



# China's Demographic Outlook to 2040 and Its Implications

AN OVERVIEW



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A M E R I C A N   E N T E R P R I S E   I N S T I T U T E

# Executive Summary

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Surprising as this might sound, we already have a fairly reliable picture of China's population profile for the year 2040 because the overwhelming majority of people who will be living in China in 2040 are already alive and living there today. Consequently, despite the uncertainties in population projections and the additional data problems caused by Beijing's longstanding One-Child Policy, we can actually describe China's impending demographic trends and evaluate their implications with a fair degree of confidence today.

China's population prospects over the decades ahead are largely shaped by its prolonged episode of sub-replacement childbearing, underway for a generation at this writing and likely to have been in effect for a half century by 2040. Thanks to continuing low levels of fertility, China's population is on track to peak in the coming decade and to decline at an accelerating tempo thereafter. Apart from radically redrawing the country's boundaries, Beijing can do nothing to forestall this decline.

China's impending depopulation will be accompanied by a momentous transformation of national demographic structure. Between 2015 and 2040, China's population age 50 and older is on course to increase by roughly one-quarter of a billion people; the under-50 population is set to decline by a roughly comparable magnitude. This means China is set to experience an extraordinarily rapid surge of population aging, with especially explosive population

growth for the 65-plus group, even as its working-age population (conventionally defined as the age 15–64 group) progressively shrinks. While the Chinese government has a number of policy options for mitigating the impact of pronounced population aging and a shrinking manpower pool, these trends can only make for serious economic headwinds, presaging the end of China's era of "heroic economic growth."

Additionally, a number of demographic changes underway now and all but impossible to forestall over the generation ahead constitute "wild cards" for China's future: These factors will have unpredictable and potentially powerful disruptive effects. They include (1) the impending "marriage squeeze" due to abnormal sex ratios at birth from the One-Child-Policy era, which may severely prejudice the odds of family formation for the rising cohort of would-be grooms in China; (2) the "Soweto with Chinese characteristics" problem of mass urbanization under a *hukou* system that consigns hundreds of millions of migrants in urban areas to an officially inferior status; and (3) the revolutionary changes in the Chinese family structure, which portend a dramatic departure from previous arrangements on which Chinese society and economy depended. While it is admittedly difficult to predict how such changes may affect social cohesion, political stability, and national security, it would be highly unwise to presume they will have no impact on these matters.



# China's Demographic Outlook to 2040 and Its Implications

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## AN OVERVIEW

### Nicholas Eberstadt

For any serious attempt to assess China's future outlook, an examination of the country's population prospects is not only advisable but absolutely indispensable. There are two reasons for this.

First, of all areas of inquiry about China's future that might be of interest in academic, business, and policy circles, China's demographic future is perhaps the *least* uncertain over the coming generation. The reason, quite simply, is that the overwhelming majority of the people who will be living in China in (say) the year 2040 are already alive, living there today. Population projections are far from error-free, but if we are trying to peer ahead a couple of decades, they are most assuredly more reliable (and empirically grounded) than corresponding projections of economic change, much less political or technological change.<sup>1</sup>

Second, demographics and demographic change actually matter—to economic performance and social development and in some measure arguably to such things as military potential, political stability, and international security. This is not to invoke the “demography is destiny” claim, often attributed to the 19th-century French polymath Auguste Comte. A less florid, more immediately defensible reformulation of that aphorism would be that “demographics slowly but unforgivingly alter the realm of the possible.” In the following pages, I try to show just how the realm of the possible is being reshaped in China by impending demographic changes over the decades immediately ahead.

### China's Current and Future Population: What We Know and How We Know It

Before presenting the demographic projections underpinning this report, we are obliged to address two basic questions about China's demographic outlook: What do we know and how do we know it? Answering these questions requires us to discuss data limitations today and the intrinsic limitations of demographic projections for tomorrow.

Consider first the limits of current Chinese population data. Vastly more population information is available for China today than was for most of the Maoist era, when a virtual statistical blackout prevailed. China today also has trained and groomed a large cadre of top-rate demographers and population economists who work in the nation's universities, state-sponsored think tanks, and government. On the other hand, China has not yet achieved complete or near-complete vital registration, meaning that analysts must rely mainly on reconstructions of trends from censuses and “mini-censuses”<sup>2</sup>—and these counts are far from error-free.

Many errors in China's population data are essentially politically induced; the data are deformed by mass misreporting due to ordinary people's attempts to avoid the harsh consequences of Beijing's various population control policies (using that term broadly). With regard to Chinese household registration data (which are derived from a separate demographic system run by the Ministry of Public Security), the 2010

census indicated that at least 13 million Chinese citizens lacked legal identity papers because they were born “out of *hukou*”—that is, outside the locality that the state mandates to be their residence<sup>3</sup> (more on the *hukou* system shortly). But that guesstimate is based on official assumptions about China’s true population totals, and China’s vital statistics, census returns, and sample population surveys have undercounted the nation’s actual numbers for decades due to Beijing’s heinous One-Child Policy and the familial incentives it established for birth concealment.

The United Nations Population Division (UNPD) currently suggests that the 2010 China census estimate missed the mark by about 30 million, even after its own internal undercount adjustments, and that it may have failed to enumerate well over a quarter of all female children under 15 years of age.<sup>4</sup> From the 1982 China census onward, population totals and sex ratios for given birth years from one census to the next have proved unstable for babies, children, and youth. These errors due to politicization of demographic rhythms of life may lessen now that Beijing appears to be scrapping its anti-natal campaign, but they are embedded in the data we use for projections to 2040.

As for demographic projections themselves, these are no more reliable than the baseline data they use and the assumptions they input about future trends in fertility, mortality, and migration. International migration is negligible for China in relation to its enormous population, and the assumption is this will continue to be true—lucky that, since demographers have no really defensible method for projecting international migration trends into the future. Demographic techniques for projecting survival trends for the currently living are fairly good—thanks to actuarial mathematics, after all, the life insurance industry has not gone out of business—but catastrophes of biblical proportion do take place from time to time, and Providence has already visited a number of them on postliberation China.

As a matter of simple population mathematics, however, fertility trends dominate longer-term population projections, and since there is no reliable method for projecting future fertility levels,

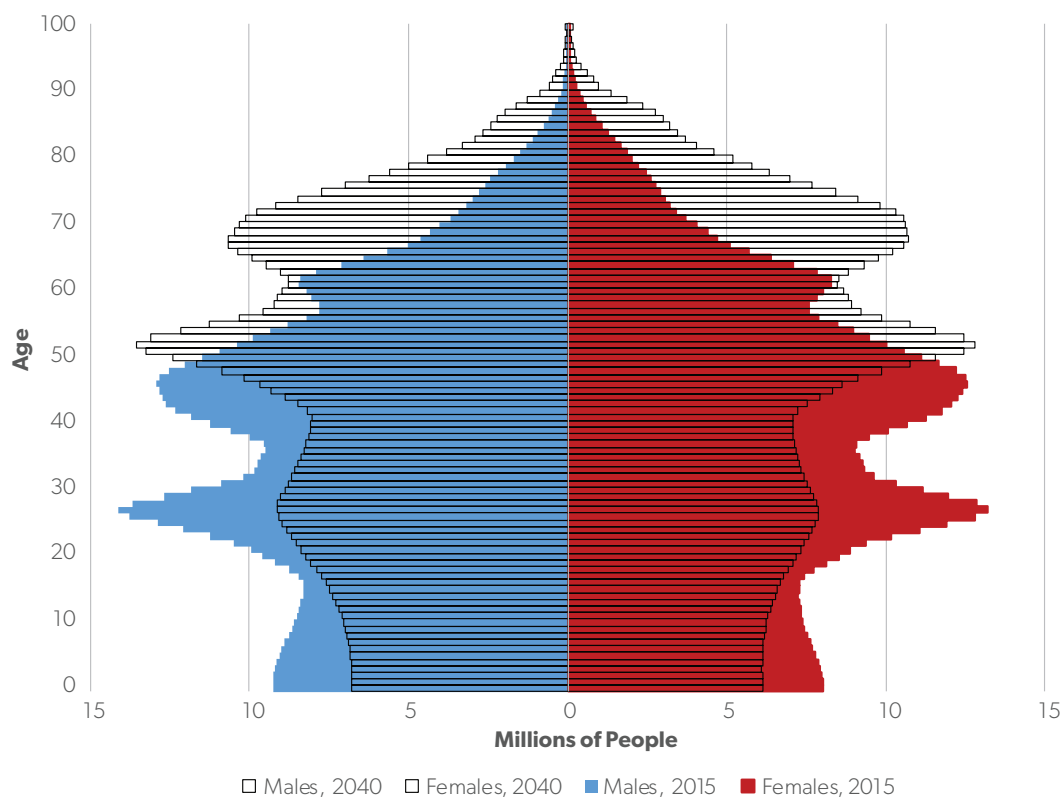
assumptions are crucial. China clearly undercounts births—with a reported total fertility rate (TFR) of 1.18 births per woman per lifetime in the 2010 census—but no one knows by exactly how much. The consensus, for better or worse, is that the actual rate in recent years has been around 1.6, or about 30 percent below the level required for long-term population stability in the absence of in-migration, but consensus are not always correct.

