

# SEISMIC SHIFTS: THE ECONOMIC IMPACT OF DEMOGRAPHIC CHANGE. AN OVERVIEW

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Most economic developments are hard to predict. Considerable uncertainty surrounds forecasts for output growth, inflation, and unemployment a year from now, for instance. But demographic developments are different in this respect. Although demographic surprises abound, the major trends build slowly, and the broad contours of medium-term outcomes become discernible well in advance. Given the decreases in fertility rates and the increases in life expectancy that have already occurred in most industrial countries, we can be pretty certain that the population will age rapidly in coming decades. As one result, the ratio of the population aged 65 and over to the population of working age will likely rise sharply. Coincidentally, as child mortality in Third World nations has declined, the ensuing baby booms have helped to drive a predictable surge in emigration to the aging industrial countries. Since child mortality rates in the Third World continue to fall, large-scale migration will likely characterize the decades ahead. However, while we can discern the general trajectory of demographic trends, the uncertainty surrounding these projections is huge. Will world population growth simply slow in coming decades, or will it actually turn negative?

Some consequences of future demographic trends, like the effect of population aging on the finances of pay-as-you-go social insurance systems, have been widely discussed. But much is still unknown about how population shifts will affect the economy, particularly as some forecasted demographic developments are entirely unprecedented. Never before in human history have individual fertility choices led

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national populations to shrink for extended periods, for instance. Accordingly, demographers and economists have many issues to explore and a growing body of work to synthesize.

With these goals in mind, the Federal Reserve Bank of Boston brought together an international group of economists, demographers, and other social and biological scientists to examine the topic "Seismic Shifts: The Economic Impact of Demographic Change" at the Bank's forty-sixth economic conference. Early sessions covered lessons from previous episodes of demographic shock, an assessment of official demographic projections for the next half century, and the effect of demographic change on U.S. labor markets. On the second day, participants explored the fiscal impact of U.S. demographic change, the effect of demographic trends on global flows of labor and capital, and the policy implications of demographic projections. Still other presentations addressed the political dimensions of demographic change, and the roles of immigration, assimilation, and acculturation in the new global era.

Several themes emerged at the conference. A number of speakers pointed out that the current use of age 65 to define the start of old-age dependency is arbitrary. As life expectancy has increased, the health of the "young elderly" has also improved, and there is no inherent reason why they should be dependent on younger generations to produce or finance their subsistence. To the degree this is true, the "problem" of increasing old-age dependency may not be much of a problem after all. People are living longer and staying healthier to later ages, making it possible for work to continue well into what used to be considered old age.

Although conference participants tended to be optimistic regarding the issue of old-age dependence, this attitude was tempered with concern about the fiscal status of social insurance programs. Our notion of when old age begins may have changed, but policymakers generally have made only minor adjustments to the ages used to determine eligibility for social insurance programs and to calculate benefit amounts. Among conference participants, the need to reform social insurance programs to prevent future fiscal crises was surprisingly noncontroversial. Widely endorsed policy recommendations included raising the official retirement age and encouraging increased labor force participation by women and the young elderly.

There was also a consensus that international migration will continue to be an important phenomenon and that immigration can help to attenuate problems associated with population aging in the industrial countries. Most, but not all, participants thought that political factors would likely prevent migration flows from being large enough to have a major impact on population aging, however.

Another theme to emerge from the conference was the importance of education. Several participants noted that education has a significant

impact on demographic outcomes by affecting female labor force participation and fertility in both the developed and the developing countries. By influencing the pace of immigrants' acculturation and the overall rate of productivity growth, education also affects the ease with which countries will adjust to the economic and political tensions engendered by demographic change. A few participants expressed a related concern that increases in income and education may be encouraging prolonged population declines in some industrial countries. While all agreed that small countries can thrive (witness Switzerland and Denmark), a few noted that we do not know how ongoing population decline affects economies.

Finally, although we know much about the massive demographic shifts that will occur over the next few decades, conference participants also emphasized how much we do not know. Areas of great uncertainty include the size of future migrations, particularly from Africa to Europe; the degree to which current low fertility rates in Japan and much of Europe will rise toward replacement levels; the rate at which high fertility rates in the developing world will fall toward replacement levels; the extent to which life expectancy will increase over the next century; and the pace at which medical costs will increase. Add to these questions the possibility of massive environmental change or political upheaval, and one comes away impressed with the wide range of possible scenarios for the evolution of demographic change and its economic consequences.

## THE POLITICAL DIMENSIONS OF DEMOGRAPHIC CHANGE

**Michael Teitelbaum** adopts the conference title's metaphor of "seismic shifts" in his opening address. He notes that demographic trends can be regarded as "human tectonics." Like the movement of tectonic plates, the demographic forces of decreased fertility rates, decreased mortality rates, and increased migration from poor to rich countries work slowly and steadily, building up enormous momentum. And in both geologic and demographic tectonics, violent eruptions can occur if surface tensions build up, rather than being gradually released.

Teitelbaum notes that the facts regarding these trends are not as straightforward as some think. For example, while it has been widely noted that fertility rates in much of the developed world have fallen well below the replacement rate of 2.1 children per woman, Teitelbaum cautions that to some degree this development is a transitional phenomenon associated with the movement to childbearing at older ages, and that eventual fertility rates for the current cohort of women of childbearing age may be higher than the rates currently reported. It is clear that a movement to lower fertility rates has occurred, but the long-run magnitude of the shift is not yet known.

Accompanying the decline in fertility rates is a decrease in mortality

rates, with its associated increase in life expectancy. The combination of low fertility rates and increased life expectancy will result in an increase in the old-age dependency ratio, now conventionally defined as the number of people aged 65 and over divided by the number of people of working age. That this ratio will increase markedly in the near future throughout the developed world is not controversial. However, Teitelbaum notes that although age 65 might have been an appropriate threshold for defining old age when Social Security was first established, advances in health status and life expectancy since that time argue for using a higher age threshold today.

In Teitelbaum's view, the third demographic tectonic force, international migration, cannot realistically be expected to occur in great enough numbers to offset the aging of the native-born population. He cites a recent UN report that concluded that the increase in immigration required to hold constant the old-age dependency ratio in the industrial countries would be so large as to be politically unacceptable. Teitelbaum notes that although demographers and economists view immigrants as factors of production, the general public sees immigrants as people with particular (and different) cultural backgrounds. Even though one can make an economic case for increased immigration when fertility is low, the public is wary of immigration at such times because of the potential effect on the receiving country's culture.

Teitelbaum concludes that the best feasible solution is to adopt multiple small-scale policies, gradually implemented. These measures would include policies to encourage modest increases in fertility, immigration, labor force participation, and the official retirement ages for public pension programs, as well as modest constraints on public pension benefits and taxes.

## DEMOGRAPHIC SHOCKS: THE VIEW FROM HISTORY

**Massimo Livi-Bacci's** paper examines demographic shocks from a historical perspective. He begins by documenting the huge decline in fertility that has occurred throughout the industrial world in the past half century. Among the ten largest high-income countries, only the United States has fertility close to the replacement level. Reviewing the history of the Western world, Livi-Bacci concludes that not since the plague epidemics of the late Middle Ages has there been a situation where populations failed to reproduce themselves over a prolonged period.

Demographic shocks in the past were generally characterized by a crisis that caused a sudden increase in mortality. According to Livi-Bacci, the increase in deaths was usually accompanied by a temporary decrease in fertility and births, postponement of marriages, and out-migration from the area affected by the crisis. Following the end of the crisis, fertility and marriage rates rebounded, and out-migrants often returned.

