

Considerations for Pension Forecasting: How Long Are We Really Going to Live?

FLORIDA PUBLIC PENSION TRUSTEES ASSOCIATION



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Shaping the Future - Trustee by Trustee

Forecasting Quotes

- “It is difficult to make predictions, especially about the future.”
 - Danish Parliament 1937–38
- “There is no way that we can predict the weather six months ahead, beyond giving the seasonal average”
 - Stephen Hawking
- “Who needs theory when you have so much information? But this is categorically the wrong attitude to take toward forecasting, especially in a field like economics where the data is so noisy.”
 - Nate Silver, *The Signal and the Noise: Why So Many Predictions Fail—But Some Don't*



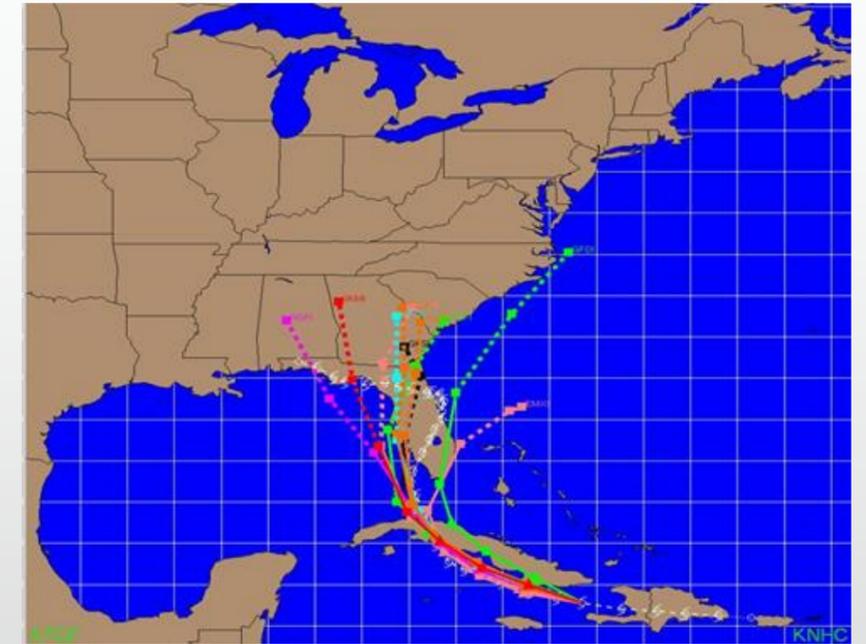
Forecasting Quotes (continued)

- “There are two kinds of forecasters: those who don’t know, and those who don’t know they don’t know.”
– John Kenneth Galbraith
- “There are known knowns, things we know that we know; And there are known unknowns, things that we know we don't know. But there are also unknown unknowns, things we do not know we don't know.”
– Donald Rumsfeld



Forecasting Encounters

- We often encounter forecasting
 - Hurricane season,
 - Hurricane paths and intensity (once they form),
 - Elections, earthquakes, and the weather this afternoon
- For the actuarial management of insurance companies:
 - Medical costs, car accidents, slip/falls, lawsuits
- For the actuarial management of Social Security:
 - Rates of birth, covered immigration, employment and death, covered earnings
- For the actuarial management of pension plans:
 - Future rates of inflation and investment returns (the most important actuarial assumptions)
 - Future rates of mortality, turnover, disability, retirement, salary increases, etc.



Forecasting Today's Agenda

1. Future investment returns of a pension portfolio

– In pension actuarial valuations:

- We project future benefit payments and salaries for each plan member
- Then discount them back to present values using the portfolio's forecasted investment return

➤ To calculate balance sheet liabilities, funded ratios and required contributions

2. Future death rates

- Recent mortality rates and future improvements in mortality rates
- Aging population

Forecasting Future Investment Returns for Asset Pools

- Forecasting returns for short-term cash management involves:
 - Inflation rates
 - Interest rates
 - Yields
 - Credit quality
 - Duration
- Forecasting returns for pension funds involves:
 - Inflation rates
 - Asset allocations to numerous and diverse asset classes
 - Stocks&bonds, domestic&international, public&private markets, alternatives
 - Apply capital market assumptions for each asset class
 - Expected returns and cash flow demands over the mid-term (10 yrs) and long-term (20-30 yrs)
 - Goal is a reasonable best estimate; not overly optimistic



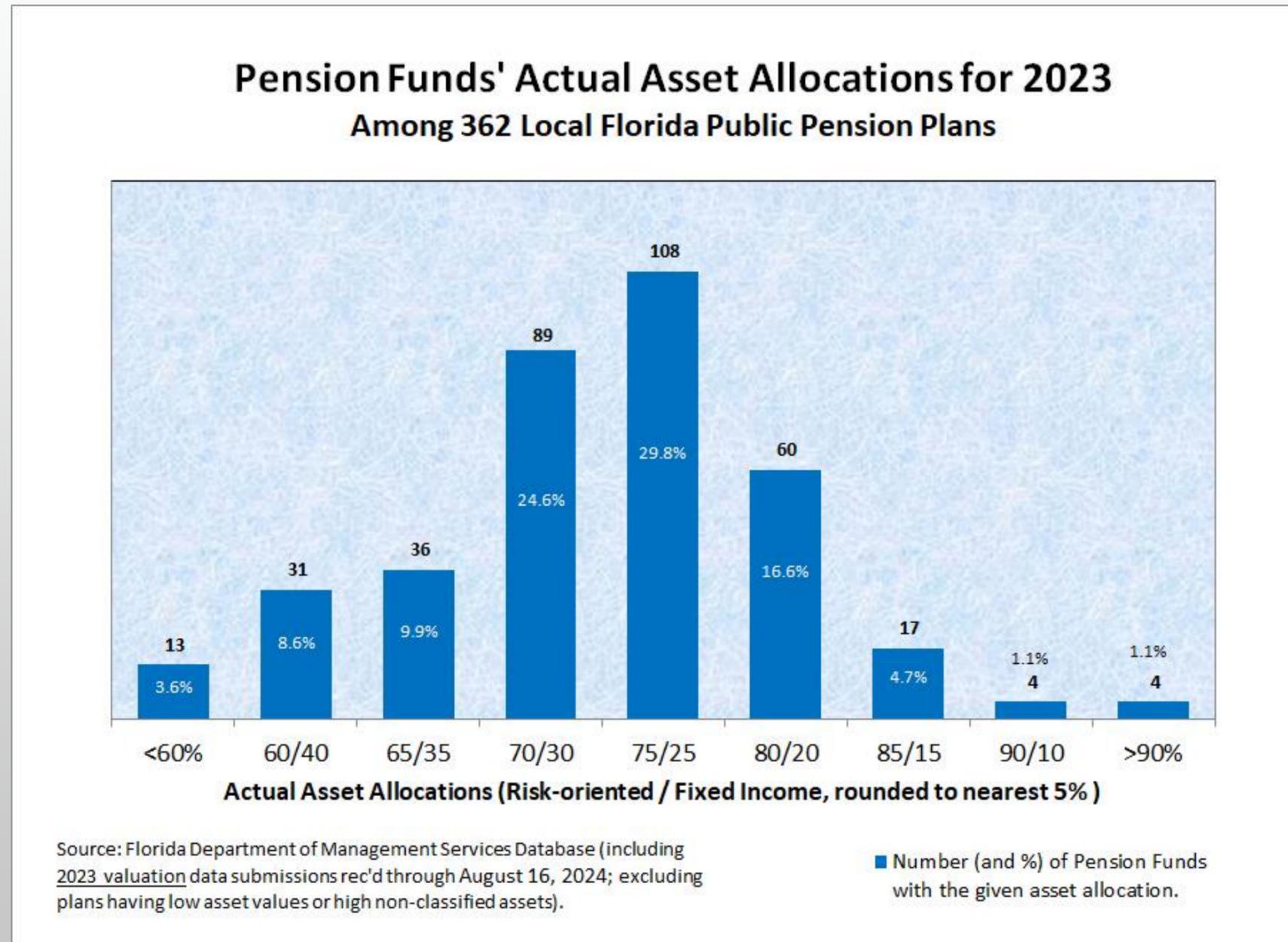
Sample Pension Fund Asset Allocations

Forecasting future investment returns begins with setting targets for asset allocation

A Spectrum of Sample Asset Allocations							
Risk/Fixed Assets	60/40	65/35	70/30	75/25	80/20	85/15	90/10
Large Cap Equity	35%	35%	30%	25%	20%	15%	15%
Sm/Md Cap Equity	15%	15%	15%	10%	10%	10%	10%
Developed Intl Equity	10%	10%	10%	10%	15%	15%	15%
Emerging Mkt Equity			5%	10%	10%	10%	15%
Real Estate		5%	5%	10%	10%	10%	10%
Private Equity			5%	10%	10%	15%	15%
Hedge Funds					5%	5%	5%
Other Alternatives						5%	5%
Total Risk-oriented	60%	65%	70%	75%	80%	85%	90%
Govt Fixed Income	20%	15%	10%	5%			
Corporate Fixed Income	15%	15%	10%	10%	10%	5%	
High Yield	5%	5%	10%	5%	5%	5%	5%
International Debt				5%	5%	5%	5%
Total Fixed Income	40%	35%	30%	25%	20%	15%	10%

Florida Pension Fund Asset Allocations

What do others do?