### China 2040: The Population Projections

Like sausages and law, the making of demographic projections may not look so pretty when seen up close. Nevertheless, population projections for China are likely to be *less* problematic than for many other countries or regions of the world. China is a low-migration, low-mortality, low-fertility society. This means there is, so to speak, relatively little “turnover” in the population from one year to the next. According to UNPD or US Census Bureau projections, almost four-fifths of China’s projected 2040 population will be 22 or older than—meaning they have already been born at this writing. This brute fact far outweighs many of the smaller uncertainties highlighted above and in a sense rescues us from them.

Nonetheless, we need to know the assumptions built into the China population projections. Consider UNPD’s projections, which I will mainly use in this report. (The UNPD’s assumptions, by the way, are fairly close to those of the US Census Bureau and for that matter also the National Bureau of Statistics of China.) For the 2015–40 period, the UNPD assumes negligible net outmigration from China of 0.2 percent per year—a rounding error, essentially. With respect to mortality, the UNPD estimates overall male plus female life expectancy at birth was a bit over 76 years in 2010/15 and that it would rise to 80 by 2040/45 (with detailed “life tables” offering survival probabilities for males and females of every age over the interim). As for fertility, the UNPD “medium variant” fertility projections envision a gradual rise in China’s TFRs from 1.6 to just over 1.7, meaning that childbearing in China would still be almost 20 percent below

**Figure 1. Chinese Population Structure, 2015 vs. 2040: UN Population Division Estimates and Projections (Medium Variant)**



Source: UN Department of Economic and Social Affairs, Population Division, 2017 Revision of World Population Prospects, 2017, <http://esa.un.org/unpd/wpp/index.htm>.

the level required for long-term population stability around 2040. While this assumption about China's fertility trajectory is highly debatable—future fertility trends are always a “known unknown”<sup>5</sup>—this assumption has relatively little influence on our overall assessment of the implications of coming demographic trends. These assumptions, for example, would affect only the small share of the 2040 labor force as yet unborn (those then in their late teens or very early 20s), and even for this cohort the impact of errant assumptions would be marginal. Perhaps the clearest and simplest way to see what these changes would portend is to superimpose the projected population structure of China 2040 on the estimated population structure of China 2015 (see Figure 1).

Overall, total numbers in 2015 and 2040 would be quite similar: somewhere around 1.4 billion. But this

is only a coincidence. Due to steep and prolonged sub-replacement childbearing (China's net reproduction ratio is widely believed to have dropped below 1.0 in the early 1990s), China's population would be on track to peak in about a decade (circa 2028 or 2029) and shrink at an accelerating tempo thereafter. Whereas China is thought to be growing by around 5 million a year nowadays, by these projections it would be shrinking by about 4 million a year in 2040. (In these UNPD projections, incidentally, India edges out China as the world's most populous country just before 2025.)

Although China's population totals are similar in 2015 and 2040, a fundamental transformation of China's population structure is manifest in Figure 1—a change so dramatic we might even call it a leap into the demographic unknown. To be sure, there are

esoterica in this tableau that would naturally catch a demographer's eye, such as the population bulge for "the class of 1987," which is an "echo" of the upsurge in births in the early 1960s after the end of the famine unleashed by Mao's catastrophic Great Leap Forward. But the main story on display is the extraordinary redistribution of China's population upward, toward the top of the "population pyramid."

Two broad differences between China 2015 and projected China 2040 stand out. First, the overall population under 50 years of age is larger in China 2015 than in China 2040, and for certain cohorts, such as those in their mid-20s or early 40s, China 2015 is dramatically larger than China 2040. Second, the overall population over 50 years of age is far larger in notional China 2040 than actual China 2015—over half again as large—and for many age cohorts, including septuagenarians, octogenarians, and nonagenarians, China 2040's population is vastly larger than China 2015's. In fact, the China of 2040 in Figure 1 would contain a quarter billion more people over 50 than the China of 2015, while the ranks of those under 50 would be diminished by almost the same amount.

Most people understand intuitively that steep sub-replacement fertility levels eventually lead to depopulation (absent compensatory immigration). Less appreciated but no less avoidable is the relationship between low fertility and population aging: Very small families make gray societies. In these projections, two generations of pronounced sub-replacement fertility would bring China to a place where none have gone before (at least so far). By UNPD medium variant projections, median age in China 2040 would be 47 years—higher than the median age for any country or territory on the planet as of 2015, according to UNPD estimates.

A discerning observer may notice other aspects of Figure 1—among them, the surfeit of males over females for the cohorts born during the decades of One-Child-Policy population control. Additional, potentially quite significant, population changes are underway that cannot be detected by a simple "national headcount approach." I now examine these various issues.

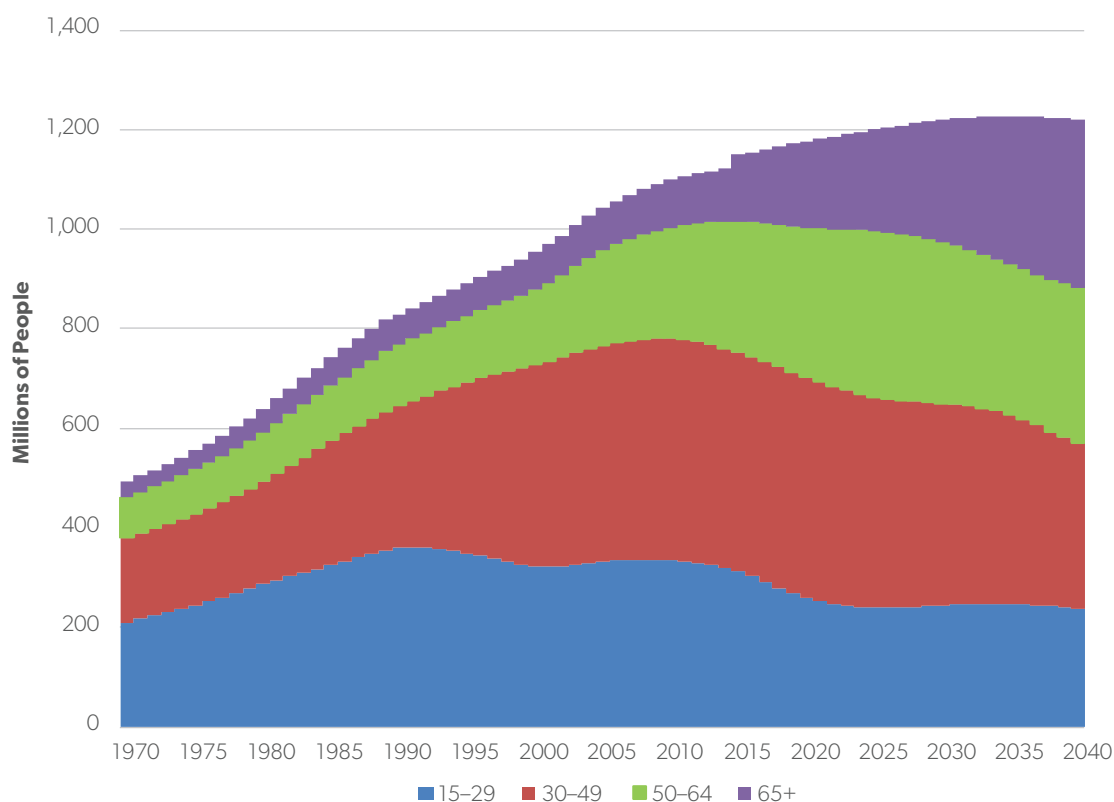
## Manpower and Labor Availability

By 2040, in these projections, China would have experienced almost half a century of sub-replacement fertility, and for most of the decades in question the nation's fertility level would have been far below replacement. Thus, it should come as no surprise that the working-age population is thought to have peaked just before 2015, and from 2015 to 2040, it is projected to shrink at ever-greater speed.

By ancient convention, demographers talk of the "working-age groups" as ages 15 through 64, and I shall do so as well in this report. I know this formulation is arbitrary and also a bit archaic: Nowhere is everyone between 15 and 64 in the workforce; growing numbers of teens and twentysomethings are out of the workforce because they enrolled in the training they need or want in order to join it, and in the real world ever-increasing numbers of people 65 and older happen to be earning pay, in China and elsewhere. Yet as a first approximation the 15–64 cohort may not be a bad one for China's working ages. In any case, population decline is in the cards between now and 2040 for most of the subgroups within this broad category too.

China's past trends and future outlook are presented in Figure 2, which details estimated and projected changes in China's "adult" (age 15+) population by broad age groups from 1970 to 2040.

Between the fateful December 1978 plenum of the 11th Central Committee of Chinese Communist Party (where Deng Xiaoping pointed China on a historic new economic direction) and 2010, China's working-age population grew by about 80 percent, swelling roughly from 560 million to one billion. Thus, over that period, overall manpower availability rose by an average of 1.8 percent per annum, and total national work hours may have risen more rapidly as underemployed labor was absorbed in both the cities and the countryside. But between 2010 and 2015, manpower growth was roughly zero, reaching its projected (all-time historical?) peak around 2014. Thereafter, China's working-age population is projected to commence a long decline, dropping by well over 100 million by 2040 to around 880 million, at which point it would be shrinking at a rate of 1 percent a year.

