WHY IS LIFE EXPECTANCY SO LOW IN THE UNITED STATES?

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Introduction

The United States is the richest major country in the world in terms of per capita gross domestic product (GDP). Since longevity is clearly associated with income, America's older citizens must live longer than their counterparts in other large industrial nations. Right? Wrong! Among the 30 developed countries that comprise the Organization for Economic Cooperation and Development (OECD), American life expectancy at age 65 for both males and females falls in the middle of the group. More than that, we are not expected to catch up anytime soon. The improvement in U.S. life expectancy, as projected by the Social Security Administration, implies that a 65-year-old American woman in 2050 will live about as long as a 65-year-old Japanese woman lives today. What are the implications of this unimpressive showing? And what explains the poor U.S. performance?

Trends in Life Expectancy at Age 65

Throughout the twentieth century, improvements in public health, medicine, and technology have dramatically increased life expectancy at birth and at older ages in both developed and developing countries. The United States, with its vast resources, was at the forefront of this improvement. As recently as 1980, the United States led virtually all major developed countries — with the exception of Canada — in terms of life expectancy for women at age 65. U.S. life expectancy for men in 1980 was toward the middle of the pack. But since then, life expectancy at age 65 has advanced far more rapidly in essentially all other industrial nations (see Figure 1).

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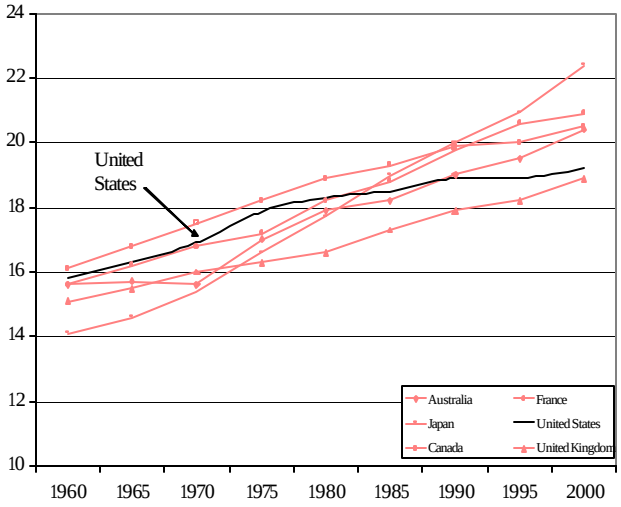
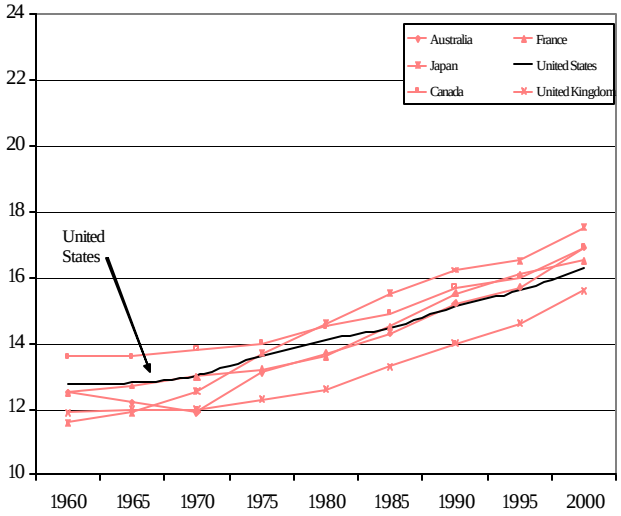
INSIDE

Figure 1. Improvement in U.S. Life Expectancy at Age 65 Has Been Sluggish Since 1980

Life Expectancy at Age 65 for Women, 1960-2000



Life Expectancy at Age 65 for Men, 1960-2000

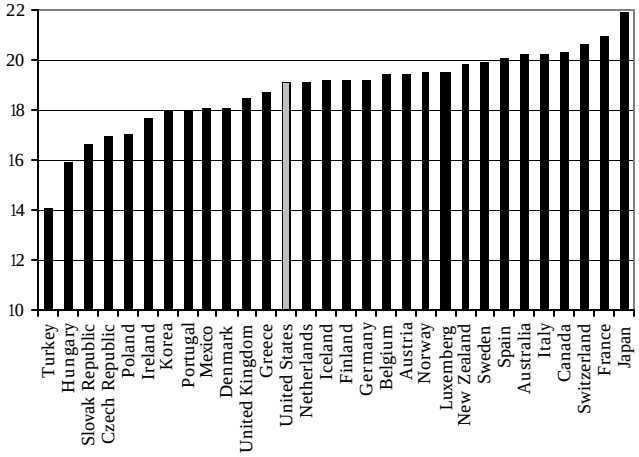


Source: OECD (2003).

