



## Differences in health between Americans and Western Europeans: Effects on longevity and public finance

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### ABSTRACT

In 1975, 50 year-old Americans could expect to live slightly longer than most of their Western European counterparts. By 2005, American life expectancy had fallen behind that of most Western European countries. We find that this growing longevity gap is primarily due to real declines in the health of near-elderly Americans, relative to their Western European peers. We use a microsimulation approach to project what US longevity would look like, if US health trends approximated those in Western Europe. The model implies that differences in health can explain most of the growing gap in remaining life expectancy. In addition, we quantify the public finance consequences of this deterioration in health. The model predicts that gradually moving American cohorts to the health status enjoyed by Western Europeans could save up to \$1.1 trillion in discounted total health expenditures from 2004 to 2050.

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### Introduction

The populations of the United States and Western Europe have experienced large gains in life expectancy over the last century. U.S. life expectancy at birth increased from 61 years in 1933 to 78 years in 2004. In many other developed countries, age-specific death rates have declined exponentially over this period (Tuljapurkar, Li, & Boe, 2000). During the first half of the 20th century, it was large declines in infectious diseases that drove down these mortality rates, particularly for the young. But in the second half of the 20th century, it was reductions in mortality among the elderly, rather than the young, that propelled increases in life expectancy (Oshlansky & Carnes, 2001).

During the first half of the 20th century, when infectious diseases were on the decline, life expectancy across developed countries converged (White, 2002). The second half, however, witnessed divergence, as the US began to fall behind other developed countries in terms of life expectancy (Oeppen & Vaupel, 2002). So far, little is known about the causes and consequences of this widening gap (Lee, 2003).

The U.S. allocates the highest share of national income to health expenditures, yet does not lead the world in life expectancy. This

has been used by some to suggest the inefficiency of the U.S. health care system. However, a recent study by Preson and Ho (2009) questions this conclusion by demonstrating that the U.S. ranks high in terms of life expectancy for people already diagnosed with chronic or terminal illness. They conclude that the health care system, at least in terms of curative treatment, is unlikely to be responsible for the deterioration in life expectancy. Instead, these findings point toward poor health behaviors and prevention strategies in the US population.

Indeed, many studies have shown that the health of middle-aged Americans, and health behaviors such as smoking and obesity, are much worse than those of Western Europeans (Andreyeva, Michaud, & van Soest, 2007; Banks, Marmot, & et al, 2006; Thorpe, Howard, & Galactionova, 2007). This raises the question as to whether health behaviors have contributed to the divergence in life expectancy, and the question of where in the life-cycle the deterioration in U.S. life expectancy originates. Understanding both the fact and the source of deteriorations in health is a prerequisite for intervening against such trends.

In this paper, we argue that the worsening health of middle-aged Americans relative to their Western European counterparts is responsible for this disparity. Furthermore, we quantify the fiscal consequences of this gap. We use a dynamic microsimulation model calibrated to match historical U.S. health and longevity dynamics over the life course. We use the model to simulate the total longevity, disability, and financial costs to the US population of

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its poorer health status. We also quantify the gains that could be realized over time by gradually transitioning US cohorts to the health levels enjoyed by their Western European counterparts.

For the balance of the paper, the term “European” refers to the population of a sub-group of Western European countries (Denmark, France, Germany, Greece, Italy, The Netherlands, Spain and Sweden). This group of countries is quite representative of heterogeneity in health and socioeconomic conditions within Western Europe, and growth in life expectancy has been higher than in the U.S. both for this group of countries and for an enlarged group of Western European countries (EU-15).

The paper is structured as follows. We first describe the data on mortality and health in the U.S. and Europe. Then, we describe the model that is used to describe the long-term economic consequences of these trends. Next, we use the model to quantify the effect of differences in health on longevity and government expenditures/revenues, and finally we discuss the results.

## Mortality, health behaviors, and health in the US and Western Europe

### Cross-country differences in mortality

In 1975, 50 year-old Americans could expect to live 0.6 years longer than their counterparts residing in a group of 15 Western European countries. 50 year-old Americans lived on average 27.3 years, compared to 26.6 years for the 15 countries originally forming the European Union (Austria, Belgium, Denmark, Finland, France, Ireland, Italy, The Netherlands, Norway, Portugal, Spain and Sweden, United Kingdom and West Germany). These estimates were obtained from the Human Mortality Database project ([www.mortality.org](http://www.mortality.org)). Over the ensuing decades, however, Western European life expectancy grew more quickly. As Fig. 1 shows, a 50 year-old American in 2005 could expect to live for 31 years, compared to 32 years in Europe (32.8 in France and Italy). From 1975 to 2005, life expectancy grew by 5.37 years in Europe compared to just 3.75 years in the U.S. Only Denmark experienced a lower growth in life expectancy over this period (2.9 years).

