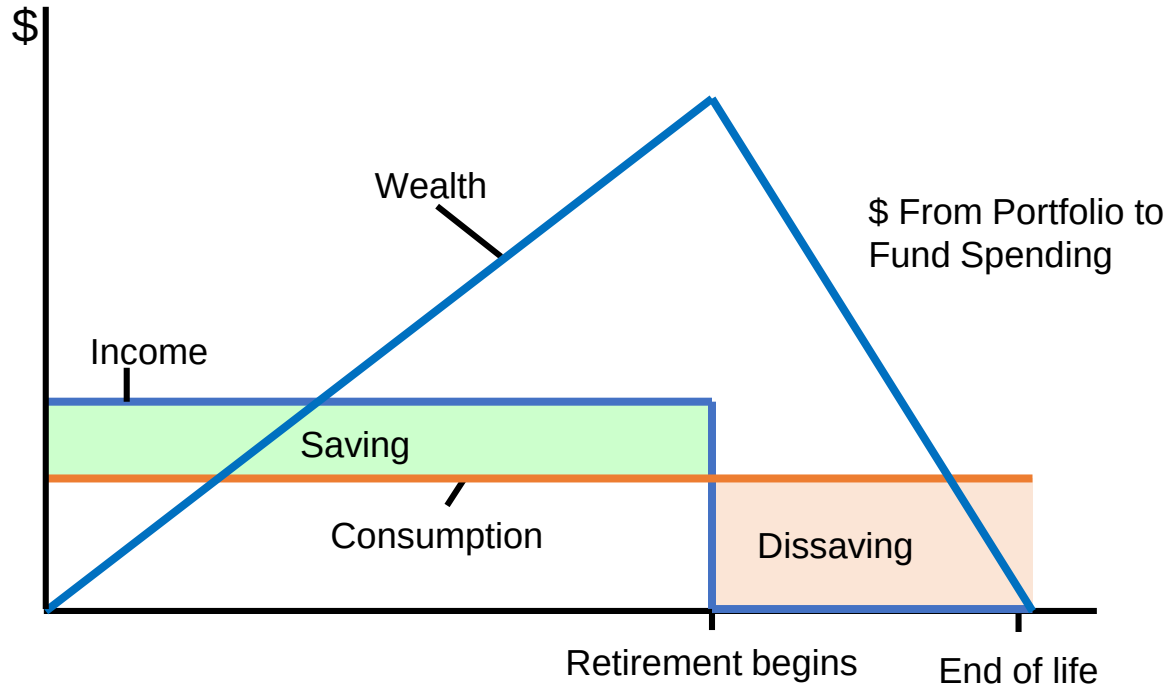
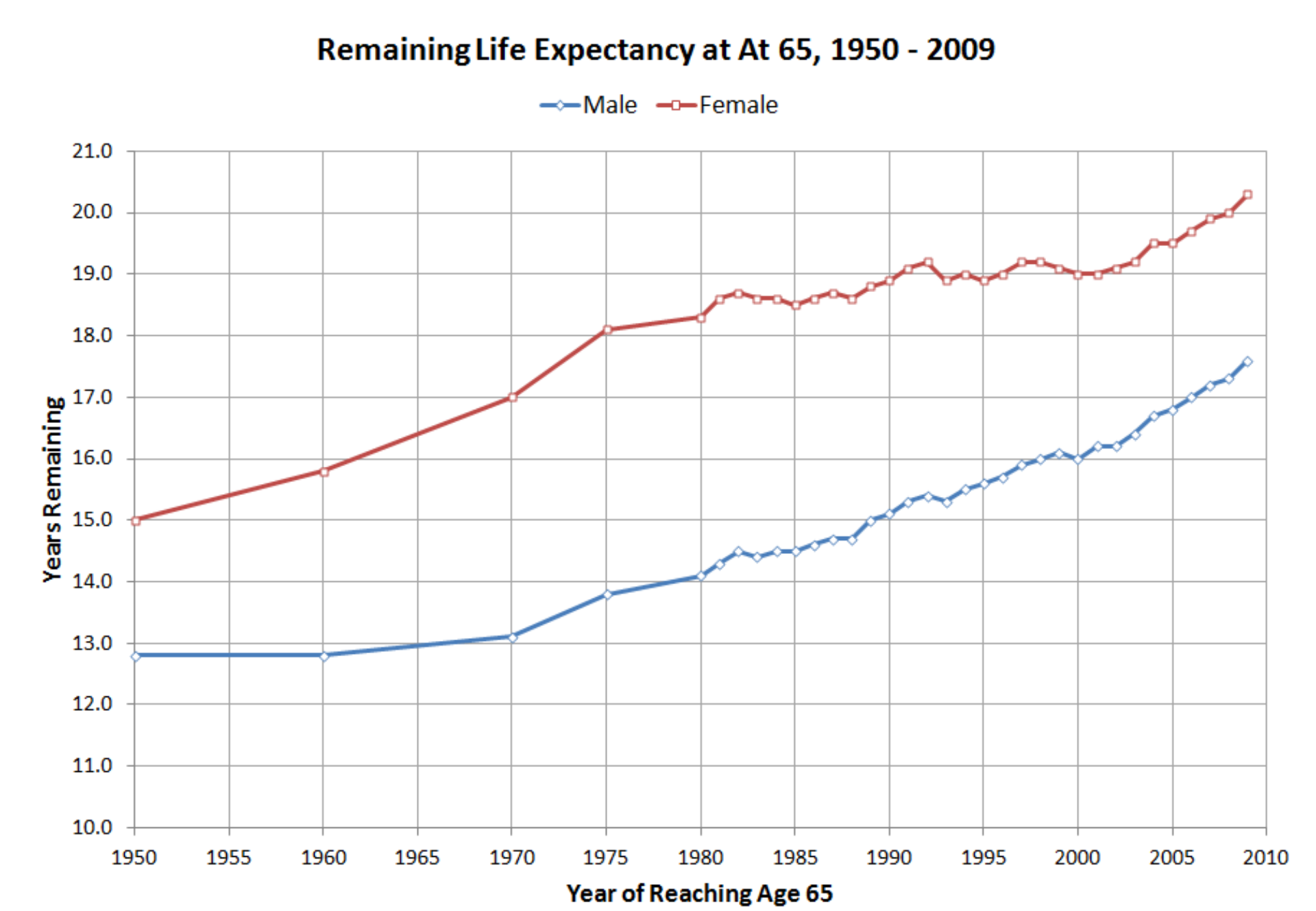
Low Returns and Optimal Retirement Savings

David Blanchett, Morningstar
Michael Finke, The American College
Wade Pfau, The American College

Retirement According to the Life Cycle Hypothesis

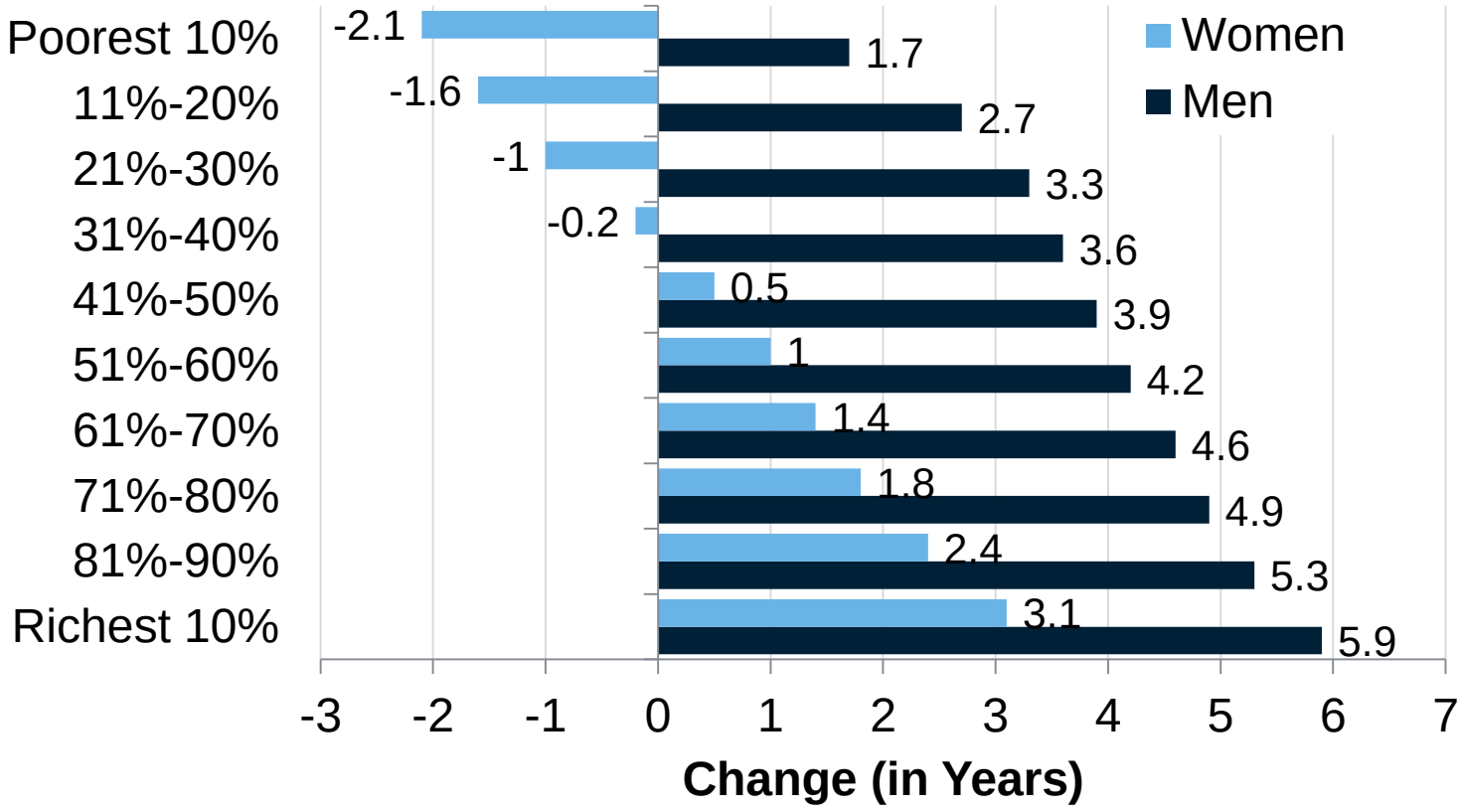




Source: U.S. Centers for Disease Control, Health, United States, 2011, www.cdc.gov/nchs/data/hus/hus11.pdf#022