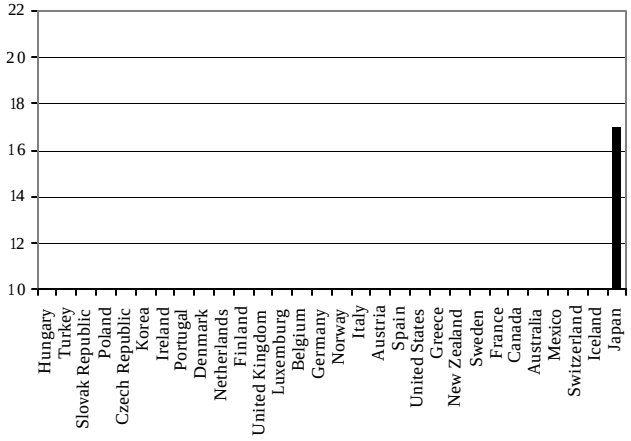
In countries like Japan, France, and Switzerland, both men and women age 65 now live longer than 65-year-olds in the U.S. The divergence is especially great for women, and in 1999 the average 65-year-old American woman could have expected to live 1.5 years less then her Swiss counterpart, 1.8 years less than her French counterpart, and 2.8 years less then her Japanese counterpart. In fact, the U.S. ranked 18th in life expectancy for women among the 30 OECD countries, slightly above Greece, Korea, Mexico, and most of the former Warsaw Pact countries (see Figure 2).[1]

Figure 2. U.S. Now Lags Many OECD Countries in Life Expectancy at Age 65

Life Expectancy at Age 65 for Women, OECD Countries, 1999



Life Expectancy at Age 65 for Men, OECD Countries, 1999



Source: OECD (2003).

[1] Despite a lower life expectancy at 65, the United States has a much lower mortality rate at ages 80 and over. While this mortality rate is still below that of other developed countries, including Japan, the difference is marginal. Moreover, as late as the early 1990s the United States was the world's leader in life expectancy at age 80. Since then, however, there has been little improvement in mortality for those 80 years and older and the United States' advantage has been lost (Manton and Vaupel 1995 and Vaupel 2003).

Why Do We Care about Life Expectancy at Age 65?

The most obvious interest in life expectancy at age 65 centers on the welfare of the population. Living a long life allows parents to see their children and grandchildren grow to adulthood. It allows people to look forward to a period of leisure after a lifetime of work, to enjoy recreational pursuits, and to spend more time with family and friends.

From the perspective of providing pension income, life expectancy at age 65 is an important determinant of cost in both defined benefit and defined contribution plans, assuming no change in the retirement age.[2] The impact in a defined benefit arrangement is clear cut; the longer people live, the more years of benefit payments the plan must provide. But life expectancy at 65 is also important in defined contribution plans. For any given level of monthly spending, a longer life expectancy requires a larger pile of accumulated assets.

Increases in life expectancy at 65 have been a major contributor to the rising cost of the U.S. Social Security system, and assumptions about future improvements in life expectancy at 65 are a crucial component of cost projections. Since the program was introduced roughly sixty years ago, life expectancy at 65 for both males and females has increased about 30 percent, and over the next 60 years life expectancy at 65 is projected to continue increasing, but only by another 20 percent (see Table 1).

The slowdown in the rate of improvement in life expectancy at 65 built into the Social Security cost projections has been the subject of controversy. Social Security actuaries give significant weight to the recent U.S. experience when projecting the future. Other demographers, however, contend that recent U.S. trends are an aberration and that U.S. life expectancy at 65 will improve much more rapidly in coming decades.[3] If the critics are correct, and improvements in life expectancy at 65 accelerate, Social Security costs could be markedly higher than currently projected. The burdens on employer plans and individual retirement savings would also be greater than expected if the critics are correct.

Table 1. Estimates of U.S. Life Expectancy at Age 65, 1940, 2000, 2060

Year	Male	Female
1940	12.7	14.7
2000	16.5	19.4
2060	20.1	22.8
	Percent Change	
1940-2000	30%	32%
2000-2060	22%	18%

Source: Social Security Administration (2004).

Identifying the factors contributing to the recent poor U.S. performance compared to other countries seems like a fruitful approach to resolving the debate. The analysis of longevity trends is a complex exercise far beyond the scope of this brief. Lots of very smart economists and demographers have spent years investigating determinants of life expectancy.[4] Very little work has been done, however, on explaining the relatively low level of U.S. life expectancy at age 65. Hence, we will review some of the most likely factors that could explain our lagging performance. We then estimate an equation for 2000 to see if these factors are related to life expectancy at 65 in the 30 OECD countries. Again, this is not a sophisticated econometric analysis, which would include historical data as well as current values, but rather a quick pass to see whether some of these factors are worth pursuing.[5] The final section speculates about how the factors explored in the regression might have contributed to the lagging U.S. performance over the last 20 years and what they suggest for the future.

