

**ENGINEERING**  
*Your*  
**RETIREMENT**

Retirement  
Planning for  
Technology  
Professionals

**Mike Golio**

**Retired**

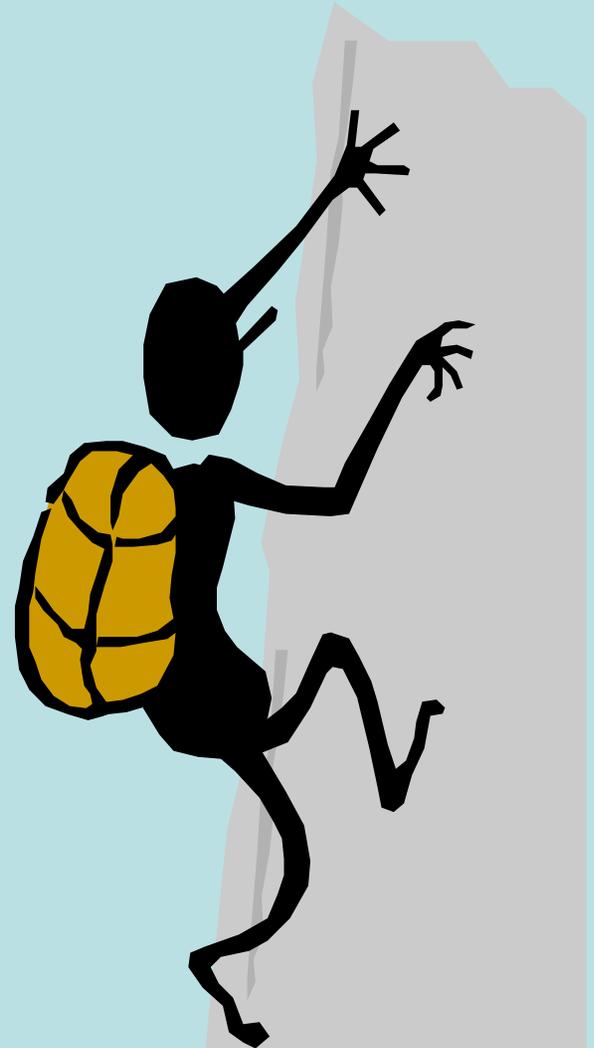
**Web Editor, IEEE  
MTT-Society**

**[www.golio.net](http://www.golio.net)**

MIKE GOLIO

# Engineering Your Retirement Agenda

- Trends in Retirement
- Retirement Environment
- What matters?
  - Lifetime, spending, saving rate, investment returns, inflation
- First things first
- How long will I be retired?
- Investment Environment
- How much do I need?
- Investing Tips
- What will I do?

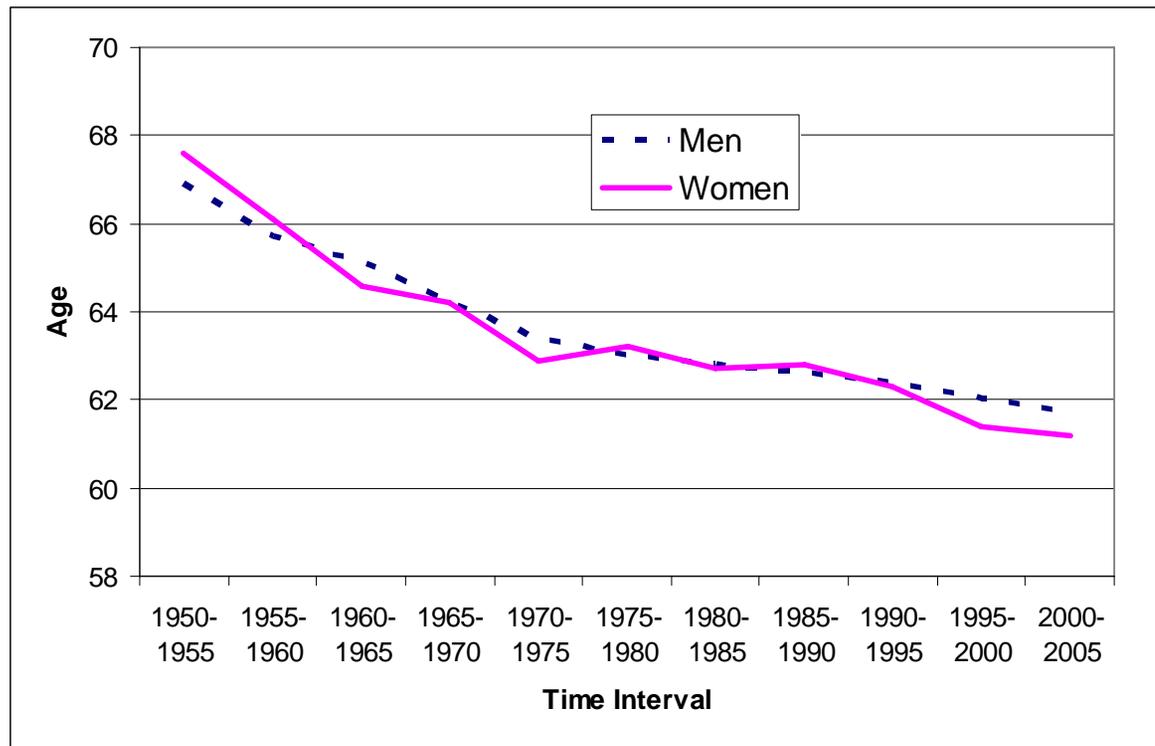




# Trends in Retirement Age

**Social Security and Medicare benefit availability has made many people think about retirement as something that occurs in their mid-60's.**

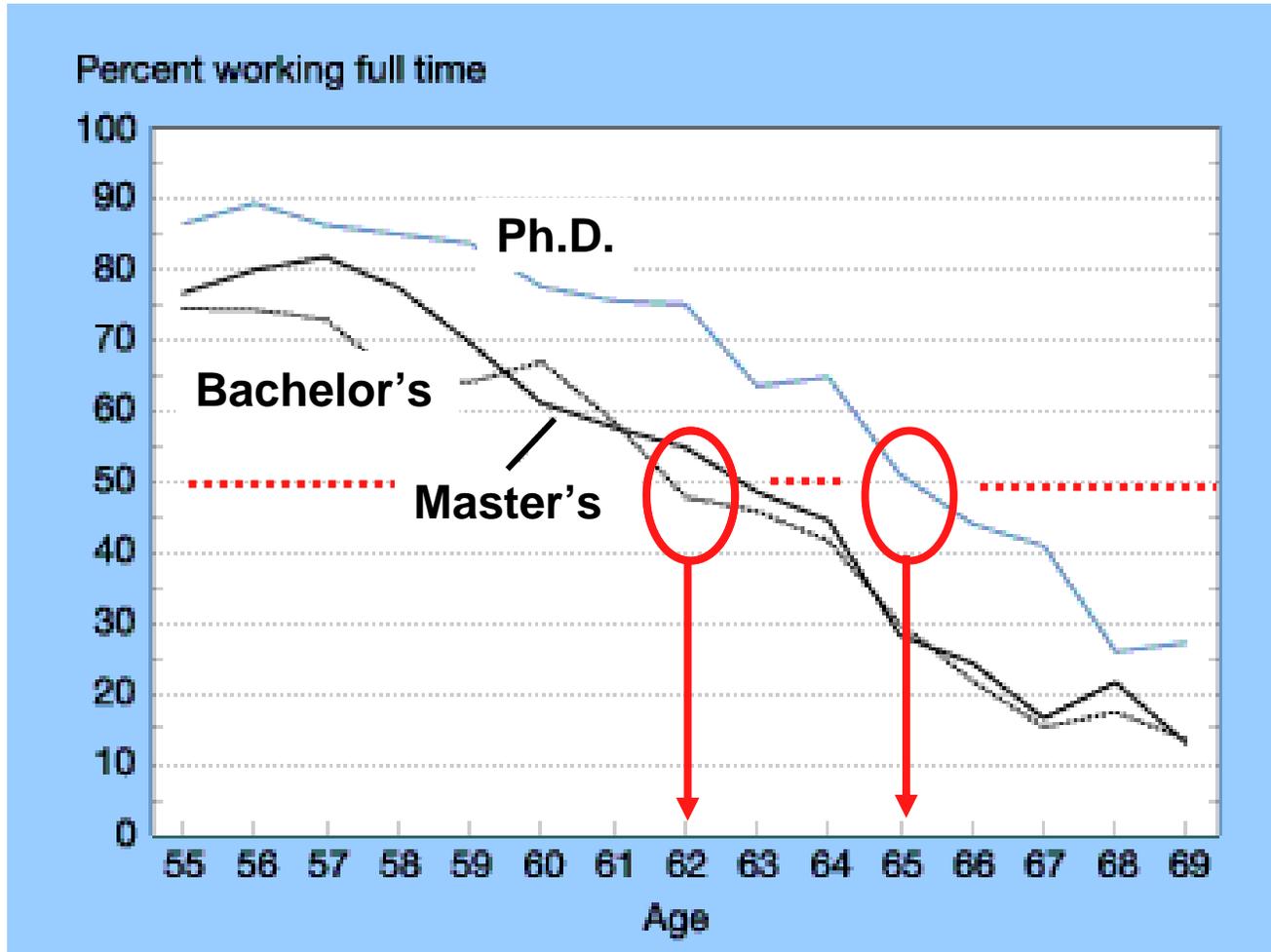
**This is not a natural law. As a technical professional you can choose to work much longer or to retire early.**



Monthly Labor Review, July. 2007



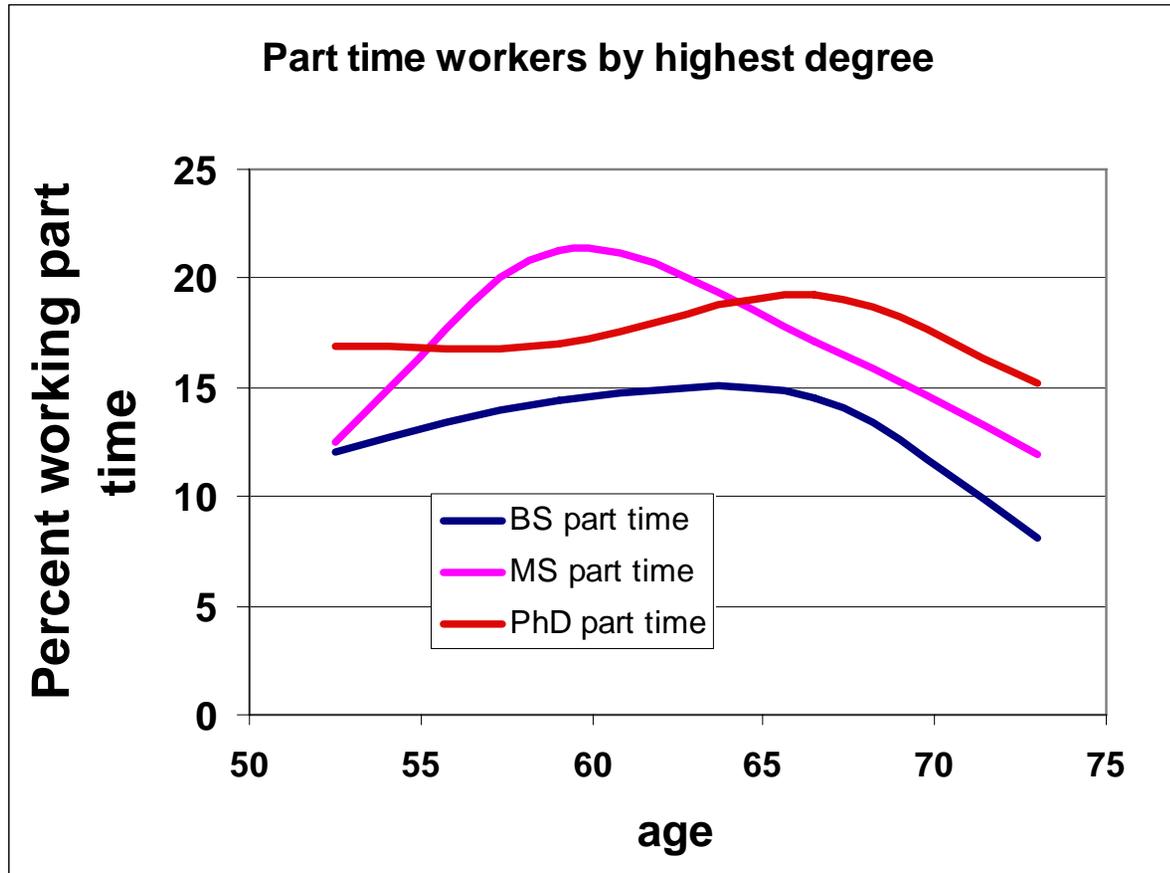
# When Scientists and Engineers stop working full time



Science & Engineering Indicators (2002)



# Science and Engineering degreed individuals who have "retired" but continue to work



*National Science Foundation, 1999*

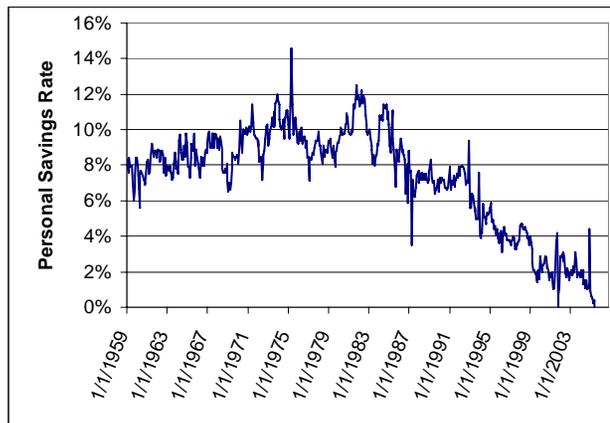


# Retirement Environment

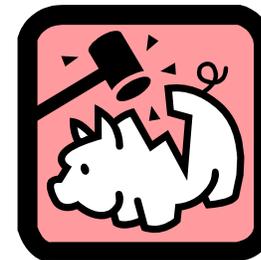
- 80 million Americans will reach “normal” retirement age within the next 20 years.
  - Social Security & Medicare facing funding issues