**Figure 2. China: Estimated and Projected Population, Age 15+ by Age Group, 1970–2040**

Source: UN Department of Economic and Social Affairs, Population Division, 2017 Revision of World Population Prospects, 2017, <http://esa.un.org/unpd/wpp/index.htm>.

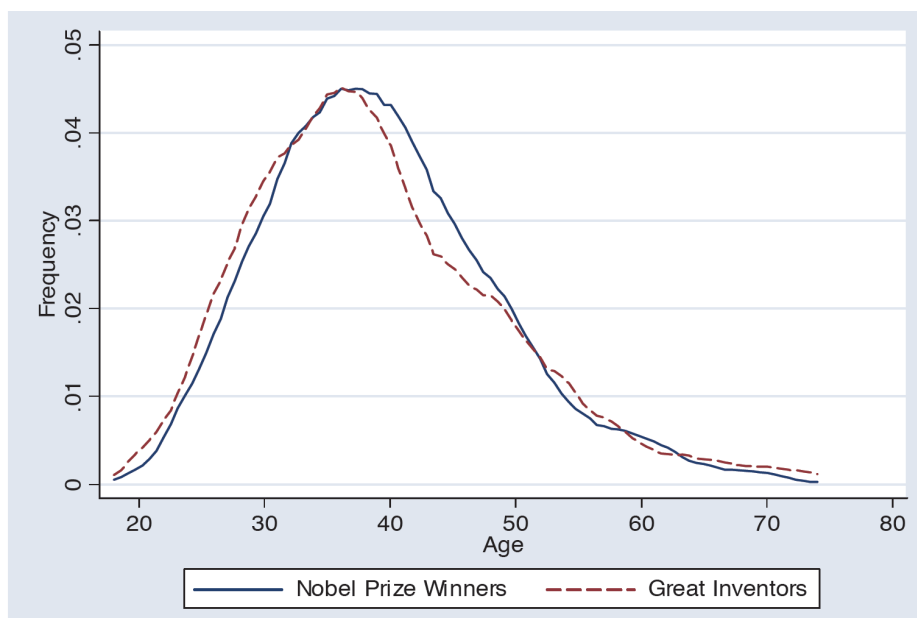
In terms of simple economic “growth accounting,” increased labor inputs did not account for all of China’s spectacular economic growth during the 1978–2010 period, or even for most of it, but it did account for a hardly trivial fraction of that boom.<sup>6</sup> The coming reversal of the delta for manpower change in the years immediately ahead means that, from the standpoint of the simplest sort of growth accounting, the Chinese economy will be facing increasingly unfavorable headwinds simply due to manpower decline, everything else being equal.

But everything else will not be equal. We already know, for example, that the composition of the working-age population is irrevocably set to change, and in ways that would seem inauspicious for economic growth. Over the coming generation, the pool of young manpower is on track to shrink sharply, with only the pool of older manpower expanding. This is

not the way economic planners would have designed things. The youth labor group (ages 15–29) in modern societies always has the highest educational attainment, is the most IT and tech savvy, and tends to be the most flexible (all the more so in China since most people in this age group have not yet started to form families). Between 2015 and 2040, the 15–29 group is projected to shrink by 75 million, or roughly a quarter, and to shrink as a share of total manpower from a little less than a third to just over a quarter.

The 30–49 group, for its part, might be regarded as a part of the life cycle in which entrepreneurship and inventiveness comes to fruition. Benjamin F. Jones’ international findings on “the age of great discovery” are particularly intriguing in this regard (see Figure 3). Without getting too deterministic about this, we may entertain the conjecture that thirtysomethings and fortysomethings add a “secret sauce” to the



**Figure 3. The Age Distribution of Great Innovation in the 20th Century**

Source: Benjamin F. Jones, "Age and Great Invention" (working paper, National Bureau of Economic Research, Cambridge, MA, May 2005), 36, Figure 1, <https://www.nber.org/papers/w11359>.

workforce and the economy. Too bad for China's outlook if so: Between 2015 and 2040, this group is also projected to shrink by a quarter (well over 100 million men and women) and to drop from 43 percent to 37 percent of total manpower. Only the 50–64 cohort can be expected to grow over the generation ahead: the least educated and healthy contingent in the labor force, although arguably also the most experienced. Its share jumps from about 25 percent of total manpower to about 35 percent over the years under consideration, but even projected numbers for this group start to fall before 2040.

Beijing's economic policymakers have some options in responding to this unfavorable impending change. Improving education of the workforce is one option, but the 50–64s of 2040 are already out of school, and China's inverted population pyramid makes the task of increasing overall educational attainment through schooling much slower than it would be for a youthful population. Raising the capital-labor ratio is another theoretical option (what Ronald D. Lee and others call "the second demographic dividend"), but

China's gross domestic capital formation ratio today is already bizarrely, perhaps unsustainably, high.

Some have argued that China can muddle through this problem by raising labor force participation rates for the working-age manpower pool.<sup>8</sup> But it is far from obvious that this will be feasible. China's everyday labor statistics are notoriously poor. The most reliable available numbers come perhaps from the 2010 census. If we go by those figures, China's working-age manpower may not be as ferociously mobilized as say Kim Il Sung's North Korea,<sup>9</sup> but its labor force participation ratios for both men and women are comparable to or higher than most countries in the Organisation for Economic Co-operation and Development, and the same is true for work rates (employment-to-population ratios).<sup>10</sup> Some might hope there would be room for coaxing additional labor out of China's underemployed adults, especially those in the countryside, but Cai Fang, perhaps China's most influential population economist, has argued that China already reached the Lewis-model "turning point" a decade ago.<sup>11</sup> Some countries and

places—Singapore, the Gulf states, and even Western Europe among them—have attempted to redress labor shortages through international migration, but as currently the world's largest country, China has a scale problem. Attracting 100 million plus workers voluntarily and through economic incentives over the coming generation is simply inconceivable in the world as we know it. However, there is the option of internal migration: ramping up productivity for the existing, dwindling manpower pool by moving peasants to more remunerative work in the cities. Beijing has seized on this option and is actively promoting it through its ongoing National New-Type Urbanization Plan, widely known as the “urbanization drive.”<sup>12</sup> There is promise in this strategy, but as we shall see in a moment, it is not exactly an unalloyed cure.

### Population Aging

Despite the prospect of overall population decline in the era ahead, China will be experiencing a very particular type of population explosion: an explosive increase in its number of senior citizens 65 years of age and older. Between 2015 and 2040 in these UNPD projections, China's 65+ population would jump by almost 150 percent, from 135 million to almost 340 million. That is a long-term growth rate of 3.7 percent a year: a breathtaking tempo of growth for any major population group for decades on end and one that perforce should be expected to reshape the nation's economic, social, and perhaps even political outlook. By 2040, if things go well, China will be a “super aged society” with 22 percent of its people 65 or older (21 percent being the conventional threshold for defining “super aged”).<sup>13</sup> (The only scenarios under which China does not become super aged are catastrophic ones.) By the criteria median age and share of population 65+, China would in fact be more aged than the United States, meaning the US of 2040 (at least, by Census Bureau projections). How China copes with its coming senior tsunami and the attendant impending old-age burden is a critical question for China's future.

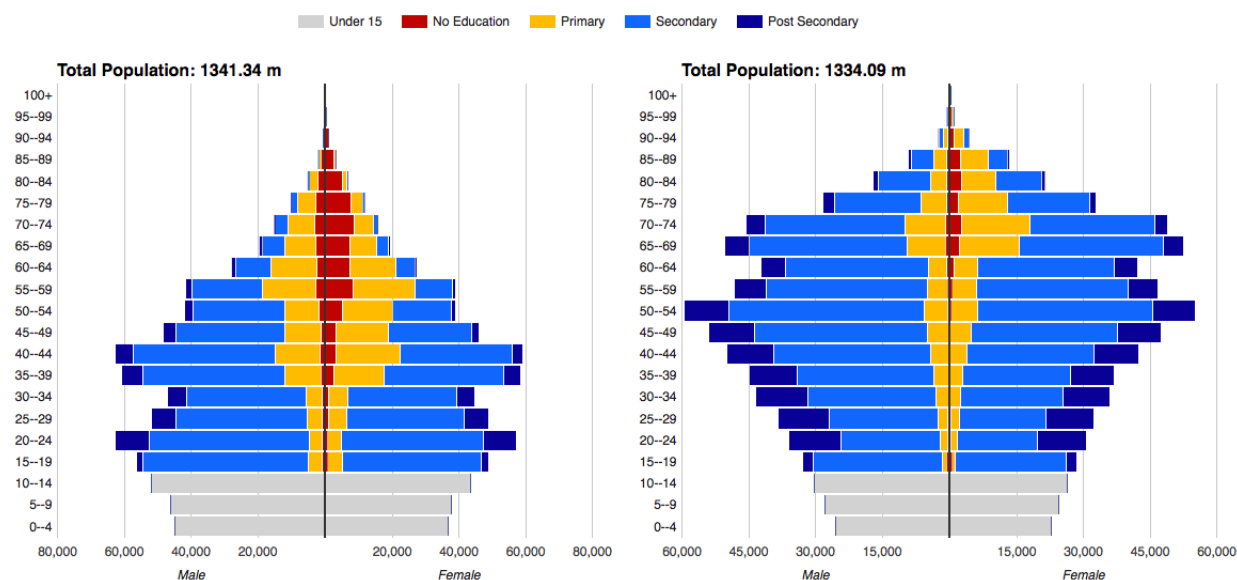
Over the past generation there has been considerable research on the role of the “demographic dividend” in spurring economic development.<sup>14</sup> This work holds that the fertility transition offers a once-in-history chance to accelerate development by raising the share of a nation's working-age population: not only increasing the availability of laborers more rapidly than total population but also propitiously influencing savings and investment possibilities through this shift in population structure. Most population economists today attribute some of China's spectacular success over the past four decades to this demographic dividend.<sup>15</sup>