Factors that Affect Life Expectancy at Age 65

Researchers have identified a number of factors that might explain the variation in life expectancy at age 65 across countries. The most obvious are income, the consumption habits of the citizens, and support for older people in terms of pension benefits and health care.

[2] To a lesser extent, mortality between ages 20 and 64 is also important because it helps determine how many workers will live to collect old-age benefits or leave young survivors who will collect survivor benefits. Child mortality does not matter at all with respect to pension costs.

[3] Technical Panel on Assumptions and Methods (2003).

[4] Deaton (2003); Doll (2004); Judge (1995); Lee (2002); and Vaupel (2003).

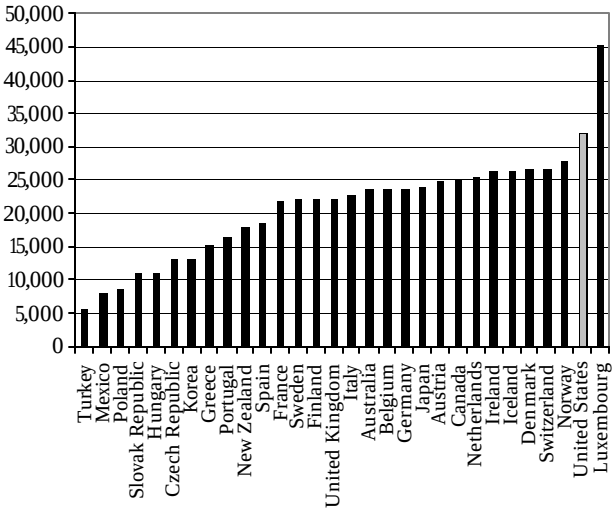
[5] A full analysis would require longitudinal data, as well as data for 2000, for the 30 countries in the sample. A pooled time series would improve the estimates in two ways. First, a larger number of observations would increase the precision of the estimates. Second, including historical data for each country allows the model to control for country-specific fixed effects and time trends. Due to lack of time-series data, this brief is a snapshot and assumes that countries have identically distributed unobserved characteristics. As such, the results should be viewed as nothing more than an initial pass.

Gross Domestic Product

The production of a nation affects how its citizens live in a variety of ways. The richer a country is the more resources it can dedicate to education, medical care, and other goods and services associated with greater longevity. A higher GDP per capita allows for greater business investment and more rapid technological progress. As shown in Figure 3, the United States ranks second in the world in terms of GDP per capita.

Figure 3. U.S. Ranks near the Top in Terms of GDP Per Capita

GDP Per Capita, OECD Countries, 1999

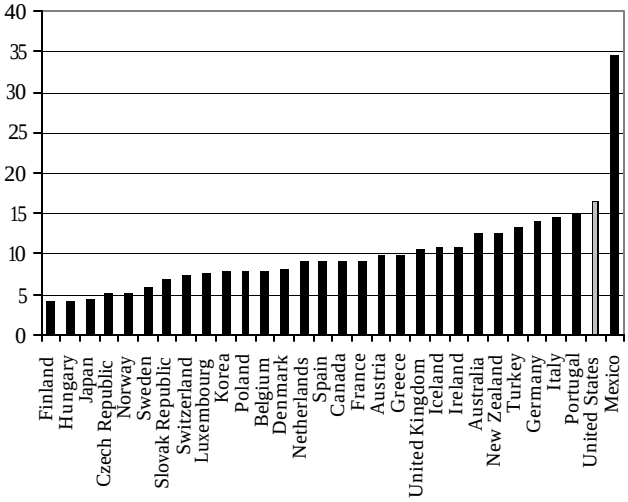


Source: World Bank (2003).

The question arises whether having high GDP per capita makes all Americans better off than their counterparts in other major advanced countries. The answer depends, of course, on how GDP is distributed within the population. If most of the rewards go the richest, the rest of the population may be relatively poor. To get an idea of the distribution of output within each country, Figure 4 shows the ratio of income going to the top 10 percent relative to that going to the bottom 10 percent. The United States is right behind Mexico in terms of concentration at the top, with 17 times more GDP going to the top than to the bottom. This disparity contrasts sharply with countries with high life expectancies at 65, such as Japan, Sweden, and Norway, where the top decile gets only 5 times as much as the bottom decile.

Figure 4. But U.S. Income Distribution is Far Less Equal

Ratio of Income for Top 10 Percent to Bottom 10 Percent, Late 1990s



Source: World Bank (2003)

The issue here is not inequality. Inequality refers to the income distribution across the entire spectrum. This discussion is focused on the level of absolute income of those at the lower end of the distribution.[6] That is, do those in the bottom portion of the income distribution within a country have the money they need to secure the nutritional, educational, and medical resources necessary to extend their lives? Hence, a more meaningful measure of well-being — and a better predictor of life expectancy — may be average GDP for the bottom 40 percent of the population rather than the average for the population as a whole. According to that measure, the U.S. is not as rich as it first appears. In fact, the United States falls in the middle of the pack (see Figure 5).