– Record numbers of pension plans are defaulting



– US Saving rate is near zero

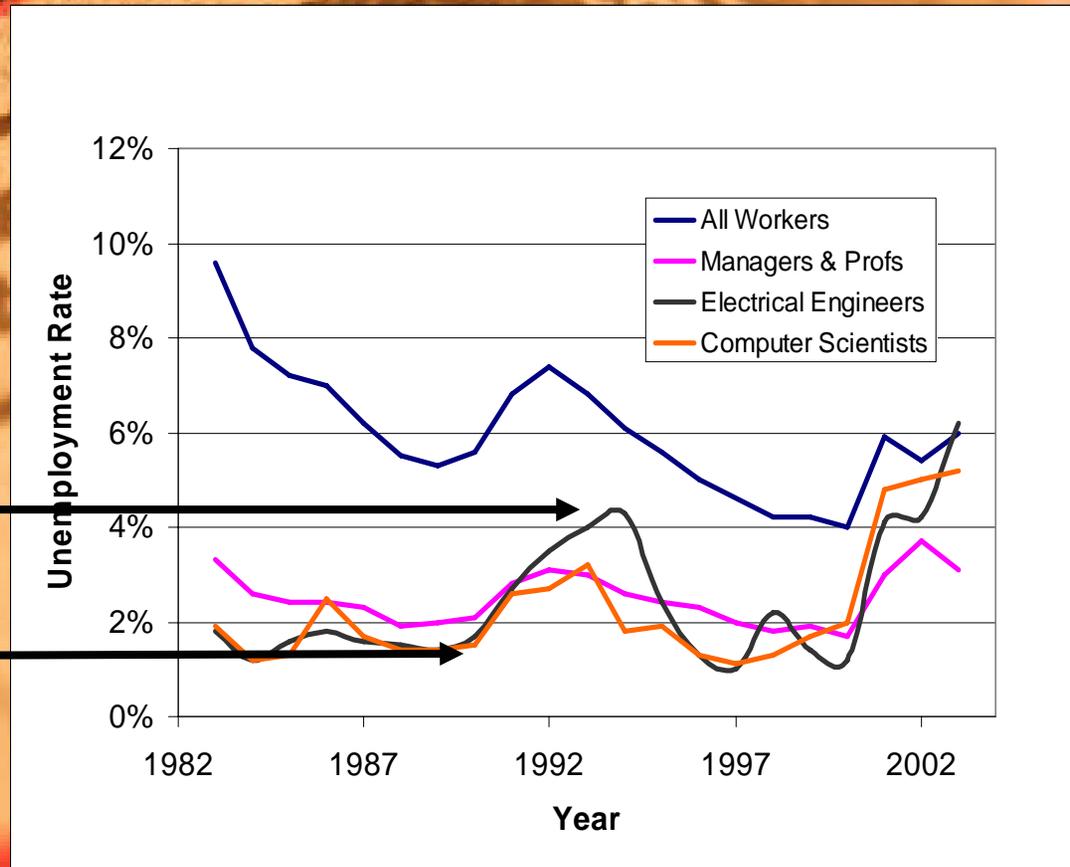


# Global economics can affect engineering unemployment

Unemployment for EEs has run much lower than for the average worker in all fields.

But ...

A 3% increase in unemployment rate over a short period (~ 2 years) represents job loss to approximately 150,000 electrical engineers.





# First things first

**Before you make any other retirement/investment plans:**



- ***Establish an emergency fund to deal with unexpected financial or personal catastrophe***

- ***Research and acquire appropriate insurance***

- House
- Car
- Medical
- Umbrella
- Long-term care



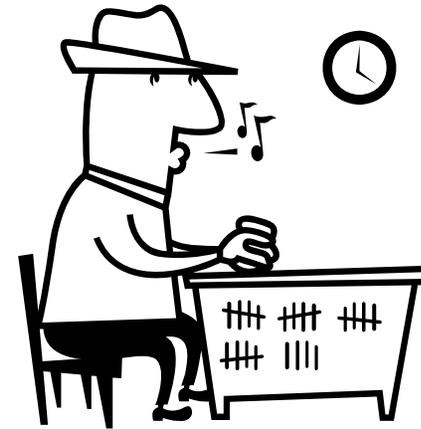
- ***Organize critical documents***

- investment records
- debt records
- wills, and other legal documents
- letter of instruction

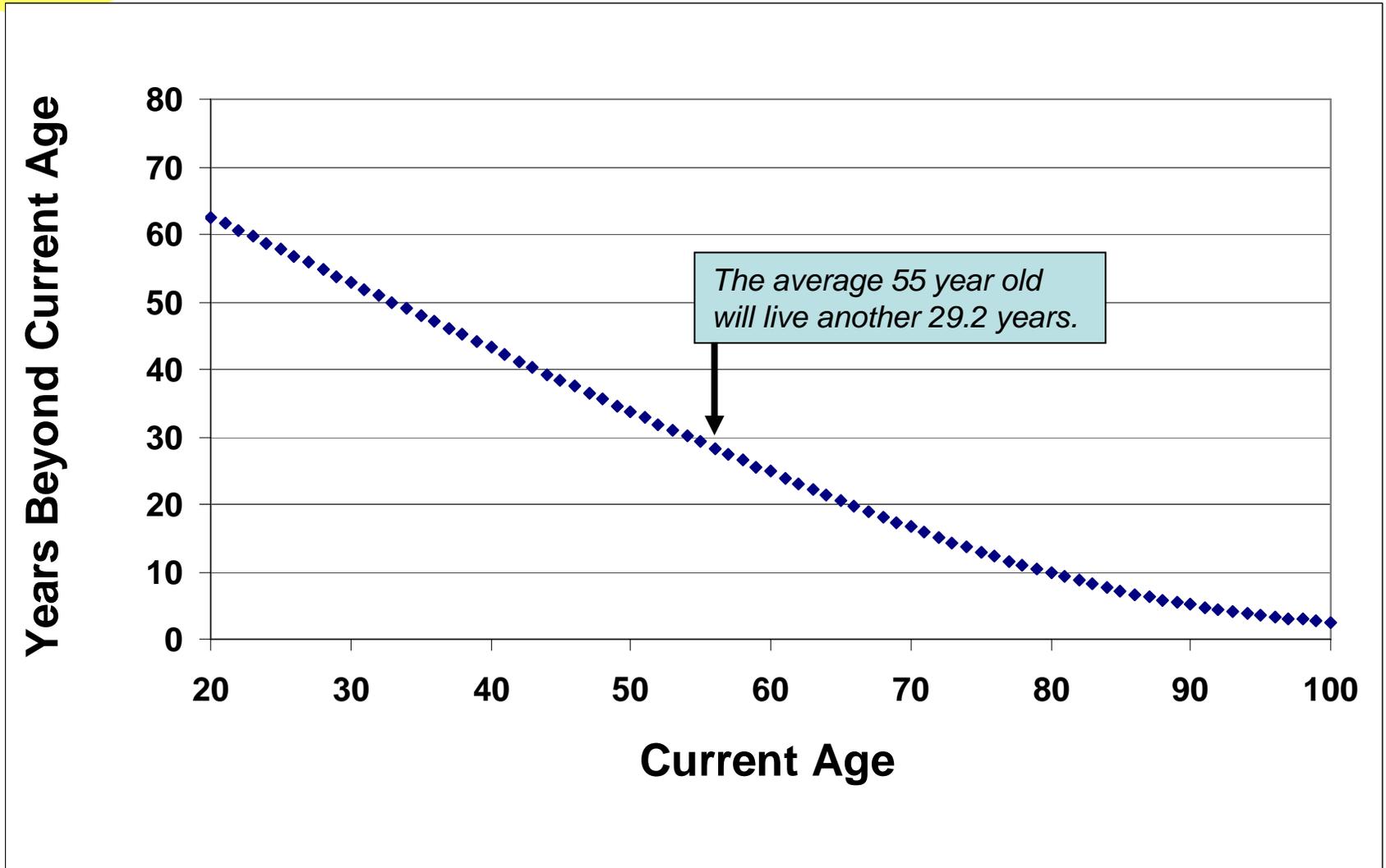
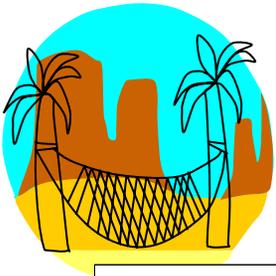


# What needs to be determined to plan your retirement?

- How long will my retirement last?
- How much will I spend?
- How much will I invest?
- How much will my investments earn?
- How will inflation erode my investments?

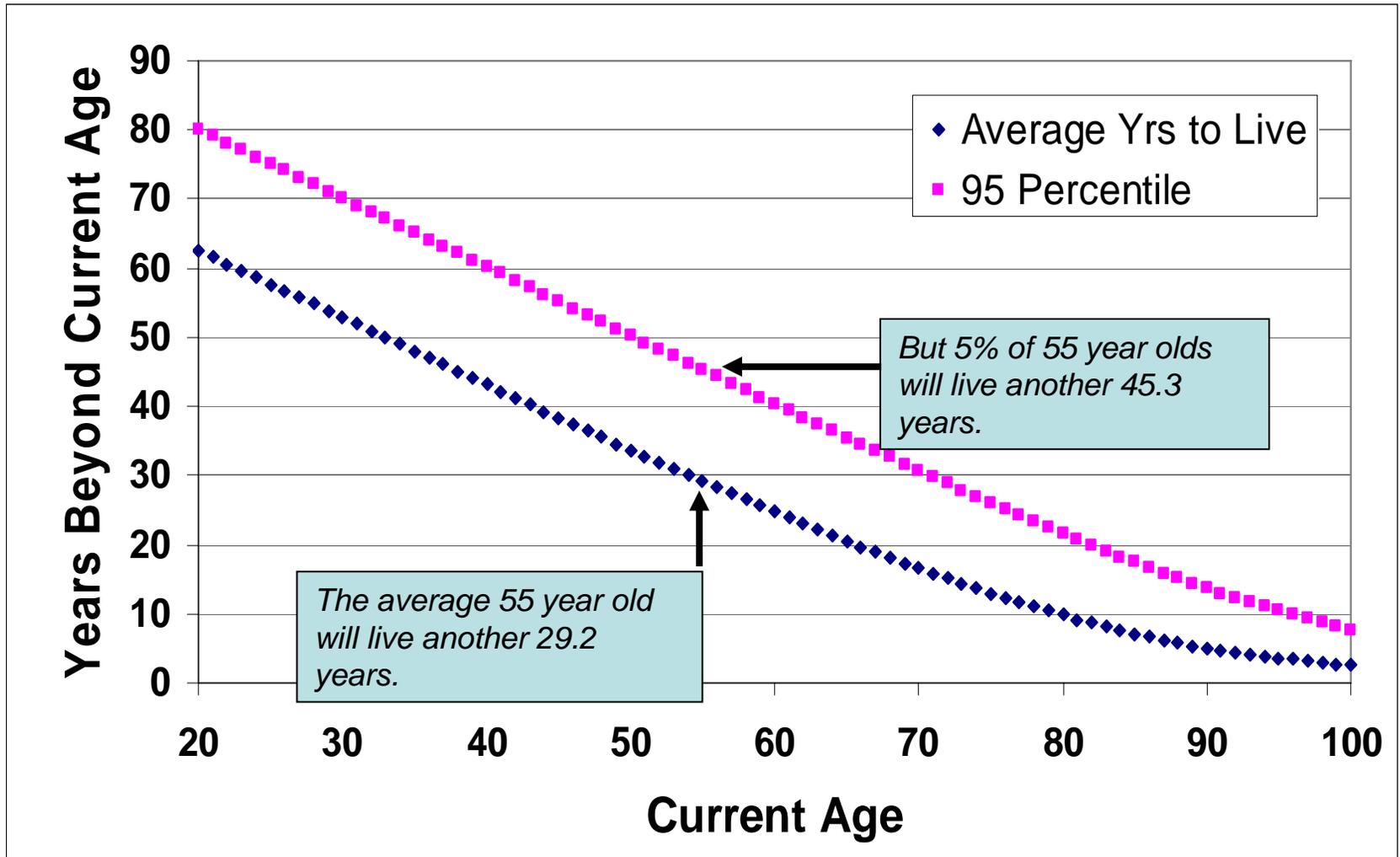


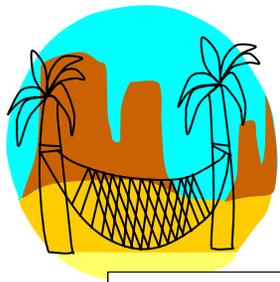
# How long will I have to fund retirement? *(How long will I live?)*