Livi-Bacci surveys the consequences of past major demographic shocks. The plague resulted in a century of depopulation in Europe starting in 1348. The consequent shortage of labor resulted in higher real wages; land previously cultivated was often turned into pasture; and families and landholdings were restructured into larger units. The Irish famine of the mid nineteenth century precipitated a large decline in the population of Ireland. Demographic consequences included mass emigration, an increase in age at marriage, and an increase in the proportion of the adult population remaining single. Unlike the earlier episodes of depopulation, which were caused by natural forces, the 1932-33 famine in the Soviet Union was largely a result of a misguided policy of forced collectivization. The ability of the population to cope with the crisis was impeded by disruption of family and community networks because of residential dislocation prior to the crisis, restrictions on movement out of afflicted areas during the crisis, and the prohibition of private agricultural production and trading.

The two world wars of the twentieth century resulted in large losses of life, destruction of physical capital, and migration. France suffered the highest rate of casualties during World War I and encouraged immigration after the war. Livi-Bacci also attributes the immigration to France, Germany, and the Benelux countries during the post-World War II era in part to the population losses during the war. The last episode reviewed by Livi-Bacci is the ongoing period of political transition in the former Soviet Union, which has been accompanied by increased mortality and reduced fertility. Underlying reasons for the demographic shifts include increased poverty, a deterioration of the health care system, increased lawlessness, and increased psychosocial stress.

Livi-Bacci draws several conclusions from his review of past demographic shocks. He notes that population rebounds tend to occur after periods of loss, but that the structural demographic and economic changes caused by shocks have long-run consequences. He concludes that the adaptive responses a society makes to crises depend very much on the characteristics of that society, on its flexibility and its ability to adjust at both the societal and the individual levels. Where traditional mechanisms of solidarity, coping strategies, and economic buffers are destroyed, crises and their consequences are more severe. The future will depend on our ability to correct negative trends and increase social flexibility through a reconsideration of age and gender patterns of social activity and functions.

**Joel Mokyr** interprets Livi-Bacci's analysis of the consequences of demographic shocks such as the plague or Irish famine in terms of a simple Malthusian model. A key assumption of this model is that the birth rate increases and the death rate decreases as the real wage and incomes increase. A shock such as a plague or famine, which reduces the

population, will cause real wages to rise, leading to an increase in births and an eventual return to the initial population and wage levels.

However, Mokyr argues that the variant of the model that best approximates the current situation in industrial countries is one where, as income increases beyond some threshold, the birth rate starts to fall instead of continuing to rise. Mokyr's reasoning is that raising children and consuming goods and services both take time. As income goes up, and people can afford to increase their consumption, they choose to spend less of their time on children and the birth rate decreases. If the birth rate falls below that needed for population replacement, eventually real wages and incomes will rise as a result of the declining population, reinforcing the process. The result would be a continuously declining population. In other words, the demographic rebound that followed historical episodes of population decline would not occur.

Mokyr also describes the factors underlying the decline in infectious disease in the industrial nations starting in the late nineteenth century. According to Mokyr, life expectancy depends on income, relative prices, and knowledge. Income growth allows people to consume more of all goods and services, including those that enhance health. Changes in relative prices, often resulting from public health measures or technological advances, determine the affordability of health-enhancing goods and services. Knowledge of what is good, or bad, for one's health allows individuals to adjust their behavior to protect their health.

**David Weil** divides his discussion of Livi-Bacci's paper into three sections: economic lessons, demographic lessons, and cultural/political lessons. Although Weil thinks that slow or negative population growth by itself is not a major problem, and that the economic consequences of increased old-age dependency are manageable, he believes the use of public pension programs to support the elderly will create major problems as population aging occurs. Public pension programs reduce the labor supply of the elderly and produce additional distortions through the imposition of taxes to fund the programs.

Turning to the demographic lessons, Weil interprets the historical shocks reviewed by Livi-Bacci in the context of a Malthusian model similar to that presented by Joel Mokyr. Like Mokyr, Weil is skeptical of whether the traditional Malthusian mechanism is currently operative. He notes that there now appears to be little relationship between income per capita and the birth rate in industrial countries, and in developing countries higher per capita incomes are associated with reduced fertility. Weil believes that the current demographic shock is the result of a shift in preferences toward wanting fewer children.

Weil's discussion of cultural and political lessons focuses on the role of immigration, which he believes is the only feasible solution to problems induced by population aging in Western Europe. Weil believes the impediments to immigration are cultural and political, rather than

economic. According to his calculations, the rate of immigration into Western Europe that is needed to make its demographic situation manageable is only about one-half the rate into the United States during its period of heavy immigration in the nineteenth and early twentieth centuries. This calculation leads Weil to conclude that immigration may be a feasible solution to Europe's demographic problems.

## **WORLD POPULATION IN 2050: ASSESSING THE PROJECTIONS**

**Joel Cohen** reviewed the major population projections from the UN Population Division (UNPD) and the U.S. Census Bureau for the world, the United States, and other areas through 2050. He began by underscoring the uncertainty surrounding these projections. Even in the rich United States, with its good statistical systems, mistakes regarding the existing population base have often been the largest source of error in short-term projections. Moreover, Cohen warned, neither apparent precision nor consensus should encourage confidence since demographers use the same tools and confer.

Cohen sees four major demographic trends. 1) The world population will be bigger by 2 to 4 billion people by 2050, with all of the gain occurring in the poor countries. 2) Population growth will slow; whether it slows to a halt depends on choices made now about investments in women's education and reproductive health. 3) Almost all of the population growth will occur in cities in poor countries—an outcome that will give rise to unprecedented epidemiological challenges. 4) Populations will age.

Cohen stressed that the official projections are no-surprise, business-as-usual projections even though surprises are part of the human condition. He listed a few possible shocks, like a major polar ice melt that could raise the mean sea level by 55 to 70 meters, with major effects on coastal cities. He noted the appearance of drug-resistant malaria and TB and pointed out that no one was expecting AIDS, Y2K or information viruses, the bombing of the World Trade Center in 1993, or the collapse of the Soviet Union. Of course, people have already survived many surprises, so everything may turn out fine. But we have to expect surprises.

Exploring the major trends in detail, Cohen reports that the UN98 "medium" projection anticipates that world population will grow from 6.1 billion in 2000 to 8.9 billion in 2050. But this projection assumes a fall in fertility that many find optimistic. In the UN's medium scenario, the population of the developed countries will fall by 3 percent by 2050 while the population of the less developed countries will rise by almost 60 percent. As a result, the rich countries will hold a small and diminishing share of the world population, regardless of fertility assumptions. With

population densities reaching 94 per square kilometer in the less developed countries in the UN projection, up from 59 today, Cohen suggests that an acceptable quality of life may be hard to achieve.

Turning to global aging, Cohen points out that the median age of the world's population rose 3 years to 26.6 between 1900 and 2000. In the UN98 medium projection, that median age will rise by over 11 years to 37.8 in the half century to 2050. This rapid aging reflects reduced fertility and longer life expectancy at birth, which has increased from about 30 years in 1900 to more than 66 years in 2000. As a result, the ratio of old (65 plus) to young (0 to 4) will likely rise from 1:1 now to 3.3:1 in 2050.

Reflecting these trends, the world dependency ratio—the ratio of the number of people age 14 and younger plus those ages 65 and over to the number ages 15 to 64—peaked in 1965 to 1970 and has been falling since. In the UN98 medium projection, this ratio will reach a minimum near 2015 and then slowly climb as the elderly population rises faster than the young population declines. This roller-coaster pattern, as Cohen describes it, will appear everywhere—first in the more, later in the less developed countries. The low point in this ratio represents a peak in the number of (potential) workers per dependent, a period known as “the demographic bonus.” The industrial countries are now passing through this peak and will soon be rolling rapidly away from it. For the United States, both the UN and the Census Bureau project that the dependency ratio will rise sharply between 2010 and 2035, more gradually thereafter.