Portfolios' Market-driven Expected Returns (2024)

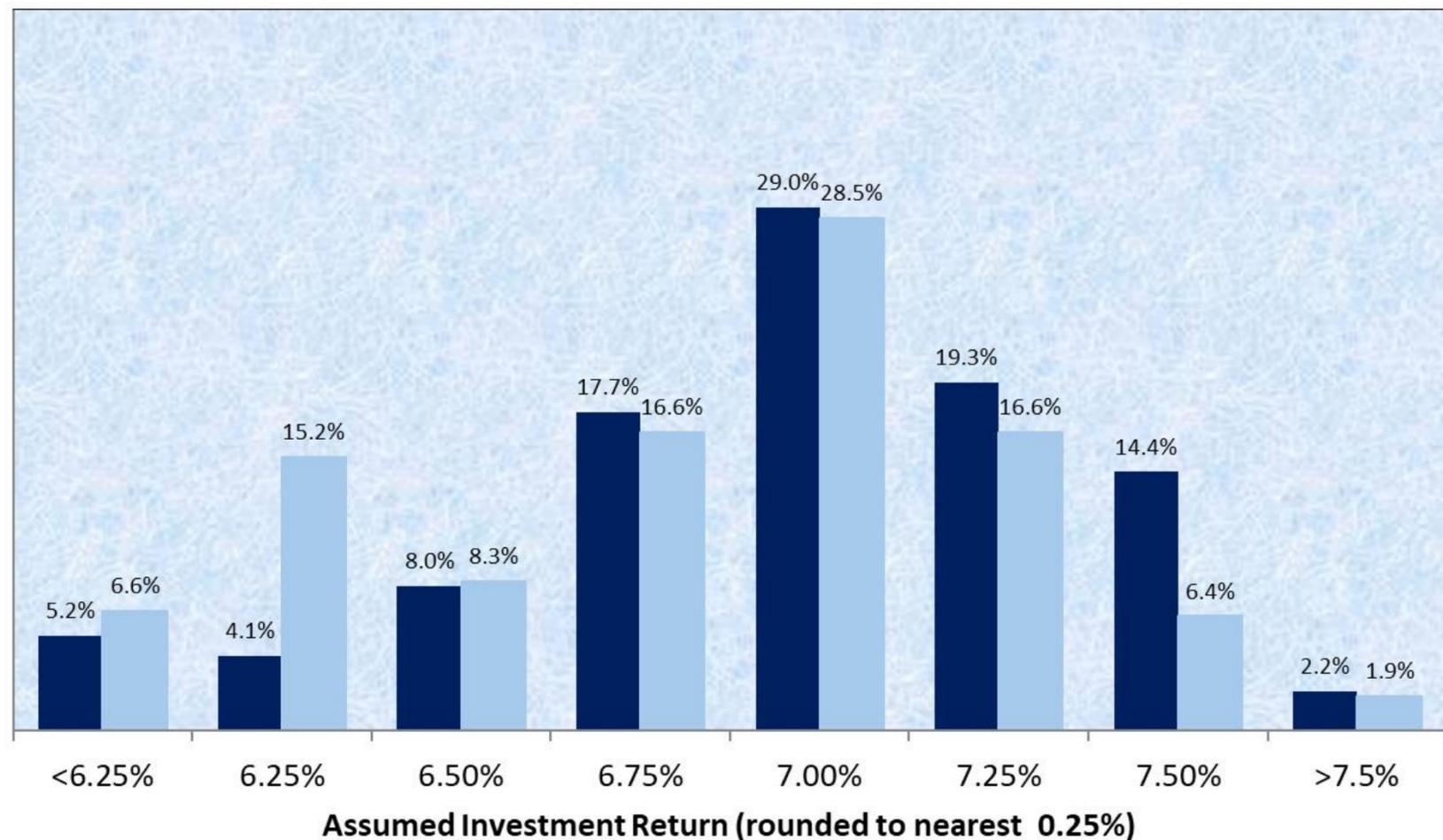
50 th Percentile (50-50 Probability of Achieving)							
BOY 2024 Expected Compound Return Over Next 10 Years							
	← More Conservative Portfolio				More Aggressive Portfolio →		
Investment Firms' Capital Market Assumption Sets (CMAs)*	60/40	65/35	70/30	75/25	80/20	85/15	90/10
1	4.38%	4.45%	5.07%	5.59%	5.66%	5.95%	6.14%
2	5.37%	5.18%	5.72%	6.01%	6.22%	6.48%	6.56%
3	5.39%	5.45%	5.89%	6.05%	6.35%	6.79%	6.94%
4	5.71%	5.85%	6.38%	6.62%	6.59%	6.89%	6.96%
5	5.82%	5.93%	6.41%	6.72%	6.80%	6.94%	7.04%
6	5.82%	6.01%	6.41%	6.77%	6.80%	7.09%	7.25%
7	6.14%	6.22%	6.62%	6.81%	6.92%	7.17%	7.28%
8	6.18%	6.26%	6.67%	6.84%	6.92%	7.17%	7.29%
9	6.41%	6.52%	6.78%	6.92%	7.03%	7.20%	7.29%
10	6.50%	6.61%	7.06%	7.07%	7.11%	7.25%	7.39%
11	6.55%	6.71%	7.12%	7.41%	7.42%	7.74%	7.89%
12	6.70%	6.75%	7.18%	7.48%	7.61%	7.75%	7.95%
2024 Consensus Average	5.91%	5.99%	6.44%	6.69%	6.78%	7.04%	7.16%

* Investment Firms' CMAs published for 2024. Investment Firms do not rank the same across all asset allocations. Some rank a little higher in some asset allocations than they do in others. Nevertheless, they are listed here from 1 through 12.

- Expected returns over next 10 years are driven in large part by the current market conditions
- Notice the horizontal spread from the most conservative portfolio (60/40) to the most aggressive (90/10)
- Notice the vertical spread from the most conservative forecaster (#1) to the most optimistic (#12)

Florida Pension Fund Return Assumptions Adopted

Comparison of 2023 Forecasts for Investment Returns with Florida Local Pension Boards' 2023 Adopted Assumptions



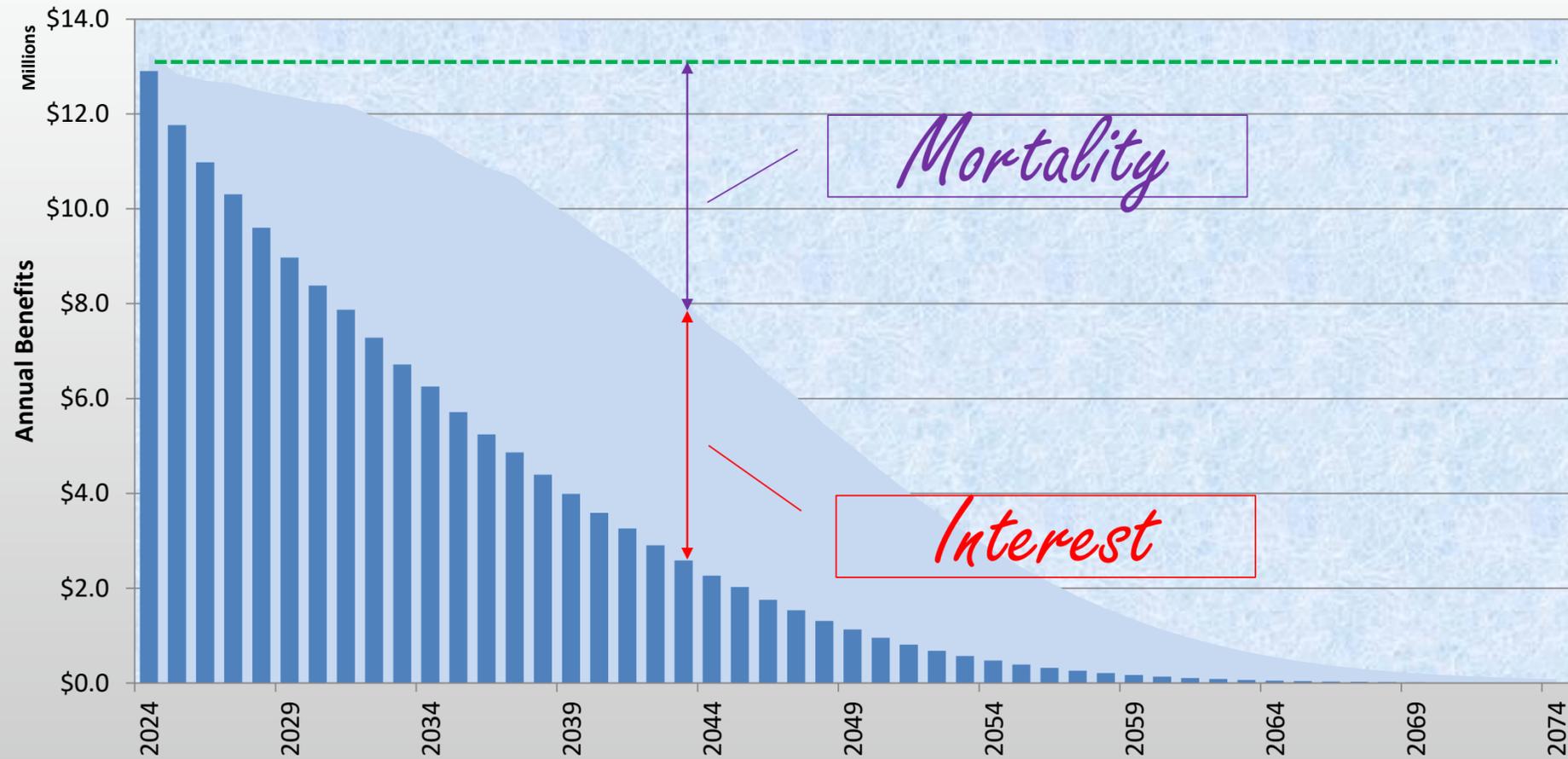
Source: Florida Department of Management Services Database (including 2023 valuation data submissions rec'd through August 16, 2024; excluding plans having low asset values or high non-classified assets).

