

Investment Planning for Retirement

November 17, 2017 Presentation

at

Rutter Associates Autumn 2017 Seminar

by

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Social Security Replacement Rates



Net %

US SS Replacement compared with UK, France, Germany, Japan, Canada, Australia (80% of all developed)



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November 17, 2017

Need for supplement to social security

- Social Security pays retirees about \$750 Billion annually
- Retirement needs are about \$1,750 Billion to \$2 Trillion annually
- To generate \$1 Trillion a year in return requires about \$40 Trillion in assets
- This is about half of all assets held by households





Journal of Economic Perspectives—Volume 23, Number 4—Fall 2009—Pages 191–210

The Liabilities and Risks of State-Sponsored Pension Plans

Robert Novy-Marx and Joshua D. Rauh

We begin this article by discussing the true economic funding of state public pension plans. Using market-based discount rates that reflect the risk profile of the pension liabilities, we calculate that the present value of the already-promised pension liabilities of the 50 U.S. states amount to \$5.17 trillion, assuming that states cannot default on pension benefits that workers have already earned. Net of the \$1.94 trillion in assets, these pensions are underfunded by \$3.23 trillion. This "pension debt" dwarfs the states' publicly traded debt of \$0.94 trillion. We show that



Save More Tomorrow ™

Using Behavioral Economics to Increase Employee Saving.

By Richard H. Thaler and Shlomo Benartzi

ECO401 – Franco Martínez Levis.

AThe Nudge Improving Decisions about Health. Wealth. and Happiness Richard H. Thaler and Cass R. Sunstein ... with a new afterword

"One of the few books I've read recently that fundamentally changes the way. I think about the world." - Steven Levitt, counthor of Preabonance

January/February 2003

Financial Analysts Journal

PERSPECTIVES

Thoughts on the Future: Theory and Practice in Investment Management

Robert C. Merton

The point is that, as powerful as the models we use are, end-of-period wealth, or wealth in general, is not a sufficient statistic for financial welfare. Wealth, or income, should be translated into an implied stream of sustainable consumption—

YOUR MONEY

New Math for Retirees and the 4% Withdrawal Ri

Retiring

By TARA SIEGEL BERNARD MAY 8, 2015



YOUR MONEY

New Math for Retirees and the 4% Withdrawal Rı

Retiring By TARA SIEGEL BERNARD MAY 8, 2015

More than two decades ago, Bill Bengen, then a <u>financial planner</u> in Southern California, said he had several anxious clients with the same question: How much can I spend in <u>retirement</u> without running out of money?



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money?

What he and his computer produced, in 1994, became part of the financial vernacular and is still the most widely referenced rule of thumb. Known as the 4 percent rule, it found that retirees who withdrew 4 percent of their initial <u>retirement</u> portfolio balance, and then adjusted that dollar amount for inflation each year thereafter, would have created a paycheck that lasted for 30 years.

The concept has been both celebrated and criticized, and it has recently come under scrutiny yet again, particularly as the current crop of retirees are entering retirement during a period of historically low interest rates.



What does a "safe" 4% withdrawal rate mean?

- If you withdraw 4% of \$500,000, you withdraw \$20,000 in the first year
- If inflation is 5% in year 1, you withdraw \$20,000 X 1.05 = \$21,000 in the second year
- The amount of your withdrawals is not tied to what happens to the value of your portfolio

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Leading capital markets reference.

Ibbotson SBBI Classic Yearbook

The Ibbotson® SBBI® Classic Yearbook is the definitive study of historical capital markets data in the United States. Used by advisors, financial planners, and brokers to analyze asset class performance, the yearbook contains total returns and index values dating back to 1926 for large and small company stocks, long-term corporate bonds, long- and intermediateterm government bonds, Treasury bills, and inflation.

 Take Actic

 ♀ Buy This

 ♀ Get Purch

See It Wor View Con





The 4% Rule is Not Safe in a Low-Yield World

by

Michael Finke, Ph.D., CFP®

Wade D. Pfau, Ph.D., CFA

David M. Blanchett, CFA, CFP®



	Summar] Statistics for US	Fable 1 Real Returns Data 192	6 - 2010		
	Summary	Statistics for 0.5	5. Real Returns Data, 192	Correlat	ion Coeffi	cients
	Arithmetic Means	Geometric Means	Standard Deviations	Stocks	Bonds	Bills
Stocks	8.70%	6.62%	20.39%	1	0.08	0.09
Bonds	2.52%	2.28%	6.84%	0.08	1	0.71
Bills	0.69%	0.61%	3.90%	0.09	0.71	1

Source: Own calculations from *Stocks, Bonds, Bills, and Inflation* data provided by Morningstar and Ibbotson Associates. The U.S. S&P 500 index represents the stock market, intermediate-term U.S. government bonds represent the bond market, and bills are U.S. 30-day Treasury bills.



