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Recent Changes in US Mortality: Continued Deterioration Relative to Peers

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Abstract

Several recent studies have documented a slowdown in rates of improvement in mortality in the United States (Case and Deaton 2017; Crimmins et al. 2011; Institute of Medicine and National Research Council 2013; Kochanek et al. 2016; Squires and Blumenthal 2016). Middle-aged white women have actually experienced rising mortality over much of the past several decades (Astone et al. 2015; Case and Deaton 2015; Kochanek 2016). The relatively slow declines in US mortality occur against a background in which US mortality was already high by standards of other OECD countries (Crimmins et al. 2011; Institute of Medicine and National Research Council 2013; Ho 2013; Ho and Preston 2010; Palloni and Yonker 2016).

In this paper, we describe recent patterns of change in US adult death rates by age in comparison to those of other OECD countries. This age-pattern of change has received relatively little attention in previous accounts.

Keywords

mortality, death rates, Human Mortality Database, OECD, Organisation for Economic Co-operation and Development

Disciplines

Demography, Population, and Ecology | Social and Behavioral Sciences

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Recent Changes in US Mortality: Continued Deterioration Relative to Peers

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Several recent studies have documented a slowdown in rates of improvement in mortality in the United States (Case and Deaton 2017; Crimmins et al. 2011; Institute of Medicine and National Research Council 2013; Kochanek et al. 2016; Squires and Blumenthal 2016). Middle-aged white women have actually experienced rising mortality over much of the past several decades (Astone et al. 2015; Case and Deaton 2015; Kochanek 2016). The relatively slow declines in US mortality occur against a background in which US mortality was already high by standards of other OECD countries (Crimmins et al. 2011; Institute of Medicine and National Research Council 2013; Ho 2013; Ho and Preston 2010; Palloni and Yonker 2016).

In this paper, we describe recent patterns of change in US adult death rates by age in comparison to those of other OECD countries. This age-pattern of change has received relatively little attention in previous accounts.

Data and Methods

We use data from the Human Mortality Data Base on 13 countries, including the United States, during the period 1986-2014. We estimate the rate of change in death rates within 5-year wide age intervals from 30-89. To do so, we use ordinary least squares regression to estimate the parameters of the following equation:

$$\ln M_{x,i}(t) = A_{x,i} + B_{x,i}\, t \,,$$

where $M_{x,i}$ (t) is the death rate at ages x to (x + 5) in country i in year t. $B_{x,i}$ is thus the estimated annual rate of mortality change at ages x to (x + 5) for country i. Comparison countries were chosen on the basis of their social and economic similarity to the United States as well as the availability of a continuous series of age-specific death rates over the period 1986-2014. Comparison countries are Australia, Austria, Denmark, Finland, France, Japan, Netherlands, Norway, Portugal, Spain, Sweden, and Switzerland.

Results

Figure 1 shows the rates of decline of US death rates by age for males and females over the period 1986-2014. It also presents the mean rates of decline for the 12 comparison countries. Relative to the mean of OECD comparison countries, US death rates declined very slowly over this period of 29 years. The decline was especially slow for women in the age interval 30-49, in part a reflection of rising death rates from so-called “deaths of despair”: drug overdoses, suicide, and chronic liver disease (Astone et al. 2015; Case and Deaton 2015; Case and Deaton 2017; Kochanek 2016). Squires and Blumenthal (2016), however, show that adverse trends persist in this age interval even after deaths of despair are removed.

A second US deficit among women appears at older ages. Rates of decline in death rates in the age interval 70-84 are about twice as fast in comparison countries as in the US over this period. Deaths of despair are not an important factor in this age interval; a reduction in rates of decline in cardiovascular mortality in the US is a more likely contributor (Lloyd-Jones 2016; Ma et al. 2015). It is noteworthy that the heaviest-smoking cohorts of US women were born between 1935 and 1944 (Preston and Wang 2006). These women were aged 70-79 in 2014; as they replaced earlier cohorts in this age interval, it is reasonable to expect that they contributed to a deteriorating mortality level during the period of study. These cohorts also showed the highest level of mortality from lung cancer (Preston et al. 2014).

