

BIG and Generational Equity in an Automated and Life-Extended Future

James J. Hughes, Ph.D.
Executive Director, Institute for Ethics and Emerging Technologies
ieet.org

Public Policy Studies
Trinity College
Hartford, Connecticut

For more information please contact:
James Hughes, Trinity College,
Williams 229B, 300 Summit St., Hartford CT, 06106, 860-297-2376,
james.hughes@trincoll.edu

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Abstract

Public policy analysts have been raising the alarm for a decade about the changing ratio of seniors to workers in the 21st century, the “old-age dependency ratio.” One symptom of the growing alarm about the old-age dependency ratio is the Bush administration’s unpopular effort to create private pension accounts to supplement senior incomes in the 2040s when the U.S. Social Security system is predicted to exhaust its trust accounts. Defenders of public pensions, in the U.S. and Europe, have argued that there is no problem in the system of social insurance that can’t be fixed by marginal changes. Unfortunately both sides in this debate profoundly underestimate the imminent and rapid change in the demographic variables that determine the dependency ratio: birth rates, death rates, senior disability, and labor force participation. This is equally true for the demographers advising the United Nations. The linear assumptions underlying most demographic and economic models are belied by the emerging technologies already driving rapid exponential change. Emerging technologies will drive a dramatic increase in the dependency ratio. Only a basic income guarantee (BIG) can establish a new social contract that addresses the problem of “intergenerational equity,” by expanding egalitarian social security to all and preventing a slide to a more atomistic and impoverished future. BIG will also need to be accompanied by a re-negotiation of the way the labor market is structured and the way the state is financed.

Introduction

The first wave of Baby Boomers (born between 1946 and 1964) won’t begin to retire till 2011. But the specter of their retirement has already triggered battles over the future of birth rates and the welfare state throughout the industrialized world. The Bush administration’s unpopular campaign to privatize the U.S. Social Security system indicates how catastrophic many conservatives believe the aging of the population could be if existing social contracts are maintained. Given only linear trends the proportion to the population on public assistance will quickly rise.

In response to the push to privatize public pensions progressives have been arguing that there is no problem in the system of social insurance that can’t be fixed by marginal changes, such as increasing the taxation rate. In the U.S., for instance, only the first \$90,000 of income are currently taxed for the Social Security trust funds; taxing all income would make the system more progressive, and close the projected deficits. Arguments also swirl about the assumptions about economic growth; more rapid economic growth could make up for the growing ratio of “old-age dependency,” i.e. the ratio of people 65 and older to people 15-64. But these optimistic models are still based around the dominant linear models being used by the actuaries, economists and demographers in the Social Security Administration and Congressional Budget Office, at the European Union and at the United Nations.

From a futurist’s point of view these models are absurdly linear when our recent past, and what we can see of the near future, looks anything but linear. Even small changes in the assumptions of the models add up to enormous consequences by the 2030s, when all the Boomers will be over 65. Given more optimistic assumptions the proportion of non-working people being supported by working age people, through taxation and public assistance and/or as dependents of households, could increase a much more dramatically than projected.

Among the variables used in these projections I will talk about four in this paper:

1. Fertility rates
2. Life expectancy
3. The incidence of senior disability
4. Labor force participation by working-age people

As of 2004, both the Social Security Administration and the Congressional Budget Office are projecting the future solvency of United States' Social Security system based on predictions that:

- the U.S. fertility rate will stabilize at 1.95 children per woman, that
- mortality rates will decline by only 0.71 percent per year, and that
- 5.8 out of every 1,000 eligible workers will become disabled each year.

