The Future of a Demographic Overachiever: Long-Term Implications of the Demographic Transition in China

WANG FENG

China has been an overachiever in the global process of demographic transition in the second half of the twentieth century. Its mortality decline was unparalleled in human history among populations of significant size, consequently setting the stage for rapid population growth. In turn, rapid population growth laid the foundation for an unprecedented state intervention in birth control. China's fertility decline in the closing decades of the twentieth century was perhaps even more extraordinary for its speed and especially for the measures taken and the authorities involved. With China's fertility now well below replacement level, what lies ahead for this demographic overachiever? In this chapter I examine three issues related to China's demographic transition. First, I briefly review the demographic transition in China. Second, I discuss the role of the Chinese state, a particularly salient aspect of the demographic transition and one that has attracted much attention and caused a good deal of confusion. Third, using population projections, I highlight a few important features of China's demographic future, deriving in large part from its status as a demographic overachiever.

China: The demographic overachiever

Demographic transition in China began with a highly compressed process of mortality decline, with a substantial improvement in life expectancy in a matter of two decades (see Table 1). Around 1950 life expectancy at birth for Chinese females, a major indicator of the mortality level of the population, was 46 years. This was the level achieved by the more developed European countries and the United States a century earlier (see Figure 1), and it was

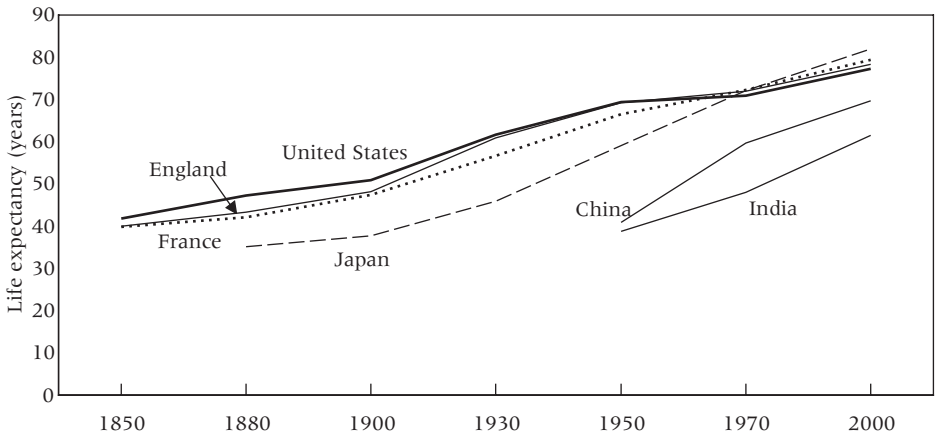
TABLE 1 Major indicators of China's demographic transition

Indicator	1950	1970	1980	1990	2000	2005
Population size (millions)	552.0	829.9	987.1	1,143.3	1,265.8	1,307.6
Birth rate (per thousand)	37	33.4	18.2	21.1	14.0	12.4
Death rate (per thousand)	18	7.6	6.3	6.7	6.5	6.5
Natural increase (per thousand)	19	25.8	11.9	14.4	7.6	5.9
Total fertility rate	5.8	5.8	2.3	2.3	1.6	1.5
Life expectancy, female (years)	45.6	63.2	69.3	70.5	73.3	74.5
Life expectancy, male (years)	42.2	61	66.4	66.8	69.6	70.7
Infant mortality rate, female	130.2	48.6	33.7	33.5	33.8	22.3
Infant mortality rate, male	145.9	54.2	35.6	32.4	23.9	18.5
Illiteracy (% of population at ages 15+)			22.8	15.9	9.0	7.9
Percent urban	11.2	17.4	19.4	26.4	36.2	43.0
GDP per capita (RMB yuan)	119	275	463	1,644	7,858	14,065

SOURCES: SPFPC 2009.

nearly 30 years below the level of life expectancy achieved in industrialized European countries and in the United States in 1950. In the next 50 years, China accomplished what it took these other countries a century to achieve, an increase in life expectancy from the 40s to over 70 years. In 2000, whereas the gap in income level between China and the United States was still around 1:10,[1] female life expectancy in China was only about five years below the US level, about 75 versus 80. China thus completed its mortality decline while

FIGURE 1 Paths to rising life expectancy, China and selected other countries, 1850–2000



SOURCES: England, France, United States, and Japan: Livi-Bacci 2007: 106, except for 1970, from United Nations 1997; China and India, Livi-Bacci 2007: 162.

per capita income was at a very low level. Whereas China's experience closely parallels the pattern of mortality decline in many other developing countries, its success is an extreme example. Government-led efforts in public health relying on simple preventive measures and widespread access to primary care are credited for such broad and significant improvements in life expectancy (Banister 1987; Lee and Wang 1999).

