Alternative Ways of Measuring Age and Their Consequences

John B. Shoven, Stanford University

Tokyo Meetings of the Western Economics Association International
March 2019
Alternative Ways of Measuring Age

• Preview: A year is a fine measure of time. It is not a good measure of age

• Assertion: age is strongly connected to health
  • Young people are very healthy
  • Old people are in poor health

• But, what are alternative ways of measuring age?
3 Alternatives to Years Since Birth (YSB) as Measures of Age

• Mortality Risk = chance of dying within 12 months

• Remaining Life Expectancy (RLE)

• Percent Completion of Conditional Life Expectancy
Table of Contents

• Mortality-based measures of age differ substantially from YSB

• Distorted impressions from using YSB as a measure of age
  • Elderly are fastest growing segment of U.S. population
  • Older U.S. men have rising labor force participation
  • Average retirement ages are roughly the same as 50 years ago
  • Prime working age adults are those between 25 & 54

• Retirement Length vs. Work Duration

• Ages that should be indexed in U.S. laws
Preliminary Thoughts on Units

• Some measures and units are timeless
  • Degrees Celsius as measure of temperature
  • Meter as measure of length
  • Pound or Kilogram as measure of weight

• Other measures vary with time and need to be subscripted
  • Dollars, Euros, or Yen (e.g. the need to state financial statistics in real dollars or 2005 dollars)

• Is a year of life as a measure of age a timeless unit (such as 1 meter) or a time varying unit (such as $1)?
“Mortality Milestones”

• Mortality risk rises with years since birth

• Mortality Milestones record the YSB when men and women first face mortality risks of 1%, 2% and 4%

• Assertion: People with same mortality risk enjoy roughly the same health and are thus the same age
Mortality Milestones: Age males reach 1%, 2%, and 4%

Source: Social Security Cohort Life Tables

Note: 58 Year old men in 1965 had the same mortality risk (2%) as 70 year olds today
Women have experienced slightly less mortality improvement than men.

66 year old women are the same age as 61 year old men.

Source: Social Security Cohort Life Tables
More on 65 year old men and women

• The next graphs show the probability of 65 year olds reaching future birthdays. They are survival curves.

• The graphs show that 65 year old men and women at different times (1955, 2019, and 2084) are effectively very different ages.
Probability of Future Birthdays for 65 Year-Old Men in 1955
Probability of Future Birthdays for 65 Year-Old Men in 1955

- 50% Reach 77.4
- 20% Reach 85
- 8.8% Reach 90
Probability of Future Birthdays for 65 Year-Old Men in 1955

- 50% Reach 74.4
- 20% Reach 85
- 8.8% Reach 90

President Dwight Eisenhower @ 65 in 1955
Probability of Future Birthdays for Men at 65 in 1955 and 2019

- Blue line: 65 in 1955
- Orange line: 65 in 2019
Probability of Future Birthdays for Men at 65 in 1955 and 2019

- 75% Chance of 77.4
- 50% Chance of 85
- 30% Chance of 90

President Xi Jinping of China @ 65
Conditional on 65, reaching 85 will have a likelihood of 66%, up from 50% today and 20% in 1955.

Chance of reaching 100 will be about 10%.
The Story is Much the Same for Women

Reaching 90 will become the norm for 65-year old women.

Conditional on reaching 65, about 15% of women in the 2019 birth cohort will reach 100.
The Story is Much the Same for Women

- Agatha Christie @ 65 in 1955
- Brigette Macron @ 65

Graph showing life expectancy at age 65 for different years.
Are These Four People the Same Age?

No, they are not. But they all are 65 years since birth.
What fraction of your expected lifetime remains at age 65?

• The next graph will answer the question

• Keep in mind that life expectancy has been revised to take into account the fact that you made it to 65
PCLE = 100 * RLE / (65 + RLE)

You are not the same age if you have 25% of your life ahead of you as someone who had 17% of their life ahead of them.
Next we look at the next 20 years of annual mortality risks faced by 65 year old women.
Conclusion: The future mortality risks of 65 year old women today look very similar to 57 year old women in 1955.
Now, let’s look at the next 20 years of annual mortality risks faced by 65 year old men.
The Next 20 Years of Mortality Risks for Men

The subsequent 20 years of mortality risks of 55 year old men in 1955 and 65 year olds today are roughly the same.

