The Next 100 Years
Workshop Report

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Table of Contents

On October 8 and 9, 2008 Booz Allen Hamilton hosted the *Next 100 Years Workshop* in Arlington, Virginia. The one-and-a-half day workshop, sponsored by the Director, Net Assessment, Office of the Secretary of Defense (OSD/NA), brought together 10 outside experts to discuss major changes that could occur over the next century in demographics, technology and information, and warfare. The following experts participated in the *Next 100 Years Workshop:*

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The workshop featured several scene-setting presentations by experts, followed by an open discussion period. The report that follows gives a brief summation of the key insights and findings of the seminar and proceeds in four sections. First, it captures the most important and fundamental changes that may occur over the next century. Second, the report outlines key trends for the next 100 years in three main areas: demographics, information and technology, and the future of war. Third, it evaluates potential implications of those trends in greater detail. Finally, it identifies questions for further research.

The issues on which experts focused are largely interconnected. Participants' presentations and discussions often overlapped, reflecting the interdependence and linkage of the material at hand specifically and the international order in general. The implications of each trend are, in almost every case, best understood by recognizing the ways in which they intersect.

Workshop findings indicated that global populations, including their location and structure, are likely to change dramatically over the next 100 years. Advances in the sciences and information technology will affect human health and life expectancy, in addition to revealing previously unknown information about human systems. Some experts argued that war and conflict will also change as a result of technology developments.

There will be fundamental changes to the location and composition of the world's population.

- Europe's population is aging and, in some countries, already declining. Fertility rates in almost all European nations are below replacement levels. Experts cautioned that birth rates are almost impossible to predict over the long run but see no evidence that this trend may soon change. Immigrants from Africa, the Middle East, and the Indian subcontinent will continue to move to Europe, comprising greater percentages of national populations over time.

- China will continue to rise for the next 15 to 20 years but will then feel the effects of demographic forces, including a rapidly aging population, that may stall economic growth. Setbacks and stagnation may result in erratic and unpredictable political behavior on the part of China driven by socio-political weakness. However, the actual consequences of Chinese instability on its future behavior are unclear.

- Japan, like Europe, will confront an aging and eventually shrinking population. Technological advances may provide Japan with a relative advantage, and it may lose fewer people due to "brain drain" than other countries, but a younger generation may not be able to sustain the nation's rapidly aging yet healthy population.

- India's challenges will stem from the consequences of disparate growth rates among different sections of its population. Experts argued that demographically, India will face fewer adverse trends than China over the coming generation but warned that serious problems would emerge. Identifying and evaluating these problems warrants further attention.

- Africa will constitute 20 percent of the global population by 2050, one-quarter of the world total by 2100, and will become a much more populous region of the world than it is today. Experts suggested economic and military power could follow this population growth, but it is unclear if increases in the number of people portend geopolitical strength.

- Russia is experiencing, and will continue to experience, a demographic crisis. Mortality is increasing, even among segments of the population, such as teenage girls, whose assumed resistance to negative changes in death rates proved false. Life expectancy, around 65 years for males and nearly 75 for females in the late

1980s, dropped precipitously in the 1990s and remains lower today than in the Soviet era.

- Life expectancy is likely to increase in the developed world, due in part to scientific and technological advances. Relatively poorer countries, however, may not reap the same benefits and could fall further behind.

- Women are choosing to have fewer children and to bear those children later in life.

- The world's population is actually becoming younger if measured as time from death instead of time from birth. Western societies and countries such as Japan will increasingly comprise aging populations that expect to live for a long time, but decreasing fertility rates will result in insufficient numbers of the younger generation to replace the aging.

- Yemen, Pakistan, Afghanistan, and Nigeria are set to grow rapidly over the coming generation. Currently powerful Muslim states such as Egypt and Iran, however, have markedly lower fertility rates, suggesting that emergent Muslim powers will replace traditionally strong geopolitical actors in the Islamic world.

- Individual and group mobility will increase, and new patterns of migration may take hold. These shifts may threaten peace and security in some countries and create new fault lines around which violent conflict may develop.

- Demographic shifts portend a radical change to the countries and groups that are either allies or adversaries of the United States. New powerful actors may challenge America, but it is possible to conceive of a situation where the United States is without a near-peer competitor.

The consequences of information and technology ubiquity will become more significant.

- Technology tools will enable enemies, affording them new opportunities to conduct mass violence or cause chaos easily. Individuals will have greater power to damage nation-states.

- Access to technology and communications tools will diminish the primacy of physical space. Experts suggested that virtual worlds will become immersive and accessible, challenging physical worlds as the primary hubs of global interaction.

- Science and technology have the prospect to facilitate a deeper understanding of human systems and cognition. Enhanced knowledge in these areas may further accelerate life expectancy and provide advantages in war by increasing situational awareness and enabling knowledge of the enemy's intentions.

Traditional war will become augmented and diversified.

- Experts posited that non-state actors, including ethnic, social, and cultural groups, will continue to rise in prominence. Their role as key actors or drivers of armed conflict is also likely to increase.

- The underlying goals of conflict will broaden to include attacking and/or controlling and exploiting critical assets, resources, and power centers of societies. "Weapons of mass confusion," such as biological and chemical weapons, may have more utility than weapons of mass destruction (WMD).

- War will become increasingly autonomous, fought less by people than by machines.

TRENDS

The next 100 years will see major shifts in the structure and location of the global population. These demographic transformations will radically reconfigure the distribution of world populations but receive relatively little attention today from policymakers who remain concerned with traditional security problems. Significant changes to the distribution and use of information and technology, the characteristics of war, and the centrality of certain ideologies and identities may also occur.

DEMOGRAPHICS

Since 1908, there has been a "radical realignment of people on the planet by geographic area," according to one expert. Rapidly declining birth rates in Organization for Economic Cooperation and Development (OECD) countries—falling far below sub-replacement levels in most cases—combined with population explosions in Africa and parts of Asia and the Middle East are likely to lead to new population and power centers over the next 100 years. Experts agreed that it is difficult to predict exactly how populations will rise and fall, but there is little doubt as to broad trends. Graphs presented by one participant showed a near-global decline in births between 1960 and 1980-90. Countries differed by the birth rates at which they started and ended, but the decline was similar across all nations represented by the graph. Importantly, models that predict population changes are limited by human inputs and may not accurately capture the extent to which population size, structure, and location will change.

Europe and the OECD

- Europe's population is currently stagnating and could implode in the generations ahead. Total fertility rates are below two births per woman in all European countries, with the possible exception of Albania, and approach one birth per woman in some nations. The replacement level is approximately 2.1.

- Indigenous fertility may be lower than the overall rate. Immigrant populations probably raise the overall birth rate in Europe.

- "White flight" (emigration of the native-born population) is probably exacerbating Europe's population decline.

- Other OECD nations such as Australia, New Zealand, and Canada have fertility levels that are only marginally higher than Europe's. Japan's population will probably decline.

- The United States is the outlier among OECD countries, presently keeping fertility rates at or near the replacement level.

Asia

- China has a rapidly aging population and low fertility rates, which dropped below replacement levels at a national level almost two decades ago. Fertility in China is lowest in urban centers.

- India is likely to face considerable challenges stemming from disparate growth among the different sectors of its population. Experts argued, however, that the economic implications of its population trends will leave India better off than China in the coming generation.

- United Nations (UN) "medium variant" projections suggest that by 2050, India and China will have the same fertility rate of 1.85. The difference is that China will reach this point in 2015, when India would still have a projected rate of 2.46.[1]

- If current demographic trends continue, Japan's population will age and decrease more rapidly than that of other major developed nations.

- Experts agreed that East Asia's population is "imploding," while West Asia's is "exploding."

Africa

- "The future of the world is black," according to one participant. Africa's population is exploding; fertility rates are higher in Africa than anywhere else in the world.

- By 2100, Africa's population may be greater than Europe and North and South America combined.

- Fertility rates in Africa are currently around five births per woman. In the Maghreb, this rate is falling to about three, which still makes for continuing expansion. Ethiopia's growth could be particularly massive.

- Africa's relatively high death rates do not mitigate its rapid population growth. Experts noted that in general, fertility rates have a much greater impact on overall population size due to their compounding effects.

Middle East

- Fertility rates can decrease rapidly, as is evident in Iran. In 20 years, fertility rates in that country dropped from almost seven to just above two.

- Yemen could experience truly astonishing rapid growth: on current trajectories, it could reach 100 million people by 2050. Its fertility rates remain around five, as is the case in Pakistan and Iraq.

- In Iraq, experts agreed that people continue to have children as a form of social security. The stabilization of birth rates around five supports this conclusion.

South America

- South America's fertility rates are similar to those of the West, but there are major differences between native and European populations. Fertility rates among indigenous peoples have stabilized at higher overall levels than in white

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[1] Helpful charts for both nations, drawn from U.N. databases, are available here:
http://globalis.gvu.unu.edu/indicator_detail.cfm?country=CN&indicatorid=138 (China); and
http://globalis.gvu.unu.edu/indicator_detail.cfm?country=IN&indicatorid=138 (India).

communities, suggesting that groups such as the Aztecs, Incas, Quechuas, and Mayans could eventually regain majority status, at least in some countries.

Life Expectancy and Health

- Life expectancy will continue to rise, as it has for 160 years, at least for wealthier countries. Since 1940, life expectancy has increased at a rate of two days per week. The life expectancy gap is likely to increase between wealthy developed and developing countries.

- Consistent scientific and technological innovation is primarily responsible for these gains, put participants noted that no single factor accounts for the increase.

- The world's population is becoming younger if the point of reference is time from death instead of time from birth.

- Societies are capable of experiencing major stagnations or even retrogressions in health. Russia's decline, at its worst in the 1990s, is evidence that even relatively successful nations can deteriorate. Botswana, generally heralded as Africa's best success story, experienced a 10-year drop in life expectancy between 1996 and 2004.

- A greater percentage of the world's female population is reaching childbearing age, even in regions where death rates are high, due to widespread advances in healthcare, education, and access to key resources.

Voluntary Childlessness, Family, and Sex

- Participants agreed that increased female autonomy and choice is leading to a preference among women to wait to have children until later in life, and a desire for smaller families.

- Experts asserted that hedonism and value changes, especially in Europe, are key drivers of shrinking fertility rates. Children are relatively more expensive than in the past. In many parts of the world, women are placing less emphasis on having children. They are choosing to spend their time and money on things other than children

- Experts predicted that it could be possible in the future to defer birth until women are in their 50s or even 60s, reflecting the fact that technology advances are, and will continue to be, a facilitator of enhanced choice and autonomy. Technological and scientific transformations often directly relate to demographic changes

- Sexual activity apparently has not declined. The prevalence of contraceptives and access to abortion allows women greater sexual freedom without the risk of pregnancy. Females are also choosing to separate sex from reproduction.

- The centrality of the family unit is declining, and new social groups and networks are gaining prominence. Friends, colleagues, and other individuals with shared values and interests are encroaching on the traditional space reserved for the family.

TECHNOLOGY AND INFORMATION

- Virtual worlds will become important to the existence of many, or even most, people.

- The quantity and availability of data is rapidly increasing. Information is less restrictive, often accessible to anyone, and offers tremendous advantage to those who receive and process it effectively first.

- Access to data and information, however, does not necessarily lead to better use of that data. Context is crucial. As one expert highlighted, what is knowable is growing much faster than our ability to make sense of it.

FUTURE OF WAR

- Actors involved in war are diversifying to include a myriad of non-state groups. War is also become highly automated.

- The location of war is shifting. Traditional battlefields will be supplemented by financial, economic, and information conflict that are "fought" primarily in the virtual world. Geopolitically, new fault lines for conflict and combat may emerge; predicting where these will arise is difficult. Clashing ethnic groups, rising national powers, and amorphous terror networks could all provide impetus for new violence in new spaces.

- Controlling hubs of power may replace population and territorial control as primary goals of warfare. Violence may diminish as the need to control scarce resources supersedes killing an enemy. Primacy over information and communication lines will become even more crucial in combat than it is today.

- Some participants asserted that human capabilities and follies, in addition to the complex and imperfect nature of war, will limit the extent to which conflict can dramatically change, regardless of other emerging trends.

IDEOLOGIES

Participants identified a series of ideologies that may be significant in the next 100 years. These ideologies will help shape human behavior, and although not entirely distinct from past ideologies, may assume new characteristics and importance.

- Feminism
- Environmentalism
- Religion

IMPLICATIONS

This section identifies and analyzes the specific global challenges or opportunities that could occur as a result of the trends identified above. By drawing on and analyzing experts' discussions, it seeks to explore the essential question of why these trends and transformations matter.

EUROPE

Europe is likely to undergo significant change in the next 100 years. It is probable that declining birth rates coupled with increased immigration will generate friction among the continent's population. The priorities of European governments are also shifting, suggesting a decreasing emphasis on the transatlantic alliance. Consequentially, as participants noted, the United States may no longer be able to rely on its traditional allies for political and military support.