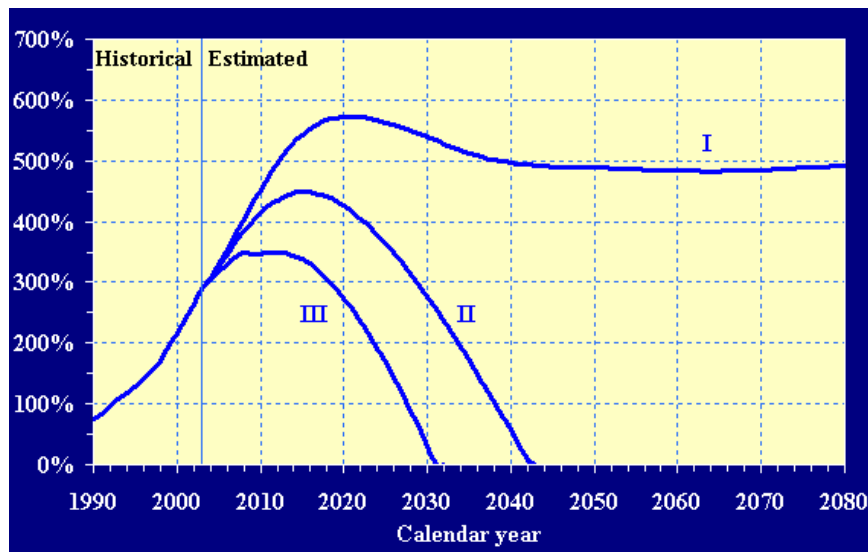
The Congressional Budget Office's model assumes a stable 5.2 unemployment rate over the next fifty years (CBO, 2004).

However, the OASDI Trustees also produce a "high-cost" or pessimistic estimate, and a "low-cost" optimistic estimate to suggest the parameters around their central model. That *most* pessimistic "high-cost" model assumes:

- a fertility rate of 1.7 children per women through 2080; that
- life expectancy at age 65 in the year 2080 will only be 27 more years (till age 92); that
- 74% of all men and 61% of all women will be employed in 2080, the same as our current rate.

Still, given these only slightly modified assumptions, which only shifts the old age dependency ratio slightly, the Social Security trust funds will be bankrupt in the late 2020s instead of the late 2030s or early 2040s, as shown in line III in Figure 1 below.

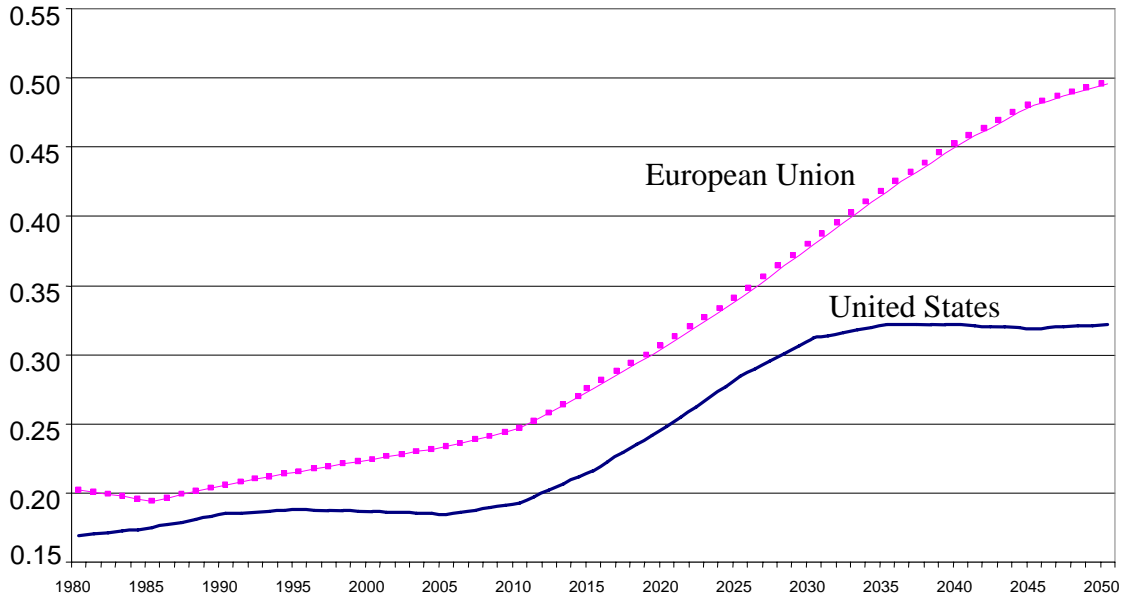
Figure 1: Long-Range Ratios of Social Security Trust Fund Accounts to Outlays Under Alternative Assumptions