Consumption Patterns of the Population

In addition to the wealth of the nation, life expectancy at 65 should reflect the consumption patterns of the population. Here, key measures appear to be the consumption of alcohol and tobacco and the obesity rate.

[6] Researchers have looked extensively at the relationship between income inequality and life expectancy. Most have found that inequality and life expectancy are unrelated (Deaton 2003; Lobmayer et al. 2000; Judge 1995). A few, however, continue to argue that income inequality does affect health. Those who find a relationship between income inequality and life expectancy fall into two schools. The "absolute income" school argues that for poorer countries the absolute amount of GDP per capita has a strong effect on life expectancy, while for richer countries income inequality is more significant (World Bank 1993). The "relative income" school contends that relative incomes within a country (inequality), not GDP per capita, determine life expectancy (Wilkinson 2001). This paper focuses on absolute income for the poorer portion of the population, not income inequality.

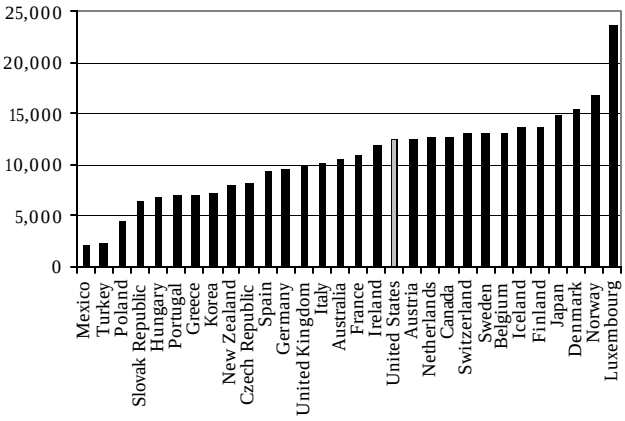
Consumption of alcohol and tobacco: Medical researchers have established a clear link between alcohol and tobacco consumption and life expectancy. Lung cancer, cirrhosis of the liver, and heart disease are among many conditions that have been linked to both smoking and drinking. Smoking, in particular, has been tied to deteriorating health and mortality. A recent study for the British Medical Journal, which followed British male doctors over the past 50 years, found that lifetime smokers died on average 10 years earlier than their non-smoking counterparts.[7]

The link to alcohol consumption is more complex. Recent studies have shown that moderate and consistent alcohol consumption may actually decrease rates of heart disease and mortality. Binge drinking and excessive alcohol consumption, on the other hand, have been shown to increase mortality rates, especially for the elderly.[8]

The U.S. population appears to be a moderate consumer of both tobacco and alcohol (see Figure 6). Only about 18 percent of the U.S. population is classified as "daily smokers," compared to about 22 percent for the OECD as a whole. Similarly, the United States consumes about 1 liter of pure alcohol per capita less per year than the OECD average. The relatively low consumption of tobacco should be a plus for the United States in terms of life expectancy at 65, while implications for the low level of alcohol consumption are more ambiguous. A U.S. increase in moderate consumption of alcohol could improve life expectancy at 65; any increase in excessive consumption, however, might hurt.

Figure 5. Average Income for Lower Portion Places United States in the Middle of the Pack

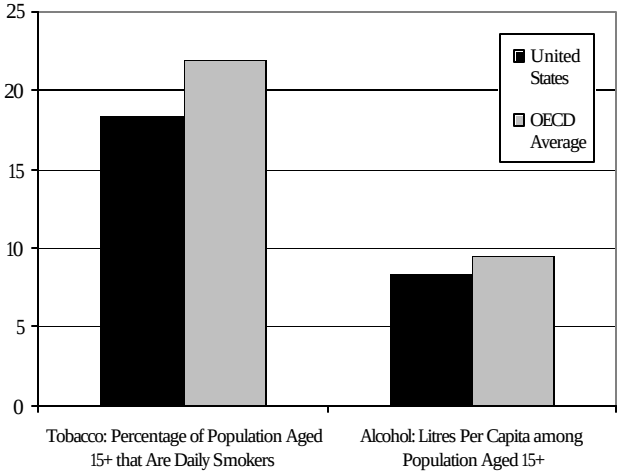
GDP Per Capita for Bottom 40 Percent of the Population, 1999



Source: Authors' calculations based on World Bank (2003).

Figure 6. U.S. Alcohol and Tobacco Consumption More Moderate than OECD Average

Alcohol and Tobacco Consumption in the OECD and the United States, 1999



Source: Authors' calculations based on OECD (2003).