Appendix Figure 1 presents patterns of mortality decline among women for individual countries from 1986-2014. The figure confirms that, compared to comparison countries, US women experienced smaller improvements in mortality rates at nearly all ages, particularly in the age interval 35-49.

Although, as Figure 1 shows, the difference between the US and comparison countries is more pronounced among women than men, American men have also had slower mortality declines than the mean of their OECD counterparts at all ages. Cohort smoking prevalence peaked among males born 1910-1919 and moved steadily downward thereafter (Preston and Wang 2006). So reductions in smoking should have contributed to faster improvements in US mortality throughout the age range in Figure 1, but they are not likely to have created major differences in rates of decline by age. Appendix Figure 2 shows that improvements for US males were consistently lower than for most of their peers in comparison countries, though the American disadvantage diminishes with age.

Figure 2 has the same format as Figure 1 but is limited to changes during the period 2001-14. The disadvantage in rates of decline for US males and females at ages under 60 is much more dramatic for this later period than for the longer period 1986-2014. Appendix Figures 3 and 4 present country-level results for females and males, respectively, for this shorter period.

Of course, annual rates of mortality decline do not provide insight into past or present *levels* of mortality; fast mortality declines can simply reflect large improvements in previously poor mortality conditions. In this case, however, the faster declines in OECD countries are not indicative of a “catch-up” phase wherein OECD countries closed the gap between themselves and superior US mortality levels. Instead, as demonstrated in Figure 3, comparison countries used this period to widen an already-existing gap between themselves and the US.

Figure 3 shows the ratio of US death rates by age and sex to those of the OECD composite in 1986-88, 1999-2001, and 2012-14. A widening gap is prominent for both sexes, consistent with previous work finding that the US disadvantage in mortality between ages 35-60 relative to peer countries has been increasing for over 50 years (Palloni and Yonker 2016). The growing disparity is especially pronounced between 1999-2001 and 2012-14, reflecting slow rates of US mortality decline during the 21st century.

The story at more advanced ages is somewhat different. Manton and Vaupel (1995) were the first to point out that the US had favorable mortality levels at very old ages. Figure 3 shows that the US began with superior mortality at all ages above 75 in 1986-88, but that the advantage was limited to ages 85+ by 2012-14 (for more details on the "age crossover", see Palloni and Yonker 2016).

The Future

The most important demographic exercise in the United States, conducted annually, is the set of projections made by the Trustees of the Social Security Administration (SSA). The fiscal balance of the Social Security Old Age and Survivors Disability Insurance system is required to be in "close actuarial balance" over the succeeding 75 years. Mortality projections play a key role in determining whether such a balance applies.

Figure 4 adds to Figure 1 the latest projected annual rates of decline in American age-specific death rates over the period 2013-2040 (Office of the Chief Actuary 2016), a period of 28 years compared to the 29-year data for 1986-2014. Differences in projections between men and women are small or negligible so only the projected rates of decline for both sexes combined are shown. They are compared to the mean of actual male and female declines. Up to age 65, the SSA projections for 2013-2040 match rather closely the mean of male and female declines over the 1986-2014 period for the United States. At ages above 65— the ages that are central to determining fiscal balances— the SSA projects a slower rate of decline than has recently been observed.

Throughout the age range, the SSA projects much slower declines than those recently observed in the OECD countries. In recent decades, these countries have stretched their mortality lead over the United States. Is their experience relevant to the US or are conditions in the US somehow unique? Additional attention to causes of differences between the US and other countries will help answer this question and illuminate likely paths for the future of American mortality.