While some demographers and economists like the dependency ratio as a summary measure of a country's age structure, Cohen emphasizes that interest in the measure rests on the questionable assumption that individuals ages 15 to 64 are “workers” while others are “dependents.” But in developing countries youngsters often work while in the industrial countries, young adults are often in school. At the other end of the age spectrum, the economic “burden” imposed by population aging will largely depend on the health of the elderly. National longitudinal surveys indicate that chronic disability among the elderly could be declining as fast as 1.5 percent a year. Such a rate of decline would likely keep the ratio of the economically active aged 20 to 64 to the chronically disabled aged 65 and older from falling below recent levels. This trend shows the danger of extrapolating directly from the dependency ratio to “burden,” Cohen notes.

Cohen reviews the (similar) assumptions underlying the UNPD and U.S. Census Bureau projections. For fertility, the UN assumes that where the actual fertility rate was above 2.1 children per woman (the replacement rate) in 1990 to 1995, fertility will decline smoothly until it hits 2.1, where it will stay. For countries with recent fertility rates below replacement, fertility is assumed to rise to a level just under replacement—permanently. But Cohen knows of no case where fertility has actually declined to replacement level and stayed there, or where below-replace-



ment fertility has returned to close to replacement on a permanent basis. Cohen notes that, unlike the UN, Census considers trends in contraception and women's educational attainment in projecting fertility rates. He applauds the use of such data but notes that Census does not make the links between these non-demographic factors and the demographic targets explicit.

As for mortality, the UN assumes that life expectancy will increase—except in countries with widespread HIV, those embroiled in strife, and formerly Communist countries where mortality rates have already stagnated or risen for years. Demographers once thought that mortality would only improve, but recent surprises have shown otherwise.

Admitting that international migration is hard to project reliably, the UNPD simply sorts countries into groups for which net migration is nonzero for given periods. The United States is in the set of countries with positive immigration for the whole projection period. Europe is not included in that group, even though, as Cohen points out, Africa will have a (mostly young) population three times as large as Europe's (mostly old) population in 50 years, with only the Mediterranean between them.

Finally, Cohen notes that demographers are developing projection techniques, including new methods of assessing uncertainty, which the official agencies have yet to embrace. While the official agencies have adopted a few of the new tools, their basic approach differs little from that used in 1895. Cohen hopes that the most recent demographic innovations will be widely adopted well before the end of this century.

In commenting on Cohen's paper, **Cynthia Lloyd** notes that highlights from the UNPD 2000 revisions to the 1998 projections are now available. These revisions suggest that the world population in 2050 will be larger by 413 million than previously thought—mostly because fertility has remained unexpectedly high in Bangladesh, India, Nigeria, and other developing countries. Indeed, the UNPD no longer assumes that fertility in the high-fertility countries will fall to replacement level by 2050. Lloyd also argues that the process of urbanization is more complex than Cohen suggests, because most recent migrants to urban centers come from other cities and towns, not rural areas. Since residents of small cities and towns fare worse in terms of health status than residents of large cities, focusing concern on the mega-cities may be misguided.

Lloyd devotes the rest of her comment to the possibly "seismic" issues linked to the youth bulge in many poor countries. She reminds us that when the ratio of youth to the adult cohort rises as child mortality starts to fall, the transition from large families to smaller, "better-quality" families usually follows with a lag. But the ratio of young adults (15 to 24) to prime age adults is far higher in many developing countries now than it was during the demographic transition in the West. Never more than 26 percent of the population in the developed countries, the young are

projected to make up 33 percent of the population in the least developed countries in 2005. Educating this unusually large cohort represents a major challenge. Moreover, the cohort is so big that continued population growth in these countries is assured even if the generation's fertility falls to replacement level. The only way to slow this momentum is to increase age at first birth. Since educational attainment is linked to greater age at first birth, investment in education becomes a tool of population policy.

Some Asian economies invested heavily in education and reaped a demographic bonus as youth dependency fell. But Lloyd and her coauthors find that many sub-Saharan African countries have recently experienced actual declines in school enrollment and educational attainment (Lloyd, Kaufman, and Hewett 2000). Even where enrollment rates are high, primary school completion rates vary because children enter school late and attend only sporadically.

Lloyd concludes that the accuracy of population projections depends importantly on today's investments in young people. Assumptions about improved mortality, declining fertility, and modest immigration are tied to unstated assumptions about steady increases in educational attainment and economic growth. If these assumptions are not met, the world could face some unpleasant demographic surprises.

Taking up where Cohen left off, **Wolfgang Lutz** was confident that the use of innovative methods of population projection was accelerating. Indeed, he was 90 percent certain that institutional projection procedures would include probabilistic elements by the end of this century. As evidence he noted that he and his colleagues were about to publish an article in *Nature* that used a synthesis of competing approaches to deal with uncertainty in future population trends (Lutz, Sanderson, and Scherbov 2001).

These new methods require two decisions about future demographic trends: The first concerns the process used to generate the time series for vital rates while the second concerns assumptions about the future range of uncertainty. To specify the time series, demographers can use piecewise linear regressions, as the major statistical offices do now, or they can use a procedure with annual fluctuations, which tends to provide more realistic outcomes. Lutz and his colleagues opted for a moving-average model with fluctuations. Assumptions about the future range of uncertainty can be based on ex post analysis of past projections, time series models, or judgment reflecting explicit argument. In *Nature*, they describe their use of a synthesis of all three approaches, which produced a broader range of uncertainty than does the ex post error method alone. Using this synthetic approach to calculate the chance that population growth will end in this century, Lutz and his colleagues estimated an 85-percent probability that world population will peak and start to fall before 2100. They see a 15-percent probability that the world population will be smaller in 2100 than it is today.

Responding to Cohen's description of the official projections as "business-as-usual" numbers, Lutz notes that demographers face a dilemma in dealing with the possibility of extreme events, like a major meteor strike, since they usually have no theoretical basis for making assumptions about the probability of such events. But one approach is to define the uncertainty distributions for future vital rates to include some high-impact, low-probability events at the tails. Adopting this long-tails approach in their *Nature* article produced one catastrophic increase in mortality in 2,000 simulations.

Lutz suggests that conventional population projections could be improved by incorporating major covariables beyond age and sex. Level of education and urban/rural residence are key candidates, since they have a big impact on population dynamics. Lutz also argues that the relative weight of various regions in the world economy will likely reflect the absolute number of working-age people with secondary and tertiary education within their borders, as well as the population share of this educated group. According to Lutz and his coauthors, China's educated working-age population is likely to grow to 750 million in 2050 while in Europe and North America together, the size of the educated working-age population will only reach 510 million.

## DEMOGRAPHIC CHANGE AND U.S. LABOR MARKETS

**Jane Little** and **Robert Triest** examine the probable impact of demographic change on U.S. labor markets. They start by reviewing the three major demographic trends affecting the United States: slow population growth, population aging, and increased immigration. Although the 2000 Census revealed that the U.S. population grew more during the 1990s than previously estimated, the Census Bureau is projecting that the decline and stabilization of fertility rates that began in the mid 1960s will result in fairly steady declines in the population growth rate over the next fifty years. Combined with a trend of increasing life expectancy, this decline implies that an increasing share of the population will be of traditional retirement age. Although the growth of the native-born working-age population has already slowed, immigration has increased, and legal immigrants appear to have supplied roughly 40 percent of the growth of the U.S. labor force in the mid 1990s. The Census Bureau projects that new (post-2000) immigrants and their descendants will account for nearly two-thirds of population growth in the United States in the twenty-first century.

