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World Population Prospects and the Global Economic Outlook:
The Shape of Things to Come

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World Population Prospects and the Global Economic Outlook: The Shape of Things to Come

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Comments welcome

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Abstract: This paper examines global demographic prospects to the year 2030 and assesses the influence that impending population trends may have upon economic performance in coming years for the world as a whole and the major regional economies. A reasonably reliable assessment of prospective global trends to 2030 is feasible today because the overwhelming majority of people who will be living in that future world are already here, alive today. This includes all of that future world's senior citizens and almost its entire workforce. Major changes in global population trends are in the offing—among these, a sharp slowdown in the growth of available manpower, with impending declines of manpower for some regions, and pervasive population aging. Furthermore, in many of today's important “emerging markets” demographic pressures may constrain economic growth more significantly than is currently appreciated. Coping with these looming demographic realities will require far-reaching reforms and innovations if we hope to maintain the pre-crisis tempo of global economic growth (much less accelerate it).

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Looking Toward 2030: A New World Coming Into Focus

Remarkable as this may sound, we already have a fairly good sense of what the world's population profile will look like in the year 2030—two decades hence. One may reasonably ask: how can this possibly be, since we know that consensus expert economic forecasts can go badly wrong even a few years into the future (as was so painfully evident in the years leading up to the current world financial crisis) and political prognostications have an even spottier track record? The reason, quite simply, is that long-term demographic projections have a powerful built-in advantage over corresponding economic, political, and prognostications about the future: the overwhelming majority of the people who will be inhabiting the world twenty years hence are already alive, living here today.¹

Given the strong regularity of survival trends in modern societies both rich and poor, this means we can talk today with some confidence about the size and composition of this future world's population aged 20 and over—as well as the size and composition of the 20-plus groups in all of the world's major demographic and economic centers—in the year 2030 (barring only some intervening catastrophe of truly Biblical proportions).

The future is by definition always shrouded in uncertainty. Nevertheless, with tolerable precision, for both developed and developing regions, we can envision the coming trends in manpower availability, the growth of the population of senior citizens that these workers will have to help support, and other demographic features of the world that awaits us in 2030.

From an economic standpoint, this long term demographic outlook is sobering—and in some respects, perhaps even troubling.

Overall, it is all too apparent that the world economy in the generation ahead will not be able to rely on the size and scope of fresh new “demographic inputs” that helped power global growth in the “pre-crisis” generation. For today's affluent Western economies, the demographic challenges ahead—increasingly stagnant and aging populations, mounting health and pension claims on a shrinking pool of prospective workers—are already generating concern, especially in Europe and Japan. But the demographic constraints on many of today's “emerging markets”—rising economies such as China, Russia and India, the places that are widely expected to serve as increasingly important engines of global growth in the decades immediately ahead—are in any case both more serious and more intractable than generally appreciated.

Sooner or later, the current painful and protracted global economic crisis will eventually be resolved. At that point, the post-crisis world economy will most likely resume its path of sustained long-term growth. What financial markets, business leaders and international policy-makers as yet fail to recognize, however, are that

¹ By the projections of the US Census Bureau's International Data Base, roughly 70%—well over two thirds—of the total global population in 2030 would be people born in 2010 or before. [US Census Bureau International Data Base, available electronically at <http://www.census.gov/ipc/www/idb/informationGateway.php>. “Medium variant” projections by the United Nations Population Division (UNPD) likewise suggest that roughly 70% of the total world population in 2030 would be persons already born by 2010. For the world's more developed regions, the proportions would be even higher, given the lesser “population turnover” inherent in their typically lower birth and death rates. [UNPD, “World Population Prospects: The 2008 Revision Population Database,” available electronically at <http://esa.un.org/unpp/index.asp?panel=3>. The figures issued by the US Census Bureau and the UNPD are the two most authoritative and widely utilized sources of population projections today—and in most ways, these assessments conform quite closely.

new demographic realities are creating mounting pressures for a *slower* future growth trajectory than we expect today, or for that matter enjoyed in the past.

This observation is not offered as a counsel of despair. Quite the contrary: demography need not be economic destiny over the decades immediately ahead. But if the world community hopes to maintain or accelerate the drive toward greater prosperity for all after we finally exit the current global crisis, coping with these new demographic realities will require profound and far-reaching changes in working arrangements, lifestyles, business practices and government policies—in both rich and poor countries alike.

Global Demography: The Revolutions That Will Be Shaping the Future

Slowly, but with a relentless regularity, population trends fashion the world of the future out of the conditions of today. If we want to understand what lies in store for coming decades, then we must first understand how we got to where we are today.

The Twentieth Century was the era of the “world population explosion.” Between 1900 and 2000, human numbers nearly quadrupled, skyrocketing from about 1.6 billion to around 6.1 billion. Nothing like this magnitude or tempo of population change had ever previously been witnessed in the history of our species. But our planetary numbers did not explode because people suddenly started breeding like rabbits; they surged, instead, because humans finally stopped dying like flies. Over the course of the Twentieth Century, global life expectancy at birth more than doubled—soaring from about 30 years in 1900 to something like 65 years by 2000.² Our global population explosion was in reality a “health explosion”—and in fact, the entirety of our enormous increase in human numbers over the past several generations was due to dramatic declines in mortality and improvements in general health conditions. This great upsurge in worldwide health prospects, incidentally, is still underway. And while there are some terrible local exceptions to these ongoing global improvements (perhaps most tragically, a number of sub-Saharan societies still in the grip of disastrous HIV/AIDS pandemics), these troubled spots remain just that—exceptions.³

² For one set of long-term estimates of global life expectancy, see James C. Riley, “Estimates of Regional and Global Life Expectancy, 1800-2001,” *Population and Development Review*, vol. 31, no. 3 (September 2005), pp. 537-543.

³ From the standpoint of economic development and material progress, the Twentieth Century’s revolutionary improvements in global health prospects were hardly inauspicious. Quite the contrary: they opened up extraordinary new vistas for enhancing human productivity, creating wealth, and spreading knowledge. Sure enough: by the reckoning of the late Angus Maddison, possibly the pre-eminent economic historian of his day, per capita output for the world was nearly five times as high in 2000 as it had been in 1900—all this, despite a near-quadrupling of human numbers over those same years. These economic gains, as we are all well aware, were not spread evenly around the world—but every country in the contemporary world is decidedly healthier and richer than 100 years ago. Cf Angus Maddison, “Statistics on World Population, GDP and GDP per Capita, 1-2008 AD,” available electronically at <http://www.ggdnc.net/MADDISON/oriindex.htm>; accessed November 5, 2010.

Observers of a Malthusian or neo-Malthusian sensibility generally failed to recognize the profound significance of the fact that the modern upsurge in human numbers was being driven by a fundamental transformation of health conditions; in consequence, they have consistently and at times notoriously

As we enter a new century, a very different but no less powerful demographic trend is transforming the world's population profile. If the Twentieth Century's revolutionary trend was the "health explosion," with radical and pervasive reductions in mortality, the Twenty First's looks to be a "fertility implosion": a dramatic, far-reaching and as yet unremitting global reduction in birth rates from previous "traditional" levels. This low-fertility revolution is pregnant with implications, so to speak, for both our demographic and our economic future.

Sustained and deliberate reductions in family size via birth control began to lower national fertility levels in certain European countries long ago—in the case of France, perhaps as far back as the era of the Napoleonic Wars. But sustained fertility decline from heretofore traditional levels only became a worldwide phenomenon after the end of the Second World War—but over the past two generations, it has swept the world with a vengeance.

Few readers today may appreciate the breath-taking progress the world's fertility revolution has already made. Over the past half century, by the estimates of the United Nations Population Division (UNPD), the world's "total fertility rate" (or TFR: a measure of births per woman per lifetime) dropped almost by half (from 4.9 in the early 1960s to about 2.6 in the later part of the decade just concluded). And the decline has been even steeper in what the UN calls the "less developed regions." There, the average fertility has dropped by well over half (meaning well over three babies per woman per lifetime) since the early 1960s.

The worldwide march toward lower fertility, of course, has been highly uneven. In some places—such as Mali, Niger, and Somalia—current TFRs are estimated at 6, 7 or even higher, with scant indications as yet of any onset of sustained fertility decline. Such places, however, account for only a tiny fraction of the world's current population. By contrast, close to half of the people in the world currently live in "sub-replacement" fertility countries: that is to say, places where current childbearing patterns, if continued, would lead to an eventual and indefinite depopulation, absent steady compensatory in-migration. As a rough rule of thumb, TFRs of 2.1 or less suggest "sub-replacement" fertility.⁴

It is today widely assumed that sub-replacement fertility is a phenomenon peculiar to affluent, educated and highly modernized Western societies. And it is true that the world's more developed regions are almost all sub-replacement societies today (with overall birth rates 20% or more below the level required for long-term

underestimated the potential for material advance in low-income societies over the past several decades. By the most formulaic of neo-Malthusian doctrine, of course, the Twentieth Century—with its simultaneous quadrupling of world population and quintupling of per capita global income levels—should never have taken place.

⁴ Technically, sub-replacement fertility obtains in locales where the "Net Reproduction Rate" (or NRR—a measure for the number of daughters per woman, taking that woman's survival prospects through the childbearing years into account) is under 1.0. Given the facts that sex ratios at birth in contemporary affluent societies are typically in the 103-105 range, and that mortality rates for young adult women are extremely low, it has become conventional to use a TFR of 2.1 as a proxy for net replacement fertility. Of course it is possible for a society to require a much higher TFR for net replacement if mortality levels for women are high and/or if sex ratios at birth are highly skewed; it is also possible for TFRs of slightly less than 2.1 to conform with net replacement fertility if young female mortality levels are near-zero and/or if sex ratios at birth are unnaturally skewed in favor of baby girls.

population stability).⁵ But since currently-developed countries account for less than a fifth of the world's population, the plain arithmetic fact is that the great majority of the world's "sub-replacement" population today actually resides in *low-income* societies.

China is one such "sub-replacement" low-income society—but of course it may seem exceptional, given Beijing's notorious official anti-natal population program (the so-called "One Child Policy"). Yet sub-replacement fertility today also characterizes many other low-income countries without coercive population controls: places, moreover, where populations may still be predominantly rural, and where educational opportunities for women often remain very limited. Impoverished and isolated Burma (Myanmar), where birth levels today are believed to have fallen below the replacement rate, is just one such case in point.⁶

By the estimates of the US Census Bureau, sub-replacement fertility characterizes virtually every East Asian country today, and is now the norm in much of Southeast Asia (including Vietnam and Thailand), in most of the Caribbean islands, and increasingly throughout Latin America (Chile, Costa Rica, Suriname, Uruguay—with Brazil, Colombia and El Salvador reportedly very near the sub-replacement threshold). No less strikingly, sub-replacement fertility has also come to parts of the great Islamic expanse that stretches from Northern Africa through the Middle East and on into Asia. According to the Census Bureau's latest figures, the roster of Muslim-majority countries with TFRs below 2.1 now includes Algeria, Tunisia, Lebanon, Azerbaijan, Uzbekistan, Brunei—and perhaps no less interesting, Iran.

There is much that we do not yet understand about the world's revolutionary and apparently continuing march toward ever-lower levels of fertility. In our era, for example, there seem to be precious few socio-economic preconditions for rapid and pronounced fertility decline—or even for an apparent slide into sub-replacement fertility, as the case of Burma underscores. We do not know, furthermore, how long a society that has entered into sub-replacement mode will stay there: at this juncture, Japan has been reporting sub-replacement fertility since the 1950s, and uninterrupted sub-replacement fertility since the early 1970s. Nor do we know how low fertility levels can fall: in recent years, TFRs for some of the East Asian "tigers"—Singapore, South Korea, and Taiwan—have been edging down toward 1.0. In Hong Kong, TFRs below 1.0 have actually been reported several times in the past decade, and in 2010 Taiwan's TFR also fell below 1.0.⁷

A generation ago, such levels would have seemed unimaginable—but there are specialists who argue that such "ultra-low" fertility may be but a harbinger of future, currently unimaginable, declines. At the moment, perhaps all we can say with confidence is that the "fertility implosion" speaks to an absolute sea-change in

⁵ According to US Census Bureau Projections, the population-weighted TFR for the 30 "traditional" OECD countries (that is to say, the current 34 country OECD roster minus Turkey, Mexico, Chile and Israel) is 1.67—or just over 20% below the notional replacement TFR of 2.1. If the United States is excluded from the grouping, the population-weighted TFR for the remaining 29 OECD countries would be 1.5—nearly 30% below this notional replacement level.

⁶ BY UNDP estimates and projections, Burma/Myanmar's TFR for 2005/2010 was 2.32; its NRR, 0.98. UNPD, "World Population Prospects: The 2008 Revisions," *loc. cit.*

⁷ According to the latest official data, Taiwan's TFR in 2010 was 0.91. June Tsai, "Taiwan birthrate plummets to all-time low," *Taiwan Today*, January 10, 2011, available electronically at <http://www.taiwantoday.tw/ct.asp?xItem=142759&ctNode=445>.

worldwide attitudes about children and family, irrespective of a country's income level, ethnicity, or cultural heritage—with no obvious end as yet in sight.

Little as we may know about the underlying causes of the ongoing global fertility revolution, we can be fairly certain of some of the consequences it portends. First, pronounced fertility declines today necessarily imply a slowdown in the growth of working-age population tomorrow—and thus a decline of working-age manpower will be in the offing. Second, low fertility today leads to population graying tomorrow—and persistent sub-replacement fertility turbo-charges the process of population aging.⁸

New Trends in Global Manpower

The conundrum facing the world economy in the decades just ahead is highlighted by prospective trends in labor availability. Labor, of course, is just one factor in economic growth—capital and improvements in efficiency being others. In our modern era, however, the wealth of nations lies primarily in human resources. Human resources, furthermore, typically have an influence on the prospects for capital accumulation and improvements in efficiency (what economists call “total factor productivity”) as well.

Viewed at the global level, the task of maintaining the sorts of growth rates recorded by the world economy over the pre-crisis generation will be appreciably complicated by the impending, and now all but inalterable, trends in worldwide manpower availability over the next two decades. By comparison with the manpower trends of the past several decades, the outlook for the next two decades is decidedly less auspicious: not only in term of overall tempo, but also with respect to the regional distribution and age composition of labor availability.

By the reckoning of the UN Population Division, the world's population of “working age” (conventionally, albeit somewhat imperfectly, defined as men and women 15-64 years of age) grew by 1.3 billion, or about 40%, between 1990 and 2010: a pace averaging about 1.7% a year.⁹ Given the pronounced global fall-off in fertility over the recent past, however, the world's manpower of economically-active ages is set to grow much more slowly between now and the year 2030. By the Census Bureau's projections, the absolute increase in the world's working age population for 2010-2030 would be around 900 million¹⁰—400 million fewer than over the past two decades—and the projected average rate of global manpower growth for the coming decades is 0.9% per annum—that is to say, only just over half the tempo for 1990-2010.