Acknowledgments

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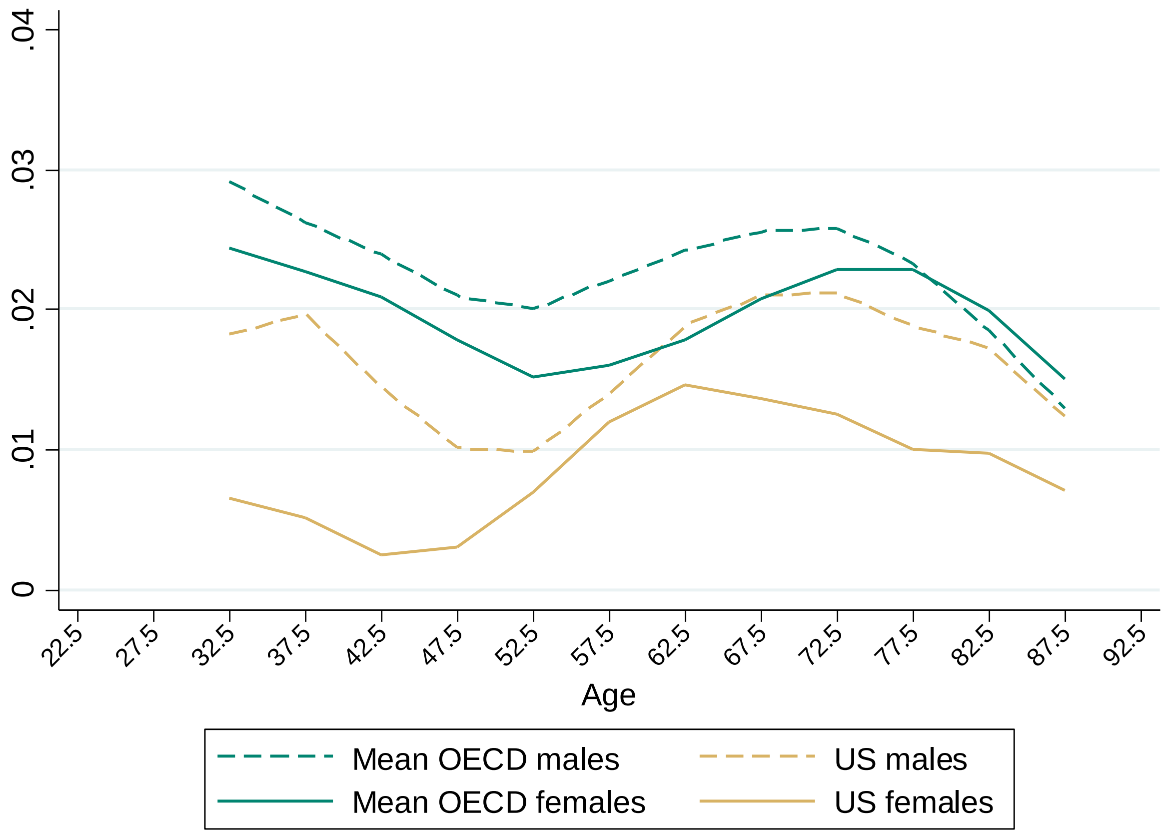
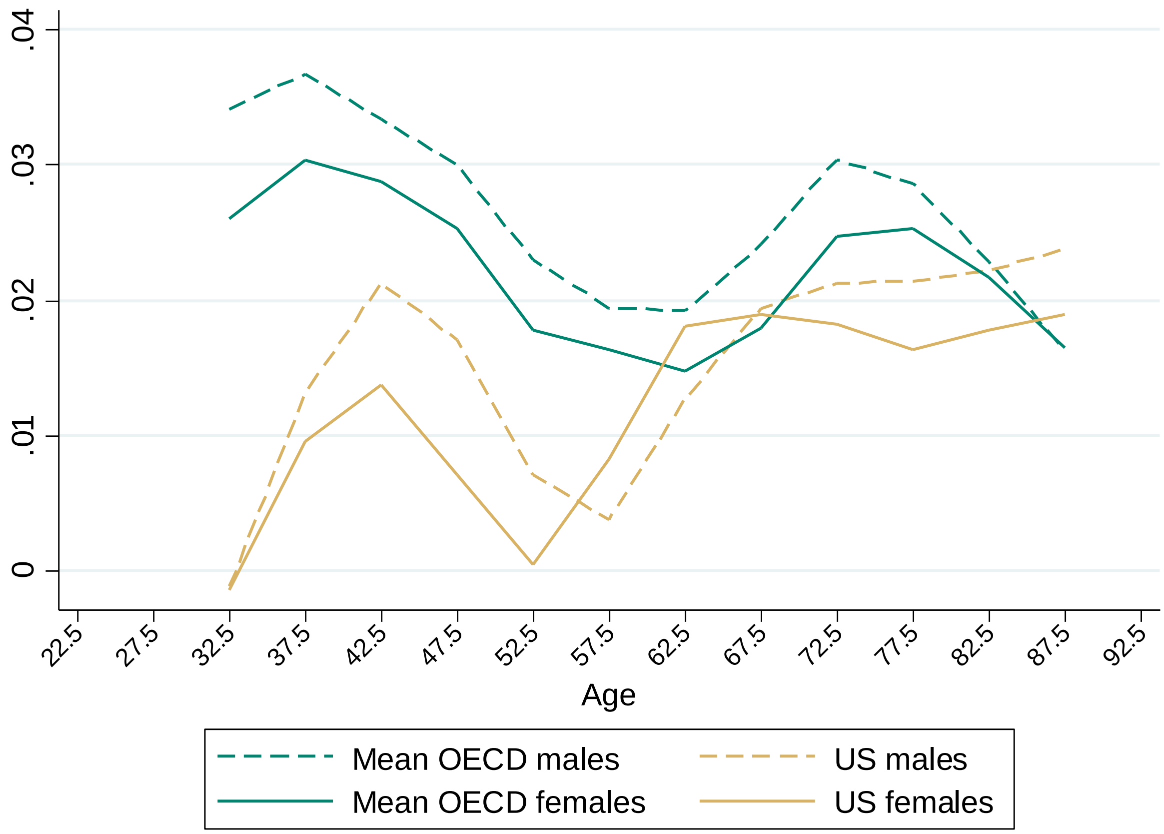
Figure 1. Annual rates of decline in age-specific mortality rates: US and mean of 12 OECD countries, 1986-2014.



