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# Global Demographic Trends and Provisioning for the Future

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**ABSTRACT**

The world's population is aging. Virtually no nation is immune to this demographic trend and the challenges it brings for future generations. Relative growth of the elderly population is fueling debate about reform of social security programs in the United States and other developed nations. In the United States, the total discounted shortfall of Social Security revenues has been estimated at about $11 trillion, nearly two-thirds of that comes after 2050. However, this paper argues that those calling for reform have overstated the demographic challenges ahead. Reformers conclude that aging poses such a serious challenge because they focus on *financial* shortfalls. If we focus on demographics and on the ability to produce real goods and services today and in the future, the likelihood of a real crisis in social security in the United States and developed nations is highly improbable. Demographic changes are too small relative to the growth of output that will be achieved even with low productivity increases. This paper concludes with policy recommendations that will enhance our ability to care for an aging population in a progressive manner that will not put undue burdens on future workers. Policy formation must distinguish between *financial* provisioning and *real* provisioning for the future; only the latter can prepare society as a whole for coming challenges. While individuals can, and should, save financial assets for their individual retirements, society cannot prepare for waves of future retirees by accumulating financial trust funds. Rather, society prepares for aging by investing to increase future real productivity.

JEL Classifications: H55, J11, J14, J18

Keywords: Social Security, aging, provisioning for the future, demographic trends

## THE BURDEN OF AGING

The data are in: we are aging. Individually and collectively; nationally and globally. If you think that is a problem, consider the alternative. Aging results from the twin demographic forces of declining birth rates and rising longevity. The first is a welcome development that negated the dire "population bomb" predictions made by Club of Rome Malthusians three or four decades ago. Many developed nations are already worried about declining populations; even most emerging nations can look forward to stabilizing populations in the relatively near future. Obviously, lower fertility rates are desirable, and necessary, for achieving environmental sustainability. Rising longevity is desirable from the perspective of individuals, and also from society's vantage point. The social investment in each human is huge, and longer average life spans help society to recoup its investment. If longer life merely meant more time spent in a decrepit and dependent situation, increased longevity could be a mixed blessing. Such does not appear to be the case, although medical resources devoted to the final weeks and months of life of aged Americans is certainly rising. However, that is a largely controllable trend, if desired, through formulation of sensible health care policy—a topic beyond the scope of this chapter.

Of course, aging is considered a problem because of the burden placed on workers of supporting those aged who do not work. The most common measure of that burden is the aged-dependency ratio, which is formed by taking the number of those beyond normal working age—for example, aged 65 and above—relative to the number of normal working age—say, age 18 to 64. At best, this is a very rough measure of the burden put on workers. There are a large number of factors that affect the true, real burden. First, many people continue to work past age 65, both in formal labor markets and in informal (paid and unpaid) work. Women have traditionally provided much of the elder care, and as longevity rises, more and more women above age 65 continue to provide care for their aging relatives and others (again, in paid and unpaid work). By the same token, young people under age 18 work within and outside the home. Further, as we will see, it is important to note that even as the aged dependency ratio rises, the youth dependency

ratio tends to fall. Thus, the total dependency burden on workers may not be rising, even if the share of elderly in the population is rising.

Additionally, the labor force participation rate and employment rate of people aged 18 to 64 can make a huge difference for the true burden on workers. A rising aged dependency ratio can be associated with a constant or falling burden on workers if the employment-population ratio is rising. The three most important factors that have led to changes of the employment rate across OECD nations in recent years have been the dramatic increase of female labor force participation rates in some western countries (the United States and Canada stand out), medium-term trends in unemployment rates (rising on trend in many European Union nations, falling on trend in the United States), and the trend to earlier age at retirement in many developed nations (although the United States has experienced rising labor force participation of elderly men—see below). These factors, in turn, depend on numerous variables including social norms, family structure, labor laws, economic necessity, and health. For example, falling fertility rates, as well as changing views of the role of women, have allowed higher female participation rates. Generous childcare systems in some nations permit even mothers with young children to work in formal labor markets. Laws protecting rights of persons with disabilities, as well as changing attitudes toward them, can increase participation rates of those formerly excluded. Improved health, perhaps due to better health care, can extend the working period for elderly persons, as well as for persons with chronic and formerly debilitating health problems. Especially in Europe, very early retirement ages have been encouraged through policy, in part as a reaction to high unemployment rates. In the future, this policy could be reversed, especially if employment rates of younger adults could be increased. Higher growth of aggregate demand—as in the United States during the Clinton years—can dramatically raise employment rates, sharing the burden of supporting the aged among a larger pool of workers. By contrast, sluggish economic performance, as in many Euro nations since monetary union, raises unemployment and lowers employment rates, increasing the burden on those with jobs—a problem that should be resolved, even if the Euro nations were not aging.

Other factors that determine the burden on workers include growth of worker productivity, as well as technological improvements that allow elderly people and people

with disabilities to work. Additionally, the propensity of elderly people to live alone might increase the burden on workers to the extent that this requires more resources than required to support elderly in a more traditional, extended family arrangement. Even if independent living does not increase the total burden, it will likely shift the burden to workers in the formal sector as care that had previously been provided by family members is purchased (privately or by government). Of course, the percent of elderly persons who live independently has risen in the developed countries, but remains low in many emerging nations (independent living may be largely, but not entirely, determined by the nation's level of income and wealth; however, culture also matters). Even where seniors tend to live alone, the burden on workers is complex and dynamically determined. Technological advances can reduce the burden—for example, by substituting electronic monitoring, telemedicine, and robotic service technologies for direct provision of care in the home by workers. Senior citizen communities can also reduce the resources required by achieving greater efficiency in provision of elder care.

Finally, net immigration of workers can forestall rising burdens on a nation's workers. Many developed nations are already experiencing a large shortfall of service workers needed in an aging society—including doctors, nurses, and long term care workers. Nearly 90% of United States nursing homes are understaffed (AARP 2005). At the same time, some emerging nations—especially India and the Philippines—are able to produce a large surplus of trained professionals. About 40% of the United States' nursing workforce is foreign-born; in Italy it is estimated that 83% of all domestic helpers are undeclared foreign-born immigrants (AARP 2005). The medium term challenge is to improve training in emerging nations that currently have relatively young populations, and to relax restrictions on immigration in aged nations with excess demand (the number of people needing long term care in Japan is expected to rise from 2.8 million in 2000 to 5.2 million in 2025, yet Japan has one of the most restrictive immigration policies among developed nations—with only 1% of its population foreign-born (AARP 2005). It is also important to increase pay, improve working conditions, and raise the status of such jobs to attract workers and to reduce very high turnover rates. Net remittances from emigrant health care sector workers are already an important source of foreign exchange for some emerging nations. As they age, the emerging nations would begin to face their own

shortages of workers to provide elder care, so they will eventually benefit directly from improved training facilities as more of their trained professionals can find jobs at home. Of course, all of this raises difficult issues regarding immigration, treatment of immigrants, and "brain drain" that can result from competition between emerging and developed nations. Still, immigration can provide needed human resources to deal with aging societies for many decades to come. Note also that net imports of goods and services is an alternative to immigration of workers in the sense that relatively "young" emerging nations with excess labor supply can export goods and services to relatively "old" developed nations with labor shortages. Again, this raises questions about "sustainability" of trade deficits and foreign indebtedness, possible impacts on employment in the importing countries, and impacts on domestic development of the exporting nations—all of which go beyond the scope of this paper.

With these complexities in mind, let us turn to projections of global demographics and dependency ratios. This will help to provide insights into the scope of the problem, even while we recognize that demographics alone tell only a part of the story.

## DEMOGRAPHIC TRENDS

The world's population is aging—a very unusual experience for the human population, which had previously experienced slow population growth with a fairly constant age structure (Batini, Callen, and McKibbin 2006). As briefly mentioned above, this results from the combination of falling fertility and mortality rates. The interplay of these two factors is somewhat complex. As the global population first transitioned from high fertility and high mortality rates to falling child mortality rates, the youth dependency ratio rose along with population growth rates. More female infants lived to reproduce, which actually lowered the average age of the population. Fertility rates tend to fall with a lag after mortality rates decline. This eventually produces a "demographic dividend" as youth dependency ratios fall and the percent of the population of working age rises. Gradually, the combination of lower fertility and mortality rates causes the aged dependency ratio to rise; this population aging process is enhanced as mortality among

elderly persons falls. In addition, the population growth rate declines and turns negative for some nations—again contributing to the aging process.