Complicating matters still further is the prospective regional distribution of the coming growth in global manpower. Over the past 20 years, the two greatest centers of manpower growth were India and China—which of course also happened to be two of the world's most rapidly growing economies at the time. Over

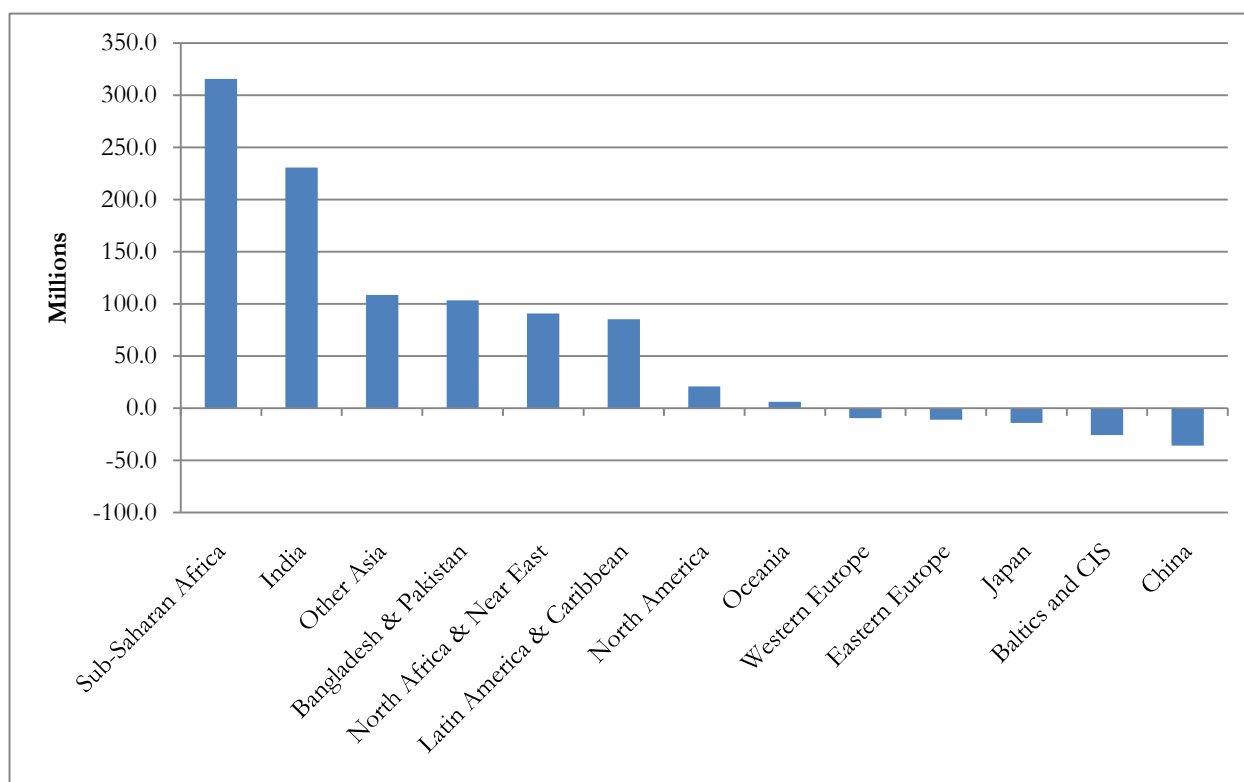
⁸ By narrowing the base of a country's “population pyramid,” and thereby perforce increasing the share of the elderly within the society. Perhaps paradoxically, birth rates typically have more of an impact on a population's age profile than average length of life.

⁹ United Nations Population Division, “World Population Prospects: The 2008 Revision Population Database,” available electronically at <http://esa.un.org/unpp/index.asp?panel=3>.

¹⁰ US Census Bureau International Data Base, available electronically at <http://www.census.gov/ipc/www/idb/informationGateway.php>.

the next 20 years, by contrast, the greatest single share of the world’s increase in working-age manpower (well over a third of total manpower growth) is set to accrue to sub-Saharan Africa—the region with the modern world’s very worst overall record of long-term economic performance. [See **Figure 1.**] (For the sub-Sahara as a whole, per capita output may be scarcely higher today than it was three decades ago).¹¹ Pakistan and Bangladesh—countries whose future growth prospects may also look far from certain—account for nearly another eighth of the world’s prospective manpower growth over the next two decades. Taken together, then, sub-Saharan Africa, Pakistan and Bangladesh are set to generate nearly half of the world’s growth in working-age manpower over the next two decades (in contrast to the 1990-2010 period, when India and China accounted for nearly 40% of total manpower growth).

Figure 1. Total Projected Growth of Working Age Population (15-64) By Region or Country: 2010 – 2030 (millions) [Total world population change: +882 million]



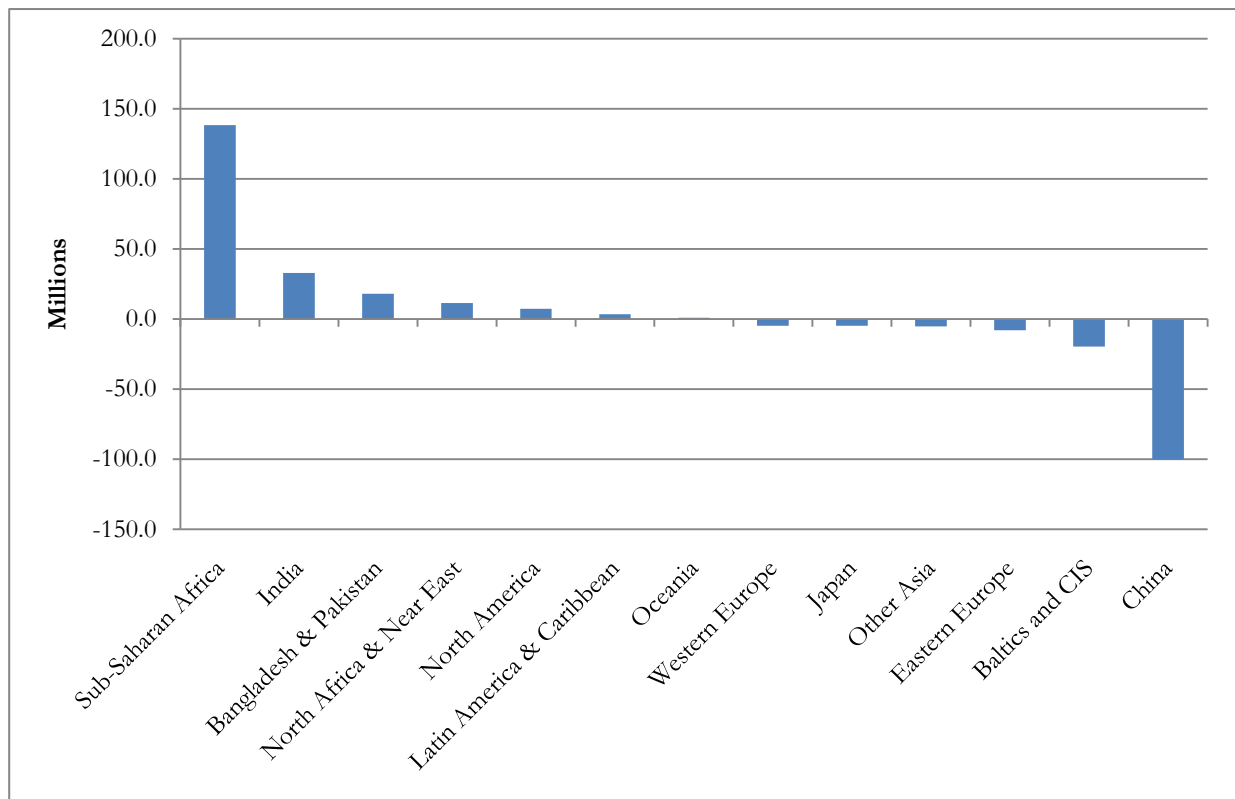
Source: US Census Bureau International Data Base, available at <http://www.census.gov/ipc/www/idb/informationGateway.php>. Accessed January 2011.

On the other hand, a growing number of countries and regions are set to experience *shrinkage* in their working-age manpower over the next two decades. These include Japan, Western Europe, Eastern Europe, the Baltic and CIS countries, and China—in other words, most of the current advanced OECD economies, and many of the contemporary world’s seemingly most promising “emerging markets.”

¹¹ By Angus Maddison’s estimates, per capita GDP for the sub-Sahara was in fact lower in 2006 than it had been in 1974—over 30 years earlier. Maddison, *op. cit.* As similar assessment comes from the World Bank’s *World Development Indicators*, which also estimates sub-Saharan GDP to have been lower in 2006 than in 1974.

The situation does not look better when we break down prospective global manpower growth into its subsidiary age-group components. In modern economies, younger workers are especially important to prospects for growth, for they typically have the highest levels of educational attainment, and bring the latest knowledge and the newest technical skills with them to the job. Over the next 20 years, however, the worldwide pool of young manpower will undergo a severe deceleration. According to Census Bureau projections, the total global increase in young manpower (ages 15-29) between now and 2030 would be just 4%, or 70 million persons—barely a fifth of the aggregate increase over the two decades just past. [See **Figure 2.**] Only sub-Saharan Africa stands to see an appreciable growth in youth manpower. In fact, the sub-Saharan Africa will account for over 100% of total growth in the world’s 15-29 population, because many regions will find their pools of young manpower shrinking over the next two decades. Japan and Europe as a whole are both on course for significant absolute declines in this key manpower pool over the next 20 years (prospective drops of almost 25%). But by far the most massive falloff in young manpower is set to take place in China. Over the next 20 years, by the Census Bureau’s projections, this key working age group will be falling in China by fully 100 million persons—or over 30 percent.

Figure 2: Total Projected Growth of Younger Working Ages (15-29): 2010-2030
 [Total world population change: +70 million]

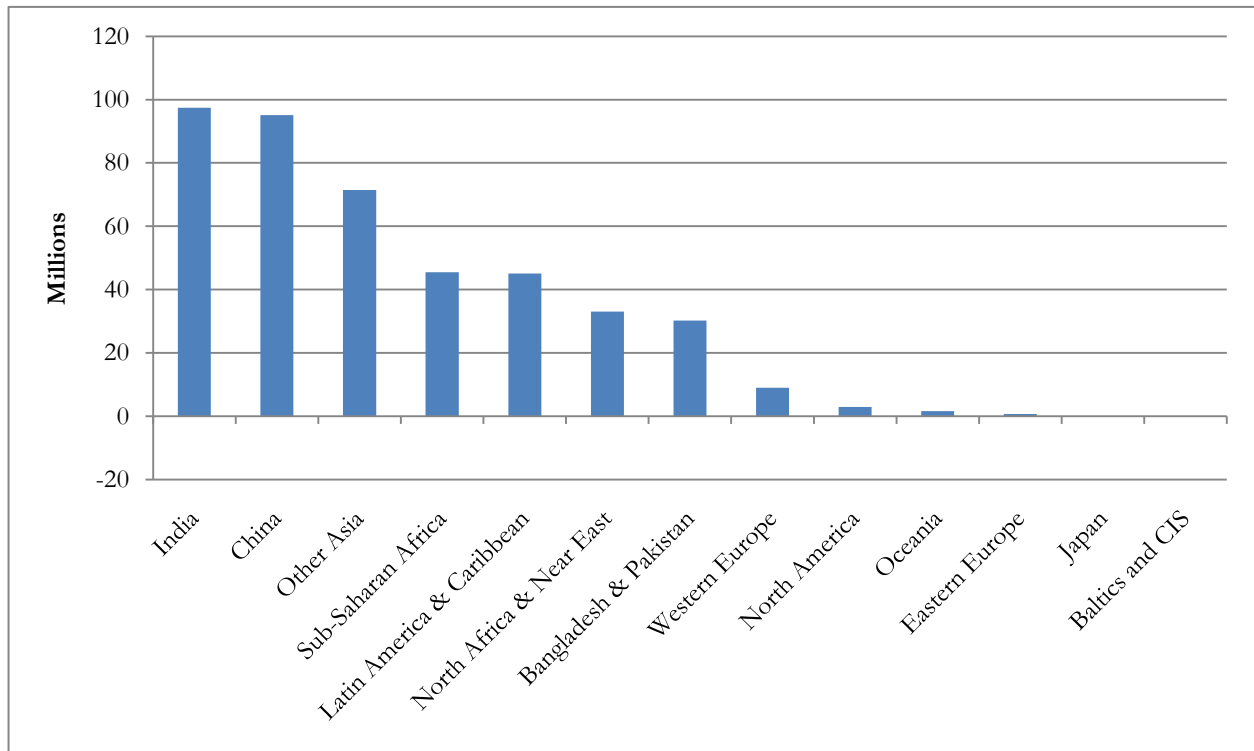


Source: US Census Bureau International Data Base, available at <http://www.census.gov/ipc/www/idb/informationGateway.php>. Accessed January 2011.

Yet as younger manpower grows ever scarcer in relative terms (and in much of the world, in absolute terms as well), older manpower is becoming increasingly abundant—practically everywhere. [See **Figure 3.**] Over the

next 20 years, the oldest segment of the conventionally-defined working-age population—men and women 50-64 years of age—is projected to account for nearly half of all global manpower growth (nearly twice the share for the 1990-2010 period). China will face a particularly huge increase of older manpower in the next two decades—a portent of massive graying of the Chinese workforce, considering that China’s overall working-age population is set to shrink between now and the year 2030. But the working-age population will also be aging in many other emerging markets, as well as in all of the currently developed Western economies.

Figure 3. Total Projected Growth of Ages 50-64: 2010-2030
 [Total world population change: 431 million]



Source: US Census Bureau International Data Base, available at <http://www.census.gov/ipc/www/idb/informationGateway.php>. Accessed January 2011.

Older manpower brings some genuine advantages to the economy: in particular, skills based on workplace experience. But older manpower also tends to be less educated and less healthy than younger counterparts—and labor force participation rates for older manpower also tend to be lower (in some affluent societies nowadays, very much lower). Thus the disproportionate growth of the world’s older manpower in the years ahead will pose a number of tests to enhancing economic performance—not the least of these being the challenge of retaining these older workers in the labor force in the first place.¹²

¹² If workforce participation rates for older manpower should decline in the decades immediately ahead, the actual slowdown in economically active manpower could be even steeper than our projections here suggest.

To be sure, the prospective global workforce of 2030 is on track to be better educated than today's. Barring unforeseen catastrophe, we can also expect general improvements of health for the world's working age manpower. In and of itself, this should presage an improvement in labor productivity in the years ahead. But the economic potential of such prospective benefits should not be exaggerated.

New studies by researchers at the International Institute of Applied Systems Analysis (IIASA) in Austria and the Vienna Institute of Demography (VID) offer past estimates and future projections for the educational profiles of 120 countries (accounting for well over 90% of the world's population).¹³ To go by their calculations, the improvement in educational attainment for the world's working age population stands to be *slower* over the next 20 years than it was over the past 20 years. Whereas the proportion of the world's working age manpower with no education at all fell by almost 8 percentage points between 1990 and 2010 (from nearly 21% to 13%), its projected drop for 2010-2030 is less than 5 points. By the same token: while the share of working age manpower with secondary schooling or better increased by an estimated 13 points between 1990 and 2010, the corresponding gain projected for 2010-2030 is just 10 points.

This prospective slowdown in educational improvements for the world's future workforce is the arithmetic consequence of two global demographic trends: the rise in the fraction of world population living in "less developed regions" (where access to schooling tends to be more limited to begin with) and the absolute decline in totals for younger manpower in "more developed regions" (which tends to slow the rise in average working-age educational qualifications in the richer countries). We should note, furthermore, that prospective slowdown indicated by these projections may still exaggerate the true pace of global educational improvements in the decades ahead, since they refer only to levels of schooling attended or completed, without making any adjustments for differences in educational quality across countries.

All in all, the manpower trends depicted here point to mounting demographic pressures for a slowdown in the tempo of long-term global economic growth in the coming growth. All other things being equal, these new trends would also weigh toward a slowdown in aggregate consumer spending, and thus perhaps to pressures of a slowdown in business profits as well. But this global overview lacks a more local resolution—it is akin to looking at the world through "Google Earth" from a vantage point beyond the stratosphere. A closer examination of the implications of population change for specific major economies within the world system is warranted at this point.

The Demography of the World's Major Economies

Let us then consider the prospective influence of demographic forces on the world's major economies over the next two decades. In this section we will briefly examine six countries or regions: China, Russia, India, Japan, Western Europe, and the United States. Taken together, these six account for over half of the world's current population, and over 70% of the world's GDP (adjusted for purchasing power parity).¹⁴ They also

¹³ See Wolfgang Lutz, Anne Goujon, Samir K.C., Warren Sanderson, "Reconstruction of population by age, sex and level of educational attainment of 120 countries for 1970-2000," *Vienna Yearbook of Population Research*, vol. 2007, pp 193-235; and Samir KC, Bilal Barakat, Anne Goujon, Vegard Skirbekk, Warren Sanderson, Wolfgang Lutz (2010). Projection of populations by level of educational attainment, age, and sex for 120 countries for 2005-2050. *Demographic Research* vol. 22, no. 15 (March 16, 2010), pp. 383-472.

¹⁴ Estimates are for the year 2008. Cf. Maddison 2010, op. cit.

accounted for about 70% of global economic growth over the decade before the current global financial crisis. The economic performance of the big six will very largely determine growth pattern for the world as a whole over the next twenty years.