Source: OASDI Trustees, 2004

Although this seems dire for the U.S., based on similar, conservatively linear projections the dependency ratio will increase even more dramatically in Europe and Japan. As shown in Figure 2, the Organization for Economic Cooperation and Development predicts that by 2050 the old-age dependency ratio will rise from 20% to 50% in Europe, or one senior per five working-age people to one senior per two working age people. Their model only projects that the U.S. would reach about 33%, or one senior per three working age people.

Figure 2: Current and Predicted Old-Age Dependency Ratio in the U.S. and European Union



Source: OECD, 2005

The old-age dependency ratio will also start to increase rapidly in the developing world once the current bulge of youth have worked their way through the working age population. The UN estimates that while the dependency ratio of seniors to workers will double in more developed regions by 2050 it will triple in less developed regions.

So, even if only use the dominant, conservative, linear assumptions of planners, there will be a growing, inescapable problem of “intergenerational equity” (Williamson, Watts-Roy, and Kingson, 1999) in the coming decades. The argument of this paper is that, rather than trying to argue these crises away, progressives need to point out the absurdity of these linear projections, and embrace the dramatic social crisis they portend as an opportunity to renegotiate the social contract. Only a basic income guarantee (BIG) can establish a new social contract that addresses the problem of “intergenerational equity,” by expanding egalitarian social security to all and preventing a slide to a more atomistic and impoverished future. It is our responsibility to make clear that BIG is the obvious, and most palatable, of the policy options by the time these more dramatic trends become widely recognized.