As a consequence of the aging of the population, the ratio of the population age 65 and over to the working-age population is projected to double over the course of this century. The total dependency ratio, which counts children under age 15 and adults age 65 and over as dependents, will increase by a smaller proportion. The projected increase in depen-

dependency raises concern among some policy analysts about the extent to which living standards can advance at the same time that the share of the population of traditional working age is shrinking.

The seriousness of the problem depends on how the economy responds to the changing demographic conditions. One possible response is an increase in labor productivity that would help to alleviate the effect of increased economic dependency on living standards. As noted by previous researchers, slower growth in labor supply will tend to push up wages, providing an incentive for investment in productivity-increasing technology. Several studies have provided empirical evidence consistent with this hypothesis. Little and Triest present results from regressions showing the existence of a negative relationship between U.S. productivity growth and the growth rate of the working-age population. Although the authors stress that, at best, the regressions are capturing a reduced-form relationship, the results give some grounds for hoping that the very low rates of labor force growth that the United States will experience early in this century will be accompanied by relatively high rates of productivity growth.

An important factor in the determination of labor productivity that is not controlled for in the regressions is the educational attainment of the labor force. Future trends in educational attainment are difficult to predict, in part because of the increased importance of immigration. Although a higher percentage of foreign-born U.S. residents have earned graduate degrees than have U.S.-born residents, immigrants are also much more likely not to have completed high school. Underlying this pattern are large differences in the educational attainment of immigrants by country of origin. Over two-thirds of Mexican immigrants ages 25 to 64 have not completed high school, compared to about one-third of immigrants from other Western Hemisphere countries and less than one-sixth of native-born Americans and immigrants from outside the Western Hemisphere. Although there is a pronounced trend toward higher educational attainment among recent cohorts of Mexican immigrants, a large gap with the educational attainment of native-born Americans will likely continue well into the future.

Little and Triest also present data showing that the educational attainment of U.S.-born Hispanics and blacks continues to be significantly lower than that of non-Hispanic whites, on average. Overall, the data suggest the possibility of stagnating aggregate levels of educational attainment in the future.

Increased consumption of imported goods and immigration are alternative means of tapping foreign labor supplies for the production of domestically consumed goods and services. The authors point out, however, that despite some similarities, increased trade and immigration are not economically equivalent. Because immigrants consume goods and services in this country, immigration raises labor demand by a greater

amount than does an increase in trade. In addition, immigrants may be more productive in the United States than in their country of origin, and they can produce non-tradable goods for consumption in the United States only if they migrate here. Indeed, immigrants play a disproportionate role in supplying services, like home health care, that loom relatively large in the consumption patterns of the elderly.

Little and Triest also touch on how demographic shifts will affect the wage structure and the NAIRU. They argue that the shrinking supply of younger workers relative to older workers is likely to decrease the wage premium attached to labor market experience, and that the interaction of increased demand for highly educated workers and relatively stagnant supply may increase the economic return to education. The aging of the labor force can also be expected to reduce unemployment rates (and the NAIRU), although much of that effect may already have occurred.

Policy implications drawn by Little and Triest include the need for addressing the educational needs of Hispanic youth and the need for reform of social insurance programs, for instance, by extending the age for retirement with full Social Security benefits as longevity increases. They identify efforts to reduce residential isolation and increased federal funding for communities affected by immigration as possible means of promoting Hispanic educational attainment.

**Axel Boersch-Supan** comments on Little and Triest's paper from a European perspective. He points out that the process of population aging has progressed further in much of Europe than it has in the United States; the recent European experience can serve as a preview of what is to come in the United States. Germany and Italy, for example, now have roughly the population age distribution that the United States will have in 2025. Boersch-Supan emphasizes that the increase in the dependency ratio induced by population aging severely strains pay-as-you-go social insurance systems, and that Germany, Italy, and the United States need to give high priority to social security reform.

Boersch-Supan's analysis of the effect of population aging on productivity growth differs from that of Little and Triest. His analysis of age-specific productivity levels suggests that productivity is reduced by aging of the labor force. However, this effect is small relative to the loss in production that results from the shrinking share of the population that is working. An increase in the quantity of capital per worker may potentially boost productivity, but Boersch-Supan believes this investment is unlikely to occur unless social security programs are reformed.

Because consumption patterns differ over age groups, aging of the population can be expected to produce shifts in the pattern of labor demand across sectors. According to Boersch-Supan's calculations, about one-fifth of the German workforce will need to shift sectors in response to demographic change. He thinks that this transfer will be more difficult to

achieve in Europe than in the United States because of the relative inflexibility of European labor markets.

In his discussion, **James Smith** disagrees with elements of Little and Triest's analysis of how the labor market will adjust to demographic shifts. He is skeptical about whether the empirical relationship between the growth of the working-age population and labor productivity estimated by Little and Triest should be interpreted as causal. Smith points out that movements in population growth rates are forecastable, and so changes in investment behavior in response to changes in the growth rate of the working-age population should precede the actual occurrence of the demographic changes. Smith believes that the coincidence of the productivity-depressing oil shocks with the rapid growth of the working-age population in the 1970s, and the coincidence of the computer technology-induced productivity growth boom with the slow growth of the working-age population in the 1990s, may be responsible for the relationship estimated by Little and Triest.

Smith also takes issue with Little and Triest's analysis of the impact of immigration on educational attainment and productivity growth. He makes the theoretical point that immigration of workers who are less educated than native-born workers would be expected to increase the productivity of native-born workers. However, Smith questions whether there is, in fact, a gap between the education levels of immigrants and the native-born. In a recent study coauthored with Guillermina Jasso and Mark Rosenzweig, Smith found that legal, permanent immigrants have higher education and skill levels than do native-born workers. Smith also believes that Little and Triest present an unduly pessimistic view of the degree of progress over generations in the educational attainment of the descendants of Latino immigrants. He believes that assembling the data in a manner that avoids confusing age and generation effects leads one to find a greater rate of progress in educational attainment.

## **U.S. IMMIGRATION AND THE CULTURAL IMPACT OF DEMOGRAPHIC CHANGE**

In his address on immigration and acculturation, **Marcelo Suárez-Orozco** began by asking, "Is what is going on in East Los Angeles today the same as what happened on New York's Lower East Side 100 years ago?" While similarities exist, Suárez-Orozco argued that it is premature to conclude that the Mexicans are the Irish of the new millennium and will follow the same trajectory, since half of the Mexicans living in East Los Angeles arrived just 10 years ago. Moreover, new information, communication, and transportation technologies have changed the nature of both the immigration process and the destination. That is, they have changed migrants' ability to maintain ties with their homelands and turned the United States into a thoroughly multicultural society.

With immigrant children the fastest-growing segment of the U.S. child population and one in five children living in immigrant homes, how well these youngsters adapt is critically important for this country's future. Right now, the outcome is extraordinarily bimodal. Immigrants are overrepresented at Harvard and among Nobel Laureates, but they are also overrepresented among school dropouts and prison inmates.

Our ideas about assimilation are being bypassed, Suárez-Orozco suggests, by the new transnational strategies that immigrants employ. Symptomatic of these efforts to maintain ties to two countries, remittances now total more than \$100 billion a year and for many countries are the largest component of the capital inflows they receive. Increasingly, moreover, source countries are developing dual-nationality arrangements that allow immigrants to participate in the domestic politics of their country of birth. The last Dominican election was fought and won in New York, not Santo Domingo, he noted.

In the receiving nations, by contrast, the newest wave of immigration is rekindling the same concerns voiced 100 years ago. While the second law of immigration is "Immigrants, we love them," the first law expresses eternal doubts about the cultural impact of large-scale inflows. But, Suárez-Orozco argues, these concerns reflect a misunderstanding of the nature of culture. He suggests dividing culture into two parts—mental and expressive—with mental culture referring to the skills and behaviors required to make a living, and expressive culture referring to values, world outlooks, and patterns of interpersonal relations.