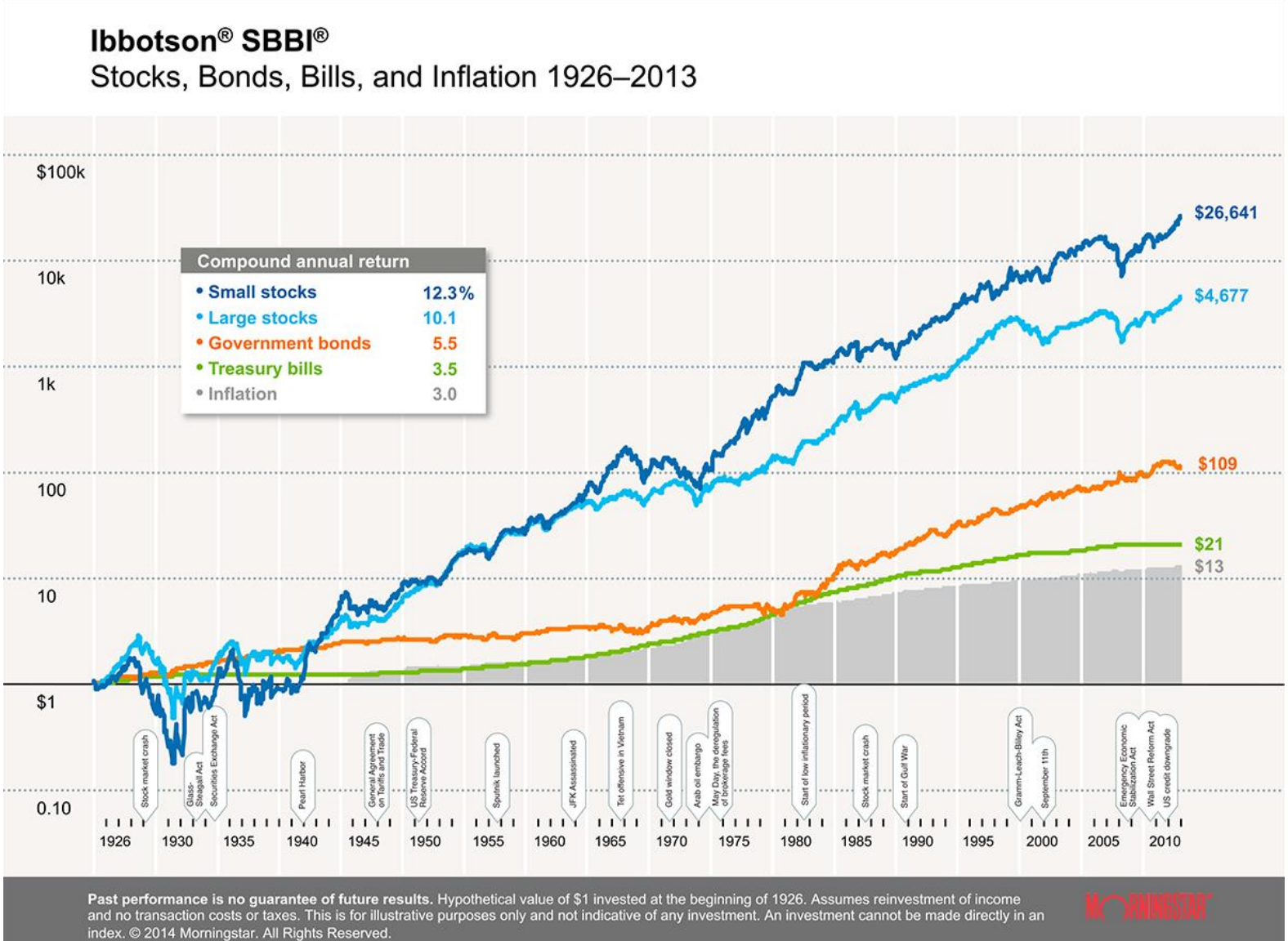
Wealthier People Tend to Live Longer

Change in average additional life expectancy (in years) at age 55, by wealth, between cohorts born in 1920 and 1940