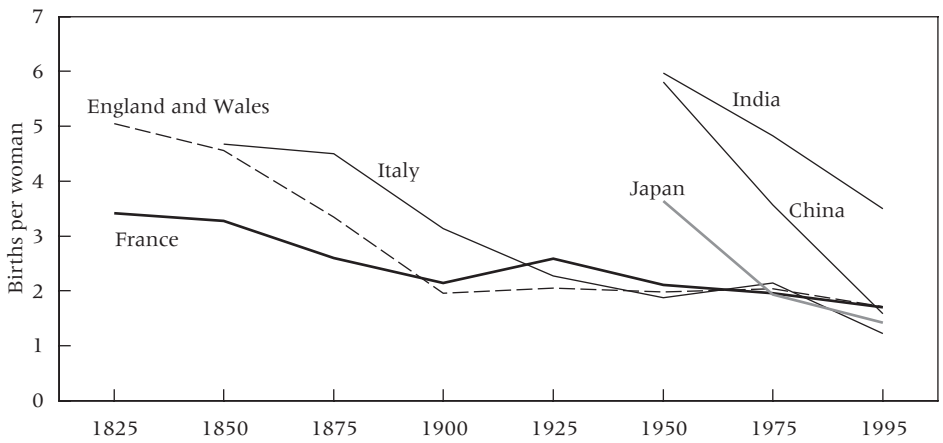
The remarkable improvement in life expectancy set the stage for rapid population growth in China. In the two decades after 1950, the crude death rate of the Chinese population was reduced by nearly 60 percent, from 18 per thousand in 1950 to 7.6 in 1970. At the same time, fertility remained at roughly the same level, around 5.8 children per woman (Table 1). In the absence of a sharp drop in fertility corresponding to the rapid mortality decline, and in particular following a fertility rebound in the wake of the Great Leap Forward famine of 1959–61, China had a rate of natural increase mostly in the high 20s per thousand in the late 1960s, a level implying a population doubling every 25 years (Table 1). Indeed, while China's population grew from 600 million in 1954 to 700 million in 1964, it took only a decade to add the next 200 million. Such a rate and the magnitude of population growth were unprecedented in Chinese history and contributed to the worldwide concerns of population explosion in the 1970s and 1980s.

Yet, once it began, China's fertility decline was even more compressed than its record mortality decline. As shown in Table 1, major fertility reduction in China took only half of the time required for mortality. In the decade from 1970 to 1980, the total fertility rate was more than halved, from 5.8 to 2.3, a record largely unmatched elsewhere. In contrast to Western European countries, where it took 75 years or longer to complete a fertility transition from a TFR of around 5 to the replacement level, in China a similar decline took only about two decades. Moreover, whereas in some European countries fertility stayed at replacement level for half a century or longer before dipping below that level, in China the time lag for that further decline was only about one decade (Table 1 and Figure 2).

The new phase of fertility decline in China began quietly and remained unnoticed for almost a decade. The first signs that China's fertility had dropped below replacement level came in the early 1990s, when a national survey of fertility and contraception conducted by China's National Population and Family Planning Commission reported a fertility level considerably below replacement. The finding was quickly dismissed in the context of what was believed to be the widespread practice of birth underreporting. Nevertheless, in all surveys since then, the national fertility level has never been found to exceed replacement.

By the turn of the twenty-first century, it was beyond question that China had entered its post–demographic transition stage. It is now widely believed that fertility in China nationally fell below replacement in the early

FIGURE 2 Paths to below-replacement fertility, China and selected other countries, 1925–1995



SOURCES: 1950 and before, Livi-Bacci 2007: 114; 1975 and 1995, United Nations 1997.

1990s (Cai 2008; Gu 2008; Gu and Cai 2009; Guo 2004a, 2004b, 2008; Guo and Chen 2007; Retherford et al. 2005; Zhang and Zhao 2006; Morgan, Guo, and Hayford 2009). By 2005, the TFR was around 1.5 and possibly lower. In China's more developed regions, fertility has been even lower for more than a decade, barely above the level of one child per couple. In ten of China's 29 mainland provinces and municipalities, fertility based on China's 2000 population census was 1.1 children per couple or below, a level that rivals the ultra-low-fertility countries (Gu et al. 2007; Chen et al. 2009).

In roughly half a century, China completed its transition from a low rate of natural increase due to high mortality and high fertility to a low rate of natural increase as a result of low mortality and low fertility. In 2005, China's rate of population growth was around 0.5 percent, down from over 2.5 percent in 1970. For China, the historical importance of completing its demographic transition in such a compressed fashion has many dimensions. One of these is that in less than 15 years from now, for the first time in history, China will no longer be the most populous country in the world.[2]

The Chinese state in demographic transition: Instigator or accelerator?

China's compressed demographic transition under a strong centralized state has often led to the belief that China has been an exception in the global process of demographic transition. Undoubtedly the role of the Chinese state was central in establishing the systems of national welfare and public health that contributed to China's vast improvement in life expectancy in a short time,

and a birth control policy that is sustained by layers of bureaucratic oversight unequaled in the world.

To credit China's demographic transition entirely or even mostly to the Chinese state, however, would be greatly mistaken. A careful look at the timing and underlying process of China's demographic transition shows that in terms of both origin and agency, it is the Chinese people, not the Chinese state, who are the main motors behind China's demographic transition.

Origins

Looking more closely at the main indicators of China's demographic transition, the most impressive mortality reduction was completed by 1970, with a gain in life expectancy between 1950 and 1970 of roughly one year per calendar year, with the female infant mortality rate dropping from around 130 per thousand to less than 50, and the crude death rate dropping below 10 per thousand. While mortality decline has continued since 1970, it has never matched the pace of the two decades between 1950 and 1970.

What accounts for the drastic mortality decline in those two decades? Studies have paid special attention to three factors: a socialist welfare distribution system that sharply reduced poverty and increased economic equality; a government-initiated public health system that focused on prevention and provision of basic care at low or no cost; and the spread of modern health and medical knowledge that began nationally in the early twentieth century (Banister and Preston 1981; Jamison et al. 1984; Banister 1987; Rogaski 2004). Of the three factors, the least known is the last, namely the long process of mortality decline that began prior to the Communist takeover in 1949. Modern mortality decline in China began at the start of the twentieth century, with the adoption of public health measures in selected populations. Studies during the last decade or so of historical populations in the Republic Era (1911–49) provide much evidence of such an origin. Substantial mortality decline began first in Beijing, Tianjin, and other port cities (Benedict 1996; Campbell 1997, 2001; Rogaski 2004). A major contributor was abandonment of the practice of female infanticide and child neglect. Calculations by Ansley Coale and Judith Banister show that by 1950, the level of excess female deaths had dropped to 5 percent, from over 15 percent before 1940 (Coale and Banister 1994). A proactive culture of mortality control, longstanding in the Chinese population, facilitated the early adoption of public health measures in selected cities in the early twentieth century, and these measures were introduced nationwide once the socialist government took control in the second half of the twentieth century. The historical roots of the culture of mortality control were summarized in Lee and Wang (1999) and further explored by other studies (Campbell and Lee 2004; Derosas and Tsuya 2010).