Today the world's population is growing at about 1% per year, or 74 million people—which is the difference between 130 million births and 56 million deaths annually (CBO 2005). It is projected that the global population will peak in 2050 and stabilize at about 9.1 billion. Developed nations, taken as a whole, will experience falling population, although the United States population will continue to grow (ultimately expanding by about one-third); the population of emerging nations will grow just slowly enough after 2050 to replace the population lost by developed nations. Over the next 20–30 years, emerging nations will actually enjoy a demographic dividend as fertility rates fall and the percent of population of working age rises. Eventually, however, the combination of lower fertility and falling mortality will age even the emerging nations. Indeed, the aging process will be much quicker for emerging nations than it has been for the developed nations—the speed of aging is rising quickly.

There are several ways to track aging:

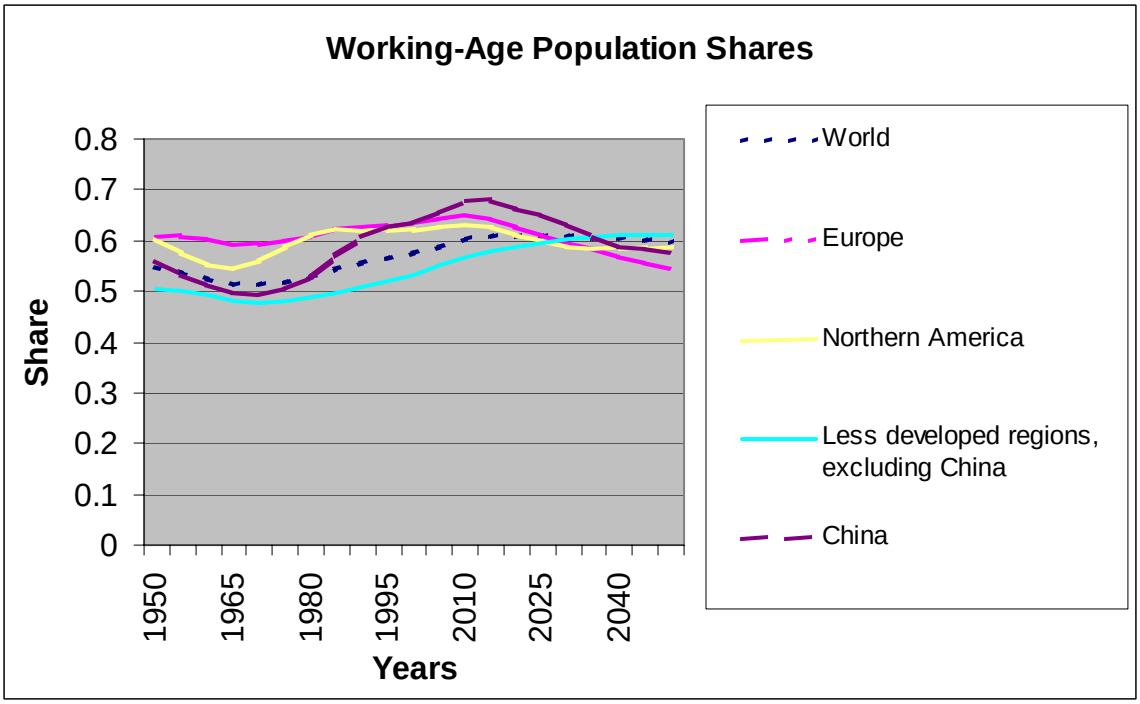
1. Median age: The median age of the world's population is projected to rise from 27 years in 2000 to 37 years in 2050 (Batini, Callen, and McKibbin 2005). Most industrial countries already have a median age above 31. Japan's average age recently reached 40—the first country to achieve that feat (Bloom and Canning 2004); most developing countries have a median age below 25, and a few have a median below 15 years.
2. Aging index = (for example), (100)*(number aged 65+ years)/(number aged 0–17 years). This is the ratio of the aged to the young. By 2030, most developed nations will have an aging index above 100; Japan will be above 200.
3. Aged dependency ratio = (for example), (number aged 65+ years)/(number aged 18–64 years). This gives an indication of the "burden" placed on those of normal working age of supporting the elderly—although we must keep in mind the issues raised in the previous section. This is one of the most often cited ratios in the Social Security debate; it is closely related to the beneficiary-support ratio, which is a ratio formed by the number of Social Security beneficiaries over the population paying payroll taxes.

South Korea has the fastest rising aged dependency ratio (number aged 65+/number aged 20-64): in 2000 the ratio was 10%, but it will rise to 69.4% in 2050 (AARP 2005).

4. Youth dependency ratio = (for example), (number aged 0–17 years)/(number aged 18–64 years). This measures the burden of supporting the young, again with the caveats noted above. As fertility rates fall, this ratio tends to fall—although that can be postponed in the case of a nation that is transitioning from very high to lower child mortality rates.
5. Total dependency ratio = aged dependency ratio + youth dependency ratio. This measures the total burden placed on those of working age.

Over the next half century, the share of the global population made up by those of normal working age will remain constant, while the youth dependency ratio will fall and the aged dependency ratio will rise. For example, if we define the working population as those aged 18 to 64 years, this remains a constant share at 59–60% of global population over the next 50 years (Figure 1).

**FIGURE 1: Working-Age Population Shares**



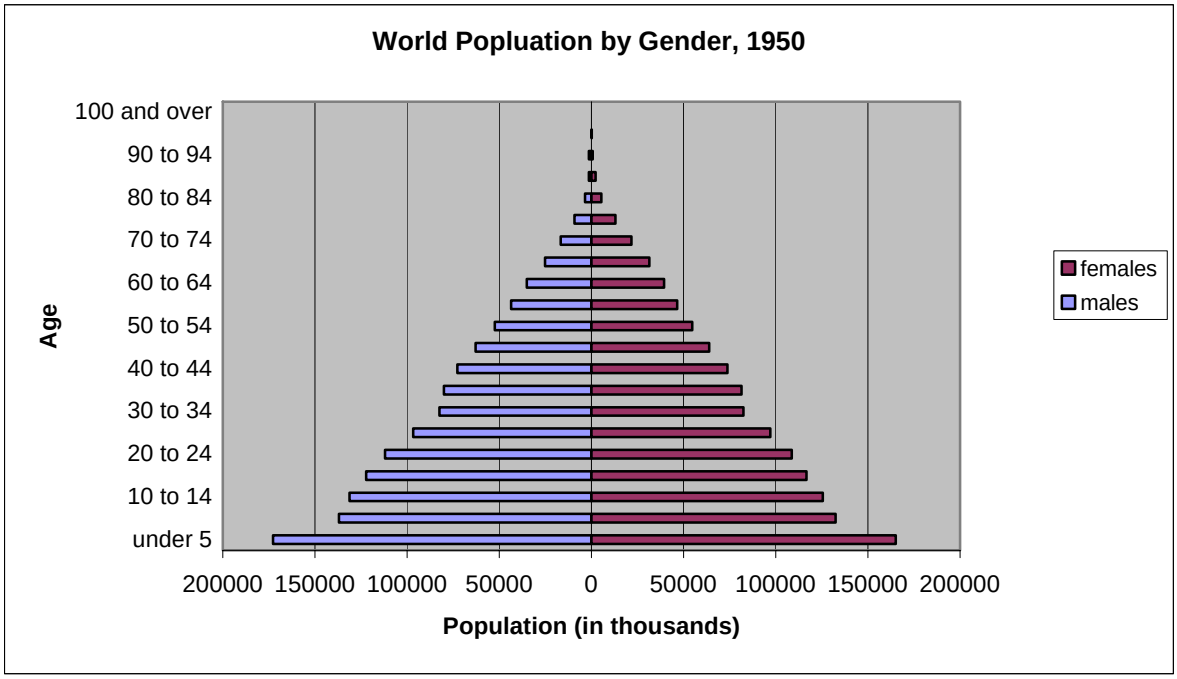

(Source: Population Division, Department of Economic and Social Affairs, UN; medium variant)