Obesity: Obesity, which today is defined as having a body mass index greater than 30 kg/m^2, has long been identified as a health problem. Hippocrates discussed the value of a responsible diet and regular exercise. The issue continued to be debated in the late middle ages and into the nineteenth century. In the twentieth century, obesity emerged as one of the most important health problems facing the world. Currently, the World Health Organization (WHO) estimates that 1 person out of every 6 in the world is overweight and that the number of obese has reached 300 million. More than that, the level of obesity is a major contributor to the burdens of chronic disease and disability and is causing increasing rates of diabetes, some forms of cancer, and cardiovascular diseases.[9]

The United States in particular has experienced an explosion in obesity rates. In 1978, 17 percent of American women and 13 percent of American men were considered obese. By 1999, 34 percent of American women and 28 percent of men were obese. These percentages are extremely high by international standards, although anecdotal information suggests that obesity rates are starting to rise in Europe as well. Nevertheless, among OECD countries, the United States had the highest rate for men and the second highest for women in 1999 (see Figure 7). When compared to Japan, the U.S. percentages seem astronomical: only 4 percent of Japanese women and 2 percent of Japanese men are considered obese.

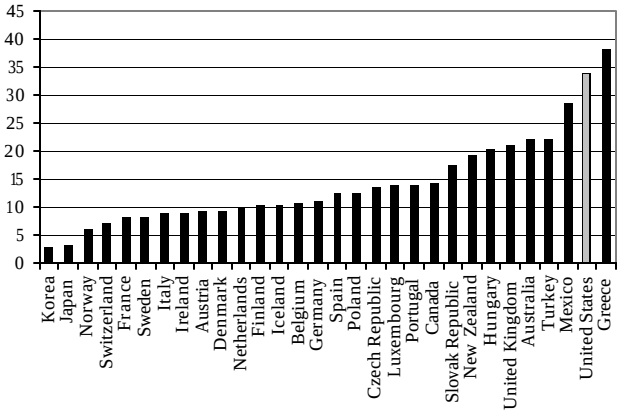
[7] Doll et al. (2004).

[8] Simmons et al. (1991).

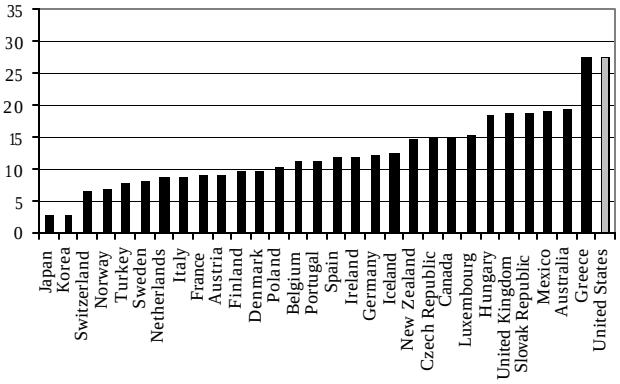
[9] WHO (2003).

Figure 7. Obesity Rates of the US (and Greece) Are Off the Chart, Late 1990s [a]

Percentage of Women Classified as Obese (Body Mass Index Greater than 30kg/m^2)



Percentage of Men Classified as Obese (Body Mass Index Greater than 30kg/m^2)



Source: OECD (2003).

[a] Data for individual countries are from 1997, 1998, or 1999.

Many argue that obesity has risen throughout the world because of increased consumption of energy-dense foods and reduced physical activity. A recent study places most of the blame for the increase in obesity in the United States on a dramatic increase in caloric intake from snacking, rather than on a decrease in physical activity.[10] Regardless of the cause, the growth in obesity rates, particularly in the United States, is undeniable. And its impact on health and life expectancy is becoming more apparent. A study reported in the Annals of Internal Medicine found that obesity decreased life expectancy among its participants by more than three years.[11] Thus, an unhealthy diet may help explain the difference between life expectancy at 65 in the United States and other developed nations.

Health and Well-Being of the Older Population

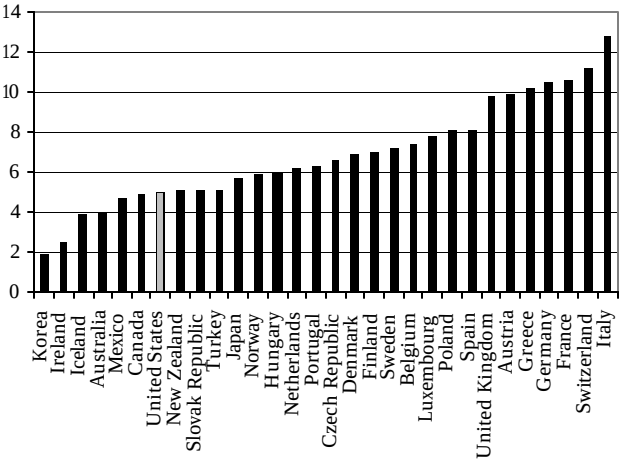
The health and well-being of the older population is also likely to affect life expectancy at 65. In this area, three factors seem important: the level of old age benefits, spending on health care, and the level of activity.