For better or worse, China's demographic dividend has already been cashed. Between 1978 and 2010, China's 15–64 group shot up from 58 percent of total population to an amazing 74 percent. Now it is on its way back down, and by 2040, in UNPD projections, it will be back to 62 percent—where it was in 1982—and still heading south. The dependency ratio of 2040 and 1982 may be identical, but their portent is very different, since almost all the nonworking age population then were children and in 2040 the great majority will be elderly adults.

To be fair, in 2040, on current trajectories, the 65+ population in China will be the healthiest and best educated cohort of seniors that has ever inhabited the Chinese mainland. Among other things, this means they may be *less* economically dependent than those before them, more capable of making do financially on their own. But that is a relative comparison.

China's seniors in 2040 will also be China's least educated adult grouping. By the projections of the Wittgenstein Centre, for example, in 2040 nearly half (46 percent) China's seniors would have a primary school education or less—that is, six years or less, with 5 percent of them having no education at all. (The corresponding share in 2040 for the 20–39 group would be 13 percent.) Over three-fourths of China 2040's seniors would have no more than lower secondary education—that is, nine years of school or less (see Figure 4).<sup>16</sup> Thus, paradoxically, China's seniors—China's most physically fragile contingent—would be the group most likely to be obliged to engaged in physical labor if attempting to support

**Figure 4. China Population Structure by Educational Attainment, 2010 (Estimated) and 2040 (Projected)**

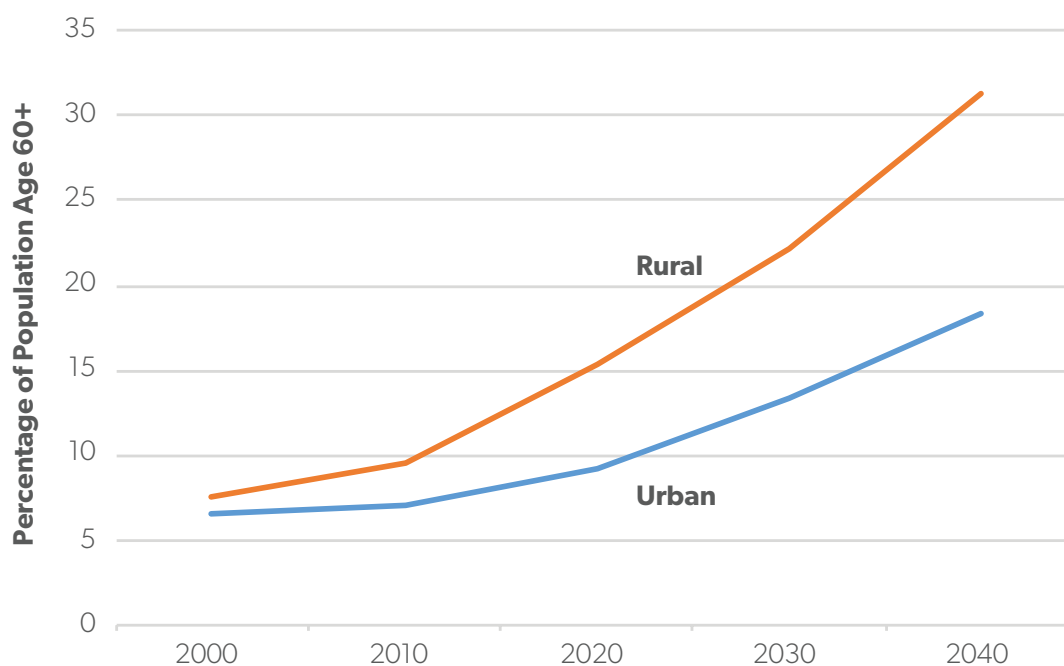


Source: Wittgenstein Centre, Graphic Explorer, 2018, <http://www.wittgensteincentre.org/en/index.htm>.

themselves economically. Wang Feng (University of California, Irvine, and Fudan University) and his colleagues calculated that as of 2010 Chinese seniors earned less than 40 percent of the resources that were sustaining them at age 65, just 20 percent at age 70, and maybe 10 percent at age 75.<sup>17</sup>

The fastest-growing contingent of seniors in China as elsewhere is the oldest old, men and women 80+ years of age. This group is on track almost to triple as a share of China's population, from 1.7 percent in 2015 to 4.9 percent in 2040. The risk of dementia and Alzheimer's increases rapidly after age 80; until and unless humanity finds the silver bullet for this terrible affliction, the burdens implicit in an Alzheimer's explosion also must be taken into account with China's senior tsunami. In addition, a steadily growing share of China's seniors and oldest old are living by themselves in one-person households (a trend, not particular to China, but to the contrary witnessed worldwide.). The especially rapid growth of China's live-alone senior population can only make for additional vulnerability and risk in the years ahead.

Note that the graying of China promises to be a highly varied process geographically, with one of the most dramatic cleavages separating urban and rural China. Projections by Yi Zeng<sup>18</sup> of Peking University and Duke and his colleagues suggest that rural China is already far grayer than urban China thanks to rural-to-urban labor migration—and that the gap is only set to widen in the decades ahead<sup>19</sup> (see Figure 5). Zeng et al. anticipate a China in 2040 where something like a third of total population would be 65 or older—twice the ratio for urban areas. By way of comparison, the grayest spot on earth today (2015) according to UNPD is Japan, with 26 percent of population 65+. As the famous aphorism notes, Japan got rich before it got old; one does not have to be a Sino-pessimist to recognize that rural China is getting ready to do things the other way around. In fact, China's grayest regions in the future are most likely to be its poorest, least educated, and least healthy as well; they will no doubt benefit from remittances (from migrant working-age children living off in urban China), but only to a

**Figure 5. Projected Percentage Population 65+: Urban and Rural China, 2000–40**

Source: Yi Zeng et al., *Household and Living Arrangement Projections: The Extended Cohort-Component Method and Applications to the U.S. and China* (New York: Springer, 2014), 19–48.

degree. Even with better education, health, and capital investment in 2040, seniors in China are set to be dependent on support from resources other than their own earned income.

The question inescapably arises: Who will provide for China's immense population of future seniors? A first response would be that current government policies will almost certainly *not* do so—or at least will not do so comprehensively and adequately. Beijing has been dithering about nationwide public pension and old-age health care guarantees for over two decades now, and while it has taken some important steps, the situation is what might charitably be called a work in progress. As of 2017, for example, less than 65 percent of China's working-age population was covered by any pension schema, and only 35 percent of urban migrants were covered. In rural areas, the pension schema offered a “basic benefit” of 70 RMB per month for qualifying retirees—just over \$10 US per month at today's exchange rates.<sup>20</sup>

Even so, China's real existing pension and health system is severely underfinanced, due in part to overpromises to special constituencies such as urban residents and state-owned enterprise (SOE) employees. According to International Monetary Fund calculations, the implicit debt (net present value of unfunded liabilities) in China's current health and pension programs amounts to about 100 percent of the country's gross domestic product (GDP).<sup>21</sup> China's pension liabilities can be reduced through practical and feasible reforms—reexamining vested benefits for urban groups and SOEs and raising retirement ages from the Stalin-normed levels of 60 for men and 55 for women that were set in the early Maoist era—but that still begs the question of coverage and support levels for the gray needy, of whom there will likely be vast numbers. And this budgetary problem stands in addition to China's other notorious looming debt challenges.

If public policy will not fill the gap, what will? Personal savings are one answer, and uncertainty about

future government old-age guarantees may help explain China's strikingly high private savings ratio.<sup>22</sup> But generally speaking, savings and need are inversely correlated in China as elsewhere, meaning China's vulnerable aged of tomorrow cannot count on their own savings and assets for old-age security.

China's historic mechanism for assuring care and income security for seniors was called the family. The family mechanism will no doubt be relied on in the coming generation, too. Just how well it will acquit itself in providing for frail and failing elders is another question. Two generations of sub-replacement fertility will have taken their toll on the family unit in China 2040 (and on the extended family as well). The son—or rather, the daughter-in-law to which he is attached—has been the notional caregiver and provider for aging parents under Chinese norms since at least the consolidation of the Chinese empire under the Qin dynasty.