■ Assumed ■ Forecasted

- Shift back to 2023 again . . .
- Assumptions more optimistic than consensus forecasts
- If forecasters are right, long-term earnings may fall short of today's assumptions

Present Value of Future Cash Flows

Sample Closed Pension Trust Fund
Present Value of Each Year's Expected Annual Benefits



- Liability for retirees today = Sum of **future benefit payments (shaded)** discounted to today (**bars**)
- **Benefits expected for each year are discounted using expected rate of return;**
- **Benefits paid in the future years are expected to gradually decrease due to mortality.**

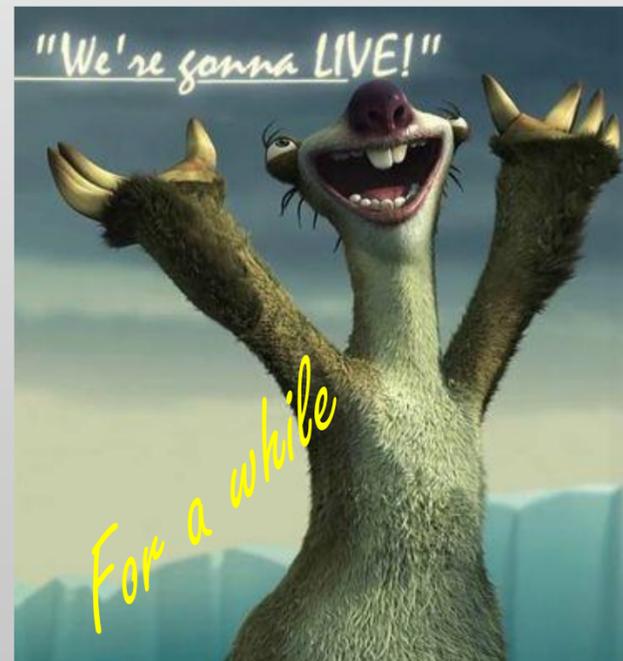
■ Accrued Benefit CashFlows To Current Members ■ Present Value (PV) of Annual Benefits

Mortality Trends



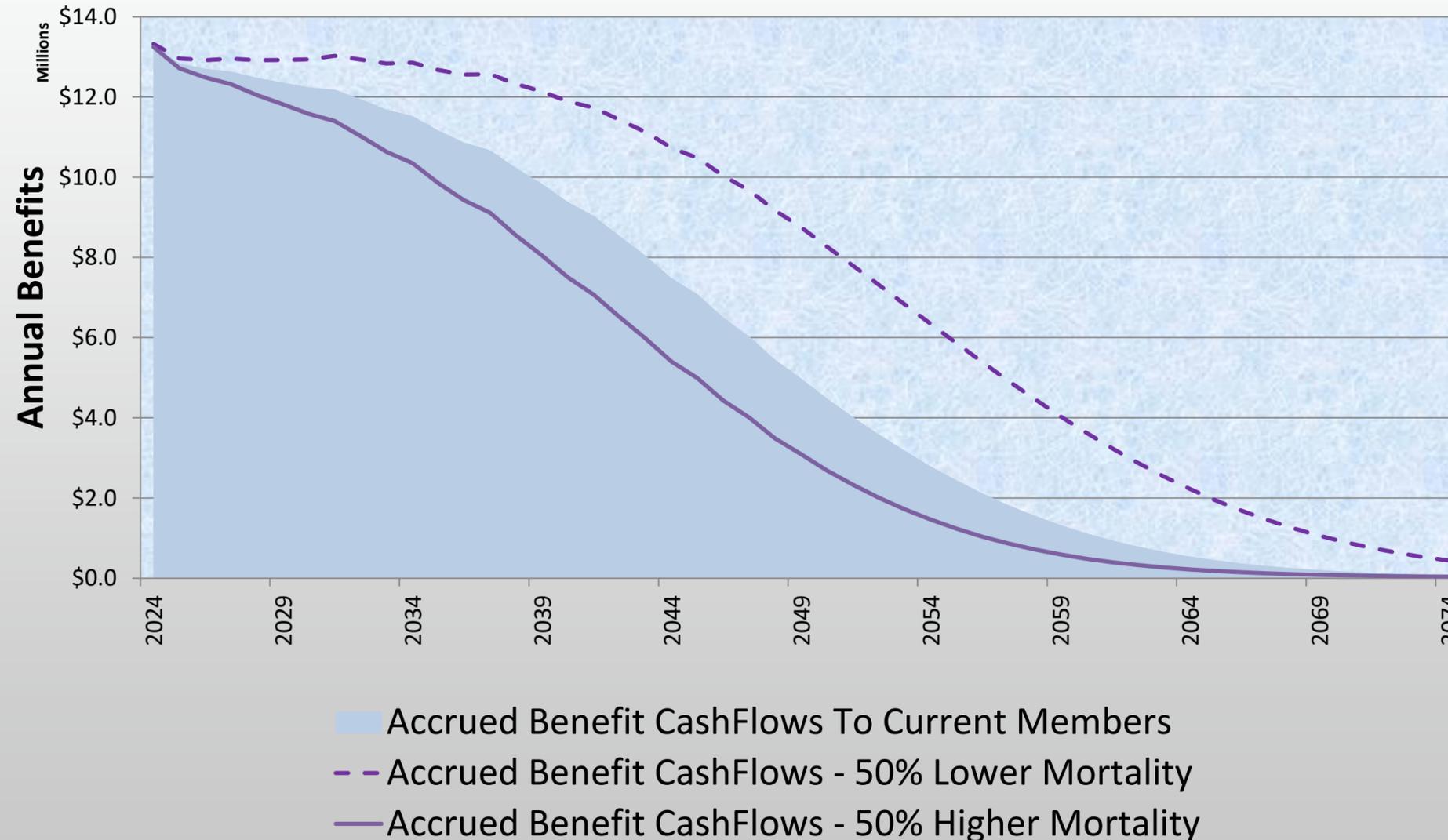
1. Probability of dying is 100%
 - No change

2. Timing is uncertain
 - Continues to evolve
 - Expectations keep changing



Mortality trends

Sample Pension Trust Fund
Present Value of Each Year's Expected Annual Benefits

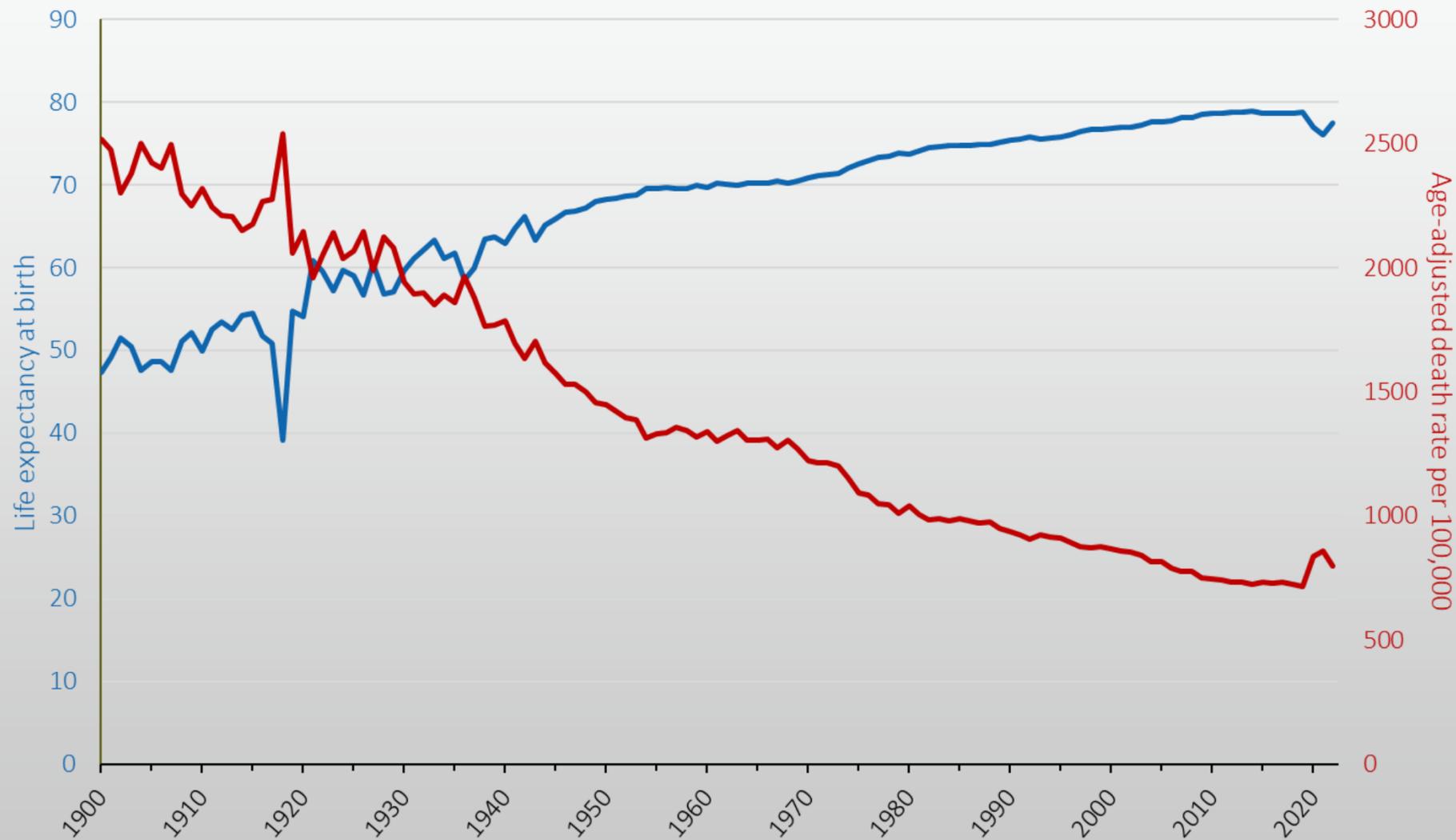


Does timing matter? – Scenario Testing

- Two scenarios tested:
 - Mortality rates multiplied by factor of 1.5
 - Mortality rates multiplied by factor of 0.5
- 50% higher mortality reduces total of benefits paid by 17% and liability by 11%
- 50% lower mortality increases total benefits paid by 35% and liability by 17%.