Old-age benefits: The United States spends a much smaller share of GDP on public old-age pensions than most other OECD countries — about 2 percentage points less than the OECD average (see Figure 8). Similar to the relationship between life expectancy and GDP per capita, higher benefits translate into larger incomes, a higher standard of living, and likely longer lives for retirees.

The comparison between the United States and the rest of the OECD is not quite fair because the United States provides a larger share of retirement income through its employer-sponsored pension system than other countries. As a result, the focus on public benefits understates the resources flowing to retired persons. On the other hand, almost 40 percent of U.S. households receive no employer-provided benefits, so the public pension measure seems the most relevant for the low-income elderly, whose life expectancy is significantly below the national average and drags down the overall rate.

Figure 8. The U.S. Social Security Program Absorbs an Unusually Small Share of GDP

Public Old-Age Benefits as a Percent of GDP, 1999



Source: OECD (2003).

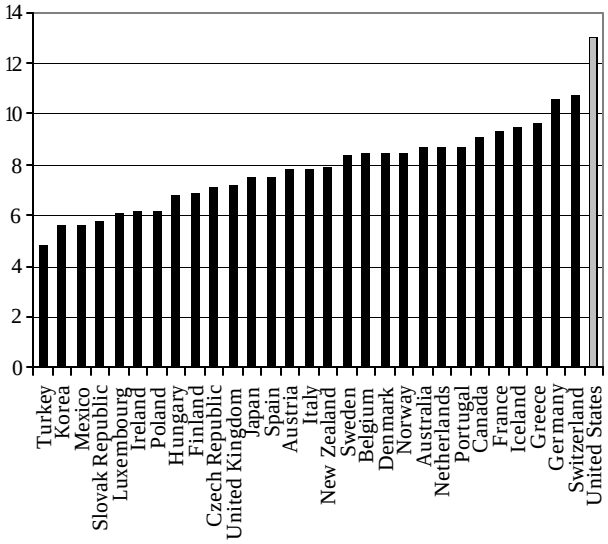
[10] Cutler, Glaeser, and Shapiro (2003).

[11] Netherlands Epidemiology and Demography Compression of Morbidity Research Group.

Health care spending: The physical well-being of a population would be expected to be related to the strength of its health care system. One way to measure health care effort is the amount spent on health programs. Bear in mind, however, that research has repeatedly shown that outcomes are not necessarily highly correlated with outlays.[12] In terms of total health expenditure, the United States spends a higher percentage of GDP — 13 percent — than any other OECD country, and the entire U.S. population 65 and over is covered by government health insurance through the Medicare program (see Figure 9).

Figure 9. The U.S. Health Care System Absorbs an Unusually Large Share of GDP

Total Expenditure on Health Care as a Percentage of GDP, 1999

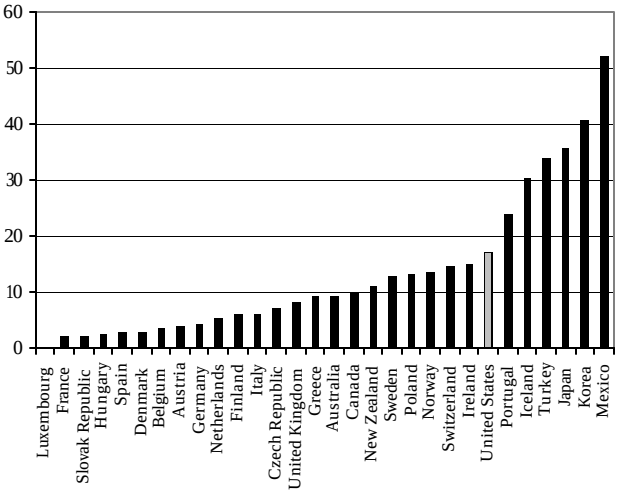


Source: OECD (2003).

Labor force participation: Keeping active at older ages may be one way to live longer. Countries with long-lived populations, such as Japan and Iceland, have traditions of working past the established retirement age. This suggests that there might be a relationship between elderly labor force participation and life expectancy. Compared to the entire OECD, the United States performs fairly well in this category. In 1999, 9.0 percent of women and 17.0 percent of men age 65 and older participated in the labor force. The OECD averages were 5.4 and 13.2, respectively. Figure 10 shows the pattern for men by country; the comparable numbers for women are similar, simply at a lower level.