Processes

China's fertility decline shows even stronger evidence of origins that predate strong state intervention and control. The first noteworthy feature of China's fertility decline is that it preceded the completion of the major mortality decline. In fact, fertility decline started in selected regions and among some segments of the population simultaneously with rapid mortality decline, in the 1950s. By the early 1960s, birth control in urban China was no longer limited to a minority of the population. Soon after the compensatory baby boom following the Great Leap Forward famine, fertility in urban China started its precipitous fall, to a total fertility rate of only three births per woman in 1966. In his study of regional variations in fertility decline, Peng Xizhe marked 1964 as the onset of fertility decline for urban China and 1972 for rural China (Peng 1993: 104). By 1974, fertility in urban China had fallen below replacement level and for the last three and half decades has never risen above that level. Since 1980 and for nearly three decades, in the wake of China's one-child policy, fertility in urban China has stayed barely over one child per woman, a level that rivals the lowest in the world. The similarity between the trajectory of fertility decline in China and in other regions in Asia without strong government intervention was documented by Ansley Coale and Ronald Freedman in a paper first presented in 1988. They observed that "the similarity in the demographic changes that took place between the 1950s and 1980s in these populations is striking," and concluded that "fertility in mainland China may have been brought down by intensive government programs, but the culture that led other 'Confucian' populations to reduce fertility without such strong government intervention may have helped make the Chinese policy very effective" (Coale and Freedman 1993: 218).

The second less noticed feature of China's fertility decline is that the country as a whole largely completed the fertility transition in the 1970s, prior to the launching of China's ambitious and controversial one-child-per-couple policy in 1979. As mentioned earlier, total fertility was more than halved between 1970 and 1980. The starting point of 1970 is arbitrary, since this year is not the starting point of China's demographic transition. It is simply a time point when the national fertility level entered a mostly consistently downward trend. The choice of the end point, however, is deliberate. This is the year when China began its one-child birth control policy, a policy that is not only unique, but also has often obscured the underlying processes and causes of China's fertility decline. Fertility decline during the 1970s was accelerated by a national birth control program under the slogan of later (marriage), longer (birth intervals), fewer (births), but enforcement of the program was far less stringent than what followed with the one-child policy.

Not only did China's most significant fertility decline take place prior to the government's draconian birth control policy, but in the decade imme-

diately following the announcement of that policy, the fertility level for the country as a whole hardly changed. The 1980s was a decade of fluctuations, with fertility hovering around 2.5 births per woman. As shown in Table 1, the TFR was the same in 1980 and 1990. The role of government intervention was prominent in certain respects. For instance, the fluctuation in the fertility trend was in part the effect of relaxing the late-marriage age rule, with earlier marriage age causing birth-heaping (Feeney and Wang 1993). Another important factor was a backlash against the initial forceful implementation of the one-child policy, leading to small baby booms following the government's adjustment of the policy in the mid-1980s (Greenhalgh 1986). In contrast to the 1970s, when the government's birth control program served largely the unmet need for contraceptive use and birth control, in the 1980s, when confronted by an unusually restrictive policy that ran directly contrary to the fundamental interests of Chinese families, the Chinese population resisted and in some cases revolted, and the Chinese state backed off.

The most recent evidence supporting the independent role of the Chinese population in China's demographic transition and especially its fertility transition comes from studies of Chinese couples who are not subject to the one-child policy. China's one-child policy covers the majority of the Chinese population, with some 63 percent of Chinese couples currently subject to the one-child restriction (Gu et al. 2007). At the same time the policy contains numerous exemptions that allow the other third of Chinese couples to have two children (Wang 2005; Gu et al. 2007). A number of locales in China have been exempt from the policy for a variety of historical reasons, and couples who are only children themselves can have two children. In four largely rural areas with a combined population of over 8 million that is largely exempt from the one-child policy, studies show that fertility has dropped below replacement level and often to a level lower than in the surrounding areas. Moreover, while the provinces in which these areas are situated all have an abnormally high sex ratio at birth—one of the often-discussed negative consequences of the one-child policy—in those areas exempt from the one-child policy the sex ratio at birth has remained within the normal range (Gu and Wang 2009). In a separate study of fertility intention and behavior in six largely rural counties in Jiangsu province with a combined population exceeding 5 million, over half of couples who are qualified to have two children report that they intend to have only one child, citing mostly economic and financial concerns (Zheng et al. 2009). Recent analysis of fertility variations across China's different geographic regions reaches the same conclusion that local economy and other factors, not policy, explain much of the fertility variations (Chen 2005; Cai 2010).

As my colleagues and I have documented elsewhere on the basis of historical population records, China's fertility transition traces its roots to a cultural tradition of proactive reproductive control long before the modern

fertility decline (Wang, Lee, and Campbell 1995; Lee and Wang 1999; Campbell, Wang, and Lee 2002; Lee, Campbell, and Wang 2002; Wang, Campbell, and Lee 2010). The Chinese population did not exhibit marital control, that is, curtailing fertility by delaying or forgoing marriage, as seen in historical European populations; rather it relied on other forms of control, mostly within the institution of marriage. Means of control ranged from female infanticide (which also results in male celibacy) to birth spacing and, in some cases, early stopping. Regulating marital sexual life was a major mechanism to achieve the goal of fertility control. Such a practice persists today in the aftermath of the demographic transition. Couples who have not achieved their preferred size and sex composition of offspring have a higher frequency of sexual intercourse than those who have (Lavely 2007).