Ideas about the skills needed to function in today's global economies have everywhere converged. These requirements include cognitive and symbolic reasoning, good work habits, communication and interpersonal skills, and, increasingly, an ability to work in other cultures. Immigrants know that their children must acquire these abilities. Indeed, immigration represents a chance to offer their children access to these skills.

In sharp contrast, he finds immigrant parents to be ambivalent about their children's exposure to the expressive elements of U.S. culture, which they perceive to have an anti-education, anti-authority streak that glorifies violence and precocious sexual behavior. This exposure is particularly problematic for children from Latin America, who are more likely to attend hyper-segregated schools than any other youngsters in the country. For them, mainstream U.S. culture is something they watch on television.

Although today's immigrants are highly diverse, they share common values centered on family, hard work, and optimism. The largest number of visas by far is granted for family reunification. Still, the fundamental motivation for immigration remains the hope of finding a better life, a better job. And immigrants see hard work as essential to the project. Suárez-Orozco suggests that these attitudes strengthen the cultural stock of the nation.

Of course, immigration changes the dominant culture as well as the immigrants themselves. We speak, eat, and dance differently in the United States today than we did 30 years ago because of recent, large-scale immigration. Immigration changes everyone, but rather than advocating that immigrant children abandon all elements of their culture as they assimilate, a more promising path, Suárez-Orozco believes, is to nurture hybrid identities and trans-cultural competencies. In this global era, the tenets of unidirectional assimilation are clearly no longer relevant. Today the benefits to being able to operate across cultures are obvious, and immigrant children have advantages in this regard. Their abilities are assets to be celebrated and cultivated.

## THE FISCAL IMPACT OF U.S. DEMOGRAPHIC CHANGE

**Ronald Lee and Ryan Edwards** examine the fiscal impact of demographic change in the United States. Their paper starts with a critical review of demographic assumptions and projections made by the Social Security Administration. They contrast the official projections with stochastic forecasts developed by Lee and coauthors in previous research. The stochastic forecasting approach has the advantage of explicitly modeling the uncertainty embedded in the forecasts and providing a probability distribution over the range of possible outcomes.

Lee and Edwards then present a model of how population aging resulting from reduced fertility affects public decisions regarding spending on age-targeted programs. In their model, demographic shifts alter the trade-offs between different policy options. Benefits targeted to the old are much more costly than those targeted at the young, and population aging increases the cost of age-related programs by increasing the proportion of the population eligible for benefits targeted to the old. The proportion of aggregate income that must be devoted to the programs increases as a result of the shift in the age distribution. Policymakers can be expected to respond to the increased “price” of providing benefits to the aged by reducing the level of benefits per recipient (although total expenditures on the aged may still increase because of the increased number of beneficiaries). Lee and Edwards cite the increase in the normal retirement age for the U.S. Social Security system as an example of this phenomenon.

Lee and Edwards calculate how the trade-off between after-tax income and provision of age-targeted benefits will change during the twenty-first century separately for the U.S. federal government and for state and local governments. Although there is little change in the trade-off for state and local governments, the relative cost of age-targeted programs for the federal government increases sharply as the baby boom generation starts retiring early in the century. Lee and Edwards project that the relative cost of federal age-targeted programs will continue to



rise, although at a slower rate, during the second half of the century, when the baby boom generation has passed but population aging continues as a result of improved life expectancy.

Lee and Edwards present projections of government expenditures and revenues at the federal and the combined state and local levels for the twenty-first century. Although their model of the trade-off between after-tax income and age-related government expenditures suggests that population aging may reduce the generosity of age-targeted programs, they assume that government benefit programs remain largely unchanged, in order to provide a clear baseline for understanding how population aging will affect the fiscal balance. If government revenues were to grow at the rate of productivity growth, which is roughly what would be expected if tax laws were left unchanged, the ratio of public debt to GDP would reach untenable levels by the end of the century. Lee and Edwards avoid that problem by assuming instead that the Social Security payroll tax is adjusted in such a way that the Social Security trust fund never falls below the cost of the following year's benefit payments, and that other federal taxes are adjusted so that the ratio of public debt to GDP does not exceed 0.8.

Although Lee and Edwards forecast little change in state and local government expenditures as a share of GDP, under their assumptions federal expenditures will grow from 16 percent of GDP to close to 40 percent of GDP by 2100. The bulk of this growth is the result of projected increases in spending on programs for the elderly. Lee and Edwards project that only about one-eighth of the increased government spending on the elderly will be in Social Security retirement payments, with most of the rest accounted for by added spending on health programs. However, they caution that their assumptions may lead to understatement of Social Security's share of the spending increase.

Lee and Edwards examine two possible means of attenuating the projected fiscal consequences of demographic change: increased fertility and increased immigration. Both would reduce the growth in the fraction of the population receiving benefits targeted to the elderly, and both are estimated to have a positive fiscal impact. However, Lee and Edwards caution that increased fertility may be associated with negative environmental externalities and that the aggregate fiscal impact of increased immigration is likely to be modest.

**Paul Atkinson** draws on recent work at the OECD on the fiscal implications of aging populations in his discussion of the paper by Lee and Edwards. Projections made by the OECD study are similar in many respects to those of Lee and Edwards, but the OECD study projects significantly less growth in spending on health programs. Atkinson points to two differences in assumptions that may be affecting the health program expenditure projections. Lee and Edwards assume greater increases in life expectancy than does the OECD. They also assume that

spending on Medicare and Medicaid per beneficiary grows faster than labor productivity over the entire forecast period, which Atkinson suggests may be too pessimistic. Despite these caveats regarding the quantitative estimates, Atkinson agrees with Lee and Edwards's conclusion that increased spending on health programs will be the largest contributor to fiscal problems in the United States.

Atkinson's summary of the OECD report shows that the United States is expected to face a less severe old-age dependency problem than most of the other OECD countries. The OECD study expects the U.S. fertility rate to be somewhat higher than those of the other member countries over the next half century, and it also expects the United States to experience above-average levels of immigration. As a result, the old-age dependency ratio will rise less in the United States than in almost all of the other OECD countries.

The OECD has projected the increase in age-related spending in its member countries for the first half of the twenty-first century, assuming that policies remain unchanged except for reforms that have already been legislated. The United States is expected to experience lower than average growth in spending on publicly funded pensions, but a greater than average increase in spending on health programs for the aged. Atkinson cautions that the difficult policy decisions needed regarding social security and medical care programs only become more difficult as they are delayed. He stresses the need for creating conditions that encourage private saving for retirement.

In his discussion of Lee and Edwards's paper, **Eugene Steuerle** points out that population aging reflects both reduced fertility and longer life expectancy. Lower fertility results in an increase in the fraction of the population who are in the last portion of their lives and may be economically dependent. Increased life expectancy means that individuals have more years to live, generally in better health at every age. Greater longevity creates fiscal problems for social insurance programs that have fixed ages of eligibility, but it need not signify that an increased fraction of the population is dependent.

Steuerle notes that people are spending an increasing fraction of their lives receiving retirement benefits, as life expectancy increases but typical retirement ages remain unchanged. This results in idle human capital and lost economic output. He believes that labor demand developments may result in increased labor force participation by older individuals, especially if policy changes remove impediments to their work effort. If such an increase in labor supply does not occur, the United States will experience a prolonged period of declining adult employment rates, the macroeconomic consequences of which Steuerle believes deserve further attention.

Steuerle points out that it is not solely population aging that drives our increased spending on age-related programs. Much of the increased

spending on health care programs for the aged is caused by an increase in the relative price of medical care services, which have not experienced the below-average price increases of almost all other growth sectors of the economy. Steuerle urges careful attention to these costs, and to the macro and micro impacts associated with the scheduled increase in the share of human capital that will be wasted if we permit a continuing decline in the adult labor force participation rate.