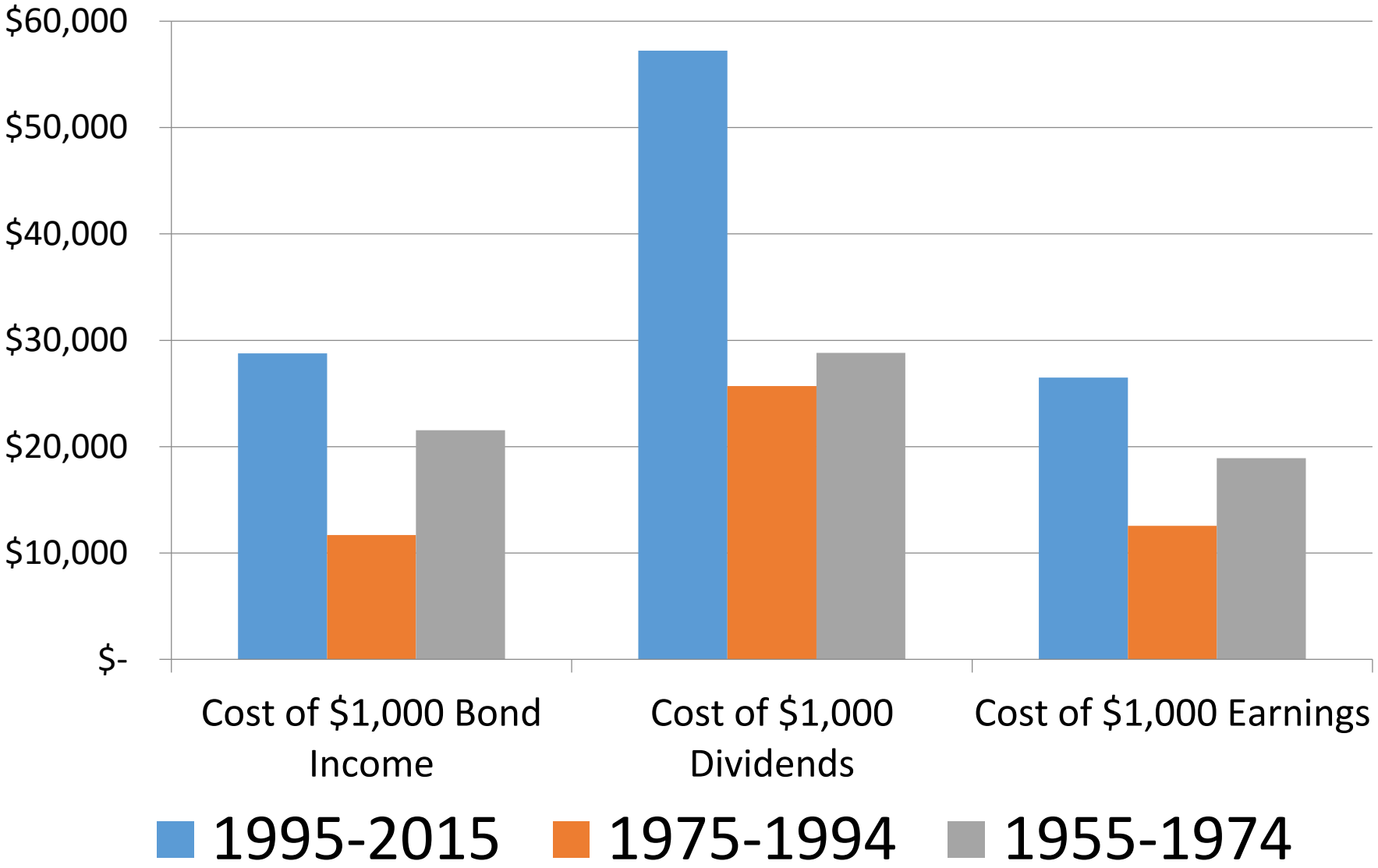


Source: Barry Bosworth, Brookings Institution

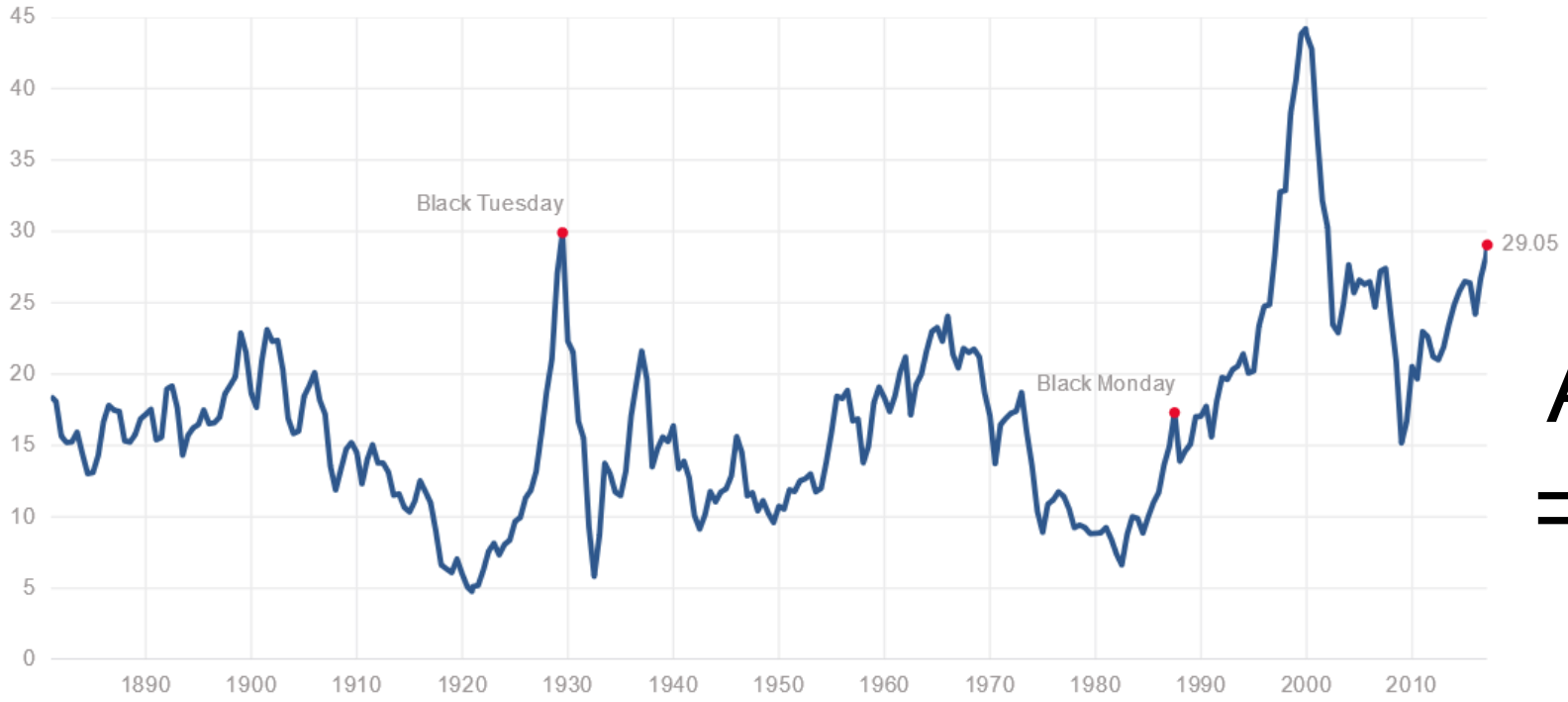
Asset Returns



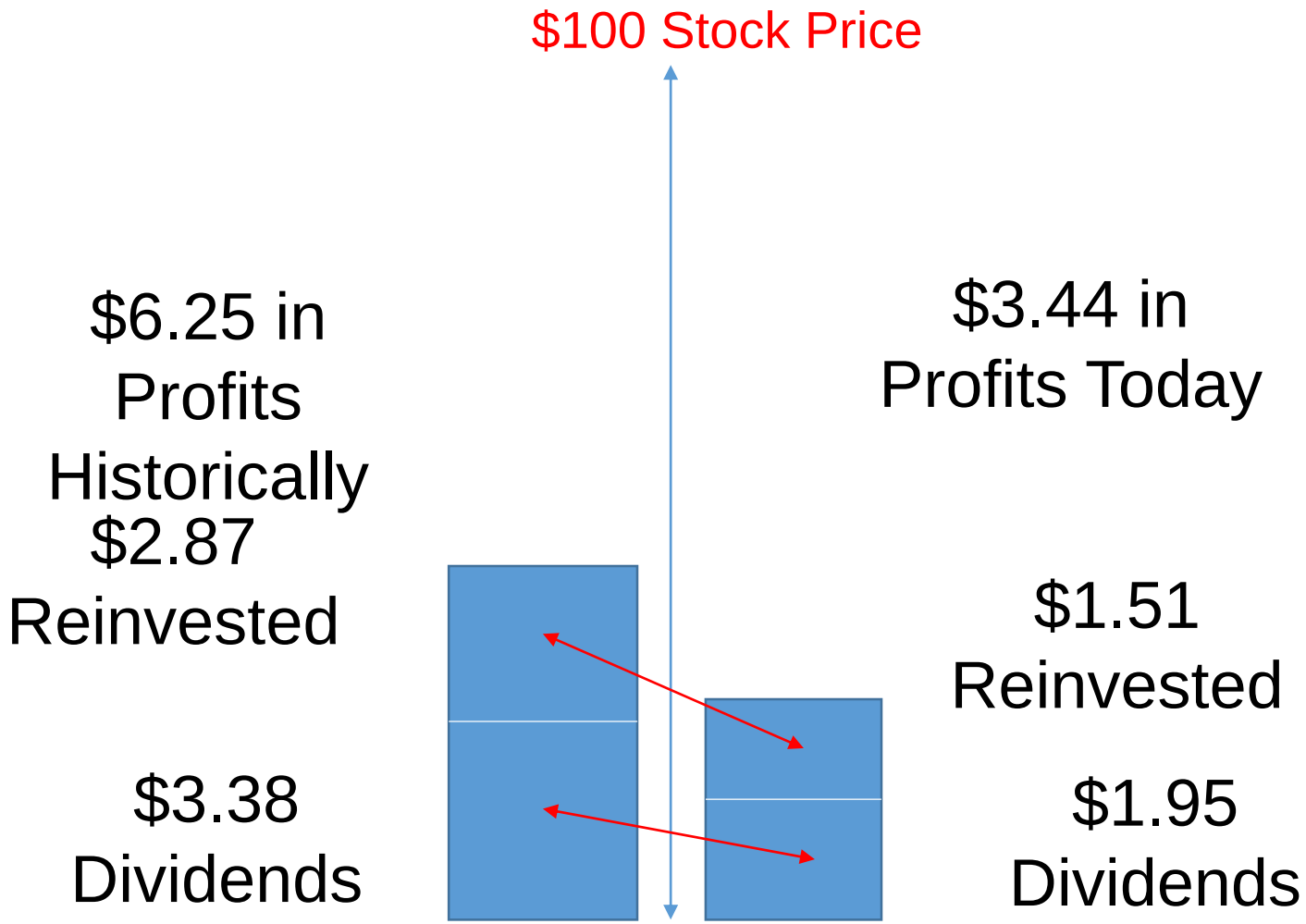
Prices of Risky and Safe Assets are Higher



Equities – Shiller P/E



Avg = 16


$100 Stock Price
$6.25 in Profits Historically
$2.87 Reinvested
$3.38 Dividends
$3.44 in Profits Today
$1.51 Reinvested
$1.95 Dividends

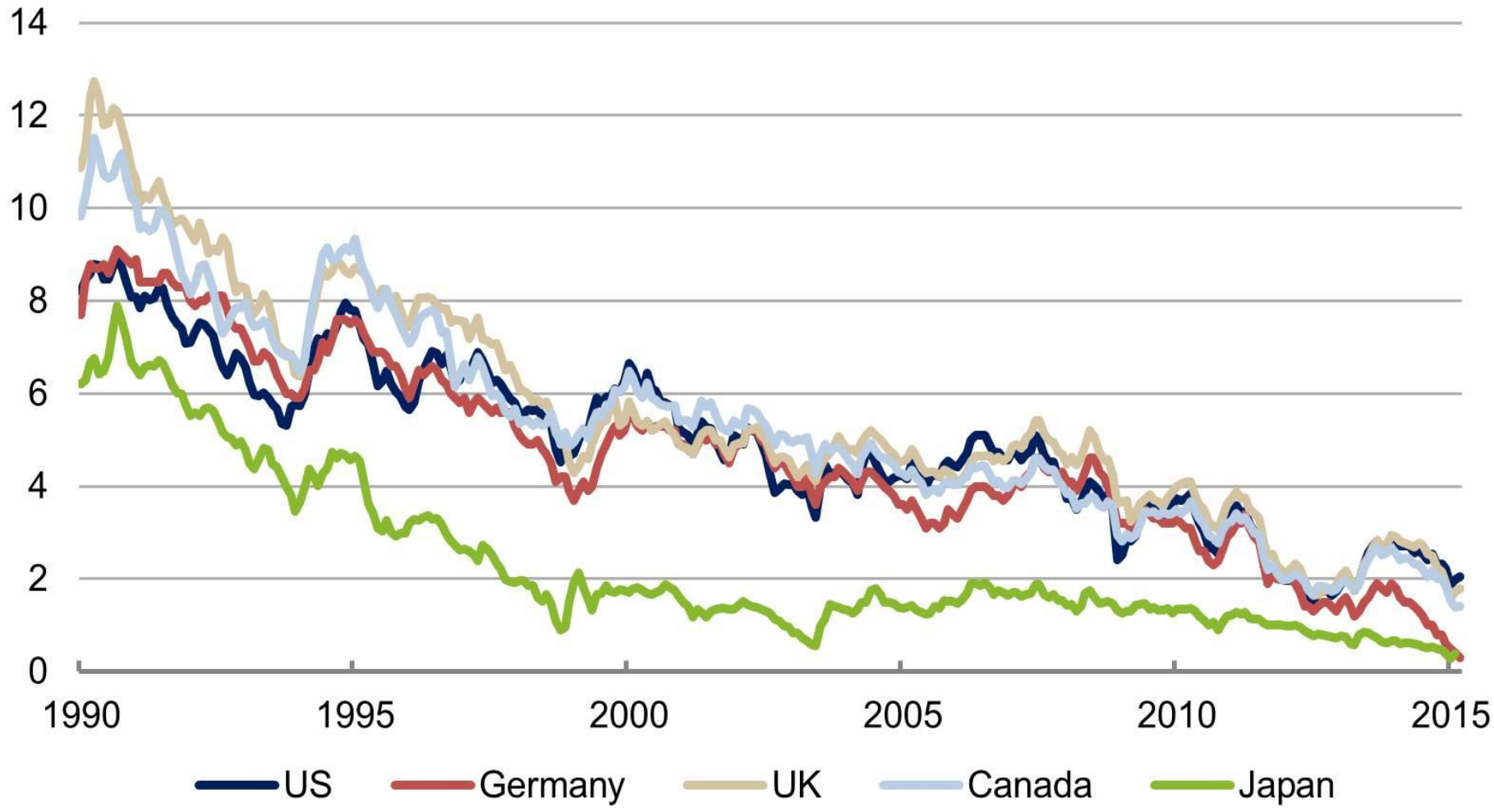
What Does Current P/E Imply?

Results For S&P 500 From Different Starting Shiller P/Es 1926-2012

Starting P/E		Avg. Real	Worst Real	Best Real	Standard
Low	High	10 Yr Return	10 Yr Return	10 Yr Return	Deviation
5.2	9.6	10.3%	4.8%	17.5%	2.5%
9.6	10.8	10.4%	3.8%	17.0%	3.5%
10.8	11.9	10.4%	2.8%	15.1%	3.3%
11.9	13.8	9.1%	1.2%	14.3%	3.8%
13.8	15.7	8.0%	-0.9%	15.1%	4.6%
15.7	17.3	5.6%	-2.3%	15.1%	5.0%
17.3	18.9	5.3%	-3.9%	13.8%	5.1%
18.9	21.1	3.9%	-3.2%	9.9%	3.9%
21.1	**25.1**	**0.9%**	**-4.4%**	**8.3%**	**3.8%**
25.1	46.1	0.5%	-6.1%	6.3%	3.6%