China

By almost all accounts today, no major economy has more radiant prospects for the coming decades than China. Such assessments are predicated on extrapolation of the country's extraordinary recent record of performance into the future. Over the past generation, China's economic transformation has been nothing less than dazzling. In the three decades following Deng Xiaoping's 1978 moves toward overarching systemic reform, by Angus Maddison's reckoning, China's GDP grew almost ten-fold: averaging an estimated 7.5% growth a year for 30 years—and if we go by other sources, China's growth rates would have been even more rapid.¹⁵ No economy in world history has ever grown so fast for so long. Over this same interim, China also emerged from self-imposed autarky to become a major player in the world economy. Today it is number one in both merchandise exports and in holdings of foreign exchange reserves. In aggregate, China now appears to be the world's second largest economy, edging out Japan last year.¹⁶

Chinese policymakers confidently predict the country's torrid growth will continue on into the future; Beijing officially forecasts annual growth rates of roughly 7% per year between now and 2030.¹⁷ This rosy prognosis is accepted by many in the world financial community, and even by some of the intelligence and security services that advise Western governments. But there is a major problem with this optimistic reading of China's economic future—it does not seem to take into account the demographic tempests that China will have to weather in the years immediately ahead. A wide sweep of new, powerful and fundamentally unfamiliar demographic forces are now gathering in China in the years ahead, and will buffet the country simultaneously. China is confronting the demographic version of “the perfect storm,” and these new demographic realities may ultimately force us to revise today's received wisdom about “China's rise.”

China's future demographic profile will differ substantially from its current population situation, mainly because of the country's low levels of fertility. Although there are some inconsistencies and problems in official Chinese population data, population specialists believe that China became a sub-replacement fertility society about two decades ago—and that birth rates have fallen far below the replacement level since then. The Census Bureau, for example, believes that China's current TFR is about 1.5—over 30% below the level required for long-term population stability.¹⁸

¹⁵ The World Bank's *World Development Indicators (WDI) 2010*, for example, suggest that China's real GDP grew at 10% a year between 1979 and 2009, making for a seventeen-fold expansion over those three decades. Cf. World Bank, *WDI Online*, available electronically at <http://data.worldbank.org/data-catalog/world-development-indicators>; accessed January 11, 2011.

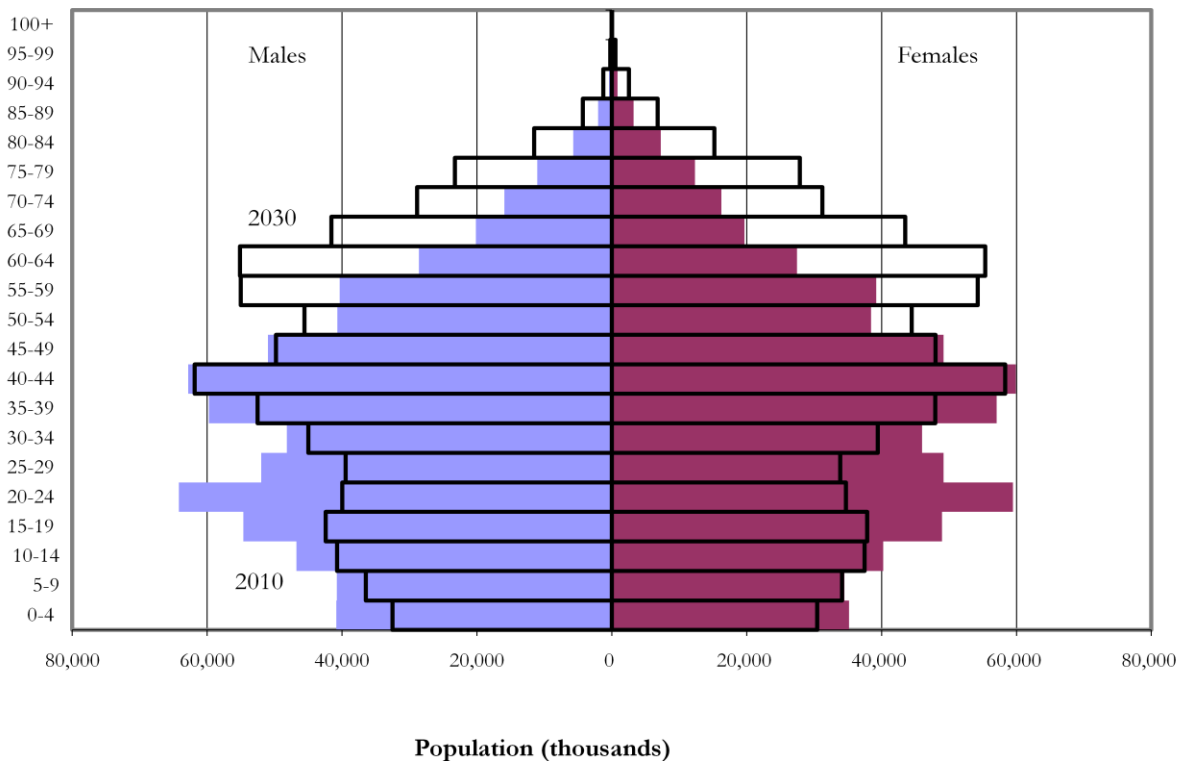
¹⁶ David Barboza, “China Passes Japan as Second-Largest Economy,” *New York Times*, August 15, 2010. Note these are not PPP-based comparisons, but rather comparisons based on prevailing foreign exchange rates.

¹⁷ See, for example, Andrew Batson and Bob Davis, “China Begins to Plan for Slower Growth,” *Wall Street Journal*, July 15, 2010.

¹⁸ China's coercive population control program is surely responsible for some of this drop-off, but hardly all of it: in urban areas, for example, fertility today may average just 1.2 birth per woman, and in place like

Persistent and extreme sub-replacement fertility is the demographic driver shaping the China of tomorrow. Given current trends, in fact, Census Bureau projections anticipate a peaking of total Chinese population in 2026—just 15 years from now—and a continuing national depopulation thereafter. For greater detail, we can contrast China’s current (2010) population profile with its projected profile for 2030 in **Figure 4**. In this future China, there would be fewer people under the age of 50 than in China today—and many fewer Chinese in their 20s and early 30s. On the other hand, there would be many more elderly Chinese than today—vastly more, in fact, in their 60s, 70s and 80s.

Figure 4. Projected Population Structure: China, 2010 vs. 2030



Source: US Census Bureau International Data Base, available at <http://www.census.gov/ipc/www/idb/informationGateway.php>. Accessed January 2011.

Beijing and Shanghai, women are having less than one birth per lifetime—fewer, in other words, than China’s restrictive policies would actually allow. In fact, many Chinese demographers today suspect that the country might not even return to replacement fertility if the “One Child Policy” were entirely scrapped. For some indications that China’s current low levels of fertility reflect in part changes in prevailing norms concerning childbearing, see Yong Cai, “China’s Below-Replacement Fertility: Government Policy or Socio-Economic Development?,” *Population and Development Review*, vol.36, no. 3 (September 2010), pp. 419-440.

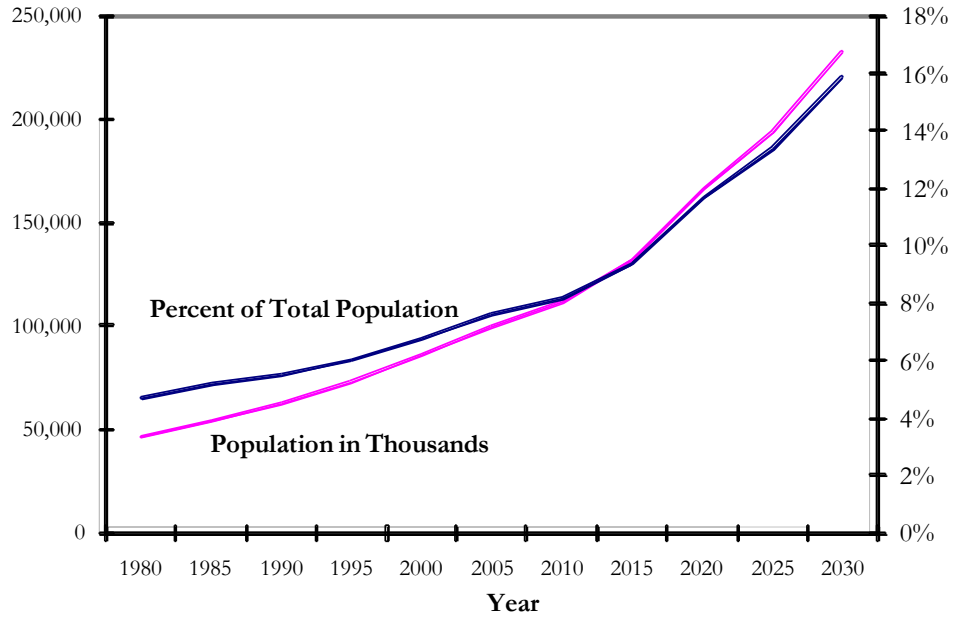
This dramatic shift in China's population profile has four major economic and social implications for the years immediately ahead.

The first is the end of labor force growth. Over the past three decades of hyper-rapid development in China, the country's working age population rose by over two-thirds—growing by an average of about 1.8% a year. By contrast, as we have already seen, China's total working age population is set to fall between 2010 and 2030. (By Census Bureau projections, China's working age manpower will be peaking in 2016—just 5 years from now; by 2030, it stands to be shrinking by almost 1% a year). Furthermore, as noted above, China's manpower pool will be graying over these years; in fact, by 2030, there would be more than four older (50-64 years) prospective workers for every three younger counterparts (15-29 years)—a complete inversion of the current ratio.¹⁹ With a smaller and much greyer Chinese workforce on the horizon, sustaining the growth rates of the recent past would be a truly counterintuitive proposition.

Second, there is the broader issue of rapid and pervasive population aging. Though Chinese authorities may have clamped down on births for three decades, the country will be experiencing a population explosion of senior citizens over the next twenty years (progeny of the pre-population control era). In 2010, about 115 million Chinese were 65 or older; by 2030, the corresponding number is projected to approach 240 million—meaning that China's cohort of senior citizens would be soaring at an average rate of 3.7% per year. [See **Figure 5.**] The trajectory of population aging that China can expect to experience over the next two decades is virtually unprecedented in human history to date—until now, only Japan has undergone such a rapid tempo of graying. But Japan was rich before it grew old; China will have to do things the other way around. Moreover, China's very poorest regions—in the countryside—are also generally its greyest, since younger rural men and women have been moving to the cities for better-paying jobs. By 2030, according to Census Bureau projections, China's median age (the age-line that bisects the population into two equally sized groups) will be higher than the USA's—and according to projections by Chinese demographers, over 22% of rural China's population will be 65 or older. [See **Figure 6.**] (In aged Italy and Germany today, the corresponding proportion is 20%.) How China's coming tsunami of senior citizens is to be supported remains an unanswered question. As yet, China has no national public pension system in place, and only the most rudimentary of public provisions for rural health care. Meeting the needs of its rapidly growing elderly population, however, will undoubtedly place economic and social pressures on China that no country of a comparable income level has ever before had to face.

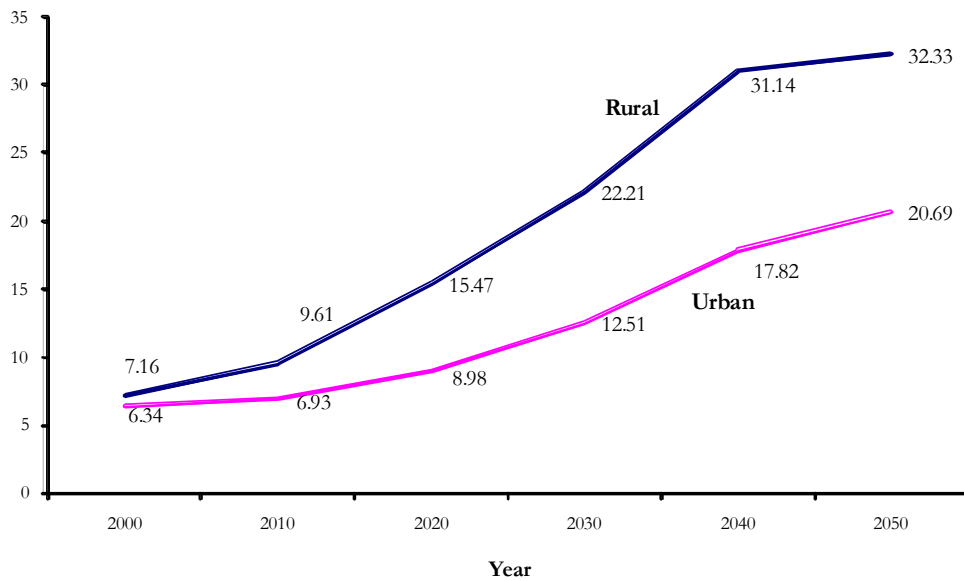
¹⁹ China's older manpower, remember, is much less educated than their more youthful successors: nearly half of today's 50-64 grouping has not completed primary school.

Figure 5. Estimated and Projected Population Ages 65+ (China, 1980-2030)



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2008 Revision, <http://esa.un.org/unpp>, Wednesday, May 13, 2009; 2:12:34 PM. Note: “medium variant” projections.

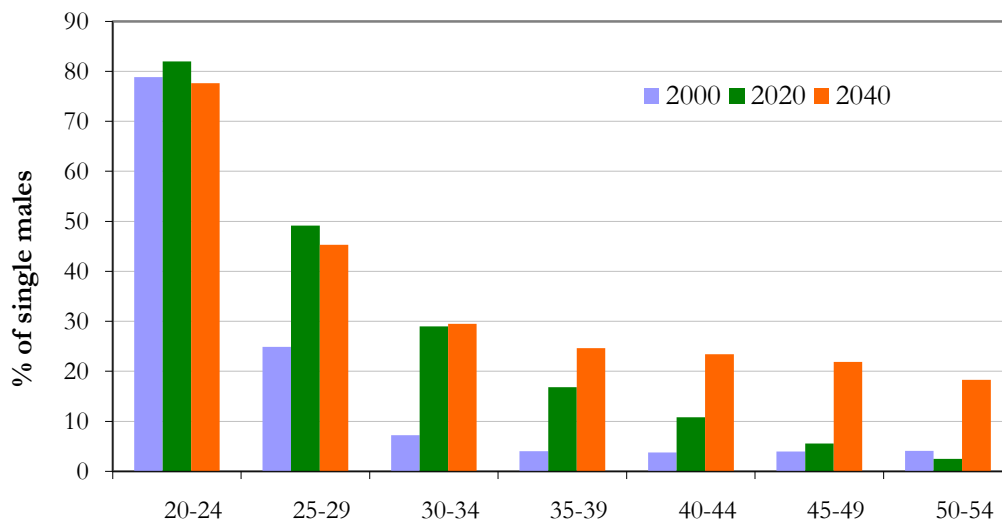
Figure 6. Elderly [65+] in China’s Rural and Urban Total Population (percent, projected, medium fertility and mortality)



Source: Zeng Yi, Zhenglian Wang, Jiang Leiwon, and Danan Gu, “Projection of Family Households and Elderly Living Arrangement in the Context of Rapid Population Aging in China,” *Genus* LXIV, No. 1-2 (2008): 9-36.

Third, in the decades immediately ahead, China will see the emergence of a growing host of essentially unmarriageable young men. This outcome will be the all but inescapable arithmetic consequence of the gender imbalance that has accompanied the country's "One Child Policy"—while ordinary human populations regularly and predictably report 103 to 105 baby boys for every 100 baby girls, China's officially reported sex ratio at birth (or SRB) was almost 120 boys for every 100 girls in 2005.²⁰ This imbalance between the numbers of little boys and little girls in China sets the stage for a "marriage squeeze" of monumental proportions in the decades just ahead. Calculations by Chinese researchers suggest the dimensions of the social dislocation that may await.²¹ [See **Figure 7.**] In the year 2000, all but 5% of Chinese men in their late 30s had managed to get married; by 2030, their projections suggest that the corresponding proportion of never-married men in their late 30s may be over 25% nationwide. (The Zeng Yi et al. projections suggest the levels of those unmarried will be even higher in the Chinese countryside, since the poor, uneducated and the rural will be more likely to lose out in the coming competition for brides.) How will China fare with a growing army of unmarriageable, underprivileged, and quite possibly deeply discontented young men in its midst? It is impossible to know for certain, but it is difficult to see how this could prove a plus for either economic performance or social cohesion.

