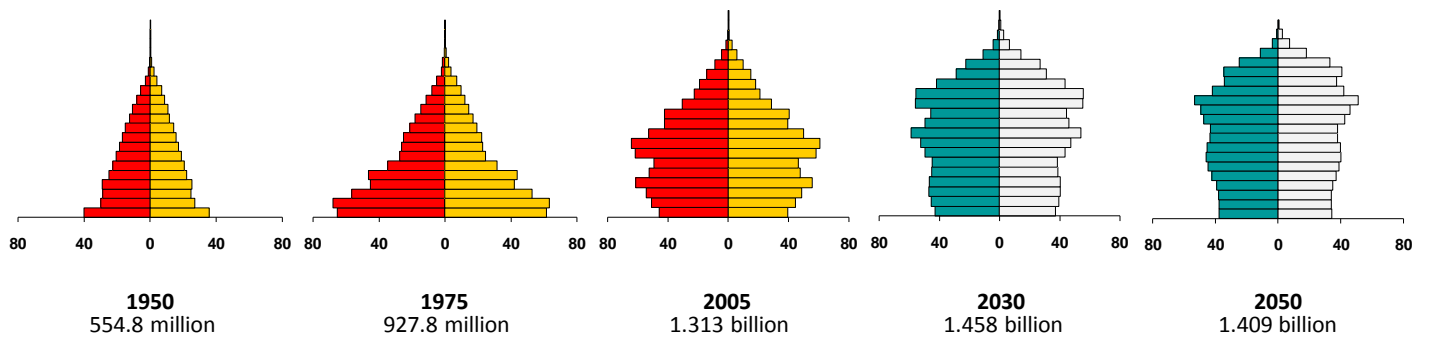




China's Demographic Shifts: The Shape of Things to Come

Adele Hayutin, Ph.D.
Director, Global Aging Program
Stanford Center on Longevity
October 24, 2008
ahayutin@stanford.edu
<http://longevity.stanford.edu/myworld>



Contents

This briefing provides an overview of population aging in China and illustrates key workforce implications. The document is organized as follows:

- Summary
- Demographic Drivers
 - Fertility
 - Life Expectancy
- Population Age Structure
- Speed of Aging
 - % 65+
 - Median Age
- Changing Age Mix
 - Population Growth by Age Bracket
- Workforce Implications
 - Workforce Growth by Age Bracket
 - Economically Active Population
 - Demographic Dividend
 - Worker-to-Retiree Ratios
- Urbanization

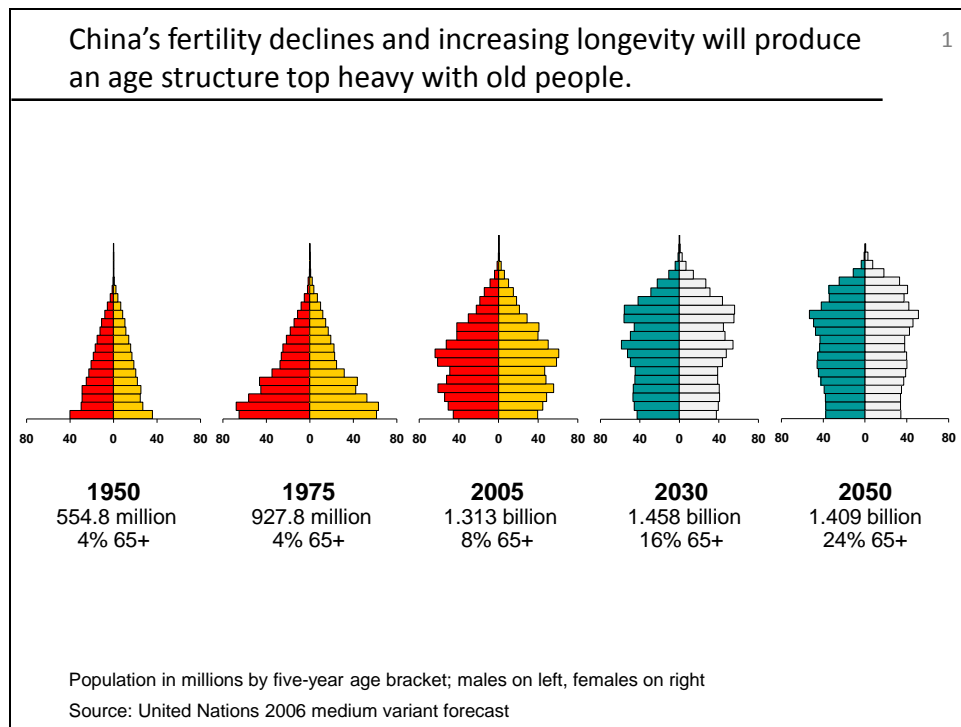
Appendix A: Alternative Fertility Scenarios

Appendix B: Comparative Reference—India, South Korea, Japan, and U.S.

Note on Sources:

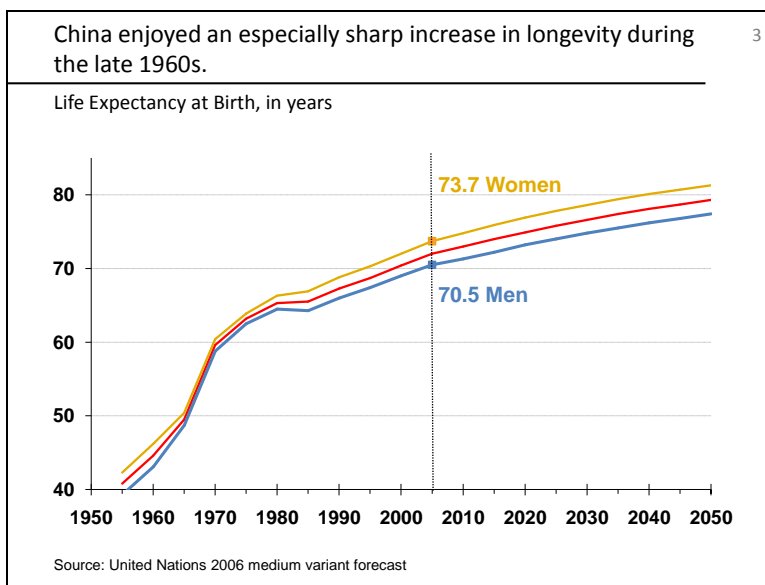
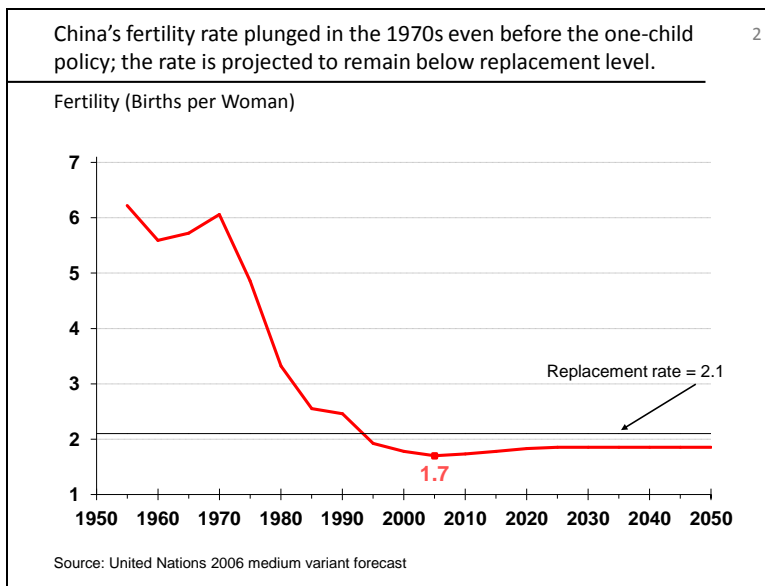
This briefing relies on the United Nations 2006 medium variant forecast, unless otherwise noted.