Here are the Remaining Life Expectancies and mortality risks:

A. 65 in 2019  
   - 19.22 years  
   - 1.48%

B. 65 in 1955  
   - 13.11 years  
   - 3.41%

C. 55 in 1955  
   - 19.67 years  
   - 1.56%
Now, let’s examine what percentage of the U.S. population are elderly
PERCENT OF U.S. POPULATION 65+ IN 2015

- 14.67%
Conventional Wisdom: 14.67% of U.S. Population was Elderly in 2015

• Now, let’s look at how this percentage has and will evolve over the period 1955 - 2055
PERCENT OF U.S. POPULATION 65+
THE AGING OF AMERICA

- 1955: 8.64%
- 1975: 10.38%
- 1995: 12.51%
- 2015: 14.67%
- 2035: 20.56%
- 2055: 21.13%
Conventional Wisdom: % of the Population that is Elderly will be 145% higher in 2055 than in 1955

• 21.13/8.64 = 2.45 or 145% growth

• Conclusion: over the century, the fraction of the population that is elderly will grow dramatically

• “The fastest growing segment of the population is the elderly”

• But, is it true?
PERCENT OF U.S. POPULATION WITH MORTALITY OF 2015 65 YEAR-OLDS OR WORSE IS PROJECTED TO BE SLIGHTLY LOWER IN 2055 THAN IN 1955

The orange bars are the number of men with mortality risk of 1.60% or higher plus the number of women with mortality risk of 0.98% and up divided by the total population.
Slightly smaller % of the population will have mortality of today’s 65+ population in 2055 than in 1955

- Elderly were a *smaller* % of U.S. population in 2015 than in 1955 if you use mortality risk to measure age!

- The dramatic aging of America is due to how we measure (or mismeasure) age

- If we measure age by health and health by mortality risk, then there is not any dramatic change in % of the population that is elderly

- A year is a good measure of time, but a poor measure of age
Labor Force Participation of 64-year old American men

LFP Increases from 40% to 50% between 1999 and 2009
Are Older American Men Working More?

LFP of men with 1.4% Mortality Risk

LFP of 64 Year Old Men
Are Elderly Men Working More or Not?

• It depends on how you measure age.

• By conventional “Years Since Birth” such as 64, a higher fraction of men were in the workforce in 2009 than in 1999

• However, if you measure age by mortality risk, then a lower fraction of elderly men were working in 2009 than in 1999
What’s Wrong with this Graph?

The Age Range is Not Constant!

Labor Force Participation Rate of Adults 25-54

Source: U.S. Bureau of Labor Statistics
What do you mean, the age range is not constant?

- The upper cutoff was 54 in 1948, when 54 year old males had a mortality rate of 1.64% and a RLE of 20 years.

- The upper cutoff is 54 in 2019, when 54 year old males had a mortality rate of 0.69% and a RLE of 28.5 years.

- The early years includes much older people than the more recent years.
Average Retirement Age for Men in the U.S.

<table>
<thead>
<tr>
<th>Year</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1910</td>
<td>74</td>
</tr>
<tr>
<td>1940</td>
<td>70</td>
</tr>
<tr>
<td>1970</td>
<td>65</td>
</tr>
<tr>
<td>2000</td>
<td>62</td>
</tr>
<tr>
<td>2019</td>
<td>64</td>
</tr>
</tbody>
</table>

Average retirement age for men has not changed much since 1970 using YSB to measure age. But, mortality-based measures would indicate that the average retiree is much younger.
Length of Retirement for 64 Year Old Husband, 62 Year Old Wife

• The second death of the couple is likely to take place 28-32 years after retirement

• Unfortunately, it is almost impossible to finance a 30 Year Retirement with a 40 Year Career
The U.S. Needs to Stop Discouraging Work for Those Over 62

• Possible Ideas:

• Increase when retirement assets can be accessed from 59.5 to 62
• Eliminate the Social Security Earnings Test
• Establish a new category of worker called “Paid Up”
• Let 65+ keep their Medicare (national health insurance) coverage whether they work or not
• Significantly raise age at which you must start withdrawals from retirement accounts (e.g. from 70.5 to 80)
The Retirement Crisis in America is Partly Due to Who We Treat As Elderly

• The retirement crisis refers to fact that households, state governments and the federal government cannot finance retirements lasting 30 years

• We should encourage work for those 65 -75. They are not nearly as old as 65-75 year olds used to be!