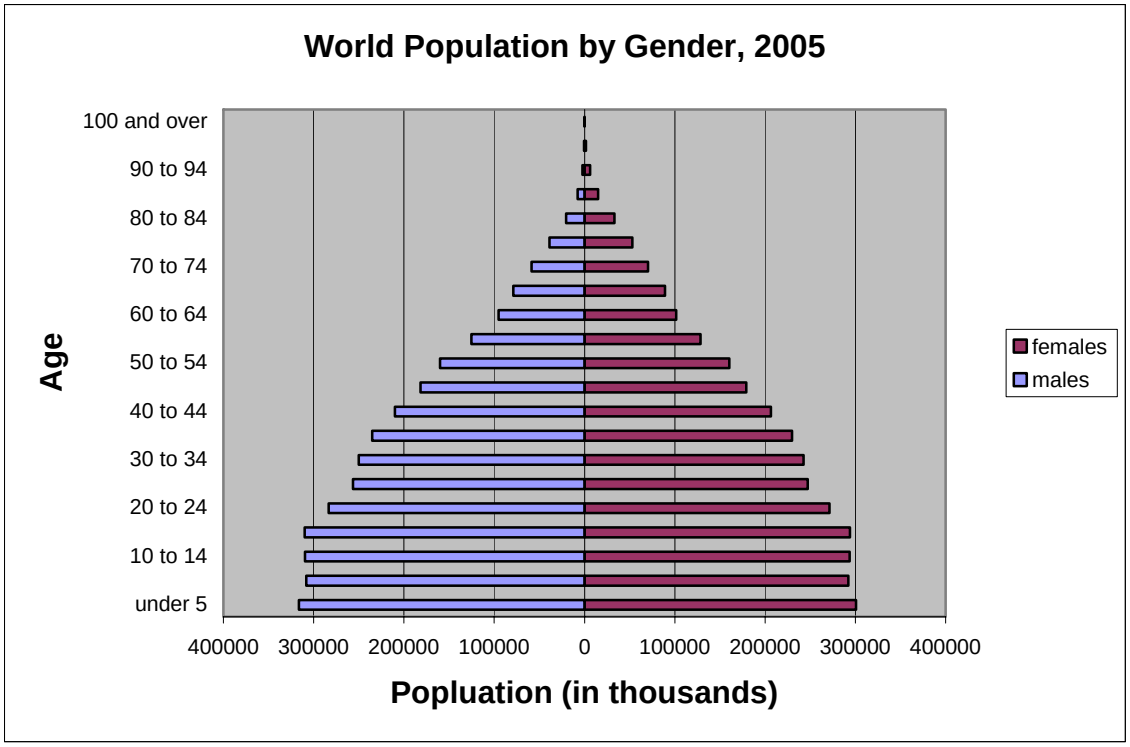
The share of the population aged under 18 will fall from the current 34% to about 24%; the share of the population that is aged rises from 7% to 16% (CBO 2005). Of course, the results vary across countries. In the United States, the share of the population made up by those of working age (again, defined as age 18–64) will decline by 4% points; the youth dependency ratio will also fall by 4% points as the aged dependency ratio rises by 8 % points. Taking all the developed nations except the United States, the working age population will decline by 10% points and the youth dependency ratio will fall by 2% points so that the aged dependency ratio will rise by 12% points. Among the emerging nations, the youth dependency ratio will fall by 15% points, the aged dependency ratio will rise by 10% points, and the working age population will rise by 5% points (the demographic dividend). Somewhat surprisingly, China will actually be older than the United States by 2050, as its aged dependency ratio rises by 16% points, its youth dependency ratio falls by 8% points, and its working age population falls by 8% points (all data are from CBO 2005).

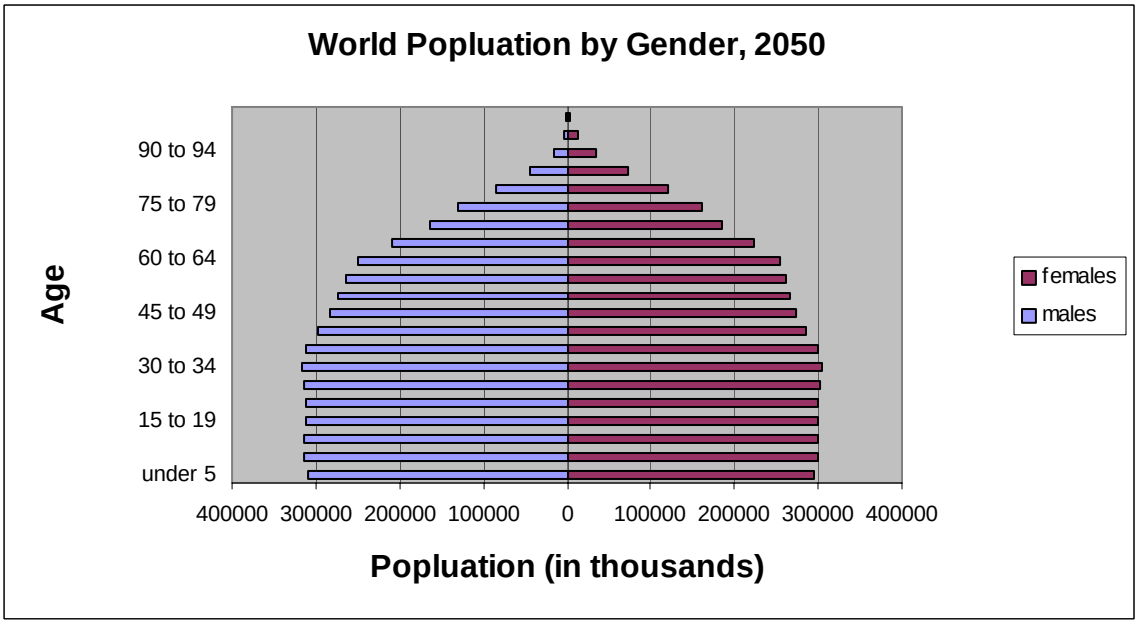
It is also surprising to compare these projections with historical data (see Figure 1). The working age population was actually a lower percent of the population in the recent past than it is projected to be in the future. Most countries reached the low point some time between 1965 and 1980—with developed nations reaching the trough earlier than emerging nations with a larger population of young. As mentioned above, the ratio is projected to remain constant for the world as a whole through 2050, but many nations will experience a falling proportion of the population of working age. Still, it is important to recognize that this ratio remains in a very tight range across the major groupings of nations, with projections of the ratio converging on 55% (for the more developed nations excluding the United States) to 62% (for less developed nations excluding China and the least developed nations)—a generally higher ratio than they had in 1950, and significantly higher than at their respective troughs. From this perspective, the globe as a whole, and even many nations individually, have already lived through the worst "demographic time bomb" in terms of the total dependency burden placed on the population of normal working age. What is new is that more of the burden is due to relative growth of the elderly population.

It is useful to examine population pyramids to get a better picture of the demographic changes involved. Figure 2 shows the evolution of the population pyramids for the world, while Figure 3 presents pyramids for the United States, each presenting a snapshot of the distribution of the population by age.