Demographic Pressures. A major implication revealed during the workshop was that "white" Europe might become a minority sometime in the next 100 years. It is expected that African and Muslim immigrant communities will grow in both the near and long term. As such, traditional and dominant European culture may be radically different in a few generations. Europe needs immigrants to sustain even its current levels of economic growth and productivity; given rapidly declining birth rates, migrants are critical to maintaining economic strength. Germany, one expert pointed out, must absorb 4,000 immigrants per million citizens to keep its population constant. The general sentiment in many European nations, however, is that increased immigration creates political tensions and social cleavages. France, the United Kingdom, Spain, Belgium, and the Netherlands already experience consistent public discord, occasionally resulting in violence, between natives and immigrants. Population trends suggest that these trends will worsen, potentially challenging domestic political stability in some European countries.

The Transatlantic Alliance. Europe's value as an ally will probably be of concern to the United States over the next 100 years. Major changes to the structure of the European population could preclude the continent from maintaining a deep alliance with Washington. Individual European countries may come under pressure to loosen ties with the United States as their non-white populations become more assertive. America may find that within a few generations it can no longer rely on its traditional European allies when pursuing global geopolitical objectives. Europe's turn inward may also be increasingly evident by the development of the welfare state. Participants noted that the level of national resources diverted toward social services might diminish the ability of European countries to take external action.

Turkey. Turkey presents special challenges for Europe. On the one hand, Ankara's deepening integration into the European community, culminating in eventual European Union (EU) membership, is a way to extend Europe's sphere of influence and demonstrate to Muslim communities that Europe and the West do not seek to build barriers against Islam. On the other hand, there is little doubt that Turkish membership in the EU would radically transform the composition of Europe's population. The majority

of European leaders oppose Turkish accession, as does the European street. As such, there is a real risk of Muslims assuming that Europe intends to preserve the EU as a predominately white political and cultural group. Backlash is possible.

ASIA

Experts agreed that Asian nations and the region as a whole will undergo major demographic, economic, and political changes. Participants predicted that emergent challenges in China might destabilize the region and draw the United States into conflict. Divergent rates of population growth in different countries will probably exacerbate political and economic risks and may lead to a shift in the regional balance of power.

China. Experts concurred that China will suffer a major economic downturn within the next 15-20 years. One participant predicted that China will "get old before it gets rich;" another asserted, "enormous bills will come due." An aging population with health risks will lead to stagnated economic growth, potentially creating internal political and social instability. Participants noted that the specific changes China will undergo remain unclear.

Some participants asserted that the current global economic crisis will have more dramatic near-term impacts on China than are expected, but there was consensus that domestic demand will fuel Chinese growth for at least a decade before serious structural problems emerge. Experts offered that a decline in social trust driven by rapid urbanization could also negatively affect China. Family unity and kinship are vital to the Chinese, but the country's massive cities create conditions that make it difficult for those bonds to remain intact. Changes to the social order are likely to exacerbate tension and instability.

The Chinese government constantly focuses on maintaining power and legitimacy. Internal weakness may lead to aggressivity from Beijing as it seeks to shore up its power and convince domestic and international constituencies that it is in control. The Communist Party leadership could launch a diversionary conflict to avert attention from internal strife and compel the population to rally around the flag. Taiwan, Tibet, or a sovereign nation-state could be the target of such aggression. Participants noted, however, that China is well placed to preserve social cohesion in the face of domestic discontent. One expert argued that China can use kinship to organize and mobilize the population. These cultural characteristics may be politically advantageous, but also may be barriers to economic efficiency. Nepotism—stemming from kinship—is chronic.

India. Demographics experts underscored that India's population is considerably more stable than China's. Its fertility rates are not declining as fast, nor are its people becoming as old as rapidly as they are in China. China and India will reach the same fertility rate in approximately 2050. India will grow faster than China until then, potentially helping to relieve the strain of an aging population and providing momentum for continued economic growth and development.

Balance of Power. India, China, and the United States are not the only nations that affect the balance of power in Asia. West Asian populations are increasing, suggesting that old centers of power such as Japan and Korea may give way to emerging nations that have the population to drive economic growth and support hegemonic ambitions. Powerful Asian nations or regional hegemons may be different from what they are today. Specifically, China's massive growth and rapid rise to global power may be an anomaly in its history. There was no evidence, for example, of China's strength in 1908.

The Asian City. Asia's urban centers drive the region's growth and are widely considered the future of the continent. Cities are growing at unprecedented rates, and the dominant view is that this will be the status quo for the near future. Participants noted, however, that these metropolises are "fertility death traps." Urban inhabitants have fewer children, finding their time and resources consumed by a wealth of other options. Singapore, Shanghai, Hong Kong, and other similar urban centers are at the core of Asia's rapid development, growth, and global integration, but if their residents stop reproducing, that may not be the case in a few generations. Rural-to-urban migration may sustain some urban populations, but many cities will decline. Consequentially, there may be an increase in unemployment and a drop in productivity and profits for major companies and industries.

AFRICA

Participants concluded that Africa's rapidly increasing population has the potential to transform the continent. Ambitious actors may emerge, and new flashpoints could develop. The population boom, coupled with the ongoing paucity of political stability and consistent economic growth, increases the likelihood that threats to global security will emerge from the continent. Experts evaluated the probability that Africa could become a stable, important world power and explored the conditions that would facilitate such a rise, but disagreed on which conditions were most relevant.

Migration. Emigration will be a major consequence of Africa's, particularly Sub-Saharan Africa's, population explosion. Absent major improvements to living standards, quality of life, and employment, many Africans will simply leave. Many will move to Europe, straining European governments and exacerbating socio-cultural cleavages between white Europeans and African, particularly African Muslim, immigrant communities. Experts noted that this migration will consist mostly of young men; evidence suggests that this subset of the population is relatively more likely to be aggressive and violent than any other group.

Socio-political Violence. On the continent, massive crowds of angry young men, lacking not just employment but also any feasible prospects for employment, are likely to turn to crime, aggression, and violence. Social trust and cohesion may decline as the potential for group-on-group and predatory violence increases. In the face of rising hopelessness, bands of individuals and small groups may attempt to control scarce resources and mechanisms of power to obtain some relative advantage over others. Participants agreed that bands of young men using violence to exert illegitimate authority could existentially challenge already fragile governments.

Civil and political strife are the norm in Africa. If governments make little or no progress in creating jobs, ensuring relatively even access to scarce resources, providing basic social services, and establishing a modicum of property rights as the population explodes, it is probable that there will be substantial increases in the frequency, duration, and magnitude of violence across Africa. Conflict causes human flight, which is destabilizing for both the nation people are leaving and the country to which they flee. Importantly for Africa, rural-to-urban migration and sprawling, uncontrolled metropolises add to friction as people collide in densely populated environments dominated by squalid living conditions, massive unemployment, and extremely limited social trust.

The fusion of exploding and young populations, weak and failing governments, human flight, competition over valuable resources, and persistent development problems is extremely volatile. Tribalism, ethnic violence, and insurgency threaten even the most basic functions of government.[2] Where governments cannot exert authority, power vacuums emerge. Criminals and terrorists seeking to plot, plan, and execute illegal and violent activity fill these voids.

Reform and Development. Whether or not Africa can actually implement the necessary reforms and programs to turn its massive population into a potent global actor is unclear. One expert stated, "there will be no economic revolution in Africa in 20 years, but we must be more open minded 100 years out." Generally, participants emphasized the codification of property rights, establishment of the rule of law, and infrastructure development as prerequisites to sustainable progress in Africa. Building legal frameworks that ingrain and uphold basic property rights is essential to tapping illiquid wealth and catalyzing investment in infrastructure and other development programs. Momentum for development in Africa requires widespread institutionalization of basic norms and laws that the developed world takes for granted. Infrastructure is necessary for progress, but not sufficient in and of itself. Importantly, without steady investment, which will not come without rule of law, sustainable progress in infrastructure development is impossible. Currently, Africa's limited and dilapidated infrastructure is what one participant called a "mish-mash" of colonial relics.[3] Highway networks are nearly nonexistent. As a result, markets remain unlinked, and economic growth is severely constrained.[4]

Relatively little attention was given to ongoing development problems in Africa. Education, healthcare, food, clean water, and sanitation remain scarcely provided basic

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[2] In early 2008, violent tribalism emerged in Kenya after contested elections. Kenya was previously considered a relatively stable African country. Ethnic violence is common in Africa, but in its extreme and intractable forms can entirely paralyze nations, as is the case in Sudan, Congo, and Uganda. Nigeria faces an increasingly potent insurgency along the Niger River Delta; control of oil resources is the catalyst for conflict in this case.

[3] The often-mentioned non-standardization of rail gauges in Africa is a microcosm of larger infrastructure problems. Trains frequently cannot operate across borders due to different-sized gauges. The efficient movement of goods is hampered; non-paved roads become the only other option for internal transportation.

[4] The development economist Paul Collier notes the importance of infrastructure in Africa, particularly for landlocked countries, in his text *The Bottom Billion* (New York: Oxford University Press, 2007). Access to ports, for example, is crucial to economic growth.

needs despite decades of effort from the international community. Housing is inadequate, and infectious disease, including HIV/AIDS, is prevalent. In light of an exploding population, these problems may worsen. It is certainly true that where populations are growing, there are already hungry people, and, as one participant adroitly noted, better nutrition is part of economic growth. Proper nutrition enables people to work harder, resist disease and illness, and gain more from education.[5]

Technology. Technology is now essential to millions of Africans and may help alleviate some of the development problems on the continent. One expert posited that virtual worlds will become especially dominant in Africa as $100-laptops proliferate and offer people in shantytowns an alternative lifestyle. Cell phones, it was claimed, are now considered to be as, if not more, important than food. Technology fosters interconnectivity—in Africa, the creation of grassroots networks among people is crucial to development. The importance for individuals to be able to access information and become linked to new and diverse markets in order to buy and sell goods should not be underestimated.

Moreover, technology has unexploited utility. As one participant noted, sending regular, positive messages about the United States to every cell phone in Africa could have, over time, a broad and deep positive impact. Technology can also protect people. A text message or special phone call can alert individuals to looming natural disasters and impending violence. A small team sitting in an office anywhere in the world could monitor by satellite, for example, the movements of the *janjaweed* in Sudan and alert people by cell phone of impending mass atrocities. One text message to one person has the potential to save an entire village.

African Leadership and Empires. The specific people, countries, or regions that might facilitate and lead a strong and powerful Africa are unclear. Experts noted that there was evidence of Chinese unity 100 years ago and asked whether this type of cohesion is required for Africa's rise. It may be possible for a collective political bloc to form that is not at the hands of one or two specific regimes but still acts as a driver and controller of African power. Such an arrangement might increase the resiliency of individual countries. If continental unity is unlikely, specific countries or regions may emerge as leaders. One expert noted the potential of West Africa (excluding Nigeria) to assume such a role due to its low levels of corruption, historic entrepreneurialism, and geographic location on the Atlantic. Others disagreed with this prediction, preferring to explore the possibility of a single country such as South Africa or Nigeria assuming a greater role in pushing Africa forward.

One participant emphasized the artificiality of 20th-century political boundaries, suggesting that there may be increased violent competition for resources and power on ethnic or tribal lines with little regard for borders. Given that countries in Africa are

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[5] This argument is made by Jeffrey Sachs in his text *The End of Poverty* (New York: Penguin, 2006), which can be valued for its description and assessment of Africa even if the reader does not agree with the author's policy proposals.

constructs of European colonization, it is worth considering whether ethnicity and tribalism might be more important than the state as the population continues to grow.

MIDDLE EAST

Participants spent little time discussing the Middle East and focused their attention predominantly on Yemen's rapid demographic changes. Yemen has a rapidly growing population that will likely number more than 100 million by 2050. It suffers from internal strife, scarcity of resources, and lack of opportunities for its burgeoning population. One expert suggested that there will either be a massive Yemeni diaspora, or the country may become expansionist as it attempts to preserve a basic standard of living for its people, perhaps even "taking over" Saudi Arabia.

IDENTITY AND IDEOLOGIES

People are likely to seek new identities based on ethnic, tribal, religious, or subnational categories; they may even identify themselves in terms of ad hoc social networks. In light of expanding options for self-identification, however, confusion emerges. People, pulled in a multitude of directions, may lose a clear sense of self-identity. Moreover, experts noted that accurate DNA mapping capabilities may force people to recognize previously unknown elements of their identity. This information could reveal things people do not like about themselves, their family, or their neighbors. Kinship may become relatively more important to some and less important to others, creating new lines of allegiance.