Figure 10. Older Americans Are Somewhat More Likely to Remain in Labor Force

Percentage of Men Age 65 and Older Participating in the Labor Force, 1999



Source: OECD (2003).

A Look at the Data

The OECD and the World Bank publish data by country on life expectancy at age 65, GDP per capita, consumption habits, and other influences on the health and well-being of the population. The precise definition of the variables can be found in the Appendix Table. This dataset allows us to explore whether a country's life expectancy at age 65 is indeed related to the factors identified above. As noted earlier, the analysis is meant to be nothing more than illustrative, since a thorough study would require pooled time-series data which are not available for all the OECD countries.

One would expect life expectancy to be positively related to per capita GDP of those in the bottom 40 percent of the population, spending on old age benefits, health care expenditures, and the labor force participation of older workers. On the other hand, it seems reasonable that life expectancy at 65 should be negatively related to obesity and to tobacco consumption. To examine these possible relationships, we estimate a regression for 29 OECD countries.[13] The final equation is as follows:

Life Expectancy at 65 = f (GDP/capita for lowest 40 percent, BMI>30, Tobacco, Old-Age Benefits/GDP, Health Expenditures/GDP, and Labor Force Participation 65+)

[12] Newhouse (1993).

[13] Greece was removed because it is an outlier with extremely high obesity rates, low GDP per capita, and average life expectancy.

The results for both women and men are summarized in Table 2. Although 29 countries is a very small sample, the results are quite reasonable. An increase in GDP per capita for the bottom 40 percent, in old age benefits as a percent of GDP, and in health care expenditures as a percent of GDP raises life expectancy at 65. An increase in smoking reduces life expectancy at 65.[14] Obesity also appears to have a negative effect on life expectancy at 65 for both men and women, although the coefficients are not statistically significant. Labor force participation has a significantly positive effect only in the case of men.

Table 2. Explaining Life Expectancy at 65, OECD Countries, 1999

Variable	Women		Men	
	Coefficient	T-statistic	Coefficient	T-statistic
GDP per capita (bottom 40 percent)	0.0002	2.74	0.0001	3.34
Percent with BMI > 30	-0.040	-1.07	-0.009	-0.21
Tobacco consumption	-0.058	-1.45	-0.056	-2.72
Public old-age benefits	0.108	1.29	0.180	2.51
Percent of GDP on health care	0.337	2.52	0.184	1.57
Labor force participation of 65+	0.010	0.18	0.073	3.36
Constant	15.36	12.40	12.08	6.06

Source: OECD (2003).

Note: The regression is run with robust standard errors. The R-squared is 0.57 for women and 0.62 for men. The number of observations is 29; Greece is excluded because it is an outlier in terms of both obesity and income.

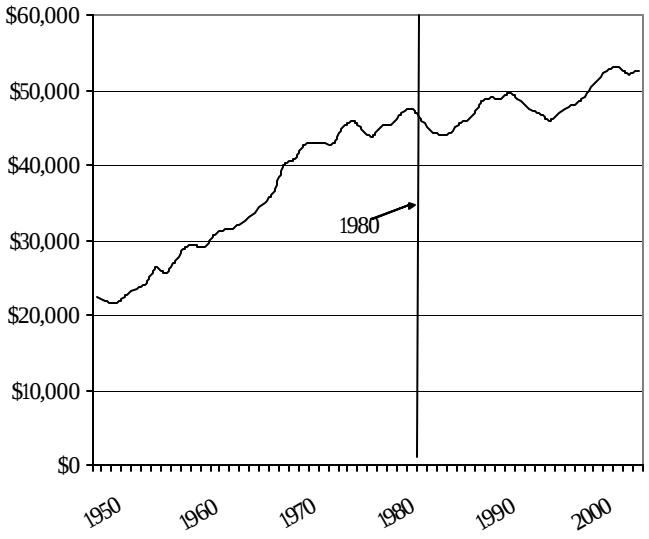
What do these results tell us about why U.S. life expectancy is so low? First, the United States is not so rich relative to its OECD peers for a large population. The U.S. average is high, but those in the top quintiles receive an unusually large share compared to other OECD nations. In the lower part of the income distribution, Americans have incomes that fall in the middle of the OECD countries. The results of the equation shown in Table 2 suggest that raising the income of women at the bottom of the Unites States income distribution by $3,000 — to bring it in line with that in Norway, Denmark, and Japan — would increase life expectancy at 65 by 0.6 years.

Second, although the regression results are not very robust in statistical terms with regard to obesity, they suggest — particularly in the case of women — that obesity might explain some of the variation in life expectancy across countries. The estimated coefficient for women indicates that reducing the percentage of the population with a body mass index in excess of 30 kg/m^2 from the U.S. level of 34 to the Japanese level of 4 — admittedly a Herculean challenge — would increase U.S. life expectancy at 65 by another 1.2 years. Also, obesity will likely become a more important determinant of life expectancy at age 65 in the future. U.S. obesity rates jumped in the 1980s and 1990s, and the vast majority of the population affected by obesity had not yet reached age 65 by 2000. As the large baby boom cohort begins to turn 65 in the coming years, a stronger connection between obesity rates and life expectancy may emerge.