Before the demographic transition, the Chinese family was the foundation for the behavioral pattern of multiple fertility controls. The family was replaced by the state—or its lower-level agency, the collective—during China's socialist years (Lee and Wang 1999). In dismantling the socialist planned economy in the last 30 years, the Chinese state has also returned the rights and responsibilities of economic production to the family, although to date the state has not relinquished its control over reproduction. Continuing the draconian one-child policy, therefore, presents a fundamental inconsistency between economic and reproductive rights, as the policy itself was formulated in part on the assumption that the earlier socialist planned economy encouraged reproductive free riding and sustained high fertility in rural China (Johnson 1994; Lee and Wang 1999).

To summarize, China's demographic transition shares many characteristics of the transition seen elsewhere in the world. Such similarities have often gone unrecognized, overshadowed by the extraordinary intervention in reproduction by the Chinese state. It is unquestioned that the modern Chinese state played a prominent role in facilitating both the mortality and fertility declines, but the Chinese, like most people everywhere, are keenly aware of the consequences of their reproductive decisions and regulate their fertility accordingly. The state did not start the demographic transition but greatly accelerated it, sometimes through the use of force. To credit China's demographic transition entirely to the Chinese state, however, obscures important historical facts and contributes to a misguided view that exaggerates the role of the state and justifies continued state intervention in reproduction.

Long-term implications of China's demographic transition

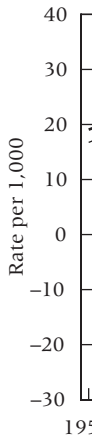
Clarifying the state's role in China's demographic transition, especially its role in achieving very low fertility, has significant implications for understanding

China's
transiti
demog
where
demog
of the
have b
at a fas
demog

Prospe

With fe
mentu
prospe
culatin
project
based s
effect c
implied
our cal
the obs
increas
the ear

FIGURE
increas



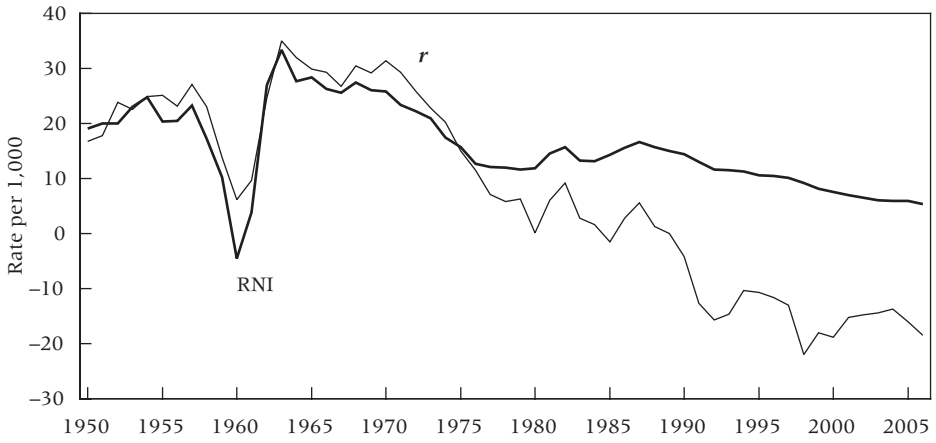
SOURCE:

China's demographic, social, and economic future. If China's demographic transition was achieved largely by individual volition, then the long-term demographic prospect in China may not differ from that of other populations where the transition had been completed earlier. Moreover, because China's demographic transition took place within a relatively short time frame, many of the often-problematic consequences of the demographic transition that have been observed elsewhere have also emerged sooner and are unfolding at a faster pace. China, in other words, is destined to pay a price for being a demographic overachiever.

Prospects for population decline and accelerated aging

With fertility below the replacement level for nearly two decades, the momentum of population decline has already begun in China. To illustrate the prospects for China, we use two common tools of demographic analysis: calculating the intrinsic rate of population growth and carrying out population projections. The intrinsic rate of growth (*r*) is a measure of population growth based solely on fertility and mortality levels of the population, omitting the effect of population age composition. It shows the underlying rate of growth implied by the level of fertility and mortality.[3] Figure 3 presents the results of our calculation for China for the period 1950–2006. To compare this rate with the observed trajectory of population growth, we also plot the rate of natural increase (RNI). The rate of natural increase has dropped precipitously from the early 1960s to its current low level of around 5 per thousand, but it is still

FIGURE 3 Intrinsic rate of growth (*r*) and observed rate of natural increase (RNI), China 1950–2006



SOURCE: Wang, Guo, and Mao 2008.

positive, indicating net population growth. The intrinsic rate of population growth, however, shows a complete reversal in a 30-year time period: from around 20 per thousand in the mid-1970s to roughly –20 per thousand in 2005. Just as a rate of growth of 20 per thousand implies a population doubling time of about 30 years, a rate of –20 per thousand means the population size is halved every 30 years.

China's population size, however, will not be halved in the next 30 years, because of the effect of its population age structure, or the momentum of population growth. A relatively young population age structure, even with below-replacement fertility, still produces more births than deaths, hence net population gain. This momentum is evident in each of our three population projections, shown in Table 2. Even if China maintains its policy-dictated TFR of 1.47, its population will continue to grow for another decade or so, to 1.35 billion in 2023.[4] If China's currently fertility rate is 1.6, the officially recognized level, its maximum population size will be 1.38 billion, reached in 2026, less than 20 years from now.