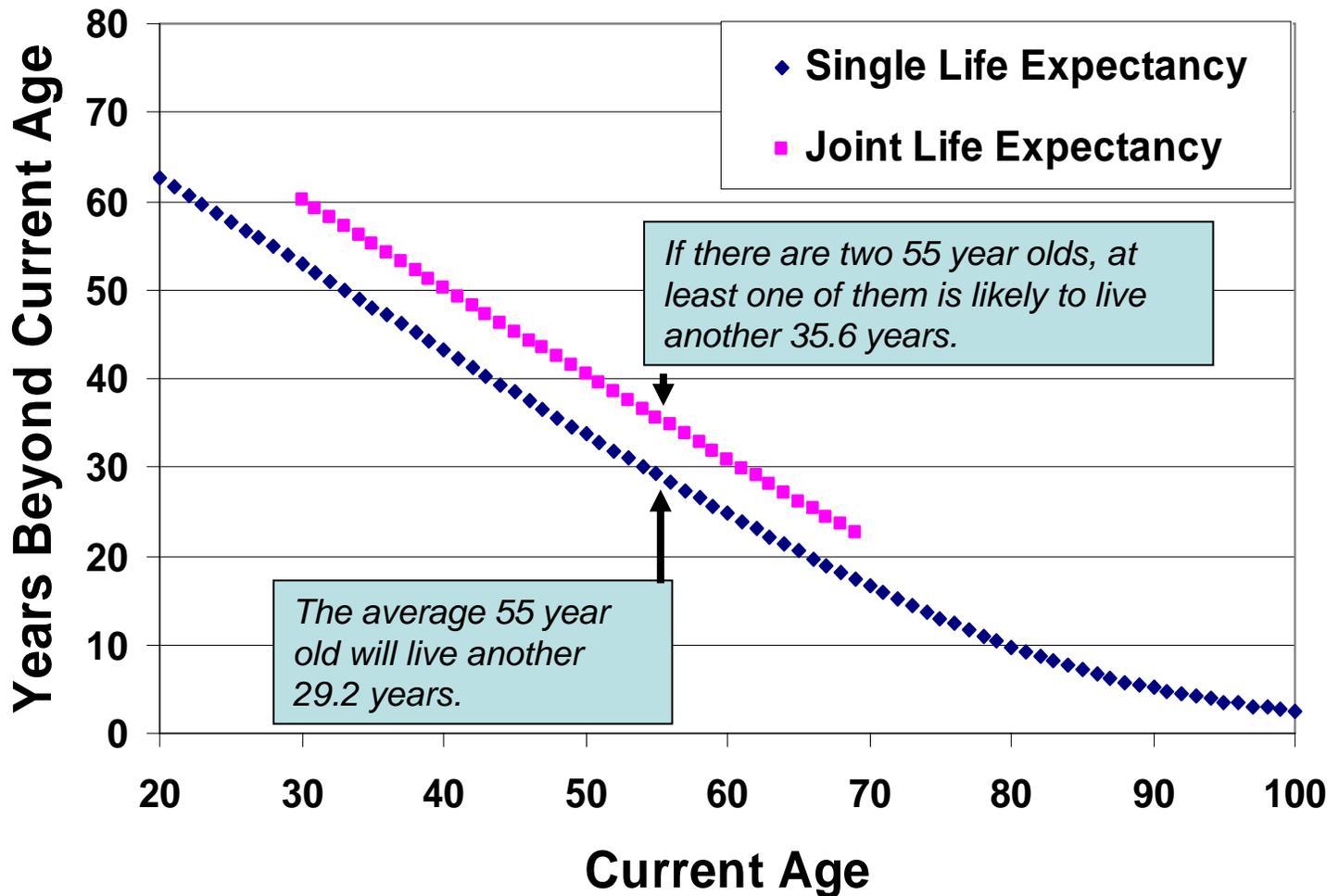


# How long will I have to fund retirement? *(How long will I live?)*



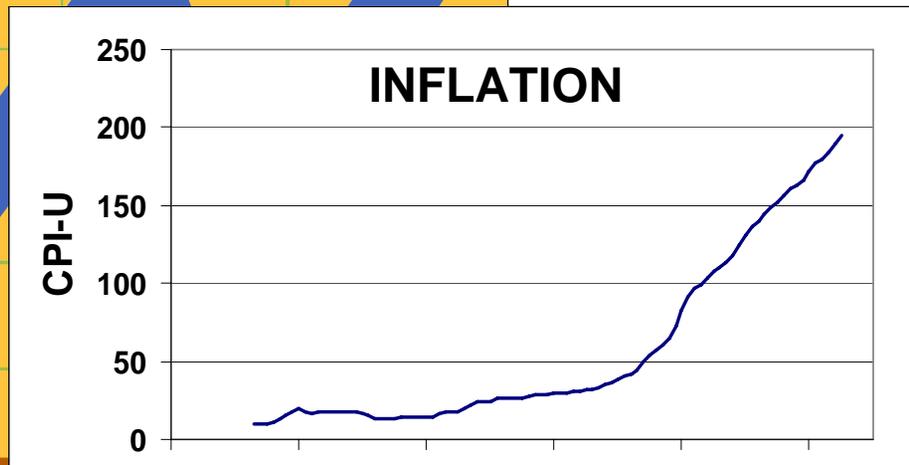
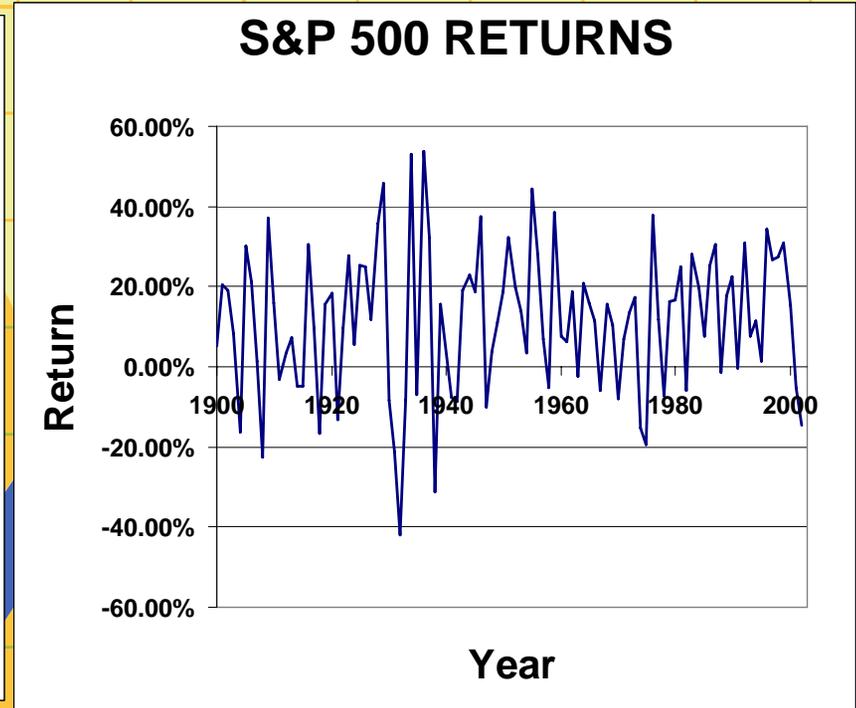
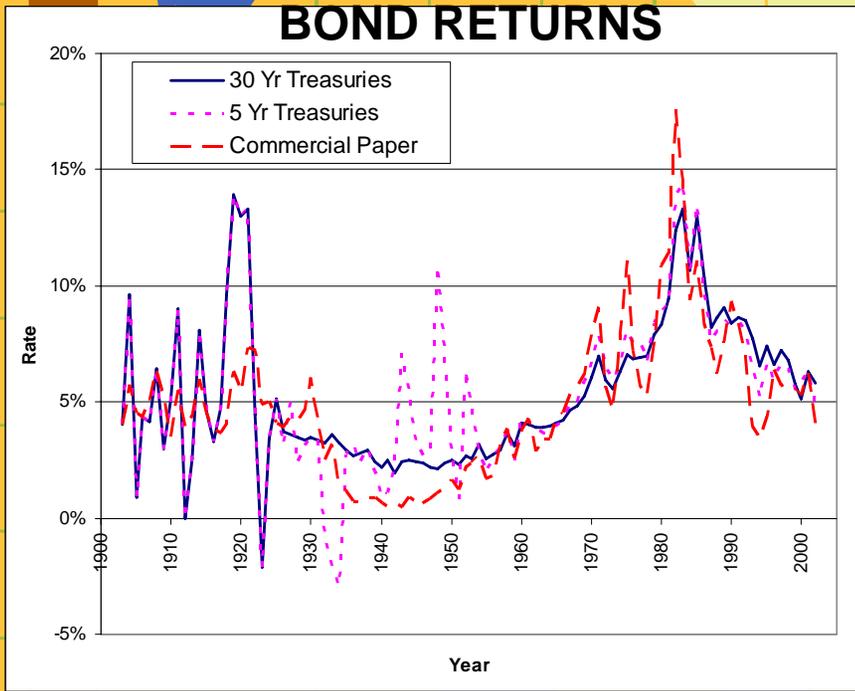


# How long will I have to fund retirement? *(How long will I live?)*





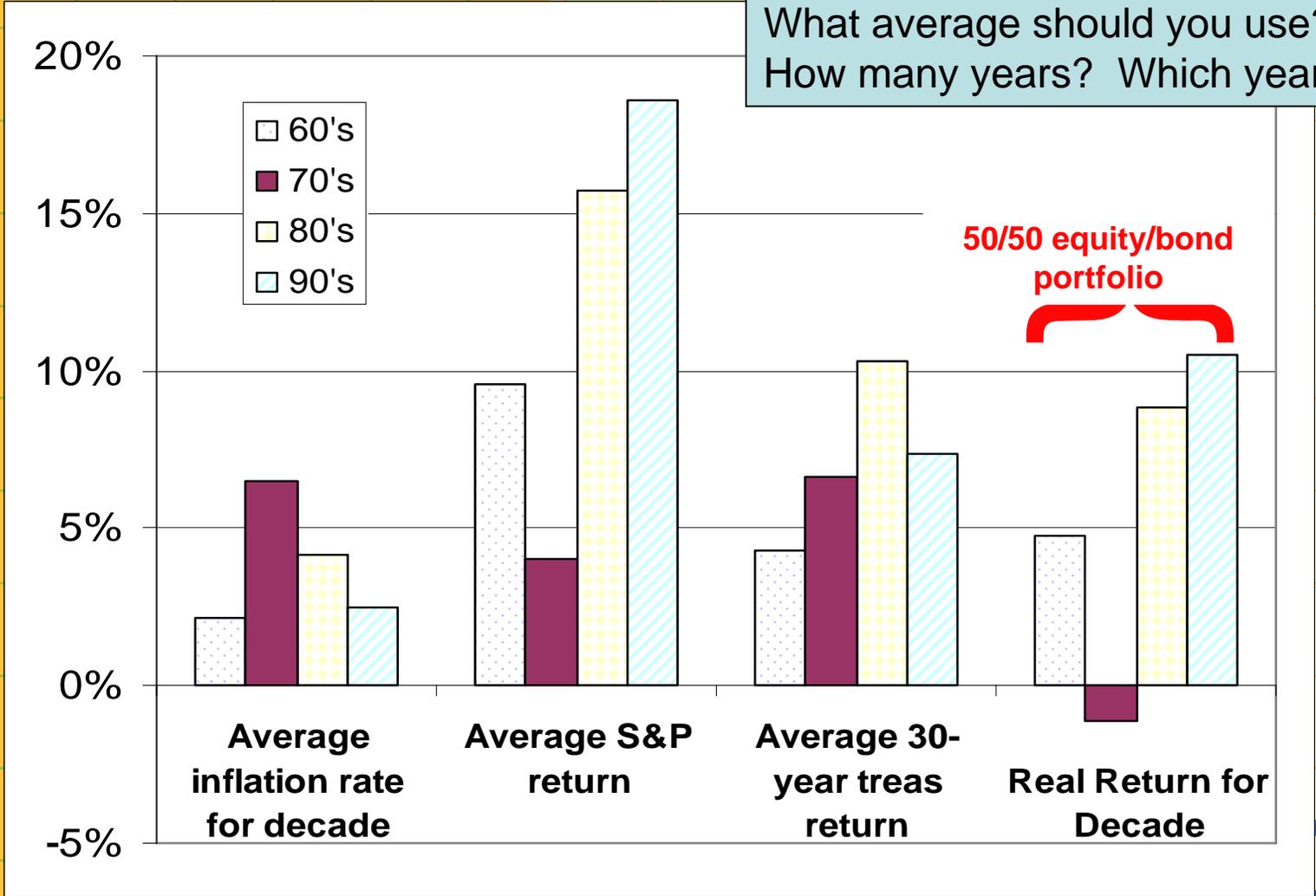
# Average Returns and Inflation Don't Tell You the Story You Need to Know