Source: *Asness, 2012*

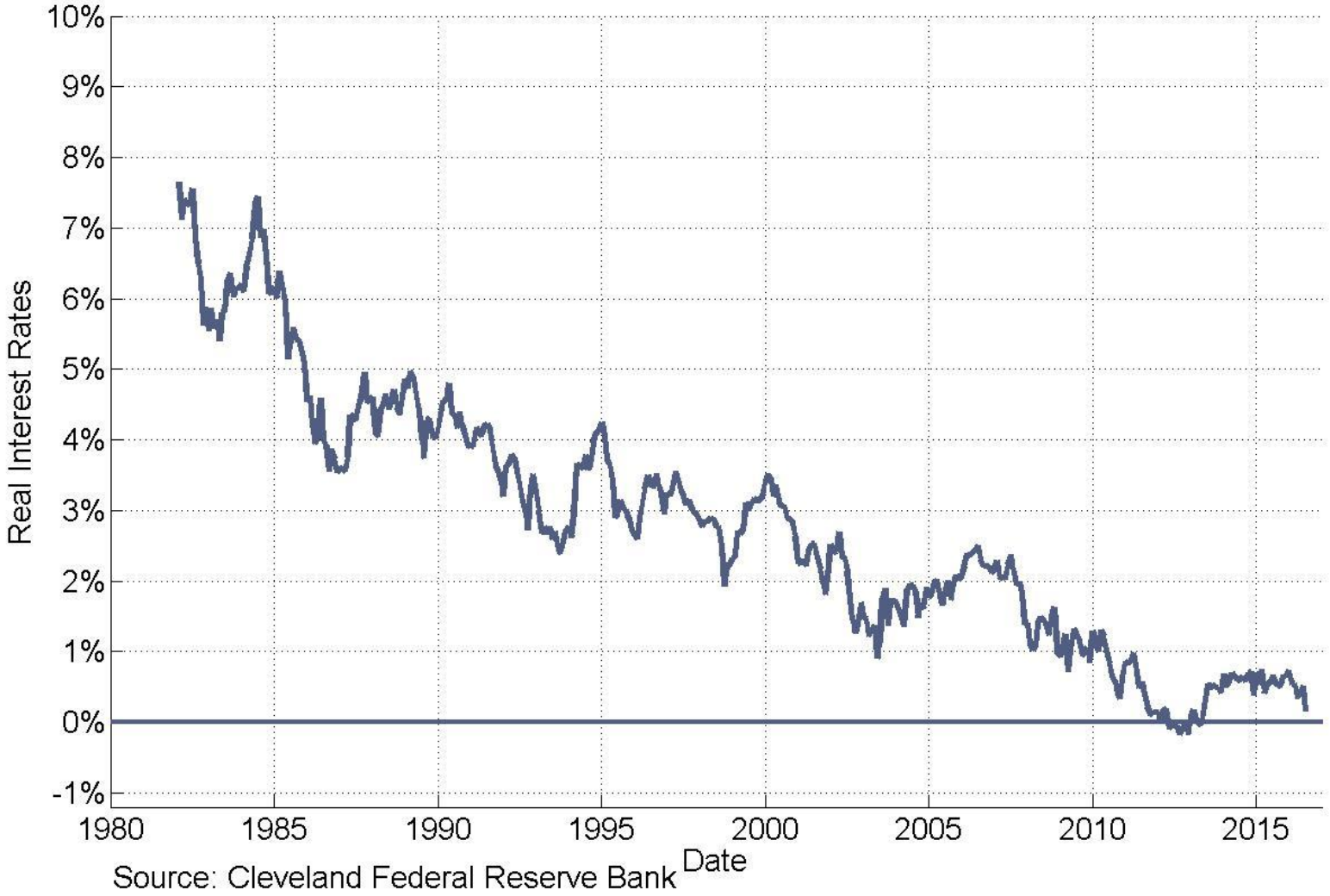
Figure 1: 10-Year Government Bond Yields (%)



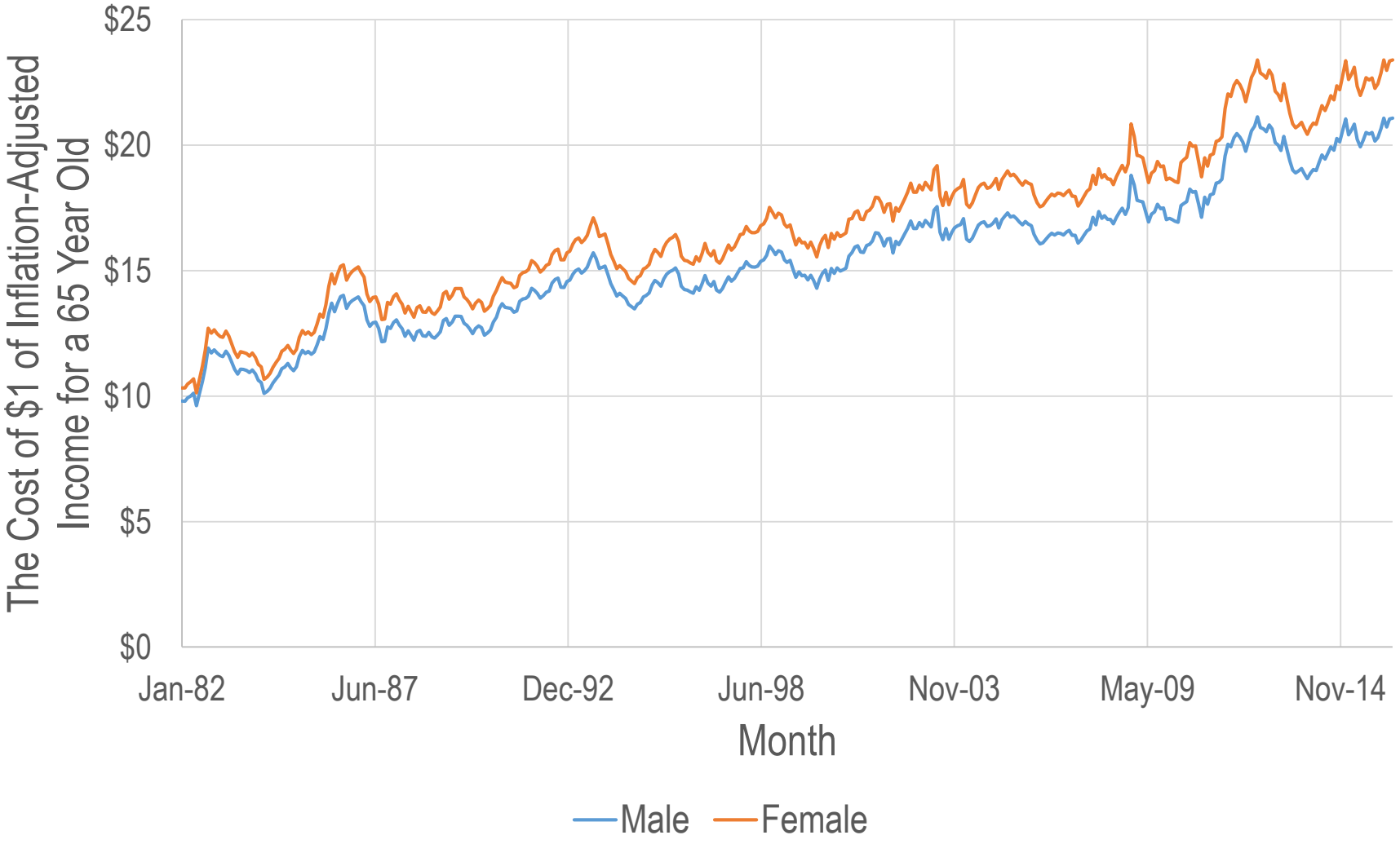
Sources: National Central Banks, Haver Analytics

BROOKINGS

Estimated Real Interest Rates (10-Year Maturity)



Increasing Longevity, Lower Bond Returns Have Doubled the Cost of $1 Real Retirement Income

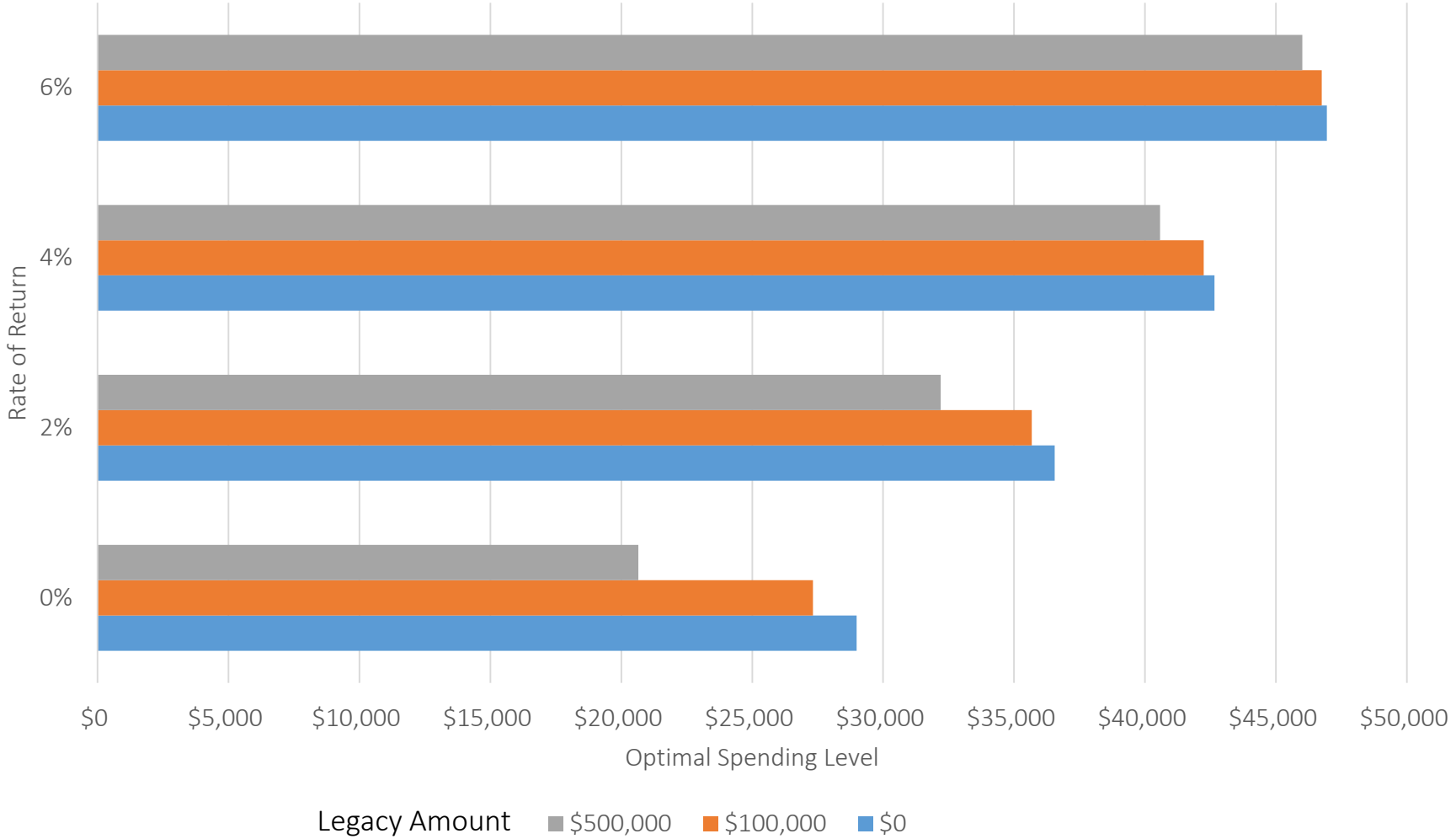


Simple Life Cycle Illustrations

- 35-Year Old Worker
- $50,000 income 1% real wage growth for 30-year career
- 30-year retirement
- Estimate optimal saving to smooth lifetime spending
- Include legacy goal