Source: Human Mortality Database.
OECD countries include Australia, Austria, Denmark, Finland, France, Japan, Netherlands, Norway, Portugal, Spain, Sweden, and Switzerland.

Figure 2. Annual rates of decline in age-specific mortality rates: US and mean of 12 OECD countries, 2001-2014.

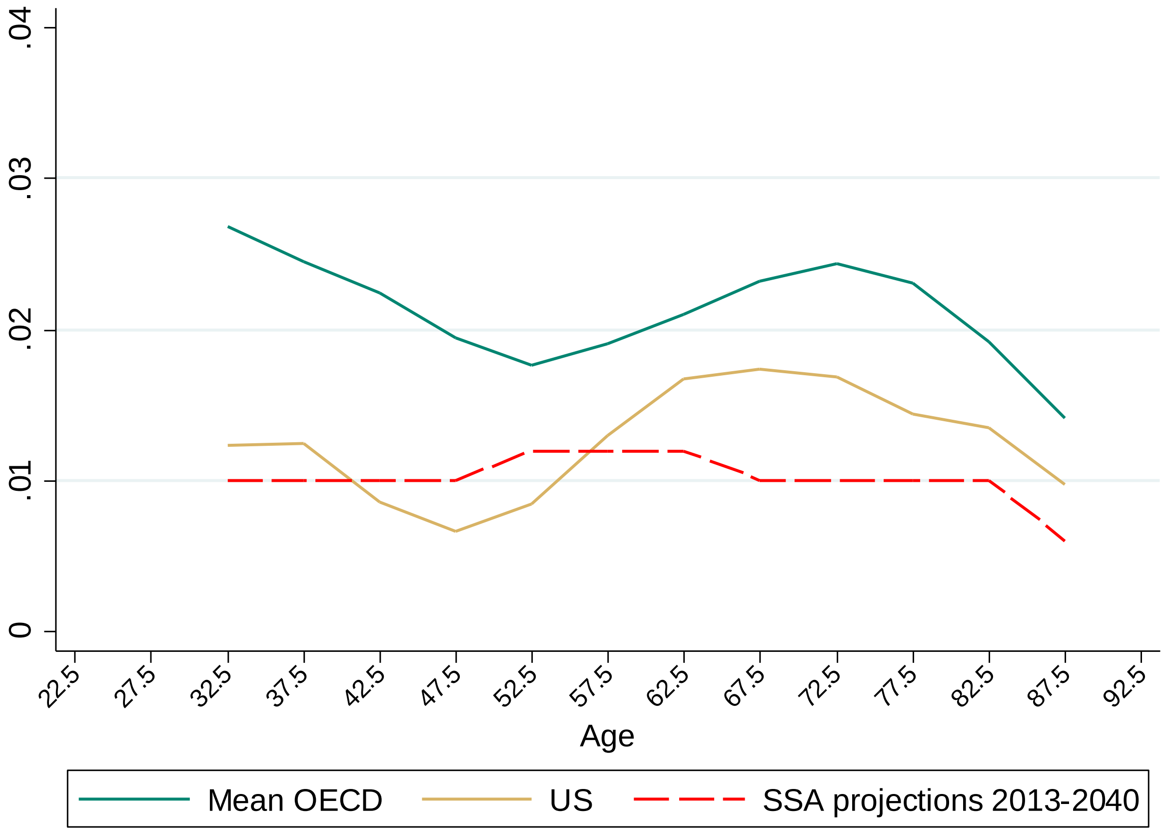


Source: Human Mortality Database.