Mortality Trends

Age-adjusted death rates and life expectancy at birth: U.S., 1900-2022

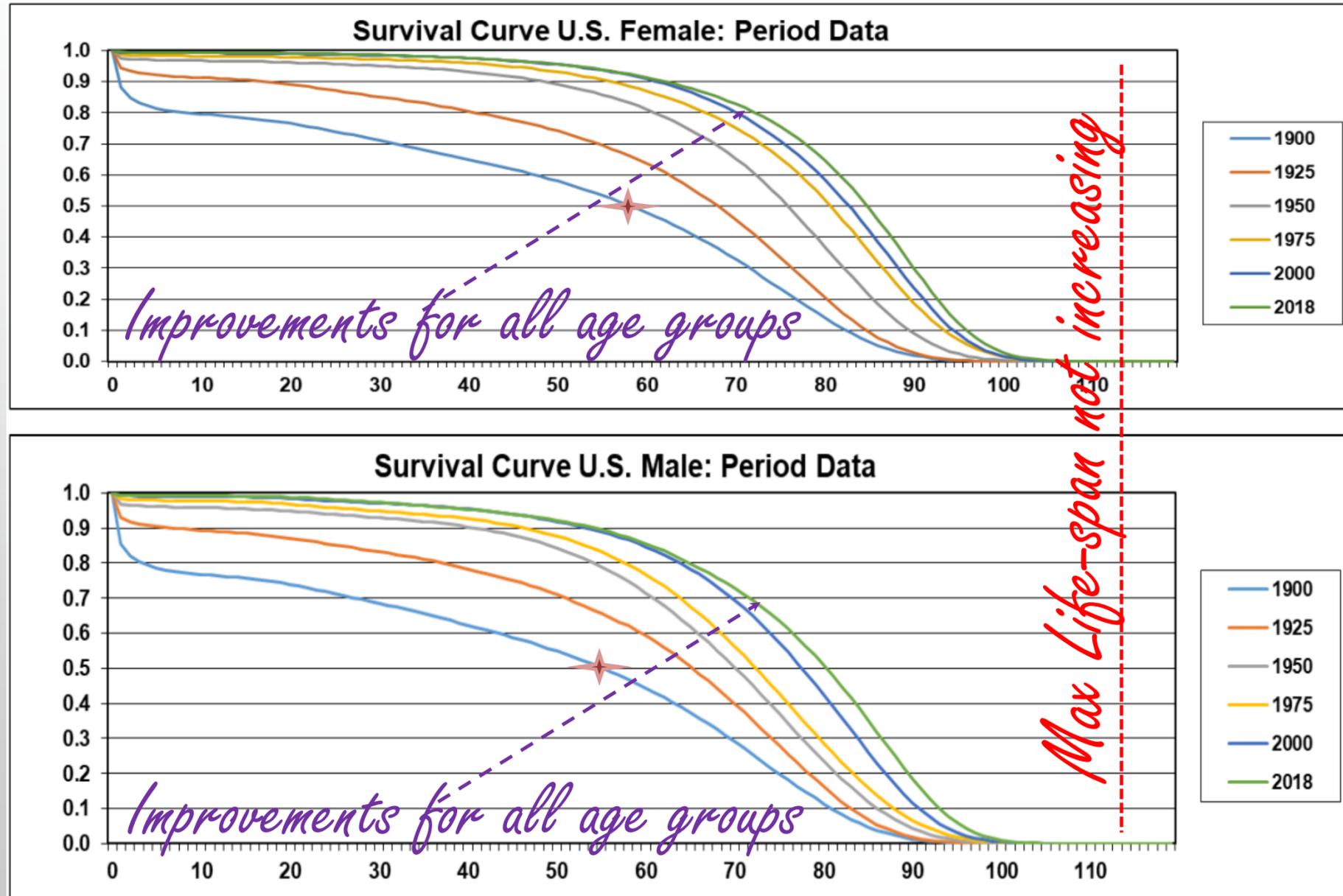


(courtesy Robert Anderson, NCHS)

Big picture

1. Mortality rates have been declining through most of the 20th century
2. Declines slowed down at the beginning of the 21st century
3. Historically, temporary spikes didn't result in trend reversal

Mortality Trends



1. Improvements in survival over time varied by age group:
 - Dramatic improvements observed for children in early 20th century
 - Improvements during retirement ages continue through 20th century and into 21st century
2. Maximum life-span not increasing

Courtesy of SSA Chief Actuary Office

Mortality Trends



Jeanne Calment enjoys her daily cigarette and glass of red wine on the occasion of her 117th birthday.

[Humans Could Live up to 150 Years, New Research Suggests | Scientific American](#)

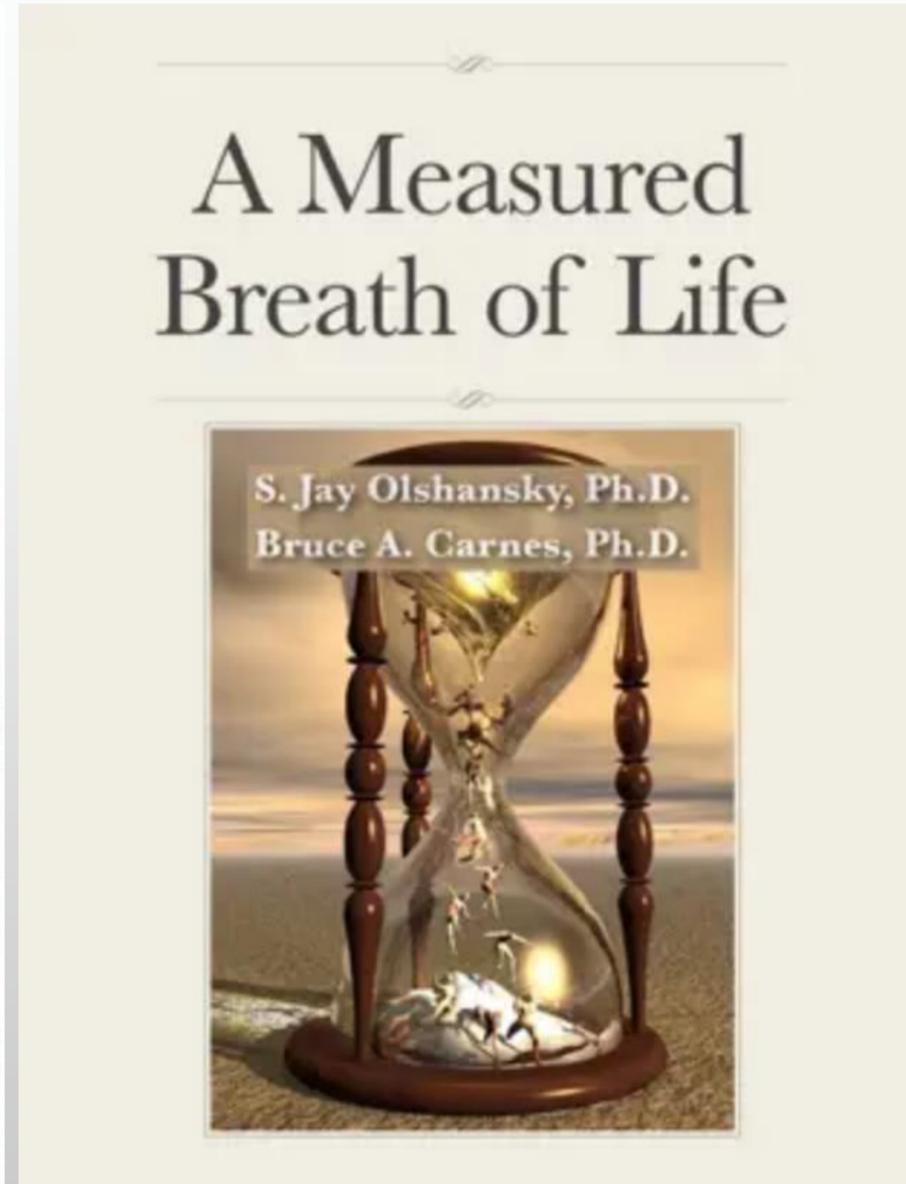
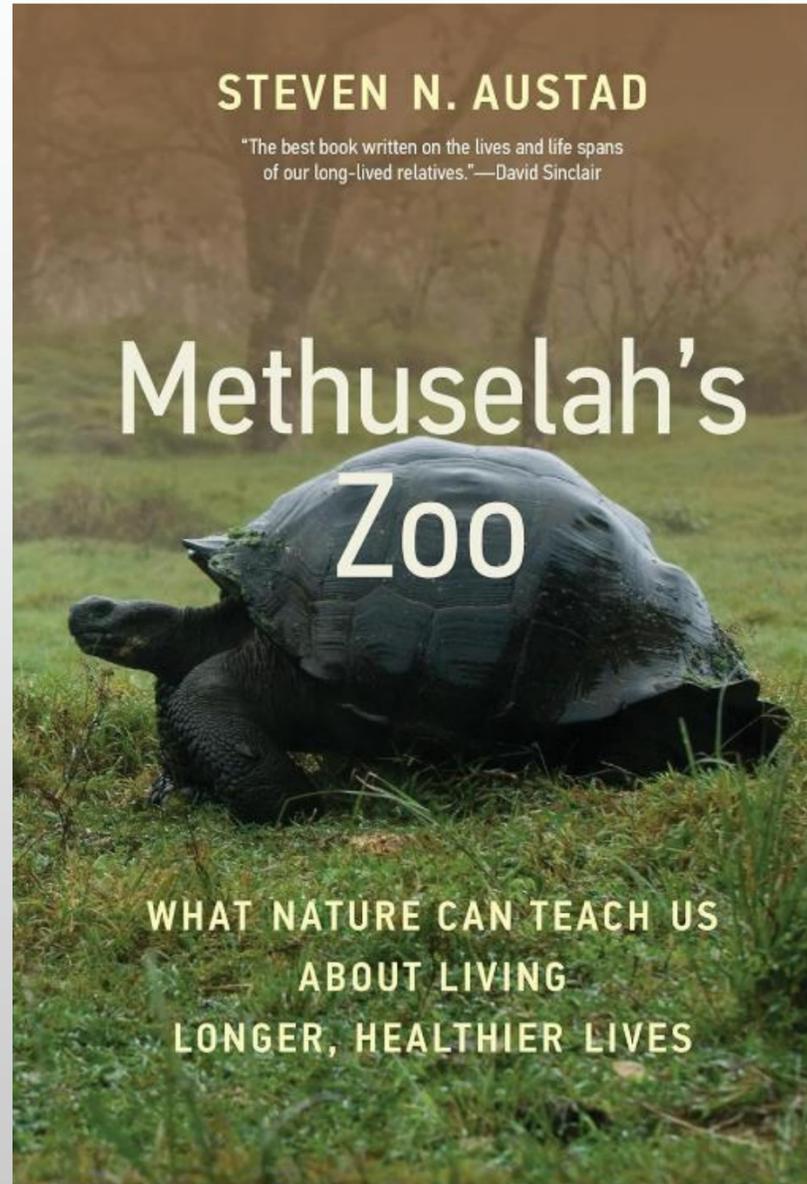
Recent medical developments failed to increase the maximum life-span extensions.