What happens when there is no living son? We are about to find out, big time. Back-of-the-envelope calculations suggest that the proportion of Chinese women 60 years of age with no male child may have risen from 7 percent in the early 1990s to 30 percent or more for post-2025 China. Dutiful daughters may of course step in, but their loyalty, attention, and resources may be too frequently divided, inadequately, between two sets of aging parents.

All of this presupposes that two and a half millennia of Confucian values will inform the behavior of adult children toward their elderly parents in the generation to come. That means taking the near-universal continuation of filial piety for granted. Such devotion might have been easier when the elders were scarce and the children were plentiful; tomorrow those tables will be turned. Beijing has already begun to lay down markers, criminalizing nonsupport of parents and even nonvisiting in 2013.<sup>23</sup> Why do authorities feel such laws to be necessary?

We can assume China will be considerably richer in 2040 than today; *ceteris paribus* that would mean more resources for elderly support. Human beings tend to cope: As work from Ronald D. Lee's National Transfer Account project has suggested, intergenerational household resource transfers may be quite

effective in dealing with population aging in much of East Asia, including perhaps China. Some Polyanthas have even suggested that the sheer scale of need for China's rising cohort of seniors will help the nation undertake overdue reforms, such as a shift to consumption-oriented growth. Suffice it to observe that darker scenarios are also possible, including the prospect in rural areas of something like a pervasive, slow-motion humanitarian tragedy met with Darwinian solutions. It is also possible that these "optimistic" and "pessimistic" scenarios could unfold at the same time within the same country.

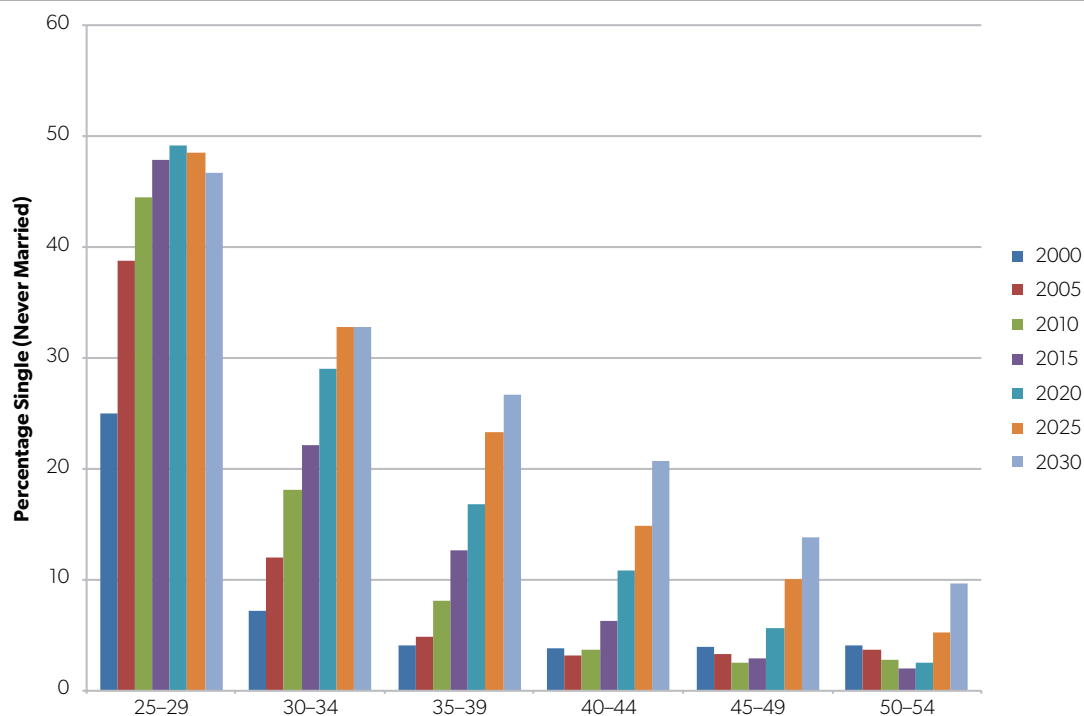
### **Gender Imbalance and "Marriage Squeeze"**

China's eerie and biologically unnatural One-Child Policy-era upsurge in sex ratios at birth raises another demographic dilemma for China, this one seemingly out of a science fiction novel: the prospect of a Chinese future with a major and persistent shortage of brides.

In normal human societies of any size, there is an abiding regularity to the sex ratio at birth (SRB) across history, countries, and ethnicities, typically running in the range of 103 to 105 baby boys per 100 baby girls. From the 1982 China population census to this writing, however, weirdly high SRBs have been reported in official Chinese population data. By the 2010 census, the reported SRB was about 120. In certain provinces, the SRB has reportedly exceeded 130, and in not a few localities, it has exceeded 150. These numbers point to mass female feticide in the context of reliable prenatal gender determination technology and unconditional abortion. China is by no means the only spot on the planet where this is taking place (elsewhere I have written about "the global war against baby girls"<sup>24</sup>), but it is arguably the largest and most brutal battlefield in that campaign.

Given the persistent undercounting of China's babies in the One-Child-Policy era, we cannot tell directly from official data just how severe China's true SRB distortion has been. It is left to demographers to reconstruct actual trends, and their assumptions

**Figure 6. China: Proportion of Never-Married Males by Age Group, 2000–30 (Estimated and Projected)**



Source: Yi Zeng et al., *Household and Living Arrangement Projections: The Extended Cohort-Component Method and Applications to the U.S. and China* (New York: Springer, 2014), 19–48.

about the degree of undercounting can differ; likewise in projections about the future. UNPD today estimates that China's SRB peaked in the 2000s at 117, is currently around 115, and will be 111 around 2040. The Census Bureau says SRB peaked at 118 in 2005, is 113 in 2108, and will be 107 in 2040. (Such differences of course have a multiplier effect on the dimensions of the "marriage squeeze" one envisions for the brides-and-grooms-to-be several generations hence, but they do not much affect estimates for the dimensions of the "marriage squeeze" facing China in 2040.)

Up to now, family formation in China has been influenced by what we might call a "universal marriage norm," an ethos strongly informed by the Confucian metaphysical imperative of continuing the family lineage through the male issue. Toward the end of the 20th century, that norm was translated into reality with all but 4 or 5 percent of men and an even smaller fraction of women in their late 40s

having been married. Now the arithmetic of gender imbalance means all this must change. It will change even faster and more acutely if the universal marriage norm erodes. In almost all the rest of East Asia, that norm has already fallen into considerable disrepair; demographer Gavin Jones talks of a "flight from marriage" in the region,<sup>25</sup> with ever greater proportions of young men and women postponing marriage or forgoing it altogether. If young women in China follow the example of their peers in Japan, Taiwan, Hong Kong, and elsewhere, the prospects for the marriageability of China's prospective future bridegrooms will dim all the more.

In Figure 6, I project one outlook for China's coming marriage squeeze, using Zeng's invaluable ProFamy software.<sup>26</sup> (I regard this as a "middle" variant set of assumptions about fertility, SRBs, "flight from marriage," and the rest. More dramatic scenarios could be imagined.) In this scenario, 20 percent of

Chinese men in their early 40s are never-married by 2030—up from just 4 percent in 2000. This would be a nationwide average, though. Needless to say, the odds of being unable to marry would be higher for men who were rural, poor, or poorly educated. Such projections furthermore suggest a China 2040 with tens of millions of essentially unmarriageable men (although such calculations also would include some men who would be voluntarily never-married).

A reality check on these projections comes from UNPD and US Census Bureau projections for China 2040. In UNPD medium variant, there would be 23 million more men than women in the 25–44 cohort, and 29 million more men than women if the more appropriate comparison is men 30–49 for women 25–44. In the census projections, the corresponding surfeit of marriage-age males would be 22 million and 30 million, respectively, or 13–17 percent of the total male reference population. Since we are dealing with stocks and flows in calculating the prospective marriage squeeze, these figures are not so inconsistent with the projections in Figure 6.

What will it mean for China to have a growing internal army of unmarriageable, predominantly poor and poorly skilled young men? Counterintuitively, there may be some positive economic spillovers: Some research suggests male competition for brides has already promoted something like a savings race.<sup>27</sup> Economists and public intellectuals such as Gary Becker and Richard Posner, further, have mused that the scarcity of females in China would eventually have the beneficial effect of increasing their “value.”<sup>28</sup> To date, alas, “rising value of women with Chinese characteristics” has meant kidnapping, sex trafficking, and other violations of human rights.

Moreover, there is no obvious policy solution in sight for the coming marriage squeeze. Places such as Hong Kong and Taiwan have dealt with their own bride shortages by “importing from abroad,” but China has a scale problem. Mainland China would also be in a different segment of the marriage market, requiring (huge numbers of) willing brides for its relatively impoverished hinterlands. Zeng and others have suggested that establishment of solid national pension and health care guarantees would reduce

“son hunger” in China, especially in the countryside. But as already mentioned, nothing like this is yet in place in rural areas, and once implemented, it would take another generation for such policies to affect the marriage squeeze.