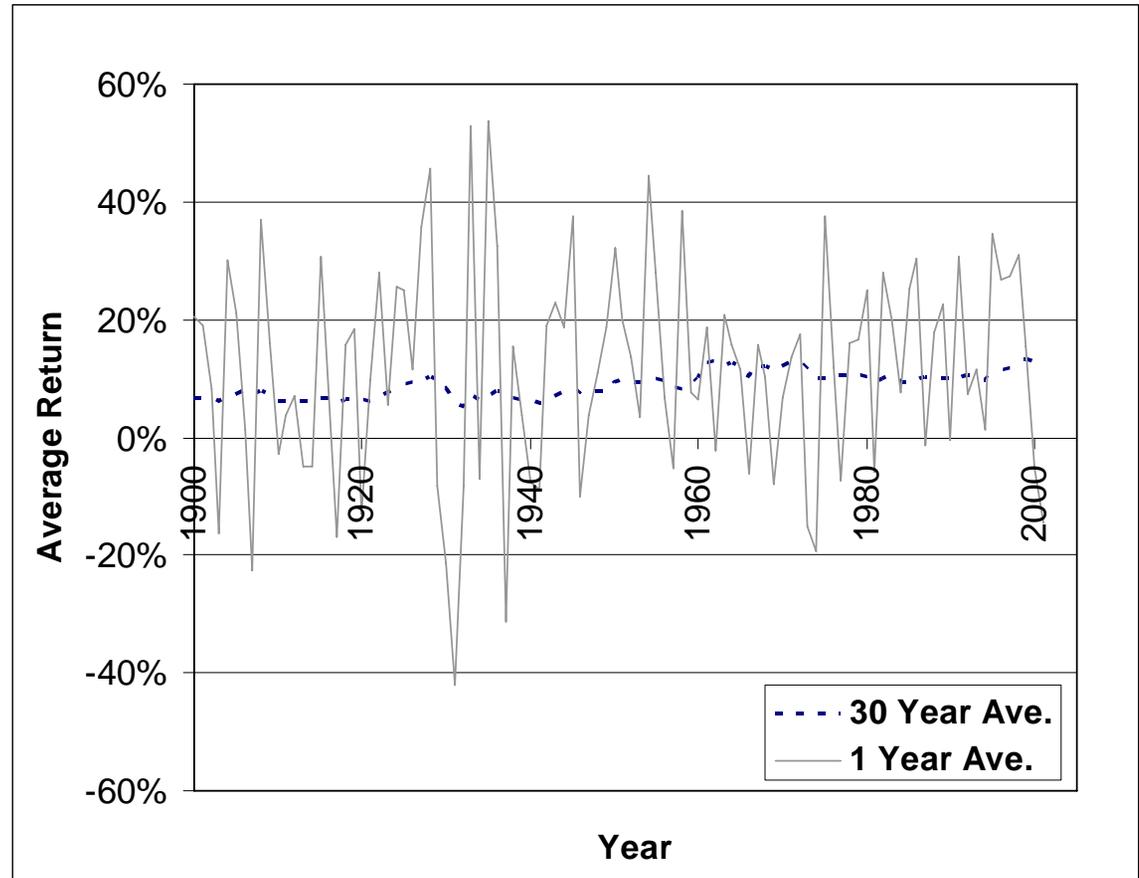
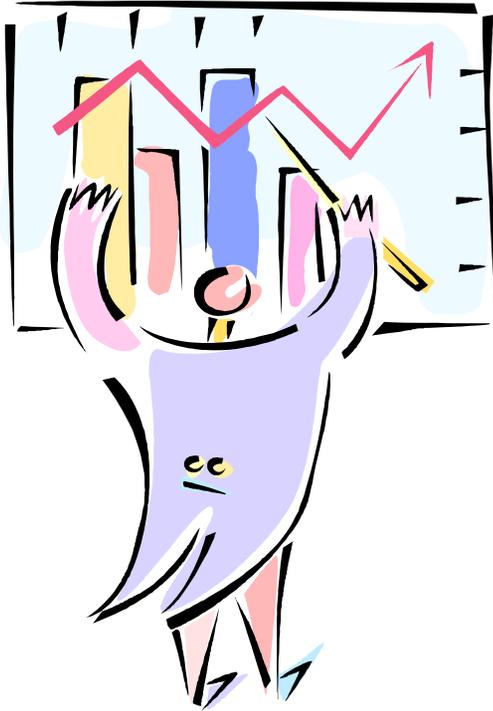
# Average Returns and Inflation Don't Tell You the Story You Need to Know

What average should you use?  
How many years? Which years?





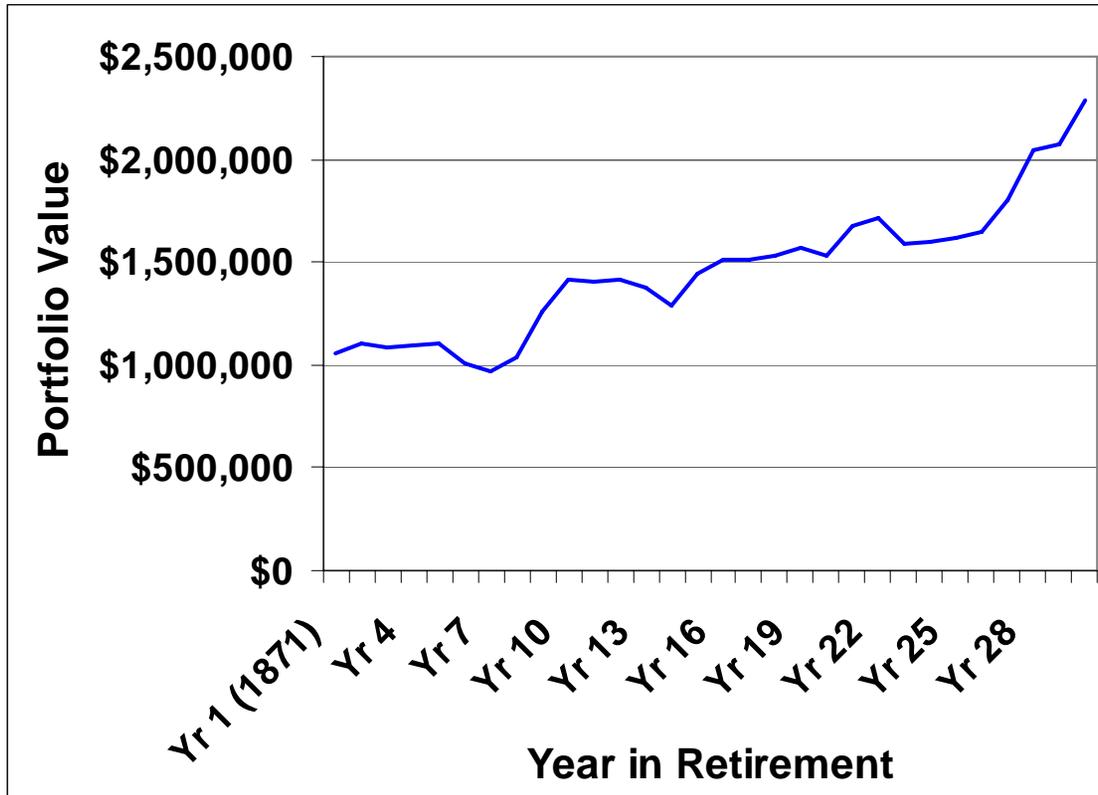
# Return variation and Long-term planning





# Historical Retirement Simulation

(The unit retiree retires in Jan. 1871)



## The unit retiree:

Portfolio value = \$1M

- 50% invested in S&P 500

- 50% invested in bonds

Annual spending = \$40K

- Spending inflation adjusted

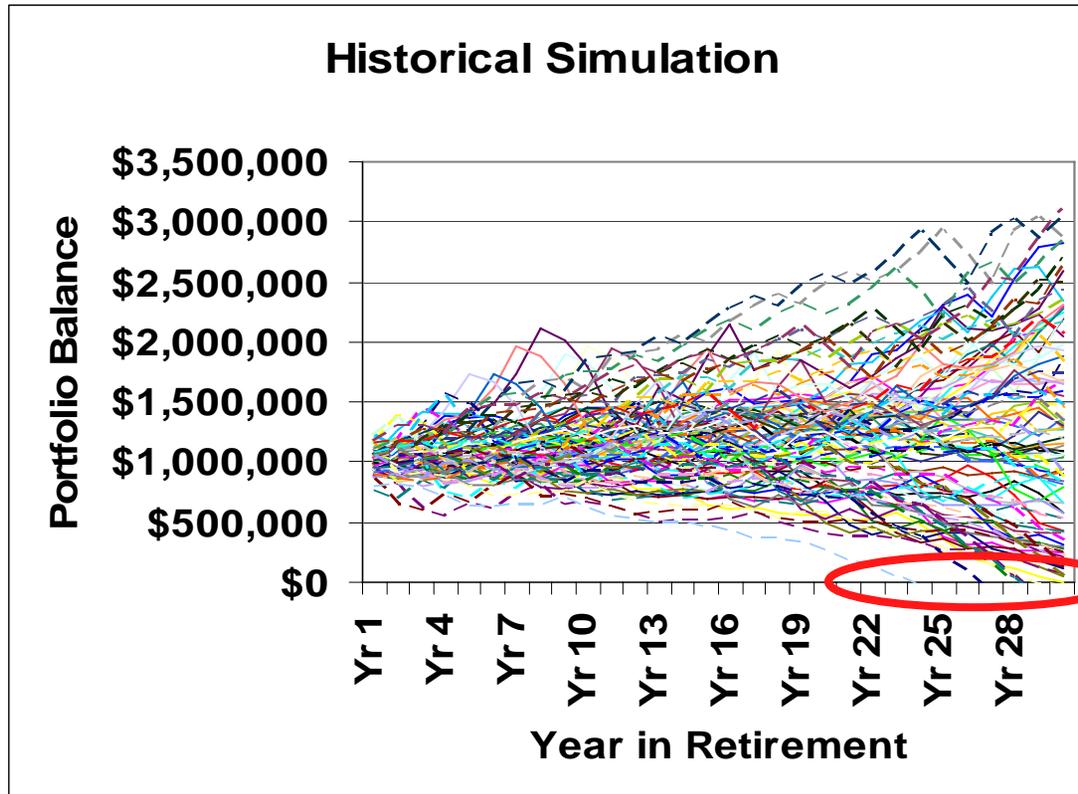
Consider the unit retiree described above who retired in 1871.

The 1871 unit retiree did well, but what about 1872 unit retiree? 1873? ...



# Historical Retirement Simulation

All years in historical record: 1871 to 1977



## The unit retiree:

Portfolio value = \$1M

- 50% invested in S&P 500

- 50% invested in bonds

Annual spending = \$40K

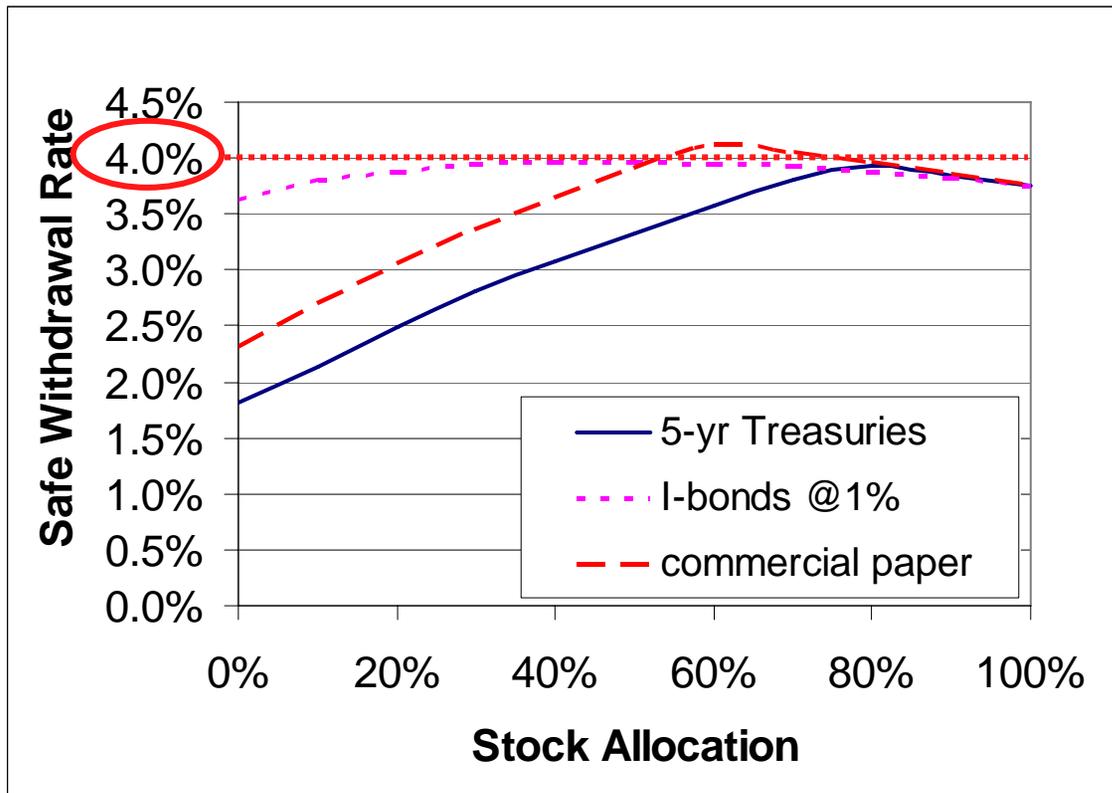
- Spending inflation adjusted

Only a handful of cases out of 130+ years of investment history threaten retirement survival.



# Safe Withdrawal Rate (SWR) and the 4% rule

$$SWR = \frac{1}{25} \times (P) = 0.04 \times (P)$$



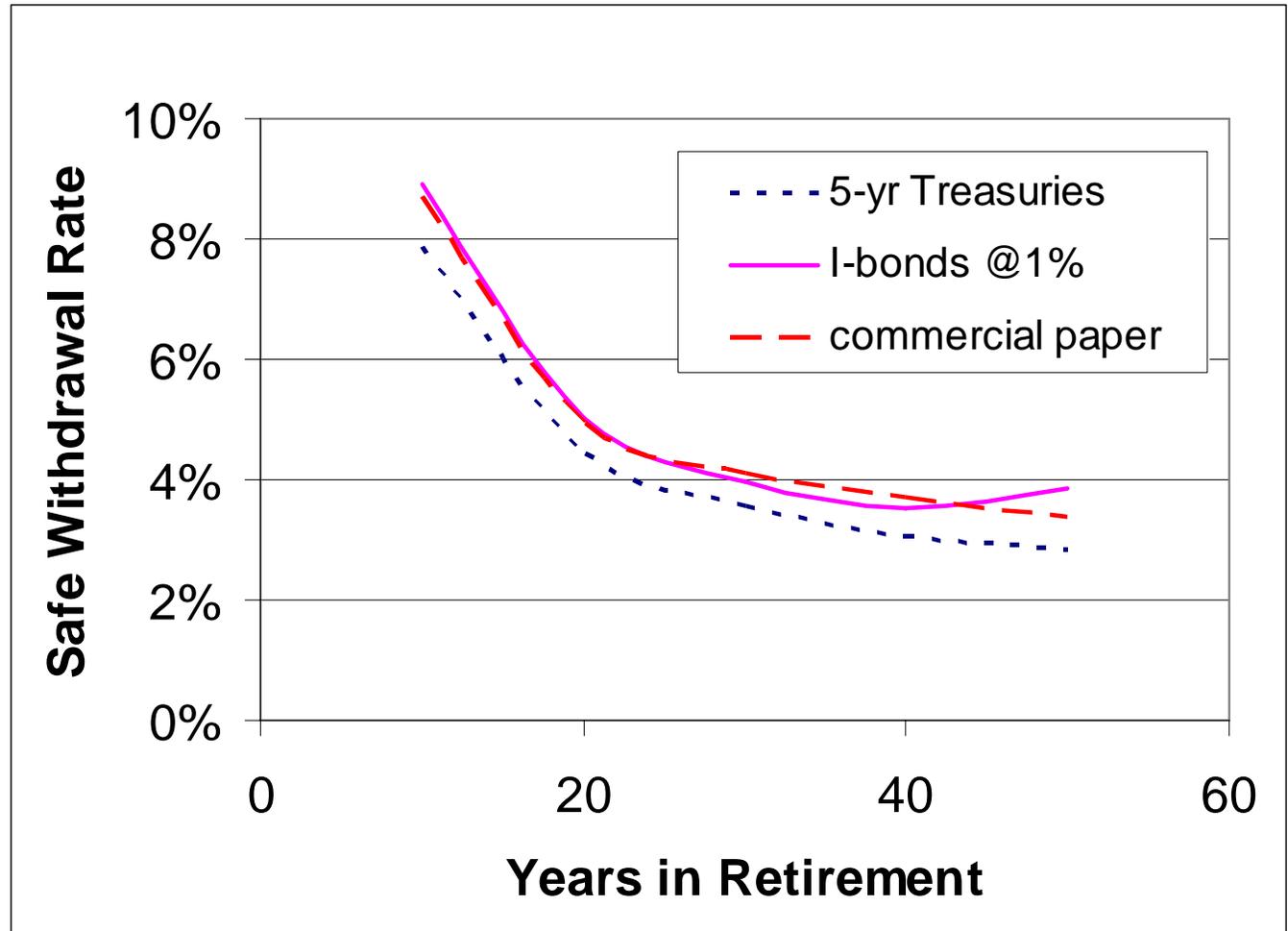
Where  $P$  is your total portfolio value