Jeanne Calment died in 1997 at the age of 122 and still holds the record for being the person with the longest life span.

Jiroemon Kimura died in 2012 at the age of 116.



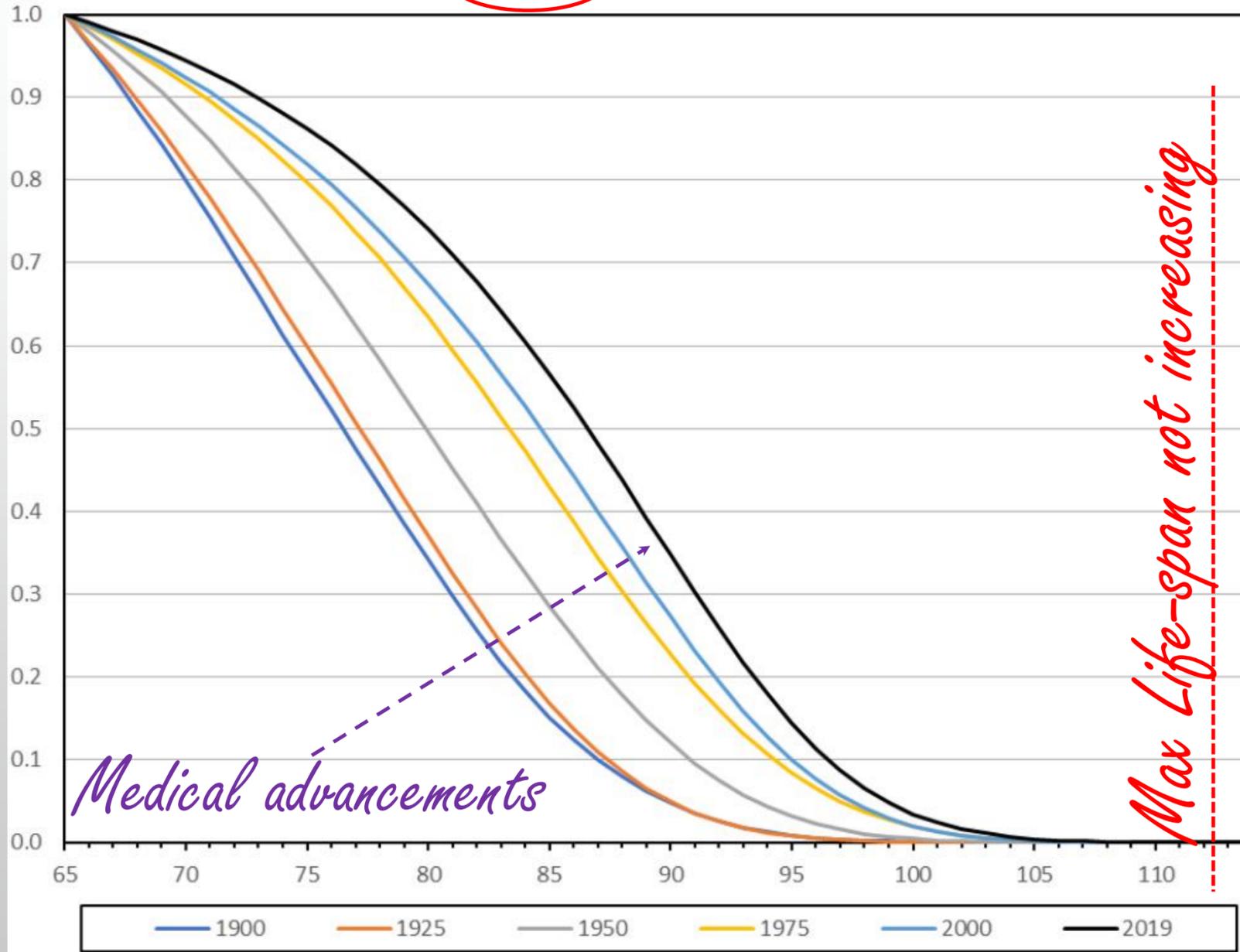
Mortality Trends



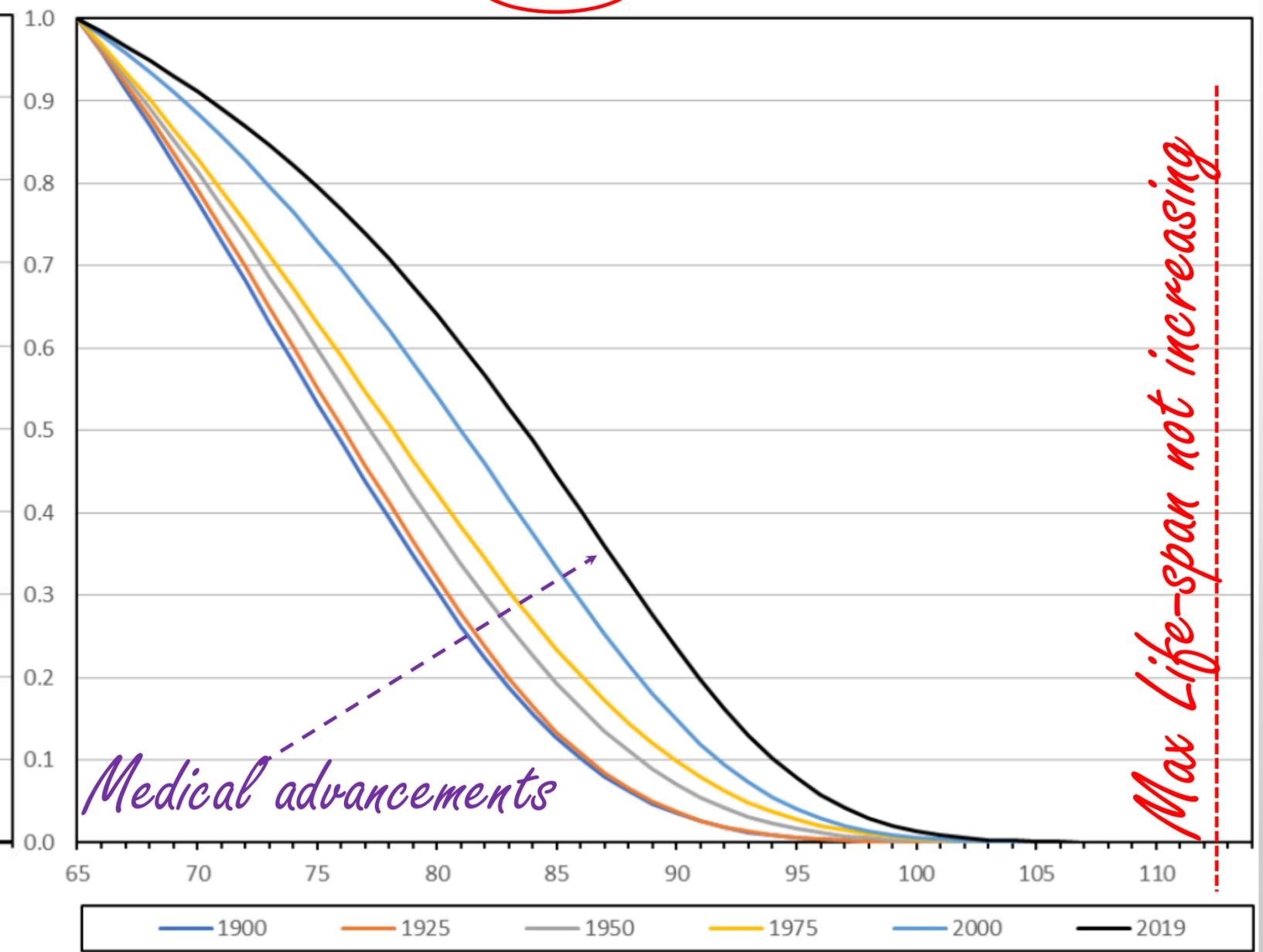
1. No consensus on whether future medical advances could result in increased maximum life-span.
2. Dr. Steven Austad (U-Alabama) is betting against Dr. Jay Olshansky (U-Illinois), that there will be someone at least 150 years of age by the year 2150 (implying that this person had already been born).