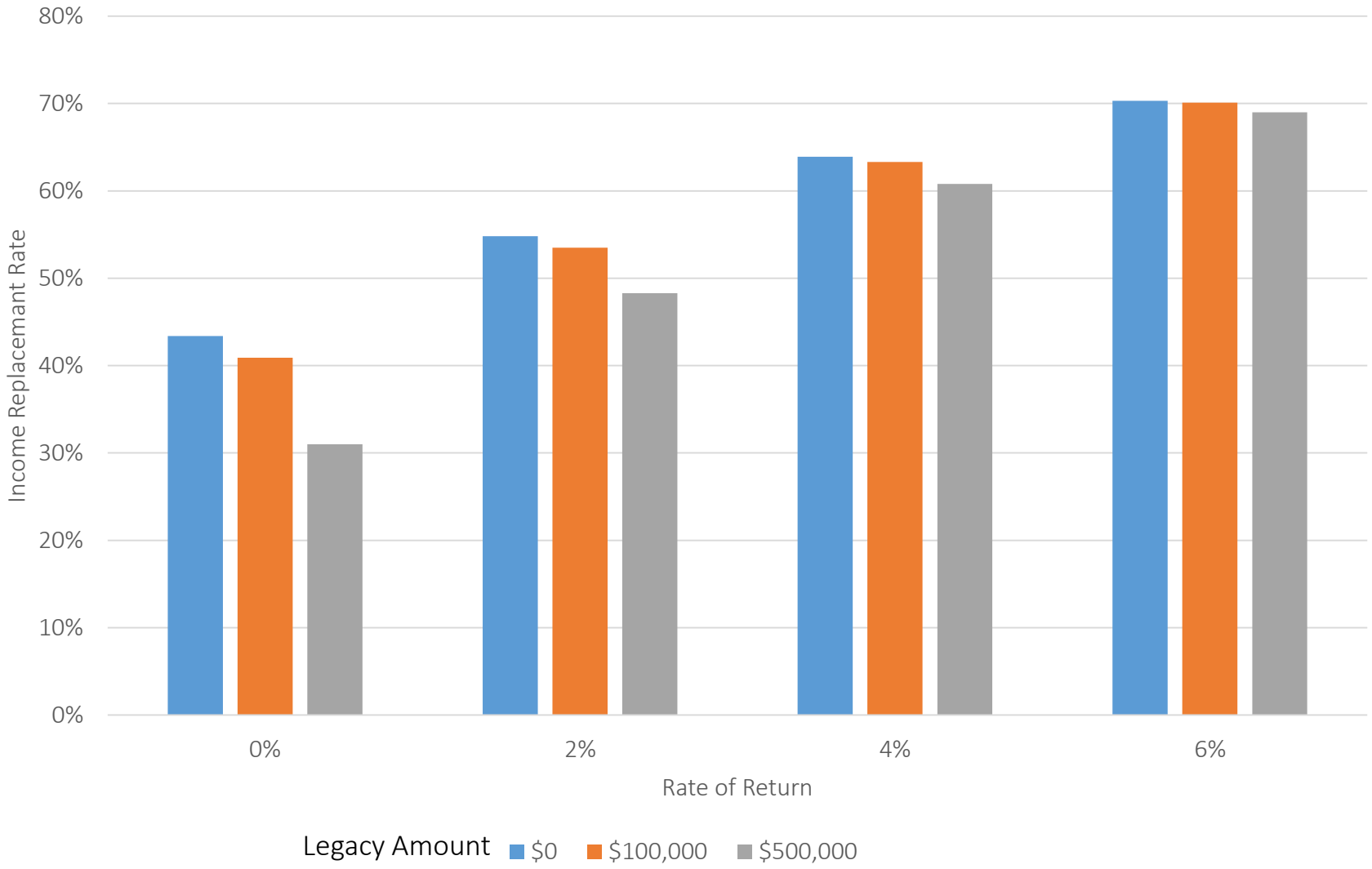
Smoothed Lifetime Spending

By Real Rate of Return and Legacy Goal



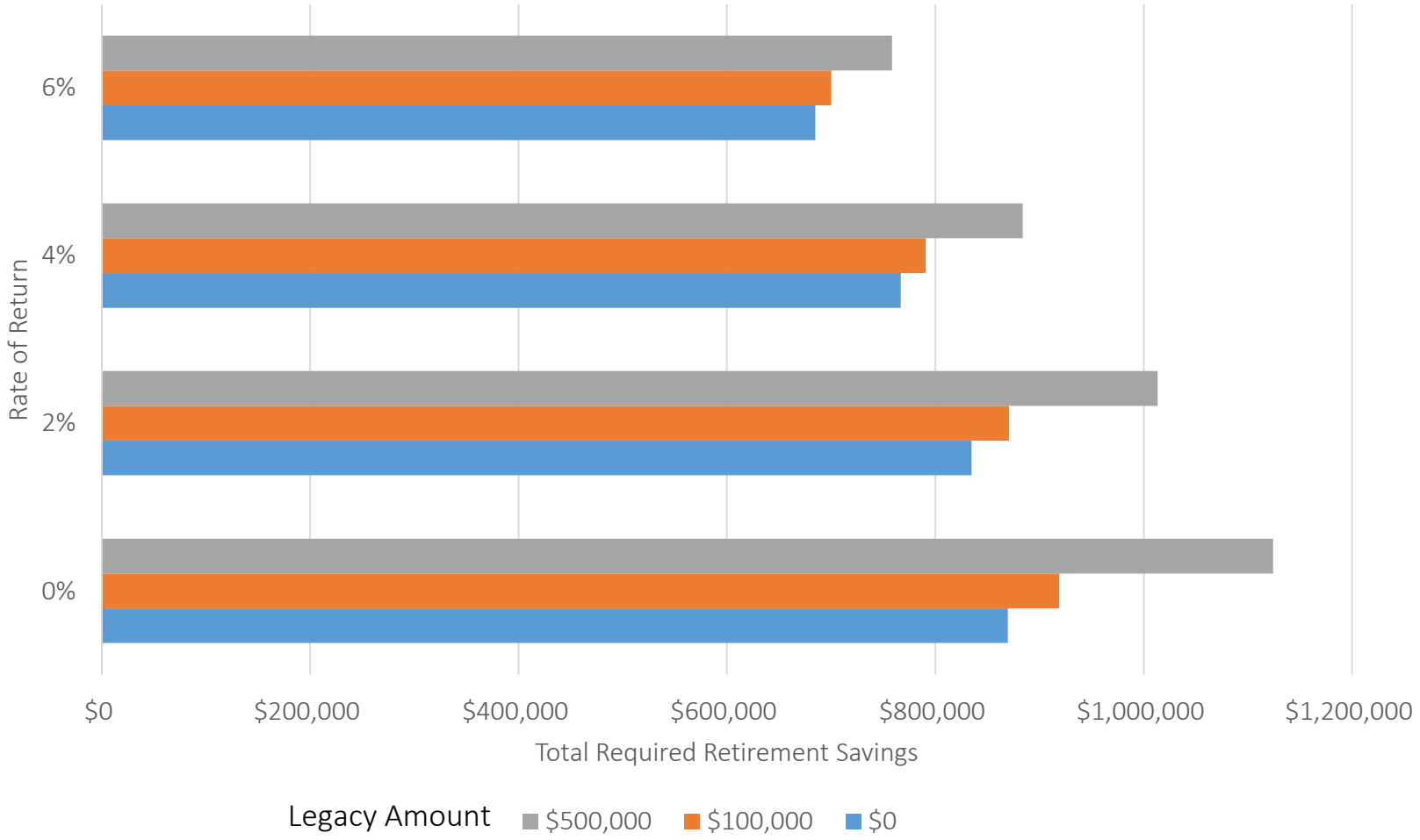
Income Replacement Rates to Smooth Spending

By Legacy Goal and Real Asset Returns



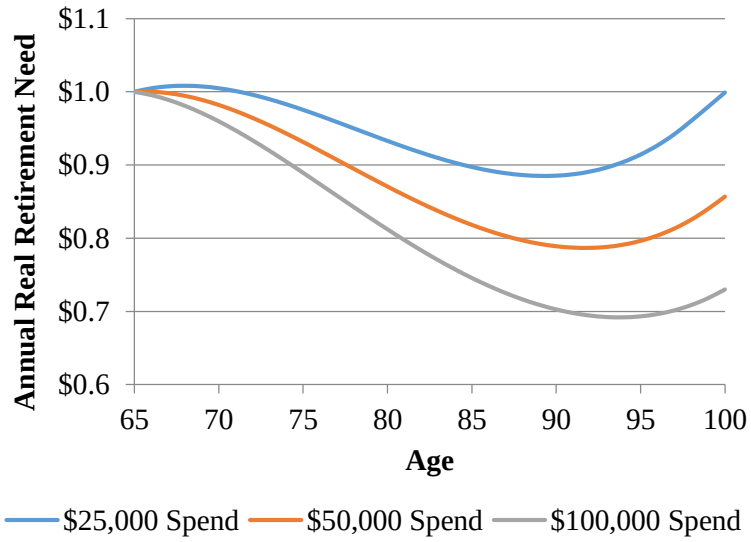
Savings at Retirement to Smooth Spending