*Simulation is for a 30 year retirement with 0.2% expense ratio. Data is for portfolios that would have survived 100% of time throughout history.*



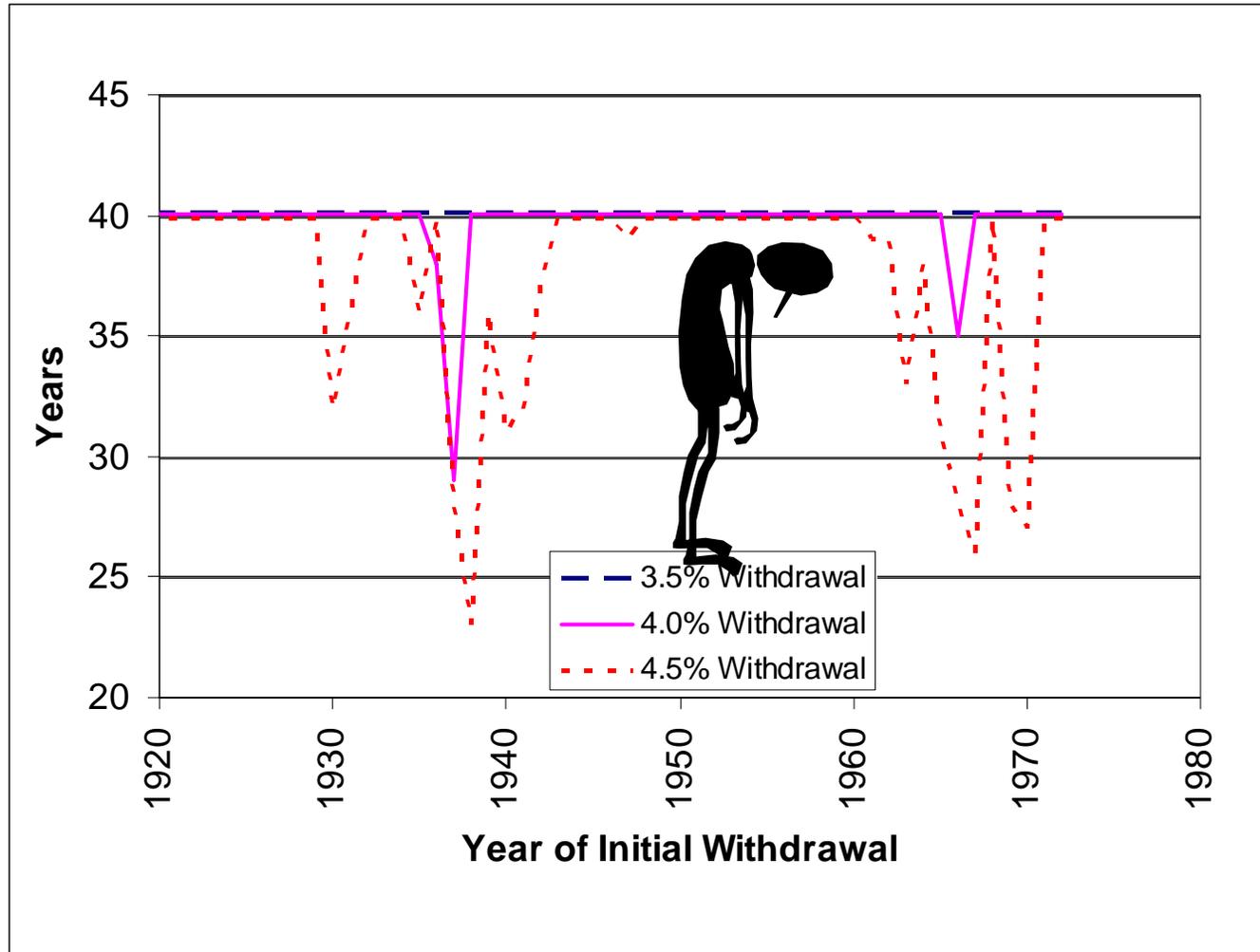
# Safe Withdrawal Rate (SWR) and the 4% rule

*Simulation is for a 60% equity portfolio with 0.2% expense ratio. Data is for portfolios that would have survived 100% of time throughout history.*





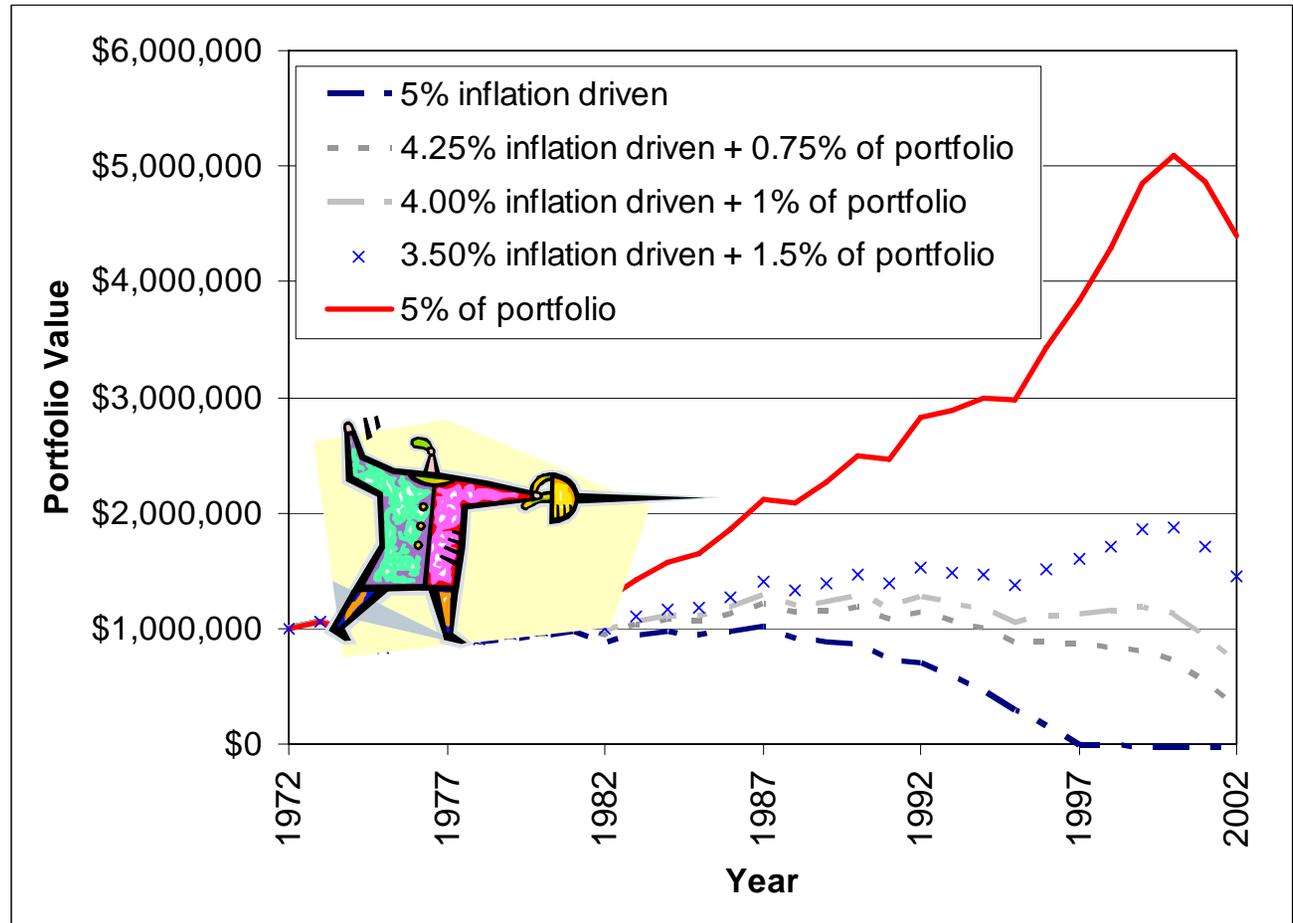
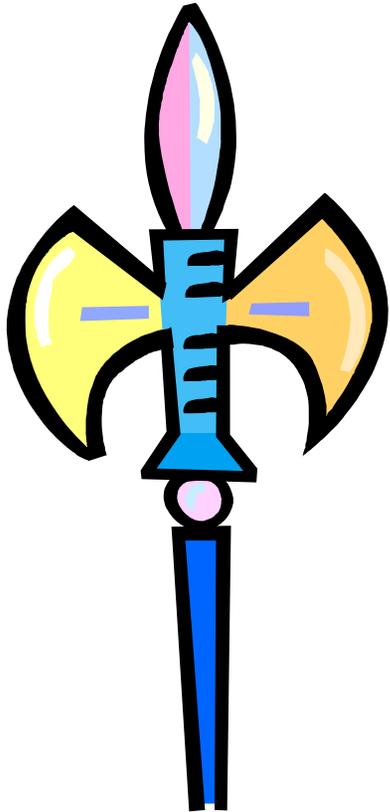
# The Worst Time in history to retire



*Simulation is for a 60% equity portfolio with 0.2% expense ratio.*



# Your most powerful weapon: Control of spending

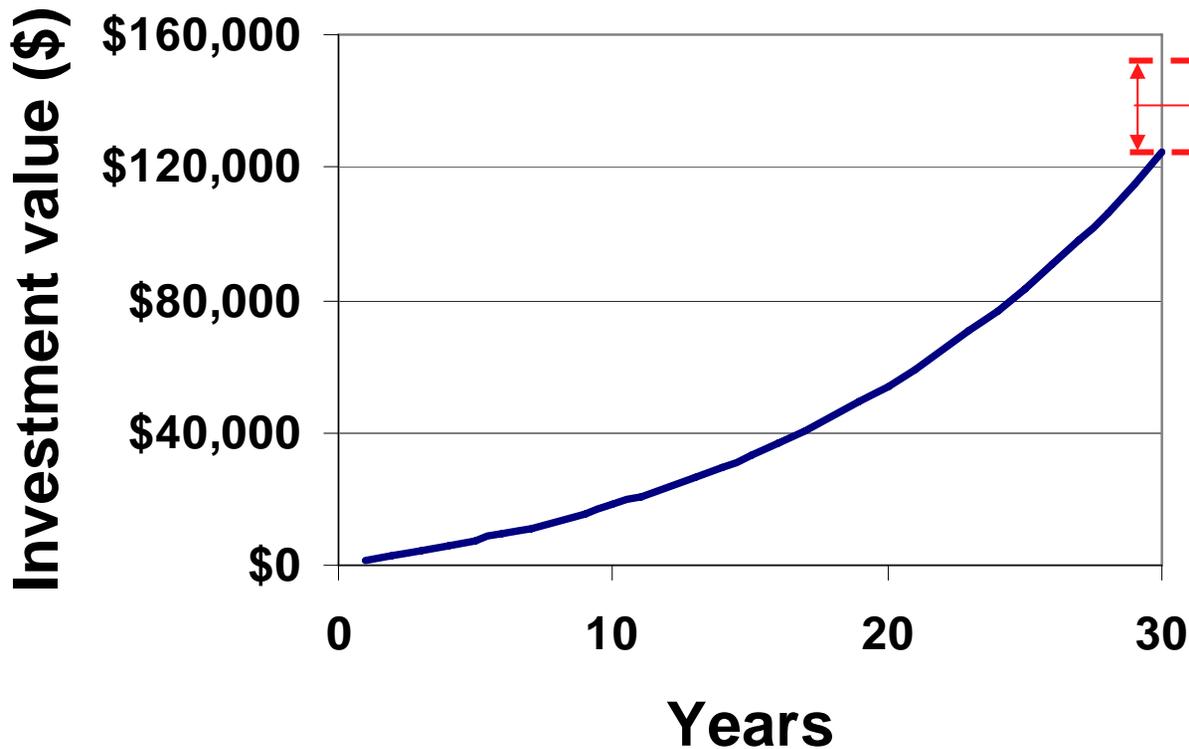


Considering only a small fraction of your spending to be discretionary and based on the performance of your portfolio (rather than inflation) can dramatically extend your SWR.



# The cost of a cup of coffee

## investment value of \$3.50 cup of coffee



Continuing the cup of coffee habit for 30 years in retirement requires an additional \$32,000 nest egg

The search for items that impact portfolio longevity do not have to be limited to high cost expenses like auto purchase or remodeling.