Feminism. Consistently expanding female choice is leading to assertions of the self that value having children less so than in the past. Women in most, but not all, parts of the world have heightened autonomy, and many are using that freedom to promote personal interests and desires. Women no longer feel a responsibility to have children and are able to engage in sex knowing that such activity does not have to be reproductive. At the same time, the importance of fathers is decreasing. Women are more willing and able to raise children on their own and can rely on a comprehensive set of welfare state resources to do so.[6] Alternatively, societies in which women lack personal freedom and men continue to assume a primary role in the family may continue to see higher birth rates than established communities or countries with relatively more feminist principles.

Environmentalism. Participants also emphasized the importance of the green movement in driving human behavior. Environmentalism was described by one expert as a "new religion" that will be increasingly prevalent over the next 100 years. Environmentalism is, however, a largely Western phenomenon to the extent that it emphasizes the destructiveness of human behavior and calls for limited or zero population growth. In developing and poorer countries, emerging concern for the environment does not automatically translate into a zero-growth, anti-population ideology.

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[6] A driver of this assertive feminist ideology, especially in Europe, as participants noted, is "Eurogamy:" the situation in which the welfare state replaces the father in childrearing. The need for male paternal support diminishes when the state is willing to sustain comprehensively mother and child. Eurogamy also frees women from having to commit to a particular man, even if she is pregnant.

Religion.   In the next 100 years, religion may become an increasingly polarizing phenomenon. Megachurches enable mass and overt displays of religiosity at the same time many communities are fighting to separate religion further from the public sphere. Some nations and regions are undergoing heightened religiosity; others are experiencing increased secularization.   Additionally, experts posited that theology is a driver of reproduction and that relatively religious societies are more likely to experience population growth than secular ones.

DEMOGRAPHICS AND STRUCTURAL CHANGES

Participants discussed several political, economic, and military implications of fundamental changes in demographic realities over the next century and suggested how these shifts might affect the United States.   First, existing security arrangements may require modification or redevelopment because of changing populations within countries and the emergence of new powers. Second, emigration may reduce the pool of human resources and talent that help drive economic and technological growth.   Finally, preference for smaller families and fewer children might create disincentive for military service.

Changes in Power Structure. A fundamental implication of the demographic trends presented at the workshop is that America's traditional allies are likely to experience eventual population declines. So too, however, are its potential near-peer adversaries. Europe, Japan, and Australia may have smaller populations and a radically different population structure in 100 years, but the same is true for China and Russia.

Participants also used specific population trends and group characteristics to predict the emergence of new powers. One expert argued that the United States should pay special attention to groups or nations that have a compact, cohesive population between 10 and 50 million and currently exist on the periphery of global society. Drawing on the history of the rise of Athens, Britain, and Japan, he suggested that these groups have the capabilities to be successful if they choose to be assertive. Participants were quick to note that policymakers seeking to discern potential new powers should analyze ethnic and social groups as well as nation-states.

One expert argued that disapora Chinese could become more powerful. This group does not have a unified, clearly defined territory, but it does have access to financial resources. Some participants posited that the bank "might be the new territory," or could at least reduce a group's need for a physical space from which to assert power.

Loss of Valuable Immigrants in the United States. Demographic trends for the United States are favorable when compared to other OECD countries. The American fertility rate is above replacement, and its population is expected to continue to grow.[7] As such, any declines in U.S. hegemony will have little to do with domestic population numbers. Participants suggested, rather, that the United States will see the departure of its best and

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[7] A middle-series projection from the U.S. Census Bureau projects a population of 392 million by 2050. See http://www.census.gov/population/www/pop-profile/natproj.html

brightest immigrants, who contribute value to the U.S. economy. Experts pointed to the importance of providing conditions and incentives to retain immigrants—especially those from China and India—who increasingly tend to return home after a short period in the United States.

The Military.   The size of the U.S. military may change dramatically due to the increased preference for small families. Participants hypothesized that smaller families might be less likely to allow their children to be put in harm's way. This reality may be particularly pronounced in only-child families. If this hypothesis is correct, then there may be a shortage of volunteer military personnel in the future. Potential adversaries such as China and Russia, however, may suffer similar problems.

Private organizations could become more important by providing services mostly restricted to national armed forces. Experts predicted a boom in the mercenary business over future generations, driven mostly on the supply side by rapid population growth in Africa.   South Africa's private military forces are already well known.   Pools of unemployed young men will be willing to accept risk for a job, an income, and an adventure.

INFORMATION, TECHNOLOGY, AND STRATEGY

Information inundates U.S. policymakers. In itself, however, more data does not confer any strategic advantage.   Sheer information abundance can complicate the strategic landscape if it is not organized and channeled properly. Currently, context-facilitating algorithms are "flatlining" as data volume grows exponentially, which, according to one participant, actually "makes us dumber." What is crucial is developing and implementing context engines to manage, discern, and harness that information to maintain strategic preeminence.   Technological systems and human skills are mutually essential to contextualizing information and using it effectively.

The ubiquity of information and technology will pose ever-greater risks.   Islamic extremists utilize the internet for radicalization, networking, and the actual planning of attacks. The genetic code for smallpox is now available online, underscoring the ease by which individuals can access information that has the potential to facilitate mass violence.   Further dissemination of information and the development of new technological tools will only increase the power of individuals and small groups over the next century. Experts also pointed to the rising threat of "weapons of mass confusion," which include biological agents, as evidence of the fusion of public information and technologies in ways that threaten rather than help.

Access to information technology is also a prime driver of individual empowerment. A single person can make hundreds of millions or even more than a billion dollars from his or her bedroom, or create deadly and destructive weapons, including WMD or weapons of mass confusion, for less than $1,000. Mark Zuckerberg and Jerome Kervail have

already demonstrated this emerging trend.[8] Super-empowered individuals will continue to influence the course of global events. Moreover, it is now easy for much of the world's population to obtain "cheap technology that is seen as old and throwaway but is still highly useful."

Experts also underscored the importance of information and technology to surveillance regimes. According to a participant, by 2050, "collective intelligence will locate what you need to know…and tell you." Cloud computing will become widespread.[9] It is important to note, however, that regardless of the extent of technological progress, information will always be subject to human decisions about how it is applied. One expert noted, for example, that individuals will view collective intelligence positively when it serves the individual and his or her doctor in solving a medical problem, but negatively when it is facilitating police surveillance.

Virtual worlds are "immersive and accessible," and may become equally important to physical communities. People will not just have a "second life" in a virtual world but will increasingly operate in virtual space. It will be, according to one expert, "nearly impossible to be involved in society without getting into these worlds." Virtual worlds also facilitate individual connections with a greater number of social circles, reinforcing the decline of the family as the primary unit of allegiance and identification. These trends are already evident through Islamists' use of the Internet, which in some cases extends to the creation of entire online communities of like-minded individuals who insulate themselves from the rest of the world to propagate radical ideologies among their ilk.

One expert argued, however, that information technology tends to "keep things the way they are." Countries that already have access to technology and the capabilities to diffuse it tend to lead new developments in technology, perpetuating their advantage. Increased access to technology will not lead to a radical restructuring of the global order; however, it can level the playing field by providing sub-state and non-state groups with tools through which they can challenge nation-states.

FUTURE WAR AND CONFLICT

Experts predicted potential changes to future war and conflict, including the actors involved, the location, and characteristics of war in the next 100 years. The emergent themes described below will augment traditional war and combat. Participants highlighted the problem of continually preparing to fight the last war better, rather than preparing for new and unexpected threats. One expert stated, "wars can be driven by a specter of external and internal weakness," suggesting that war may be manifested for increasingly diverse reasons and in new and different ways.

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[8] Zuckerberg is the founder of Facebook; Kerviel is the rogue trader who is alleged to have cost the French bank Société Générale nearly €5 million.
[9] Cloud computing is the process by which information is collected, stored, and then made available to everyone, wherever they are located, without knowledge of the systems that actually organize the information and make it available.

Actors Involved. The state is likely to continue to lose its monopoly on the use of force. As such, wars and armed struggles will continue to involve non-state actors, and the centrality of those actors will increase. Conflicts may erupt exclusively between groups and organizations that are not accountable to any government. Ethnic, tribal, or group-on-group violence is likely to be more common. The United States may increasingly be fighting against, or working with, individuals and small groups of people who have no formal authority but represent, in any specific situation, one of the parties to hostilities. A key consequence of these possibilities is that prevailing international norms and laws of war will be inadequate in regulating future conflict. Even knowing who to engage in diplomacy or negotiations may not be clear. Each conflict will be dramatically different, suggesting the need for strategic and operational flexibility.

The decentralization of conflict will continue over the next 100 years. According to one participant, "everyone can be involved in conflict, including poorly-identified, part-time, loosely-affiliated combatants." A multitude of potential adversaries, including small groups and individuals who are difficult to identify before they actually conduct violence, may have the capability to use tools of war to affect geopolitics.

Future war is likely to be increasingly autonomous, mechanic, and electronic. Combatants will employ "surrogates and avatars;" *Star Wars*-like scenarios of combat are a "not-unlikely future," according to one expert. Reliance on robotics diminishes or removes human risk from combat, and, as such, may allow more freedom to take military action in places or situations that would otherwise have been inappropriate or unsuitable.

Participants tempered predictions of a total shift to non-human war by emphasizing a "specter of autonomy…a sweet spot between man and machine in the interface [to] maximize the utility of both." Success and strategic advantage depends on maintaining an optimal balance between human and machine capabilities, rather than developing machines at the expense of humans. One expert described this conundrum as the question of "injecting man into the loop at the right time and place." Situational awareness remains fundamentally important to war, regardless of technology.

Location. It is nearly impossible to predict the exact setting of future conflict. One expert argued that "nowhere has been impervious to violent political conflict. You cannot look out and say that you will not have conflict between great powers, or internal conflict. You have to be prepared for everything." Small wars in seam states or on the periphery of the functioning core of stable, peaceful, integrated countries may be frequent.[10]

Future wars may not require physical space; experts posited an increase in virtual and cyber conflict. Runs on banks or other manipulations of markets and currencies, carried out by just a few people, could destabilize entire countries. Moreover, cyber attacks or

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[10] The military strategist Thomas Barnett developed the idea of the "functioning core," distinguishing it from the "non-integrating gap," and suggests that future conflicts will be between the core and the gap. For more information, see *The Pentagon's New Map* (New York: Penguin, 2004).

technology-driven attacks on financial and economic hubs can be carried out from anywhere in the world.

Characteristics. Denying the enemy access to key strategic assets will augment goals of traditional war. Future adversaries will seek to attack financial, economic, and technological hubs and exploit vulnerabilities by disturbing other critical control centers of modern society or gaining control of scarce resources.[11] A participant described these realities as battle over things that are "valuable and exist in small quantities." Another expert posited that future battlefields would be "critical infrastructures" of societies. The target will not just be governments and their direct assets, but anything of value to a particular society.

Experts predicted that information, already critical to success in war, will become more vital in the future. One expert argued that winners will be able to "see and hear everything and act accordingly, often highly automatically," and that "mastery of the electromagnetic spectrum will be ever more synonymous with geopolitical mastery." As is the case with all information, greater data quantities do not necessarily lead to better results on the battlefield. Human calculations and abilities are critical. Arguments that future "winners" will be free of a "fog of war" are entirely premature, according to one participant, who questioned the extent to which the current frictions in war will ever be eliminated. Technological advances do not overcome the need for sensible and sophisticated strategic thinking. Participants also noted the potential for "mind reading" to offer an information advantage. The brain, according to one expert, considers an action seven seconds before the person executes that action. In battle, those seven seconds could be significant.

There will be a blurring of crime and war over the next 100 years. One expert suggested that future enemies will exploit the inability of policymakers to manage this dichotomy effectively by operating in the gray area between law and war. Many future security threats may not fit the current definitions of crime or war; participants asked, for example, whether Chinese hackers taking down vital financial websites in the United States, for an example, is a crime or act of war.

Basic problems of strategy and friction will not disappear from war, regardless of any other changes. According to one participant, "friction is inherent in military operations…the fundamental sources of friction cannot be eliminated." No level of automation or access to information removes uncertainty, unpredictability, and chance. Certain events will be unforeseen, the enemy will act in an unexpected way, and there will always be physical and political limits to accomplishments in war. Good strategy is the only mitigation against these risks; as one expert noted, there are patterns of strategic

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[11] For further discussion of this shift in the character of war, see John Robb, *Brave New War* (Hoboken, NJ: Wiley & Sons, 2007). Robb writes "This new method is called *systems disruption*, a simple way of attacking the critical networks (electricity, oil, gas, water, communications, and transportation) that underpin modern life" (p.4, emphasis in original). He also argues that "[P]erhaps in as little as twenty years, and as the leverage provided by technology increases, this threshold [the ability of small groups to conduct and win wars] will finally reach its culmination – *with the ability of one man to declare war on the world and win*" (p.8, emphasis in original).

problems in U.S. policy documents, including mistaking goals for strategy, picking poor goals, failing to recognize limitations, and making false presumptions about the parties to war. Developing good strategy relies on exceptional calculations and planning by thoughtful and talented individuals. Identifying the cognitive abilities of people who may be particularly suited to serve as strategists and leaders will be a crucial component for military advantage in the next 100 years.