Does China’s coming “bare branches” problem portend social or political instability? The question occasions continuing, sometimes heated, debate. Valerie Hudson, author of the bare branches thesis,<sup>29</sup> famously argues that a surplus of men tends to make for domestic and international tensions.<sup>30</sup> On the other side, Feng and others have pointed out that a serious surplus of marriage-age men has been the norm rather than the exception throughout Chinese history due to the abhorrent but time-honored practice of mass female infanticide and killing of girls,<sup>31</sup> suggesting that Chinese customs and institutions have long adapted to this demographic anomaly.

Feng et al. have those historical particulars right. What that means for the future, however, is another question. In the generation ahead, China may well be on the rise, but an increasingly powerful and affluent nation will be inhabited by growing numbers of presumably frustrated young men who find their life chances worsening in a most personal and bitter fashion. Their expectations will be shaped not by ancient Chinese history, but by marriage prospects within living memory. Will this make for millions of stories of quiet personal desperation or something more collective and convulsive? For anomie or fury? It is too early to tell. At the very least, we should regard China’s future marriage squeeze as a potential wild card—possibly an important one.

### **Domestic Migration, Urbanization, and the *Hukou* System**

Integral to the structural transformation of the Chinese economy during its extended spate of exceptionally rapid growth has been a reallocation of labor out of agriculture and into industry and services and a corresponding movement of population out of the countryside and into the cities. Between 1978 and 2015, the population of what China officially defines as

urban areas has grown by almost 600 million (roughly 200 million more than total national population growth), and the official urbanization ratio has more than tripled, catapulting from 18 percent to almost 56 percent.<sup>32</sup> The UNPD envisions a further increase of China's urban population of over 300 million between 2015 and 2040, at which point China would be over three-fourths (76 percent) urban.<sup>33</sup>

Chinese leadership is counting on urbanization as an engine of economic growth for the Chinese future and is attempting to accelerate the rise of cities through the aforementioned far-reaching urbanization drive. Authorities in Beijing are right to regard cities as engines of growth; a corpus of economic research corroborates that judgment.<sup>34</sup> But "urbanization with Chinese characteristics" involves a population problem that does not show up in conventional "head count" statistics. It relates to China's peculiar institution, the *hukou* system. (More detail on the dilemmas of urbanization and migration in contemporary China can be found in a forthcoming AEI monograph,<sup>35</sup> some of the findings from which I summarize in the following pages.)

*Hukou* is a system for household registration and personal identification that traces far back into imperial China, but whose modern import derives from Mao's weaponizing it as a tool of totalitarian control. From the 1950s onward, the Chinese Ministry of Public Security has supervised *hukou* and designated the official place of residence of every Chinese citizen. It is illegal to live outside of one's authorized *hukou*, although temporary *hukou* can be approved in certain circumstances (for example, if one has found a job in a city or a different province).

Although Beijing relaxed its stringent controls on domestic migration in the early 1980s, to date the Chinese government has proved extremely reluctant to "update" workers' or migrants' *hukou* in accordance with their new places of residence. Thus, an enormous "floating population" of out-of-*hukou* migrants has emerged with the rise of Chinese cities and the attendant upsurge in urban demand for labor. As of 2010, China officially numbers its floating population at around 220 million; about one-fifth of all working-age men and women were out-of-*hukou*

then, and both the totals and proportions would be higher today.

Most of China's floating population is comprised of migrant peasant working in urban areas. (Their *hukou* identity papers ascribe that class status, by the way, but delicately categorize this background as "agricultural.") With few exceptions, these men and women—and the migrants who left their hometowns and cities for other urban jobs—work in places where they are at best second-class citizens, at worst de facto illegal aliens. In their "temporary" residence as a rule they have no right to local services (e.g., health care and education). They have no right to bring their (nonworking) family members with them. Their compensation is lower than for in-*hukou* counterparts with the same education and skill levels. And in legal or other disputes involving authorities, they are virtually sure to lose.

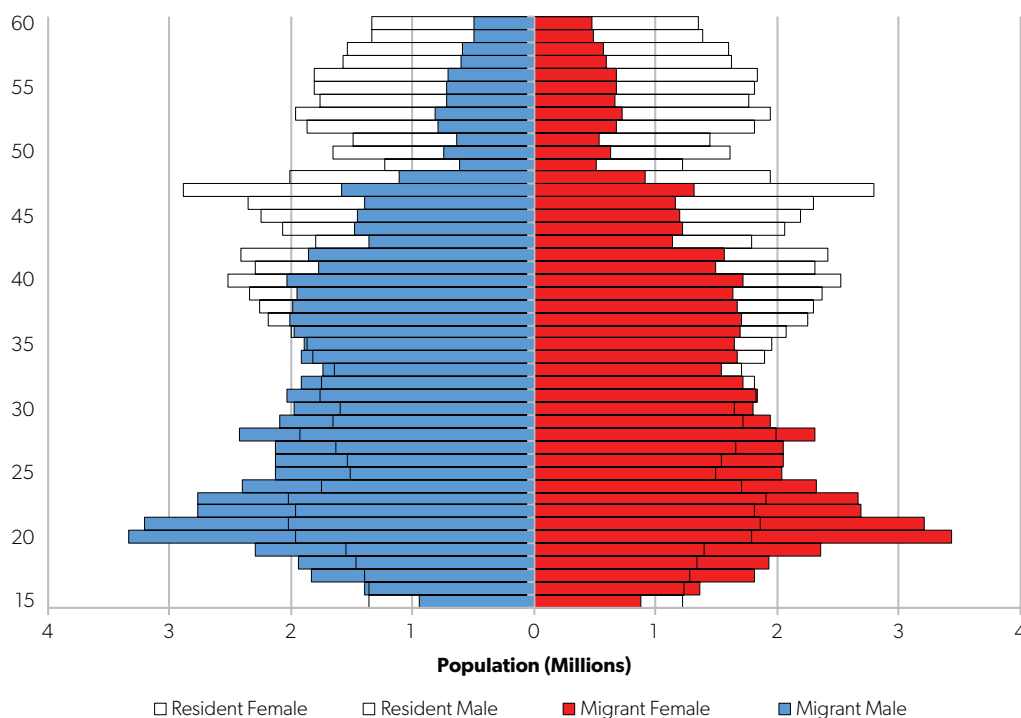
Urban China desperately needs migrants for demographic and economic reasons. Fertility levels are extremely low in Chinese urban areas and extraordinarily low in China's bigger cities. In recent years TFRs in places such as Beijing and Shanghai have sometimes been below 1.00—one birth per woman per lifetime. Overall, prolonged extraordinary sub-replacement fertility means that these places can no longer sustain their overall population totals, much less their labor forces, without a constant inflow of new migrants.

Thus, the contradiction: Cities (and economic planners) need new urban migrants, but those very same migrants must be treated as inferior beings by the logic of the current *hukou* population control system. The contradiction is highlighted in Figure 7, which depicts the population structure by *hukou* status of China's big cities (*shi*) as of 2010. In all, migrants accounted for over 40 percent of the big-city population that year, and migrants comprised a majority of all big-city residents in their late teens, 20s, and early 30s. The data in Figure 7 are now nearly a decade out of date. Notwithstanding, we can be sure that migrants still form a majority of many working-age groups in a great many of China's larger cities today.<sup>36</sup>

Even in the Beijing dictatorship itself the patent injustice of *hukou*-based exploitation of the new caste of migrant workers is widely recognized. Official and



**Figure 7. Resident vs. Migrant: Reported Composition of Working-Age (15–64) Manpower, China (City), 2010**



Source: National Bureau of Statistics of China, *China Population Census: Tabulation of the 2010 Population Census of the People's Republic of China* (Beijing: China Statistics Press, 2012).

semiofficial discussion of *hukou* “reform” (meaning abolition) has been in the air for more than two decades. And some adjustments are underway: The official urbanization drive talks of granting local *hukou* to 13 million workers a year through at least 2020. But since urban population will be growing rapidly at the same time, such measures would merely more or less cap the size of the urban out-of-*hukou* contingent. If everything goes according to plan, 15 percent of China’s total population (over 200 million people) will be “temporary urban residents” in 2020. To judge by current indications, Chinese leadership plans to maintain the *hukou* system indefinitely.

But why? There are at least two obvious answers. First, under current arrangements, migrant workers are cash cows for the cities and townships in which they toil. Vesting them with the same rights to services as in-*hukou* urbanites would throw public finances into disarray for municipalities across

the country. The central government could fix this problem through budgetary consolidation relatively easily—but this would also be expensive, and Beijing does not want to assume these costs. Second, the *hukou* system still seems to be viewed by this police state as an indispensable instrument of control. Social and political stability in urban areas is a paramount concern for Chinese leadership—in part for historical reasons. Dynasties fall when the capital and the major cities fall, and the *hukou* system helps assure public order in cities.<sup>37</sup>

Just a decade ago, during the global financial crisis of 2008–09, an untold number of migrant workers (perhaps 20 million or more) were sent back home when export demand slumped; this mass resettlement was enforced via *hukou*. What would have happened if those unemployed masses had stayed in place, milling about in the cities? Chinese authorities did not want to find out. That experience—and more recent

exercise of *hukou* power for mass ejection of migrants (in Beijing for example)—has presumably demonstrated the utility of the *hukou* system and reinforced the regime's determination to keep it in place.