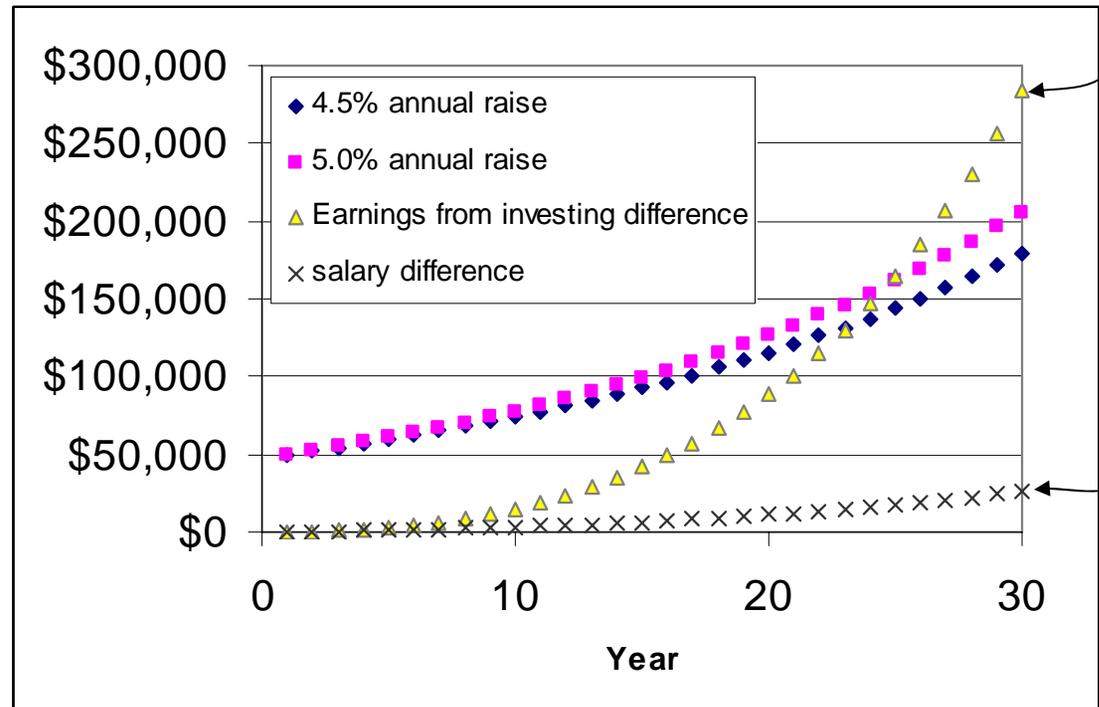


# Investing in your career pays off

Assume a starting salary of \$50,000 per year: one engineer receives 4.5% annual raise and one engineer receives a 5% annual raise.

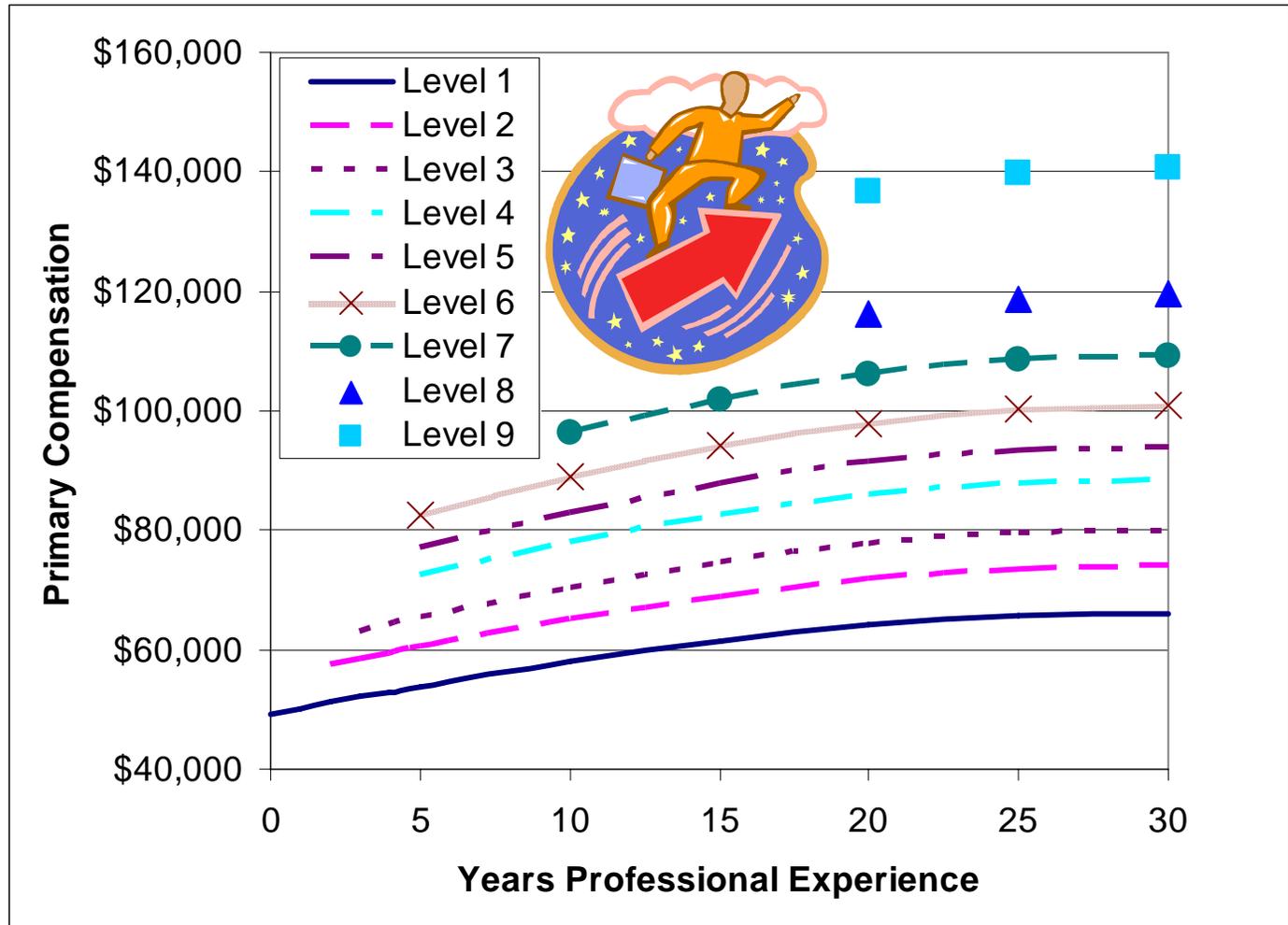
At the end of 30 years, the salary differential is over \$26,000 per year.

If the salary difference is invested with 6% annual return, the additional ½ percent of raise would produce an excess of over \$280,000.





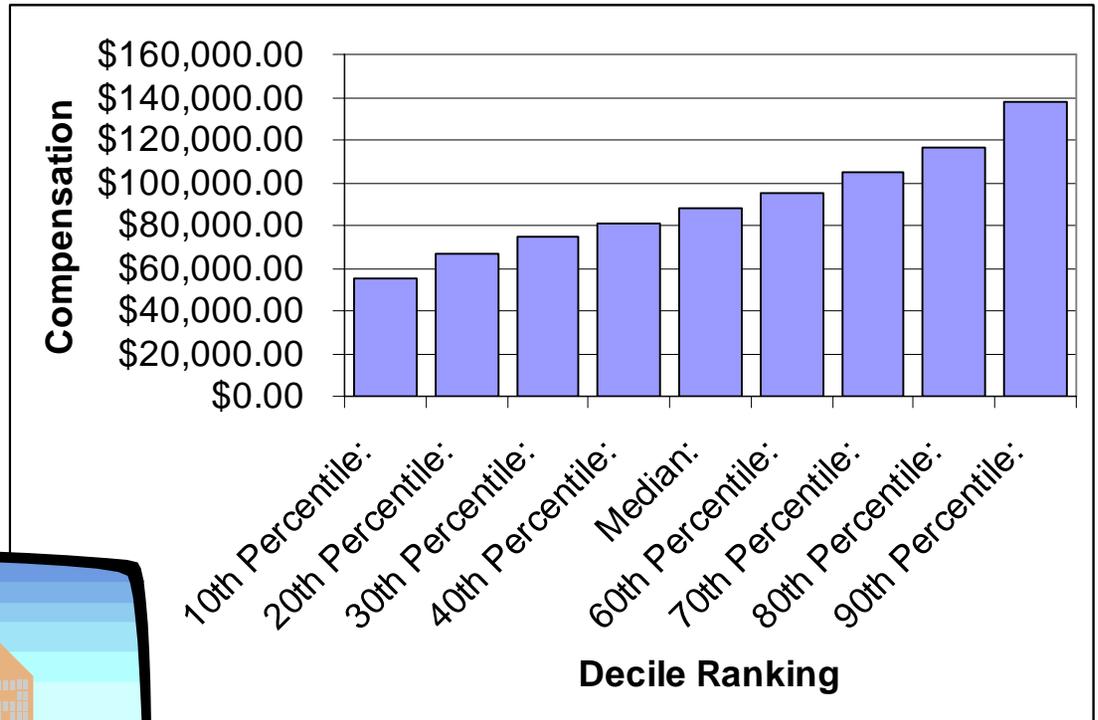
# Promotions are more valuable than experience



IEEE Salary Survey Data



# Being valued by your supervisor is more valuable than experience



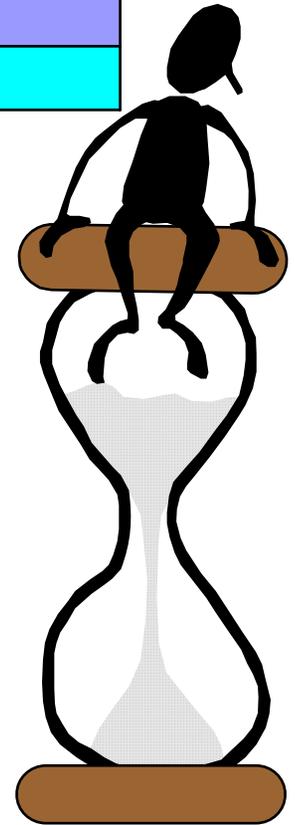
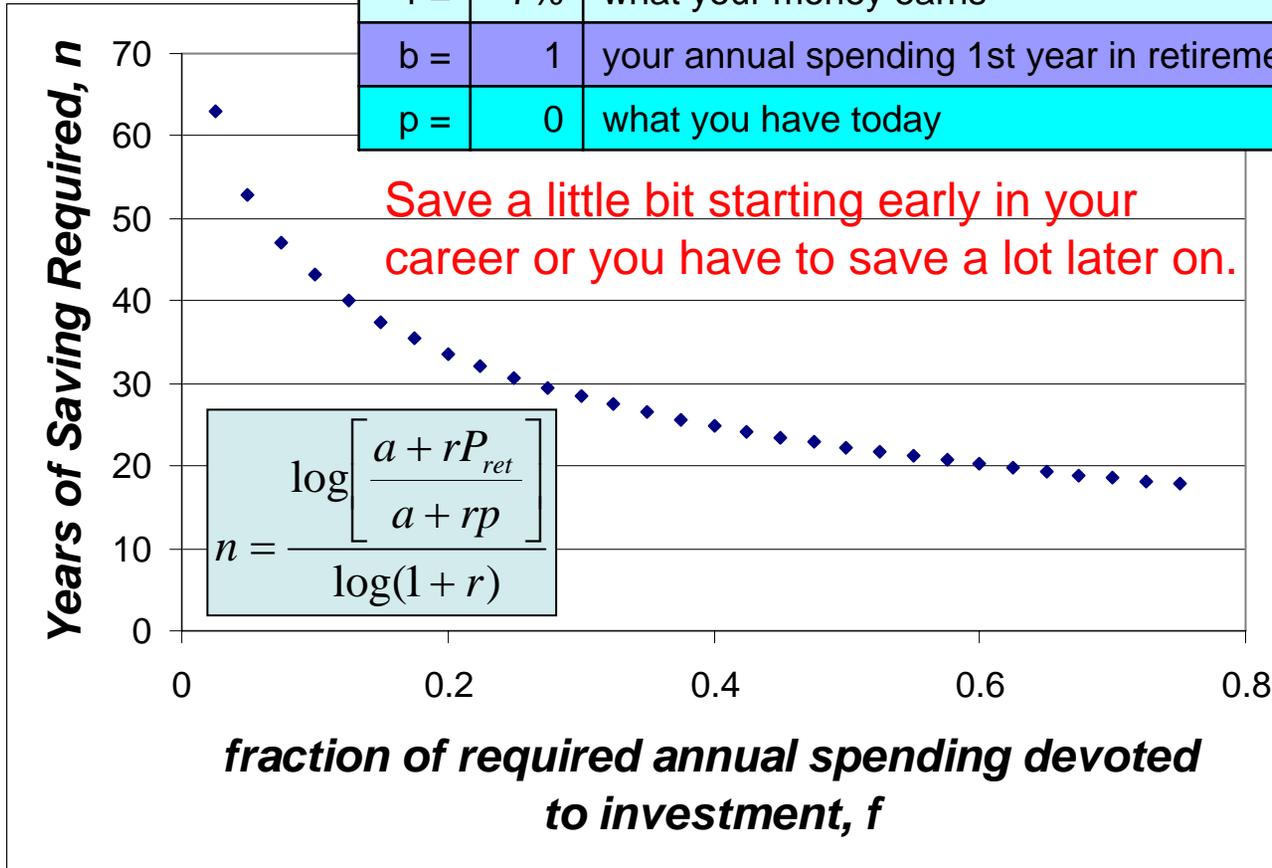
IEEE Salary Survey Data