**FIGURE 2: WORLD POPULATION PYRAMIDS**

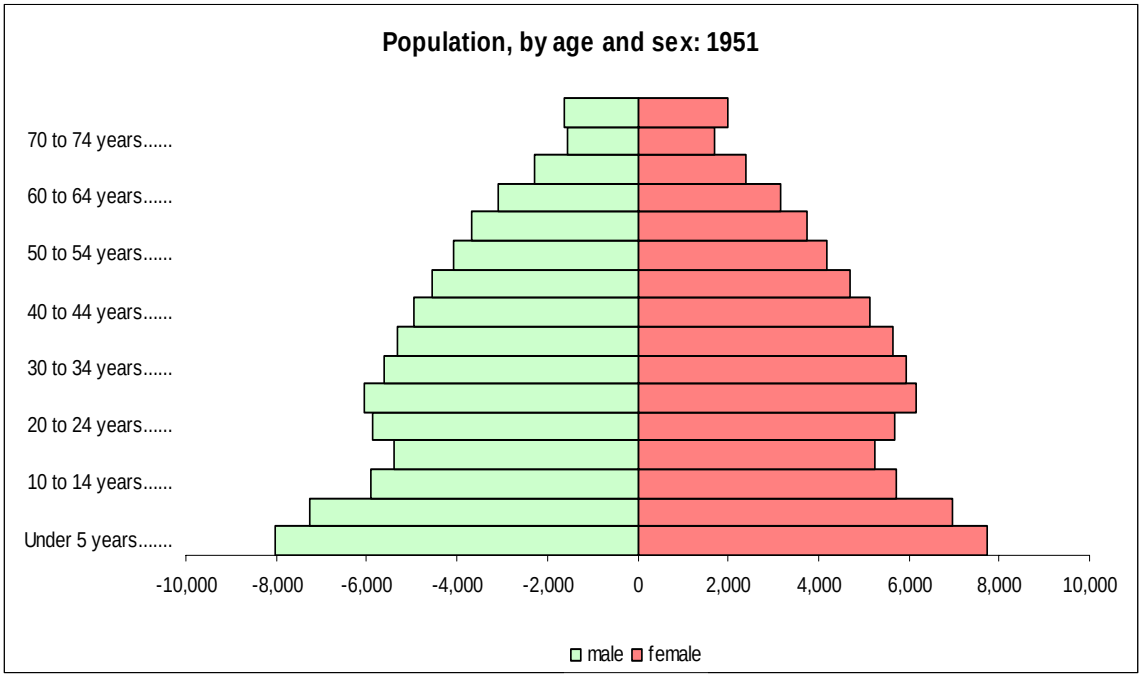


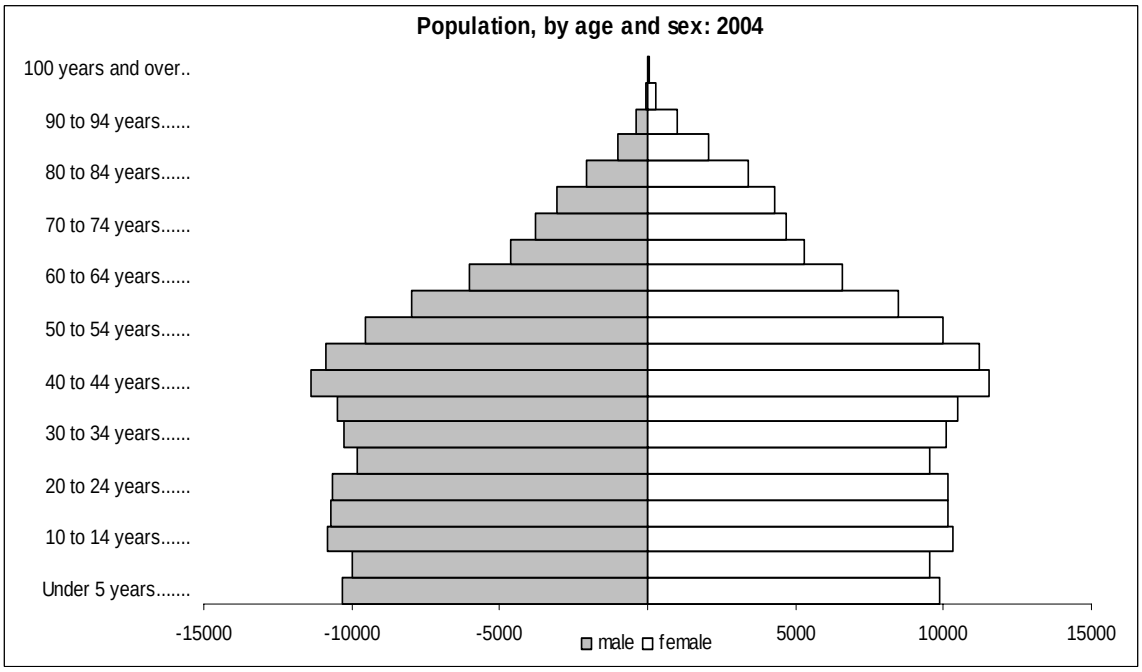


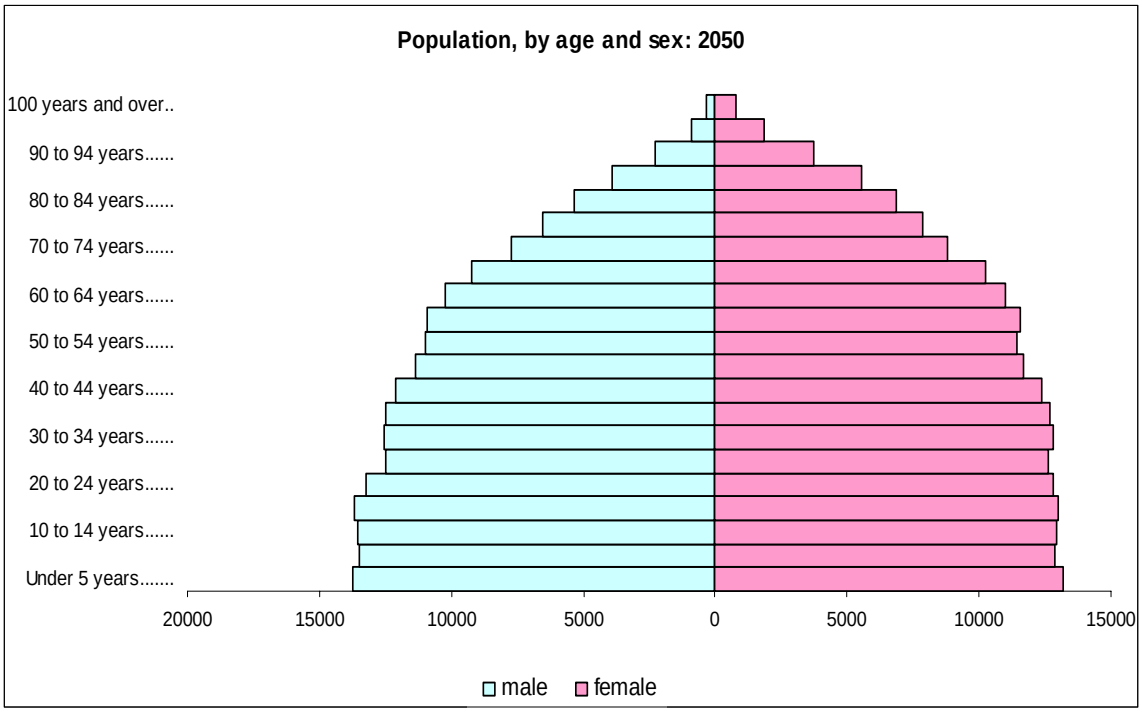



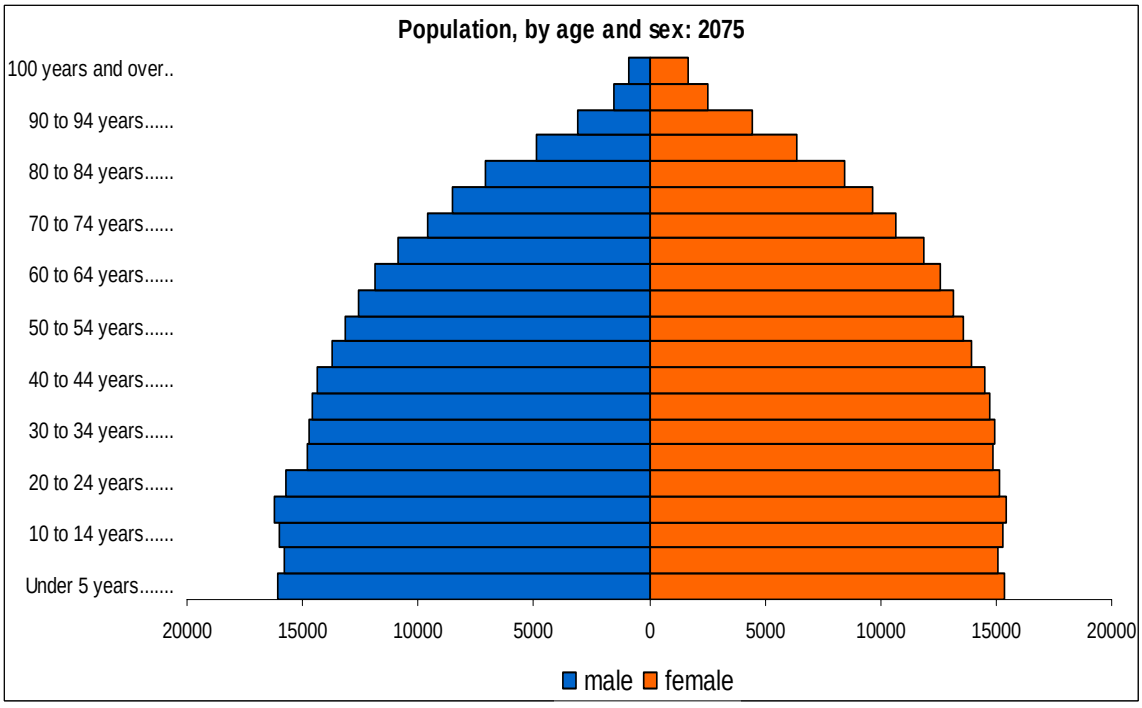

(Source: Population Division, Department of Economic and Social Affairs, UN; medium variant)