	Stocks	Bonds	Percentage Stocks:	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Average	8.70%	2.32%		2.32%	2.96%	3.60%	4.23%	4.87%	5.51%	6.15%	6.79%	7.42%	8.06%	8.70%
Std Dev	20.39%	6.84%		6.84%	6.63%	7.07%	8.05%	9.41%	11.00%	12.74%	14.58%	16.47%	18.42%	20.39%
Ratio	43%	34%		34%	45%	51%	53%	52%	50%	48%	47%	45%	44%	43%

	-]	Fable 1			
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Std Dev		15.00%	6.84%		6.84%	6.45%	6.44%	6.82%	7.53%	8.48%	9.61%	10.85%	12.18%	13.57%	15.00%
Ratio		58%	34%		34%	46%	56%	62%	65%	65%	64%	63%	61%	59%	58%



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Average	6.00%	۶ <u>1.00%</u>		1.00%	1.50%	2.00%	2.50%	3.00%	3.50%	4.00%	4.50%	5.00%	5.50%	6.00%
Std Dev	15.009	6.84%		6.84%	6.45%	6.44%	6.82%	7.53%	8.48%	9.61%	10.85%	12.18%	13.57%	15.00%
Ratio	409	6 15%		15%	23%	31%	37%	40%	41%	42%	41%	41%	41%	40%



		1	Table 1			
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Average	5.00%	0.00%		0.00%	0.50%	1.00%	1.50%	2.00%	2.50%	3.00%	3.50%	4.00%	4.50%	5.00%
Std Dev	15.00%	6.84%		6.84%	6.45%	6.44%	6.82%	7.53%	8.48%	9.61%	10.85%	12.18%	13.57%	15.00%
Ratio	33%	0%		0%	8%	16%	22%	27%	29%	31%	32%	33%	33%	33%

Low Yield Environment : Wade Pfau, et al

Low yields on bonds appear to be the result of excess demand fueled both by the demographics of an aging population and the growth of economies with higher average savings rates. As populations continue to age, it is likely that demand for fixed-income securities and equities will continue to be strong. Governments have also increased the supply of bonds, adding to national debt among many developed countries. Any rise in nominal rates as a result of excessive debt, however, will likely be accompanied by inflation rather than real vields



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Iriumph of the **Optimists**

101 YEARS OF GLOBAL INVESTMENT RETURNS



CREDIT SUISSE

Research Institute Thought leadership from Credit Suisse Research

and the world's foremost experts

February 2013



CREDIT SUISSE GLOBAL INVESTMENT RETURNS YEARBOOK 2013 5

The low-return world

The financial crisis has created a new investment landscape. Yields on sovereign bonds in safe-haven countries have fallen to historic lows. This has prolonged the bull market in bonds, but prospective real yields in many countries are now negative, or very low. Meanwhile, since 2000, equity returns in developed markets have been disappointing, leading many to ask if the cult of equity is dead. In this article, we assess what rates of return investors should now expect from equities, bonds, and cash. We also examine the stresses and challenges of this new, low-return world.



Low Yield Environment : Dimson, Marsh, and Staunton

Distortions leading to low rates are likely to be permanent. Regulatory pressures on insurers and pension funds are unlikely to diminish; pension funds are maturing and should lean towards higher bond weightings; baby-boomer retirement is ongoing; and with a stock market that could easily see an increase in volatility...the safe-haven demand for bonds could even increase.

The virtues and drawbacks of the Bengen approach

- VIRTUES
 - The advantage of using constant dollars
 - Easier to plan future living expenses
 - More direct comparison of future living expenses to savings
 - Doesn't vary spending wildly based on market swings
- DRAWBACKS
 - Dependent on historical analysis
 - Doesn't say how to adjust to unexpected bad returns
 - Doesn't offer guidance on risk vs. return

The advantages of working with constant dollars

- Easier to plan future living expenses
- More direct comparison of future living expenses to savings
- Intuitive calculation of savings needs
 - How much savings do you need to fund \$50,000 a year for 20 years with real return of 0?
 - \$1 million = \$50,000 X 20

The advantages of working with constant dollars

- Intuitive calculation of savings needs
 How much savings do you need to fund \$50,000 a year for 20 years with real return of 0?
 \$1 million = \$50,000 X 20

 - What would happen if you had a real return of 2%?
 \$800,000 = \$1 million X (4% / 5%)
 - $\cdot 5\% = 1/20$

 - $\cdot 4\% = 5\% 2\%/2$
 - Same result if you have real return of 0 but have expenses grow 2% slower than inflation

The advantages of working with constant dollars

- Intuitive calculation of savings needs
 - How much savings do you need to fund \$50,000 a year for 20 years with real return of 0?
 - \$1 million = \$50,000 X 20
 - What would happen if you wanted expenses to grow with GDP (roughly 2% above inflation)?
 - \$1,200,000 = \$1 million X (6% / 5%)
 - 5% = 1/20
 - $\cdot 6\% = 5\% + 2\%/2$

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FINANCIAL MANAGEMENT

The Crisis in Retirement Planning

by Robert C. Merton

FROM THE JULY-AUGUST 2014 ISSUE

The trouble is that investment value and asset volatility are simply the wrong measures if your goal is to obtain a particular future income. Communicating with savers in those terms, therefore, is unhelpful–even misleading. To see why, imagine that you are a 45-year-old



6.1 RISK MEASUREMENT

6.1.1 General Principles

As stated in Chapter 1, the key characteristic that distinguishes financial risk management from other types of risk management is that financial risk management can take advantage of liquid markets as part of a risk management strategy. In this chapter we examine the structure of financial risk management in more detail, and a good starting point is to consider the hypothetical case in which a market is so liquid that any position can be liquidated instantaneously. While this is obviously an extreme that does not exist in reality, it will still provide an instructive background against which to consider more realistic cases.