In the *hukou* system we see a political problem in demographic form. It is akin to “influx control” under the old South Africa apartheid regimen; thanks to *hukou*, urban centers now look a bit like “Soweto with Chinese characteristics.” We know what happened in Soweto. Until and unless the *hukou* system is genuinely reformed, China may have comparable tinderboxes in every one of its big cities. For this reason, migration and urbanization should be regarded as another wild card in China's future—and one whose risk of being cast could be considerably higher than the marriage squeeze card.

### The Coming Revolution in Family Structure

One immensely important and utterly unstoppable demographic change now underway in China has attracted curiously little attention from Chinese policymakers and their think-tank advisers: the coming revolution in Chinese family structure. While the Chinese Academy of Social Sciences, the Development Research Center of the State Council, and other organizations have provided voluminous analyses on coming labor force trends, the implications of population aging, urbanization and migration, and even SRB gender imbalance, there has as yet been no research so far as I can tell on mapping out the dimensions or examining the implications of the now unavoidable atrophy of the extended family, or the equally unavoidable rise of a “new family type” in China. Perhaps this is because such work would take us beyond “the headcount approach”; the Chinese government, like other modern states, collects demographic data on individuals and households, not kinship networks.

Changes in childbearing and survival patterns cannot help but change nuclear family and extended family patterns too, and dramatic changes in childbearing and survival lead to dramatic changes in family patterns. (For simplicity's sake, I will discuss only consanguineous family here, but that is not a

bad first approximation for family in China today.) Generally speaking, improved survival increases the number of living family members and kin at any point across one's life course, while declining fertility has the opposite effect. But the distribution of births (the “parity progression ratio” or PPR) also matters: A society could have an average of two births per woman if half of all women had four children and half had none, and this would look very different from one in which all women had exactly two children. China's tremendous improvements in life expectancy since the early 1950s greatly increased the number of living kin for grown men and women over the past three generations. But total potential living kin depend on birth patterns, and, of course, fertility has plummeted in modern China. (We discuss the outlook and implications for these changes in a separate forthcoming AEI volume,<sup>38</sup> which helps inform the following pages.)

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## Dynasties fall when the capital and the major cities fall, and the *hukou* system helps assure public order in cities.

Of particular interest in this regard is the number of only children in China, today and tomorrow. The rise of the only child radically transforms not only the structure of the nuclear family but also extended kinship networks. Both official Chinese and independently conducted reconstructions of PPRs indicate that almost all women of childbearing age married and almost all had at least one child, but since around 1993, fewer than half of first births led to further births for the country as a whole. In 1990, by these reckonings, about one in six Chinese births would end up only children; by 2000 the fraction would jump to two in five or perhaps even higher.

Calculations for the proportion of only children are highly sensitive to underreporting of births, so it is possible that they overstate the nationwide proportions of only children in China. That said, there is no doubt whatever that only children have comprised a majority of newborns in urban China for decades. Whereas the national fertility level fell below replacement in the early 1990s, it appears to have dropped below replacement in urban China in the early 1970s, years before the One-Child Policy. By 1982, in the early days of that population control drive, TFRs in urban areas were already down to an estimated 1.4 births per woman per lifetime.<sup>39</sup> By 1984 over half of all urban births (townships plus big cities) may have been only children, and in the big cities the ratio may have been closer to 70 percent. In the biggest metropolitan areas the share of only children might be even higher. By collaborative estimates of the National Bureau of Statistics of China and the East-West Center in Hawaii, four-fifths of babies born in Shanghai were only children as early as 1990, with ratios for Beijing only slightly lower.

Today, only children form a majority of urban China's (legal *hukou*) population under 35 years of age and a supermajority of the under-35 population in the country's big cities. This means we are starting to see the rise of a new family type in China: only children begotten by only children, and boys and girls with no siblings, cousins, uncles, or aunts, only ancestors and (perhaps eventually) descendants. For this new family type, the traditional extended family has essentially collapsed. This new family type is now beginning to account for a sizable fraction of urban China's (officially authorized resident) children—very possibly, an outright majority in the country's economic and political nerve centers (Shanghai and Beijing) and in other cities of size as well. Even in places where the emerging new family type does not dominate in the rising generation who will be the parents of 2040, the extended family and its kinship networks are being dramatically compressed by long-term sub-replacement fertility.

The family unit matters everywhere, but it has assumed a particularly prominent institutional and even spiritual role in Chinese tradition. For millennia,

*guanxi* networks—comprised principally although not exclusively of fellow clansmen—have helped provide financial and human security for the Chinese population. They have been integral to getting business done at the micro level and at the macro level have improved national economic performance by reducing transaction costs and risk.

What will happen to economic performance in China as its *guanxi* networks come under extraordinary new demographic pressure? We are about to find out. There are of course functional substitutes of sorts for family-based *guanxi* networks: Deep personal friendships among unrelated individuals would be one; impersonal spheres of “social trust” now witnessed in China's fascinating “fintech revolution” would be another. But it is far from clear that these substitutes are complete substitutes, much less perfect ones.

The ongoing family revolution in China might also have implications for political cohesion and national security. A decade ago, thousands of schoolchildren perished in the tragic Sichuan earthquake. Many were only children; their deaths brought a permanent end to untold family lineages. In those localities and across China there was a spasm of social rage as people learned that the earthquake knocked down cheap and shoddily constructed schools, even though nearby Chinese Communist Party and government buildings survived the tremors. The tragedy took on an electrifying import across China, one magnified by its consonance with the age-old Chinese theme of unjust rulers losing the Mandate of Heaven. This disaster was thus also a public relations disaster and forced the regime into contrition mode, requiring the unusual spectacle of conspicuous and repeated public apologies by Chinese officialdom, all the way to the very top.

Consider what this domestic tragedy may portend for a future international confrontation or conflict involving serious Chinese casualties. Many of the soldiers in the People's Liberation Army will presumably be only children. Major losses would mean the end of a great many family lines. If China suffers setbacks in international military operations or if the Chinese public deems these losses to be the result of

an illegitimate use of power, what sort of explosion of social rage might Beijing face? No less pertinent, how might regime calculations about the *possible risk* of social rage due to military losses condition China's defense strategy and tactics in the years ahead?

## Concluding Observations

Demographic factors suggest, among other things, that the coming generation will not see a repeat performance of the phenomenal economic rise that China enjoyed over the past generation (or generation and a half). To be sure, despite the demographic constraints outlined above, China is certainly capable of generating creditable rates of economic growth for the foreseeable future. But demographic realities among other forces are likely to end China's era of "heroic economic growth," possibly sooner rather than later. Using a human capital-based model, Stanford's Scott Rozelle and his colleagues have ventured that the Chinese economy would grow by an average of 3 percent per annum over the coming 20 years.<sup>40</sup> In my own current work, a simple human-resources-plus-business-climate calculation comes up with results more or less consistent with Rozelle et al.: about 2.5 percent per annum GDP growth for the 2025–40 period in purchasing-power-parity terms (with somewhat higher rates for exchange-rate-based GDP), assuming no changes in business climate over the decades immediately ahead.<sup>41</sup> We should recognize that such projections are lower than most prevailing estimates, but they highlight the headwinds the Chinese economy faces when demographic trends are taken into consideration.

Demographic constraints could also complicate Beijing's quest to mobilize political power and/or apply it abroad. At this writing the Chinese regime seems to be behaving in an increasingly ambitious and assertive fashion: The era of "hide your strength, bide your time" appears to be over. Demographic stresses *could* reduce social cohesion or even contribute to social or political instability. Note the verb "could": This is by no means a certainty, but it is a possibility that would be unwise to ignore. Dynasties in China

always end. When and how the current regime will end, and whether demographic forces will play any appreciable role in its demise, will only be known in the fullness of time.

In any event, over the next generation that regime must cope not only with the "marriage squeeze" and the "floating population" problem but also with an upending of an extended family system that is as old as Chinese civilization itself. It is still difficult for us to imagine what China will look like, much less how things will work, with the rise of the new family type. We cannot yet dismiss out of hand the conjecture that this development could prove to be an existential, civilization-challenging event.

Finally, there is the question of China's long-term fertility trends and what the government may do to affect these. This question is not too pertinent to the demographic outlook for 2040, as we have already seen, but it is highly relevant to speculation about China 2050 and beyond.

It is important to recognize that the regime still holds the national birth rate to be a matter of state, not of parental choice. The adjustments to the population policy in recent years did not vitiate the regime's claim for itself to the right to set national fertility levels; it merely raised the birth quotas the government would permit.

Now there are hints that Beijing may be toying with a population policy U-turn, a 180 degree shift to a pro-natal population policy. Some have noted, for example, this year's new Lunar New Year postage stamps, featuring a cartoon of five happy pigs: two parents and their three children. Little signals like this are sometimes leading indicators for new political campaigns.