Figure 7. Projected Percentage of Never-Married Males by Age Group: China, 2000-2040



Source: Calculated from ProFamy Software as described in Zeng Yi, Zhenglian Wang, Jiang Leiwen, and Danan Gu, "Projection of Family Households and Elderly Living Arrangement in the Context of Rapid Population Aging in China," *Genus* LXIV, No. 1-2 (2008): 9-36.

²⁰ Some demographers suggest the official numbers may slightly exaggerate the disparity, but there is no doubt that the disparity has been rising for a generation, and is extraordinarily high today. See for example Daniel M. Goodkind, "Fertility, Child Underreporting, and Sex Ratios in China: A Closer Look at the Current Consensus," *Demography* (forthcoming).

²¹ Zeng Yi, Zhenglian Wang, Jiang Leiwen, and Danan Gu. 2008. "Projection of Family Households and Elderly Living Arrangement in the Context of Rapid Population Aging in China --A Demographic Window of Opportunity Until 2030 and Serious Challenges Thereafter." *GENUS - An International Journal of Demography*, vol 54 no. 1-2 (2008), pp. 9-36.

Finally, China faces the prospect of truly revolutionary changes in family structure, especially in its ultra-low fertility urban areas. A new family type is in the making in China today: only-children begotten of only children. In China's cities, a large minority of young adults are themselves single children, and within 20 years, this "new family type" could become common, if not predominant. The children in this new family type would have no siblings: no cousins, no uncles or aunts—only ancestors and descendants. The emergence of this new family type could have truly far-reaching implications for China—including implications for economic performance. Until now, after all, China has been a "low-trust" society; given the risky environment in which business must take place, people have relied heavily upon trusted social networks (*guanxi*) largely composed of blood relatives. In China's most important economic centers, however, the kinship networks that have lowered the risks and transaction costs of business are rapidly eroding. Unless China can come up with serviceable institutional substitutes—and quickly—economic performance in China may be adversely affected by this rapid transformation of the urban Chinese family.

When all is said and done, China still has many potential sources for enhancing productivity in the years immediately ahead. These include the migration of rural workers to more productive urban jobs, wider application of as yet underutilized technical knowhow, improved financial intermediation for the country's famously high savings rates, and broader institutional and policy reforms to enhance economic efficiency. Given such still-untapped potential, it is perfectly reasonable to argue that China could enjoy continuing growth in the decades immediately ahead.

But given the confluence of serious demographic challenges that China now faces—problems that are not generally as yet appreciated, apparently even by Beijing's leadership—China's growth over the next two decades could be slower than is generally expected today, possibly dramatically slower.

Russia

The Russian Federation is another emerging market widely regarded as holding immense economic promise for the future—not least by the Kremlin. Despite the current economic downturn, official Russian plans envision an average long-term pace of economic growth for Russia of 6% a year through 2020 and continuing rapid growth thereafter.²² Some foreign analysts have offered assessments no less enthusiastic than the Kremlin's own; in one of its "BRIC" reports, for example, a Goldman Sachs team forecast nearly 6% per capita growth for the Russian Federation from 2010 to 2030.²³ These ambitious visions, however, take no account of the country's demographic constraints, which are arguably even more serious than China's. Indeed, in many respects, the Russian demographic outlook can fairly be described as dire.

Russia, to begin, has been in the grip of a protracted demographic crisis since the end of Communist rule—a continuing paroxysm characterized by a sharp slump in births and an upsurge in deaths. Between 1992 and

²² For more detail on the Kremlin's "Concept of Long-Term Socio-Economic Development of Russian Federation for the Period until 2020," see Andrew C. Kuchins, Amy Beavin, and Anna Bryndza, *Russia's 2020 Strategic Economic Goals and the Role of International Integration* (Washington, D.C.: CSIS, 2008).

²³ Derived from Goldman Sachs Global Economics Group, *BRICs and Beyond* (2007), p. 149, available electronically at <http://www2.goldmansachs.com/ideas/brics/book/BRIC-Full.pdf>, accessed January 19, 2011. By the year 2050, in this study's projections, per capita output would be higher in Russia than in Germany, France, or any other country of continental Europe; higher than in Japan; and even slightly higher than in Canada. *Ibid.* p. 37.

2009 (the most recent calendar year for which such data are available) there were 13 million more deaths than births in the Russian Federation. Over that period, in fact Russia registered just over 3 deaths for every two live births.²⁴ To go by such figures alone, one would guess that Russia was in the midst of a protracted famine or an unending, brutally disruptive war.

Immigration (mainly from the “near abroad”—i.e., other former Soviet states) has helped slow the country’s population decline in the face of this massive mortality surfeit, but has not been able to prevent it. Between the start of 1992 and the start of 2010, official figures suggest Russia’s population has shrunk by almost 7 million, or about 5% (from over 148 million to under 142 million). And despite some promising improvements in recent years (for the first time in a decade and a half, Russia’s officially tallied population did not decline appreciably in 2009), the outlook is further depopulation in the years ahead. “Medium variant” projections by the Kremlin’s official statistical service, Rosstat/Goskomstat, envision a further surfeit of deaths over births over the next two decades on the order of 10 million.²⁵

More troubling than Russia’s past and prospective depopulation, however, is the health disaster that has been driving the country’s population totals downward. There can be no sugar-coating the situation: for an urbanized, literate society at peace, Russia’s health trends have been catastrophic. According to estimates by the Human Mortality Database research team, which examines and standardizes figures for over three dozen European and Western societies, overall life expectancy at birth in Russia was slightly lower in 2008 than it was in 1960—almost half a century earlier.²⁶ By their reckoning, female life expectancy in 2008 was somewhat lower than it was in 1989—and male life expectancy almost two and a half years lower.

To make matters worse, at least from an economic standpoint, Russia’s health disaster is concentrated in its population of working ages. [See **Figure 8.**] Over the 40 years between 1965 and 2005, for example, death rates for men between their late 20s and mid 50s typically doubled. Scarcely less alarming, death rates for women in those same age groups generally rose by about 50%. Public health experts do not entirely understand the reasons for this death spiral. While diet, smoking, sedentary lifestyles, and above all, Russia’s deadly romance with the vodka bottle can explain much of this broad deterioration in public health conditions, the actual decline in survival prospects appears to be worse than such standard “risk factors” would of themselves suggest.²⁷

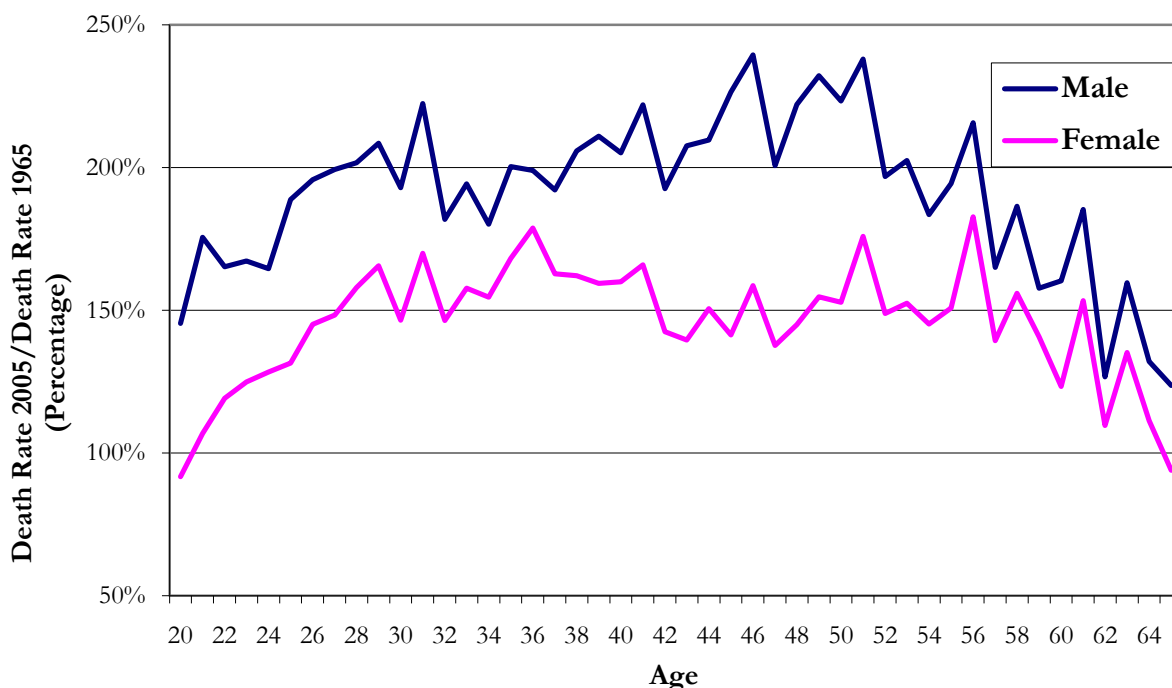
²⁴ Derived from Russian Federation Statistical Service (Goskomstat/Rosstat), *Demographic Yearbook of Russia 2010*, available electronically at http://www.gks.ru/doc_2010/demo.pdf; Table 2.1; accessed January 19, 2011.

²⁵ Derived from Russian Federation Statistical Service (Goskomstat/Rosstat), “Estimated Numbers for the Population of the Russian Federation,” (April 29, 2010), Table 2.1, available electronically at http://gks.ru/wps/wcm/connect/rosstat/rosstatsite/main/publishing/catalog/statisticjournals/doc_1140095525812; accessed January 19, 2011.

²⁶ Human Mortality Database, available electronically at www.mortality.org.

²⁷ For a more detailed analysis of what might be called “the enigma of Russian mortality” see Nicholas Eberstadt, *Russia’s Peacetime Demographic Crisis: Dimensions, Causes, Implications*, (Seattle, WA; National Bureau of Asian Research, 2010).

Figure 8. Death Rate Ratio, Ages 20-65: Russia, 2005 v. 1965



Source: Human Mortality Database. University of California, Berkeley and Max Planck Institute for Demographic Research. Available at www.mortality.org. Accessed January 2011.

Given the stagnation and decline of health levels in Russia, and the general, progressive rise in health throughout almost all of the rest of the globe, Russian adult health profiles are sometimes today described as “Third World.” But in some ways, this may be unfair—to the Third World. In some respects, Russian adult health levels in recent years have been more akin to those of the “Fourth World,” which comprises the planet’s most desperate and impoverished states. According to estimates by the World Health Organization, for example, life expectancy for a 15-year old man in 2008 would have been lower in Russia than in Cambodia, Eritrea, or Haiti.²⁸

It would be heartening to conclude that Russian health levels *must* improve dramatically in the years ahead, since the situation seems so patently abnormal. Unfortunately, there is reason to fear that in Russia the abnormal has become the new norm. As a rule, health and wealth correspond closely in the modern world. Yet even though during the ten years between 1998 and 2008 the country’s official per capita income doubled, estimated life expectancy at birth was only a few months higher in 2008 than it had been in 1998.²⁹ There is an enormous amount of “negative health momentum” in Russia’s population structure today—for men, simply re-attaining their father’s survival prospects would count as a considerable public health achievement. Such an “achievement,” however, could still leave adult male life expectancies well below the levels now

²⁸ World Health Organization, “Life Tables for WHO Member States,” available electronically at http://www.who.int/healthinfo/statistics/mortality_life_tables/en/; accessed August 10, 2010.

²⁹ According to the Human Mortality Database, overall life expectancy at birth in the Russian Federation was 67.2 years in 1998 and 67.9 years in 2008. Human Mortality Database, *loc. Cit.*

common in such places as Pakistan and Bangladesh. This may help explain why the UN projects that male life expectancy in Russia will remain below the average of the “less developed regions” through at least 2030.

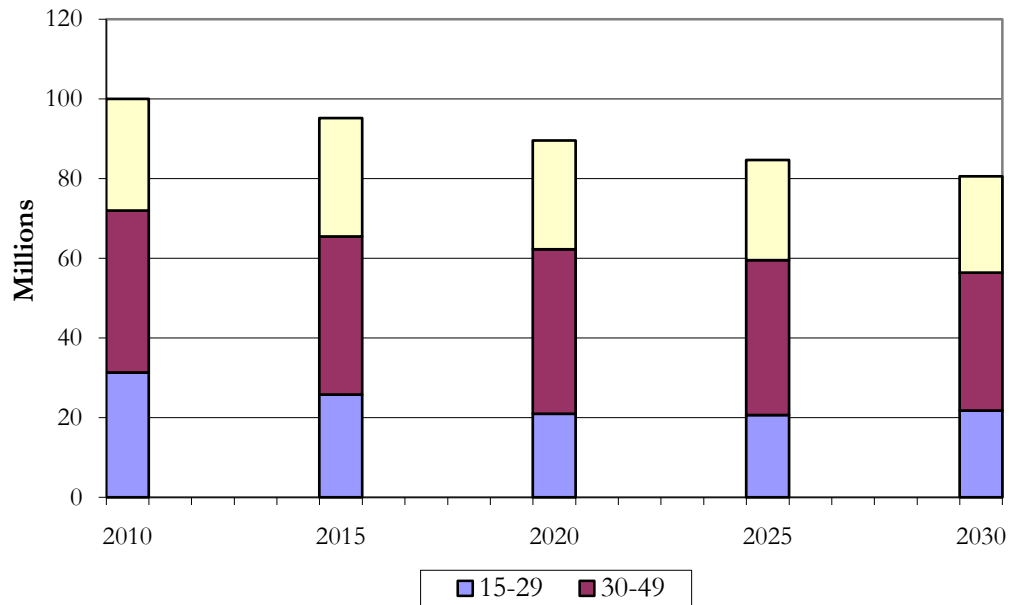
Between now and 2030, the Census Bureau projects that Russia’s working age population will fall by nearly 20%. [See **Figure 9**.] This prospective workforce, alas, is likely to remain more debilitated and frail than its counterparts in the OECD—or for that matter, even in the other BRIC countries with which Russia today is sometimes categorized. (Combined male and female life expectancy at age 15 today is not only lower in Russia than in China or Brazil—it is also lower than in India.³⁰) In the modern world, urban centers are typically the epicenters of economic growth—but Russia’s urban population is smaller today than at the end of the Communist era, and the UN projects there will be fewer inhabitants in Russia’s cities 20 years from now than today.³¹ In addition, Russia’s old-age burden will be steadily increasing over the decades ahead; whereas 13 percent of the Russian population today is 65 or older, the projected proportion for 2030 is 21%. [See **Figure 10**.] Taking all this into account, it is difficult to see how Russia can hope to generate sustained and rapid economic growth on the basis of the country’s human resources. Natural resources, for their part, may offer economic opportunities for Russia in the years ahead, but these should not be exaggerated. Despite all its energy and mineral wealth, after all, Russia’s total annual exports have never yet exceeded those of Belgium—not even at the height of the pre-crisis oil boom.³²

³⁰ In 2008, by WHO estimates, life expectancy at age 15 for both sexes together was 60.2 years for China, 60.1 years for Brazil, 54.8 years for India, and 53.8 years for the Russian Federation, World Health Organization, “Global Health Observatory,” available electronically at <http://apps.who.int/ghodata/?vid=720>; accessed January 19, 2011.

³¹ UN Population Division, “World Urbanization Prospects: The 2009 Revision Population Database,” available electronically at <http://esa.un.org/wup2009/unup/index.asp?panel=1>.