## DEMOGRAPHIC SHOCKS AND GLOBAL FACTOR FLOWS

Jeffrey Williamson's paper deals with the links between demographic shocks, mass migrations, and international capital flows. To matter, he points out, a shock must be big and must change the composition of the population. Wiping out a disease that kills randomly will influence the size but not the structure of a population, but a medical advance that lengthens life will increase the share of the population that is elderly. A big baby boom also has a long-term effect on a population's age structure. In the OECD, the postwar baby boom is the best known example. But the sharp decline in child mortality in the Third World in the past fifty years has created a far bigger demographic shock.

This shock reflects the shift from the high fertility and mortality rates of the pre-industrial era to the low fertility and mortality of the post-industrial era. Because parents' expectations concerning their children's survival adjust with a lag, a decline in child mortality results in a youth glut that moves slowly through the population as the transition cohort ages. This shift can take decades to complete.

Williamson's paper examines how such shocks affect global factor flows—starting with labor. Since young adults have most to gain/least to lose by moving, migrants disproportionately self-select from this age group. When a large cohort enters the labor market, the glut of young adults reduces wages and encourages emigration if the glut is in a sending region. As a result, mass migrations from nations in the middle of their demographic transition tend to flood advanced nations that have already finished theirs, unless the flow is impeded by immigration policy. If so, illegal immigration ensues.

Turning to capital, Williamson reminds us that capital inflows reflect a gap between domestic savings and investment, both of which are affected by demography. On the savings side, he cites the admittedly controversial Coale-Hoover (1958) dependency burden hypothesis, which suggests that rapid population growth in a demographic transition first raises the child-dependency burden and boosts consumption at the expense of savings. Then, as the youth glut matures, accumulating savings contribute to an economic "miracle." Later, as the large cohort ages and the elderly-dependency burden rises, savings dwindle and the miracle ends.

The investment impact of a demographic transition is less contentious since most economists agree that the need to equip and house a baby-boom cohort raises the demand for investment as the cohort enters the workforce. While investment demand and domestic savings tend to rise and fall together in the transition, any gap between the two triggers world capital flows and sets their direction. Studying Asia from 1950 to 1992, Higgins and Williamson find that investment demand exceeds domestic savings early in the transition, while later the savings supply outruns the demand for investment. Thus, nations making the demographic transition import capital for many years, then enter an era of financial independence as the transition cohort reaches age 40 and investment demand falls faster than savings.

Williamson suggests that his demographic arguments explain large-scale international factor flows in the mass migrations from Europe before 1914, contemporary emigration from Africa, pre-1914 capital flows from Europe, and East Asian capital flows from 1950 to 1992. Indeed, although other developments were also important, he finds that over half of Europe's emigration before World War I was driven by the rise in the share of young adults in the sending regions, as the local labor glut cut real incomes.

The same forces that drove European emigration before 1914 are even more powerful in Africa today, Williamson suggests. For example, European-African wage gaps are double those for the New World and low-income Europe in the 1800s. To date, restrictions on immigration to Europe have helped stem the migrant tide, but Williamson argues that larger flows can be expected. With the young adult share of the African population expected to rise by several percentage points by 2025, Williamson anticipates that African emigration could reach the same pace as European emigration in the 1870s.

Williamson next notes that international capital flows in the late 1800s were larger than ever before or since. Britain was the era's preeminent capital exporter, with one-third of its wealth invested overseas in 1913. As an early example of Lucas's Paradox, two-thirds of this capital went to the rich New World with one-tenth of the world's population, while only one-fourth went to Asia and Africa with almost two-thirds of the world's people. Observers usually argue that labor and capital both sought natural resources. Alternatively, Williamson points to the gap between youth dependency ratios in the Old and New Worlds. Rapid population growth in the New World led to strong investment demand, while its high youth dependency rate discouraged domestic savings. Given Europe's relatively low youth dependency ratio and high savings rate at the time, Williamson believes that the dependency-burden model may explain two-thirds of British net foreign investment before 1914.

In his final example, Williamson argues that East Asia's demographic

transition helps to explain its evolution from big capital importer to capital exporter. East Asian savings rates soared from an average 14 percent in the late 1950s to 35 percent in the early 1990s, while investment as a share of GDP rose almost (but not quite) as much. As the current account balance swung from deficit to surplus, East Asia went from heavy dependence on foreign capital to financial independence. The shift was highly correlated with the decline in East Asia's youth dependency burden, which peaked in the 1960s at levels far above the highs seen in the advanced nations during their transitions.

Williamson ends by pointing out that the world's two halves are in different demographic stages. The elderly OECD should want to invest its capital surplus in a Third World now burdened by a capital deficit, while the young Third World will want to send its labor surplus to OECD countries struggling with labor scarcity. Will policymakers allow this intergenerational transfer to occur? Williamson wondered.

While **Gary Burtless** found Williamson's argument—that a big demographic shock can have major consequences for international factor flows—totally plausible, he expressed surprise that the impact was as large as Williamson had suggested. Indeed, Burtless felt that simpler explanations were at least as important.

In the case of European migration to the New World before World War I, the simple explanation was that real wages were higher and land prices lower in the United States than in Europe. While demographic differences between the two regions undoubtedly contributed to the labor flows, the crucial determinant was the relative abundance of natural resources, not the shape of the population pyramids. In Burtless's view, the Irish potato blight increased the wage gap between Ireland and the United States and encouraged emigration. The same set of events would have occurred whatever the shape of the two population pyramids.

Today, because Africans have access to more capital and better technology in Europe than in Africa, they can also earn higher real wages in Europe. This difference would exist regardless of the shape of the two regions' population pyramids, Burtless argued. While the age structure of the population will affect the share that is willing to migrate, that structure has only a secondary impact on the level of real wages.

By contrast, Burtless found Williamson's story about East Asia—that population age structure can affect a nation's savings-investment balance—to be much more persuasive. But, Burtless argued, other developments often swamp the impact of demographics on a nation's savings-investment balance. As a case in point, in many OECD countries, savings rates have recently declined as the supposedly high-saving, middle-aged workers' share in the population has risen, contrary to the predictions of the demographic model. As Burtless's work with Bosworth and Sabelhaus suggests, factors that influence private saving within age groups can have a larger impact on total private saving than the population's age

profile. While the East Asian experience conforms to Williamson's demographic model in a satisfying way, Burtless concludes from the OECD experience that such episodes may not be the norm. In other words, demographic shocks are important, but other influences on savings and investment frequently overwhelm them.

**Efraim Sadka** also finds Williamson's "intriguing" story, especially the parable of African emigration, less than fully convincing. Like Burtless, Sadka also asked if pressures to emigrate from Africa to Europe would abate if African and European demographic profiles were similar. He doubts the answer would be yes and suggests that the huge economic advantages of living in Europe's welfare states are unlikely to dissipate as Africa's demographic transition runs its course.

In this regard, Sadka also emphasizes that incentives for migration include the education, health insurance, pension, and other benefits provided by government in addition to the economic return to labor that Williamson discusses. Because social security systems around the world are under financial pressure, some have advocated increased immigration to help restore these systems to financial balance. But, citing *The New Americans* (Smith and Edmonston 1997), Sadka concludes that when all public expenditures and taxes are taken into account, the fiscal benefits of immigration are highly uncertain and depend crucially on the educational attainment of the immigrants. Prime-age immigrants with less than a high school education impose a net fiscal burden over their lifetimes, while more highly educated immigrants make a net contribution.