Mortality Trends

Survival Curve **from 65**, U.S. Female: Period Data

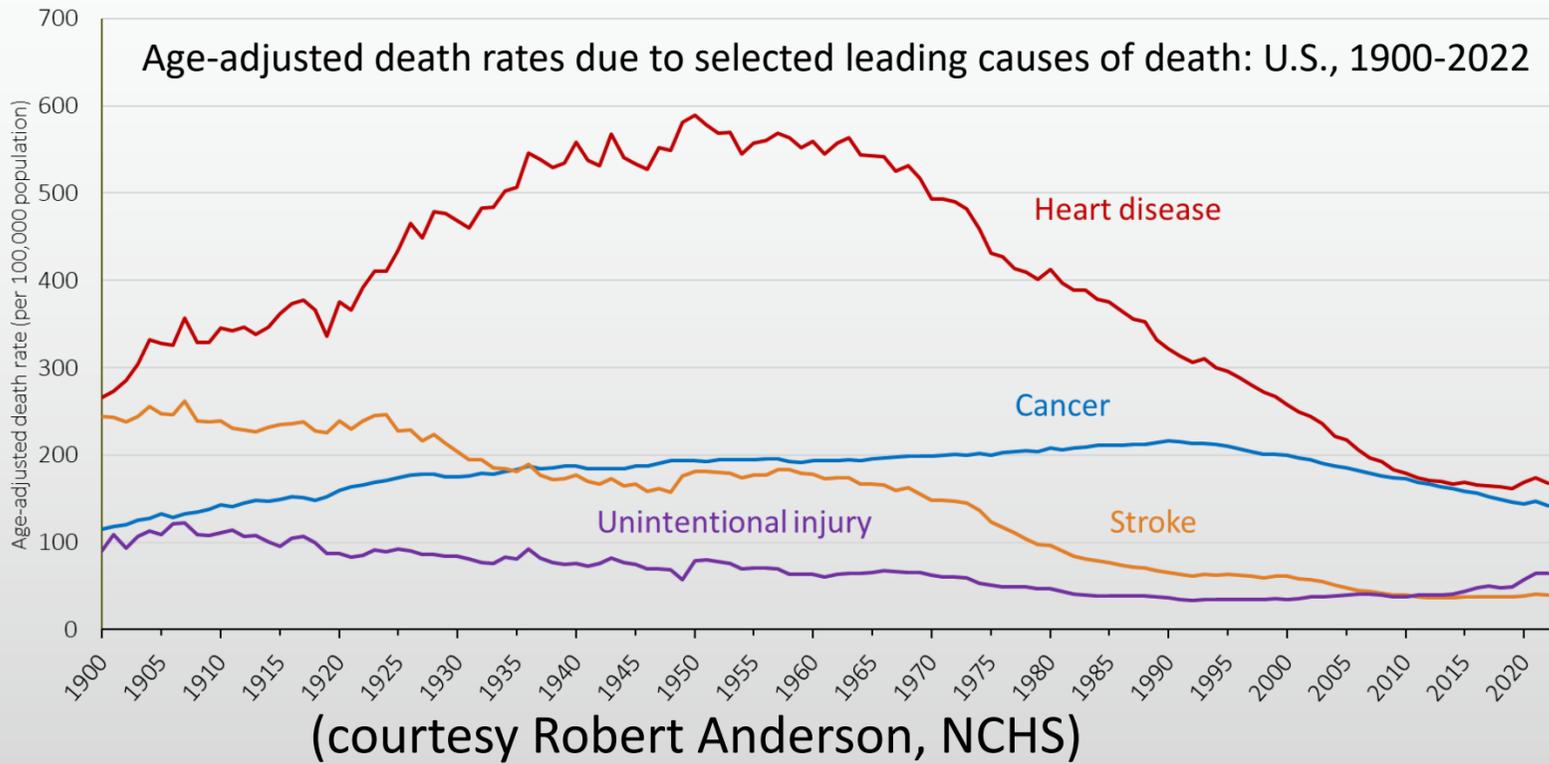


Survival Curve **from 65**, U.S. Male: Period Data

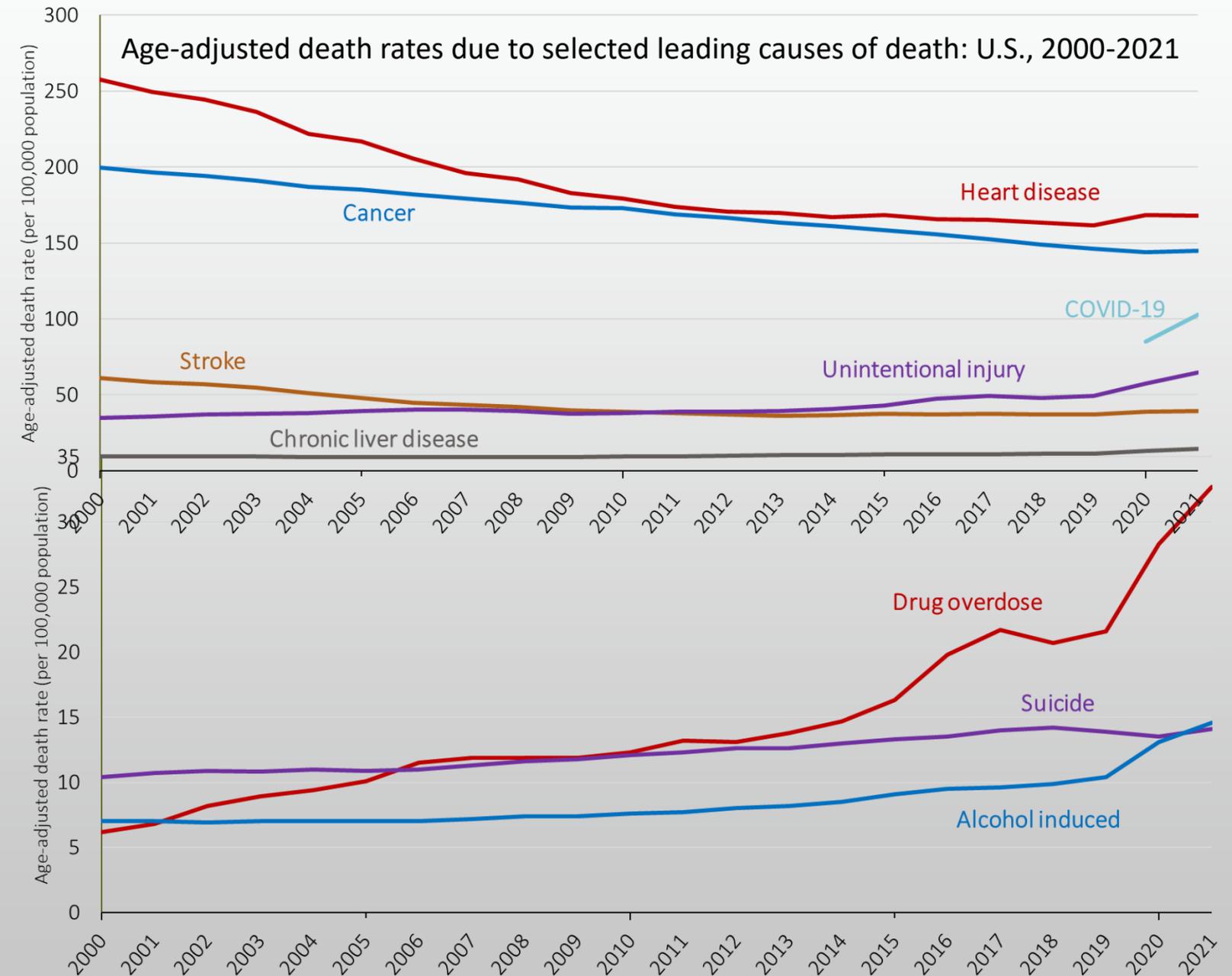


Courtesy of SSA Chief Actuary Office

Mortality Trends

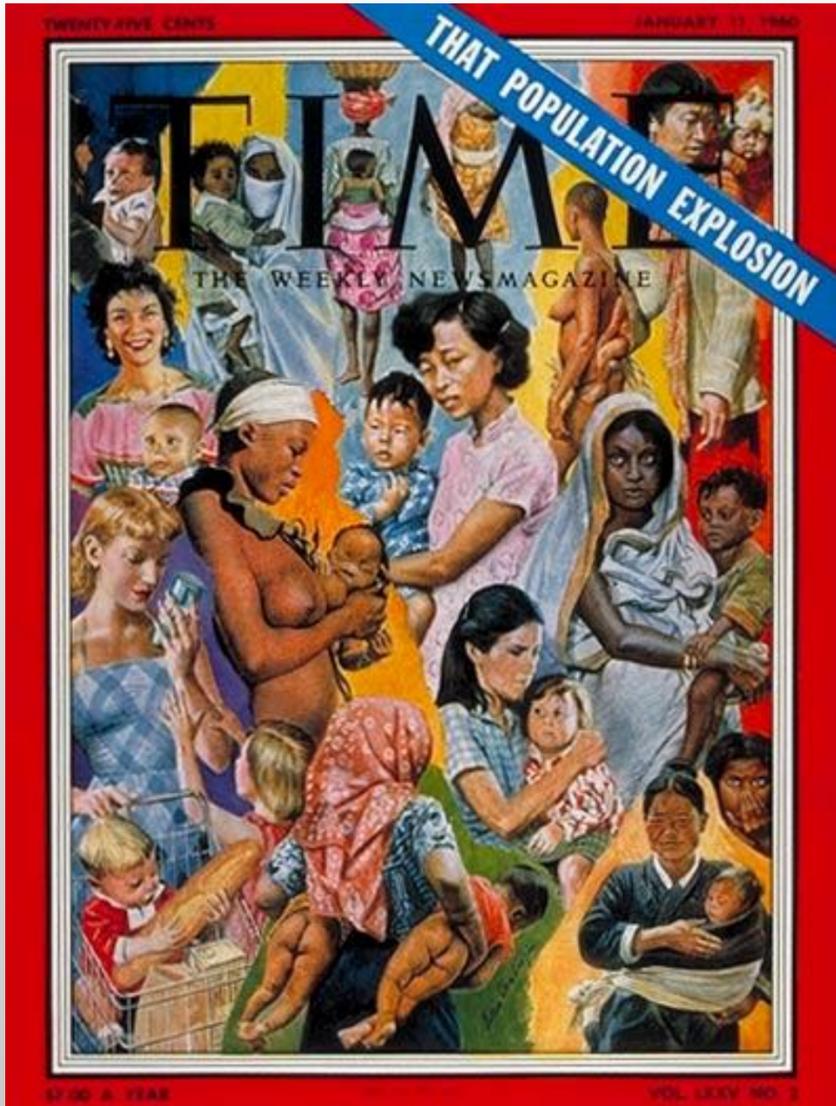


1. Improvements after 1950 largely driven by advancements in treatment and prevention of heart disease.
2. Lower prevalence of heart disease was partially offset by increased mortality from other causes.

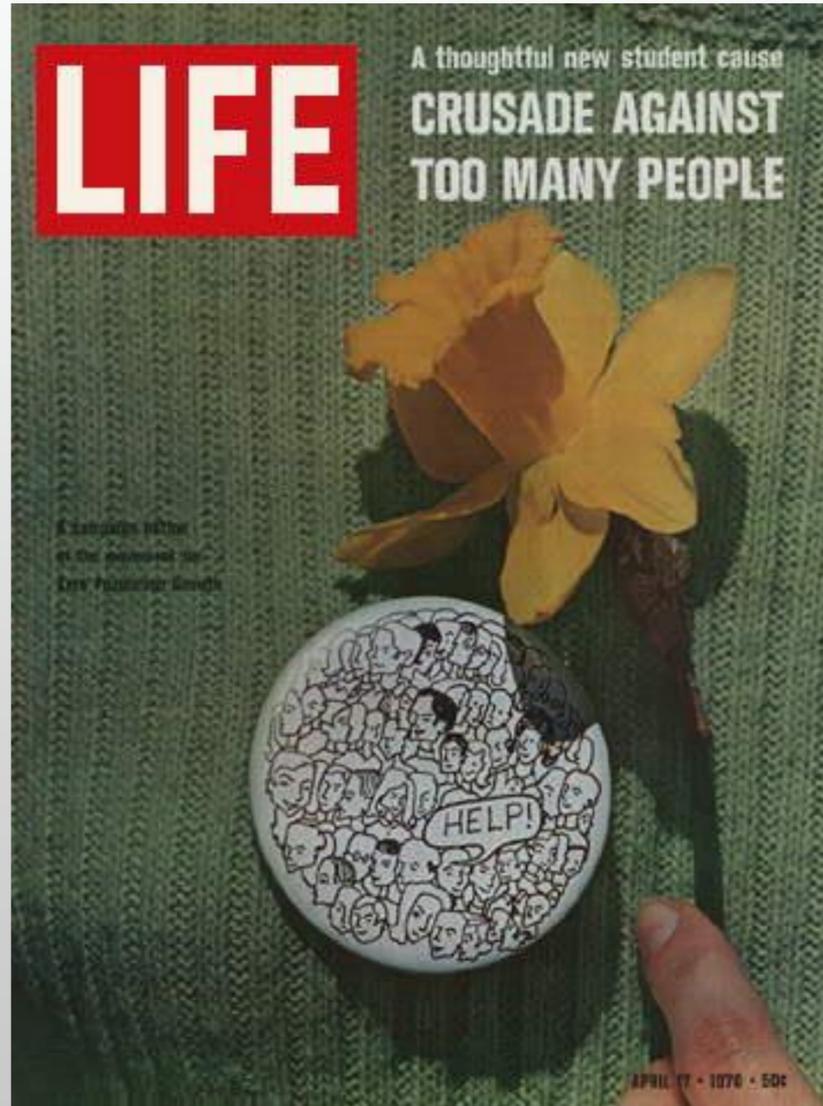


Fertility Trends