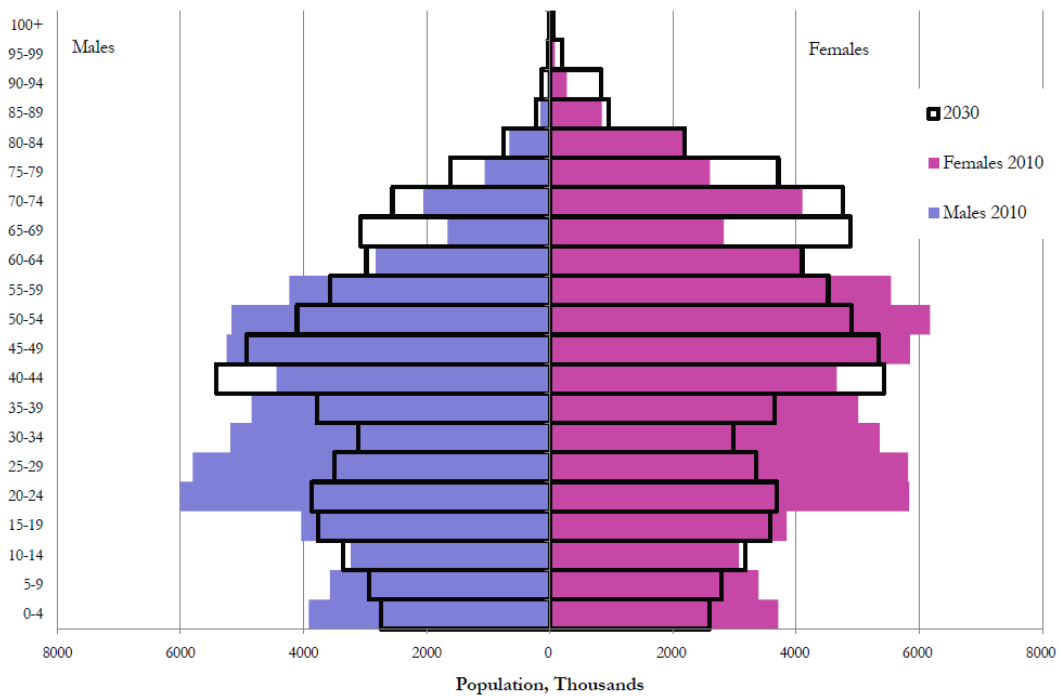
³² In 2008, according to data from the World Trade Organization, Belgium just edged out Russia in total merchandise exports: \$471.9 billion vs. 471.6 billion. In 2009, Belgium’s merchandise exports were estimated at \$ 369.9 billion—Russia’s, at \$ 303.4 billion. World Trade Organization Statistical Database, Time Series on International Trade, available electronically at <http://stat.wto.org/StatisticalProgram/WSDStatProgramHome.aspx?Language=E>, accessed January 19, 2011.

Figure 9. 15-64 Population by Age Group: Russia, 2010-2010 (estimated and projected, millions)



Source: U.S. Bureau of the Census International Database, available online at <http://www.census.gov/ipc/www/idbacc.html> Accessed January 2011.

Figure 10. Projected Population Structure of Russia, 2010 v. 2030



Source: U.S. Bureau of the Census International Database, available online at <http://www.census.gov/ipc/www/idbacc.html> Accessed January 2011.

India

What about India? Since the country's 1991 financial crisis and ensuing economic reforms, India's GDP growth has averaged an impressive 6.5% a year—in recent years, the country has been humming along at 8% per annum. Many observers think the best may be yet to come. Officially, India's current (11th) Five Year Plan, which runs through 2012, is targeting a growth rate of 9% per annum,³³ and India's draft 12th Five Year Plan for 2012-2017 is aiming for a 10% annual growth rate.³⁴ Looking further ahead, a member of the country's Planning Commission suggested in 2008 that India would be growing at 8%-9% a year for the next quarter century (i.e., through 2033).³⁵ Such official thinking tracks with sanguine assessments from the private sector. The Goldman Sachs "BRIC" team, for example, forecast an average GDP growth of almost 9% per year for India between 2010 and 2030.³⁶

In government and private sector circles alike, a growing number of analysts believe that India's future growth will be accelerated by demographic tailwinds. By this argument, the projected changes in India's population profile will position the country to benefit from what demographic economists call "the demographic dividend." Over the next two decades, India's total population is set to grow by a little over 1% per annum, possibly becoming the world's most populous state before 2030—and almost all of this growth would be working age manpower. [See **Figure 11.**] As India's manpower pool grows, the country's "dependency ratio" (the ratio children under 15 and persons over 65 to working-age population) will be falling, and the society will remain relatively youthful. Such changes in population structure could facilitate higher levels of national savings, investment, and thus—all other things being equal—economic growth.³⁷ (By some readings, just such a "demographic dividend" contributed to the spectacular economic growth enjoyed throughout much of East Asia over the past several decades.)

³³ Government of India Planning Commission, *Eleventh Five Year Plan, 2007-2012: Volume I, Inclusive Growth* (New Delhi: Oxford University Press, 2008) Table 2.2, available electronically at http://planningcommission.gov.in/plans/planrel/fiveyr/11th/11_v1/11th_vol1.pdf.

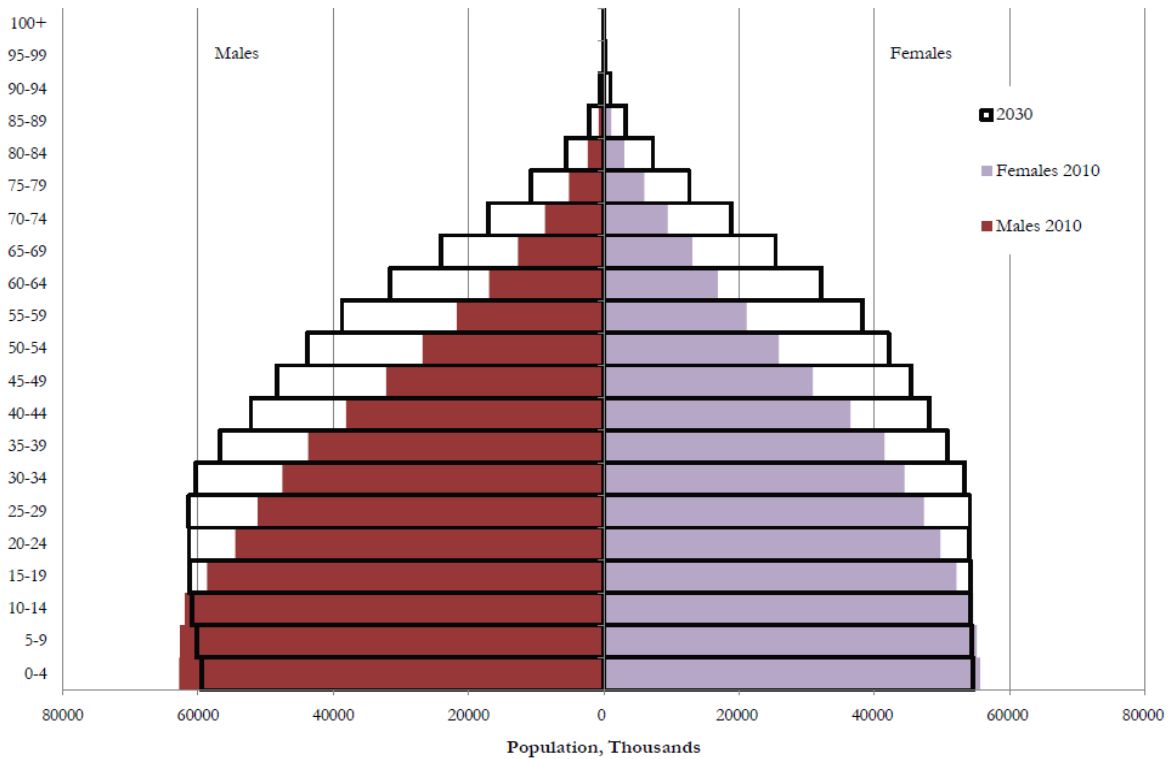
³⁴ "10pct GDP growth aimed in 12th Plan" *Financial Express* (New Delhi), June 19, 2010, available electronically at <http://www.financialexpress.com/news/10-pct-gdp-growth-aimed-in-12th-plan/635935>.

³⁵ "Nuclear option needed to meet India's energy needs," *Outlookindia.com*, June 13, 2008, available electronically at <http://news.outlookindia.com/item.aspx?7718>.

³⁶ Goldman Sachs Global Economics Group, *BRICs and Beyond, loc. Cit.*

³⁷ The canonical version of this argument is offered in David Bloom, David Canning, and Jaypee Sevilla, *The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change*, (Santa Monica, CA: RAND, 2003). For an updated version focused specifically on India, see David E. Bloom, "Population Dynamics in India and Implications for Economic Growth," *The WDA-HSG Discussion Paper Series on Demographic Issues*, no. 2011/1 (January 2011), available electronically at http://www.wdaforum.org/assets/files/2011/WDA-HSG_DP_2011_1.pdf.

Figure 11. Projected Population Structure of India, 2010 v. 2030

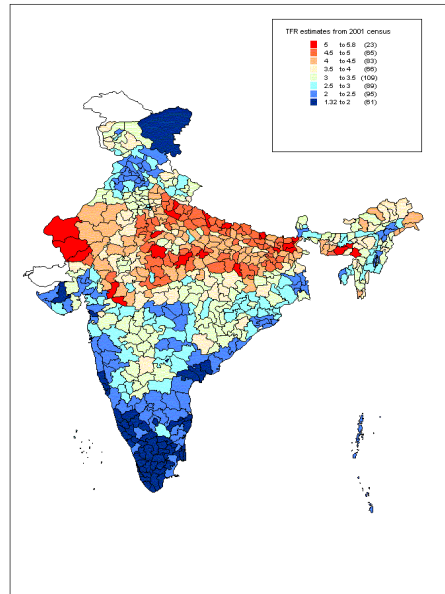


Source: U.S. Bureau of the Census International Database, available online at <http://www.census.gov/ipc/www/idbacc.html> Accessed January 2011.

Viewed in the aggregate, India today would indeed appear to be a poster child for a coming potential “demographic dividend.” But closer examination necessarily qualifies that initial impression. India’s vast, striking regional disparities in population profiles, and its still-appreciable human resource shortfalls in many regions, could make sustaining rapid economic growth a trickier proposition than might at first seem the case.

India is a land of many different religions, languages, cultures—and fertility patterns. This can be seen in Figure 12, based on the most recent (2001) national census. [See **Figure 12.**] To oversimplify only slightly, India today is bisected by a great North/South fertility divide. In much of the North (including parts of the Ganges belt and some of the country’s western-most districts) fertility levels remain quite high, with birth levels per woman of 4 or more. In much of the Indian south, on the other hand, fertility levels are at, or already below, the replacement level.

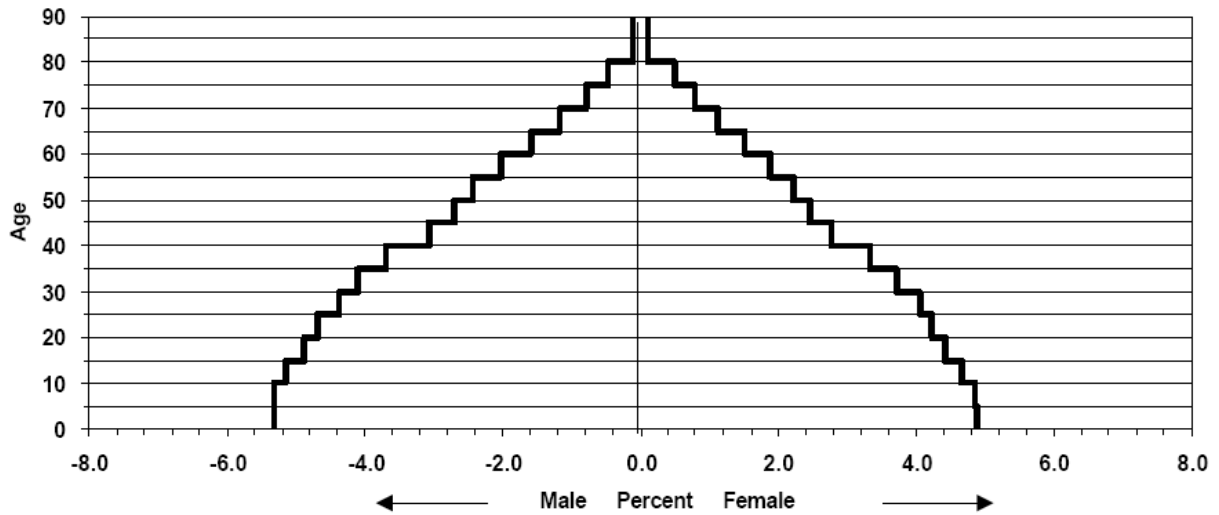
Figure 12. Fertility Map of India, 2001



Source: Christophe Z. Guilmoto et al., South India Fertility Project, <http://www.demographic.net/sifp/maps/TFR2001.gif> Accessed February 11, 2011.

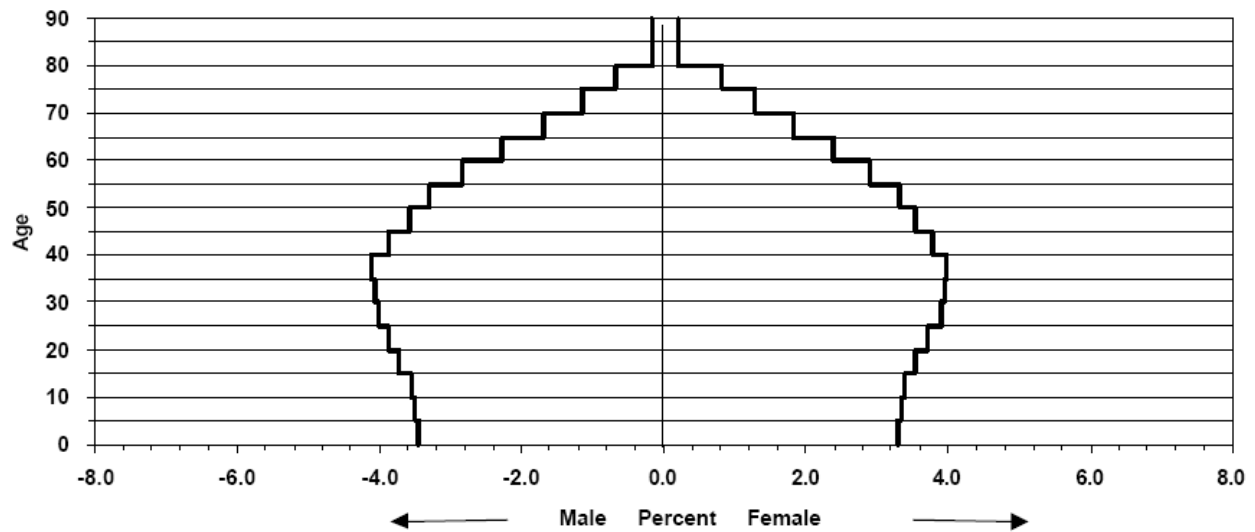
In effect, this means that two very different Indias are being born today: a youthful, rapidly growing north India whose future population structure will be akin to a traditional “Third World” society [see **Figure 13**], and a south India where population growth will be slowing or ceasing, where manpower growth will be coming to an end, and where pronounced population aging will be commencing [see **Figure 14**].

Figure 13. Projected Population Structure of North India, 2025



Source: Bhat, P.N. Mari, “Demographic scenario, 2025.” Institute of Economic Growth, Delhi, Figure 5. Available online at <http://planningcommission.nic.in/reports/sereport/ser/vision2025/demogra.pdf>. Accessed May 2005.