By Legacy Goal and Real Asset Returns

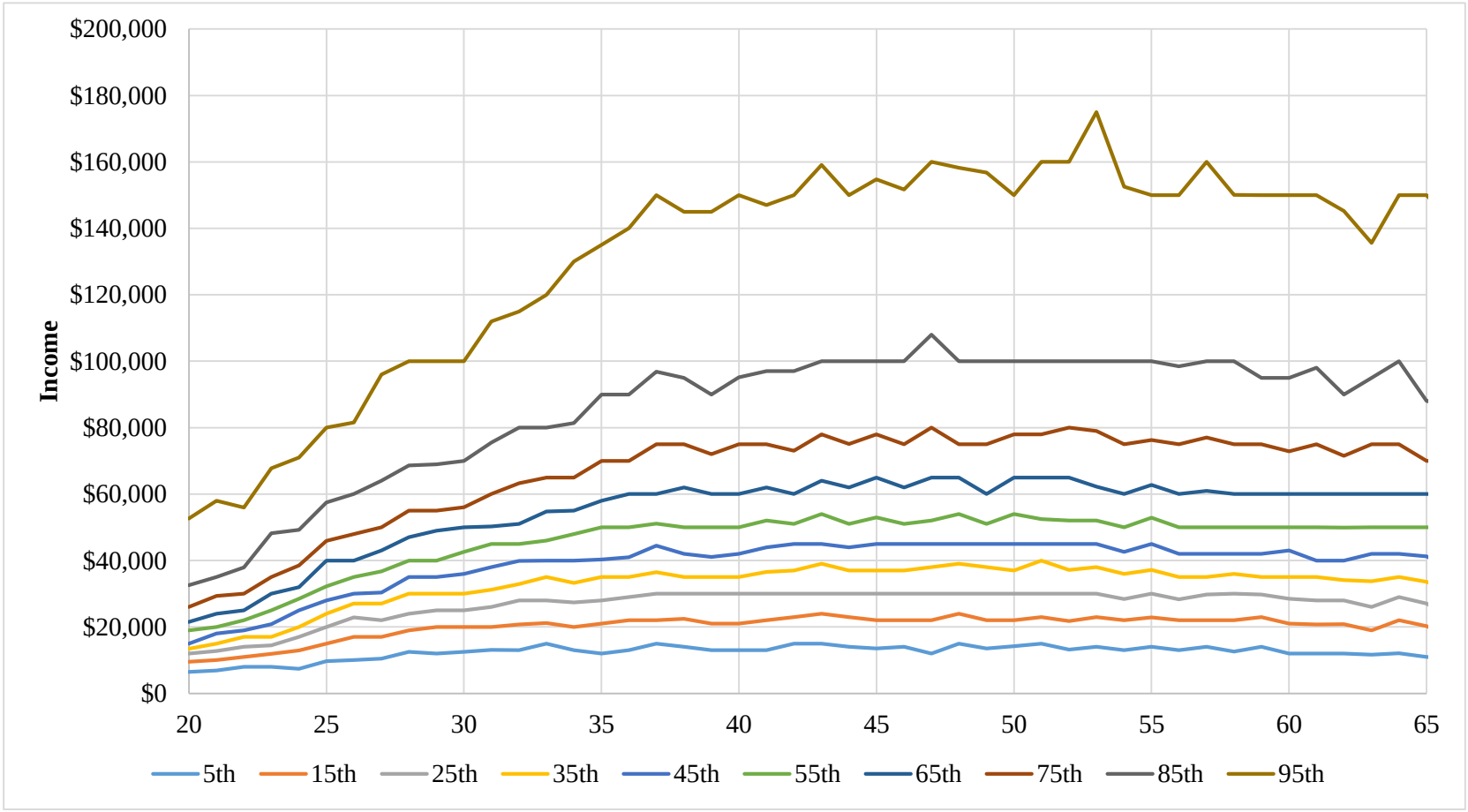


Complex Optimal Savings Calculations

- Include Social Security
- Marginal Tax Rates Before/After Retirement (includes Medicare taxes and Social Security taxes)
- Goal = smooth net spending at retirement
- 50 bp fees
- However, assume real spending falls after retirement



Income Growth Rates by Percentiles



Asset Returns

- Bonds assume to begin at todays rates and follow a process that
- A) reverts to return slightly above today
- B) reverts to return slightly below historical average
- C) reverts to historical average
- Equity Risk Premium
- Low – 3.5%
- Medium – 4.5%
- High – 5.5%
- Standard Deviation = 20%
- Stock and bond returns are random and optimal savings estimated using lifetime return simulations

Results

25 Years Old Optimal Savings Rates

Single Household

Household Income ($0,000s)	Return Assumptions: Historical	Low	Mid
$25	6.8%	11.3%	9.0%
$50	8.1%	14.2%	11.2%
$100	8.2%	14.9%	11.4%
$150	8.8%	15.9%	12.1%
$200	9.0%	16.4%	12.7%
$250	9.3%	16.8%	13.0%

Joint Household

Household Income ($0,000s)	Return Assumptions: Historical	Low	Mid
$25	4.3%	7.0%	5.7%
$50	6.4%	10.9%	8.6%
$100	6.9%	12.5%	9.7%
$150	8.0%	14.2%	11.2%
$200	8.7%	15.6%	12.0%
$250	9.0%	16.4%	12.7%

30 Years Old Optimal Savings Rates

Single Household

Household Income ($0,000s)	Return Assumptions: Historical	Low	Mid
$25	7.4%	12.2%	9.9%
$50	9.9%	17.0%	13.5%
$100	10.1%	17.6%	14.0%
$150	11.0%	18.7%	14.6%
$200	11.4%	19.2%	15.4%
$250	11.7%	19.5%	15.7%

Joint Household

Household Income ($0,000s)	Return Assumptions: Historical	Low	Mid
$25	4.2%	6.6%	5.5%
$50	7.2%	12.1%	9.6%
$100	8.5%	14.3%	11.5%
$150	9.6%	16.9%	13.2%
$200	10.6%	18.1%	14.2%
$250	11.3%	18.8%	15.0%

Don’t Wait Until Age 40

40 Years Old Optimal Savings Rates									
Single Household					Joint Household				
		Return Assumptions					Return Assumptions		
		Historical	Low	Mid			Historical	Low	Mid
Household Income ($0,000s)	$25	10.4%	14.8%	12.8%	Household Income ($0,000s)	$25	4.3%	6.3%	4.9%
	$50	13.9%	19.4%	17.5%		$50	9.4%	12.4%	11.2%
	$100	16.5%	25.6%	20.4%		$100	12.6%	19.0%	16.5%
	$150	17.6%	26.4%	22.8%		$150	14.5%	23.8%	18.6%
	$200	18.1%	27.3%	24.3%		$200	16.4%	25.5%	20.1%
	$250	18.5%	27.5%	24.8%		$250	17.6%	26.4%	22.8%

Impact of Retirement Age

Retire at Age 65

Single Household

Household Income ($0,000s)	Return Assumptions: Historical	Low	Mid
$25	9.1%	13.6%	11.3%
$50	12.3%	18.1%	15.8%
$100	13.2%	20.4%	17.1%
$150	13.8%	22.2%	17.8%
$200	14.3%	23.7%	18.4%
$250	14.8%	24.1%	18.8%

Joint Household

Household Income ($0,000s)	Return Assumptions: Historical	Low	Mid
$25	4.3%	6.3%	5.0%
$50	8.9%	13.1%	11.1%
$100	10.7%	16.8%	13.4%
$150	12.1%	19.0%	15.4%
$200	13.4%	21.1%	17.4%
$250	14.2%	23.5%	18.3%

Retire at Age 70

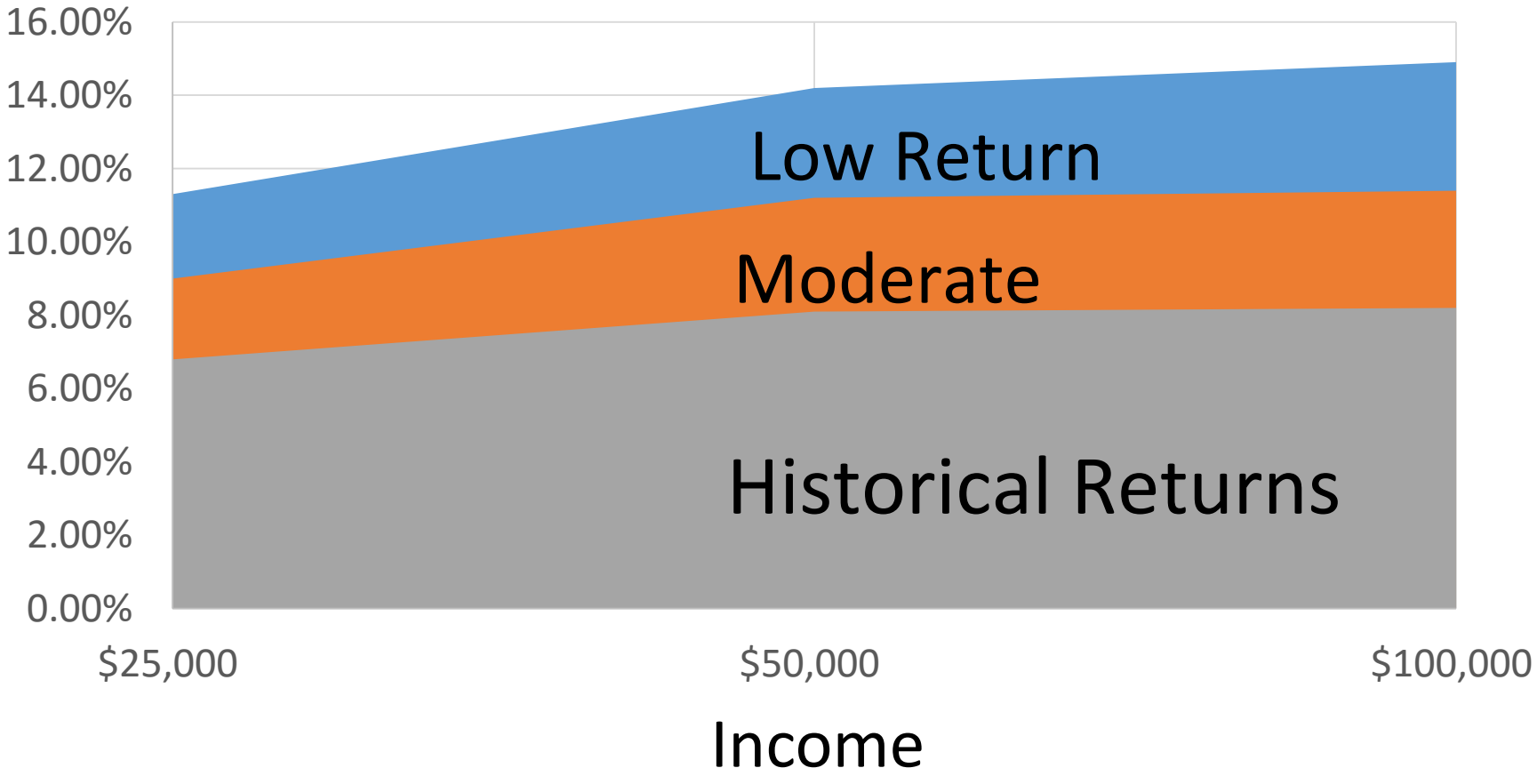
Single Household

Household Income ($0,000s)	Return Assumptions: Historical	Low	Mid
$25	4.2%	6.2%	4.8%
$50	8.7%	12.7%	10.6%
$100	10.3%	15.9%	12.8%
$150	11.7%	18.3%	14.7%
$200	12.8%	19.8%	16.6%
$250	13.6%	21.4%	17.6%