OECD countries include Australia, Austria, Denmark, Finland, France, Japan, Netherlands, Norway, Portugal, Spain, Sweden, and Switzerland.

Figure 3. Ratios of US age-specific mortality rates to mean of 12 OECD countries.

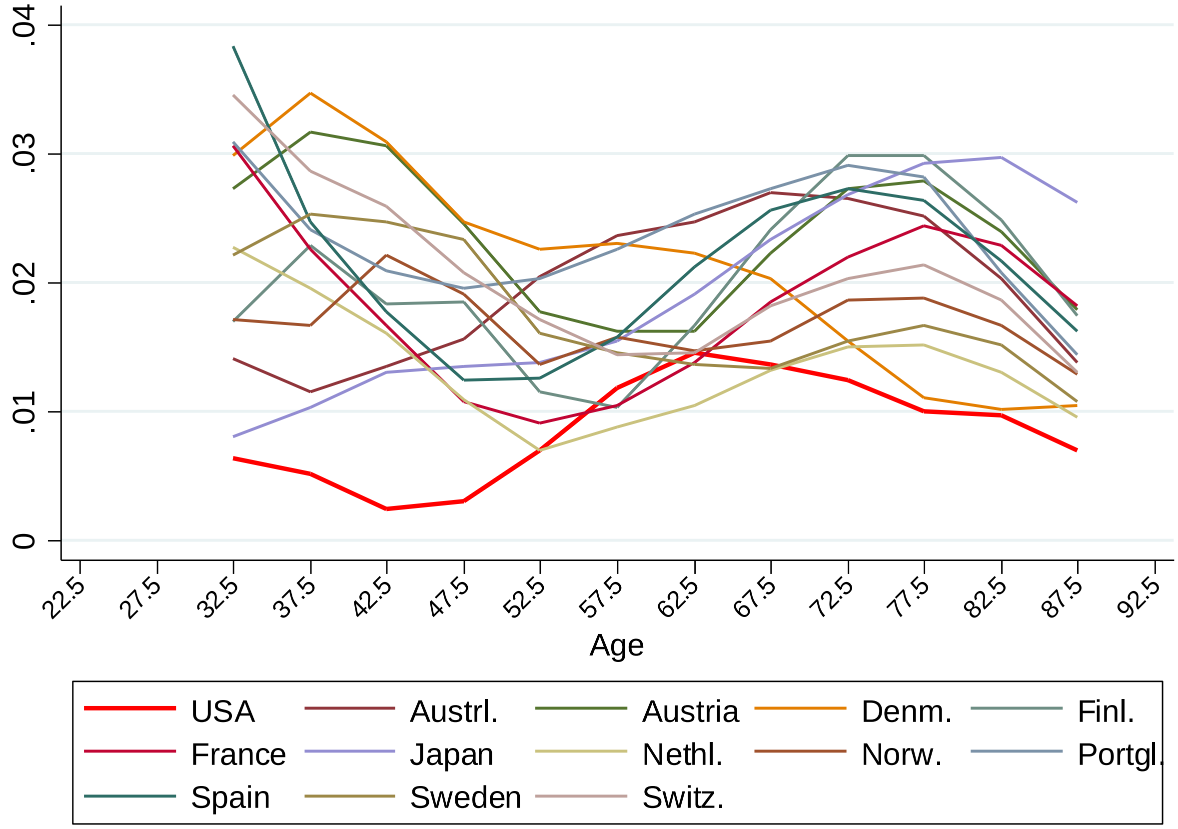
Source: Human Mortality Database.
OECD countries include Australia, Austria, Denmark, Finland, France, Japan, Netherlands, Norway, Portugal, Spain, Sweden, and Switzerland.