These two factors — the average income going to the lowest 40 percent of the population and obesity — might also explain why U.S. life expectancy at 65, which in 1980 exceeded that of almost every other country, has fallen behind. As shown in Figure 11, income for the typical family, which grew vigorously in the post-war period, has increased very slowly since 1980. That is, absolute incomes in the lower portions of the income distribution did not keep pace with the average for the population as a whole and lost ground vis-à-vis other OECD countries.

Figure 11. U.S. Median Family Income Growth Has Slowed Dramatically Since 1980 [a]

U. S. Median Family Income, 1947-2002



Source: U.S. Bureau of the Census (1998, 2003).

[a] This figure uses 2002 dollars.

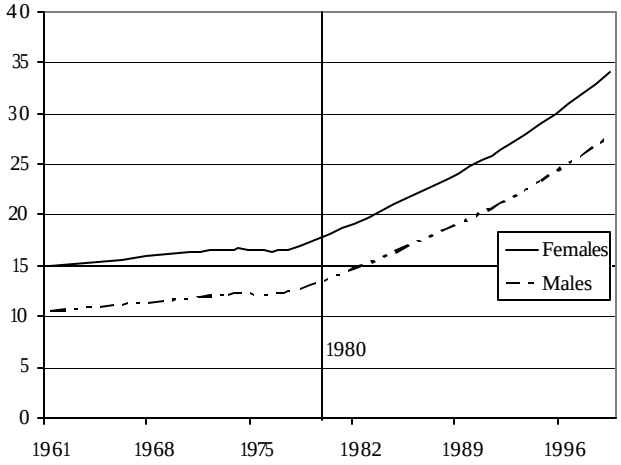
[14] As suggested by the literature, alcohol had no apparent effect when added to the equation.

Similarly, obesity was not a serious problem in the United States until the early 1980s, when rates ballooned (see Figure 12). Even though the surge in obesity has been recent and its full impact has not been felt by older Americans, obesity may well have contributed to the slow-down in improvement in U.S. life expectancy in the last 20 years.

The results presented are purely suggestive. A more detailed analysis of the sluggish growth of U.S. life expectancy at age 65 should address many more factors. It would also require a more complete examination of income and obesity trends in other OECD countries. Still, these preliminary results suggest that these two factors, income and obesity, may explain some of the puzzle.

Figure 12. U.S. Obesity Rates Have Soared in the Last 20 Years

Percentage of U.S. Adult Men and Women Classified as Obese, 1961-1999



Source: U.S. Center for Disease Control (2004).

Conclusion

Life expectancy at age 65 in the United States is below that for other developed countries despite the fact that the United States has virtually the highest GDP per capita. This has not always been true. As recently as 1980, Americans at 65 had a longer life expectancy than citizens of most other industrial countries.

For estimating future pension costs, the important question is whether the last 20-year period was an aberration or a harbinger of future performance. More work is obviously needed to answer this question. Nevertheless, income and obesity may be important in explaining these trends.

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Table A1. Description of Variables

Variable	Description	Means
Life Expectancy at 65	The average number of years that a person at age 65 can be expected to live, assuming that age-specific mortality levels remain constant.	Females - 18.8 Males - 15.4
GDP per capita	The sum of the final uses of goods and services divided by the population and adjusted for purchasing power parity (PPP) and in current international dollars.	$21.307
GDP per capita for the lowest 40 percent of the population	Total GDP, adjusted for PPP and in current international dollars, multiplied by the share of income for the poorest 40 percent and divided by 40 percent of the total population.	$10,638
Obesity Rate	The Body Mass Index (BMI) is the ratio of an individual's weight to height in kilograms and meters. The WHO has established the standard for obesity at a BMI > 30kg/m2.	Females - 14.2 Males - 12.7
Labor Force Participation 65+	The labor force participation rate for men and women age 65 and older.	Females - 5.4 Males - 13.2
Tobacco Consumption	Percent of the total adult male and female population that are daily smokers.	Females - 21.8 Males - 33.9
Old-Age Cash Benefits	All cash expenditures (including lump-sums) paid as old-age pensions within the public sphere as a percentage of GDP.	6.9
Total Health Expenditure	Total expenditure on all activities, from all sectors, which meet the OECD standards for a health goal as a percent of GDP.	8.0

Source: Most data come from the OECD Health Database 2003, 3rd Edition. The exceptions are the income ratio and GDP per capita for the lowest 40 percent, which are calculated figures based on the World Bank's World Development Indicators, 2003.

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