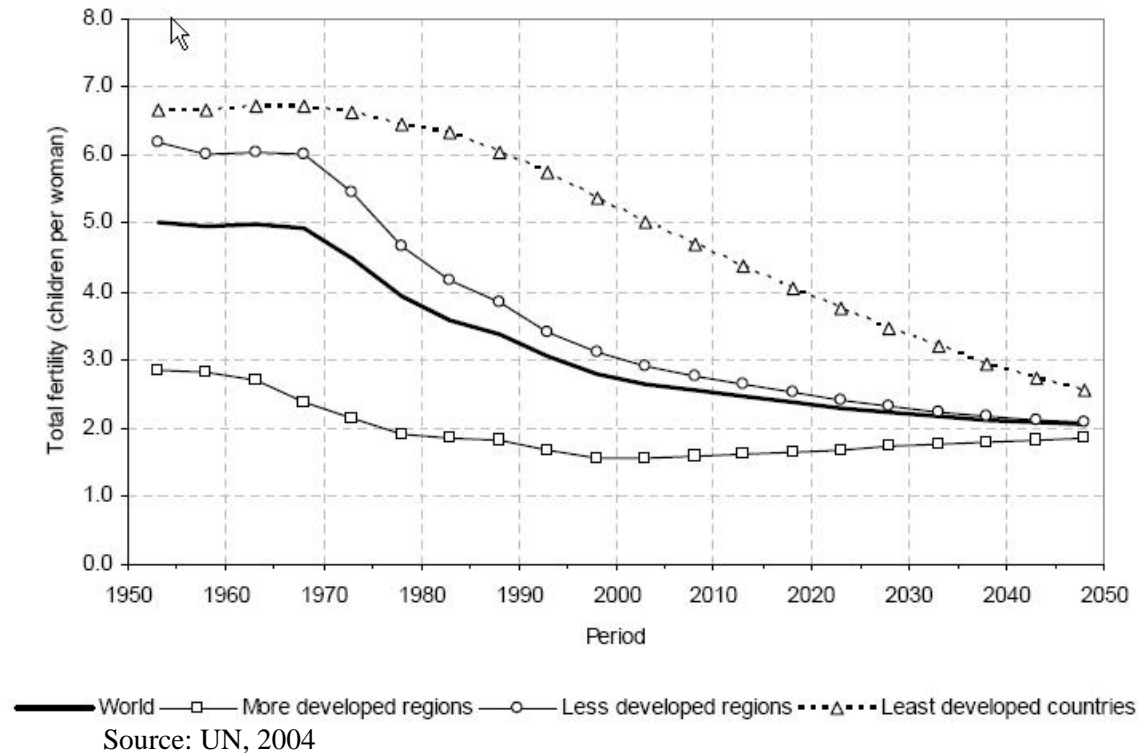
Declining Birth Rates

Birth rates have been falling rapidly in both the developed and developing world, more rapidly than most demographers predicted in the 1970s and 1980s. Currently about half of the world's population is reproducing at below the "replacement rate" of 2 children per woman. In the early 1950s, women in developed countries had an average of 2.8 children, but today that has fallen to about one and half children a piece. The most rapid decline of fertility has been in Europe; the fertility rate in Italy is now only 1.2 children per woman, and in Austria, Greece, Portugal, Germany, Japan, Spain, Italy, Singapore and Korea birthrates per woman are between 1.2 to 1.5. (UNFPA, 1999; UN, 2004). Women in Tokyo are having less than one child on average.

In the developing world fertility has dropped from about 6 children per woman in 1950 to 2.9 children. China, the world's largest country, has seen one of the most rapid declines in fertility; in urban China the fertility rate is now only 0.7 children per woman (UNFPA, 1999; UN, 2004; Economist, 2004).

Despite these dramatic and rapid declines the United Nations, like the Social Security Administration, is projecting that the global fertility rate will converge on 2.0 over the next fifty years, as shown in Figure 2 below.

Figure 2: Total fertility trajectories of the world and major development groups, 1950-2050 (medium variant)



Despite this assumption, all the trends that have contributed to the decline of fertility in the last fifty years – in particular, the increasing health and education of increasingly urbanized and

emancipated women - appear likely to accelerate in the next fifty. Women with more education and opportunity, and better access to contraception and abortion, marry later, have more control over their fertility, and have fewer children in order to protect their health and life opportunities. The level of education and emancipation of women seems likely to continue to rise, and many of the political obstacles to birth control have been removed since almost all governments now support family planning.

The chief limiting factor on even more rapid reductions in the birth rate is access to contraception and abortion. The Population Reference Bureau estimates that more than 100 million women worldwide who want contraception still don't have access to it, and abortion remains illegal in many countries. The falling price and growing availability of contraceptive drugs and devices, however, suggests that this barrier will be increasingly surmounted. The rapid economic development in India and China suggests that growing proportions of the world's women will have access to these technologies and the economic motivations to use them.