Figure 4. Annual rates of decline in age-specific mortality rates: US and mean of 12 OECD countries (1986-2014), and SSA Projections (2013-2040).



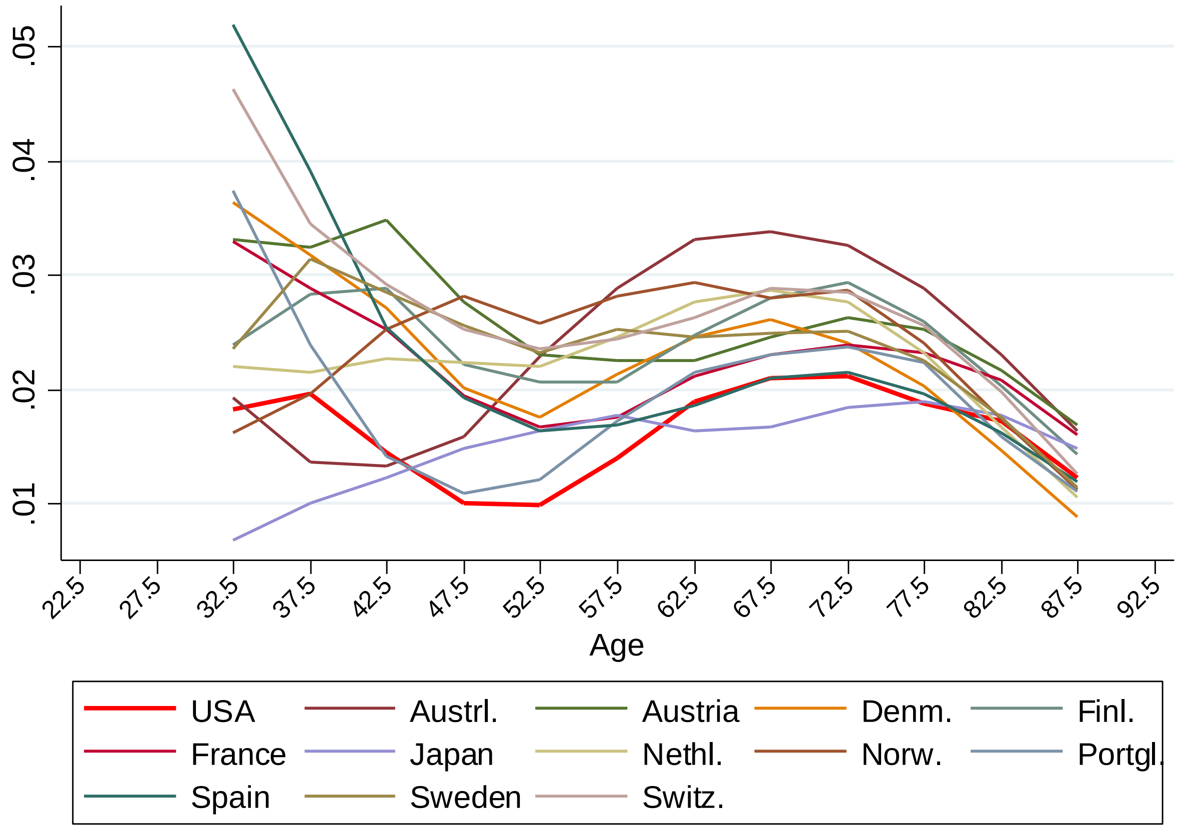
Source: Human Mortality Database and US Social Security Administration.
US and OECD lines are averages of male and female data. SSA projections are for both sexes combined.
OECD countries include Australia, Austria, Denmark, Finland, France, Japan, Netherlands, Norway, Portugal, Spain, Sweden, and Switzerland.