As the population ages, the momentum of negative growth will eventually predominate. The prospect of population decline and aging is also shown in the projection results in Table 2. Should China's fertility remain low, population decline and aging will undoubtedly characterize China's demographic prospects for much of the twenty-first century, if not longer. We assumed in the first two scenarios in Table 2 that by 2037 China's fertility will be raised to replacement level, and in the third scenario we assumed the indefinite continuation of fertility at the level implied by the current policy, which requires on average that couples have 1.47 children. Even under the first two scenarios, once fertility is restored to replacement level, China's

TABLE 2 Post-transition demographic prospects for China under three scenarios for TFR over 2007–2100

	Scenario		
	I	II	III
Momentum of population growth			
Peak population size (millions)	1,350	1,382	1,350
Year peak reached	2023	2026	2023
Momentum of population decline			
Duration of population decline after TFR = 2.1 (years)	54	49	70+
Reduction in population size (millions)	308	220	673
Highest median age (years)	47.6	45.6	52.9
Year highest median age reached	2047	2044	2100

NOTES: Scenario I assumes that TFR remains at 1.47 for 30 years from 2007 and then rebounds to the replacement level of 2.1; Scenario II assumes that TFR remains at 1.6 for 30 years and then rebounds to 2.1. Scenario III assumes TFR remains at 1.47 indefinitely.
SOURCE: Wang, Guo, and Mao 2008.

population decline will continue for another half century or more. In the process, China's population will be reduced by between 220 and 308 million from its peak, and the median age of the population will increase steeply, from 30 years in 2000 to close to 50 years in the next four decades. If fertility remains below replacement level, by the end of the century China will have a population size only about half of what it is now.

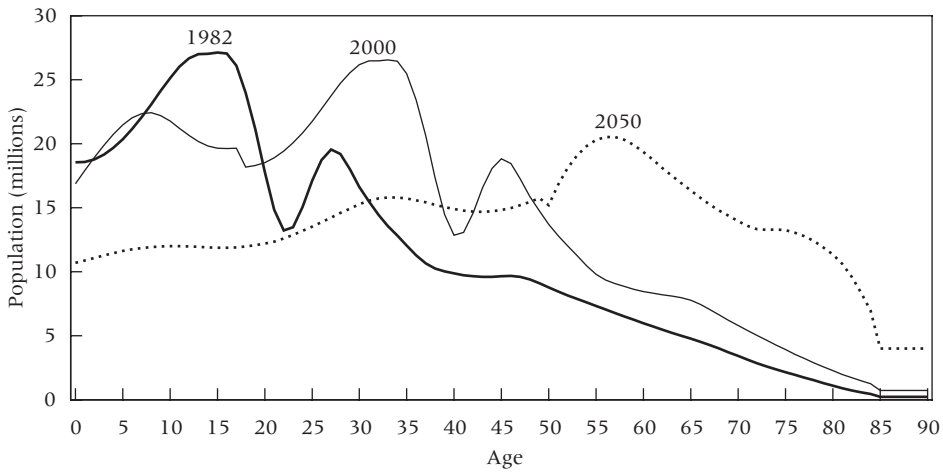
Economic implications: Dwindling demographic fortune

Rapid population aging and sustained population decline in China have far-reaching implications for China's and the world's economy. In the last 25 years China has witnessed unprecedented economic growth and increase in the standard of living. As China enters a new era of low fertility and accelerated population aging, its economy will have to undergo a fundamental transformation to respond to the underlying demographic shifts.

The economic boom in China in the last three decades has been driven by many factors. If one focuses on the key factors for economic growth, aside from institutional changes, the role of capital investment is salient. Foreign direct investment, especially from overseas Chinese, brought in not only capital but also technology and management acumen (Huang 2003; Arrighi 2007). Foreign consumer demand, especially in the United States, supplied a huge market for China's export industries. Capital, technology, and overseas markets alone, however, did not make China the world's factory starting in the last two decades of the twentieth century. China's economic boom has relied on another crucial factor, namely a young and productive labor force. This large labor force, a non-repeatable historical product of the rapid demographic transition, was present fortuitously as the Chinese economy was about to take off. As shown in Figure 4, the large birth cohorts of the 1960s and 1970s were at their peak productive ages when the recent economic boom began. 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 (Cai and Wang 1999; Cai 2004; Wang and Mason 2008).

By now, China has largely exhausted its demographic dividend, as indicated by the decline in the support ratio between effective producers and effective consumers (Wang and Mason 2008). As shown in Table 3, between 1982 and 2000 China enjoyed an average annual rate of growth in the support ratio of 1.28 percent, a number that is known as the demographic dividend, or the demographic contribution to the growth rate of the economy. Currently, that net gain attributable to favorable demographic conditions has been reduced to only one-fifth of its earlier level, about 0.28 percent per year. In the immediate future, the growth rate will turn negative, that is, the growth rate of net consumers will exceed that of net producers. Our estimate is that this

FIGURE 4 Population age structure, China, 1982, 2000, 2050



SOURCE: Wang and Mason 2008.

negative growth rate will result in a decline of at least 0.5 percentage points in China's annual economic growth rate.[5] Compared with other economies, China will not fare much better than Japan or Taiwan between 2013 and 2050 and will fare much worse than the United States and France.