With such perfect liquidity, risk management could, in principle, just consist of setting loss limits for each trader and each trading group (the industry jargon for this is a *stop-loss limit*). As soon as a trader reached the limit for a position, the entire position could be liquidated with no further loss. Or if management decided that its risk tolerance had changed because of changes in their view of the economy or the institutional environment, positions could be liquidated with no further losses. Even in such an extreme case, the following rules would be needed.



Marvin Appel

THE SAFEST INVESTMENT THERE IS

Treasury Inflation-Protected Securities (TIPS)



ECONOMY

The Annuity Puzzle

Economic View

By RICHARD H. THALER JUNE 4, 2011



The second problem is more psychological. Rather than viewing an annuity as providing *insurance* in the event that one lives past 85 or 90, most people seem to consider buying an annuity as a *gamble*, in which one has to live a certain number of years just to break even. But, as the example of Dave and Ron shows, it's is the decision to self-manage your retirement wealth that is the risky one.

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Making Retirement Income Last a Lifetime

Stephen C. Sexauer, Michael W. Peskin, and Daniel Cassidy, CFA

To enable investors to spend down the assets in their defined contribution accounts more easily, the authors propose a decumulation benchmark comprising a laddered portfolio of TIPS for the first 20 years (consuming 88 percent of available capital) and a deferred life annuity purchased with the remaining 12 percent. This portfolio can be used directly by the investor (akin to indexing) or as a benchmark for evaluating the performance of a more aggressive strategy.

hat is the lowest-risk retirement strategy for an individual? How can we engineer such a strategy so that people can invest in it? Should investors buy annuities, or is there a better strategy for guaranteeing a lifetime income? Is there a behavioral block that prevents investors from acting in their own best interest? Can we do anything to encourage investors to adopt retirement strategies that insure against longevity risk?

minimal investment risk and achieving the goal of longevity-risk protection.

By measuring the expected cash flows from this strategy, we can establish a *benchmark* for postretirement asset decumulation. Comprising a *set of future cash flows* produced by a given amount invested, such a benchmark differs from ordinary benchmarks, which are lists of securities and security weights that, when summed, produce a market price or present value.

	DCDB Benc	hmark Assets
Characteristic	20-Year Self-Liquidating TIPS Portfolio ^a	Deferred Nominal Annuity Starting in Year 21 ^b
Initial allocation to asset	88%	12%
Age range over which portfolio component provides income	65–85	85 to death
Yield or annuity rate	5.69% (including return on principal)	
Annual income per \$100,000 invested, Years 1–20	\$5,118 in today's dollars, inflating at realized inflation rate	\$0
Annual income, Year 21+	\$0	\$7,332 (in nominal dollars)
How income is calculated	First-year income = 5.69% distribution rate × 88% allocation × \$100,000 × (1 + first-year inflation), thereafter inflating at realized inflation rate	Based on \$5,118 first-year nominal income, inflated for the next 19 years at 1.91% TIPS breakeven inflation rate
Inflation protected	Yes	No
Counterparty risk	No	Yes
Investor control of assets	Yes	No

TIPS vs Annuities

- TIPS + 30 Year deferred annuities vs TIPS only
 - TIPS + 30 Year are 25% less expensive if you protect against 3% inflation
 - TIPS + 30 Year are 20% less expensive if you protect against 6% inflation
 - Annuity premiums only account for 4% of the total cost (9% if protecting against 6% inflation)
- TIPS + 20 Year deferred annuities vs TIPS + 30 Year deferred annuities
 - TIPS + 20 Year are 15% less expensive if you protect against 3% inflation
 - TIPS + 20 Year are just as expensive if you protect against 6% inflation
 - Annuity premiums for TIPS + 20 years account for 21% of the total cost (36% if protecting against 6% inflation)

RETIREMENT RISKS

Understanding the risks you face in retirement is a great place to start when beginning to plan for retirement.

Market Risk

Market risk is the risk associated with investments that are invested in individual stocks, stock mutual funds, and variable annuities. You accept the risk that your principal can be lost in down markets.





Inflation Risk

Inflation risk is the risk of your income not keeping up with the cost of living in retirement.

How important is it to you to earn a Rate of Return that keeps up with inflation? VERY IMPORTANT / SOMEWHAT IMPORTANT / NOT IMPORTANT

2

Longevity Risk

Longevity Risk is the risk of outliving your life expectancy and your financial resources.

