24 years will come to its peak in the next few years and follow with a precipitous drop. The size of the population in this age group is expected to decrease to a historical low, from 125 million people in 2010 to around 80 million in 2020. Such a drastic decline in the young labour force not only ushers in for the first time ever in recent Chinese history successively smaller cohorts of labour force entrants, it will also have profound consequences for labour productivity, as these are the most recently educated and tend to be the most innovative, as well as for consumption, as these young people are also the most active consumers, from spending on wedding banquets to new housing units. As a major player in the global economy, the impact of China’s demographic change will certainly go beyond its own geographic boundaries.

#### E. CONCLUDING REMARKS

This paper reviewed a number of empirical studies that have carefully examined Chinese fertility trends and showed there was more consistency than disagreement across different data sources and estimation methods. Total fertility had a sustained and rapid decline in the 1970s, fluctuated around 2.5 children per woman in the 1980s, and then underwent another decline from the late 1980s and continued to decline at a slower but steady pace. Total fertility is now well below replacement level, though there is a relatively wide range of estimates of China’s low fertility level, with many around 1.4 children per woman to 1.6 children per woman.

Low fertility in China should not be seen as surprising given the profound socio-economic transformations in China over the last three decades. The swift development of the market-oriented economy and massive rural to urban population movement have exerted a tremendous impact on many aspects of Chinese society, including people’s attitudes and behaviours with respect to marriage, childbearing, childrearing and the use of modern contraceptives. Field investigations carried out in various parts of the country in recent years have also provided empirical evidence that the mean age at first marriage has been moving upward and ideal family size has been moving downward. Many eligible couples even forgo having a second child though they are entitled to have an additional child according to the local fertility policy. Many of these changes are in line with social change and demographic transition theories. In the larger context of fertility transition, China is not an exception.

The implications of China’s low fertility are difficult to address since the demographic reality is relatively recent and a full understanding of it is still limited. However, the implications are critical for China’s future development, and the effects exerted from prolonged low fertility will soon loom large and

become increasingly visible. The paper discussed some of these issues, such as rapid population ageing, the fragile nature of Chinese families with one child, shrinking of the labour force as well as negative population momentum.

At the turn of the 21<sup>st</sup> century, below-replacement fertility has become a new global demographic reality (Morgan and Taylor, 2006). With over one fifth of the world's population, China is a newcomer but an important one in the emerging global regime of below-replacement fertility. The arrival of below-replacement fertility in China calls for a new understanding of population dynamics and a review of population policies to address the issues arising from sustained low fertility.

“Low fertility” as a demographic phenomenon has now been observed not only in Europe but also in Asia, not only in developed countries but also in developing countries, and not only in traditionally “low fertility” societies but also in traditionally “high fertility” societies (Gubhaju and Moriki-Durand, 2003; Lutz, O'Neill and Scherbov, 2003). As Wilson (2004) concisely stated, the human population is crossing “a historical, but so far largely unnoticed threshold”; that is, most of the world's population “will live in regions with less-than-replacement level fertility than in regions with fertility above 2.1”. Below-replacement fertility has gradually become a global trend in population dynamics and a concern for numerous countries (United Nations, 2000). Below-replacement fertility has even been claimed to be “the norm in post-transitional societies” (Demeny, 1997; Bongaarts, 2001). Understanding the global trend toward below-replacement fertility as well as the issues associated with the emerging demographic dynamics is still at its beginning stage.

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