QUESTIONS FOR FURTHER STUDY

This section identifies geopolitical and geo-economic, as well as identity and socio-cultural questions that warrant further research.

GEOPOLITICAL AND GEO-ECONOMIC QUESTIONS

- **Indian Demographics.** What will be the outcome of India's disparate demographic trends? Does the Indian government have a strategy to manage its population growth? If China will become old before it is rich, what does India need to do to become rich before it is old?

- **Migration.** Which countries will be sources and recipients of large-scale migration? Why will these migrations occur? At what point will Asians and Africans have the mobility to migrate en masse?

- **Resources.** Where will there be violent competition for resources? How will the United States ensure access to a variety of critical resources? How can resources be protected?

- **Economic Prosperity.** Given demographic changes, what countries and regions will be wealthy or poor? What are the major economic changes that flow from population shifts? Will Africa's economies become strong and competitive enough to drive the continent's geopolitical rise?

IDENTITY AND SOCIO-CULTURAL QUESTIONS

- **Sources of Identity.** What will be the precise sources of personal identity? How will these differ between people and places? How might advances in DNA technology, which can provide people with greater information about their genealogy and that of their neighbors, affect geopolitics?

- **Soft Power.** How do population changes affect cultural and soft power? Will English cease to be the dominant global language? Will American culture, often viewed both positively and negatively as the core driver of globalization, remain preeminent? Will the U.S. dollar remain the paramount global currency?

- **Dominant Cultures.** Which cultures and ethnicities are likely to be politically, socially, and economically dominant? How will these groups behave?

The Next 100 Years:

Speculations about
Global Demography

American Enterprise Institute

October 8 and 9, 2008

A-1

Outline of Presentation

- Limits of our Current Knowledge—and Imagination

- Prospects for Mortality

- Possibilities for Fertility

- New Family Patterns and Living Arrangements

- Consequences of Migration

- Impending Global Shifts

What A Difference A Century Makes:
Would We Have Predicted *Today* in 1908?

	c.1908	c.2008
World Population	1.7 Billion	6.7 Billion
Total Fertility Rate	5+	2.6
Life Expectancy	30 years	66 years
Median Age	20 years	28 years
Europe as Share Of Total World Population	24-24 percent	11 percent

Hunting Methuselah
Record Female Life Expectancy, 1840-Present
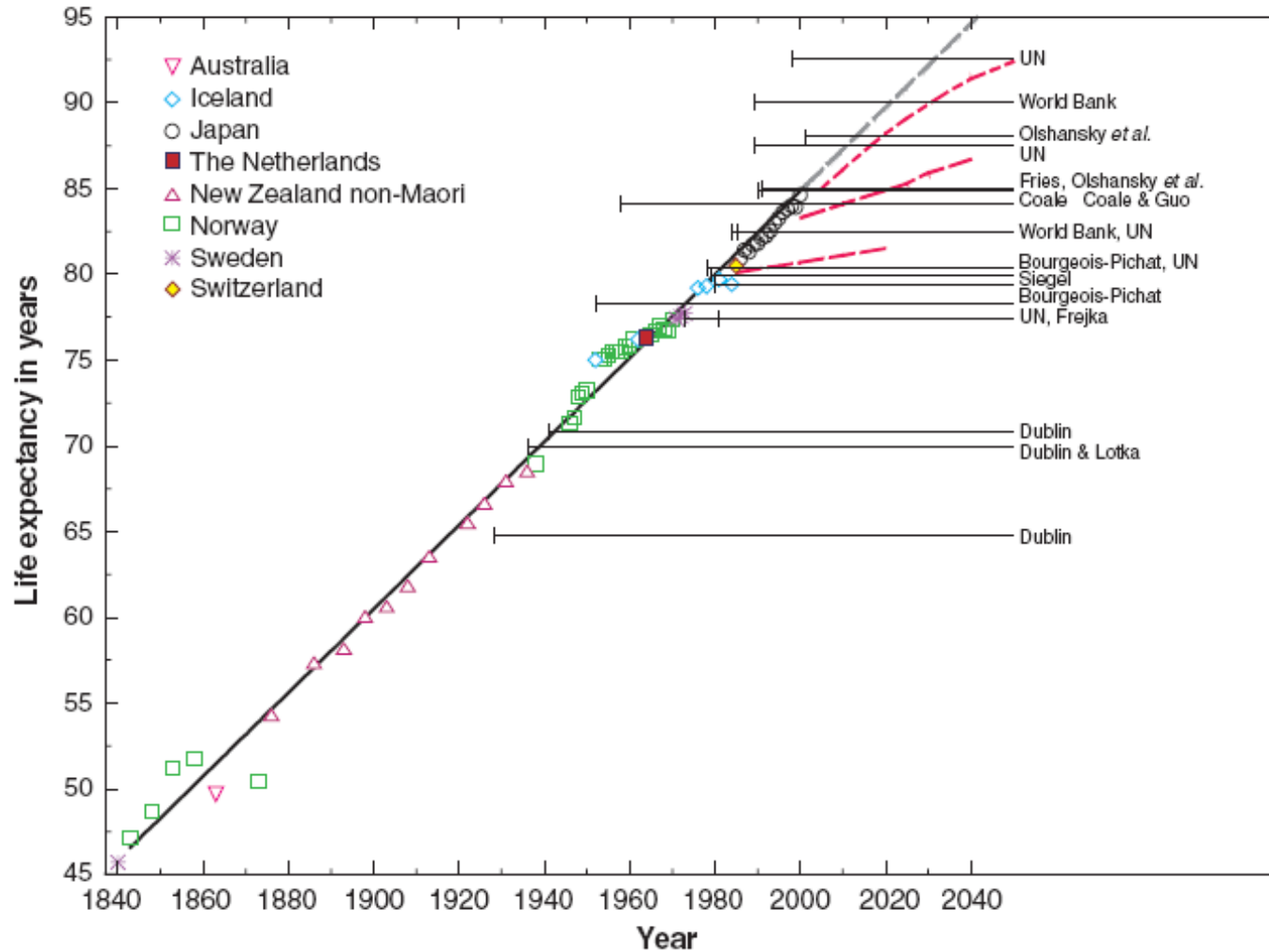
Source: Vaupel, James W. and Jim Oeppen, "Broken Limits to Life Expectancy," *Science*, May 10, 2002

Note: The horizontal black lines show asserted ceilings on life expectancy, with a short vertical line indicating the year of publication. The dashed red lines denote projections of female life expectancy in Japan published by the United Nations in 1986, 1999, and 2001.

Not Only Longer Lives, But Healthier Ones

Age-Adjusted Prevalence of Disability, U.S. Non-institutionalized Population 70+, 1983 to 2005
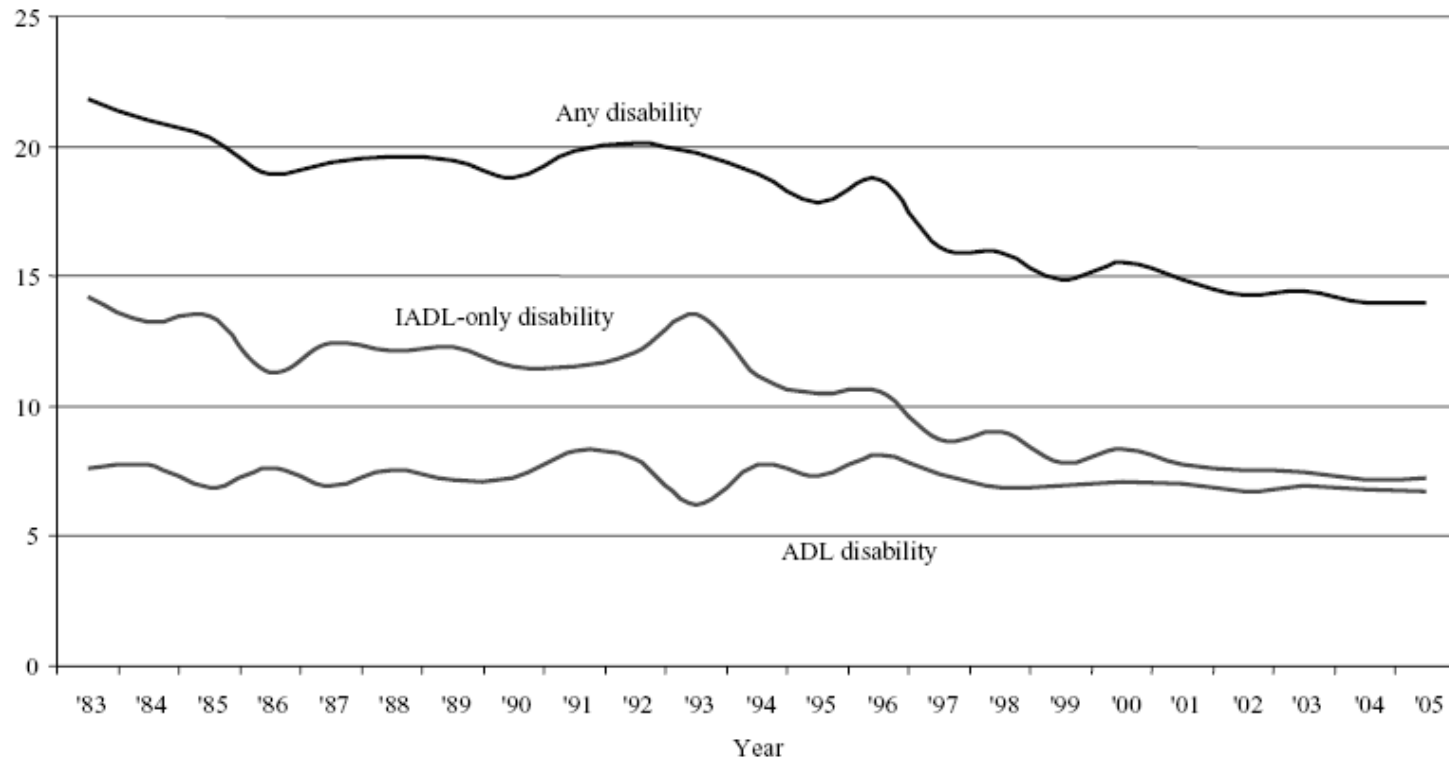
Source: Authors' tabulations using the National Health Interview Survey.

Schoeni, Robert F., Vicki A. Freedman, and Linda G. Martin, "Why is Late-life Disability Declining?," The Milbank Quarterly, Vol. 86, No. 1, 2008 (pp. 47–89)

But Not Everyone Gets Healthier Over Time…

Life Expectancy at Birth: Russian Federation, 1958/59-2006
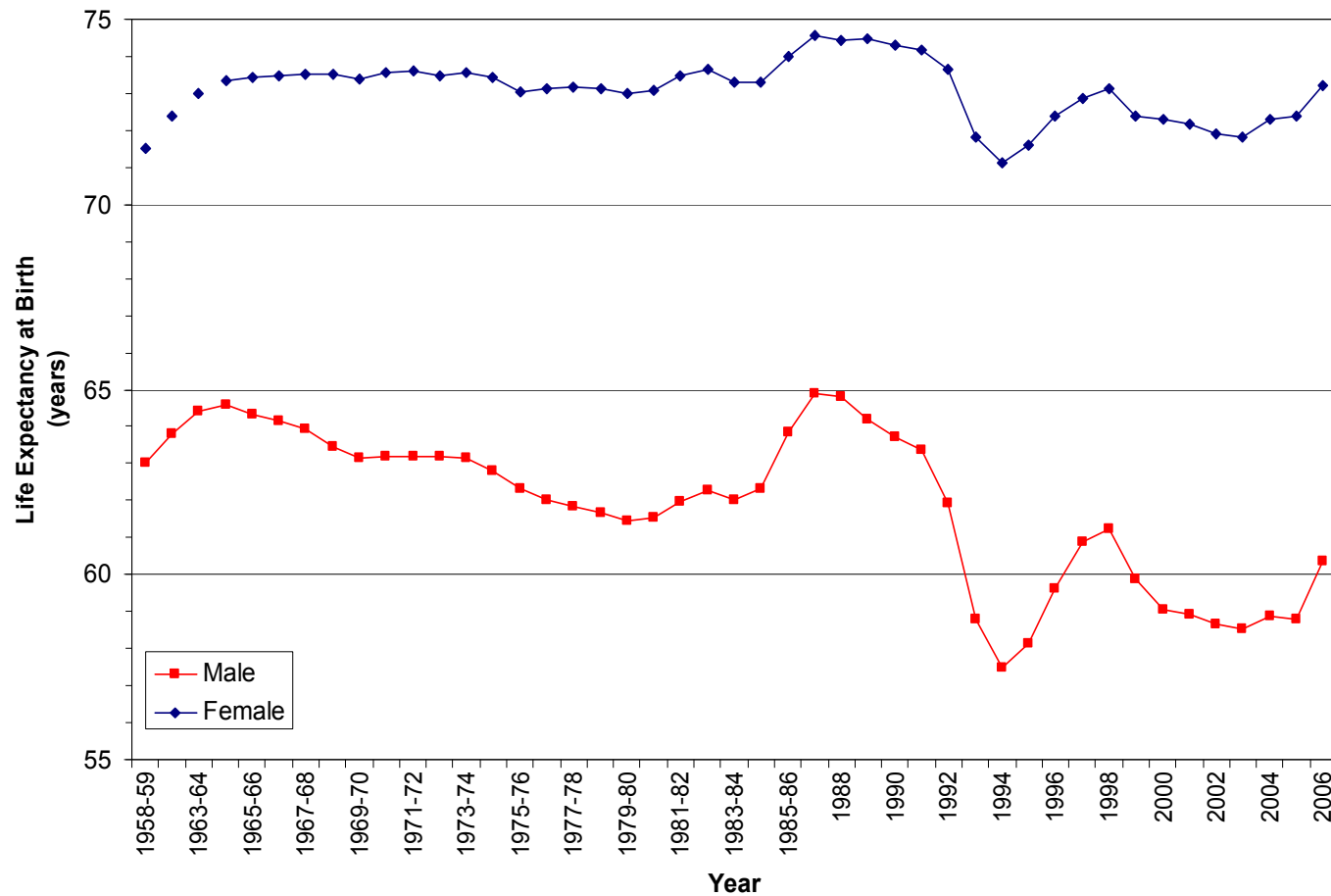
..And For Some, Bad News Farther Than The Eye Can See