Male Age 65	Female Age 65	Couple at Age 65
Age 85 - 50% chance	Age 88 - 50% chance	One at Age 92 - 50% chance
Age 92 - 25% chance	Age 94 - 25% chance	One at Age 97 - 25% chance

How important is Guaranteed Lifetime Income? VERY IMPORTANT / SOMEWHAT IMPORTANT / NOT IMPORTANT How important is Passing Assets to Heirs? VERY IMPORTANT / SOMEWHAT IMPORTANT / NOT IMPORTANT "ONE OF THE BEST™®ESTMENT BOOKS OF ALL TIME... THIS IS THE BUY-AND-HOLD BIBLE.' -James K. Glassman, The Washington Post, on 2nd edition of Stocks for the Long Run



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Marvin Appel

THE SAFEST INVESTMENT THERE IS

Treasury Inflation-Protected Securities (TIPS)



Financial Analysts Journal, Vol. 38, No. 6 (Nov. - Dec., 1982),

by Martin Leibowitz and Alfred Weinberger

Contingent Immunization–Part I: Risk Control Procedures

Contingent Immunization is a procedure for the pursuit of active bond management within a framework that provides a minimum return even under adverse experience. This is achieved through a procedural "safety net" based upon the modern techniques of bond immunization. The portfolio remains in an active management mode as long as the portfolio's asset value places it above this safety net. The portfolio enters the immunization mode only when absolutely necessary to assure a promised minimum return.

Contingent Immunization with a TIPS-Deferred Annuities "Safety Net"

- Continuously update the cost of the safety net based on current TIPS rates and deferred annuity quotes (provided by Rutter)
- Can see where the value of a liquid investment portfolio stands relative to the safety net
- As long as you have a comfortable cushion, free to follow any investment strategy without fear of running out of spending capacity
- You can use simulation virtually identical to Wade Pfau's to evaluate risk vs. return tradeoffs
 - But if you are wrong about return assumptions, you won't go broke

Calculator

- Details we can handle
 - Choice of mix between TIPS and annuities
 - Joint annuities
 - Expected return and standard deviation of investments
 - Inflation level to protect against for annuity investment
 - Stress cushion
- Details we can't handle
 - Detailed tax planning
 - Precise quotes for annuity price

Contingent Immunization with a TIPS-Deferred Annuities "Safety Net"

- If you have a cushion, is it better to segment your investments into a safe portfolio and a risky portfolio or invest everything in risky portfolio with a contingent immunization safety net?
 - Using the same assumptions about the distribution of risky returns, the contingent immunization strategy has higher expected returns because it invests more in the risky portfolio.
 Example: with a 1/3 safety margin, the contingent immunization strategy has a 50% higher expected
 - return

20-Year Treasury Inflation-Indexed Security, Constant Maturity (DFII20)

FR	ED 📈 — 20-Yea	ar Treasury Inflation-Indexed Se	ecurity, Constant Matu	ırity					
Percent	3.5 3.0 2.5 2.0 1.5 1.0 0.5	m	Yum	Manymulud	1. Min hits	M	Mm	mo Walter and	wyww.
	-0.5	2006 2007	2008 2009	2010	2011 2012	2 2013	2014	2015 2016	2017

	Stocks	Bonds	Percentage Stocks:	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
verage	6.00%	1.00%		1.00%	1.50%	2.00%	2.50%	3.00%	3.50%	4.00%	4.50%	5.00%	5.50%	6.00%
td Dev	15.00%	6.84%		6.84%	6.45%	6.44%	6.82%	7.53%	8.48%	9.61%	10.85%	12.18%	13.57%	15.00%
latio	40%	15%		15%	23%	31%	37%	40%	41%	42%	41%	41%	41%	40%

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DOWNLOAD

	4.50	CT	Deferred Arr	aultu Dogina	05	
	Age	65	Deferred Ani	nuity Begins	95	
	M/F	M	Worst Case I	nflation	3.00%	
Safe Strate	egy					
	Draw		\$100,000			
	Growth Relative t	o CPI	0.00%			
	Investent Needed		\$2,772,605			
	Stress Cushion		20%			
	Variance		1%			
Aggressive	e Startegy					
	Draw		\$100,000	Expected Ret	turn	4.00%
	Growth Relative t	o CPI	0.00%	Standard Dev	viation	9.61%
	Investment		\$3,000,000			
<u>Results</u>						
	Within:	5 Years	10 Years	15 Years	20 Years	25 Years
	Probability					
	of switching					
	to safe strategy	86%	87%	87%	88%	88%
	Expected Assets	\$2 634 801	\$2 321 501	\$2 012 170	\$1 703 7/9	\$1 440 730
	Expected Assets	92,034,001	22,321,301	\$Z,012,170	Ş1,703,749	Ş1,440,730

	Age	65	Deferred An	nuity Begins	95	
	M/F	М	Worst Case I	nflation	3.00%	
Safe Strat	egy					
	Draw		\$85,000			
	Growth Relative	o CPI	0.00%	1		
	Investent Needeo	ł	\$2,356,715			
	Stress Cushion		20%			
	Variance		1%			
Aggressiv	e Startegy					
	Draw		\$100,000	Expected Ret	turn	4.00%
	Growth Relative	to CPI	0.00%	Standard De	viation	9.61%
	Investment		\$3,000,000			
Results						
	Within:	5 Years	10 Years	15 Years	20 Years	25 Years
	Probability					
	of switching					
	to safe strategy	31%	34%	36%	36%	37%
	Expected Assets	\$2,943,880	\$2,948,559	\$2,957,636	\$3,021,125	\$3,126,999