Summary



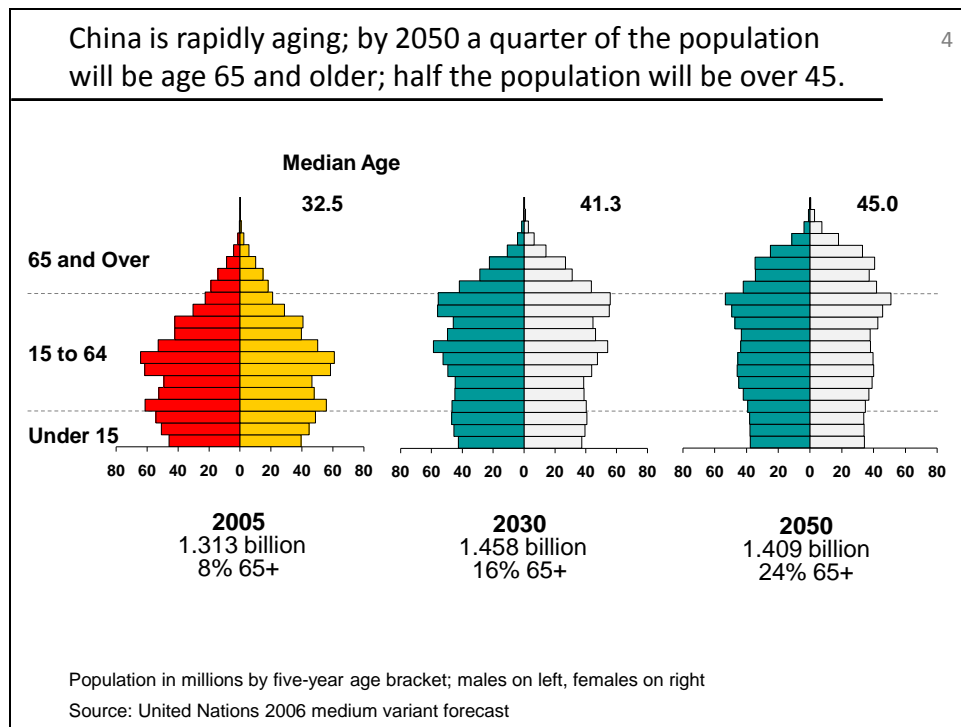
- China is rapidly aging; by 2050 half the population will be over 45 and a quarter of the population will be age 65 or older. Because of its early and steep fertility decline, China will age sooner and faster than other developing countries. China's age structure will soon be top heavy with old people.
- The absolute number of children and young workers will decline sharply. Without a dramatic increase in fertility, population gains will occur only in the older age brackets.
- The workforce will rapidly age as the number of young workers declines; total working-age population will peak in 2015 at about 1 billion, and then fall 13% by 2050. Total population is projected to shrink by 2030.
- Over the past several decades China has benefited from the demographic dividend of an increased number and share of working-age people coupled with high productivity growth. China has a few more years to capitalize on this demographic dividend. After that, the projected decline in working-age population will pose significant challenges for China's sustained growth: absent sustained productivity gains and labor market changes, China's economic engine could stall. Thus, we can expect greater pressure for productivity gains as well as changes in labor market structure.
- A further demographic challenge will be the doubling of the urban population to 1 billion by 2050; by then, 73% of China's 1.4 billion people will live in urban areas.

Demographic Drivers



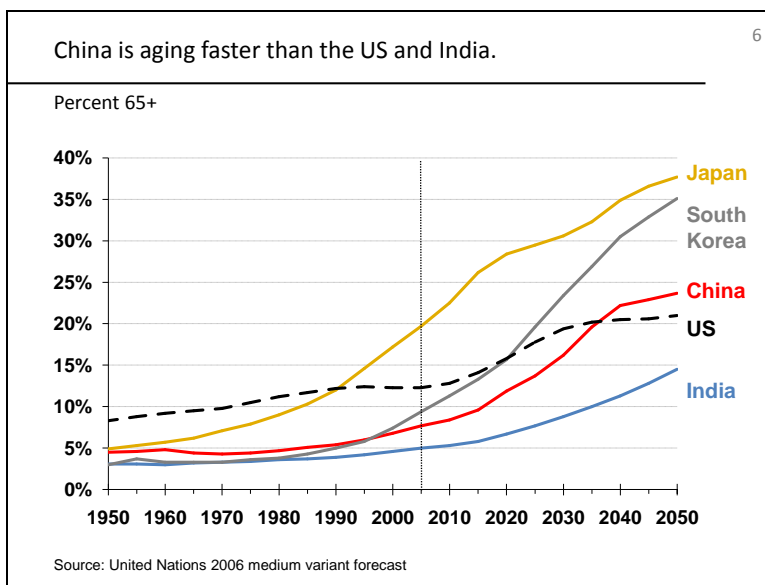
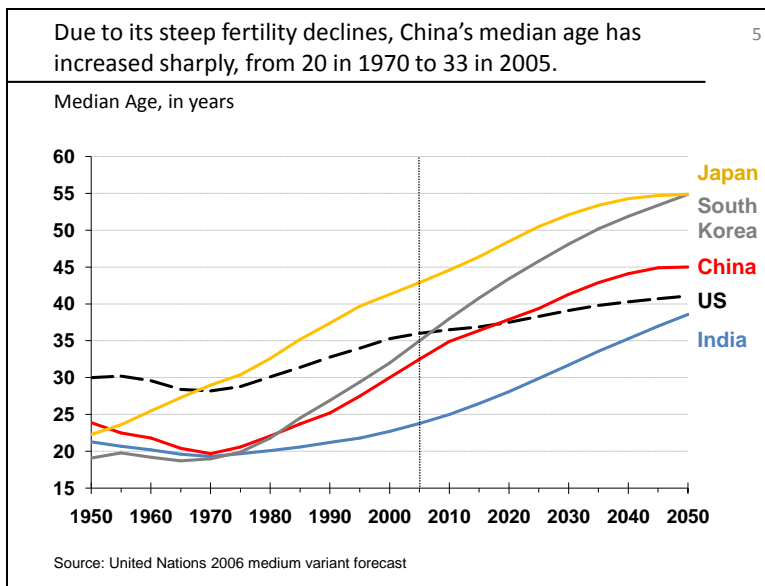
- Two major factors determine population aging. First is declining fertility, which reduces the number of children. Second is increasing longevity which increases the number of old people.
- Fertility in the developing world has dropped by half since about 1970, from 6.0 to 2.9 births per woman. China experienced one of the world's fastest declines in fertility, dropping from 6 births per woman in 1955 to less than 2 in the early 1990s.
- While longevity gains have occurred globally, China enjoyed an especially steep increase in life expectancy—from 50 to 60—during the late 1960s. Life expectancy reached 72 in 2005 with continued increases forecast over the next half century.