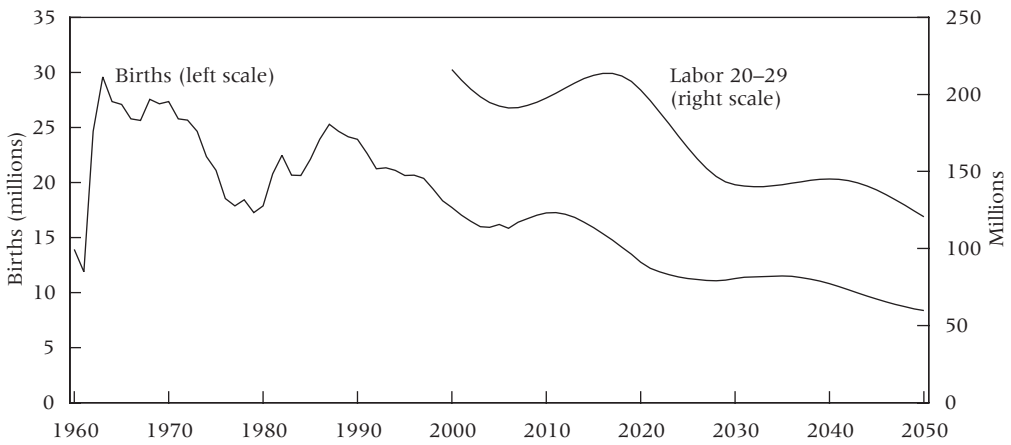
As a result of China's very low fertility in the last two decades, the era of abundant young and inexpensive labor will soon end. The number of young workers aged 20–29 will plateau over the next few years and drop precipitously beginning around 2025. In the ten years between 2016 and 2026, the size of the population in this age range will be reduced by about one quarter, from 200 million to 150 million (Figure 5). For the younger age group, aged 20–24, that decline will come sooner and be steeper: in the next decade, its size will be reduced by 50 percent. Such a steep decline in the young labor force not only will usher in for the first time in recent Chi-

TABLE 3 Average annual rate of growth in the support ratio[a] (percent), 1982–2050, China and selected other countries

	1982–2000	2000–2013	2013–2050	1982–2050
China	1.28	0.28	–0.45	0.15
Taiwan	1.07	0.01	–0.60	–0.04
Japan	–0.18	–0.24	–0.60	–0.42
United States	0.44	–0.46	–0.04	0.01
France	0.4	–0.41	–0.17	–0.06

[a]Effective producers ÷ effective consumers.
SOURCE: Wang and Mason 2008: 149.

FIGURE 5 Declines in the number of births and in population aged 20–29 years (labor 20–29), China, 1960–2050



SOURCE: Author's calculations.

nese history successive shrinking cohorts of labor force entrants; it will also have profound consequences for labor productivity, because these cohorts are the most recently educated. As the young population declines, domestic demand for consumption may weaken as well, because young people are also the most active consumers. And because of its major role in the global economy, the impact of China's demographic change will not be limited to its own geographic boundaries.

Social implications: The vulnerable family

China will face familiar social consequences of the global demographic transition, such as an aging population. As a demographic overachiever, China's aging process will be faster than that of many other countries. In addition, in part because of China's one-child policy, the sex ratio at birth in China has risen and stayed at an abnormal level of 120 boys per 100 girls or even higher in recent years, causing fears that as many as 20 million or more Chinese men will be life-long involuntary bachelors. What most sets China apart from other societies that have experienced the demographic transition, however, is the social cost and risk resulting from numerous families with only one child. A unique component of China's demographic transition has been a government policy that requires the majority of Chinese couples to have only one child. Over the last three decades, in no small part because of the implementation of the one-child policy, China has accumulated nearly 160 million single children aged 0 to 30.[6] Such a number implies that over

TABLE 4 Risk of becoming childless among elderly parents in China with only one child

	Father's age			Mother's age		
	60	**70**	**80**	**60**	**70**	**80**
Years of life remaining	13.9	10.8	6.5	20.4	13.3	7.7
Risk that son dies before parent (%)						
Son's age						
35	4			8		
45		6			12	
55			6			17
Risk that daughter dies before parent (%)						
Daughter's age						
35	3			6		
45		4			8	
55			4			11

SOURCE AND NOTES: Calculated from United Nations Model Life Table (Far Eastern Model), with male life expectancy at birth of 71 years and female 75 years. For illustration, a son or daughter is assumed to be 25 years younger than the parent. Percent deceased is calculated for the interval of a child's age and the average life span of the parent.

40 percent of Chinese households have only one child. Taking into account very young only children who may have a sibling in the future, it is safe to assume over a third of all Chinese households may well end up with only one child. Whereas other countries such as Japan will also see a large share of their populations in older age groups, the pace of aging is much faster in China and the resources needed to face the demands of population aging are not as widely available.

Moreover, the large number of families with only one child, often against the will of the parents, presents serious economic and social risks for Chinese families and for society as a whole. The tragic deaths of thousands of only children in the May 2008 earthquake in Sichuan province highlights an extreme misfortune—large numbers of parents who have lost their only children, in many cases too late to replace them. With the current birth control policy in place and low fertility continuing, by the middle of the current century half of Chinese women aged 60 will have only one child.

Even with the country's low mortality level, some Chinese parents still face a future in which their children will predecease them and they will die alone. The numbers shown in Table 4 illustrate the magnitude of such a risk for elderly Chinese parents with only one child. At ages 60, 70, and 80, and assuming the current age-specific mortality schedule, Chinese men and women could still expect to live for a number of years. For men, the likelihood that their sons will predecease them ranges from 3 to 6 percent. For women, given their longer average life span, the likelihood ranges from

6 to 17 percent. For Chinese parents who rely on their children for old-age emotional and instrumental if not financial support, the prospect of dying alone is both poignant and harsh.

Conclusion

For much of world history, China has accounted for roughly one quarter of the human population (Lee and Wang 1999). In the second half of the twentieth century, China completed its demographic transition, joining most other developed and developing countries. China's demographic transition took place at an almost unparalleled pace, with most of its mortality decline accomplished in two decades and its fertility decline in little more than one decade. The significance of China's demographic transition is therefore not only for its magnitude, as the world's largest population, but also for its speed. China is clearly an overachiever in the global demographic transition.