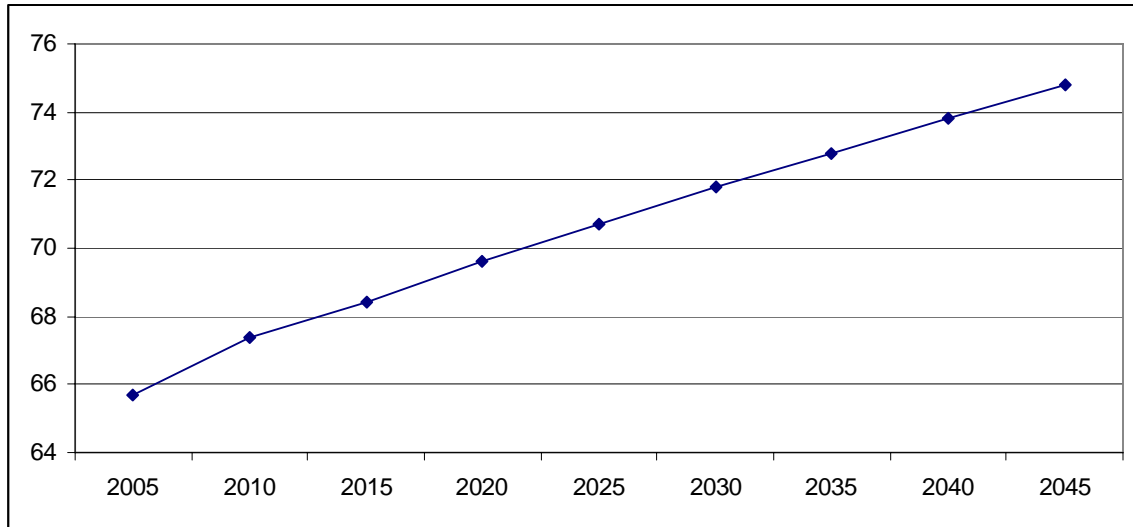
Given the global decline in fertility there are good reasons to doubt the assumption of a stabilization of US and global fertility rates near the 2.0 replacement. It seems more likely that we are heading toward rates closer to those in Tokyo, Rome and Beijing, a prospect now motivating pronatal policies in Japan and Europe, such as improved parental leave policies and financial assistance for families (Chamie, 2004). Scandinavia and the Netherlands appear to have had some short-term success in encouraging child-bearing with these policies. But the evidence also suggests that these policies only change the timing of child-bearing, and not the number of children born per woman (Economist, 2004; Grant, et al. 2004). George Bush's \$1.5 billion program to encourage marriage notwithstanding, public policy will also have little success stemming the declining proportion of the population that is married, a trend which also discourages fertility. In the U.S. in 2000 only half of adults were married, a quarter had never been married and quarter were divorced, and the rate of marriage is even lower in Europe and Japan. A survey conducted in February 2005 by the Yomiuri Shimbun newspaper found that 73% of single Japanese women would rather stay unwed ([Japan Today, 2005](#)). In China, the divorce rate has increased 500% in the last twenty five years (Watts, 2005).

Declining Rates of Death and Disability

The US Social Security Administration's projections are based on the assumption that by the year 2060 the life expectancy of 65 year-olds will only be 20 more years of life for men, and 23 more years for women. That is only an increase of 3.5 years of life expectancy for seniors in the next 55 years. Their current *most* optimistic model only allows that by 2075 life expectancy at age 65 might increase to 23 more years for a male and 26 more years for a female, or a 6.5 year increase over 2005.

With infectious diseases like AIDS, cholera, and tuberculosis still rampant, and impending crises like deforestation, climate change, and avian flu looming, the UN can be forgiven their pessimistic projection of only a 0.25 per year increase in life expectancy at birth. But that still means that the life expectancy of the average child born in 2050 is only supposed to be 76 years, just 11 years more than today.

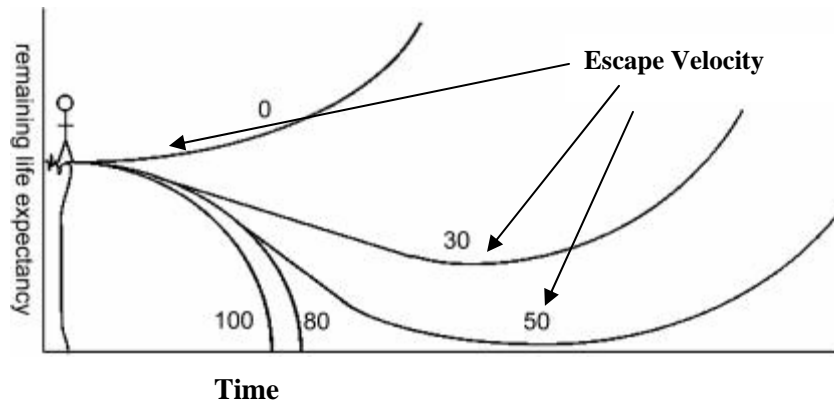
Figure 2: The UN's Most Optimistic Projection of Global Life Expectancy at Birth