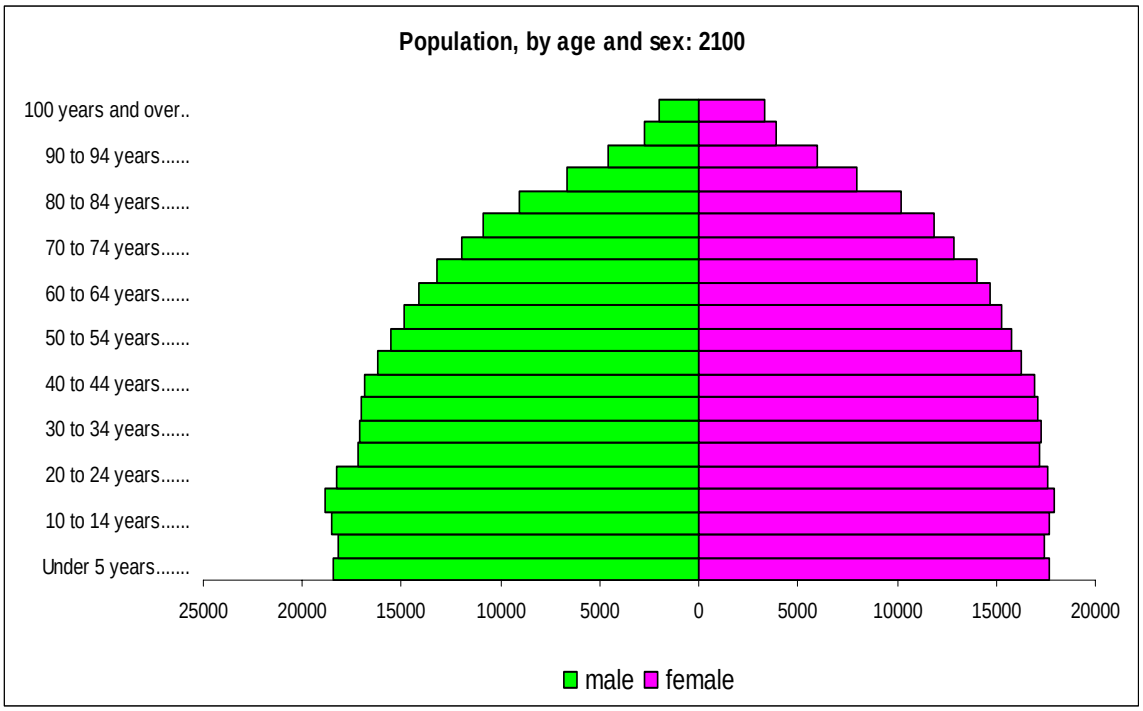
## FIGURE 3: U.S. POPULATION PYRAMIDS, SELECTED YEARS




Population, by age and sex: 2050
100 years and over..
90 to 94 years.....
80 to 84 years.....
70 to 74 years.....
60 to 64 years.....
50 to 54 years.....
40 to 44 years.....
30 to 34 years.....
20 to 24 years.....
10 to 14 years.....
Under 5 years.....
20000
15000
10000
5000
0
5000
10000
15000
male
female


Population, by age and sex: 2075
100 years and over..
90 to 94 years.....
80 to 84 years.....
70 to 74 years.....
60 to 64 years.....
50 to 54 years.....
40 to 44 years.....
30 to 34 years.....
20 to 24 years.....
10 to 14 years.....
Under 5 years.....
20000
15000
10000
5000
0
5000
10000
15000
20000
male
female



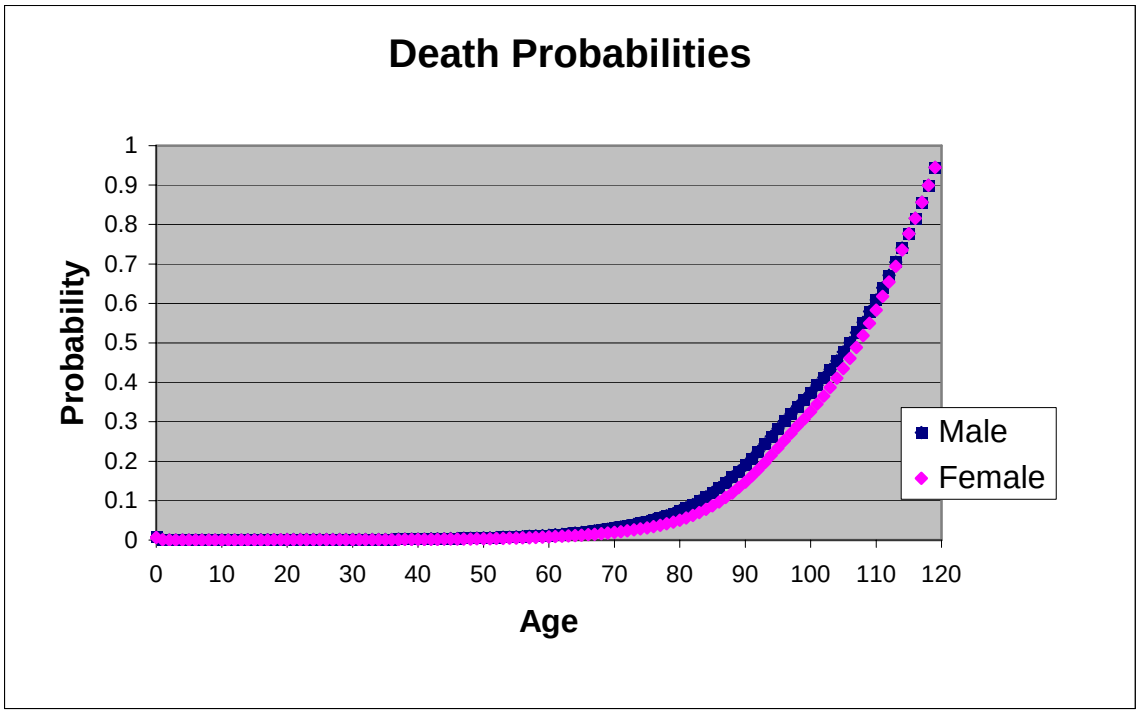

Source: U.S. Census Bureau

The pyramids for the world show the years 1950, 2005, and 2050, while the pyramids for the United States show the years 1951, 2004, 2050, 2075, and 2100. A "normal" pyramid would have a broad base, with each older age group having a smaller population—up to a sharp peak at the oldest age group. A sharp decline of fertility rates would reduce the size of the base; falling mortality rates among the young would tend to convert the pyramid to a column at the lower age group range. Falling death rates among middle aged and senior age groups would generate a columnar shape at the older age end of the spectrum. Finally, a baby-boom bulge would move up the age distribution through time. As these figures demonstrate, the United States is already a substantially aged society, with a distinct columnar shape (except at the oldest age groups, where the figure is sharply peaked), rather than a pyramid shape. The baby-boomer bulge is obvious as we move through time, but will have disappeared by 2050. The world population pyramid still displays a normal pyramidal shape today, except at the youngest age groups. By 2050, however, the figure for the world population looks quite similar to that of the United States. The United States figures presented for projections beyond 2050 look very similar to the 2050 pyramid—columnar with a sharp peak, and with a slowly growing population in the highest age groups as longevity increases. As these long-term

projections indicate, however, there are no major demographic surprises looming late this century.

It might be supposed that low fertility combined with steadily falling mortality rates could eventually produce an inverted pyramid, with a tiny population of young people, a moderate number of people of working age, and a huge population of elderly people. However, this cannot happen, except in exceedingly unusual circumstances (such as an epidemic that disproportionately killed the young; or in the case of a society that will disappear because of failure to reproduce—see below), because of the distribution of death probabilities by age. Figure 4 shows current United States death probabilities, which rise rapidly with age beyond 70 years.

**FIGURE 4: U.S. DEATH PROBABILITIES BY AGE, 2001 (UPDATED APRIL 22, 2005)**




Source: The 2005 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Stability Insurance Trust Funds, U.S. Government Printing Office, Washington, D.C.

While rising longevity will push this curve out, it will not be likely to change the shape of the curve very much. For this reason, the United States population pyramids of the distant future will not be inverted. However, for a few nations (Japan and Italy, for example) with very low fertility rates and negative population growth, the pyramids can

become inverted during a transition period. If we carry negative population growth through an infinite horizon, we eventually obtain a population of zero when the last elderly person dies. Exactly how nations like Japan and Italy will ultimately react to declining (and aging) populations is not known, but it seems likely that they will use some combination of incentives to increase fertility rates, as well as increased immigration, to avoid that fate. Finally, even if a handful of nations do achieve inverted pyramids, the world as a whole will not—unless the human population is destined to shrink and finally disappear from the planet.