Appendix Figure 1. Annual rate of decline in age-specific mortality rates in 13 OECD countries: Females, 1986-2014.



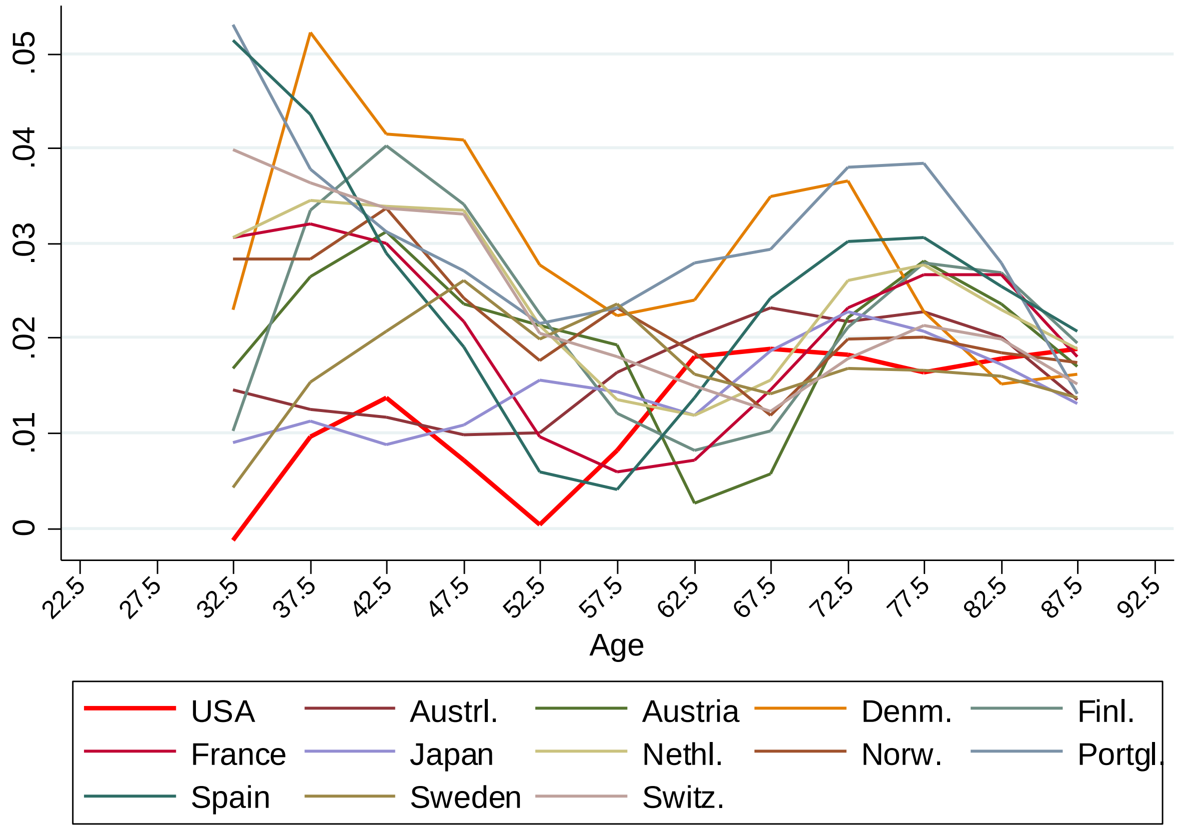
Source: Human Mortality Database.