Sadka is also not fully persuaded by Williamson's discussion of the impact of East Asia's demographic transition on the region's per capita growth rates. After estimating the impact of growth in the working-age population and in the total population on growth in GDP per capita, and finding the first to be positive and the second negative, Williamson had concluded that demographic factors would retard East Asian growth considerably for the next 25 years. But Sadka questions these projections, noting the possibility of reverse causality between growth in per capita GDP and migration. Might not high per capita GDP growth attract young immigrants? he asks.

Sadka then suggests that Williamson's analysis of how a country's demographic transition affects its savings-investment behavior may help to explain the Feldstein-Horioka puzzle, which contrasts the financial openness of OECD countries with the high correlation of domestic savings and investment in the same nations. While capital market integration presumably breaks the link between the two, the correlation persists.

In concluding, Sadka points out that Williamson's work should not be interpreted as arguing that the demographic transition fully or solely explains international factor flows. Still, reading Williamson's paper has

persuaded Sadka that demographic shocks do indeed rival economic shocks in this regard.

## POLICY IMPLICATIONS OF DEMOGRAPHIC CHANGE

The conference concluded with a panel discussion on the policy implications of projected demographic change. **Joseph Chamie** began by rejoicing at his good fortune in being a demographer in the twentieth century, an unparalleled period in demographic history. He reeled off the century's "gold-medal" achievements—among them, that the world population almost quadrupled from 1.6 billion in 1900 to 6.1 billion in 2000. Within the century, the population took the shortest time ever to double (just 39 years). It also experienced the fastest year-over-year world population growth on record (2 percent), a rate unlikely to be reached again. It saw unprecedented declines in fertility virtually everywhere, significant migration and urbanization, and revolutionary improvements in mortality and longevity. Indeed, Chamie views the increase in longevity as humanity's greatest single accomplishment.

Looking ahead, Chamie cited the distribution of population growth as an important aspect of the new demographic order. Currently, just six countries—India, China, Pakistan, Nigeria, Bangladesh, and Indonesia—account for half of the world's population growth. Even more dramatically, while the European Union grew by 343,000 in 2000, India grew that much in the first six days of the year. As this contrast suggests, Europe and Japan are growing very little, if at all. By 2050, 39 countries are expected to be smaller than they are today—Japan and Germany by 14 percent, Russia and Ukraine by 28 to 40 percent. By contrast, the United States, Canada, and Australia will be 30 to 40 percent larger. And despite the worsening AIDS crisis, the population of Africa is likely to double in the next fifty years. As a consequence, the balance of the world's population will shift to the Third World. While the ratio of population in the developing world to that in the developed world is now 4:1, in 2050 that ratio will be 7:1.

Another major feature of the new demographic order will be increased migration, with all the political and social spillovers such flows entail. To illustrate why immigration may be "a" but cannot be "the" solution to population aging, Chamie looked at Korea. To keep Korea's population at its current size of 47 million until 2050 would require immigration of 100,000 per year for the next fifty years. But to keep the ratio of the working-age to the retirement-age population constant at 12.6 would require an average of 94 million immigrants a year—an impossibly large number.

Population aging will also be pervasive. In many countries, one of every three people will be over the age of 65 in 2050. This aging will result in a shift in the population's gender mix because the ratio of females to

males rises rapidly with age. At age 60, the ratio of women to men is about 1.2, but at 100 the ratio rises to 4. Rarely discussed are the possible consequences of couples' new ability to determine the sex of their fetus and, perhaps, to create an imbalance in the gender mix of the newborn.

What are the policy implications of a larger, older, more urbanized, and more diverse population, of which nearly 90 percent will be in the Third World? Sure that the market will deliver the required adjustments, many advocate a *laissez-faire* approach, but Chamie disagreed. He urged acknowledging that for hundreds of millions of people in the developing world, market forces, their governments, and the international community are failing to deliver the food, clothing, and shelter that they need today. In the developed world, Chamie advocated that governments look beyond the near term and rethink their policies on hard issues like pension reform and immigration. Facing these challenges, Chamie concluded, we need vision, leadership, and resources—financial, environmental, and human. But if we are willing to play an active role in developing an agenda based on mutual respect and internationally recognized human rights, Chamie can foresee a better future for all the world's citizens.

**Assaf Razin** provided observations on the political economy of demographic change and the welfare state. He noted that a flow of low-skilled immigrants to industrial countries with comprehensive welfare systems tends to provoke opposition in the host countries because low-income workers are generally the system's net beneficiaries in the short run. Pension benefits are especially problematic; globally, social security systems are facing insolvency and, in many nations, the contribution rates required to balance the system are much higher than statutory rates. Recent studies based on generational accounting methods have underscored the high net tax burdens facing the young and middle-aged in the industrial countries because current transfers to the elderly are generous compared to their contributions to the pension system. But current fiscal systems would last longer if net pension liabilities were partly financed by foreign savings. Further international migration might also help by enlarging the tax base.

While many observers have recommended that the advanced countries might admit more immigrants to share the burden of additional retirees, UN projections suggest that the numbers of immigrants required to keep the elderly dependency ratio constant would be far above current inflows. Indeed, many analysts view the required annual inflows as politically and economically infeasible. But Razin also noted that the actual size of the net fiscal burden imposed on native residents varies significantly with the educational attainment of the immigrants and the number of school-age children in their households. On balance, he suggested, the present-value fiscal impact of U.S. immigrants and their descendants is positive.



While it may be common sense to think that even low-skilled young immigrants can help pay pension benefits to the current elderly, it may also seem reasonable that they may affect the current young adversely if the immigrants are net beneficiaries of the welfare state. But Razin and Sadka (1999) show that, as long as an economy is small and has good access to world capital markets, all income groups and all age groups living when the immigrants arrive benefit from that immigration, even if the newcomers are low-skilled and net beneficiaries of the pension system. In addition, if the migration episode repeats itself or if the social security trust accumulates a surplus that is invested to finance future benefits, all future generations are better off. Razin notes that this intertemporal aspect of the net contribution of low-skilled immigrants is missing in much of the literature.

By contrast, when Razin and Sadka drop the small, open economy assumption and allow migration to affect factor prices, particularly the wages of low-skilled workers, they show that immigration may hurt some income groups now and in the future. Using data for 11 European countries, Razin, Sadka, and Swagel (2002a) find that while high-skilled immigration tends to lower the labor tax burden, low-skilled immigration tends to raise it, reducing the politically acceptable tax rate.

Finally, Razin turned to the implications of population aging for tax rates and welfare benefits in the industrial countries. Razin and Sadka (1999) develop a model in which tax rates and the size of social transfers between workers and retirees are determined by voting, with the outcome reflecting the balance between those who gain and those who lose from more extensive tax-and-transfer policies. While a growing number of elderly raises the demand for benefits, it also reduces the willingness of the working-age population to agree to higher taxes and transfers. As Razin and Sadka argue, on balance, a higher dependency ratio is likely to lead to lower taxes and transfers. Using panel data from 1974 to 1992 for 12 European countries to explore this idea, they find that taxes and transfers did indeed vary inversely with these countries' dependency ratio. The dependency ratio had a significant negative effect on both the labor tax rate and the size of per capita transfers. These results relate to the current debate on the privatization of social security systems in industrial countries, since a privatized system does not redistribute income but provides a publicly run, often mandatory vehicle for savings. Because such systems reduce the payroll tax burden and the size of public transfers, the Razin-Sadka model explains the growing call for privatization.

**Naohiro Yashiro** focused his comments on the policy implications of demographic change in Japan. Reacting to comments made earlier in the conference, he pointed out that while small population size does not deter economic development (consider Switzerland and Sweden), population decline can matter—especially if it is accompanied by population aging. Population aging is occurring faster in Japan than in any other OECD

country. And making matters worse are a social system based on seniority and fixed gender roles that distort the allocation of labor.