Population Age Structure



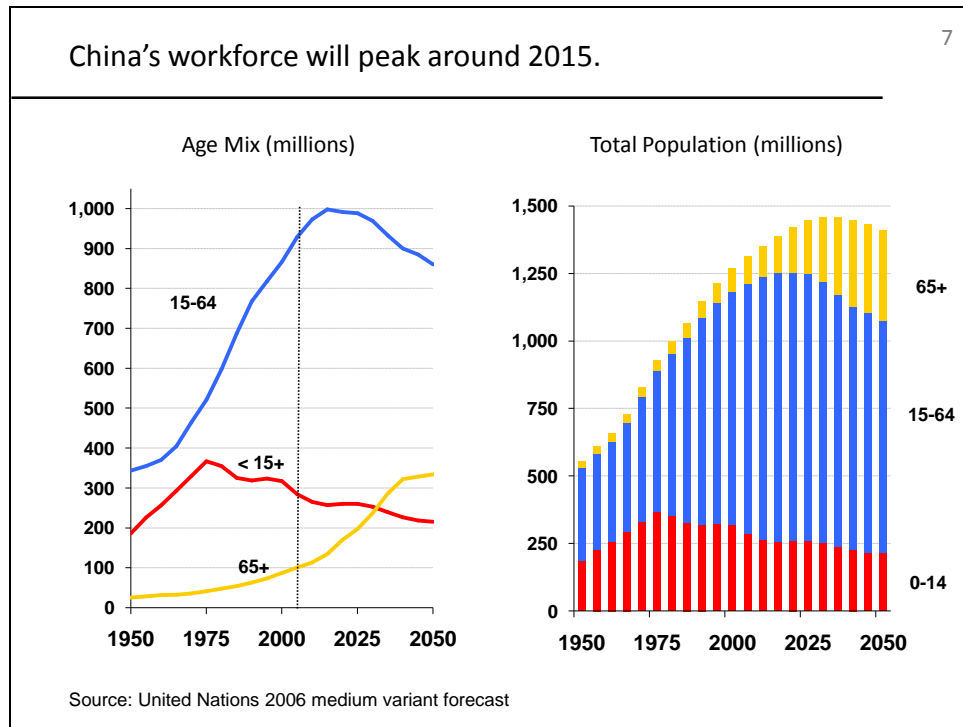
- This series of histograms shows how China changes from a society with a broad base of young people to an aging society top heavy with old people.
- Each histogram above shows the population in five-year age brackets, with children on the bottom and old people at the top; males are on the left and females on the right.
- The impact of the 1970s fertility decline and the 1979 one-child policy can be seen at the bottom of the 2005 histogram: as fewer children are born, the histogram's base narrows.
- With a 2005 fertility rate of only 1.7—well below the 2.1 replacement rate—China already has a decreasing number of children as shown by the narrowing of the histogram's base.
- At the same time, the top of the histogram widens as life expectancy increases and more people live longer, moving into the upper age brackets.
- In 1950, when China had a pyramid shaped age structure with a broad base of young people, only 4% of the population was 65 or over, but by 2005, the share of 65+ had increased to 8%. The share is projected to increase to 16% by 2030, slightly higher than the current U.S. share, and much higher than the projections for most other developing countries.

Speed of Aging



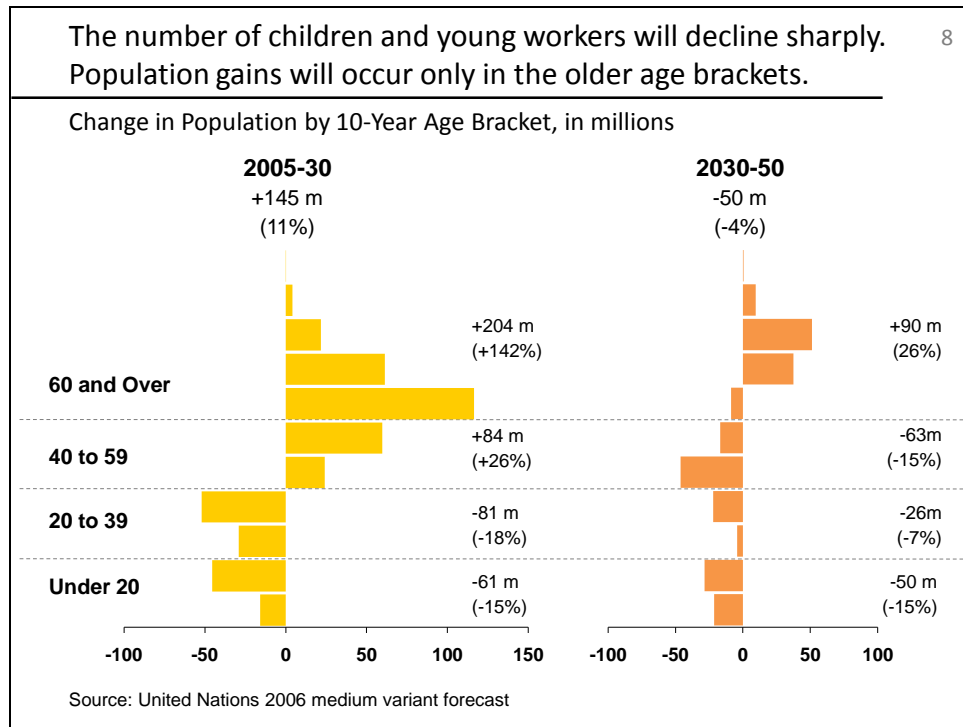
- The simultaneous increase in life expectancy and a precipitous drop in fertility contributed to the sharp increase in China's median age beginning in 1970. At that time, half the population was younger than 20. By 2030 half the population will be older than 41, compared with 39 for the US.
- The combination of a sharp fertility decline and a steep longevity gain results in an "age wave" beginning in 2015, as the share of the population 65+ begins a steep increase. By midcentury, almost a quarter of the population will be age 65 and over.

Changing Age Mix



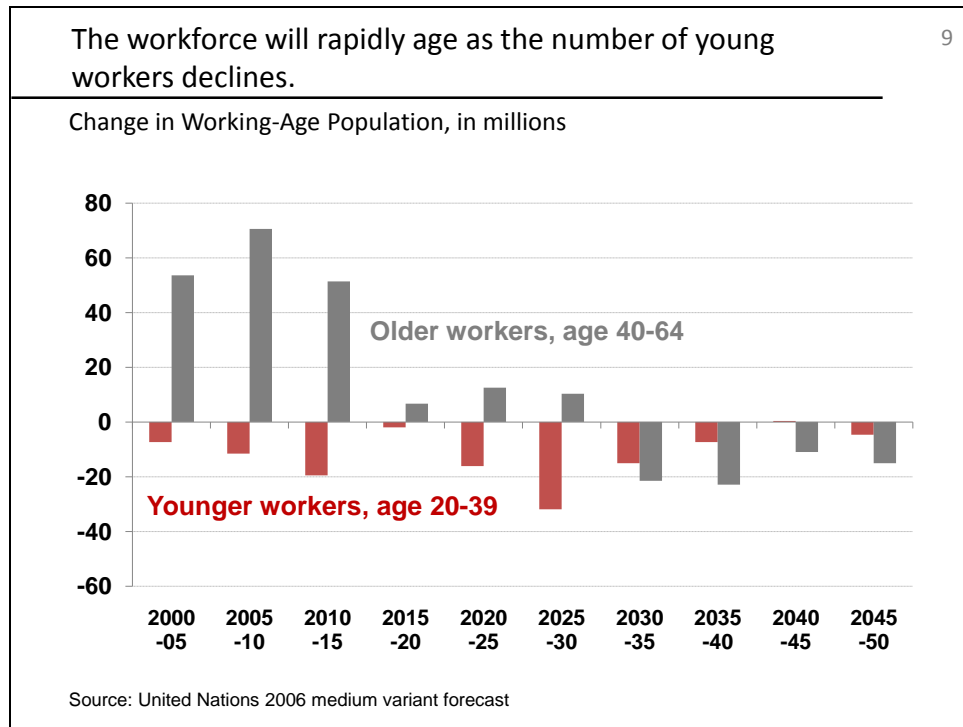
- This age mix chart shows the size and growth of the three age major groups.
- The population aged 65+ has been steadily increasing and will more than triple, growing from 100 million in 2005 to over 300 million by 2050.
- Due to the steep fertility decline, the number of children has been declining since 1975.
- This steep decline in number of children will in turn decrease the size of the working-age population. Working-age population is projected to peak in 2015, then fall 14% by 2050.
- Total population is projected to start declining in 2030.