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		65	Deferred An	uity Poging	05		
	Age	60	Delerred An	nuity begins	95		ŀ
	M/F	M	Worst Case I	nflation	3.00%		
Safe Strat	egy						ľ
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	Investment		\$3,000,000				
<u>Results</u>							-
	Within:	5 Years	10 Years	15 Years	20 Years	25 Years	
	Probability						
	of switching						
	to safe strategy	86%	87%	87%	88%	88%	
	Expected Assets	\$2,634,801	\$2,321,501	\$2,012,170	\$1,703,749	\$1,440,730	
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	Δσe	65	Deferred An	nuity Begins	95	
		03 N4	Warst Case I	ndicy begins	2 00%	
		IVI	worst case i	mation	5.00%	
Safe Strat	egy					
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	Investment		\$3,000,000			
Results						
	Within:	5 Years	10 Years	15 Years	20 Years	25 Years
	Probability					
	of switching					
	to safe strategy	31%	34%	36%	36%	37%
	Expected Assets	\$2,943,880	\$2,948,559	\$2,957,636	\$3,021,125	\$3,126,999
		, _,,,	//3==	, _,,	, ,	, ,

	Age	65	Deferred An	nuity Begins	95	
	M/F	М	Worst Case I	nflation	3.00%	
Safe Strat	egv					
	Draw		\$100,000			
	Growth Relative	to CPI	-1.00%			
	Investent Needeo	ł	\$2,388,770			
	Stress Cushion		20%			
	Variance		1%			
Aggressive	e Startegy					
	Draw		\$100,000	Expected Ret	turn	4.00%
	Growth Relative	to CPI	0.00%	Standard Dev	viation	9.61%
	Investment		\$3,000,000			
<u>Results</u>						
	Within:	5 Years	10 Years	15 Years	20 Years	25 Years
	Probability					
	of switching					
	to safe strategy	36%	40%	41%	42%	43%
	Expected Assets	\$2 922 445	\$2 912 494	\$2 902 884	\$2 929 676	\$2 994 649
	Expected Assets	92,522,445	92,512,454	92,502,004	92,525,070	92,55 7,07 5



	Age	65	Deferred An	nuity Begins	95								
	M/F	м	Worst Case I	nflation	3.00%			Age	65	Deferred Ann	nuity Begins	95	
								M/F	M	Worst Case I	nflation	3.00%	
Safe Strate	gy						Safe Strate	201					
	Draw		\$85,000				<u>Sale Strate</u>	Draw		\$100.000			
	Growth Relative t	to CPI	0.00%	1				Growth Relative	to CPI	-1.00%			
	Investent Needeo	1	\$2,356,715					Investent Needer	d	\$2,388,770			
	Stress Cushion		20%					Stress Cushion		20%			
	Variance		1%					Variance		1%			
Aggressive	Startegy						Aggressive	Startegy					
	Draw		\$100,000	Expected Ret	turn	4.00%		Draw		\$100,000	Expected Ret	urn	4.00%
	Growth Relative t	O CPI	0.00%	Standard De	viation	9.61%		Growth Relative	to CPI	0.00%	Standard Dev	viation	9.61%
	Investment		\$3,000,000					Investment		\$3,000,000			
Results							Results						
	Within:	5 Years	10 Years	15 Years	20 Years	25 Years		Within:	5 Years	10 Years	15 Years	20 Years	25 Years
	Probability							Probability					
	of switching							of switching					
	to safe strategy	31%	34%	36%	36%	37%		to safe strategy	36%	40%	41%	42%	43%
		40.040.000	40.040.555	40.057.055	40.004.407	40.400.000		Expected Assets	\$2,922,445	\$2,912,494	\$2,902,884	\$2,929,676	\$2,994,649
	Expected Assets	\$2,943,880	\$2,948,559	\$2,957,636	\$3,021,125	\$3,126,999		•••••••••••••••••••••••••••••••••••••••					

	Age	65	Deferred An	nuity Begins	95	
	M/F	M	Worst Case I	nflation	3.00%	
Safe Strate	egy					
	Draw		\$100,000			
	Growth Relative	to CPI	-2.00%			
	Investent Needeo	Ł	\$2,077,069			
	Stress Cushion		20%			
	Variance		1%			
Aggressive	e Startegy					
	Draw		\$100,000	Expected Re	turn	4.00%
	Growth Relative	to CPI	0.00%	Standard De	viation	9.61%
	Investment		\$3,000,000			
<u>Results</u>						
	Within:	5 Years	10 Years	15 Years	20 Years	25 Years
	Probability					
	of switching					
	to safe strategy	8%	12%	15%	16%	18%
	Expected Assets	\$3,083,517	\$3,188,924	\$3,297,922	\$3,454,745	\$3,639,128

	Age	65	Deferred An	nuity Begins	95	
	M/F	М	Worst Case I	nflation	3.00%	
Safe Strate	egy					
	Draw		\$100,000			
	Growth Relative t	O CPI	-2.00%			
	Investent Needeo	ł	\$2,077,069			
	Stress Cushion		20%			
	Variance		1%			
Aggressive	e Startegy					
	Draw		\$100,000	Expected Ret	turn	4.00%
	Growth Relative t	O CPI	1.00%	Standard Dev	viation	9.61%
	Investment		\$3,000,000			
<u>Results</u>						
	Within:	5 Years	10 Years	15 Years	20 Years	25 Years
	Probability					
	of switching					
	to safe strategy	9%	17%	21%	24%	26%