Joint Household

Household Income ($0,000s)	Return Assumptions: Historical	Low	Mid
$25	0.0%	0.0%	0.0%
$50	2.0%	3.8%	2.8%
$100	6.3%	9.1%	7.4%
$150	9.1%	13.8%	11.3%
$200	11.1%	17.2%	13.8%
$250	12.2%	18.7%	15.4%

Savings Rate Needed to Smooth Spending

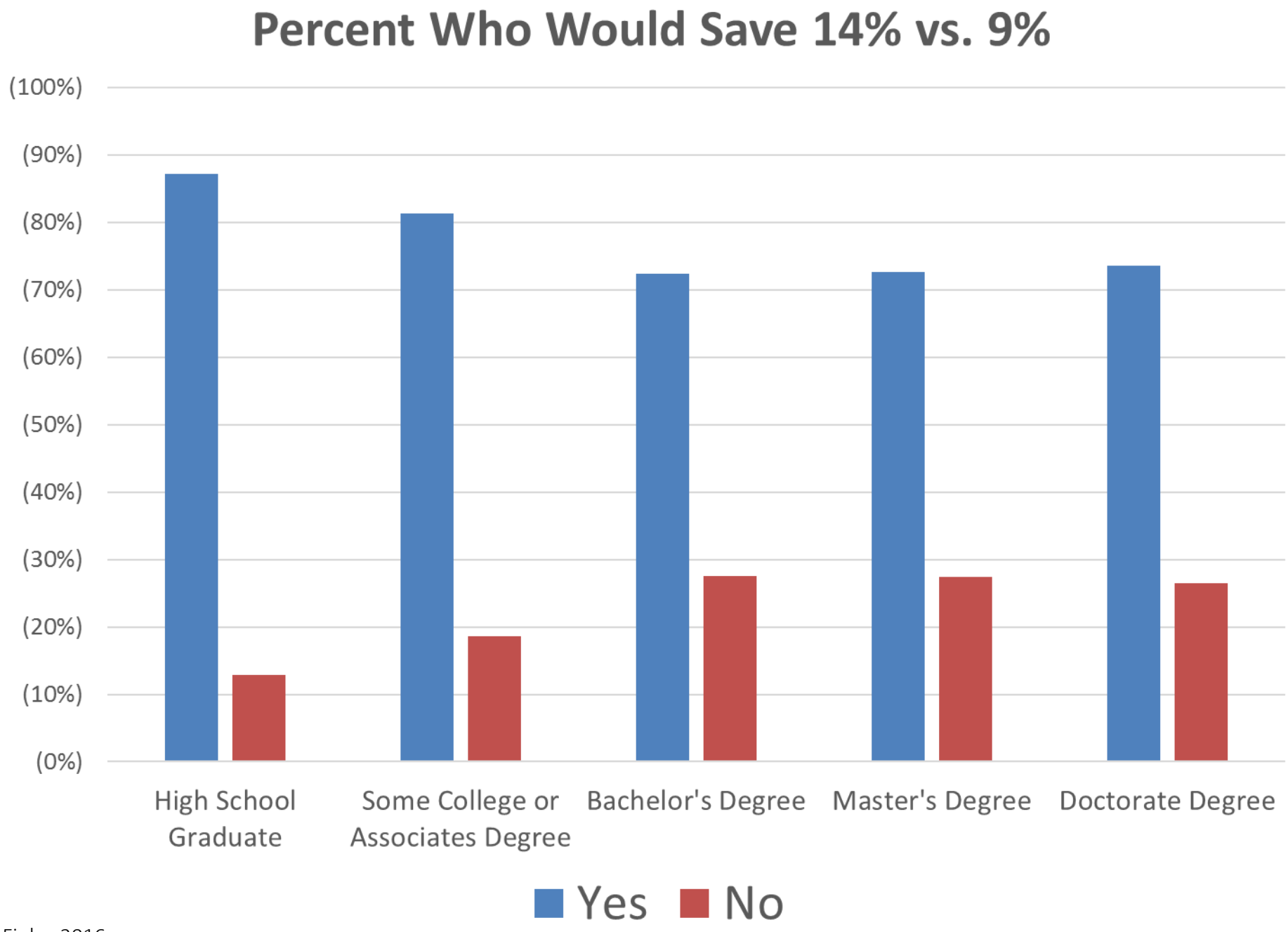


Can Workers Handle the Truth?

Ideal retirement = **70%** likelihood by 9% of salary
30% of the time will spend less than retirement goal

Would you save **14%** of income to have a **100%** likelihood of meeting your spending goal?

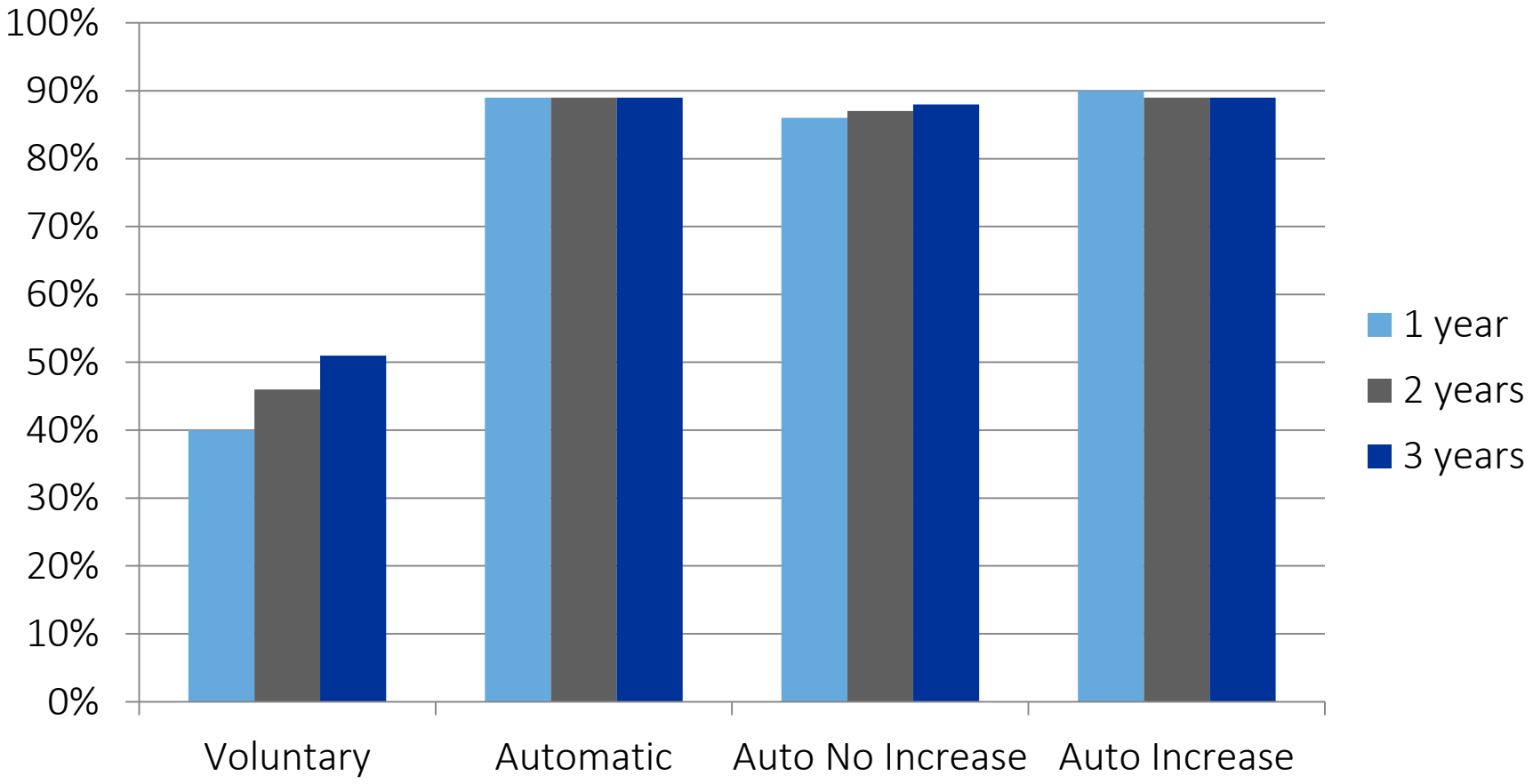
This will mean you'll need to reduce your spending today by **5%.**


Percent Who Would Save 14% vs. 9%
(100%)
(90%)
(80%)
(70%)
(60%)
(50%)
(40%)
(30%)
(20%)
(10%)
(0%)
High School Graduate
Some College or Associates Degree
Bachelor's Degree
Master's Degree
Doctorate Degree
Yes
No

Finke, 2016

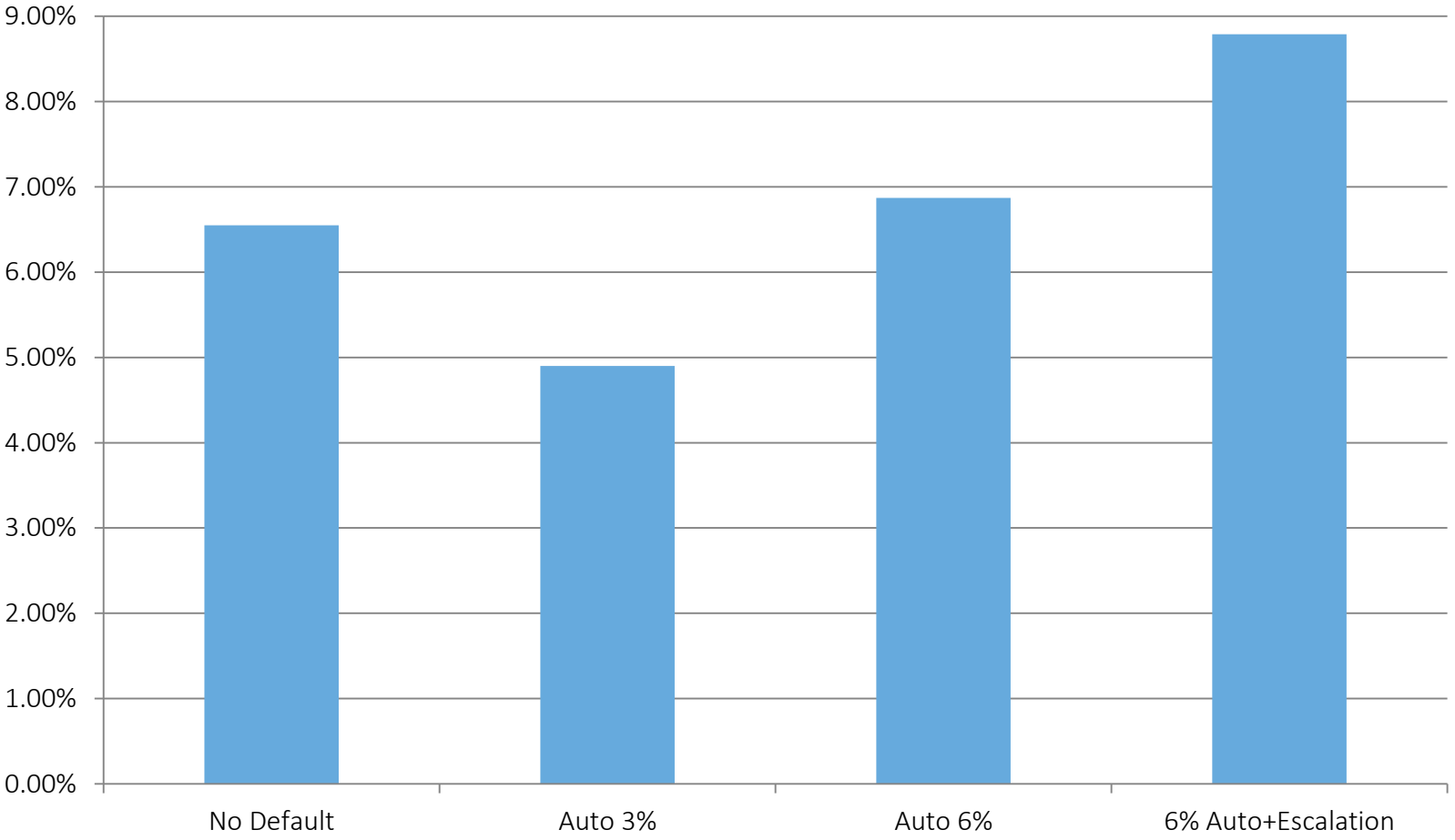
Post PPA Studies
(June 2013 for employees hired 2010-2012)