Changing Age Mix



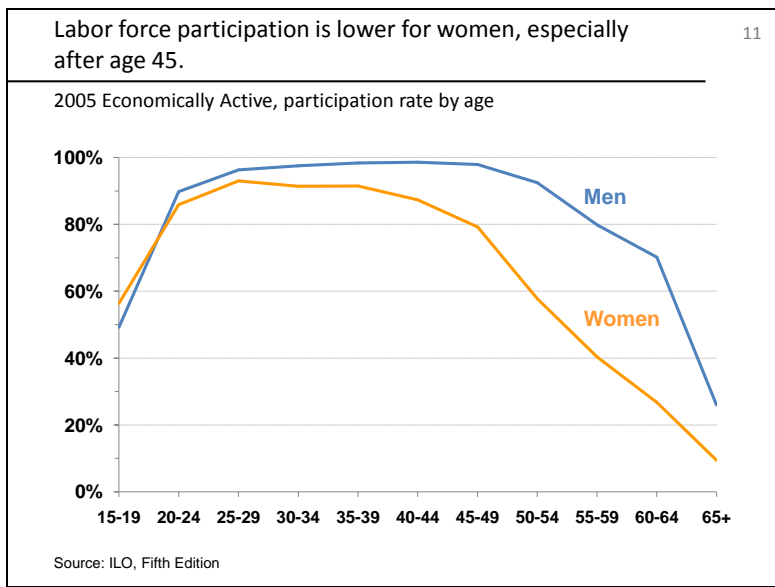
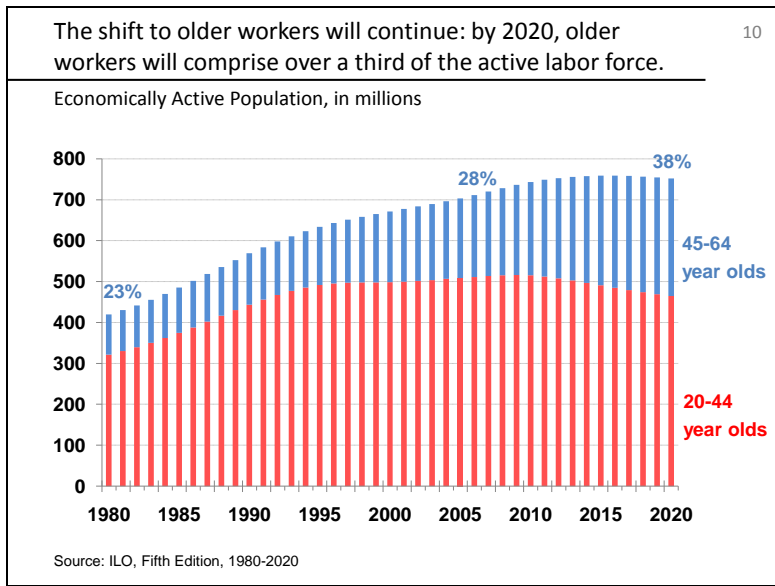
- These “change histograms” show the change in population by age bracket. They represent the change between the histograms shown in Chart 4. The graph on the left shows the change from 2005 to 2030, and the one on the right shows the change from 2030 to 2050.
- From 2005 to 2030, the total population is expected to grow by 145 million, an 11% increase. All of the gain occurs in the older age brackets, while population in the younger age groups will shrink. Over the coming 25 years, the number of young people under 20 will shrink by 15% and the number of younger working-age people will shrink by 18%.
- This general pattern continues over the period from 2030 to 2050 and moves up the age histogram: All of the brackets from age 0 to 60 will lose people, while the age group 60 and above will have a 26% gain, adding 90 million people. The total population will decrease by 50 million.

Workforce Implications: Workforce Growth by Age Bracket



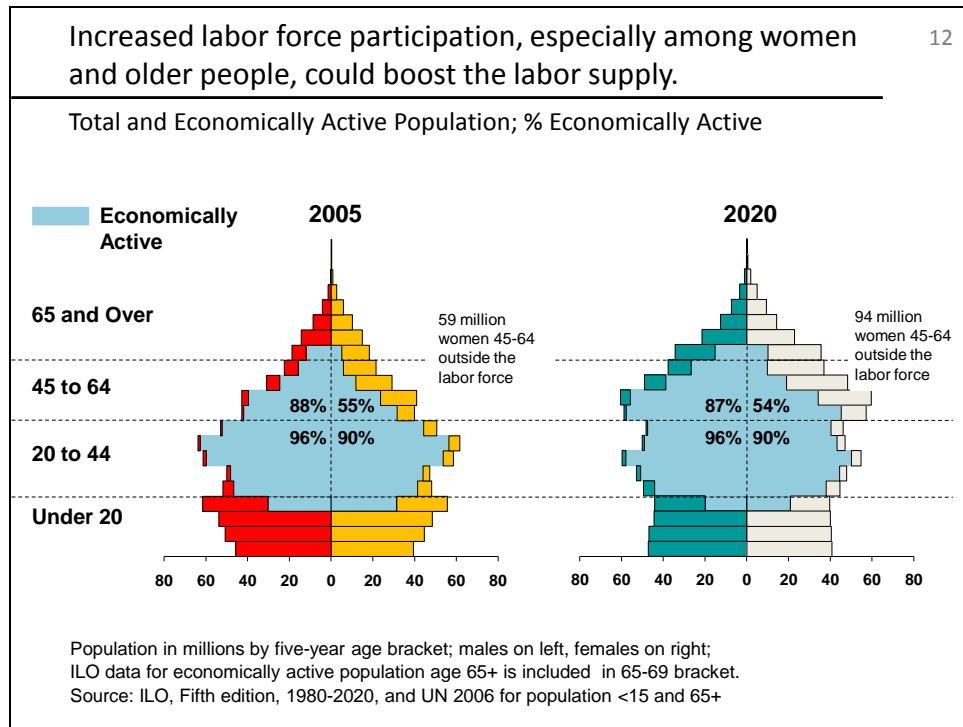
- The population in the younger working-age brackets, age 20-39, is projected to steadily decline leading to a rapid aging of the remaining workforce.
- As the population ages, the number of people in the older working-age bracket of 40-64 will increase, but beginning in 2030, the size of that age group also begins to decline.

Workforce Implications: Economically Active Population



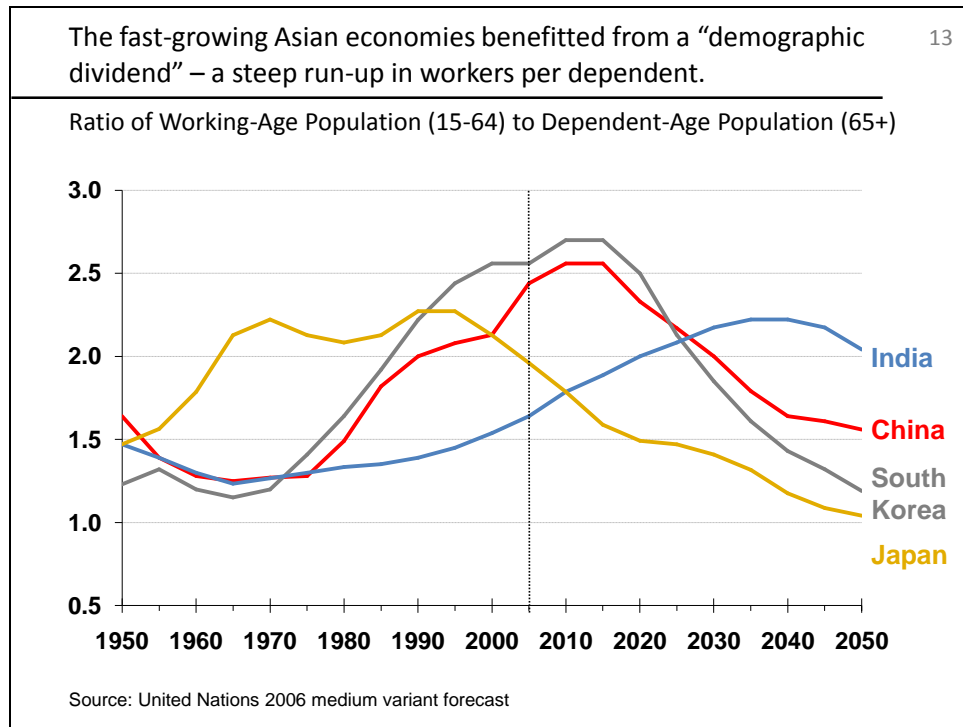
- The previous charts showed data for the number of "potential workers," the total population in the working-age brackets. In reality, the "actual" number of workers is significantly less because not everyone of working age participates in the labor force. The charts in this section show ILO estimates of the "economically active" population.
- Chart 10 shows that the shift to older workers will continue. By 2020, workers age 45 to 64 will account for 38% of the labor force ages 20-64, up from 23% in 1980 and 28% in 2005. The share will increase as the potential number of young workers continues to decline.
- As shown in chart 11, labor force participation is lower for women than men at almost all ages, with participation dropping off sharply at age 45. For men the drop in labor force participation occurs at age 60. These patterns reflect the "official retirement ages" for those limited number of workers who have retirement coverage. The ILO projects that these participation rates will remain relatively steady through 2020.