Figure 14. Projected Population Structure of South India, 2025

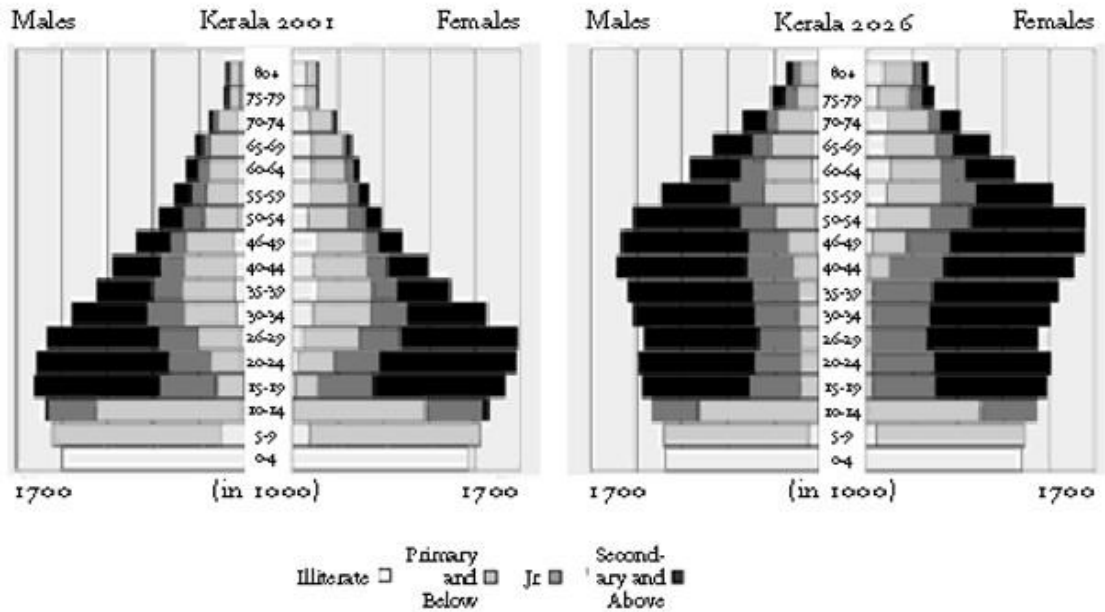


Source: Bhat, P.N. Mari, “Demographic scenario, 2025.” Institute of Economic Growth, Delhi, Figure 6. Available online at <http://planningcommission.nic.in/reports/sereport/ser/vision2025/demogra.pdf> accessed May 2005.

This great impending demographic divergence bears directly on the prospects for sustaining rapid growth in India in the decades immediately ahead. At the risk of oversimplification, it is India’s sub-replacement fertility areas (which include not only much of the south but virtually all of the country’s major urban centers—Mumbai, Chennai, Bangalore, Kolkata, and the rest) that are the country’s engines of economic growth, while the high-fertility areas are generating the country’s future prospective workers. But there is a fundamental mismatch here—India’s growth engines require workers with relatively high levels of educational attainment, and India’s high-fertility areas are turning out a rising generation of young Indians with woefully low levels of schooling.

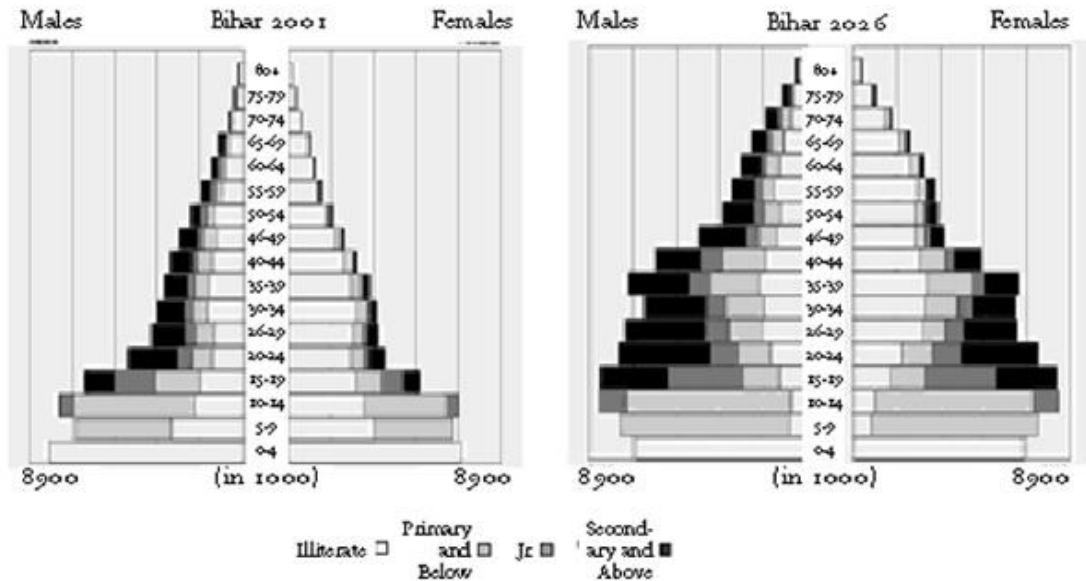
The dilemma can be highlighted by contrasting the prospective educational profiles of Kerala (which is now one of India’s most prosperous states) and Bihar (one of its poorest). [See **Figures 15 & 16.**] In just over a decade and a half, Kerala’s working-age population will be on the brink of stagnation—but the state’s working age manpower will be fairly well trained (roughly half of Keralites aged 15-64 would have high school education or better). By contrast, Bihar’s working-age manpower will still be growing briskly—but as 2030 approaches, these projections suggest that well over half of working-age Biharis will have received no more than some primary schooling, and nearly a third of the state’s working age manpower will have no formal education at all.

Figure 15. Age and Education Pyramid for Kerala, India: 2001 and 2026 (projected)



Source: Anne Goujon and Kirsty McNay, “Projecting the educational composition of the population of India: selected state-level perspectives.” Applied Population and Policy 2003:1(1) 25–35, Figure 1.

Figure 16. Age and Education Pyramid for Bihar, India: 2001 and 2026 (projected)

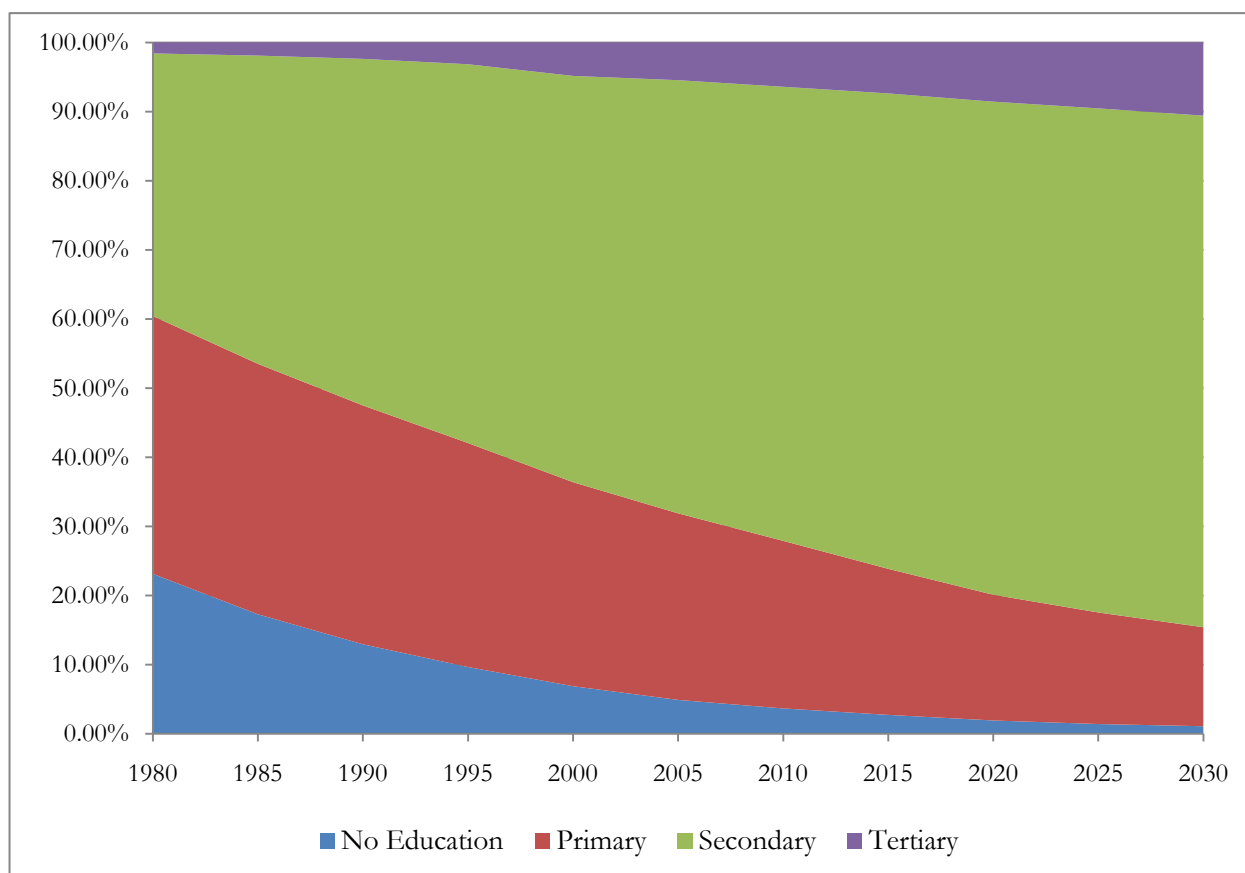


Source: Anne Goujon and Kirsty McNay, “Projecting the educational composition of the population of India: selected state-level perspectives.” Applied Population and Policy 2003:1(1) 25–35, Figure 1.

India today, it is true, can boast of a cadre of millions of highly-trained engineers, scientists, researchers and professionals. But in a country of well over a billion people, these specialists comprise only a tiny fraction of the country's overall manpower—and for the country as a whole, educational levels are still remarkably limited. These education shortfalls speak to a legacy of discrimination—lack of access to schooling for disfavored castes, and for girls of all religious backgrounds. India's government has been striving to overcome this legacy; just this year, national legislation for the first time mandated universal primary schooling for both girls and boys. Even so, substantially improving India's educational profile will take generations—not just decades—to accomplish.

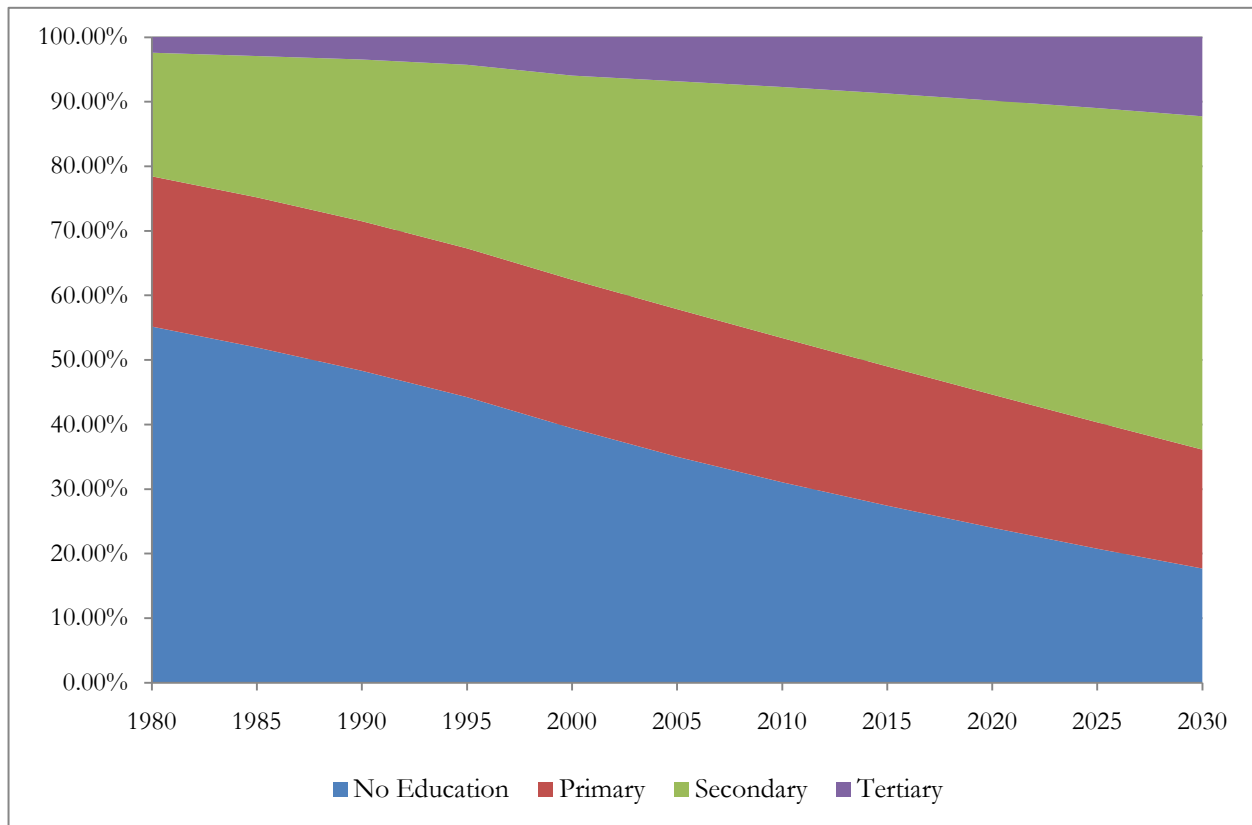
We can see just how far India has to go by contrasting the past and projected educational profile of working-age manpower in India and China. [See **Figures 17 & 18.**] In 1980—at the start of China's ongoing economic boom—slightly over a fifth of the country's working age population had never been to school. By 2030—20 years from now—India's proportion of unschooled working age manpower will be just slightly lower than was China's half a century earlier.

Figure 17. Estimated and Projected Educational Attainment of Total 15-64 Population, China, 1980-2030



Source: W Lutz, A Goujon, S K.C., W Sanderson. 2007. Reconstruction of population by age, sex and level of educational attainment of 120 countries for 1970-2000. Vienna Yearbook of Population Research, vol. 2007, pp 193-235; W Lutz, A Goujon, S K.C., W Sanderson. 2007. Reconstruction of population by age, sex and level of educational attainment of 120 countries for 2000-2030. Vienna Yearbook of Population Research.

Figure 18. Estimated and Projected Educational Attainment of Total 15-64 Population, India, 1980-2030



Source: W Lutz, A Goujon, S K.C., W Sanderson. 2007. Reconstruction of population by age, sex and level of educational attainment of 120 countries for 1970-2000. *Vienna Yearbook of Population Research*, vol. 2007, pp 193-235; W Lutz, A Goujon, S K.C., W Sanderson. 2007. Reconstruction of population by age, sex and level of educational attainment of 120 countries for 2000-2030. *Vienna Yearbook of Population Research*.

India's "education deficit," of course, tracks with other sorts of constraints on human capital in India as well—perhaps most importantly, limitations to health. By the Census Bureau's reckoning, overall life expectancy at birth in India is currently eight years lower than in China. Within India itself, as of 2002/05, some of the country's least educated states lagged in life expectancy at birth by over a decade and a half behind Kerala, the most educated state.³⁸ The implications for economic productivity of such human resource disparities and shortfalls are self-evident.

This is not to say that India cannot continue to grow, and to play an ever greater role in the international economy, in the years ahead. But the proposition that India might nearly quadruple its per capita income in the next 20 years (as a continuation of 8%-9% growth might imply) simply ignores the human resource requisites for such an economic ascent.

For India to achieve such a feat, it would have to reach the income levels characteristic of Taiwan and South Korea in the early 1990s. At that time, however, South Korea and Taiwan were already universal-literacy

³⁸ As estimated in India Ministry of Finance, National Informatics Centre, *2009-10 Economic Survey*, available at <http://indiabudget.nic.in/es2009-10/chapt2010/tab91.pdf>. Note that these life expectancy estimates cover India's 15 largest states (accounting for 90+ % of the country's population in 2001).

societies with well-educated labor forces; twenty years from now, nearly a fifth of India's working age manpower may still be illiterate, and another fifth may have no more than some primary schooling. Education—or the lack of it—thus stands to pose material, and perhaps quite unforgiving, constraints on prospects for sustaining the country's current, very rapid, rates of economic growth for decades to come.