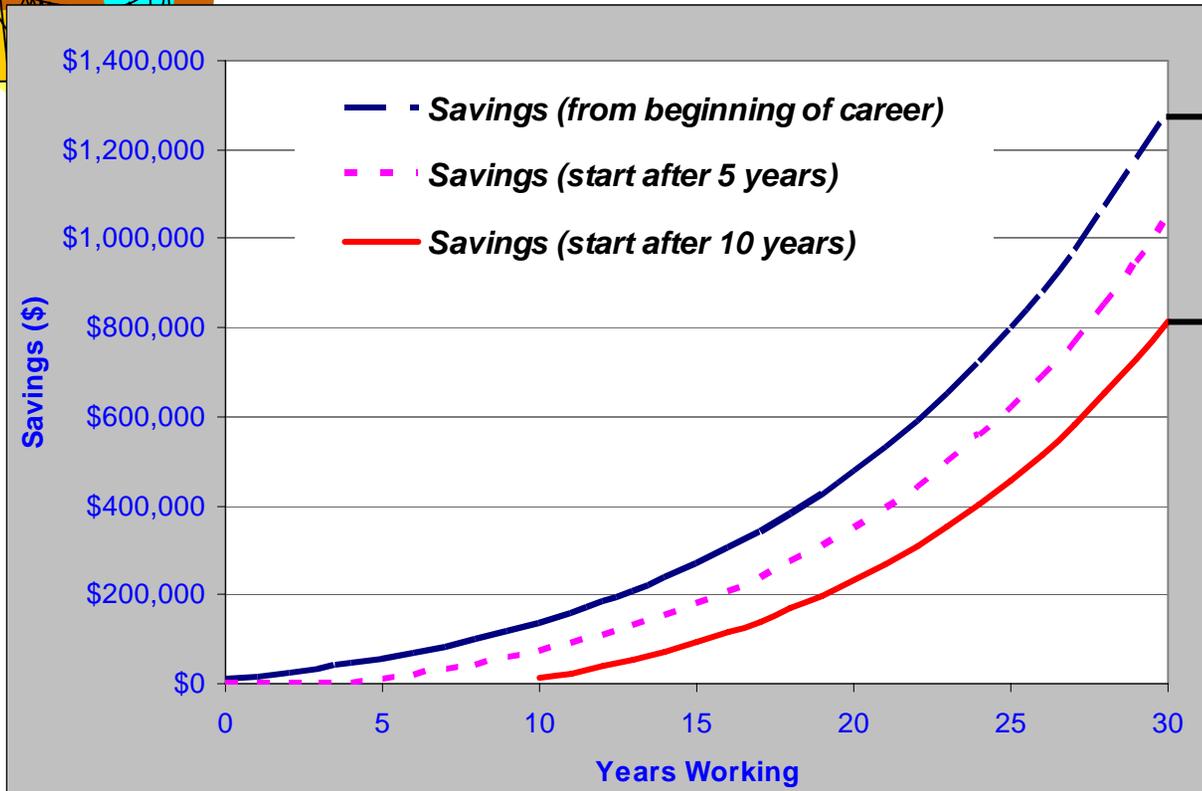


# How Long will it take me to save enough?

a =	f x b	what you save annually
r =	7%	what your money earns
b =	1	your annual spending 1st year in retirement
p =	0	what you have today



# Saving early is valuable



*Saving early results in nearly a half-million dollar retirement bonus at the end of a 30 year career.*

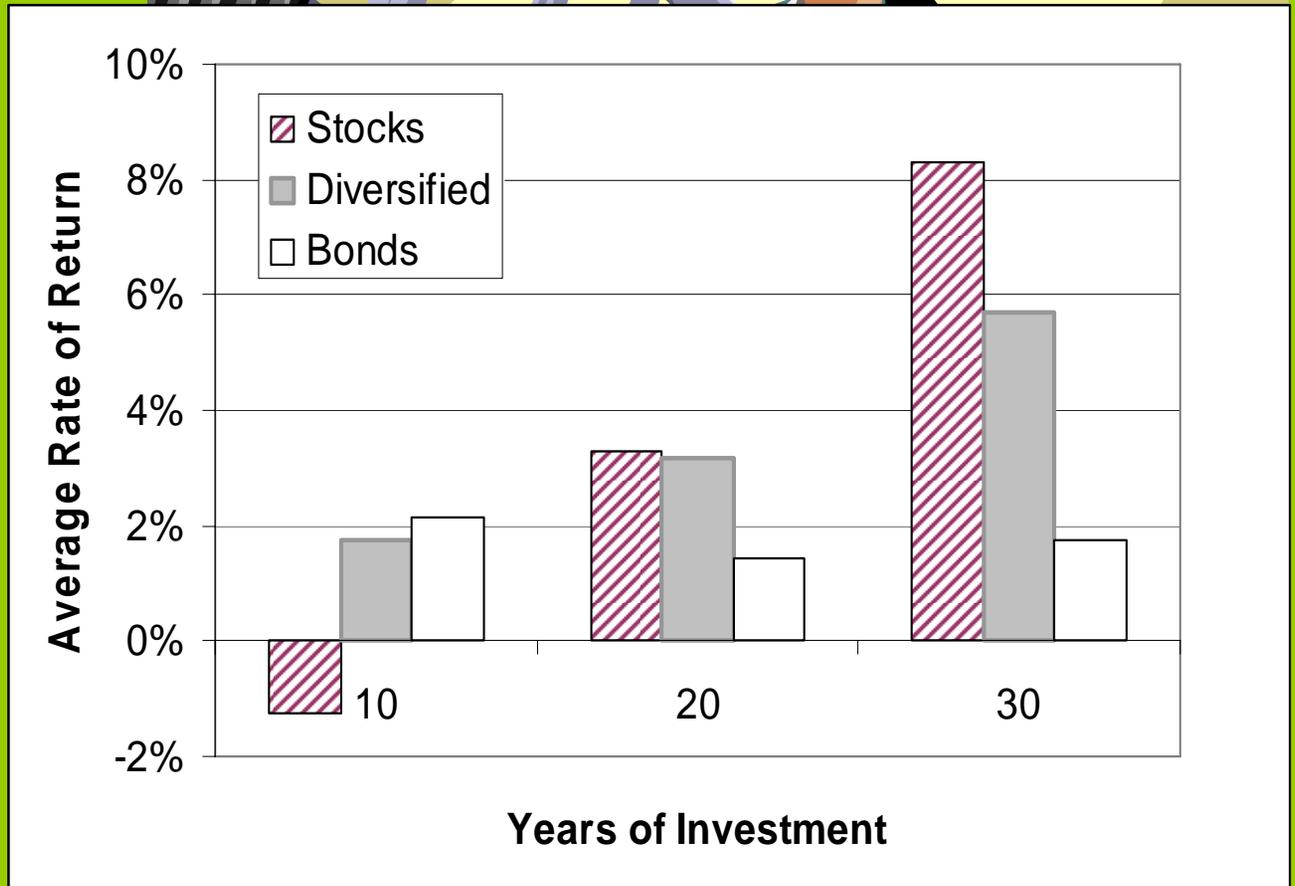
The chart considers a technical professional with a starting salary of \$50,000 per year. An average salary increase of 5.5% per year is assumed. The hypothetical engineer invests 10% of pre-tax salary each year and takes advantage of a 3% company 401(k) match. The assumed average return on all investments is 7% over the 30-year period.

# Diversify



*Average annual rate of return for a retiree retiring on January 1, 1929.*

Diversification results in slightly lower gains during good times, but less loss in bad times.





# Trying to time the Market (stock picking) is probably not your best bet

- **Buffet:**

*"Investors should remember that excitement and expenses are their enemies. And if they insist on trying to time their participation in equities, they should try to be fearful when others are greedy and greedy when others are fearful."*

*Our favorite holding period is forever.*

*If you are a professional and have confidence, then I would advocate lots of concentration. For everyone else, if it's not your game, participate in total diversification. The economy will do fine over time. ... **buy a cheap index fund and slowly dollar cost average into it.**" - Jun 27, 2008*

- 

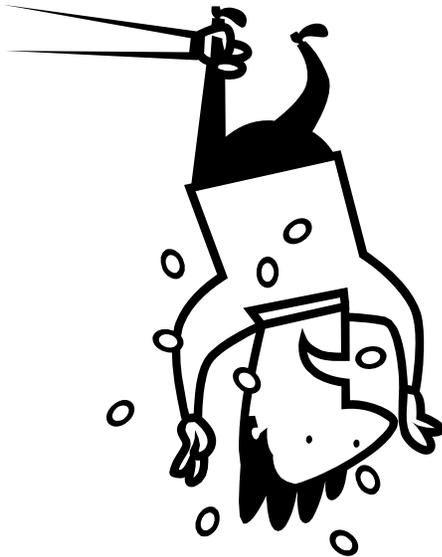
**Bogle:**

*"...for most investors hoping to gain from market timing, the opposite will be true: they will be in the market for the dips, and out of the market for the rallies. After 50 years in this business, I don't know anyone who has done it successfully. I don't even know anybody who knows anybody who has done it successfully and consistently..."*

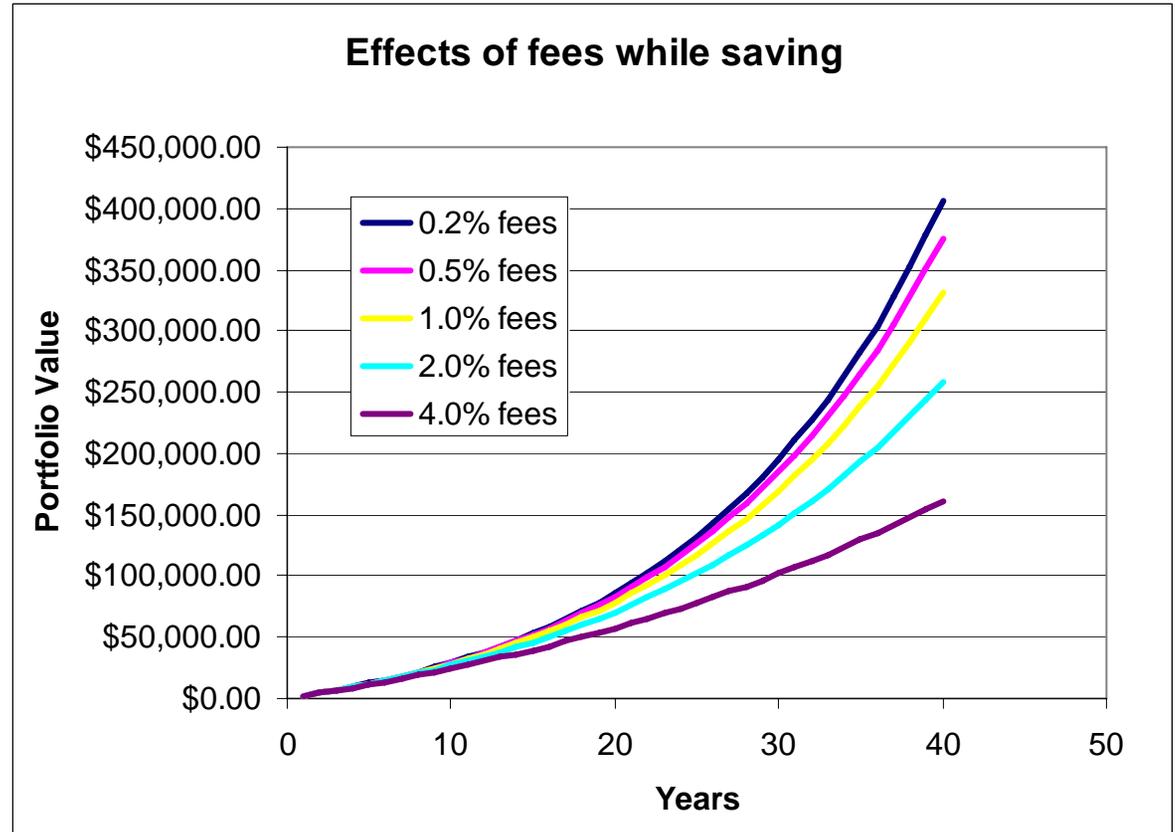
*(from "Common Sense on Mutual Funds" 1999)*



## Fees matter: *financial advisors are not your friend*



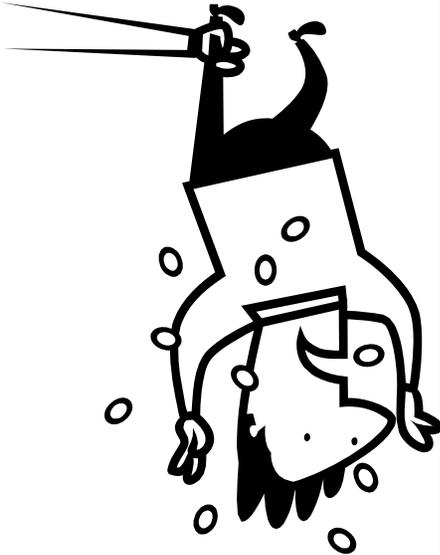
*Assumes \$2000 per year invested, 7% annual return*