Source: United Nation, 2004

At the other end of the spectrum is biogerontologist Aubrey de Grey (2004). De Grey proposes that we will achieve rapid progress in life extension technologies in the coming decades, leading to a point of “actuarial escape velocity” (AEV). The AEV is the point at which the widespread efficacy and availability of life extension technologies causes the average individual’s remaining expected years to begin growing instead of shrinking. He pegs this to the point at which there is an annual decline of 10% in the mortality rate. He thinks we might reach such a point well before 2050. Key variables in determining the widespread use of life extension therapies are, of course, their expense and their inclusion in public health systems. Some policy analysts have openly questioned the wisdom of further progress in life extension technology on the grounds that the growing burden of an aging society will be economically, culturally and environmentally unsustainable (e.g. Fukuyama, 2002). Progress toward AEV also depends on unpredictable success in cracking a number of scientific mysteries about aging and how to reverse it.

Figure 3: Aubrey de Grey's Illustration of the Concept of Actuarial Escape Velocity by Current Age



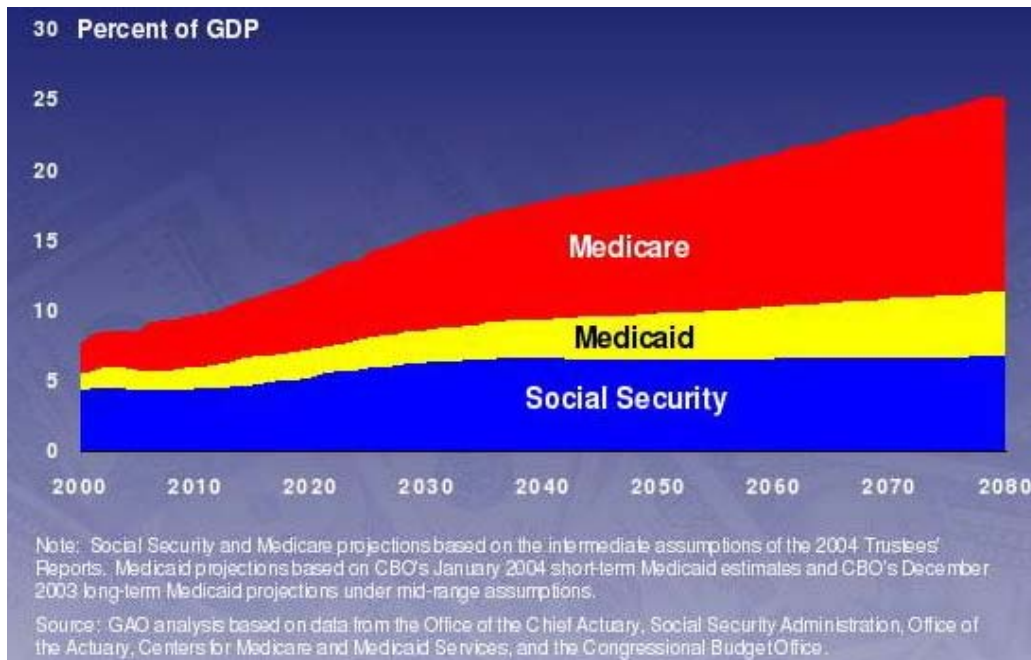
But even if the rate of mortality decline doesn't reach 10% per year in this century, it is quite likely to exceed the 0.7 percent per year decline projected by the Social Security Administration. The U.S. Census Bureau's projections of life expectancy at age 65 are that more optimistic, for instance, projecting that we will reach the SSA's 2075 milestone by 2050. Even the Social Security Administration's expert panel of demographers advised in 2004 that its assumptions were too conservative since their assumptions about the rate of decline in mortality was *below* the rate observed from 1950 to 2000. Instead of a 0.7% rate of mortality decline for people over 65, the expert panel recommended assuming the same rate of decline in the second half of the twentieth century, 0.9% per year. Given the rapid progress in identifying the mechanisms underlying aging progress seems likely to be more rapid than that. In turn each incremental increase in life expectancy for seniors pushes them ahead a couple of years to take advantage of later breakthroughs.