The Developed Economies—Japan, Western Europe, and the United States

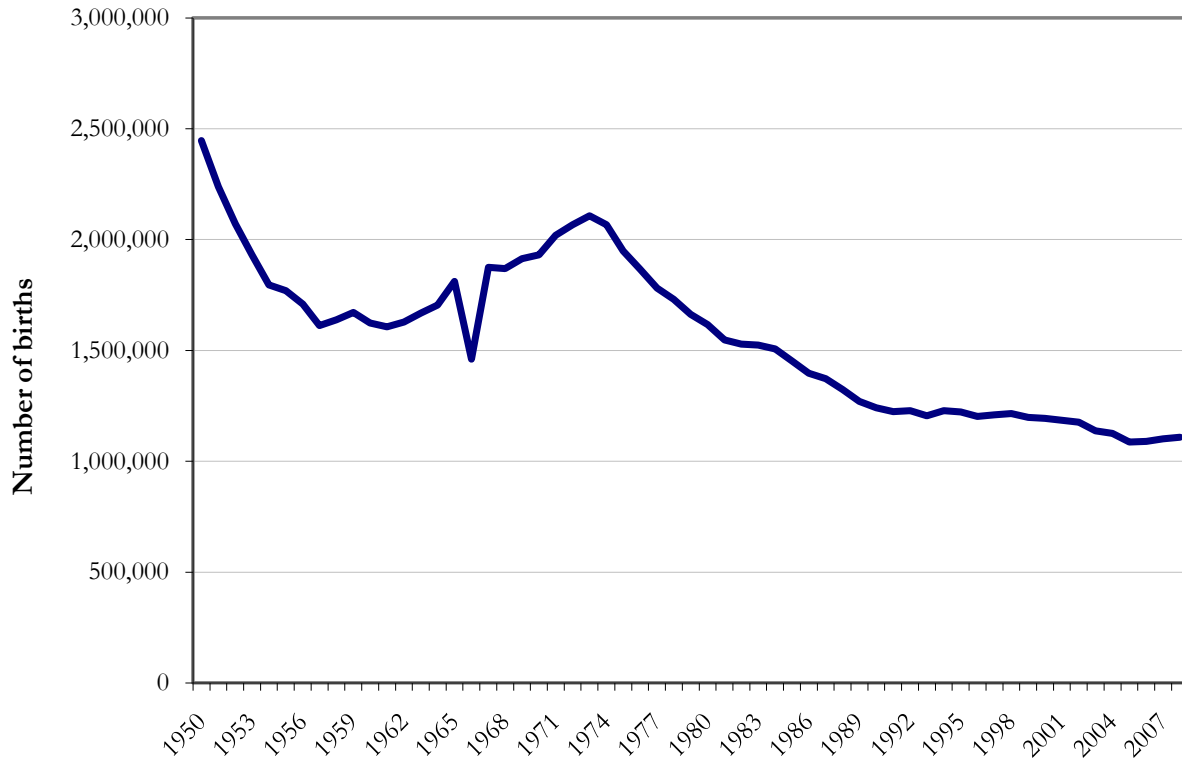
The general outline of impending demographic trends for the world's major developed economies—Japan, Western Europe, and the United States—will already be familiar to most readers. Broadly speaking, all of the developed economies face demographic slowdowns and population aging in the decades just ahead. But there are major differences in the acuteness and the precise nature of their coming demographic constraints.

In purely arithmetic terms, Japan stands to be the economic area of the three most heavily burdened by the population trends that lie immediately ahead. Japan has had the steepest, and the longest, fall-off in fertility in modern history; in 2008, the country celebrated barely 40% as many births as it had 60 years earlier. [See **Figure 19.**] This profound and protracted fertility collapse (Japanese childbearing is currently estimated to be nearly 40% below the replacement level) has set the stage for a corresponding depopulation in the generations ahead. Japan's population decline could theoretically be mitigated to some degree by immigration, but perhaps more than any other affluent Western society, Japan has been incapable or unwilling to bring in newcomers from abroad. Official Japanese statistics, in fact, report a slight net *out-migration* of population over the past four decades.³⁹ But Japan has also enjoyed the blessing of rapid and continuing health improvement over the postwar era; as of now, the Japanese have a higher life expectancy at birth than any other country on earth (as of 2008, 83 years: 79 for males and 86 for females). On current survival trends, a Japanese baby would have an almost 90% chance of reaching age 65, a 75% chance of making it from 65 to 80, and nearly even odds of living from 80 to 90.⁴⁰ Taken together, the country's fertility, migration and mortality trends are therefore propelling Japan not only into demographic decline, but also to a degree of population aging thus far contemplated only in science fiction writing.

³⁹ Derived from Government of Japan Statistics Bureau, *Japan Statistical Yearbook 2011*, (Tokyo: Ministry of Internal Affairs and Communications, 2011), Table 2-1, available electronically at <http://www.stat.go.jp/data/nenkan/pdf/yhyou02.pdf>. According to these official numbers, Japan experienced a net out-migration of 210,000 persons between 1969 and 2009.

⁴⁰ Derived from Human Mortality Database: www.mortality.org.

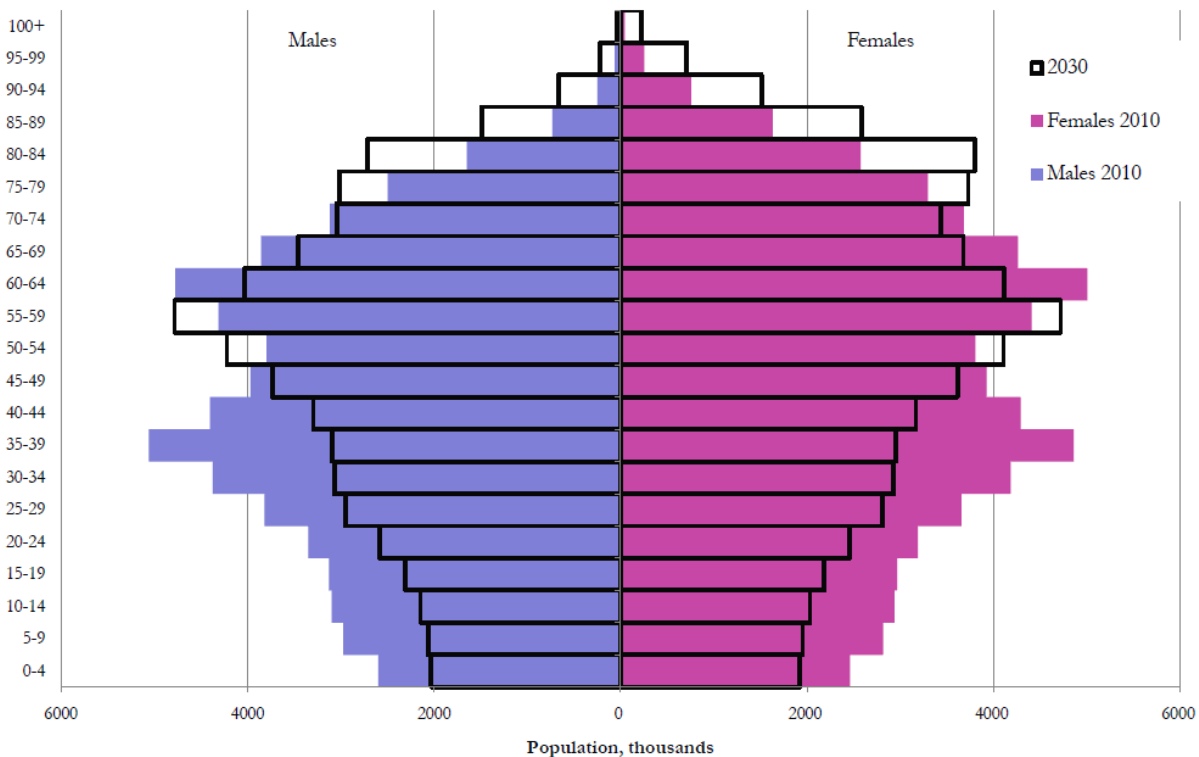
Figure 19. Live Births in Japan, 1950-2008



Source: Statistical Survey Department, Statistics Bureau, Ministry of Internal Affairs and Communications. Table 2.1. Available at <http://www.stat.go.jp/english/data/nenkan/1431-02.htm>.

Figure 20 depicts the shape of things to come in Japan over the next 20 years. To go by Census Bureau projections (which are not appreciably different from projections by the Japan’s government), there would be fewer Japanese under the age of 75 living on the Home Islands in 2030 than today—and many fewer under the age of 50—but there would be many more octogenarians, nonagenarians and even centenarians (over a quarter of a million of the latter, according to current projections, as against roughly 50,000 today). Japan is already a net-mortality nation, registering more deaths than births, and over the next two decades the surfeit of births over deaths is expected to drive down the country’s total population by about 14 million, or about 11% (from 127 million to 113 million). But the relative decline in working age manpower would be even steeper: between 2010 and 2030 the 15-64 group stands to shrink from 81 million to 67 million, or 17%. All the while, the number of Japanese senior citizens would be rising. By 2030, in these projections, over 30% of the population would be over 65, and over 12% would be over 80. In this future Japan, there would actually be more octogenarians and nonagenarians than children under 15; by the Census Bureau’s estimate, median age for the country as a whole would be well above a currently mind-boggling 52 years.

Figure 20. Projected Population Structure of Japan, 2010 v. 2030



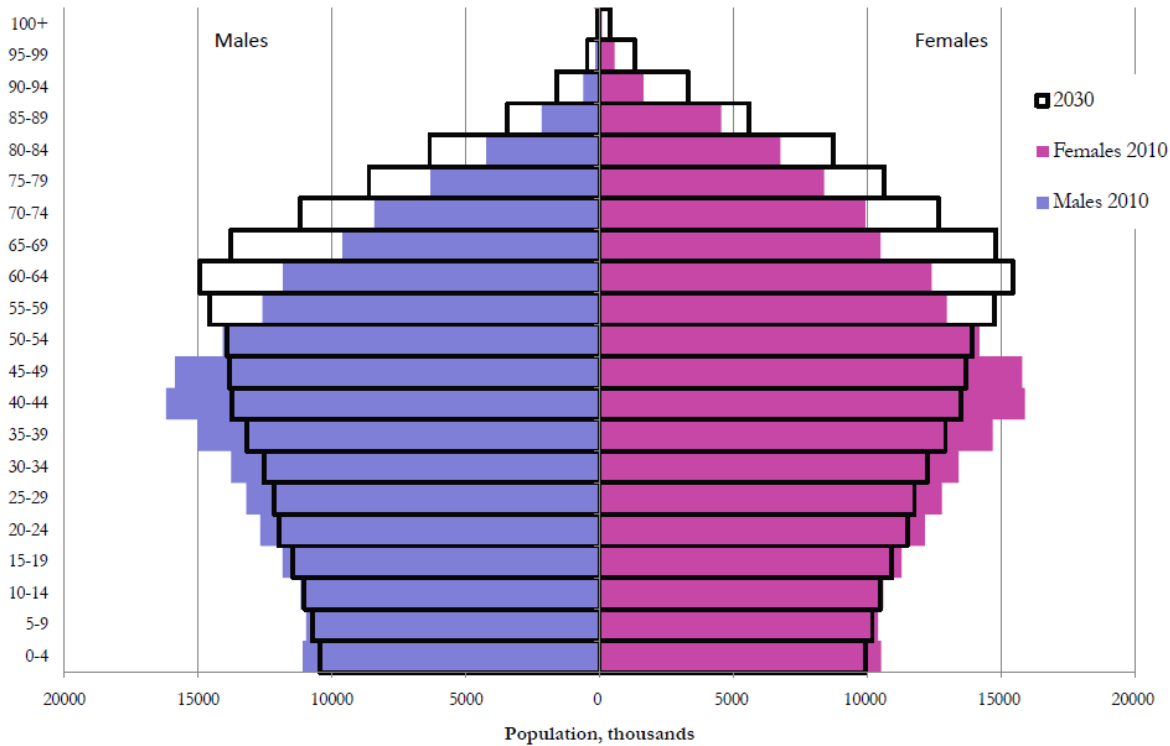
Source: U.S. Bureau of the Census International Database, available online at <http://www.census.gov/ipc/www/idbacc.html> Accessed January 2011.

The economic implications of these impending changes are far from positive. Even with healthy aging—and the theoretical possibility of ever-later retirement from the workplace—they suggest a marked contraction in the country’s labor supply. Moreover, Japan’s looming old-age boom could weigh still further against maintaining even the country’s existing sluggish rates of economic growth. The coming surge in Japan’s older population portends downward pressure on national savings and investment rates, adding to the challenge of achieving steadily positive growth in national GDP. And even though Japanese senior citizens may be the world’s healthiest, their health and pension claims are set to balloon over the next three decades. Of particular concern here are not only needs arising from physical frailty, but from all diseases for which older people are at greater risk—perhaps especially Alzheimer’s Disease (AD), which can be utterly debilitating (and thus extremely care-intensive) and for which at present there exists neither effective preventive nor curative medical treatments. Absent radical medical breakthroughs, Japan faces the prospect in the year 2030 of being a society where millions of people will be suffering from AD—a prevalence perhaps even approaching one person in 30.⁴¹ No modern country has ever before faced such a prospective burden, both social and economic.

⁴¹ Extrapolations based upon Asia Pacific Members of Alzheimer’s Disease International, “Dementia in the Asia Pacific Region: The Epidemic Is Already Here,” September 21, 2006, available electronically at <http://www.alz.co.uk/research/files/apreport.pdf>.

Western Europe’s demographic prospects are outlined in Figure 18.⁴² [See **Figure 21.**] Overall, to go by US Census Bureau projections, Western Europe is set for population stagnation, growing in total by under 4% over the next two decades, and with near-zero growth projected by the year 2030. Within the region, however, some of countries with the very largest economies—including Germany and Italy—are set to experience population decline over the next 20 years.

Figure 21. Projected Population Structure of Western Europe, 2010 v. 2030



Source: U.S. Bureau of the Census International Database, available online at <http://www.census.gov/ipc/www/idbacc.html> Accessed January 2011.

Western Europe’s impending population stagnation will be accompanied by significant shifts in demographic structure. For the region as a whole, fewer people under 55 years of age, but many more over that age, are expected to inhabit the region than live there today. Consequently, this demographically stagnating Europe

⁴² Our definition of “Western Europe” is arguably idiosyncratic, following as it does the Census Bureau’s definition of the area. It includes only the never-Communist states of Europe: the “old” EU-15, plus Norway, Switzerland, and a number of smaller islands and territories. Thus our “Western Europe” encompasses an estimated 423 million people in 2010, as opposed, for example, to the EU-27 estimated 501 million. But the countries we survey account for the overwhelming majority of Europe’s GDP (the “new” EU countries have not only smaller populations, but on the whole much lower income levels than our “Western Europe” here—and as a number of these states (Hungary, Romania, and all the Baltic countries), according to Eurostat, are already experiencing population decline, their inclusion would only make the overall European demographic outlook appear that much more under pressure.

will also be a graying Europe. Today, by Census Bureau estimates, Western Europe's median age is approaching 42 years. Put another way, that is about a year and a half higher than median age in Florida—America's grayest state.⁴³ Between now and 2030, median age is going to rise still further—to nearly 46 years, or by about a day and a half with every passing week. And of course in much of Western Europe, population aging will be even more pronounced. In Germany, median age is projected to be approaching 50 years, and in Italy to exceed 50 years, by 2030. In Greece—the epicenter of the current Euro-area debt crisis—median age in 2030 is projected at almost 49 years. Portugal and Spain, two other actors in the current Eurozone crisis, also face very rapid population graying, thanks to their exceptionally low birth rates.⁴⁴

Over the next 20 years, despite its trend toward overall population stagnation, Western Europe's 65+ population is set to grow by nearly 40% (an average of 1.6% per year) while the conventionally-defined manpower pool is slated to shrink (in Census Bureau projections, by about 10 million persons, or about 4%). These projections, however, posit a continuing and indeed increasing inflow of working-age migrants from abroad to forestall an even steeper fall-off in working age population. The Census Bureau assumes a net inflow of approximately 20 million immigrants for Western Europe over the next two decades; assumptions by Eurostat (the EU's statistical agency) are not dramatically different.⁴⁵ Absent continuing inflows of younger manpower, the shrinkage in Europe's working age population would be even more pronounced. Eurostat's hypothetical “zero migration” projection, for example, has the working age population of the EU-15 dropping by 11%—and of Germany dropping by 20%—in the 15 years between 2015 and 2030 alone. Without immigration, Western Europe's population would currently be projected to commence decline in 2014—just four years from now—and its working age population, which is already falling, would embark on an even steeper descent.