Workforce Implications: Economically Active Population



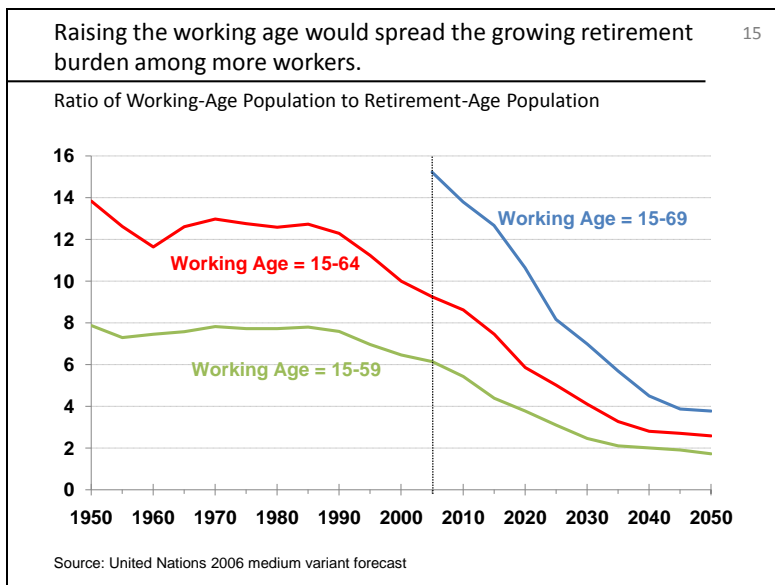
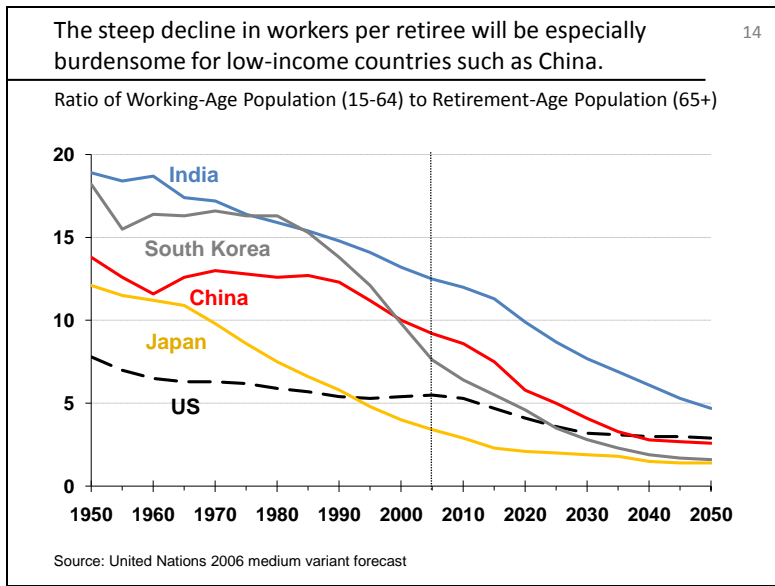
- The double histogram in chart 12 illustrates the gap between the total population in each age bracket and those who are actually economically active. The outer histogram is the total population and the inner histogram reflects the size of the economically active population.
- Labor force participation rates are high (96% for men and 90% for women) for the younger age brackets. But for the older working-age brackets, 45 to 64, the participation rate falls to 88% for men and just 55% for women. Thus, in 2005, 59 million women age 45-64 were outside the labor force. By 2020, this number will be 94 million.
- The double histogram illustrates the possibilities for increasing labor supply in the face of a shrinking number of potential workers:
 - Increase the participation rate at each age (increase width of the light blue bars)
 - Extend the definition of working age (raise the height of the light blue area)
- Most Chinese do not have retirement benefits and must rely on personal savings or family to support them in old age. Pension coverage is largely limited to urban workers in state owned enterprises where the official retirement age is 60 for men and 55 or below for women, ages that were set when life expectancy was closer to 50. Given today's life expectancy, these "official retirement ages," would result in about 19 years in retirement for men and 26 for women.

Workforce Implications: Demographic Dividend



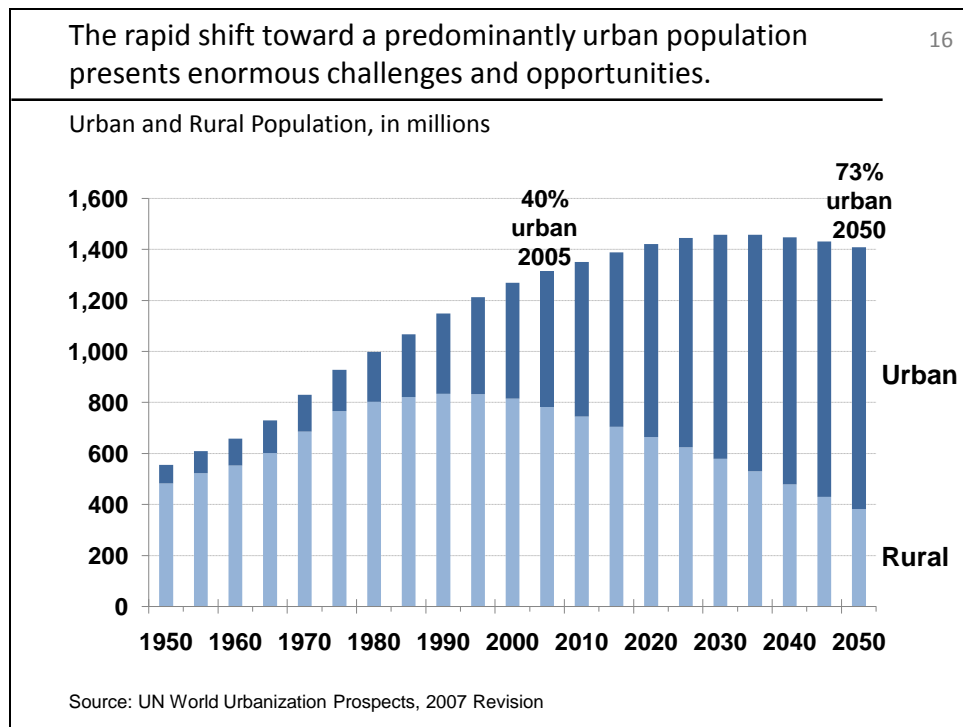
- A key determinant of a country's economic potential is growth in the relative size of its working-age population, specifically, the size of its working-age population relative to its dependent population, including children and retirees. The economic boost from an increase in the share of potentially productive people has been called a "demographic dividend."
- China has been enjoying a demographic dividend since around 1975. The increase in workers per dependent will continue until around 2015, so China has only a few years left to capitalize on this dividend. After that, the working age population begins to shrink while the older dependent population increases.