## IMPLICATIONS FOR SOCIAL SECURITY SYSTEMS

Over the past several decades, there has been rising concern about the ability of nations to provide for their aging populations. The OECD (2000) bluntly states that "[w]ithout tax increases or tax reforms, governments cannot afford to pay future retirees the benefits they are currently paying out." President Bush's Social Security reform commission even called the current program "broken" and "unsustainable" (CSSS 2001). A number of nations have already scaled back promises made to new and future retirees; some have moved toward privatization and others have considered various "reforms" that would put more responsibility on individuals for their own retirement. The United States, in particular, made major changes to its Social Security system in 1983 when it embraced "advanced funding" based on the notion that accumulation of a large Trust Fund surplus could reduce future burdens of supporting retiring baby-boomers. In addition, partial privatization, slower growth of benefits, and higher taxes have all been proposed. The primary driving force behind global efforts to reform social security systems is the perceived unsustainability of current programs in the face of rapidly aging populations. Future burdens on workers are said to be too large to permit today's systems to persist without fundamental change.

The problem, of course, is that each worker in the future will have to support more social security system beneficiaries. This results from low fertility and rising longevity, which means fewer people of working age and more years spent in retirement for a given normal retirement age. Even worse, working lives have been compressed in

many developed countries, as working is postponed until after college and as average age at retirement falls. For example, in 1970 the average French male worker collected a pension for 11 years after retirement; today, he can expect to collect a pension for 21 years (Norris 2005). In France, the average retirement age for both men and women is well under age 60; in Italy and Germany it is around age 60 (Norris 2005). As the normal age of entering the workforce is postponed to 22 years, or even 28 years, because of extended full-time schooling, working lives will total as little as 30 to 35 years. As a result, tax rates must rise to support "paygo" benefits systems (and individual savings must rise to support retirement).

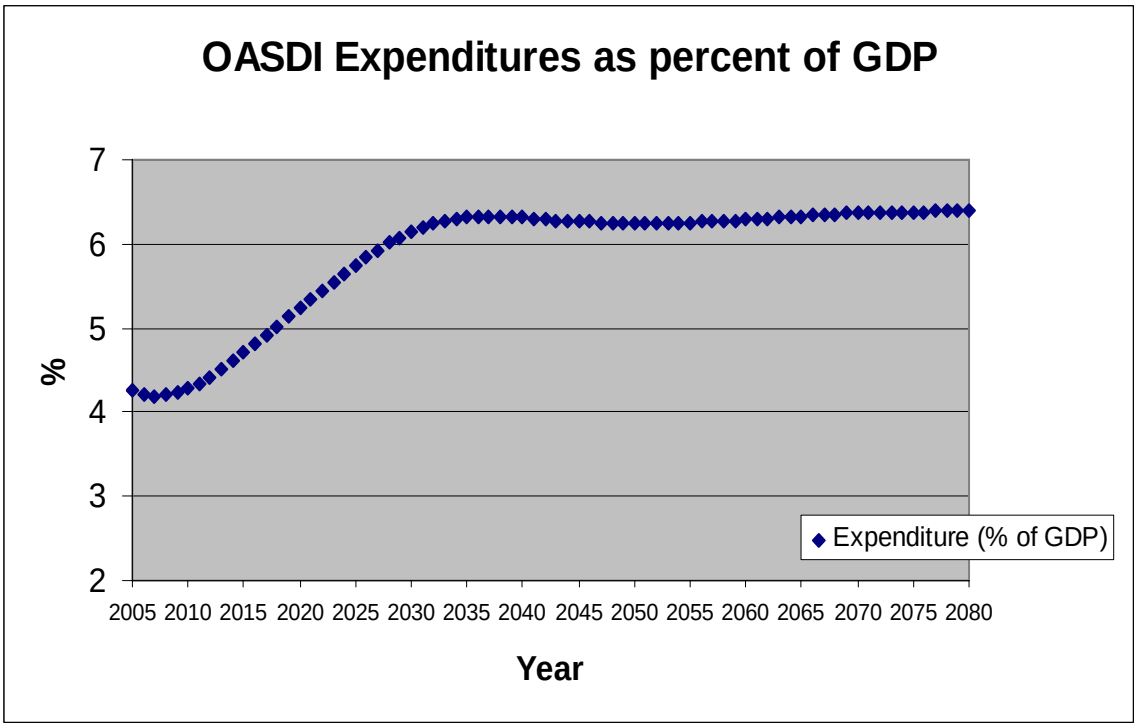
A simplified formula for the necessary tax rate for a paygo social security system is:

$$T = [P(a2)]/[W(a1)]$$

where P is the average pension benefit, T is the tax rate on wages, W is the average wage, a1 is the percent of the population of working age, and a2 is the percent of the population that is aged (Derived from Burtless 2005). As a1 falls and a2 rises, the required tax rate rises for given values of wages and benefits. Hence, we can calculate the necessary increase of the tax rate to maintain a paygo system as the population ages. However, as noted above, this is far too simple because it presumes that the percent of those of working age that are working is constant, and that those who are aged do not work (or, at least, that the percent working does not change). If employment rates rise, this can offset pressures on tax rates, even as the percent of the population of working age rises. As discussed above, employment rates for women in the United States have risen on a long-term trend. In addition, there has been a gradual, but sustained, increase of labor force participation rates by aged men in the United States since the mid 1990s. Some European nations hope to duplicate that phenomenon, for example, by making age discrimination illegal, as in the UK and the Netherlands, or by improving incentives to work longer by linking benefits to contributions, as in Italy and Sweden (AARP 2005; OECD 2000). Falling unemployment rates also reduce the necessary tax.

Another useful measure of the rising burden of public social security systems is the projected rise of the ratio of publicly-provided old age benefits to GDP.

**FIGURE 5: OASDI EXPENDITURES AS A PERCENT OF GDP**




Source: The 2005 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Stability Insurance Trust Funds, U.S. Government Printing Office Washington, D.C.

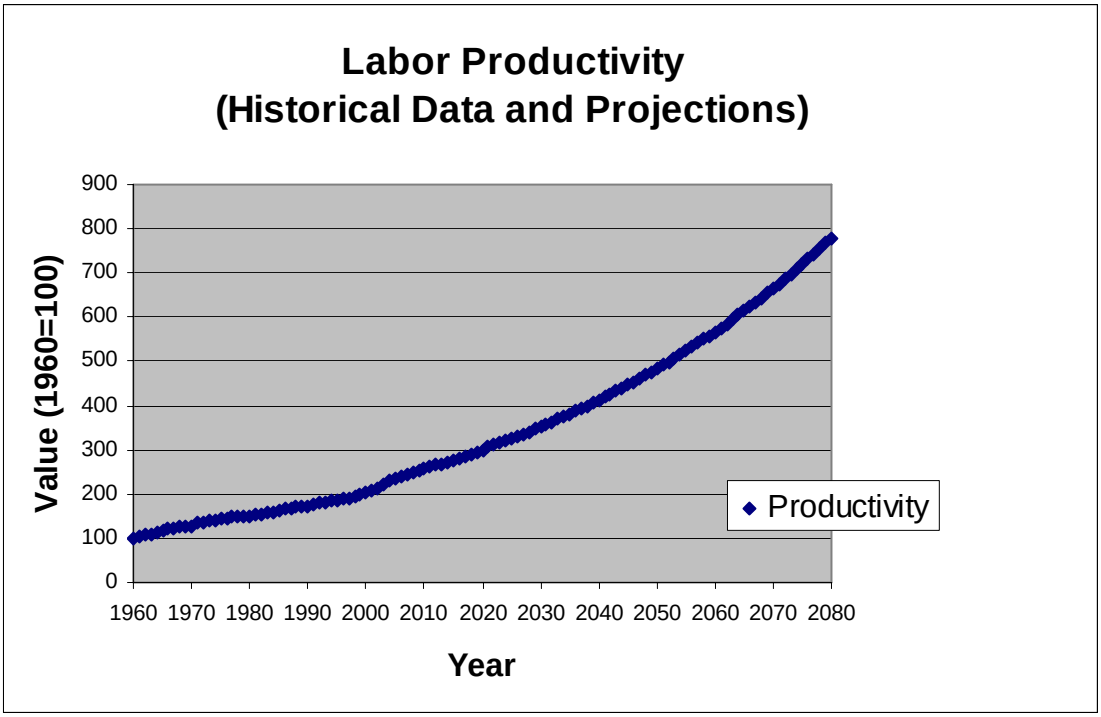
Figure 5 plots current and future United States Social Security (OASDI) expenditures as a percent of GDP, which will rise moderately from less than 4.5% today to over 6% by 2030 as baby-boomers retire. The ratio then stabilizes at less than 6.5% through 2080. Burtless (2005) reports that old age pensions as a percent of GDP also rise at a moderate pace for the G-7 nations (some actually project a falling percent), however, the relatively slow growth is, in part, due to recent reforms that scaled-back promises. Measured relative to GDP, the share of output that will have to be shifted to publicly-provided social security pensions provided to tomorrow's seniors in highly developed nations is surprisingly small, given projected demographic changes. Of course, this is only a portion of the resources that will be needed by elderly people in the future, as social security represents only one leg of the retirement stool. Still, as measured solely by the percent of GDP absorbed by social security, the changes are fairly moderate.