Declines in Senior Disability

If Aubrey de Grey and others are correct that there will be progress not only in treatments for aging-related diseases but in reversing the aging process itself then we are also likely to see more rapid declines in senior disability than we saw in twentieth century. The incidence of senior disability in turn determines not only the feasibility of pushing up the age of retirement and pension eligibility, but also the burden of aging-related health costs on society.

One piece of common wisdom among policy wonks is that the crisis in Medicare spending is orders of magnitude greater than the crisis in Social Security financing. For instance a recent chart from the General Accounting Office, using data from the Social Security Administration and Congressional Budget Office, estimated that while Social Security would continue to only consume roughly 5% of GDP through 2080, Medicare would grow to consume 15% of the GDP.

Figure 4: Social Security, Medicare and Medicaid Spending as a Percent of GDP 2000-2080



But this assessment rests again on conservative assumptions about the decline of disability among seniors, with or without age-reversing medical breakthroughs. Senior disability has declined rapidly over the course of the last century (Costa, 2002). Even though the number of American senior citizens increased by more than 30% between 1982 and 1999 there were fewer disabled seniors in 1999 than there were in 1982. Seniors' disabilities today are also less likely to be chronic. In 1982 more than 25% of American seniors over 65 suffered chronic disabilities, but that had shrunk to less than 20% in 1999. Based on the twentieth century trend of increasing disability-free "active life expectancy" at age 65, which has increased almost as rapidly as seniors' life expectancy, demographer Kenneth Manton projects that active life expectancy at 65, not just life expectancy, will be increasing by two years per decade, an order of magnitude faster than the Social Security Administration's models (Manton, 2004; Manton and Gu, 2001).

This decline of disability not only improves the quality of life of seniors and their care-givers, but it reduces social costs on society. The U.S. National Center for Health Statistics reported in 2003 that the average senior citizen with no activity limitations cost about \$4600 in health care, while the moderately disabled senior cost about \$8500 per year, and nursing home residents cost about \$45,000 per year. In fact, the declining burden of active, healthy seniors on the health care and nursing system means that those who live more, able-bodied years cost society no more overall than those who live fewer, sicker years.

In turn, the decline of senior disability throughout the industrialized will increase the demand to raise the retirement and pension eligibility age in order to reduce the old-age dependency burden. But those demands will be muted if there are no jobs for 20-60 year-olds already in the labor market.

Declining Labor Force Participation

Although the percent of the population participating in the work force increased when women entered the labor market, the number of hours worked per year per person has steadily declined in most industrialized countries from about 3,000 hours a year at the turn of the 20th century to about 1,500 to 1,900 hours per year at the turn of 21st century (Pianta and Vivarelli, 1998). There are two factors that suggest that total labor force participation in the developed world in this century will decline instead of remain stable: automation and globalization.

Much of the last century's reduction in work hours was the result of increases in labor productivity, allowing a steady increase in prosperity despite the reduction in labor intensity. Since the collapse of the 1999-2002 recession there has been growing evidence of a fundamental shift in the profitability of further investments in automation versus investments in additional human employees. As a consequence labor market participation in the United States has begun to contract and as of February 2005's job report labor force participation has declined to its 1988 level. Conversely the number of "discouraged workers" is climbing, keeping the reported unemployment rate low. The exponential improvements in computing power and telecommunications mean that as many as half of all jobs in today's economy could be automated by 2050 (Brain, 2004), with little prospect for compensatory increases in employment (for humans at any rate) in new sectors (Vivarelli, 1995).