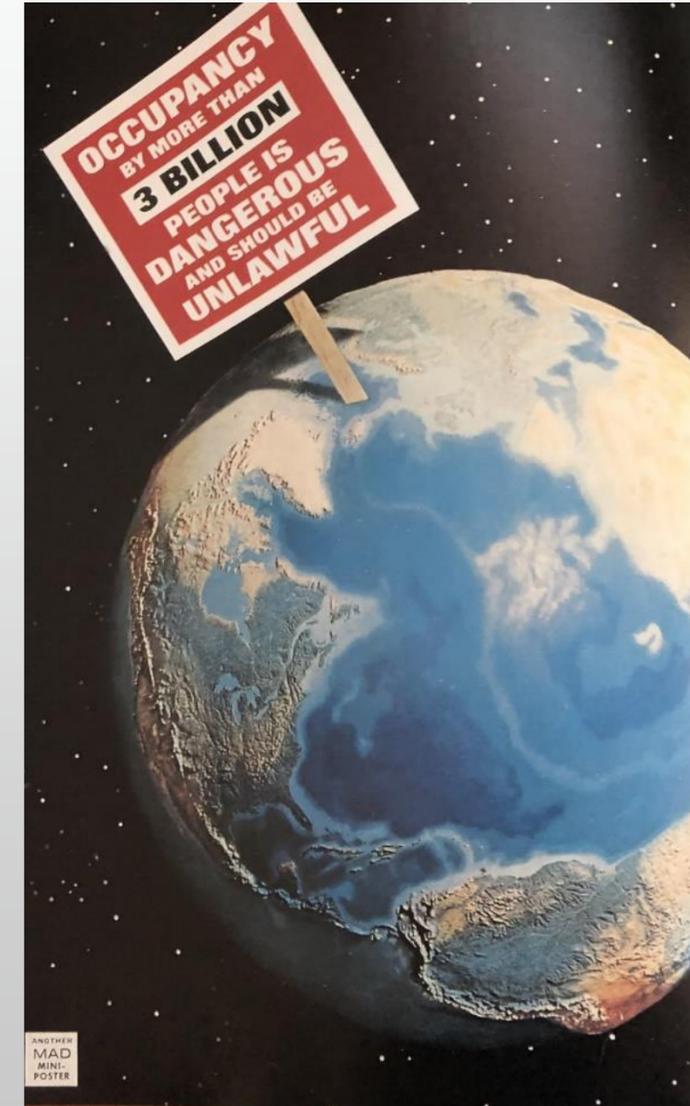
Then ...



1960



1970



1975

Fertility Trends

... and Now

THE WEEK

Why does the US fertility rate keep dropping?

Women are less eager to have children

Facebook, X, LinkedIn, Newsletter

This illustration shows five baby bottles of varying heights, from tallest on the left to shortest on the right. A thick red arrow points downwards from the top left towards the bottles, indicating a downward trend in fertility.

2024

THE WALL STREET JOURNAL

SUBSCRIBE SIGN IN

Suddenly There Aren't Enough Babies. The Whole World Is Alarmed.