Life Expectancy for Botswana: Census Bureau Projections to 2050
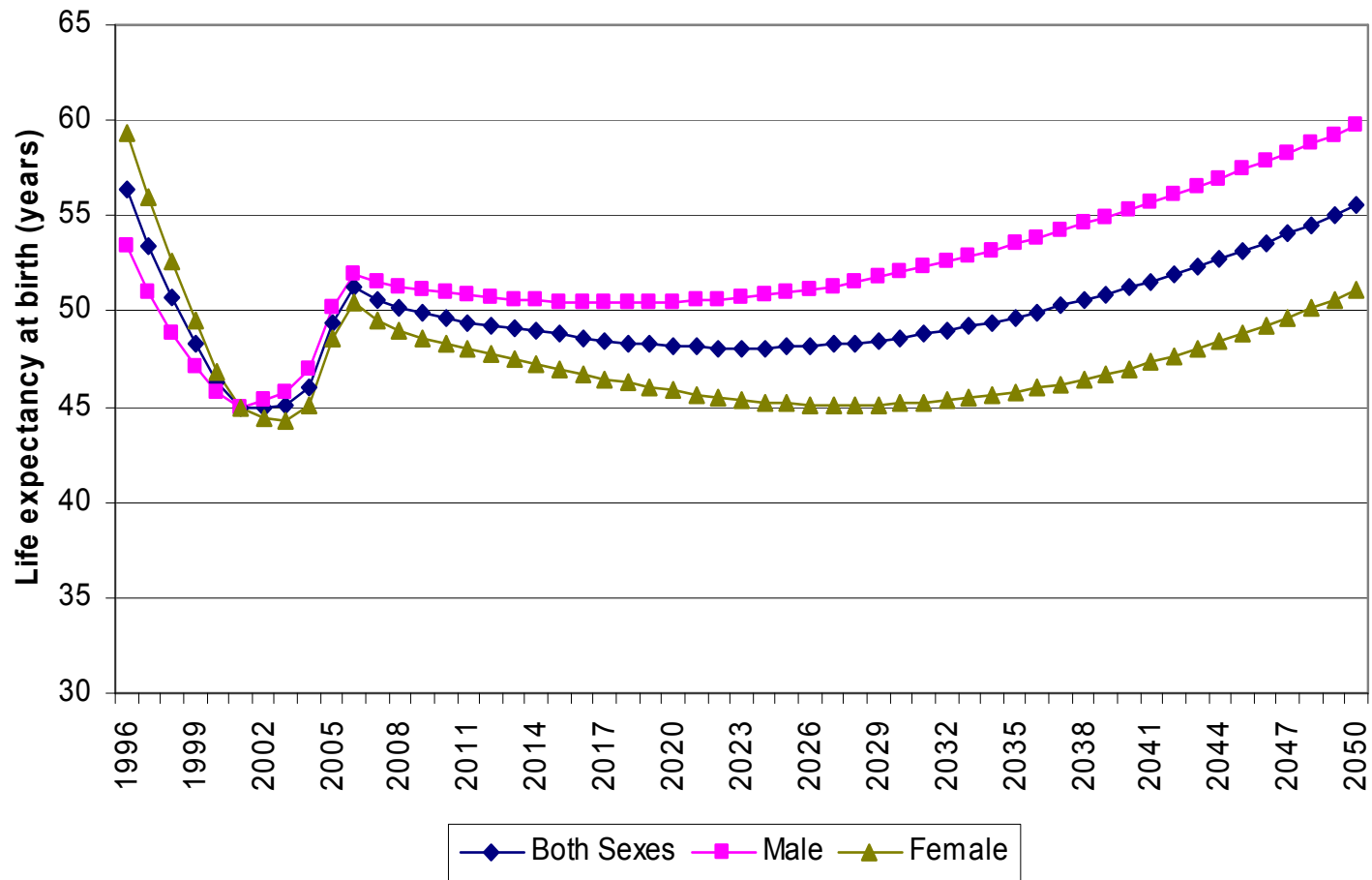
How Low Can We Go? We Don't Know!!

Total Fertility Rates for Japan and "Asian Tigers", 1975-2007
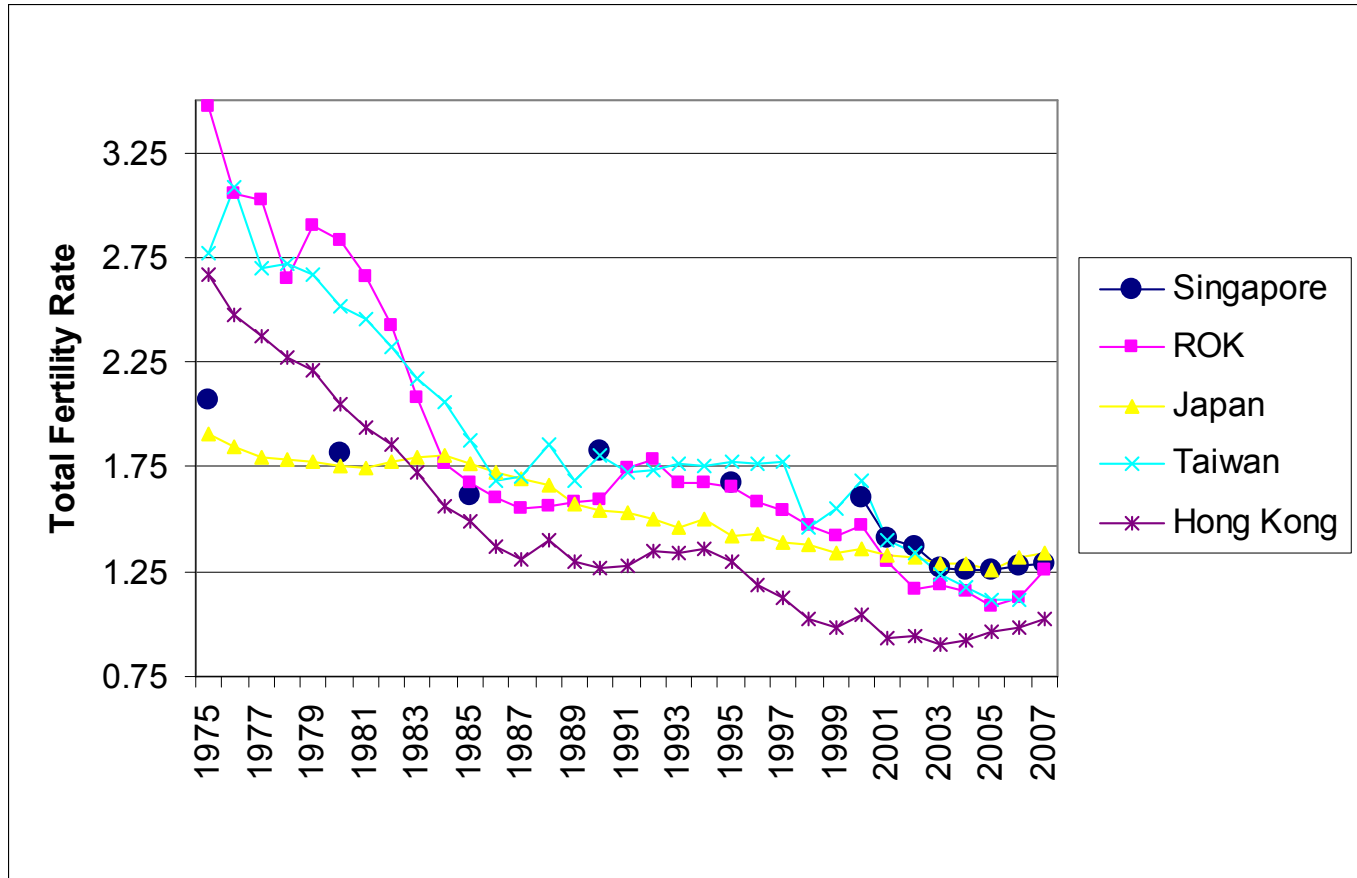
Sources: Statistics Singapore, "Demography," Yearbook of Statistics, 2008, available at
http://www.singstat.gov.sg/pubn/reference/yos/statsT-demography.pdf, accessed 09/30/2008. Ministry of Health and Welfare of Japan,
"Summary of Vital Statistics," available at http://www.mhlw.go.jp/english/database/db-hw/populate/pop4.html, accessed 9/30/2008. Korean
Statistical Information System, "Summary of Vital Statistics," available at http://kosis.nso.go.kr/, accessed 09/30/2008. National Statistics,
Republic of China (Taiwan), "Fertility Rates for Women of Childbearing Age," Yearly Statistics, available at
http://eng.dgbas.gov.tw/public/data/dgbas03/bs2/yearbook_eng/y015.pdf, accessed 9/30/2008. Census and Statistics Department, Hong Kong,
Statistical Tabkes, available at http://www.censtatd.gov.hk/hong_kong_statistics/statistical_tables/index.jsp?charsetID=1&tableID=004#6,
accessed 9/30/2008.

But we *do* know fertility rates can turn on a dime…

Total Fertility Rate in Iran, 1972-2000
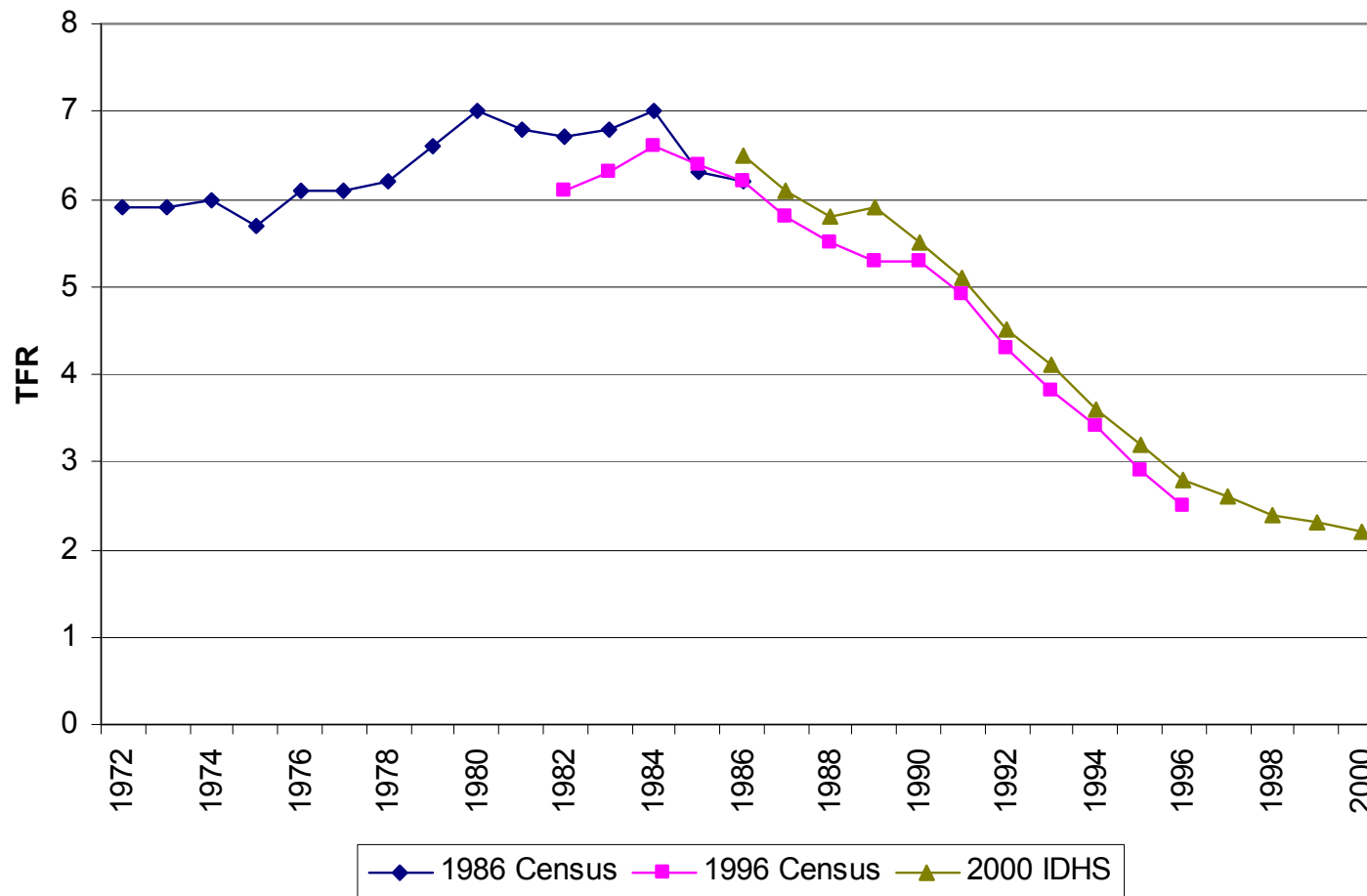
Legend: 1986 Census — 1996 Census — 2000 IDHS