Appendix Figure 2. Annual rate of decline in age-specific mortality rates in 13 OECD countries: Males, 1986-2014.



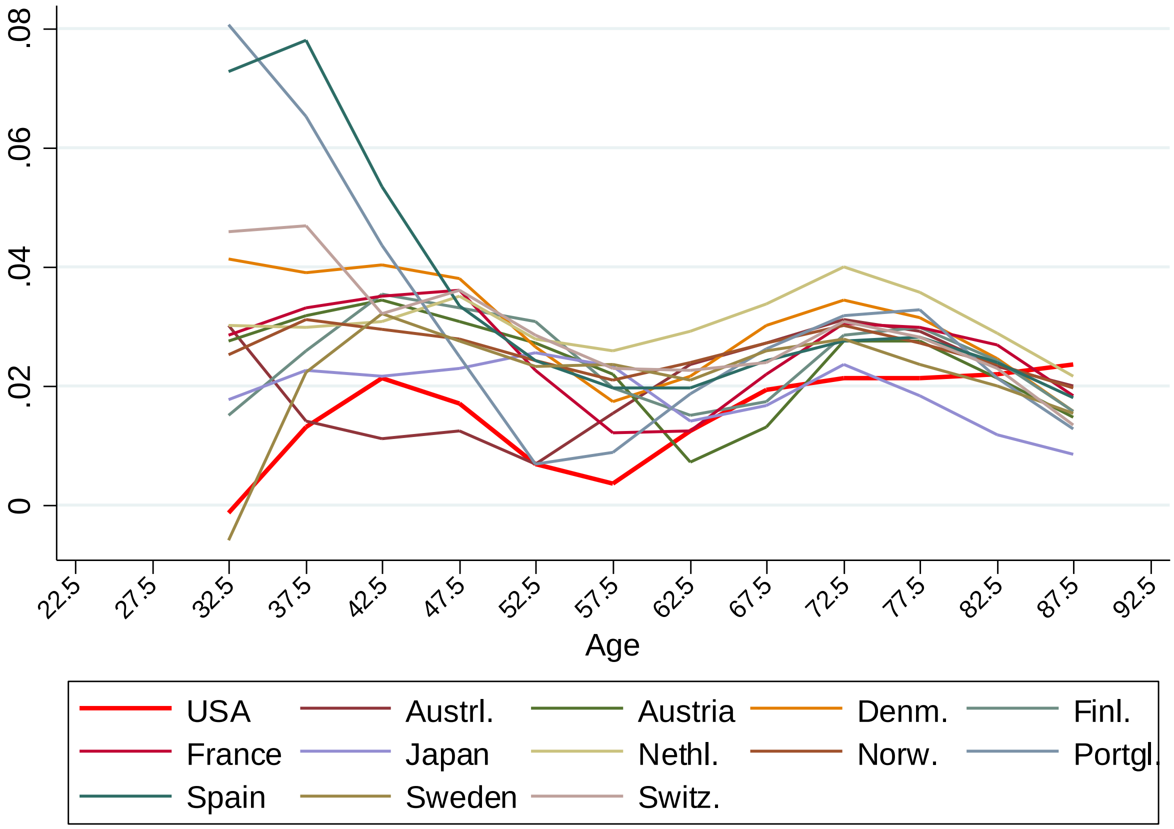
Source: Human Mortality Database.

Appendix Figure 3. Annual rate of decline in age-specific mortality rates in 13 OECD countries: Females, 2001-2014.



Source: Human Mortality Database.

Appendix Figure 4. Annual rate of decline in age-specific mortality rates in 13 OECD countries: Males, 2001-2014.



Source: Human Mortality Database.