Workforce Implications: Worker-to Retiree Ratios



- The number of potential workers per retiree will fall precipitously worldwide over the next 45 years—there will be fewer and fewer workers per retiree everywhere. In China the number of potential workers per retiree will drop from 9.2 to 2.6.
- The fiscal implications of declining worker-retiree ratios are enormous: absent huge productivity gains, economic output will be lower and fewer and fewer workers will be contributing to the support of each retiree. The declining number of workers per retiree will increasingly strain national budgets as fewer and fewer workers fund the pension and health care costs of an increasing number of retirees.
- The ratios shown on the graph are based on standard historical definitions of working age, 15 to 64, and retirement age, 65+. For China, the narrower definition of working age as 15 to 59 makes the declining support ratio even more threatening. With this definition, the potential support ratio shown by the green line will fall from 6 to 2 by 2050. However, extending the working age definition to 69 and retirement to 70+ would ease the fiscal burden posed by the increasing older population. In this case, shown by the blue line, the support ratio would be significantly higher.

Urbanization



- By 2050, 73% of China's population of 1.4 billion people will live in urban areas. By 2050, the urban population in China will reach 1 billion, almost twice the number in 2005. With a doubling of the urban population, the cities in China will face enormous challenges in providing services and maintaining infrastructure.
- At the same time, the decline in rural population will pose the challenge of maintaining living standards and social services in those areas.

Appendix A: Alternative Fertility Scenarios

Appendix B: Comparative Reference – India, South Korea, Japan, and U.S.

Appendix A – Alternative Fertility Scenarios

The United Nations presents four major projections for each country. The primary variable in the alternative variants is fertility rate. The specific fertility assumptions from the World Population Prospects 2006 Revision are listed below. The data used in this report are based on the Medium variant projection.

Fertility assumptions:

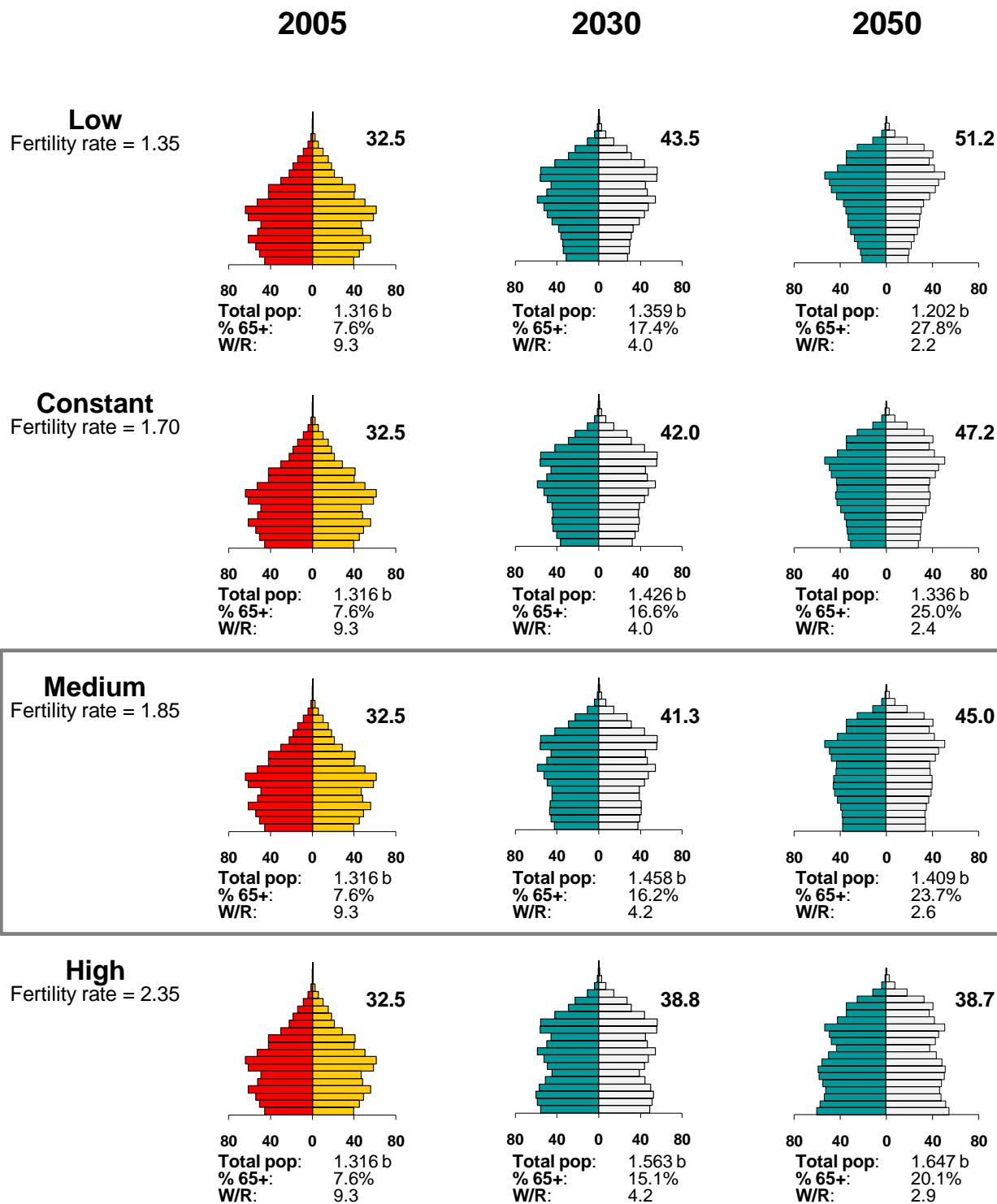
- **Low:** the fertility rate continues to fall until it stabilizes at 1.35 births per woman in 2020
- **Constant:** the fertility rate remains constant at the 2005 level of 1.70 births per woman
- **Medium:** the fertility rate increases to 1.85 births per woman in 2020 and then stabilizes
- **High:** the fertility rate increases to 2.35 births per woman in 2020 and then stabilizes

Observations:

The median age projections range from 51 for the low fertility variant (the most rapid aging) to 39 for the high fertility variant. The projections for % 65+ range from 28% to 20%, and the potential support ratios range from 2.2 to 2.9 in the high fertility case. All but the high fertility case result in declining total population.

- If the fertility rate declines to 1.35, by 2050 the median age will increase by 19 years to 51 and 28% of the population will be over 65. The potential support ratio of workers to retirees will drop to 2.2 from the current 9.3.
- If fertility rates remain constant, the share of 65+ will increase to 25% by 2050 and the potential worker to retiree ratio will fall to 2.4 from the current 9.3. The median age will increase to 47.
- In the medium variant used in this report, the fertility rate increases to 1.85 and median age increases to 45. The share of 65+ will increase to 24% by 2050 and the potential worker to retiree ratio will fall to 2.6
- In the high fertility rate scenario, by 2050 the median age will increase by only 6 years to 38.7; 20% of the population will be 65 or older, and the ratio of working-age to retirement-age people will be 2.9. The high fertility variant is the only case that produces a growing population.