A-9

Graying Societies: Made by Babies

Illustrative Percentages of Population 65+: Stable Populations, Coale-Demeny "West Model",
With Alternative Fertility (GRR) and Mortality (LE) Schedules {Population structures with over 12% over 65 in boldface]

	GRR 0.8	GRR 1.0	GRR 1.5	GRR 2.0	GRR 2.5	GRR 3.0
Female LE 20	**16.62**	**13.36**	8.51	5.81	4.24	3.21
Female LE 30	**17.85**	**14.25**	8.73	5.86	4.16	3.08
Female LE 40	**18.87**	**14.88**	8.96	5.89	4.13	3.02
Female LE 50	**19.74**	**15.45**	9.27	5.94	4.11	2.97
Female LE 60	**20.13**	**15.67**	9.16	5.87	4.03	2.91
Female LE 70	**21.24**	**16.48**	9.56	6.10	4.15	2.98
Female LE 80	**22.71**	**17.62**	10.20	6.48	4.40	3.15

Source: Ansley J. Coale and Paul Demeny, with Barbara Vaughan, *Regional Model Life Tables and Stable Populations*, (New York: Academic Press, 1983).

Where Have All The Families Gone?

Population Structure of Shanghai:2000 (Shaded) vs. 2040 (projected)
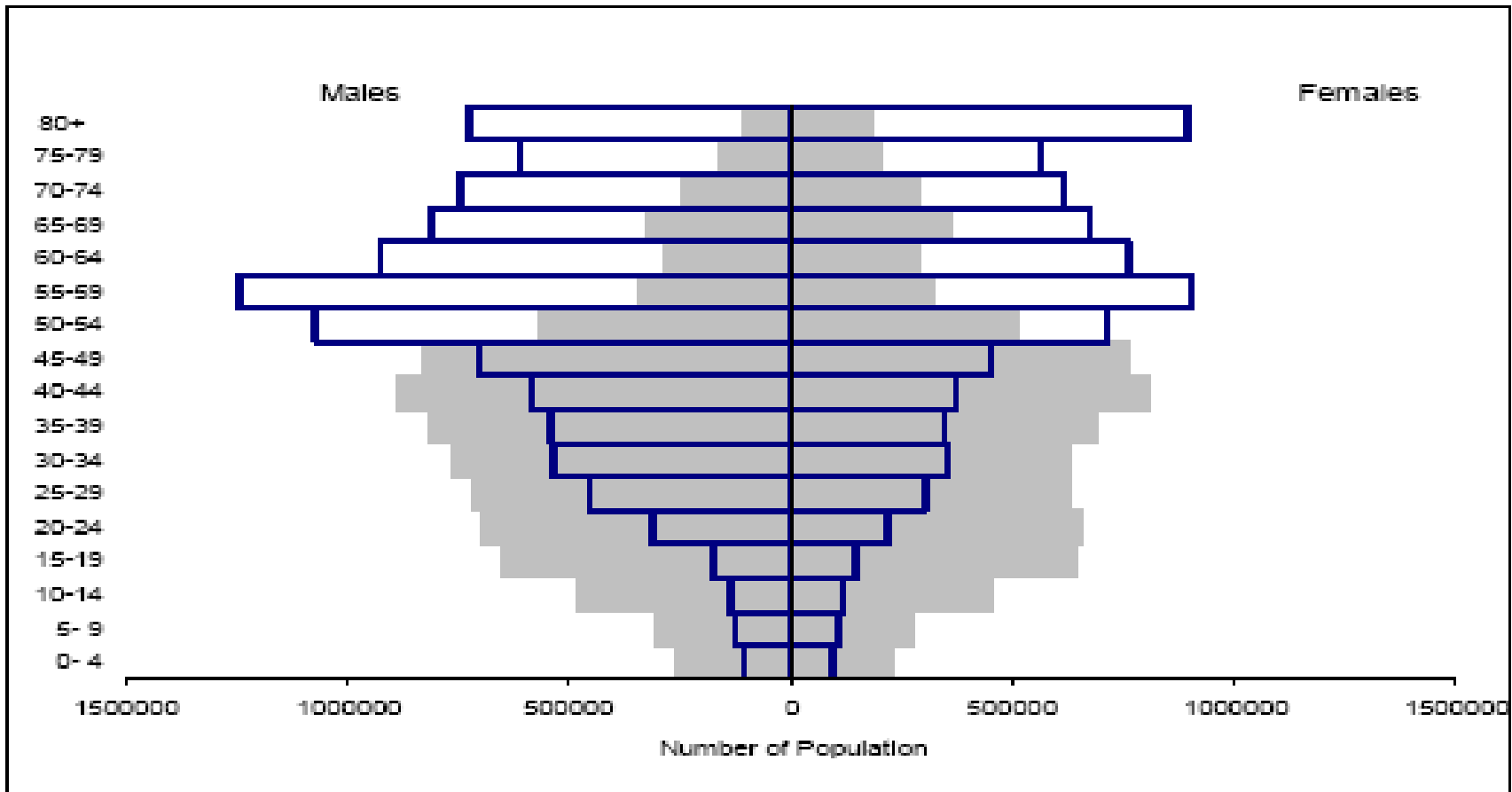
Source: Baochang Gu, "Low Fertility in China: Trends, Policy, and Impact" (Presentation paper, Seminar on Fertility Transition in Asia: Opportunities and Challenges, United Nations, Economic and Social Commission for Asia and the Pacific, December 18-20, 2006), http://www.unescap.org/esid/psis/meetings/FertilityTransition/Gu-China%20_SFTA10.pdf (accessed April 17, 2008).

A-11

It Takes a Mother, too

Childlessness in Europe, by female birth cohorts

WESTERN EUROPE
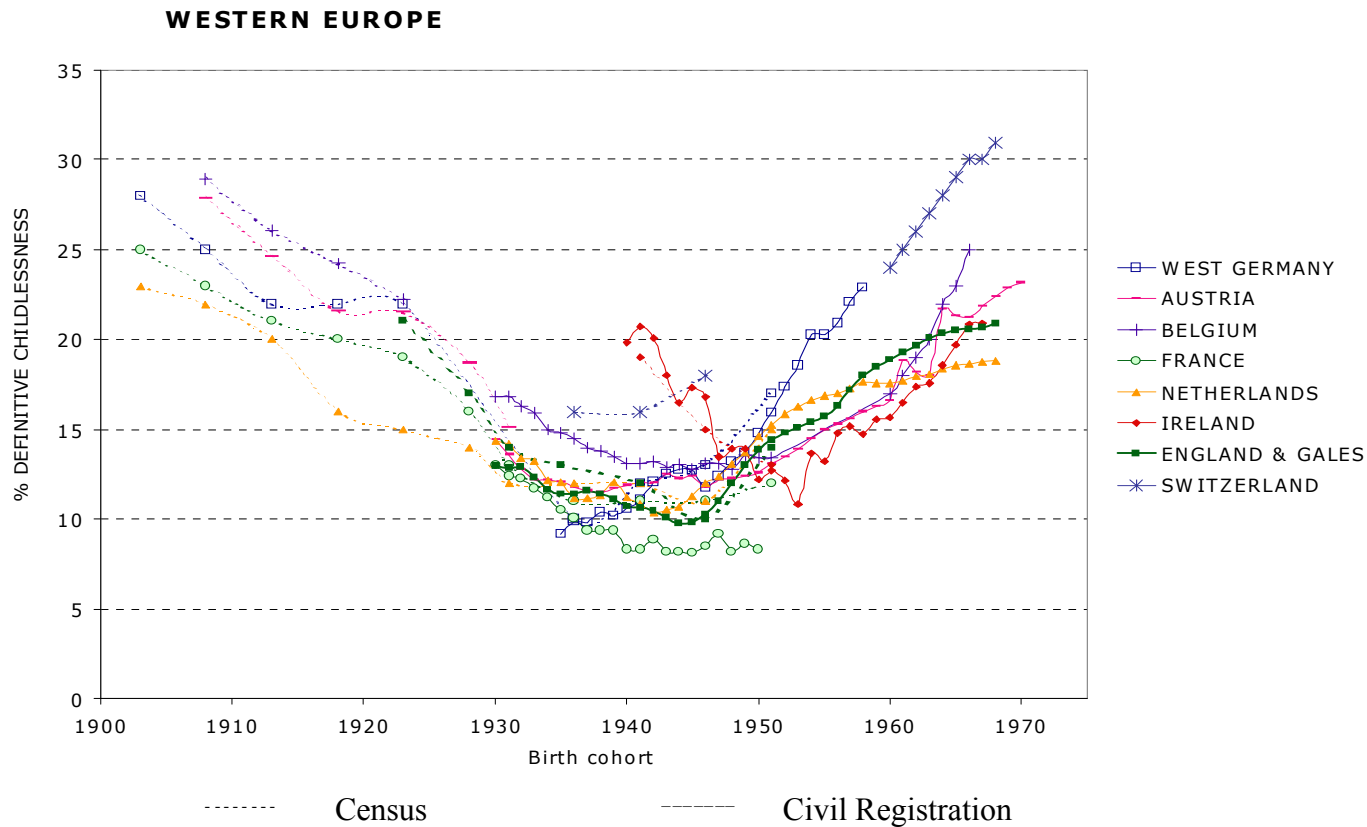
Source: Daniel Devolder, "Fertility Trends in Europe: Parity Analysis" (Presentation for XXV IUSSP International Population Conference, Tours, France, July 18-23, 2005).

A-12

Biological Imperative—Or Elective Affinity?

Projected Childlessness For Selected European Countries, by female birth cohort
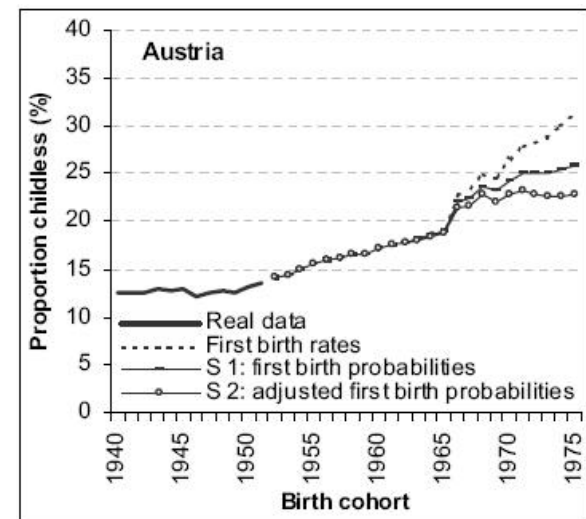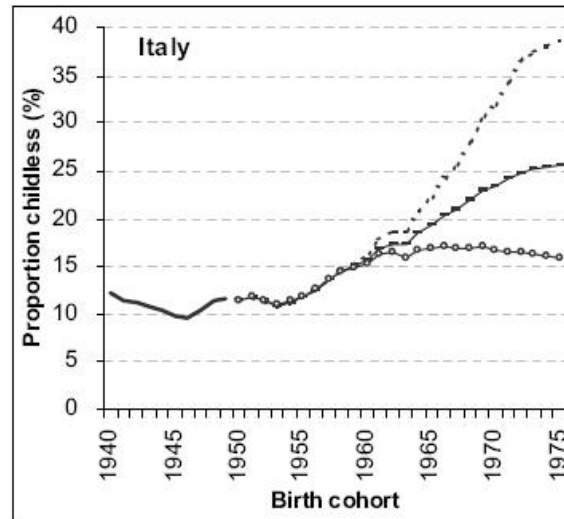
Source: Tomas Sobotka, "Chileless Societies? Trends and Projections of Childlessness in Europe and the United States," *Postponement of Childbearing and Low Fertility in Europe*, PhD dissertation, University of Groningen, 2004.