Absent government pressure, China's "natural" fertility trajectory might well be further decline. After all, fertility levels today are decidedly lower in neighboring Hong Kong, Taiwan, South Korea, and Japan. They are lower in authoritarian Singapore too, despite that nation-state's attempts to encourage births through three decades of pro-natal measures.

Could Beijing succeed where Singapore has failed? Police state power may be effective in forcing births down—but could it also force births up? In the 1960s

Communist Romania suddenly banned abortion without notice and doubled the nation's birth rate the following year—but that was a one-off, and birth rates gradually returned the abortion-era levels.

Beijing may have more sophisticated and intrusive tools at hand for any future pro-natal campaign. “Social media credit ratings” through fintech could be one of these: far-reaching financial penalties for those evidencing unpatriotic tendencies, including childlessness. Think of it as “market totalitarianism.” To date, pro-natal policies around the world have met with at best limited success. But then again, none yet have experimented with market totalitarianism.

### **About the Author**

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# Notes

1. Population projections lose their reliability when demographers begin to make guesses about how many babies the currently unborn are going to bear. There is no reliable basis for such projections today—and as long as human births are a matter of future individual volition, there presumably never can be. If we try to look more than a generation ahead for any population, we are thus getting into the realm of science fiction.

2. There are additional sources of official data that also aid in demographic reconstructions for China today—among them, educational enrollment figures by age for children and young people, hospital birth records, and *hukou* registration numbers compiled by local authorities. See Wei Chen, “Evaluation of the Completeness of Birth Registration in China Using Analytical Methods and Multiple Sources of Data,” paper presented at UN expert group meeting “Methodology and Lessons Learned to Evaluate the Completeness and Quality of Vital Statistics Data from Civil Registration,” New York, November 3–4, 2016, [http://www.un.org/en/development/desa/population/events/pdf/expert/26/notes/Chen\\_2016\\_Birth%20Registration%20in%20China.pdf](http://www.un.org/en/development/desa/population/events/pdf/expert/26/notes/Chen_2016_Birth%20Registration%20in%20China.pdf). But such population information may be regarded as supplemental, while the census returns and “mini census” surveys are essential.

3. Yong Cai, “China’s New Demographic Reality: Learning from the 2010 Census,” *Population and Development Review* 39, no. 3 (September 2013): 371–96, <http://doi.org/10.1111/j.1728-4457.2013.00608.x>.

4. Chen, “Evaluation of the Completeness of Birth Registration in China”; UN Secretariat, Department of Economic and Social Affairs, Population Division, 2017 Revision of World Population Prospects, accessed on August 27, 2018, <http://esa.un.org/unpd/wpp/index.htm>; National Bureau of Statistics of China, *China Population Census: Tabulation of the 2010 Population Census of the People’s Republic of China* (Beijing: China Statistics Press, 2012). For a more detailed discussion of the reliability of available demographic data for China today, see Nicholas Eberstadt and Alex Coblin, “Urbanization with Chinese Characteristics”: *Migration and Urban Growth in Contemporary China*, American Enterprise Institute, forthcoming.

5. Fertility projections for China these days may bear an additional measure of uncertainty—for they not only reflect the intrinsic uncertainties inherent in any projection of fertility trends into the future but also are conditioned by a special measure of uncertainty about *past* fertility trends. This is so quite simply because of the lingering and still unsettled questions regarding the demographic impact of China’s anti-natal population control policy. Some demographers argue that the birth trajectory traced out in China under the One-Child Policy was strongly shaped by compulsory policies; others argue instead that socioeconomic development was the main engine of fertility decline and that coercive population policy was rather less responsible for sustained sub-replacement fertility in China than Beijing’s population planners have asserted. For contending assessments, see on one hand Daniel Goodkind, “The Astonishing Population Averted by China’s Birth Restrictions: Estimates, Nightmares, and Reprogrammed Ambitions,” *Demography* 54, no. 4 (August 2017): 1375–400, <https://link.springer.com/article/10.1007/s13524-017-0595-x> and on the other Wang Feng, Yong Cai, and Gu Baochang, “Population, Policy, and Politics: How Will History Judge China’s One-Child Policy?,” *Population and Development Review* 38, no. S1 (February 2013): 115–29, <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1728-4457.2013.00555.x>. Until there is resolution of the controversy about the degree to which past trends reflect forcible suppression of national fertility levels below those desired by China’s parents, there will be a corresponding debate about the prospective demographic impact of relaxing birth strictures for the years ahead.

6. Very roughly speaking, the raw labor input simpliciter may have contributed close to one-quarter of China’s measured economic growth over those decades.

7. Ronald Lee and Andrew Mason, “Fertility, Human Capital, and Economic Growth over the Demographic Transition,” *European Journal of Population* 26, no. 2 (May 2010): 159–82, <http://doi.org/10.1007/s10680-009-9186-x>.

8. Baozhen Luo, “China Will Get Rich Before It Grows Old,” *Foreign Affairs*, October 30, 2015, <https://www.foreignaffairs.com/articles/china/2015-04-20/china-will-get-rich-it-grows-old>.

9. Nicholas Eberstadt and Judith Banister, *The Population of North Korea* (Berkeley, CA: Institute of East Asian Studies, 1992).

10. Organisation for Economic Co-operation and Development, “LFS by Sex and Age—Indicators,” Health Status, [https://stats.oecd.org/Index.aspx?DataSetCode=LFS\\_SEXAGE\\_I\\_R](https://stats.oecd.org/Index.aspx?DataSetCode=LFS_SEXAGE_I_R).

11. Fang Cai and Yang Du, "Wage Increases, Wage Convergence, and the Lewis Turning Point in China," *China Economic Review* 22, no. 4 (2011): 601–10, [https://econpapers.repec.org/article/eechieco/v\\_3a22\\_3ay\\_3a2011\\_3ai\\_3a4\\_3ap\\_3a601-610.htm](https://econpapers.repec.org/article/eechieco/v_3a22_3ay_3a2011_3ai_3a4_3ap_3a601-610.htm).
12. See Xinhua, "National New-Type Urbanization Plan (2014–20)," March 16, 2016, [http://www.gov.cn/zhengce/2014-03/16/content\\_2640075.htm](http://www.gov.cn/zhengce/2014-03/16/content_2640075.htm). See also "China Unveils Urbanization Plan: Aims to Have About 60 Percent of Population Living in Cities by 2020," *Wall Street Journal*, March 16, 2014, <https://www.wsj.com/articles/china-unveils-long-awaited-urbanization-plan-1395024223>; and World Bank and People's Republic of China, Development Research Center of the State Council, *Urban China: Toward Efficient, Inclusive, and Sustainable Urbanization*, July 2014, <https://openknowledge.worldbank.org/handle/10986/18865>.
13. Martina Miskolczi and Kornélia Cséfalvaiová, "Process of Population Ageing and Its Dynamic" (lecture, Seventh International Days of Statistics and Economics, Prague, September 19–21, 2013), <https://msed.vse.cz/files/2013/121-Miskolczi-Martina-paper.pdf>.
14. See David E. Bloom, David Canning, and Jaypee Sevilla, *The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change* (Santa Monica, CA: RAND Corporation, 2003).
15. Nancy Birdsall et al., *The East Asian Miracle: Economic Growth and Public Policy*, World Bank, 1993, <http://documents.worldbank.org/curated/en/975081468244550798/Main-report>.
16. Wittgenstein Centre relies on its own population projections in these estimates, not UNPD's.
17. Feng Wang et al., "Economic Boom, Population Aging, and Policy Shift: What's Ahead for China?" (presentation, Fudan Working Group on Comparative Aging Societies, Shanghai, June 8, 2013), <https://www.ntaccounts.org/doc/repository/presentation%20Wang.pdf>.
18. Professor Yi Zeng of Peking University and Duke is one of China's foremost demographers.
19. Yi Zeng et al., "ProFamy: The Extended Cohort-Component Method for Household and Living Arrangement Projections," in *Household and Living Arrangement Projections* by Yi Zeng et al. (New York: Springer, 2013).
20. World Bank, "China Economic Update—December 2017: Growth Resilience and Reform Momentum," December 19, 2017, <https://www.worldbank.org/en/country/china/publication/china-economic-update-december-2017>.
21. International Monetary Fund, "Capitalizing on Good Times," *Fiscal Monitor*, April 2018, <https://www.imf.org/en/Publications/FM/Issues/2018/04/06/fiscal-monitor-april-2018>.
22. Marcos Chamon, Kai Liu, and Eswar Prasad, "Income Uncertainty and Household Savings in China," *Journal of Development Economics* 105 (July 27, 2013): 164–77, <https://pdfs.semanticscholar.org/85c2/ebo0498e554f69b691cef3c1b8660b3ba3ed.pdf>.
23. Celia Hatton, "New China Law Says Children 'Must Visit Parents,'" *BBC News*, July 1, 2013, <https://www.bbc.com/news/world-asia-china-23124345>.
24. Nicholas Eberstadt, "The Global War Against Baby Girls," *New Atlantis* 33 (Fall 2011): 3–18, <https://www.thenewatlantis.com/publications/the-global-war-against-baby-girls>.
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41. Nicholas Eberstadt's ongoing research for the Office of Net Assessment/Office of the Secretary of Defense contributed to this report.



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