There are two separate issues regarding this future shift of resources. The first concerns the means used to achieve the redistribution. In an extended family structure,

much of the shift could be achieved outside the market through redistribution of market-purchased output within the family and through provision of elder care services (outside the market) by family members. With the growth of independent living by seniors, more of the shift of resources will be achieved through the market—with seniors using money obtained from their accumulated savings, from private pensions, and from public pensions to purchase output. Assuming that the method used to achieve the redistribution of marketed output does not impact total production, then the question comes down to designing a politically feasible policy to distribute output as desired among each age group (young, working age, elderly) and within each age group. Obviously, that is easier said than done, but will almost certainly include some combination of market and government, and will rely heavily on some sort of "tax and spend" program. There is also the possibility that output is not invariant to the redistribution method adopted. Again, that is a difficult topic. Much has been written on these issues—including a lot by me—but these matters are beyond the scope of this chapter. See Wray (1990–91) and Papadimitriou and Wray (1999a and 1999b) for more discussion.

The second issue concerns the likelihood that future production will be adequate to meet the needs of all age groups. If not, then the method used to distribute that inadequate distribution comes down to a question of triage. Many reformers seem to presume that triage will be necessary, citing the dwindling number of workers per retiree, along with projections of gargantuan financial shortfalls. However, the number of workers per social security beneficiary (which, for the United States, falls from about 3 today to about 2 in the future) provides only half the answer to the question about the ability to support future retirees. And it is probably the least important half, because growth of output will depend more heavily on growth of productivity.

**FIGURE 6: U.S. PRODUCTIVITY, HISTORICAL AND PROJECTED**




Source: The 2005 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Stability Insurance Trust Funds, U.S. Government Printing Office Washington, D.C.

Figure 6 shows historical data, as well as projections for United States labor productivity. Labor productivity has approximately doubled since 1960, and will quadruple over the next 75-year period used by the Social Security Trustees for their long-range projections. The aged-dependency ratio in the G-7 countries will increase by 16% to 38% (depending on the country) between 2000 and 2050. By contrast, United States labor productivity is projected to increase by much more than 100% over the same time period. There is a lot of uncertainty associated with such long-range projections, however, the margin provided in these projections would appear to be sufficient to cover lower-than-projected productivity growth, as well as higher-than-projected growth of longevity—with room to spare.

Further, there is good reason to believe that the Social Security Trustees have been overly cautious in projecting productivity growth, as their projections are influenced by the slow productivity growth from the early 1970s until the Clinton boom—arguably a historic anomaly (Papadimitriou and Wray 1999a; see also Langer's 2000 critique of assumptions used by the Trustees). Slow growth of aggregate demand, combined with

rapid growth of the labor force (fueled by women and immigrants entering the labor force), led to chronically high unemployment and low wage growth. This reduced the pressure to innovate to increase labor productivity. Higher effective demand during the Clinton years, plus global competitive pressure, led to faster productivity growth in the mid-to-late 1990s (Wray and Pigeon 2002). While cheap and abundant labor abroad has held down United States wage growth in recent years, if labor markets of the future face shortages due to rising aged dependency ratios, this should spur better wage growth and faster productivity growth.

Indeed, it is worth noticing that between 1970 and 1995, the United States and Canada had significantly lower productivity growth (growing by only about 20% and 30%, respectively, over the 25 years) than did other OECD nations (whose productivity increased by 50% to 100% over the same period, see Wray and Pigeon 2002). By no coincidence, the employment/population ratio increased fastest in the United States and Canada, and slowest in those nations with the highest productivity growth (Japan and Italy actually experienced a declining employment/population ratio together with very high productivity growth). This is because the two are related through an identity: per capita GDP growth equals growth of the employment rate (workers divided by population) plus growth of productivity per worker. If demand growth is sufficient, then slow growth of the labor force can be compensated by faster growth of productivity. The evidence surveyed in Wray and Pigeon seems to indicate low productivity growth experienced in the United States (and Canada) from 1970 to 1995 was due to growth of demand that was too slow to accommodate growth of the labor force plus moderate growth of productivity. In a sense, the United States "chose" the combination of high employment growth and low productivity growth, while Europe and Japan "chose" low employment growth and high productivity growth to achieve fairly similar per capita real GDP growth.

By the mid 1990s, the Clinton boom was so strong that even robust employment growth could not accommodate all the demand. This helped to generate the famous "new economy" productivity boom (that really had little to do with the new economy—see Wray and Pigeon 2002, as well as Gordon 2000). Note also that fairly rapid productivity growth has continued during the "jobless" Bush recovery, as sluggish growth of

aggregate demand has imposed a trade-off of productivity versus jobs, and for a variety of reasons, job creation lost.

Indeed, an aging society could help to generate favorable conditions for achieving sustained high employment with high productivity growth. As the number of aged rises relative to the number of potential workers, what is required is to put unemployed labor to work to produce output needed by seniors. Providing social security benefits to retirees will generate the necessary effective demand to direct labor to producing this output. Just as rapid growth of effective demand during the Clinton boom allowed sustained growth of the employment rate, even as productivity growth rose nearer to United States long-term historical averages, tomorrow's retirees can provide the necessary demand to allow the United States to operate near to full employment with rising labor productivity—a "virtuous combination" of the high productivity growth model followed by Europe and Japan from 1970–95 and the high employment model followed by the United States during the 1960s, as well as during the Clinton boom.

Finally, we return to the benefits of slower population growth, and to falling youth-dependency ratios. As discussed, the total dependency ratios for the world as a whole, and for most countries, will not change significantly because falling youth dependency ratios will offset rising aged dependency ratios. This leads to several issues. First, it could be the case that it takes fewer real resources to take care of the young than required to care for the elderly, although that is not obvious in the case of a rich, developed nation. Note also that just as the time spent in old age is rising as longevity rises, the time spent in young age is extended by full-time study in college and graduate school. When the youth dependency ratio was higher, our population was growing fast and required private and public investment in the infrastructure needed for the care of the young. Very few young people die in a rich nation—so almost all of the young grew up to be working age adults, and will become an elderly "bulge" as they retire. Much of the infrastructure we built to take care of the baby boom is still with us, and will be with us for years to come, including houses, hospitals, schools, dams, highways, and public buildings. As the baby boomers age, we may have to convert schools to senior citizen centers and hospitals to aged care facilities. However, we took care of the baby boomers with relatively few workers in 1960, and common sense implies that we ought to be able

to take care of them when they are elderly. Again, as we have discussed, once the baby-boomer bulge is gone, it appears that projected productivity growth will be more than sufficient to provide adequate output for all age groups.

The second issue generated by this demographic transition is political: workers might be more willing to support kids—especially if they have them—than the elderly. Based on current debates—which include a lot of aged-bashing—that would be a safe conclusion. However, the distribution of social spending in the United States today certainly does not reflect that bias, as federal spending on the elderly is many times greater than spending on children. Even if the population truly does prefer social spending on the young—despite all evidence to the contrary—the political climate might change as the number of elderly rises relative to the number of children. The typical United States worker in 1960 had 3.7 kids and perhaps one grandfather and a couple of grandmothers. In 2080, the typical worker will have fewer than two children, but might have four grandparents and some great grandparents—and maybe even a great-great grandparent to support. Further, all those elderly people will be of voting age, likely with voting rates above that of tomorrow's workers. It is hard to believe that political support for public spending on the elderly will wane as the population ages. Rather, the same sort of social effort put into preparing our nation for the wave of baby-boomer children could help us to prepare for the waves of seniors over the next couple of decades and beyond.

When formulating policy, it is necessary to distinguish between financial provisioning and real provisioning for the future. Individuals can provide for their future retirement by saving in the form of financial assets. These will then be "liquidated" to purchase the output needed during retirement. Assuming no change in the distribution of population by age, this process can work fairly smoothly as those of working age purchase the financial assets unloaded by those who are retired. Still, it is important to note that accumulation of financial assets does not guarantee that retirees will be able to obtain output—even if they can sell their financial assets—as they will be dependent upon: a) those of working age to produce sufficient output, and b) a well-functioning market system in which a portion of the produced output is sold. If this is the case, the retired population bids for the marketed output, using proceeds from the sale of financial assets.