						1
	Age	65	Deferred Ani	nuity Begins	95	
	M/F	М	Worst Case I	nflation	3.00%	
Safe Strat	egy					
	Draw		\$100,000			
	Growth Relative t	o CPI	-2.00%			
	Investent Needed		\$2,077,069			
	Stress Cushion		20%			
	Variance		1%			
Aggressive	e Startegy					
	Draw		\$100,000	Expected Ret	turn	4.00%
	Growth Relative t	o CPI	2.00%	Standard Dev	viation	9.61%
	Investment		\$3,000,000			
<u>Results</u>						
	Within:	5 Years	10 Years	15 Years	20 Years	25 Years
	Probability					
	of switching					
	to safe strategy	11%	24%	30%	36%	41%
	Expected Assets	\$3,073,148	\$3,125,678	\$3,120,998	\$3,069,766	\$2,957,126
	•					

	Age	65	Deferred An	nuity Begins	95		
	M/F	М	Worst Case I	Worst Case Inflation			
Safe Strate	egy						
	Draw		\$100,000				
	Growth Relative t	o CPI	-3.00%				
	Investent Needeo	1	\$1,822,004				
	Stress Cushion		20%				
	Variance		1%				_
Aggressive	e Startegy						
	Draw		\$100,000	Expected Ret	turn	4.00%	
	Growth Relative t	o CPI	2.00%	Standard De	viation	9.61%	
	Investment		\$3,000,000				_
<u>Results</u>							
	Within:	5 Years	10 Years	15 Years	20 Years	25 Years	
	Probability						
	of switching						
	to safe strategy	3%	13%	22%	28%	34%	
	Expected Assets	\$3,079,925	\$3,133,581	\$3,136,605	\$3,100,450	\$2,998,779	