Two unanswered demographic questions will loom especially heavily over the Western European economy in the decades immediately ahead. First, can the region succeed in attracting and incorporating the foreign workers their economies will need in the coming decades? Thus far, Western Europe's record on “social inclusion” (as Eurocrats call it) of immigrants may have been rather better than many appreciate. But there have also been unmistakable, and perhaps increasing, problems, especially among some of the newcomers from Muslim-majority societies—perhaps even more disturbingly, among some of the second- or even third-generation descendants of these immigrants.⁴⁶ If Western Europe does not enhance its overall performance in

⁴³ According to estimates by the US Census Bureau, Florida's Median age in 2008 was 40.1 years. http://factfinder.census.gov/servlet/ACSSAFFacts?_event=Search&geo_id=01000US&_geoContext=01000US&_street=&_county=&_cityTown=&_state=04000US12&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgs1=010&_submenuId=factsheet_1&ds_name=ACS_2008_3YR_SAF&_ci_nbr=null&qtr_name=null®=null%3Anull&_keyword=&_industry=

⁴⁴ Over parts of the past decade, the Mediterranean countries have reported fertility rates almost as low as Japan's; overall, Western Europe's fertility level is “only” about 22% below the replacement level.

⁴⁵ See Eurostat's EUROPOP 2008 migration assumptions, available electronically at <http://epp.eurostat.ec.europa.eu/portal/page/portal/population/data/database>.

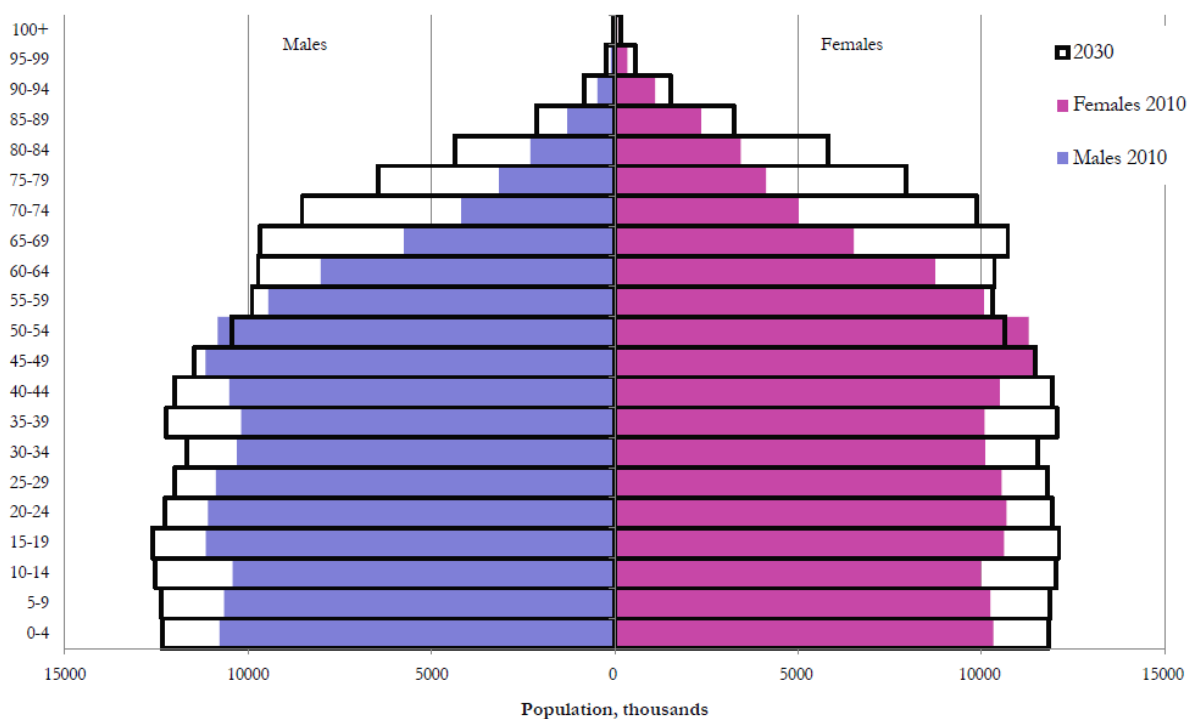
⁴⁶ In Germany, a bestseller by a former Bundesbank official touched a public nerve this past summer by openly addressing this issue. Cf. Thilo Sarrazin, *Deutschland Schafft Sich Ab* (Munich: Deutsche Verlag-Anstalt, 2010). Suffice it to say that Germany is by no means the only European state where this issue is a matter of widespread, if not always explicitly addressed or articulated, public concern.

“social inclusion,” there will be repercussions—not only for economic growth, but possibly also for social cohesion. Second, can Europe translate health improvements into a longer working life for its progressively aging population? At the moment, life expectancy in Western Europe is about 2 years higher than in America: but average retirement age in Western Europe is lower than in the USA, despite some uptrend in labor force participation for older workers in certain countries (mainly in the Europe’s more Northern countries). This past summer’s outraged political protests in France in the face of relatively meek government proposals for increases in French retirement age (from 60 to 62) shows how tough a slog it may be to achieve political consensus on this issue.

The great demographic exception within the affluent West is the United States. In contrast to the demographic stagnation or decline that faces most of the rest of the OECD over the decades immediately ahead, America, by Census Bureau projections, is set to grow by 20%, or over 60 million people, between 2010 to 2030: from 310 million to 373 million. Remarkably, by such calculations, America’s prospective pace of population growth over the next two decades would be very nearly as fast as India’s. In fact, America stands to be growing at just about the same pace as the world population as a whole—meaning that the US share of global population is not set to shrink in the decades immediately ahead.

Virtually every age group within the American population—from babies through centenarians—is set to increase in size over the next 20 years. [See **Figure 22.**] Unlike practically all the rest of the now-rich countries, America can expect a growing pool of working age manpower, characterized by a moderate but steady rise averaging 0.5 per year over the next 20 years. And while America will be a graying society, its pace of population aging is projected to be slower than virtually anywhere else in the OECD. Between 2010 and 2030, for example, America’s median age is projected to rise by just under 2 years—as against nearly 4 years for Western Europe, and over 7 years in Japan. By the metric of median age, in fact, America in 2030 would be more youthful than either Japan or Western Europe *today*. America’s senior citizens would constitute a larger share of population in 2030 than they do now (19% vs. 13%), but a decidedly smaller proportion than they will for Western Europe, to say nothing of Japan. And while America’s ratio of working age manpower to senior citizens 65 and older is set to increase in the coming years, the country’s prospective “population support ratio” for 2030 looks to be markedly higher (3.2:1) than either Western Europe’s (2.5:1) or Japan’s (under 2:1).

Figure 22. Projected Population Structure of the United States, 2010 v. 2030



Source: U.S. Bureau of the Census International Database, available online at <http://www.census.gov/ipc/www/idbacc.html> Accessed January 2011.

America’s “demographic exceptionalism” is the arithmetic consequence of two factors: the country’s relatively high fertility levels, and its continuing influx of immigrants. Over the past generation and a half, while TFRs in most of the rest of Western world were plunging, America’s was actually increasing—and unlike any other rich country of size, has been hovering just around the replacement level for the past generation.⁴⁷ And America is also the world’s principal receiving country for newcomers from abroad (roughly half of whom, in recent years, have received legal authorization for entry). Most of these immigrants are younger would-be workers. If fertility and immigration continue more or less at their current pace, as Census Bureau projections assume, the US would tally a net inflow of almost 30 million immigrants over the next 20 years, and would enjoy a “net natural increase” (a surplus of births over deaths) of almost 35 million—both of which would keep the nation growing and relatively young.

Demographically speaking, America may thus look like the “bright spot” for the now-affluent West. For all the current commentary about “American decline,” by these broad demographic forensics the outlook for aggregate economic growth over the next two decades would appear distinctly more auspicious for America than either Western Europe or Japan.

⁴⁷ Not all of the US fertility edge over the rest of the West, incidentally, is due to high Latino or minority birth rates. “Non-Hispanic whites,” as the Census Bureau designates them, have fertility levels of 1.8-1.9: slightly below replacement, but well above the region-wide averages for Western Europe, including their immigrant populations.

Nevertheless, there are also clouds on the US demographic horizon—all of them regarding the quality of future US human resources. America has a relatively good record in assimilating immigrants as loyal and productive newcomers—but future success in this endeavor will not necessarily occur automatically. America’s public K-12 education system, furthermore, produces uneven results (mediocre, by comparison with students from many other affluent societies) and the fraction of young Americans graduating from high school has been decelerating of late, possibly flat-lining in the years just ahead. Then there is the matter of health standards; despite our extraordinarily expensive national health care apparatus (it might be too much to call it a system), America’s health progress does not compare all that well with advances underway in other affluent regions. To cite a single troubling example: Eastern Germany—until 1990, part of the economically backward and notoriously unhealthy Soviet Bloc—has now overtaken the USA in life expectancy at birth. Improvements in education and health will be critical for enhancing the productivity and wealth of the US population in the decades ahead, and we have few grounds for complacency as we contemplate those challenges.

Despite the particular differences in their demographic outlooks, Japan, Europe and America share a common fiscal problem as far as population is concerned: the relationship between population aging and the rise in public debt obligations. Over the past two decades, a striking new feature has emerged in the macroeconomies of OECD countries: the gross burden of public debt as a proportion of GDP has come to correspond with the proportion of population 65 and older. The relationship, to be sure, is not tight and mechanistic—many other issues besides senior claims on the public fisc affect a rich country’s level of public debt. Nevertheless, initial inspection suggests that a one percentage point increase in an OECD country’s total share of senior citizens roughly corresponds with a seven point increase in its ratio of gross public debt to GDP. By such admittedly crude arithmetic, population aging would be associated with about half of the public debt run-up of the OECD economies over the past twenty years—and increase in the 65+ population share stands to be about twice as great in the next two decades as it was in the decades just past.⁴⁸ Coping with the fiscal and public debt implications of the pressures that population aging places on macroeconomic performance may not be an entirely new challenge to now-rich societies, but it promises to become an ever more salient one over the next 20 years.

What Is To Be Done?

Left unattended, the global demographic trends outlined above prefigure serious and gradually mounting pressures for slower world development and for downward revisions of worldwide material expectations, with all that such adverse changes could imply. But we human beings are by no means utterly helpless agents caught in the grip of this gradually tightening demographic vise. Quite the contrary—feasible options are at hand already for countermanding some of these pressures and for capitalizing upon new demographic opportunities as they may arise—in other words, for enhancing economic growth and accelerating the spread of wealth in the face of our brave new demographic future.

⁴⁸ Cf. Nicholas Eberstadt and Hans Groth, “Demography and Public Debt: Time For a ‘Demographic Stress Test’ for the Western Economies” *WDA-HSG Letters on Demographic Issues*, no. 2010/1 (August 2010), available electronically at <http://www.aci.org/docLib/EberstadtTimeDemographicStressTest.pdf>.

Addressing our new demographic challenges will require deliberate, concerted and sustained efforts at the local, national, and global levels to better prize the potential of our planet's most precious resources: namely, the men, women and children who will inhabit the world today and tomorrow. Very broadly speaking, such an approach must entail augmenting "human capital" (health, education, knowledge and skills) while simultaneously creating an economic environment in which human economic potential can be translated into actual productive value with ever greater efficiency.

To begin, we must avoid some of the obvious policy blunders that have so predictably and severely depressed human productivity within living memory. (Beggart-thy-neighbor protectionist policies and seemingly peaceful international "trade wars" come immediately to mind here). But a wider range of positive measures also suggest themselves.

Improving educational opportunity and educational quality in low-income areas, for example, will figure centrally in enhancing prospects for both local and global growth over the decades ahead. "Education for all" is still just a slogan in too much of today's world. Better educated workers tend not only to be more productive; they are healthier and better placed for longer working lives. Eliminating the disadvantage that girls face in elementary educational access in so much of the low-income world must be part of any strategy that hopes to improve global levels of educational attainment appreciably. But expanding educational opportunities through high school and beyond should surely be an objective for the rising generations in low income areas. Simply put, developing populations cannot hope to generate First World income levels on Third World educational profiles. And recasting "educational systems" (using that term very broadly) to provide genuine "life-long education" would also bear tangible and potentially important productive returns—especially in now-developed societies, where an ever-growing share of the prospective labor force stands to be older workers.⁴⁹

Continuing (and where possible, accelerating) general improvements in health conditions should also be a central objective, since health advances could prove a *sine qua non* to maintaining or increasing long-term economic growth rates in an ever-grayer world. In poor and rich countries alike, better education can have salutary (if indirect) effects on overall health levels. In both rich and poor countries alike, furthermore, great opportunities still remain for improving general health conditions through relatively inexpensive "preventive" health strategies (that is to say, through promotion of healthier, less risky lifestyles and behaviors, including reduction of smoking, moderation of drinking, more balanced diets, reasonable amounts of exercise, and the rest).

For affluent graying societies, taking economic advantage of the blessings of "healthy aging" will become ever more crucial to the quest for higher national income levels. This suggests that the existing disincentives in so many rich countries today against continued work at older ages for ever-longer living populations should be re-examined and ultimately eliminated, and that conversely voluntary extension of working life should be

⁴⁹ As David Bloom observed on reading an earlier version of this paper, impending demographic changes will also place a premium on educational investments in *developed* economies, where stagnating or even shrinking working-age populations will create pressure for the re-allocation and more efficient utilization of scarce resources (in this case, skilled human beings) and generate demand for high-productivity (i.e. healthy, well educated and well trained) laborers. But prospective shifts in factor proportions due to stagnant or declining developed country manpower availability would presage greater capital investment per worker, and would thus tend to increase productivity for the workforce in general. Note that such effects would be independent of innovation-driven improvements in labor productivity.

much more carefully incentivized. In addition, encouraging higher overall savings rates for graying societies should surely be on the international agenda, since—even in a global economy—higher national savings rates could promote higher national investment rates, and thus more rapid economic growth.

But eliciting growth in the years ahead will require more than just husbanding human resources—it will also require generating of higher rates of return on human capital for increasingly educated and healthy populations. Increasing the productivity of global manpower through improvements in efficiency is therefore also very much in order.

In part, this can be accomplished through what is termed (sometimes disdainfully) “economic reform.”⁵⁰ In the world’s emerging markets, a whole host of institutional and policy reforms—including improved rule of law, security of property rights, and governmental “transparency”—could improve the productivity and purchasing power of workers and entrepreneurs, both today and in the future. Such improvements in local “economic climate” are still sorely needed in places like China, Russia, and India, despite their developmental transformations to date. A more propitious “economic climate” likewise offers as-yet un-seized economic opportunities throughout much of Southeast Asia, Latin America, and the Middle East.⁵¹ Affluent societies are also going to need to face their own pressing economic and policy reform issues—perhaps most importantly, growth-killing public entitlements and distorted incentive structures for the pricing of financial market risk. (It is Third World countries that are usually scolded for their shortcomings in financial intermediation, and there is plenty to criticize there—but the current global economic crisis was brought on by financial intermediation problems in rich countries, not poor ones.)

Humanity has one additional “secret weapon” in accelerating growth in the years ahead: knowledge production and technological innovation. The revolutions in health and life sciences, information technology and materials science over the past generation point to the opportunities that may lie ahead for improving human productivity through a general accumulation in the stock of economically applicable human knowledge. Capitalizing upon the promise of potential advances in human knowledge, however, cannot be taken for granted. To the contrary: perhaps more than even before, we will have to commit to creating incentives for risk-taking, cutting-edge research and development, in both the public and private sectors, even with the knowledge that much of this work will lead to dead ends. We will also have to be ready to support the university systems that can provide the world-class cadre of technicians and research entrepreneurs who are indispensable in extending the realm of the economically possible through scientific and technological breakthroughs.

All of the objectives just enumerated win on their own merits; they are things the world should be doing in any case. Impending demographic trends, however, add urgency to each and all of them, for the sake of our world’s future prosperity. Demographic change seems to unfold slowly—from month to month, we can hardly notice the difference. But in reality, viewed in terms of our lives and the lives of our children, there is

⁵⁰ Note that this is not a recommendation for any specific, pre-tailored packages or programs; to be sustainable, such reforms would have to be locally devised, embraced and steadily promoted.

⁵¹ Securing a better “economic climate” throughout much of sub-Saharan Africa—where economic performance has generally been so abysmal over the past three or four decades, and where so much of the world’s manpower growth is set to occur over the next 20 years—looks to be a much more daunting prospect today than inculcating institutional reforms in other parts of the low-income world, but it is hardly a less pressing concern for that reason.

no time to lose in recognizing and adapting to the enormity of the unavoidable demographic challenges that are being thrust upon us.

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