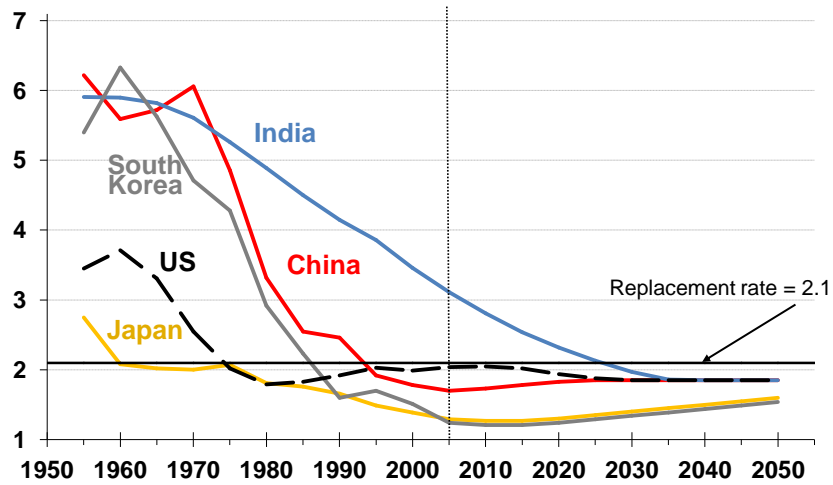
Appendix A – Alternative Fertility Scenarios



Appendix B – Comparative Reference

Fertility rates have plummeted, with especially steep drops in China and South Korea.

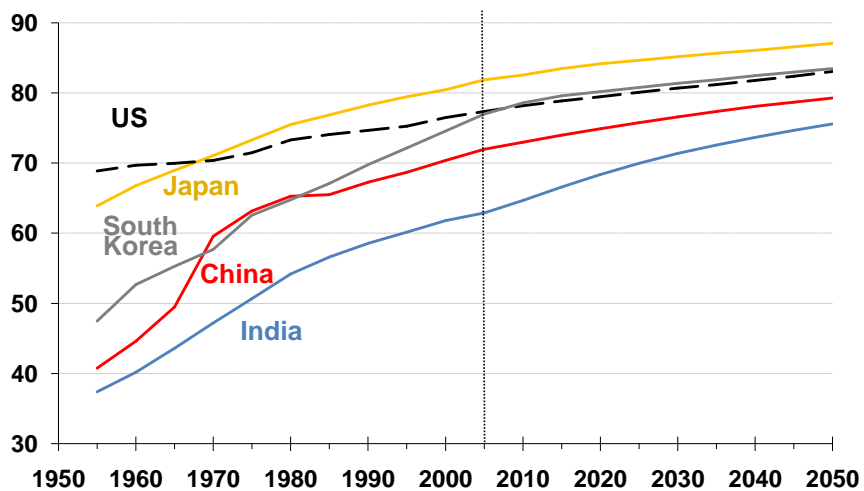
Fertility (Births per Woman)



Source: United Nations 2006 medium variant forecast

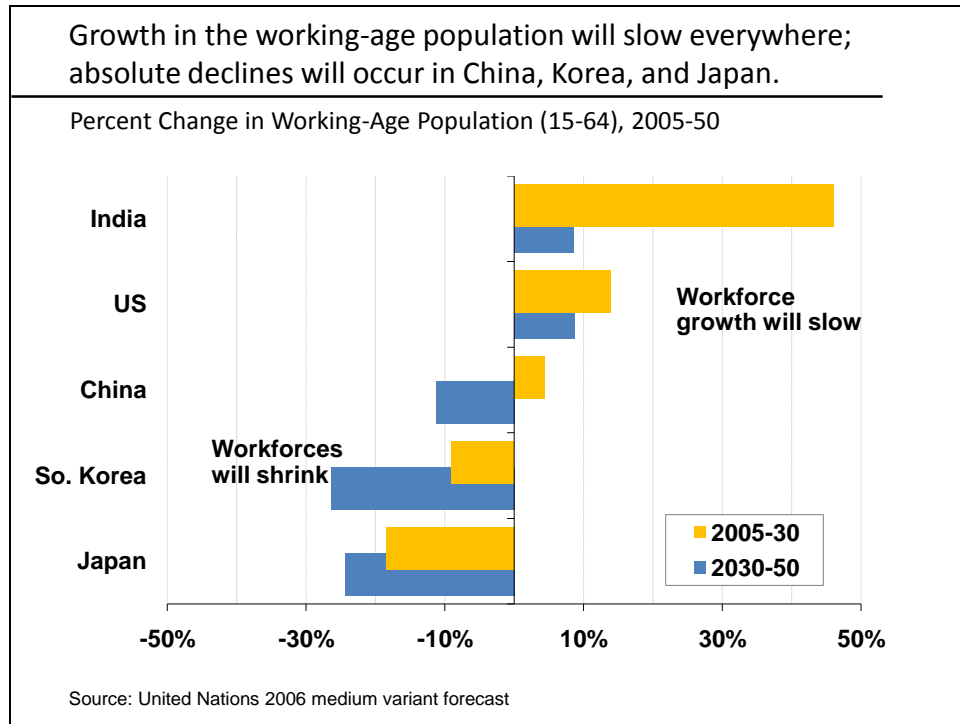
Longevity gains have occurred everywhere.

Life Expectancy at Birth, in years

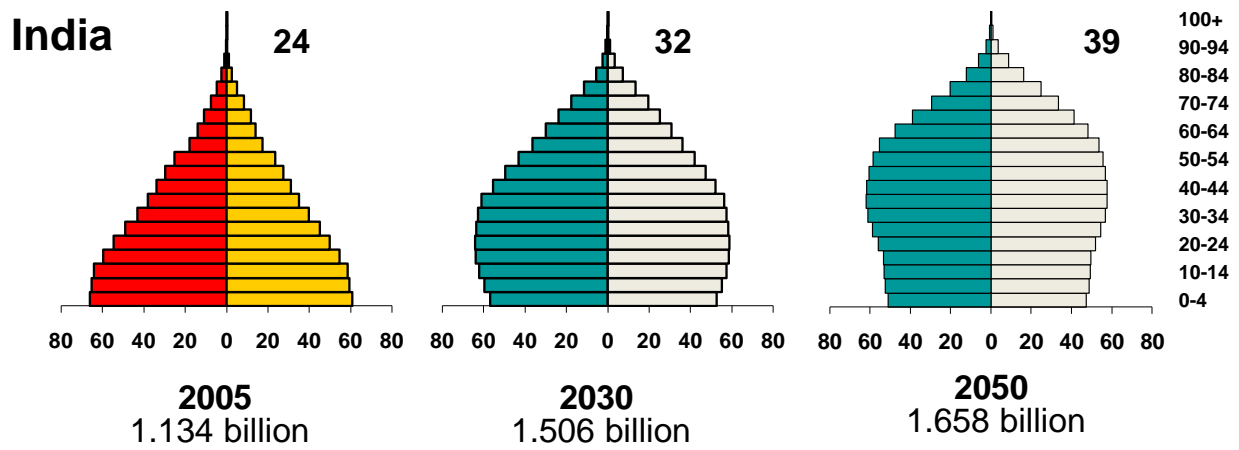
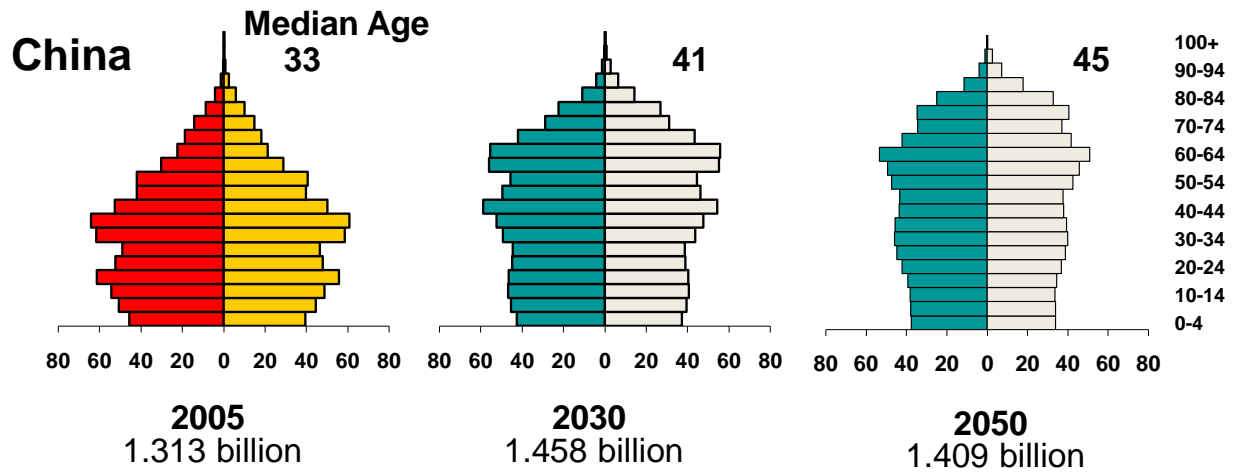