The 1.6 year life expectancy gap between the U.S. and the EU-15 countries implies a non-trivial welfare loss. For example, using \$100,000 as a lower-bound estimate of the value of a statistical life year (Viscusi & Aldy, 2003), this would represent at least a \$700 million dollar disadvantage for the current generation of 50 year-

olds. While these differences are not as large as within-country differences in health (across race for example), it is worth noting that these cross-country differences have emerged in spite of similar levels of economic development across countries.

### Cross-country differences in health behaviors

While US life expectancy was deteriorating in relative terms, chronic illnesses associated with more sedentary lifestyles were spreading (Goldman, Shang, & et al, 2005; Lakdawalla et al., 2005). Due to data limitations, it is hard to assess whether trends in chronic disease have spread *more rapidly* in the US, but historical data do exist on obesity and smoking, two important health behaviors that contribute to chronic disease.

Both the levels of obesity and growth in obesity are higher in the U.S. than in Europe (based on OECD Health Data, at <http://www.ecosante.fr>). In 1975, 15% of Americans were obese, while obesity rates in European countries such as France, the Netherlands and Spain were less than 8% as recently as the 1980s. By 2005, the obesity rate in the U.S. was well over 30%, while the European average remains close to 12%.

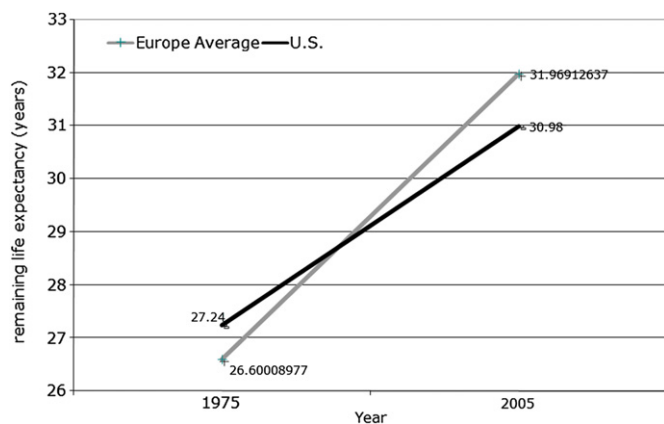
Reductions in the costs of food consumption and technological innovations that led to more sedentary work are two key explanations for the U.S. trend (Lakdawalla & Philipson, 2009). Cutler, Glaeser, and Shapiro (2003) argue that these changes may have taken place more slowly in Europe due in particular to stricter food regulation. Obesity elevates the risk of various health conditions such as hypertension, diabetes and heart disease (Colditz, 1995; Willett, 1995). In that sense, it has the potential to explain part of the difference in life expectancy emerging over time.

Tobacco consumption trends are somewhat harder to interpret definitively. On the one hand, tobacco consumption has fallen by more in the U.S. than in Europe. Today, based on data from OECD Health Database (<http://www.ecosante.fr>), tobacco consumption is higher in Europe (1750 g per capita vs. 1315 for the U.S.), but in 1975, it was much higher in the US (3506 g per capita vs. 2540 g in Europe). This means that the near-elderly Americans are less likely to be smoking now than their European counterparts. On the other hand, these American cohorts are much more likely to have *ever smoked*, which may have independent effects on health. One plausible explanation for this rapid decrease is that smoking cessation programs have been more effective in the U.S. than in Europe. For example, Cutler and Glaeser (2006) argue that 50% of the gap in current smoking status is due to differences in beliefs about the health effects of smoking.

The health consequences of smoking depend in part on the length of exposure to tobacco, or lifetime consumption, rather than consumption at a point in time. For example, Rogers and Powell-Griner (1991) estimated that for males (females), compared to current smokers, former smokers could expect to live 3.7 (5.2) additional years and those who never smoked an additional 2.4 (1) years. Based on the OECD data, it is not clear whether lifetime exposure to tobacco – in terms of cigarettes smoked – is greater among Americans or Europeans. In addition, the consequences of smoking for life expectancy will also depend on changes over time in the age composition of smokers; this may vary across countries. In sum, it is unclear whether trends in tobacco use have contributed to worsening or improving health for Americans, compared to Europeans.

### Cross-country differences in health

Fig. 2 displays the possible health consequences of these divergent trends in health behavior: The US prevalence of different types of chronic disease and risky behavior is much higher than in



**Fig. 1.** Remaining Life Expectancy at Age 50: U.S. – Europe (EU-15) Differences from 1975 to 2006. Human Mortality Database period life tables for 1975 and 2005. EU-15 countries are: Austria, Belgium, Denmark, Finland, France, Ireland, Italy, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, U.K. and West Germany. Weighted average using population size age 50.

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