Another factor in the emerging structural unemployment is the transfer of production and employment from the expensive industrialized countries to the developing world. The old-age dependency burden will be rising on workers in the industrialized world at the same time that they face pressures to increase hours, and reduce wages and benefits, in order to remain internationally competitive. Shifting the tax burden of senior assistance from workers to employers will only accelerate the transfer of manufacturing and services to the developing world with its cheaper labor and lower taxes.

Subdivide Jobs or Find New Way to Support Citizens and the State

Given these two sources of structural unemployment, any effort to raise the age of retirement and of pension eligibility in order to reduce the dependency ratio would have to be accompanied by policies to shorten the work week and thereby redistribute the shrinking pool of employment. There are barriers to this strategy however, both practical and political.

Practically, it can be far more expensive to have two workers do twenty hours of a job than to have one worker do it for forty hours. Also, seniors will require more retraining to remain in the labor force than younger workers. On the other hand the rapidity of change in economy is likely to mean that twenty year-old skills will be just as obsolescent as forty year-old skills. Everyone will have to adjust to a life-time learning model with constant on-the-job training.

Politically, the trend in recent years has been toward earlier retirement, not later, and as seniors constitute an ever more powerful political bloc it is unlikely that changes to the retirement age will occur very fast. As Figure 5 below shows, again, this challenge will be even greater for Europe which already has shorter work years, later onset of employment and earlier retirement ages than the United States. With strong social democratic parties and unions, and since seniors will constitute an even bigger proportion of the European electorate, it is even more unlikely that

Europeans will try to solve the combined crises of structural unemployment and old-age dependency by reducing benefits and changing the age of eligibility.

Figure 5: Lifetime allocation of work and non-work across OECD countries in 2000



Source: Johnston, 2004.

Conclusions

Progressives are wrong to disparage the idea of a Social Security crisis. Rather we should use the opening provided by the Bush administration's attempt to privatize Social Security, and the growing anxiety about old-age dependency throughout the industrialized world, to promote BIG as a policy solution to the conflicts which are likely to be even more imminent and severe than those projected by the Bush administration. The pool of tax-paying workers will likely to shrink more rapidly than predicted, as fertility rates collapse and jobs erode to robots and workers in developing world. At the same time, seniors will live longer and healthier lives than projected. Automation will continue to expand general prosperity enabling an increasingly prosperous standard of living, even as the percent of our lives devoted to wage labor shrinks (Mullan, 2004). Since all these trends will impact Europe and Japan first and most dramatically, and since they are more egalitarian and solidaristic societies than the U.S., we can hope that BIG will emerge elsewhere as the basis of a new type of post-industrial social contract for the U.S.

Nor will these trends be limited to the North. By 2040 China will have a more aged population (28% over 65) and a lower old-age dependency ratio (2.0 seniors per working age adult) than the U.S. (25% and 2.3 respectively). As yet, most Chinese workers have no private pension plans and are relying on their one child and the state. Chinese demographers refer to this as the "4-2-1 problem," that the one child of each Chinese family will be expected to support two parents and four grandparents. Since Brazil and South Africa are already pioneering basic income guarantee policies it may be that our new social contract model comes from places in the developing world like China (Jackson and Howe, 2004). China is also aggressively pursuing genetic engineering, nanotechnology and population health measures which may allow their seniors to continue to participate in labor force longer and more productively than the fatter and sicker U.S. seniors.

In this new hoped-for social contract seniors with expanding, rather than dwindling, active life expectancies will give up the idea of retirement in return for a basic income guarantee supplemented by a lifetime of part-time labor market participation facilitated by ongoing employment-related education. That sounds far more attractive to me than putting seniors out to die on the ice floes when their Social Security nest eggs crap out on Wall Street.

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