Source: United Nations 2006 medium variant forecast

Appendix B – Comparative Reference

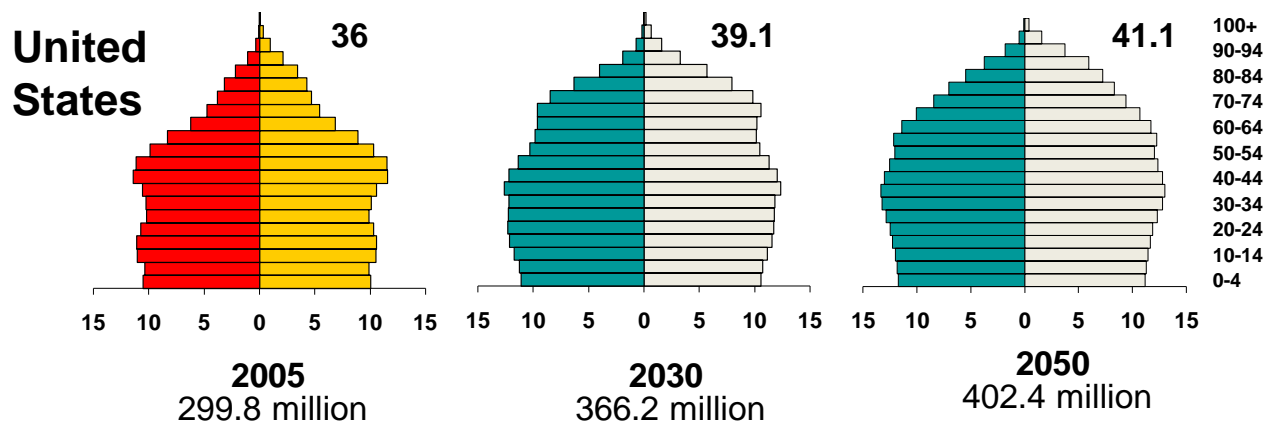
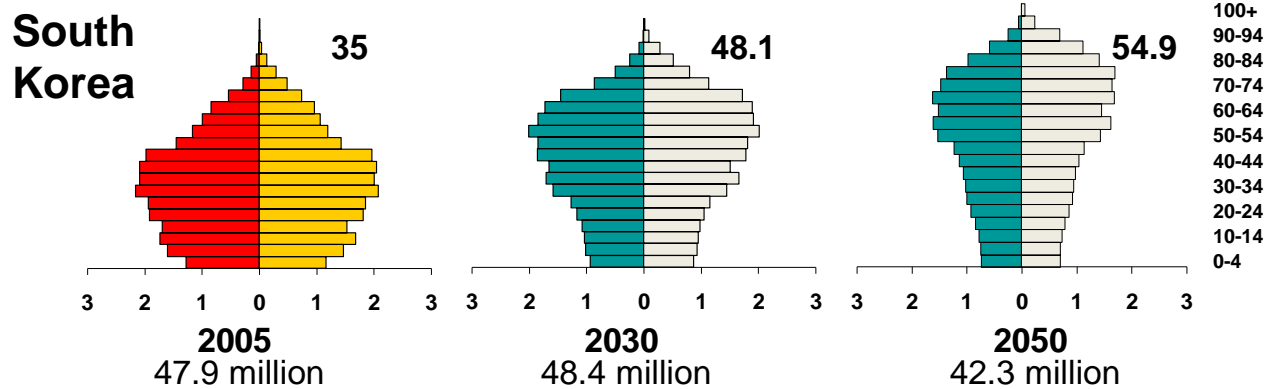
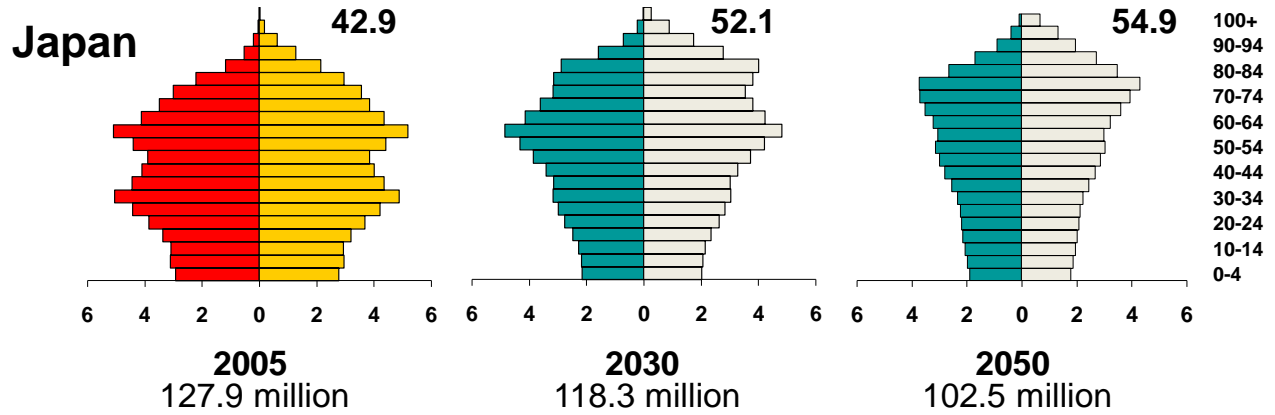


Appendix B – Comparative Reference



Appendix B – Comparative Reference

Median Age





The **Global Aging Program** at the Stanford Center on Longevity focuses on the economic and political implications of longevity. The program specifically addresses the risks and opportunities of differential population aging around the world and the impacts on global economics, sustainability, and US national security interests.

The **Stanford Center on Longevity** seeks to transform the culture of human aging using science and technology. Working as a catalyst for change, the Center identifies challenges associated with increased life expectancy, supports scientific and technological research concerning those challenges, and coordinates efforts among researchers, policymakers, entrepreneurs, and the media to find effective solutions. SCL was founded in 2006 by Professor Laura Carstensen and received its initial funding from Richard Rainwater. The SCL Advisory Council includes George Shultz, former U.S. Secretary of State, and Jack Rowe, former Chairman and CEO of Aetna.

Adele Hayutin, Ph.D., Senior Research Scholar and Director of SCL's Global Aging Program, is a leader in the field of comparative international demographics and population aging. Dr. Hayutin combines broad knowledge of the underlying data with the ability to translate that data into practical easy to understand language and implications. She has developed a comparative international perspective that highlights surprising demographic differences across countries and illustrates the unexpected speed of critical demographic changes. Previously she was director of research and chief economist of the Fremont Group (formerly Bechtel Investments) where she focused on issues and trends affecting business investment strategy. Dr. Hayutin received a BA from Wellesley College and a Master's in Public Policy and a Ph.D. from the University of California at Berkeley.

**Stanford Center on Longevity
616 Serra Street
Encina Hall, East Wing, 5th Floor
Stanford University
Stanford, California 94305**

**<http://longevity.stanford.edu/myworld>
650-736-8643**