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						_		CT	Defensed An		05		+
Age	65	Deferred Annuity Begins		95			Age	65 Deferred An		inuity Begins		<u> </u>	+
M/F	M	Worst Case I	nflation	3.00%		_	M/F	M	Worst Case I	nflation	3.00%		+
egy						Safe Strateg	<u>sy</u>						┼
Draw		\$100,000					Draw		\$100,000				
Growth Relative	to CPI	<mark>-2.00%</mark> \$2,077,069					Growth Relative to CPI Investent Needed		- <mark>3.00%</mark> \$1,822,004				Τ
Investent Neede	d												
Stress Cushion		20%					Stress Cushion		20%				
Variance		1%					Variance		1%				_
e Startegy						Aggressive	Startegy						┼
Draw	v		\$100,000 Expected Return		urn 4.00%		Draw		\$100,000 Expected Re		turn	4.00%	6
Growth Relative	to CPI	0.00% Standard De		viation	9.61%		Growth Relative to CPI		2.00%	Standard Dev	tandard Deviation		6
Investment		\$3,000,000				_	Investment		\$3,000,000				Ţ
						Results							┼
Within:	5 Years	10 Years	15 Years	20 Years	25 Years		Within:	5 Years	10 Years	15 Years	20 Years	25 Years	T
Probability							Probability						T
of switching							of switching						+
to safe strategy	8%	12%	15%	16%	18%		to safe strategy	3%	13%	22%	28%	34%	6
						_							
Expected Assets	\$3,083,517	\$3,188,924	\$3,297,922	\$3,454,745	\$3,639,128	_	Expected Assets	\$3,079,925	\$3,133,581	\$3,136,605	\$3,100,450	\$2,998,779	Э
	Age M/F Draw Growth Relative Investent Neede Stress Cushion Variance Startegy Draw Growth Relative Investment Within: Probability of switching to safe strategy Expected Assets	Age 65 M/F M PERY Investent Meeded Growth Relative to CPI Investent Needed Stress Cushion Variance Startegy Investent Needed Draw Investent Needed Stress Cushion Investent Needed Stress Cushion Investent Variance Investent Startegy Investment Investment Investment Within: 5 Years Probability of switching to safe strategy 8% Expected Assets \$3,083,517	Age65Deferred AnM/FMWorst Case IPERYInvest CPIDraw\$100,000Growth Relative to CPI-2.00%Investent Needed\$2,077,069Stress Cushion20%Variance1%PEStartegyInvestmentDraw\$100,000Growth Relative to CPI0.00%Variance1%Draw\$100,000Growth Relative to CPI0.00%Investment\$3,000,000Growth Relative to CPI0.00%Investment\$3,000,000Within:5 Years10 YearsProbability10 Safe strategy8%to safe strategy8%12%Expected Assets\$3,083,517\$3,188,924	Age65Deferred Annuity BeginsM/FMWorst Case InflationDraw\$100,000Growth Relative to CPI-2.00%Investent Needed\$2,077,069Stress Cushion20%Variance1%Draw\$100,000EstartegyInvestmentDraw\$100,000Within:5 YearsInvestment\$3,000,000Within:5 YearsProbabilityInvestersInvesters10 YearsStress15 YearsProbability5 YearsInvesters53,083,517Stantagy\$3,188,924Stap27,922	Age65Deferred Annuity Begins95M/FMWorst Case Inflation3.00%Barrow\$100,000	Age65Deferred Anuity Begins95M/FMWorst Case Inflation3.00%BeryImage: Stress Cushion\$100,000Image: Stress CushionImage: Stress CushionStress Cushion20%Image: Stress Cushion20%Variance11%Image: Stress Cushion20%Draw\$100,000Image: Stress Cushion20%Variance11%Image: Stress Cushion20%Draw\$100,000Image: Stress Cushion20%Variance11%Image: Stress Cushion20%Draw\$100,000Image: Stress Cushion9.61%Draw\$100,000Image: Stress Cushion9.61%Investment\$3,000,000Image: Stress Cushion9.61%Investment\$3,000,000Image: Stress Cushion9.61%Investment\$10 Years15 Years20 YearsProbabilityImage: Stress CushionImage: Stress CushionImage: Stress CushionImage: Stress CushionStress CushionImage: Stress CushionImage: Stress CushionImage: Stress CushionStress CushionStress CushionStress CushionImage: Stress CushionStress CushionStress CushionImage: Stress CushionImage: Stress Cushion <t< td=""><td>Age65Deferred Annuity Begins951M/FMWorst Case Inflation3.00%1BEYImage: Constraint of the second seco</td><td>Age65Deferred Annuity Begins95M/FMWorst Case Inflation3.00%M/FBraw\$100,000ConstructionSafe StrategyDraw\$100,000ConstructionCrowth Relative to CPIInvestent Needed\$2,077,069ConstructionStress Cushion20%ConstructionVariance1%ConstructionDraw\$100,000Expected ReturnStress Cushion20%ConstructionDraw\$100,000Expected ReturnStress Cushion0.00%ConstructionDraw\$100,000Expected ReturnInvestment\$3,000,000ConstructionWithin:5 Years10 YearsProbabilityConstructionof switchingConstructionto safe strategy8%12%15%16%18%Expected Assets\$3,083,517\$3,188,924\$3,297,922\$3,454,745\$3,639,128</td><td>AgeAg</td><td>Age65Deferred Annuity Begins95Age665Deferred An Worst Case Inflation3.00%M/FMWorst Case Inflation3.00%M/FMWorst Case InflationDraw\$100,000CCSafe StrategySafe StrategySafe StrategyDraw\$100,000CCCSafe StrategyStrategyInvestent Needed\$2,077,069CCSafe StrategyStress Cushion20%Variance1%CCSafe StrategyCStress Cushion20%Draw\$100,000Expected Return4.00%Growth Relative to CPI\$3,000,000StrategyStress Cushion20%Draw\$100,000Expected Return4.00%Growth Relative to CPI\$3,000,000CCSafe StrategyStress Cushion20%Draw\$100,000Expected Return4.00%Growth Relative to CPI\$3,000,000StrategyStrategyStress CushionStress Cushi</td><td>Age65Deferred Annuity Begins95Age665Deferred Annuity BeginsM/FMWorst Case Inflation3.00%M/FMWorst Case InflationBrawS100,000S100,000S100,000S100,000S100,000S100,000S100,000Growth Relative to CPI-2.00%SSSfress Cushion20%Variance1%Stress Cushion20%Stress Cushion20%Variance1%Stress Cushion20%Stress Cushion20%Draw\$100,000Expected Return4.00%Stress Cushion20%Draw\$100,000Expected Return4.00%Stress Cushion20%Variance1%Stress Cushion20%Stress Cushion20%Variance1%Stress Cushion20%Stress Cushion20%Draw\$100,000Expected Return4.00%Stress Cushion20%Investment\$3,000,000Stradard Deviation9.61%Stress StresgyStress StresgyInvestment\$3,000,000Stress 20 Years25 YearsNithin:5 Years10 YearsProbability15 Years10 Years15 Years20 Years25 YearsProbabilityStress 20 Years25 YearsWithin:5 Years10 Years15 YearsProbabilityStress 20 Years15 Years20 Years25 Years10 Years15 YearsProbabilityStress 20 Years15 Years10 Years15 Years15 Ye</td><td>Age 65 Deferred Annuity Begins 95 Age 65 Deferred Annuity Begins 95 M/F M Worst Case Inflation 3.00% M M Worst Case Inflation 3.00% Braw \$100,000 Investment Vortex \$100,000 Investment \$100,000 Investment \$100,000 Investment \$100,000 Investment \$30,00,000 Investment \$30,00,000</td><td>Age 65 Deferred Anuity Begins 95 Age 665 Deferred Anuity Begins 95 M/F M Worst Case Inflation 3.00% M M/F M Worst Case Inflation 3.00% M M/F M Worst Case Inflation 3.00% - <</td></t<>	Age65Deferred Annuity Begins951M/FMWorst Case Inflation3.00%1BEYImage: Constraint of the second seco	Age65Deferred Annuity Begins95M/FMWorst Case Inflation3.00%M/FBraw\$100,000ConstructionSafe StrategyDraw\$100,000ConstructionCrowth Relative to CPIInvestent Needed\$2,077,069ConstructionStress Cushion20%ConstructionVariance1%ConstructionDraw\$100,000Expected ReturnStress Cushion20%ConstructionDraw\$100,000Expected ReturnStress Cushion0.00%ConstructionDraw\$100,000Expected ReturnInvestment\$3,000,000ConstructionWithin:5 Years10 YearsProbabilityConstructionof switchingConstructionto safe strategy8%12%15%16%18%Expected Assets\$3,083,517\$3,188,924\$3,297,922\$3,454,745\$3,639,128	AgeAg	Age65Deferred Annuity Begins95Age665Deferred An Worst Case Inflation3.00%M/FMWorst Case Inflation3.00%M/FMWorst Case InflationDraw\$100,000CCSafe StrategySafe StrategySafe StrategyDraw\$100,000CCCSafe StrategyStrategyInvestent Needed\$2,077,069CCSafe StrategyStress Cushion20%Variance1%CCSafe StrategyCStress Cushion20%Draw\$100,000Expected Return4.00%Growth Relative to CPI\$3,000,000StrategyStress Cushion20%Draw\$100,000Expected Return4.00%Growth Relative to CPI\$3,000,000CCSafe StrategyStress Cushion20%Draw\$100,000Expected Return4.00%Growth Relative to CPI\$3,000,000StrategyStrategyStress CushionStress Cushi	Age65Deferred Annuity Begins95Age665Deferred Annuity BeginsM/FMWorst Case Inflation3.00%M/FMWorst Case InflationBrawS100,000S100,000S100,000S100,000S100,000S100,000S100,000Growth Relative to CPI-2.00%SSSfress Cushion20%Variance1%Stress Cushion20%Stress Cushion20%Variance1%Stress Cushion20%Stress Cushion20%Draw\$100,000Expected Return4.00%Stress Cushion20%Draw\$100,000Expected Return4.00%Stress Cushion20%Variance1%Stress Cushion20%Stress Cushion20%Variance1%Stress Cushion20%Stress Cushion20%Draw\$100,000Expected Return4.00%Stress Cushion20%Investment\$3,000,000Stradard Deviation9.61%Stress StresgyStress StresgyInvestment\$3,000,000Stress 20 Years25 YearsNithin:5 Years10 YearsProbability15 Years10 Years15 Years20 Years25 YearsProbabilityStress 20 Years25 YearsWithin:5 Years10 Years15 YearsProbabilityStress 20 Years15 Years20 Years25 Years10 Years15 YearsProbabilityStress 20 Years15 Years10 Years15 Years15 Ye	Age 65 Deferred Annuity Begins 95 Age 65 Deferred Annuity Begins 95 M/F M Worst Case Inflation 3.00% M M Worst Case Inflation 3.00% Braw \$100,000 Investment Vortex \$100,000 Investment \$100,000 Investment \$100,000 Investment \$100,000 Investment \$30,00,000 Investment \$30,00,000	Age 65 Deferred Anuity Begins 95 Age 665 Deferred Anuity Begins 95 M/F M Worst Case Inflation 3.00% M M/F M Worst Case Inflation 3.00% M M/F M Worst Case Inflation 3.00% - <