"Replacement Migration"?

Average Annual Net Number of Migrants between 2000 and 2050, per Million Inhabitants in 2000, by UNPD Scenario and Country or Region

Scenario	I	II	III	IV	V
Country or region	Medium Variant	Medium variant with zero migration	Constant total population	Constant age group 15-64	Constant ratio 15-64/65 years or older
France	110	0	500	1 854	30 430
Germany	2 519	0	4 244	6 009	44 825
Italy	109	0	4 414	6 531	39 818
Russian Federation	752	0	3 435	4 933	34 958
United Kingdom	341	0	899	2 132	20 383
United States	2 770	0	465	1 310	43 201
Europe	519	0	2 650	4 460	37 511
European Union	724	0	2 548	4 262	36 194

Someone Has To Live There

"Replacement Migration":
Per cent of post-1995 migrants and their descendants in total population in 2050,
by scenario and country or region

Scenario / Country or region	I Medium variant	II Medium variant with zero migration	III Constant total population	IV Constant age group 15-64	V Constant ratio 15-64/65 years or older
France	0.9	0.0	2.9	11.6	68.3
Germany	19.8	0.0	28.0	36.1	80.3
Italy	1.2	0.0	29.0	38.7	79.0
Russian Federation	5.8	0.0	22.9	27.6	71.9
United Kingdom	1.9	0.0	5.5	13.6	59.2
United States	16.8	0.0	2.5	7.9	72.7
Europe	4.3	0.0	17.5	25.8	74.4
European Union	6.2	0.0	16.5	25.7	74.7

Anyone's Guess:
World population, estimates and three UNPD scenarios: 1700-2300

A Little Goes A Long Way

Average annual rate of change of the world population, estimates and three UNPD scenarios: 1700-2300
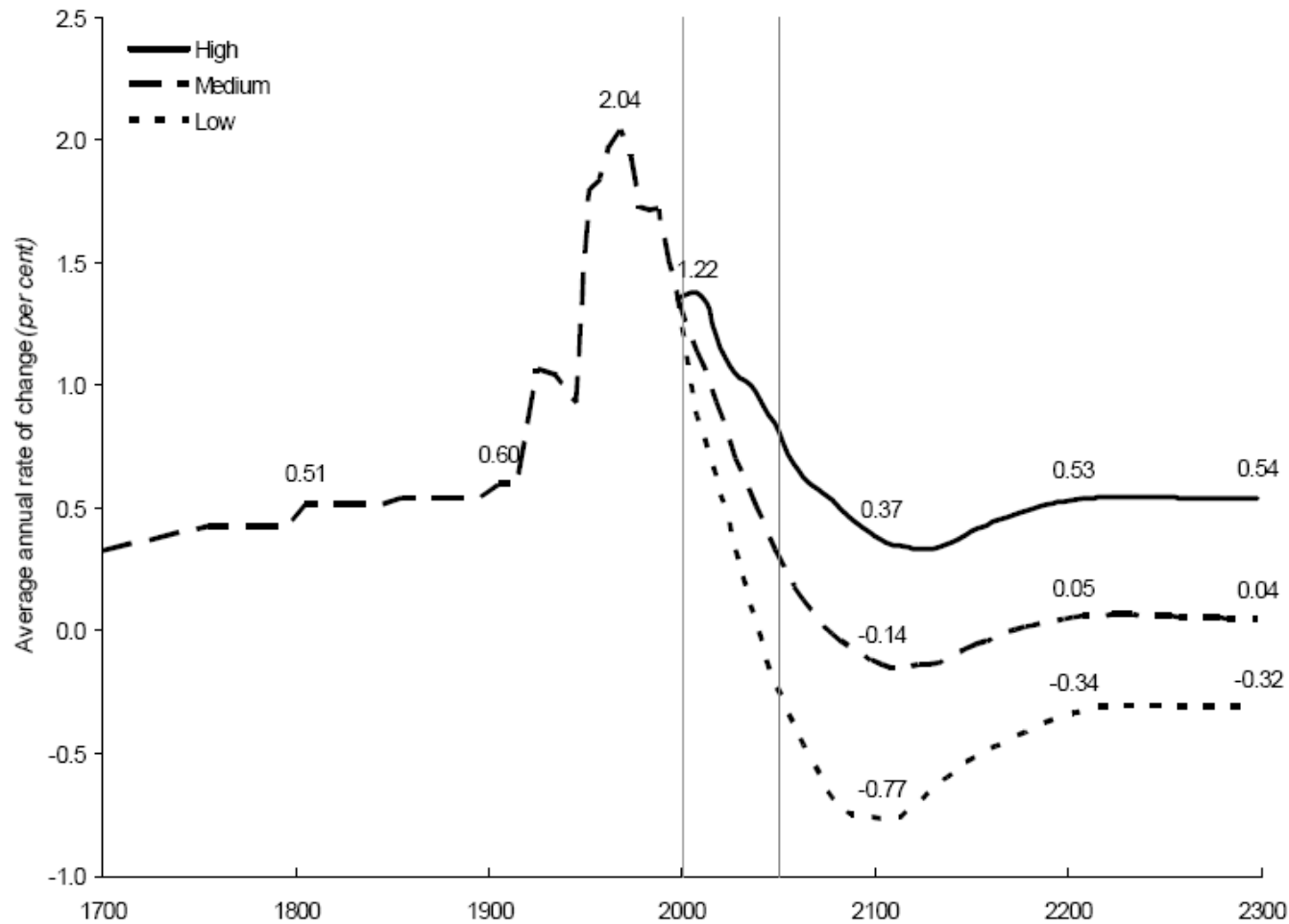
A-17

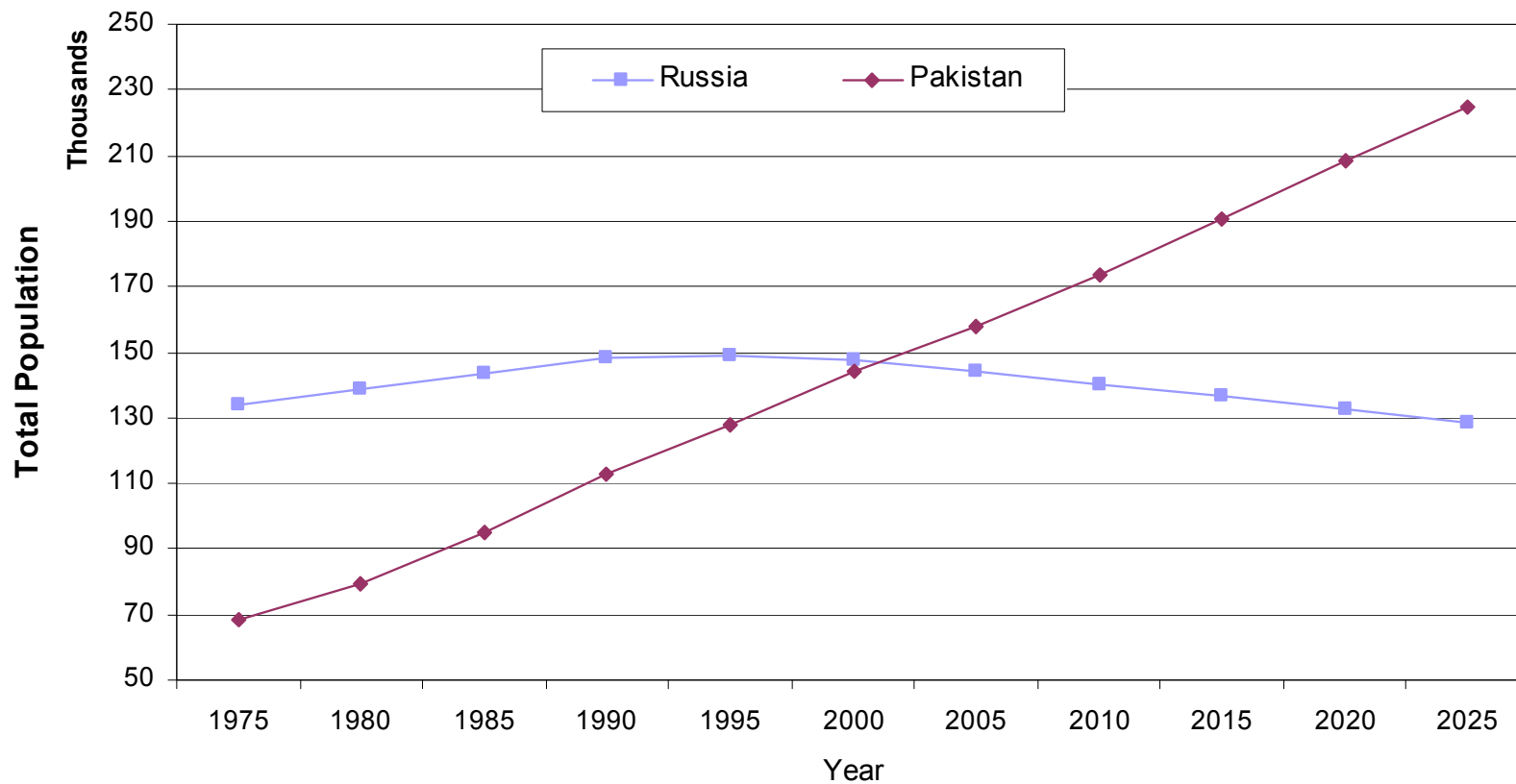# Trading Places, in Just 50 Years:

Estimated and Projected Populations of Russia and Pakistan: 1975-2025

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2006 Revision and World Urbanization Prospects: The 2005 Revision, http://esa.un.org/unpp, Monday, September 22, 2008

A-18

Trading Places Over The Course of A Century?