Things become more difficult if the distribution of the population by age changes significantly over time. A retiring baby boom might face a relatively small generation of those of working age willing to purchase financial assets, resulting in low sales prices on liquidation. Further, the relatively small number of workers might not produce much output. Note that in this case, it will do no good for the baby-boomers to accumulate even more financial assets in preparation for their retirement—they will still face a future in which output is relatively small and demand for their financial assets is small. Some research into equity market bull and bear runs does find that such demographic trends affect share prices. In the face of such negative demographic trends, baby-boomers could instead try to individually accumulate output (rather than financial assets) so that they could provide for their retirement in *real* terms. However, aside from housing, it is very difficult to set aside real goods and services for the distant future. Note that accumulation of equities does not guarantee access to real goods and services in the future; only accumulation of the real assets behind the equities can ensure that the retiring baby-boomer could use them to produce desired output for own-use.

Can public policy prepare for a retiring baby boom bulge through “advance funding”—that is, by accumulating a large trust fund? As I have argued in several pieces, it cannot (Wray 1990–91, 1998, 1999, 2005; Papadimitriou and Wray 1999a, 1999b). Even leaving to the side the issues raised in the previous two paragraphs, a social security trust fund (such as that existing in the United States) provides no “financial wherewithal” to pay for a possible future revenue shortfall. To put it simply, the trust fund is simply a case of the government owing itself, an internal accounting procedure. In, say, 2050 when payroll tax revenues fall short of benefit payments, the trust fund will redeem treasury debt. To convert those securities into cash would require the Treasury to either issue new debt or generate tax revenue in excess of what will be required for other government spending in order to make the cash payment to the trust fund without increasing general budget deficits. This is exactly what would be required even if the Trust Fund had no "financial holdings" (Papadimitriou and Wray 1999b). Government cannot financially provision in advance for future benefit payments.

The burden of providing real goods and services to retirees in 2050 or 2075 will be borne by workers in those years regardless of the tax imposed today. If the level of goods and

services to be produced in the future cannot be increased by actions taken today, then the burden that will be borne by tomorrow's workers cannot be reduced by anything we do today. This argument hinges on the assumption that the accumulation of a trust fund does not directly affect the quantity of goods and services that will be produced in, say, 2050. Such an assumption might appear to be severe, but even most conventional theory concludes that the long-run growth path of the economy is not easily changed. Because accumulation of a trust fund is not likely to have a substantial impact on long-run growth, accumulation of a trust fund cannot assure the desired future aggregate production of resources, nor the desired distribution of resources (between workers and beneficiaries). If this is true, payroll taxes should be reduced now and then increased later so that Social Security program revenues and cost would be more closely aligned. Taxes on workers reduce their take-home pay, which leaves more output available for purchase by retirees. Benefit payments to retirees provide the financial wherewithal for them to buy that output. The best time to use tax-and-spend policies in this manner is the year in which it is desired to shift output to beneficiaries. The logical conclusion derived from conventional theory, then, is for the program to be run on a pay-as-you-go basis. It makes no sense to tax workers *today* to try to redistribute output to seniors *tomorrow* (Papadimitriou and Wray 1999b). Nor does it make sense to tax workers today to try to increase the size of the pie to be distributed *tomorrow*—since even conventional theory concludes that the effects on economic growth are minimal (unconventional theory would conclude that higher-than-necessary taxes might even reduce growth of the economic pie by keeping effective demand low and reducing the incentive to invest in physical and human capital).

Ultimately, what really matters is whether the economy will be able to produce a sufficient quantity of real goods and services to provide for both workers and dependents in, say, the year 2080. If it cannot, then regardless of the approach taken to finance social security programs (or to finance the private legs of the retirement stool), the real living standards in 2080 will have to be lower than they are today. Any reforms to social security systems made today should focus on increasing the economy’s capacity to produce real goods and services today and in the future, rather than on ensuring positive actuarial balances through eternity. Unlike the case with individuals, social policy *can provision for the future in real terms*—by increasing productive capacity in the intervening years. For example, policies that might encourage long-lived public and

private infrastructure investment could ease the future burden of providing for growing numbers of retirees by putting into place the infrastructure that will be needed in an aging society: nursing homes and other long-term care facilities, independent living communities, aged-friendly public transportation systems, and senior citizen centers. Education and training could increase future productivity. Policies that maintain high employment and minimize unemployment (both officially measured unemployment, as well as those counted as out of the labor force) are critical to maintain a higher worker-to-retiree ratio. Policy can also encourage seniors of today and tomorrow to continue to participate in the labor force. The private sector will play a role in all of this, but there is also an important role to be played by government.

It is ironic that reformers have put so much effort into savings promotion schemes that have never made much difference for economic growth, while ignoring labor-force policies that would have large immediate and long-lasting impacts. On balance, if we were to focus on only one policy arena today that would best enhance our ability to deal with a higher aged dependency ratio tomorrow it would be to ensure full employment with rising skill levels. Such a policy would have immediate benefits, in addition to those to be realized in the future. This is a clear “win-win” policy, unlike the ugly trade-off promoted by many reformers that pit today’s workers against current seniors by proposing tax hikes and benefit cuts to increase the trust fund surplus.

**REFERENCES**


AARP. 2005. “Global Report on Aging.” Fall.

Congressional Budget Office. 2005. “Global Population Aging in the 21st Century and its Economic Implications.” December.

Batini, Nicoletta, Tim Callen, and Warwick McKibbin. 2006. “The Global Impact of Demographic Change.” IMF Working Paper WP/06/9, January.

Bloom, David E. and David Canning. 2004. “Global Demographic Change: Dimensions and economic significance.” in *Global Demographic Change: Economic impacts and policy challenges.* Gordon H. Sellon, Jr. (ed.). A symposium sponsored by The Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August 26-28.

Burtless, Gary. 2005. “Can Rich Countries Afford to Grow Old?” paper prepared for a conference “An ageing society” Lisbon, Portugal, May 19-20.

Gordon, Robert J. 2000. "Does The 'New Economy' Measure Up To The Great Inventions Of The Past?" *Journal of Economic Perspectives* 14(4): 49-74.

Langer, David. 2000. “Cooking Social Security’s Deficit.” *Christian Science Monitor,* January 4, p. 9.

Lee, Ronald D. 1994. “The Formal Demography of Population Aging, Transfers, and the Economic Life Cycle.” In Linda G. Martin and Samuel Preston (eds.) *Demography of Aging.* Washington, D.C.: National Academies Press. Available at: http://books.nap.edu/books/0309050855/html/R1.html

Norris, Floyd. 2005. “Live Longer, Work Longer.” *International Herald Tribune*, October 20-30, p. 18.

OECD. 2000. “The costs of an ageing society.” No. 22, November/December. Washington, D.C.: OECD.

Papadimitriou, Dimitri B. and L. Randall Wray. 1999a. “Does Social Security Need Saving? Providing for retirees throughout the twenty-first century.” Public Policy Brief No. 55. Annandale-on-Hudson, N.Y.: The Levy Economics Institute of Bard College.

————. “How can we provide for the baby boomers in their old age?” Policy Note 1999/5. Annandale-on-Hudson, NY: The Levy Economics Institute of Bard College.

President's Commission to Strengthen Social Security. 2001. Interim Report. Available at: http://www.csss.gov/reports/Report-Interim.pdf

Social Security Administration. 2005. *Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds*. Available at: http://www.ssa.gov/OACT/TR/TR05/index.html

U.S. Census Bureau. 2005. International Data Base (IDB). Available at: www.census.gov/ipc/www/idbnew.html

Wray, L. Randall. 1990–91. "Can the Social Security Trust Fund Contribute to Savings?" *Journal of Post Keynesian Economics* 13(2): 155–170.

————. 1998. *Understanding Modern Money: The key to full employment and price stability.* Cheltenham: Edward Elgar.

————. 1999. "The Emperor Has No Clothes: President Clinton's Proposed Social Security Reform." Policy Note 1999/2. Annandale-on-Hudson, N.Y.: The Levy Economics Institute of Bard College.

————-. 2001."Killing Social Security Softly with Faux Kindness: The draft report by the president's Commission on Social Security Reform." Policy Note 2001/6. Annandale-on-Hudson, N.Y.: The Levy Economics Institute of Bard College.

————. 2005. "Social Security's 70th Anniversary: Surviving 20 Years of Reform." Policy Note 2005/6. Annandale-on-Hudson, N.Y.: The Levy Economics Institute of Bard College.

Wray, L. Randall and Marc-Andre Pigeon, "Demand Constraint and the New Economy." in *A Post Keynesian Perspective on Twenty-First Century Economic Problems*, Paul Davidson, (ed.) Cheltenham: Edward Elgar.