Participation Rates



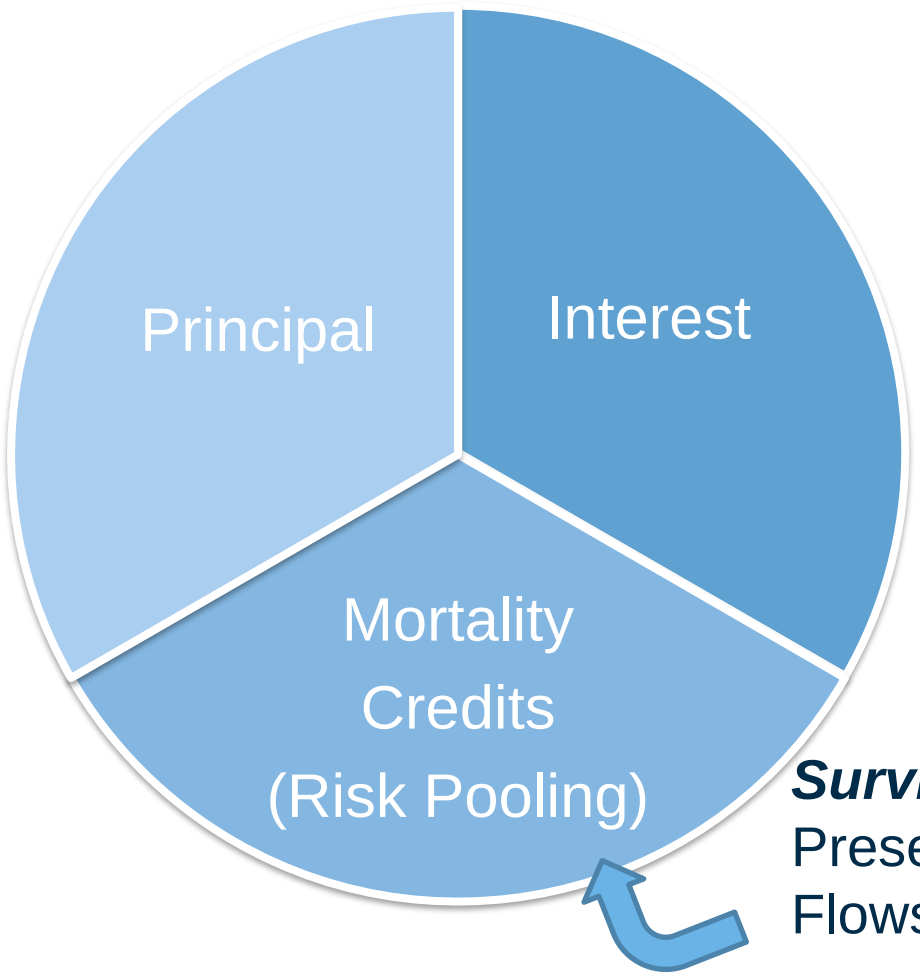
Source: Clark, Utkus and Young, 2015

How Much Are Participants Actually Saving?



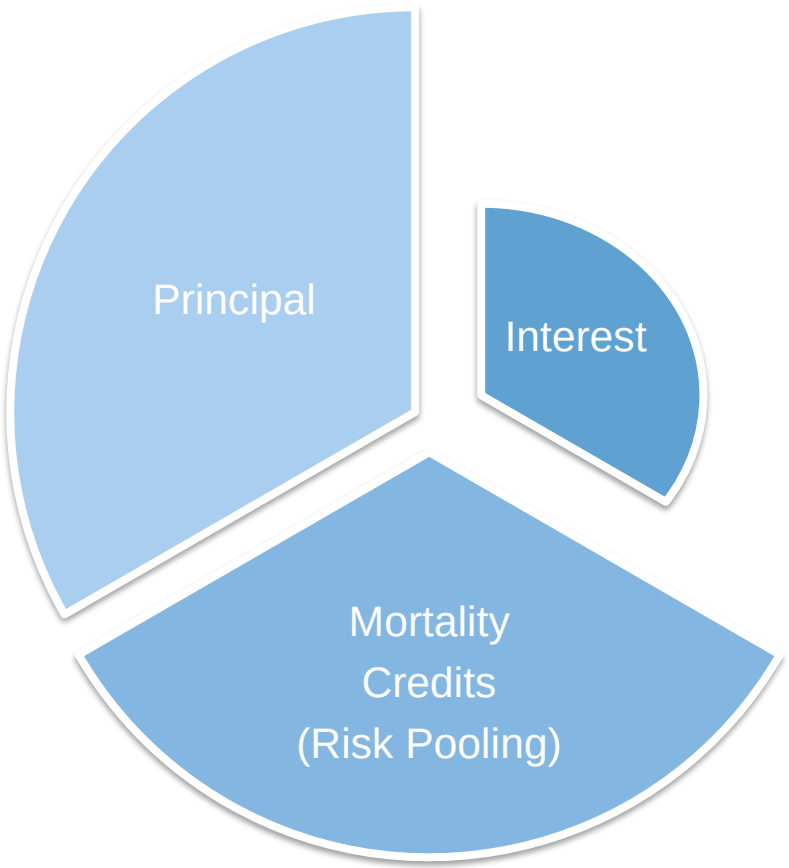
Source: Blanchett, 2016

Sources of Income Annuity Payments

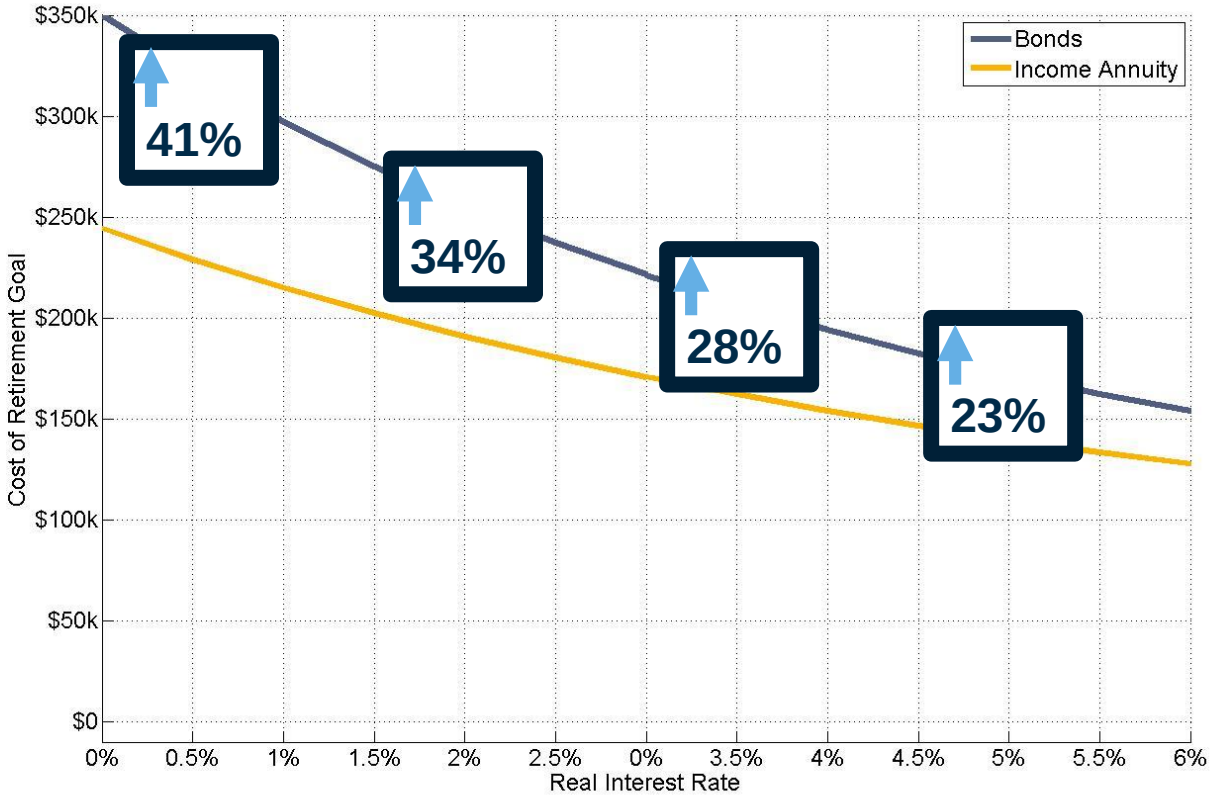


Survival-Weighted
Present Value of Cash Flows

Sources of Income Annuity Payments (Low Interest Rates)



Cost of Funding a Real $10,000 Income Stream



Assumptions:

65-Year Old Female

Planning Age: 100

Fixed real yield curve at Interest Rate

Society of Actuaries Individual Annuitant Mortality Table

Conclusions

- Retirement will be more expensive
- Workers/clients need to be aware of consequences of persistent low returns
- Save earlier, save more
- Retiring later only way to preserve lifestyle