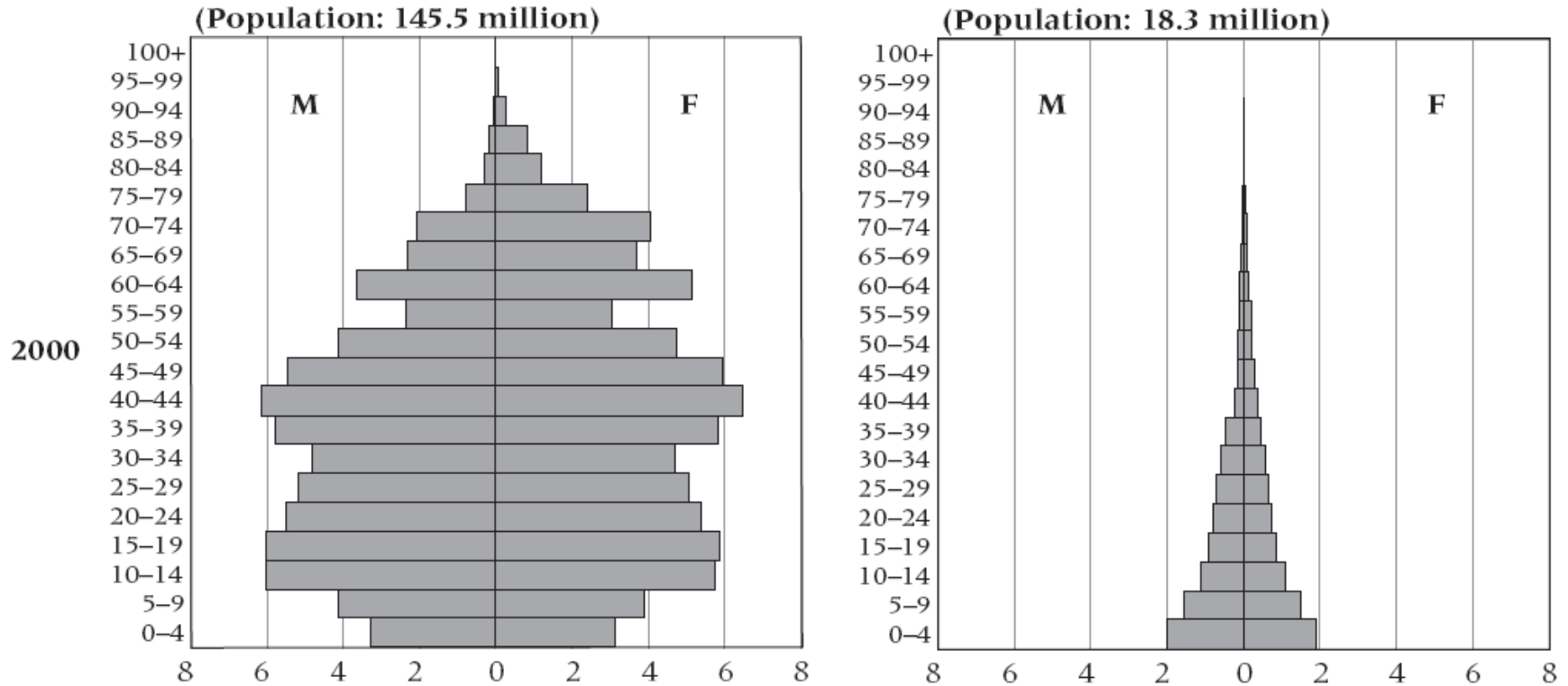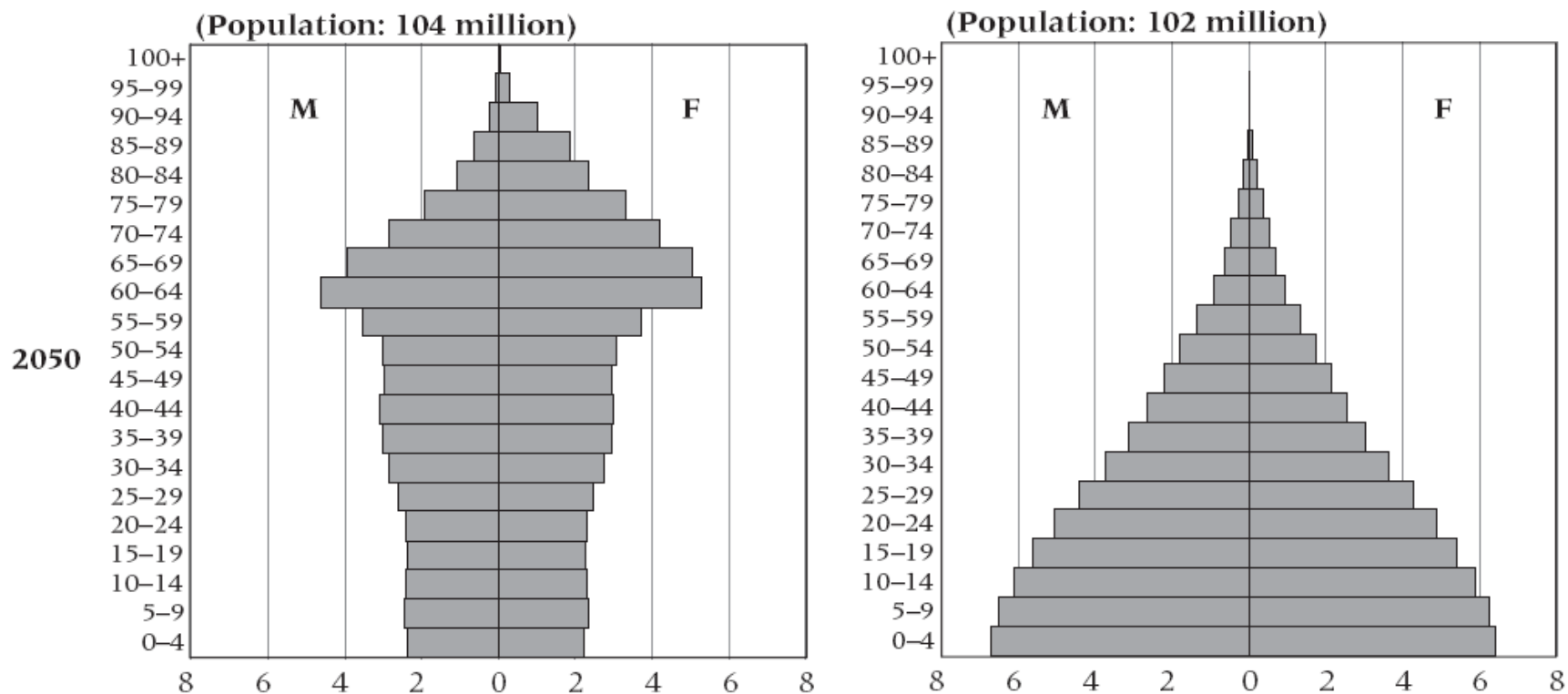## Population Distribution, Russia vs. Yemen, 1950
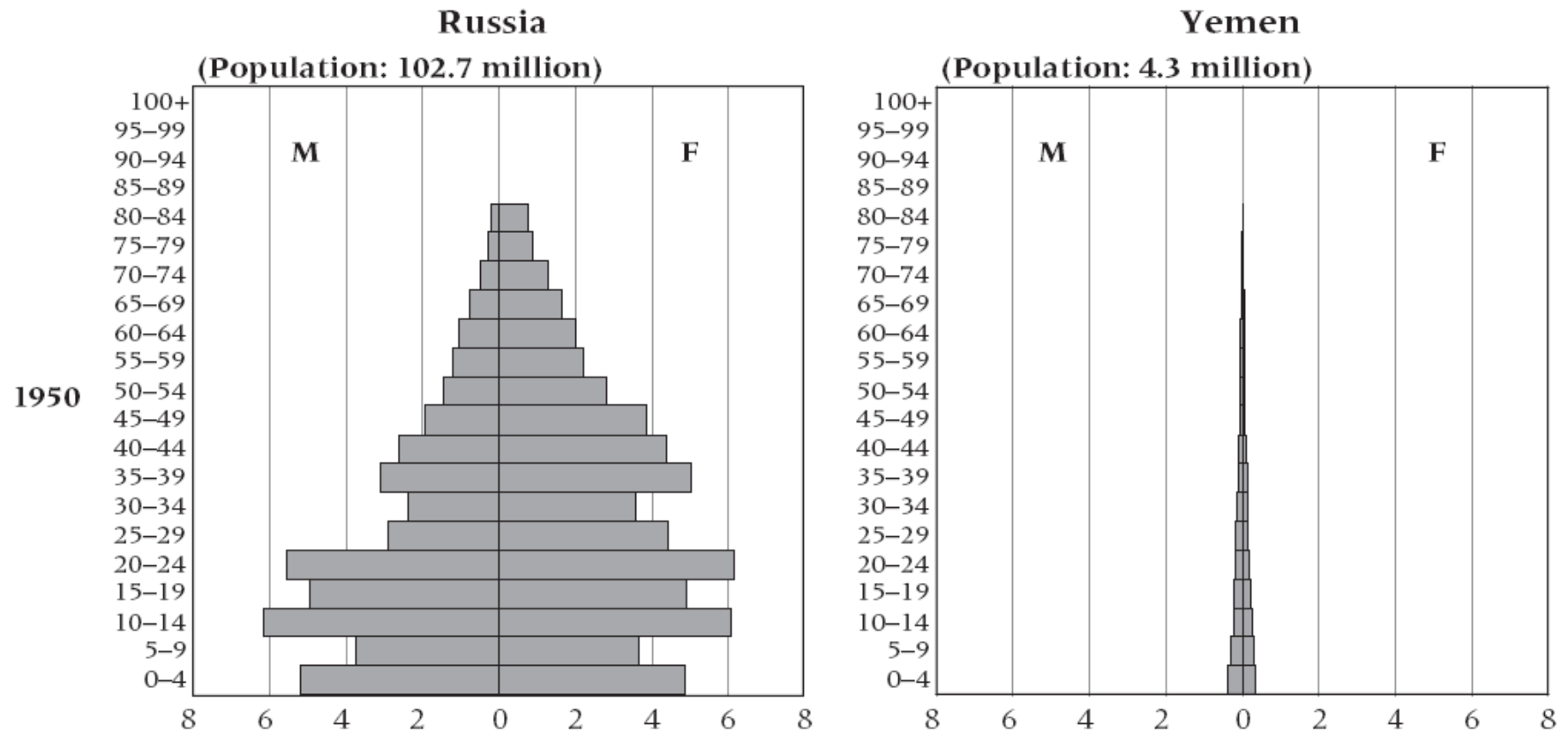
Sources: Demeny, Paul, "Population Policy Dilemmas in Europe at the Dawn of the Twenty-First Century," March 2003; United Nations 2001.

Note: Horizontal scale in million persons separately by sex.

Trading Places, Part II
Russia vs. Yemen, 2000

(Population: 145.5 million)
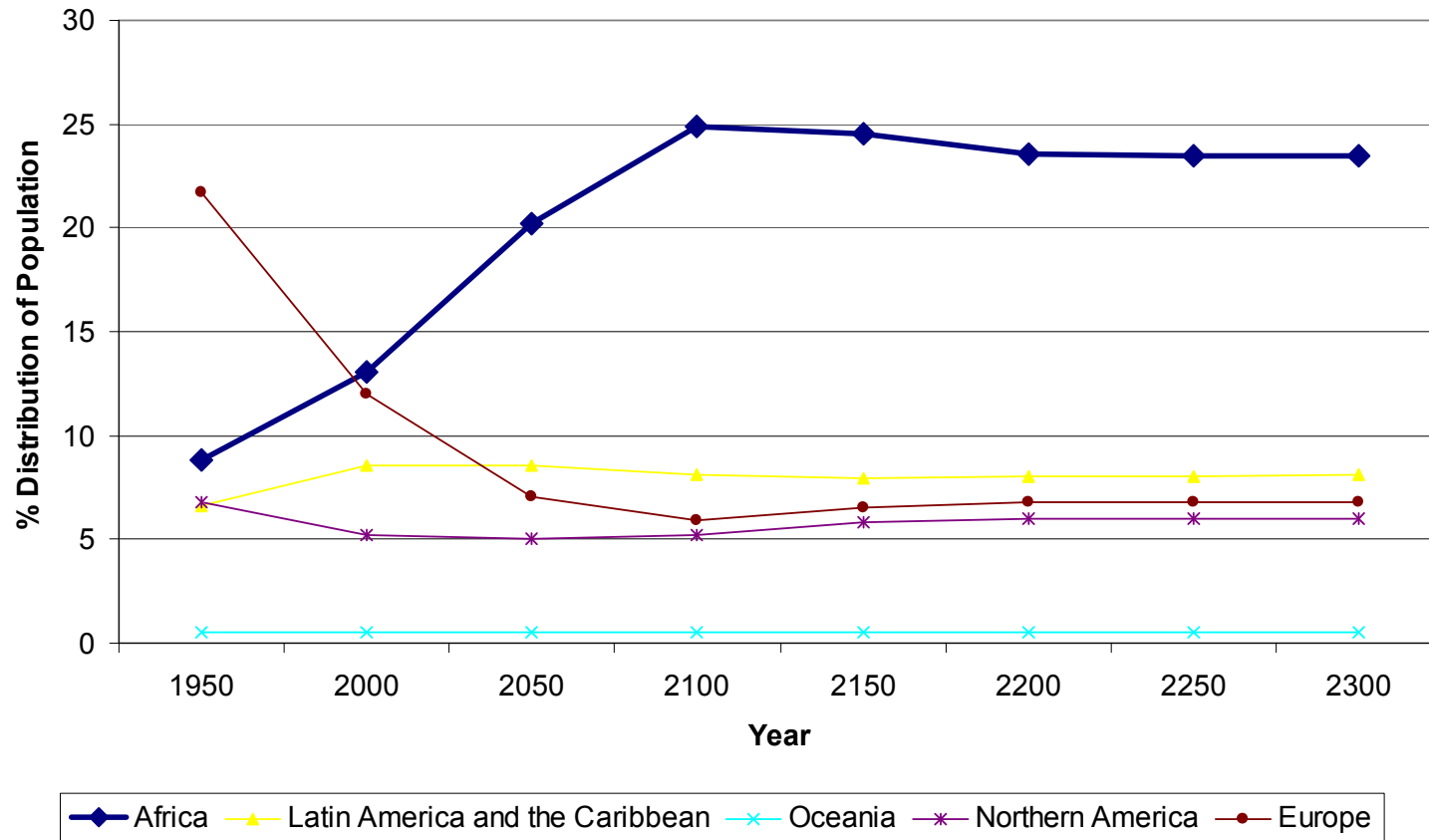
(Population: 18.3 million)

Sources: Demeny, Paul, "Population Policy Dilemmas in Europe at the Dawn of the Twenty-First Century," March 2003;
United Nations 2001.

Note: Horizontal scale in million persons separately by sex.

A-20

Trading Places, Part III?

Russia vs. Yemen, "medium variant" projections 2050

(Population: 104 million)

(Population: 102 million)

2050

Sources: Demeny, Paul, "Population Policy Dilemmas in Europe at the Dawn of the Twenty-First Century," March 2003; United Nations 2001.

A-21

Note: Horizontal scale in million persons separately by sex.

Africa, Demographically Ascendant

Africa as a Share of World Population, UNPD Medium Scenario, 1950-2300