A closer look at inflation

- Will growth of spending at CPI rate really protect your lifestyle?
- Should you aim for a higher growth rate in spending than CPI
 - GDP per capita grows about 2% above inflation
 - But an added 2% growth in spending requires 40% more savings





DAILY ONLINE PRICE INDEX



How much more would CPI be if quality improvements were included?

- Health care
 - 7 % of CPI X 2 ½% = .17 %
- Recreation and Communications
 - 10 % of CPI X 2 $\frac{1}{2}$ % = .25%
- Automobiles
 - 6 % of CPI X 1 $\frac{1}{2}$ % = .09%
- Total = 1/2%

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	Age	65	65 Deferred Annuity Begins		95		-	Age	65	Deferred An	nuity Begins	95		+
	M/F	м	Worst Case I	nflation	3.00%		_	M/F	M	Worst Case I	nflation	3.00%		T
							_							T
Safe Strate	gy						Safe Strate	gy						
	Draw		\$100,000					Draw		\$100,000				
	Growth Relative	to CPI	-2.00% \$2,077,069				Grow Inves	Growth Relative	to CPI	-3.00%				
	Investent Neede	d						Investent Needeo	Investent Needed					
	Stress Cushion		20%					Stress Cushion		20%				
	Variance		1%					Variance		1%				Ŧ
Aggressive	Startegy						Aggressive	Startegy						+
	Draw		\$100,000	00,000 Expected Return		4.00% 9.61%		Draw		\$100,000	Expected Return		4.009	%
	Growth Relative	to CPI	0.00% Standard De		viation			Growth Relative to CPI		2.00%	Standard De	tandard Deviation		6
	Investment		\$3,000,000					Investment		\$3,000,000				Ţ
<u>Results</u>							<u>Results</u>							+
	Within:	5 Years	10 Years	15 Years	20 Years	25 Years		Within:	5 Years	10 Years	15 Years	20 Years	25 Years	Τ
	Probability							Probability						T
	of switching							of switching						T
	to safe strategy	8%	12%	15%	16%	18%	_	to safe strategy	3%	13%	22%	28%	34%	6
	Expected Assets	\$3 083 517	\$3 188 924	\$3 297 922	\$3 454 745	\$3 639 128	-	Expected Assets	\$2.070.025	¢2 122 E01	\$2 126 60E	\$2 100 /50	¢2 009 77	
	Expected / ibbetb	<i>40,000,011</i>	<i>40,100,024</i>	ÇOJED I JJEE	çoj 10 1,7 10	<i>ç</i> 3,033,120	-	Expected Assets	33,013,323	22,122,201	33,130,003	\$5,100,450	72,330,113	2