Birthrates are falling fast across countries, with economic, social and geopolitical consequences

This video thumbnail features a playground with two children on swings. The text overlay discusses the global decline in birthrates and its consequences.

2024

Americans are having fewer babies as birth rate hits historic low, CDC reveals

Experts share factors that could influence couples to remain child-free

By Angelica Stabile, Melissa Rudy · Fox News

Published August 2, 2024 5:00am EDT | Updated August 13, 2024 9:42pm EDT

IS THE U.S. HEADED FOR A POPULATION COLLAPSE?

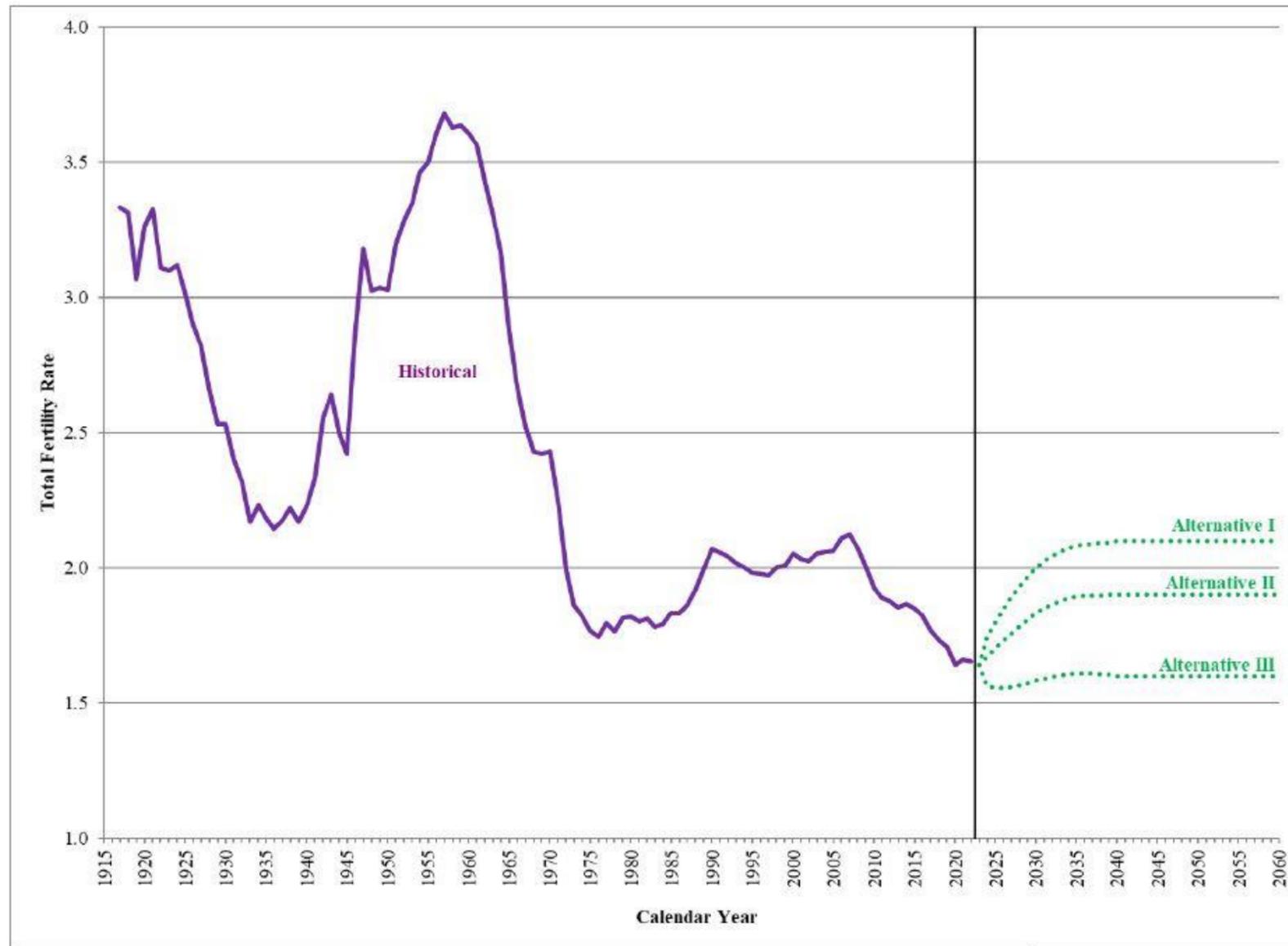
JESSE WATTERS PRIMETIME

This video thumbnail shows a woman with blonde hair on a news set. The text overlay asks 'IS THE U.S. HEADED FOR A POPULATION COLLAPSE?' and identifies the program as 'JESSE WATTERS PRIMETIME'.

2024

Fertility Trends

Chart 1.3: Historical and Projected Total Fertility Rates



1. Fertility reached a peak of 3.7 in 1957
2. Most recently, the lowest rate of 1.64 was recorded for 2020
3. Fertility rates are expected to slowly increase to 1.9
4. Demographers refer to the recent drop in the fertility rates as temporary “tempo effect” due to a delay in childbearing to older ages

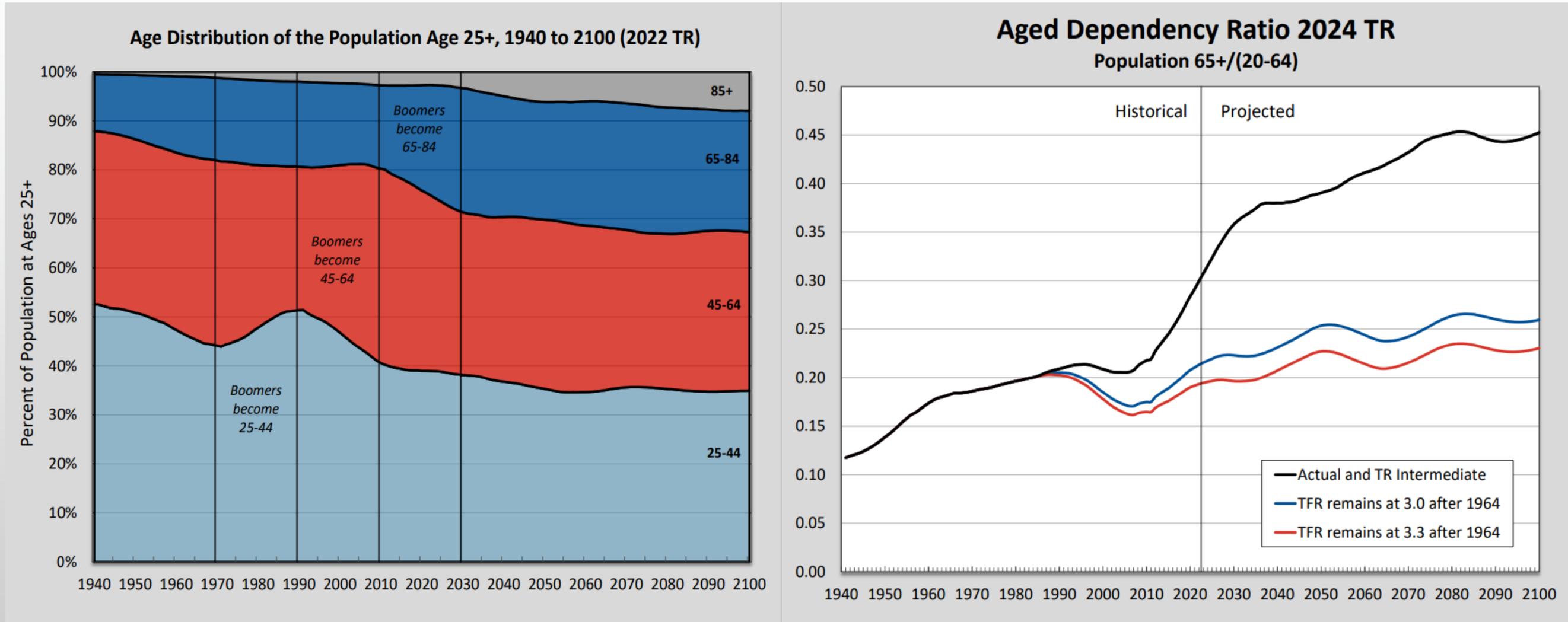
Fertility rate measures the average number of children women have during their lifetime

https://www.ssa.gov/oact/TR/2024/2024_Long-Range_Demographic_Assumptions.pdf

Social Security Administration
Office of the Chief Actuary
May 6, 2024

Courtesy of SSA Chief Actuary Office

Demographic Profile



Aged dependency ratio = (population age 65 and older) / (population age 20 through 64).
 The drop in birth rates after 1965 has caused a sharp increase in the aged dependency ratio between 2010 and 2040.

Courtesy of SSA Chief Actuary Office

Summary

- Forecasts from economists are generally less optimistic than assumptions adopted by our boards,
- Life expectancy continues to increase, but there is a limit,
- US society is aging and will to continue to age, aged dependency ratio is increasing and is expected to continue to grow.
- Pension plans are long-term propositions, we need to employ long-term thinking now, we need to prefund now to be ready for the uncertain future.

Disclaimers

- This presentation shall not be construed to provide tax advice, legal advice or investment advice; consult specialists in these fields for their opinions.
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- This presentation expresses the views of the presenters and does not necessarily express the views of the presenter's employer or the FPPTA.

ACKNOWLEDGEMENT

Thank you to Pete Strong, FSA, EA, MAAA
who checked and peer reviewed this presentation