Although Yashiro acknowledged that poorly designed social security systems produce serious distortions, he argued that declining fertility was a bigger problem than the conference participants had recognized—especially in countries like Italy and Japan, where the fertility rate is well below replacement. He felt that Gary Becker's observation that families in the industrial countries tend to substitute quality for quantity of children applied to Japan between the end of World War II and the mid 1950s. But then, after stabilizing near the replacement rate for two decades, the fertility rate unexpectedly began a steady decline, starting in the mid 1970s and reaching 1.35 in 2000. Yashiro believes this trend is not the result of optimal decisions but reflects market failure as well.

The single most important explanation for this decline in fertility is the increased labor force participation of Japanese women, Yashiro argued. While the Scandinavians demonstrate that high female labor force participation need not lower fertility, Japan's fixed gender roles make it hard for Japanese women to balance full-time work and children. While most workers like Japan's long-term job security and seniority-based wages, the quid pro quo includes long hours, frequent relocation, and a large differential between full- and part-time wages. As few mid-career opportunities exist, women returning to work after a stint of child care are limited to low-paid, part-time jobs. All told, the opportunity costs of marriage and children are substantial for a college-educated woman. Yashiro argues that demographers have not sufficiently recognized that a shrinking labor force can create a vicious circle in which labor scarcity stimulates women's labor force participation, which leads to a further decline in fertility, especially in countries like Japan with inflexible gender roles. While the government is trying to raise fertility rates, such efforts are unlikely to succeed without changes in employment practices and increased support for two-worker families.

Turning to the issue of early retirement, Yashiro noted that a drop in labor force participation by the elderly raises labor costs and boosts unemployment among the young. It also narrows the tax base for social security, increasing the tax burden on workers and firms and possibly creating another vicious circle with further declines in labor demand and increases in the tax burden. Usually, a person must retire from work to receive a public pension. But if a pension is conditioned on withdrawal from the labor market, it becomes a tax on work. Japan (partly) addresses this problem by allowing individuals ages 60 to 64 to maintain their incomes through a "part-employment, part-pension" system. Because reducing pension income yen for yen with increased earnings made semi-retirees' wages fully taxable, in 1994 Japan cut the reduction in pension income to one-half of any increase in earnings. But it remains impossible for an individual working past age 60 to receive the full

pension income to which he is entitled. Yashiro shows that in OECD countries where the rate of taxation on the maximum social security wealth that a worker could obtain is high, employment among the elderly is low. Yashiro suggests that making age the only condition for a pension might avoid discouraging the elderly from working.

Turning to immigration, Yashiro agreed with analysts who do not believe that increased immigration can help to solve the demographic “problem,” since migrants age and need benefits too. Instead, he suggested that international trade could allow a country to employ foreign workers in their productive years without taking on responsibility for supporting their retirement. He noted that Japan is currently following that strategy—exporting capital to China and East Asia and then importing labor-intensive goods in return. He argued that importing labor-intensive products is more efficient than importing foreign neighbors. In addition, increased immigration would merely delay needed structural adjustments in Japan, where labor-intensive industries are no longer viable.

Speaking last, **Richard Cooper** made the case for increased immigration as a partial solution to projected demographic pressures. He began with a reminder that 95 percent of the world’s population growth between now and 2025 will occur in the developing countries and that birth rates have already fallen below the replacement rate in all of the rich countries, Slavic Europe, Russia, and China. While demographic inertia will keep the population growing in many of these countries over the next decade or so, population growth will then turn negative; it has already done so in Japan.

These low birth rates, combined with steady gains in longevity, imply aging societies. Since we have had no experience in the past two centuries with societies facing secular population decline, Cooper pointed out that we can only speculate about the implications, which will surely be profound. Bypassing the frequently discussed implications for pensions, health care, and long-term care, he declared declines in the demand for traditional education, for housing and related durables, and for autos to be obvious (unless others follow the U.S. example of wanting two and three cars per family). He also foresaw that slower labor force growth would lead to slower productivity gains, since learning by doing is probably most rapid for new entrants and new entrants are likely to be the most mobile workers. Finally, he pointed to the social implications of the decline in the extended family. Citing Nicholas Eberstadt, he noted that if Italy’s low birth rate were to continue for two generations, 60 percent of that nation’s children would have no siblings or aunts, uncles, or cousins. What will replace the extended family in socializing future generations? he asked.

Cooper suggested that declines in labor force growth could be partly offset by raising the labor force participation of women and of the elderly

as the latter's increasingly better health status allows. He proposed that the increased leisure reaped from rising productivity could allow more flexible schedules throughout an individual's work life rather than just more retirement years. To enhance labor market flexibility, he advocated encouraging lifelong learning, since rapid technical change will likely transform the workplace more than once in a single work life.

Cooper then argued that immigration deserves far more attention than it usually gets. While immigration is rarely discussed as a policy variable, it should be, he insisted. He proposed letting immigration to this country increase enough to keep the dependency ratio at its 2000 level through 2025. With no change in participation rates or tax structure, such a proposal would keep the relationship between taxpaying and non-taxpaying residents the same as in 2000, when the Social Security trust fund and the federal budget were in surplus. Such a proposal would require an extra 36 million working-age immigrants in 25 years, or almost treble the number assumed in Census projections. Still, such a number would be manageable—if these immigrants came from a variety of source countries. He noted that the numbers cited were only intended to show that maintaining the current dependency ratio through increased immigration is feasible; smaller numbers of additional immigrants, possibly seasonal or contract workers, could also prove helpful.

Finally, Cooper observed that the United States is fortunate in facing relatively modest demographic pressures and in having a tradition of successful immigration. In Europe and Japan, where the projected demographic decline is larger than here, the immigrant tradition is less strong. Still, Cooper ventured to predict that in the coming decades immigration to all of the rich countries will be larger than now expected and that it will be generally welcomed—even encouraged.

## CONCLUSION

The conference presentations and discussions affirmed very clearly that demographic developments will transform the global economy over the next half century. Almost everywhere, populations will age markedly. The distribution of the world's population will shift dramatically toward the Third World as a result of stagnating or declining populations in most of the currently industrialized countries and continued population growth in today's less developed nations. The finances of social insurance systems will be strained, requiring difficult decisions about changes in benefit structures and in taxes to support these programs. And international migration will continue to change the ethnic and cultural makeup of many countries.

Less certain is how economies will respond and adapt to the demographic shifts. Many Third World nations are facing the huge challenge of educating a bulging youth population and then absorbing

the members of this large transition generation into productive employment. Their success with this task will influence how quickly population growth rates in the less developed countries will decline and will be a critical determinant of the growth in living standards for much of the world's population. Policies affecting global flows of labor and capital will also have a major impact on economic development.

In the industrial countries, the challenge will be providing for the needs of their older residents while delaying the age at which they become economically dependent. The rich countries will also need to ensure that new immigrants become economically assimilated and that all children, immigrant and native-born, have access to the same excellent educational opportunities. In view of these challenges, the conference participants sketched a wide range of possible scenarios. The industrial countries could enjoy productivity booms spurred by labor shortages, or their economies could stagnate in response to declining employment rates, explosive growth in social insurance spending and taxes, and a rising share of the working-age population with disadvantaged backgrounds.

The demographic shifts we are beginning to experience are largely the result of welcome advances in technology and public health that have extended life expectancy, improved living standards, and reduced population growth. However, disparities in the level and pace of economic development across the globe are producing pressures for massive movements of people and capital, while population aging presents additional challenges to established institutions. The conference presentations and discussions helped to delineate the nature of the challenges facing policymakers and to clarify some of the trade-offs that they face. Appropriate, generally modest, policy responses now will help to maximize the chance that future generations will prosper and fully benefit from the further advances in medical care and other technologies that will emerge in the coming decades.