What sets China apart from the rest of the world in the process of demographic transition is not just the role of the Chinese state in facilitating declines in mortality and fertility. The Chinese state clearly has played an extraordinary role, but the apparent success of the state was built on the foundation of the willingness and the acceptance of Chinese families and individuals. A proactive culture of mortality control and reproductive regulation, long a central cultural component in China, provided the impetus for China's mortality and fertility declines. Focusing only on the role of the Chinese state not only overlooks the true engines of China's demographic transition, but also contributes to an under-appreciation of the long-term implications of China's demographic transition.

China's rapidly shrinking young labor force, a result of very low fertility for nearly two decades, will soon end the era of abundant supply of inexpensive labor that enabled China to become the world's largest manufacturing center in the last two decades. This demographic shift in China should have far-reaching ramifications for the global economy as well. Because China's low fertility is largely the outcome of individual choice, constrained as in other parts of the world by the new political economy, a reversal of China's three-decade-long one-child policy is unlikely to result in a substantial increase in fertility. Moreover, rapid population aging will accompany the shrinkage in the size of the young labor force. These simultaneous changes in opposite directions will fundamentally reshape the Chinese economy and society. In addition, and largely because of China's forceful implementation of the one-child policy, Chinese families and especially the elderly will face the prospect of loneliness resulting from the lack of children and kin. Having realized the gains of being an overachiever in the demographic transition, China now must be prepared to pay the attendant costs.

Notes

Figures in this chapter are available in color in the electronic edition of the volume.

The author wishes to thank the MacArthur Foundation for its support that generated some of the findings for this chapter.

1 Per capita income for the United States in 1999 was $21,587 (US Census Bureau).

2 This is according to the United Nations 2008 revised population projection. With a constant-fertility assumption, China's population by 2025 will be 1,443,979, in contrast to India's 1,502,063.

3 Calculating the intrinsic rate of growth requires the calculation of two other measures, the net reproduction rate (NRR) and the mean length of a generation (T). For details of our calculations, see Wang, Guo, and Mao 2008.

4 Calculations based on local fertility policies show that at the end of the 1990s, the fertility level required by policies in China would result in a TFR of 1.47 (Gu et al. 2007)

5 This is a conservative estimate because in our projection of population change for calculating the demographic dividend we assumed a higher fertility level (1.8) than observed recently in China (1.5).

6 China's 2005 National Population Survey counted 2,098,947 only children aged 0 to 30. With a sampling ratio of 0.01325, this number translates into 158,411,094 only children nationwide (SPFPC 2009: 198).

References

Arrighi, Giovanni. 2007. *Adam Smith in Beijing: Lineages of the Twenty-First Century*. London and New York: Verso.

Banister, Judith. 1987. *China's Changing Population*. Stanford: Stanford University Press.

Banister, Judith and Samuel H. Preston. 1981. "Mortality in China," *Population and Development Review* 7(1): 98–110.

Benedict, Carol. 1996. *Bubonic Plague in Nineteenth Century China*. Stanford: Stanford University Press.

Cai, Fang. 2004. "Demographic transition, demographic dividend and the sustainability of economic growth," *Population Research* No. 2 (in Chinese).

Cai, Fang and Wang Dewen. 1999. "Sustainability of China's economic growth and the contribution of labor force," *Economic Research* No. 10 (in Chinese).

Cai, Yong. 2008. "Assessing fertility levels in China using variable-r method," *Demography* 45(2): 371–381.

———. 2010. "China's below-replacement fertility: Government policy or socioeconomic development?" *Population and Development Review* 36(3): 419–440.

Campbell, Cameron D. 1997. "Public health efforts in China before 1949 and their effects on mortality: The case of Beijing," *Social Science History* 21(2): 179–218.

———. 2001. "Mortality change and the epidemiological transition in Beijing, 1644–1990," in Liu Ts'ui-jung, James Lee, David Sven Reher, Osamu Saito, and Wang Feng (eds.), *Asian Population History*. Oxford: Oxford University Press, pp. 221–247.

Campbell, Cameron and James Z. Lee. 2004. "Mortality and household in seven Liaodong populations," in Tommy Bengtsson, Cameron Campbell, and James Z. Lee et al. (eds.), *Life under Pressure: Mortality and Living Standards in Europe and Asia, 1700–1900.* Cambridge, MA: MIT Press, pp. 293–324.

Campbell, Cameron D., Wang Feng, and James Z. Lee. 2002. "Pretransitional fertility in China," *Population and Development Review* 28(4): 735–750.

Chen, Jiajian, Robert Retherford, Minja Kim Choe, Li Xiru, and Hu Ying. 2009. "Province-level variation in the achievement of below-replacement fertility in China," *Asian Population Studies* 5(3): 309–328.

Chen, Wei. 2005. "The relationships among 'development, family planning, and fertility': Review of provincial data," *Population Research* 29(1): 2–10 (in Chinese).

Coale, Ansley J. and Judith Banister. 1994. "Five decades of missing females in China," *Demography* 31(3): 459–479.

Coale, Ansley J. and Ronald Freedman. 1993. "Similarities in fertility transition in China and three other East Asian populations," in Richard Leete and Iqbal Alam (eds.), *The Revolution in Asian Fertility: Dimensions, Causes, and Implications*. Oxford: Oxford University Press, pp. 208–238.

Derosas, Renzo and Noriko O. Tsuya. 2010. "Child control as a reproductive strategy," in Noriko O. Tsuya, Wang Feng, George Alter, James Z. Lee et al. (eds.), *Prudence and Pressure: Reproduction and Human Agency in Europe and Asia, 1700–1900*. Cambridge, MA: MIT Press, pp. 129–155.

Feeney, Griffith and Wang Feng. 1993. "Parity progression and birth intervals in China: The influence of policy in hastening fertility decline," *Population and Development Review* 19(1): 61–101.

Greenhalgh, Susan. 1986. "Shifts in China's population policy, 1984–86: Views from the central, provincial, and local levels," *Population and Development Review* 12(3): 491–515.

Gu, Baochang. 2008. "The arrival of low fertility in China," in Gavin Jones, Paulin Tay Straughan, and Angelique Chan (eds.), *Ultra-low Fertility in Pacific Asia: Trends, Causes, and Policy Issues.* London and New York: Routledge, pp. 73–95.

Gu, Baochang and Yong Cai. 2009. "Fertility prospects in China," paper presented at the Expert Group Meeting on Recent and Future Trends in Fertility, Population Division of the Department of Economic and Social Affairs, United Nations, New York, 2–4 December.

Gu, Baochang and Wang Feng (eds.). 2009. *An Experiment with Eight Million People: Reports from Areas with Two-Child Policy*. Beijing: China Social Sciences Academic Press.

Gu, Baochang, Wang Feng, Guo Zhigang, and Zhang Erli. 2007. "China's local and national fertility policies at the end of the twentieth century," *Population and Development Review* 33(1): 129–147.

Guo, Zhigang. 2004a. "Study and discussion about the fertility of 1990s in China," *Population Research* 28(2): 10–19 (in Chinese).

———. 2004b. "Re-discussion about the low fertility of 1990s in China," *Population Research* 28(4): 16–24 (in Chinese).

———. 2008. "China's low fertility and its determinants," *Population Research* 32(4): 1–12 (in Chinese).

Guo, Zhigang and Chen Wei. 2007. "Below replacement fertility in mainland China," in Zhongwei Zhao and Fei Guo (eds.), *Transition and Challenge: China's Population at the Turn of the Twenty-First Century*. Oxford University Press, pp. 54–70.

Huang, Yasheng. 2003. *Selling China: Foreign Direct Investment during the Reform Era.* New York: Cambridge University Press.

Jamison, Dean et al. 1984. *China: The Health Sector*. Washington, DC: The World Bank.

Johnson, D. Gale. 1994. "Effects of institutions and policies on rural population growth with application to China," *Population and Development Review* 20(3): 503–531.

Lavely, William. 2007. "Sex, breastfeeding, and marital fertility in pretransition China," *Population and Development Review* 33(2): 289–320.

Lee, James Z., Cameron D. Campbell, and Wang Feng. 2002. "Positive check or Chinese checks?," *Journal of Asian Studies* 62(2): 591–608.

Lee, James Z. and Wang Feng. 1999. *One Quarter of Humanity: Malthusian Mythology and Chinese Realities 1700–2000*. Cambridge, MA: Harvard University Press.

Livi-Bacci, Massimo. 2007. *A Concise History of World Population* (fourth edition). Oxford: Blackwell Publishing.

Morgan, S. Philip, Guo Zhigang, and Sarah R. Hayford. 2009. "China's below-replacement fertility: Recent trends and future prospects," *Population and Development Review* 35(3): 605–629.

Peng, Xizhe. 1993. "Regional differentials in China's fertility transition," in Richard Leete and Iqbal Alam (eds.), *The Revolution in Asian Fertility: Dimensions, Causes, and Implications*. Oxford: Oxford University Press, pp. 99–127.

Retherford, Robert D., Minja Kim Choe, Jiajian Chen, Li Xiru, and Cui Hongyan. 2005. "How far has fertility in China really declined?," *Population and Development Review* 31(1): 57–84.

Rogaski, Ruth. 2004. *Hygienic Modernity: Meanings of Health and Disease in Treaty-Port China*. Berkeley: University of California Press.

SPFPC (State Population and Family Planning Commission). 2009. *Commonly Used Statistics of Population and Family Planning 2008*. Beijing: China Population Press (in Chinese).

United Nations. 1997. *UN Demographic Yearbook 1997: Historical Supplement*. New York.

Wang, Feng. 2005. "Can China afford to continue its one-child policy?," Asia Pacific Issues No. 17. Honolulu: East-West Center.

Wang, Feng, James Z. Lee, and Cameron D. Campbell. 1995. "Marital fertility control among the Qing nobility: Implications for two types of preventive check," *Population Studies* 49(3): 383–400.

Wang, Feng and Andrew Mason. 2008. "The demographic factor in China's transitions," in Loren Brant and Thomas Rawski (eds.), *China's Great Economic Transformations*. Cambridge University Press, pp. 136–166.

Wang, Feng, Cameron D. Campbell, and James Z. Lee. 2010. "Agency, hierarchy, and reproduction in Northeast China, 1789–1840," in Noriko O. Tsuya, Wang Feng, George Alter, James Lee et al. (eds.), *Prudence and Pressure: Reproduction and Human Agency in Eurasia, 1700–1900*. Cambridge, MA: MIT Press, pp. 287–316.

Wang, Feng, Guo Zhigang, and Mao Zhuoyan. 2008. "A preliminary study of China's negative population growth momentum in the 21st century," *Population Research* 32(6): 7–17 (in Chinese).

Zhang, Guangyu and Zhongwei Zhao. 2006. "Reexamining China's fertility puzzle: Data collection and data quality over the last two decades" *Population and Development Review* 32(2): 293–321.

Zheng, Zhenzhen, Yong Cai, Wang Feng, and Gu Baochang. 2009. "Below replacement fertility and fertility intention in Jiangsu," *Asian Population Studies* 5(3): 329–347.