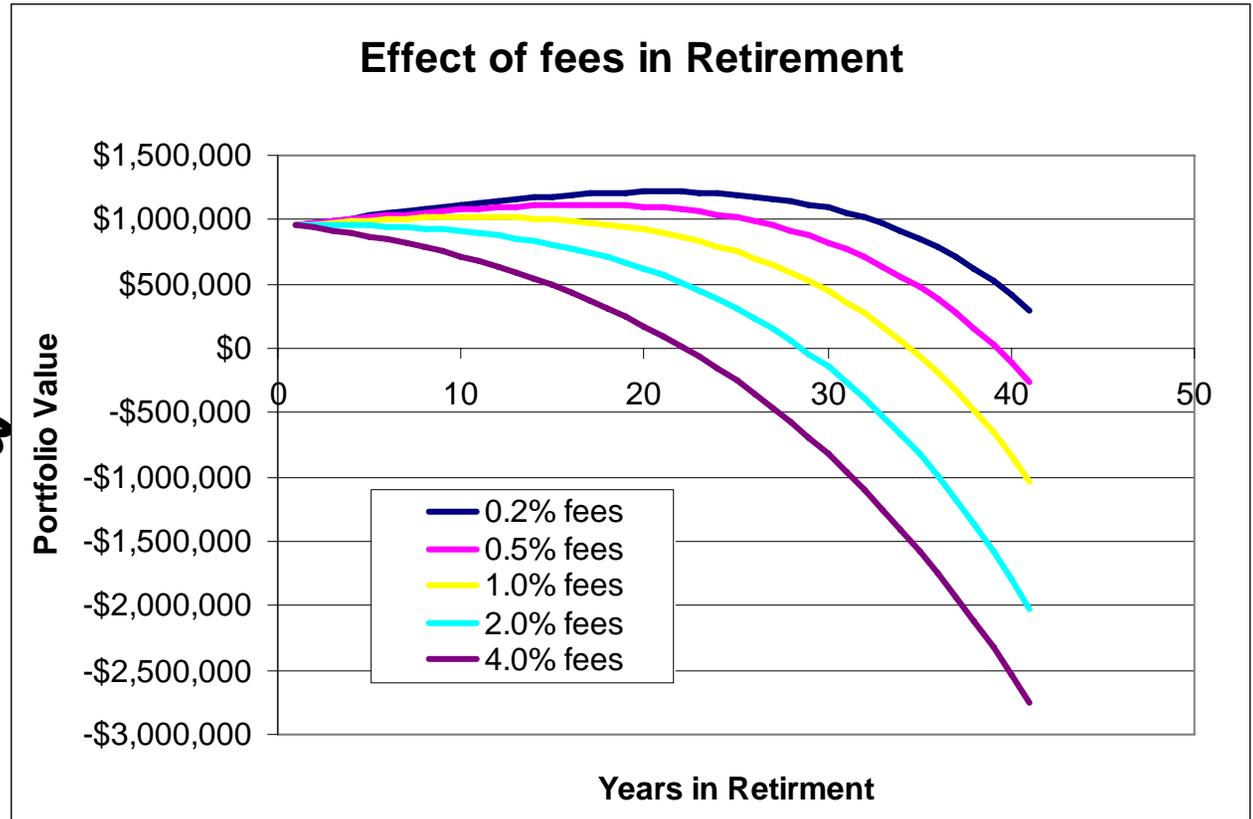
*At the end of 30 years, a financial advisor collecting a 1% fee has taken over \$33,000, 16% of your money.*



# Fees matter: *financial advisors are not your friend*



*Assumes 7% annual return, 3.0% inflation, 4.5% inflation adjusted withdrawal*

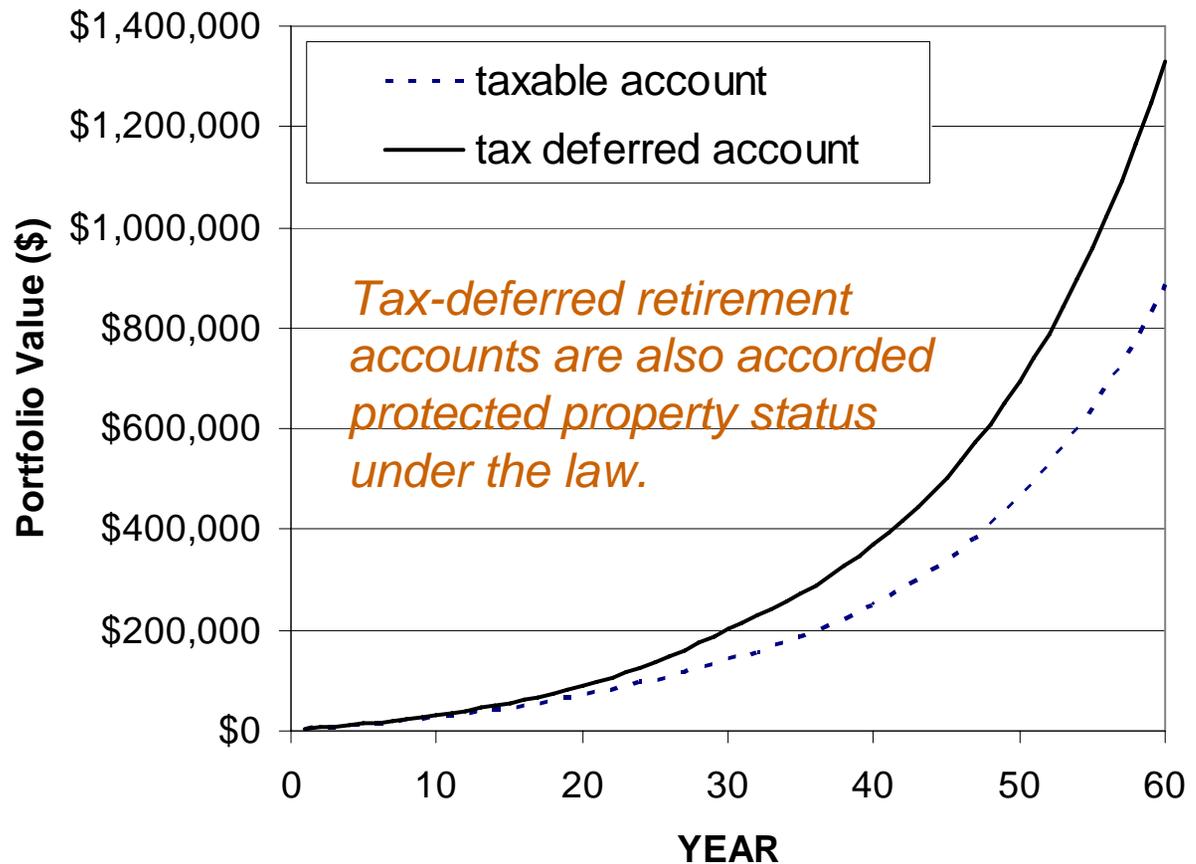


# Use available tax advantages

**Assumes a \$2000 per year investment for 30 years followed by a \$2000 per year withdrawal for 30 years.**

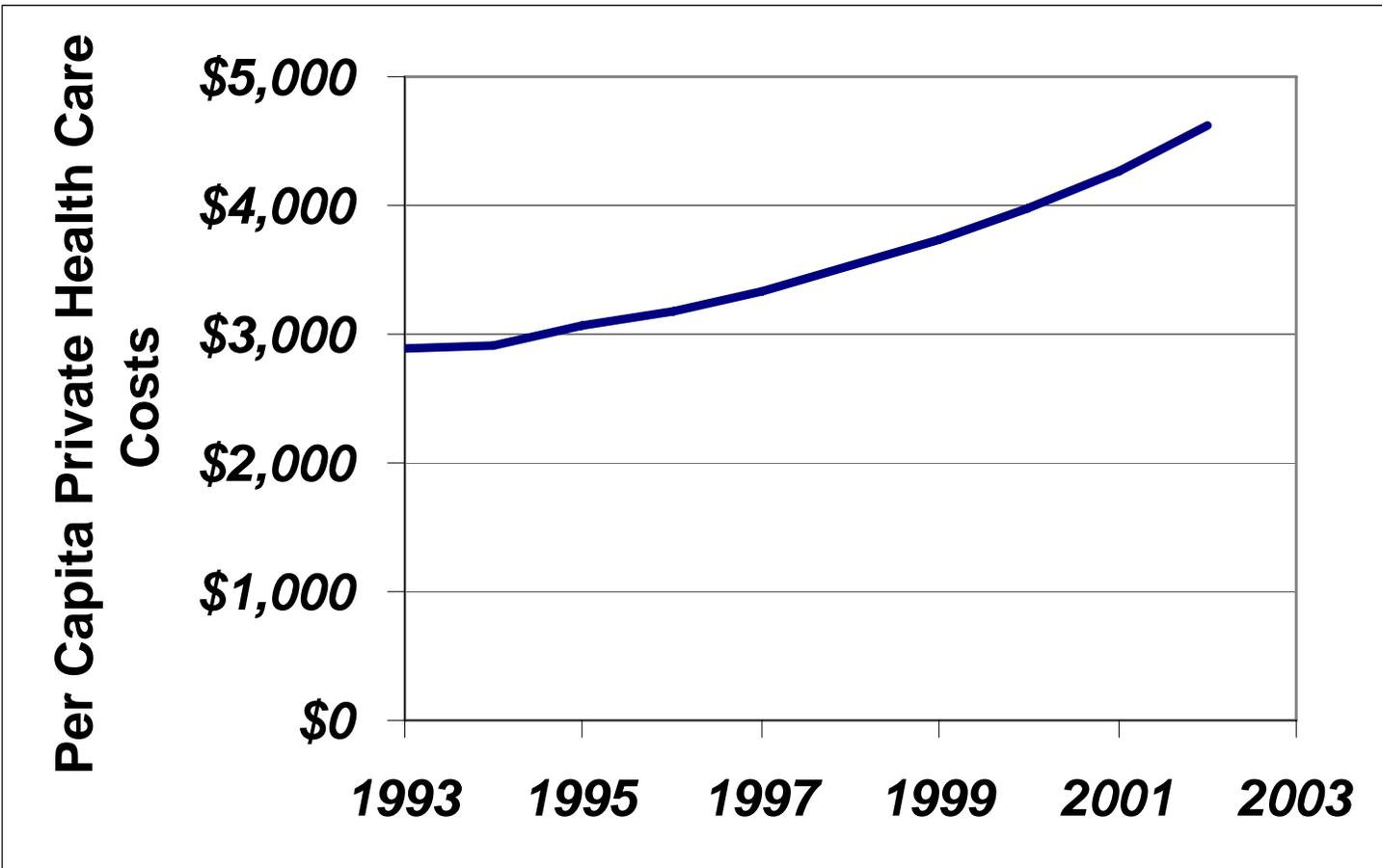
**Taxable acct: Pre-retirement earnings are taxed at 28%. Post-retirement earnings are taxed at 18%, withdrawals untaxed.**

**Tax-defrred acct: Pre-retirement earnings are untaxed. Post-retirement withdrawals are taxed at 18%**

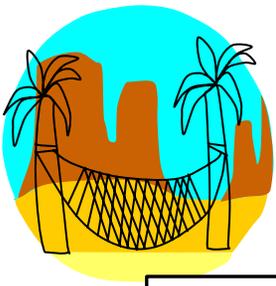




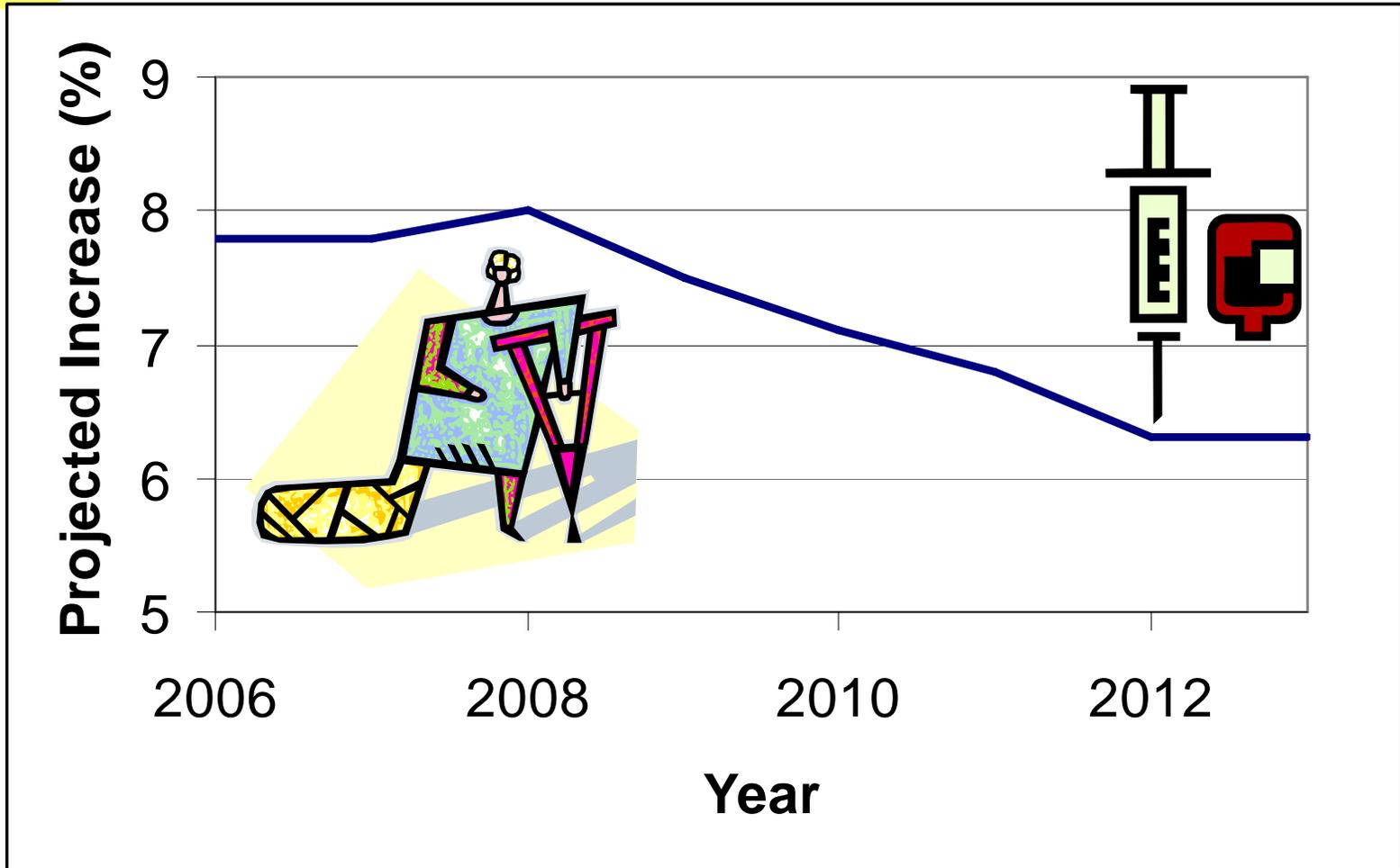
# Healthcare costs: The bane to retirement planning



Source: Monthly Labor Review, USBLS, Nov. 2004



# Healthcare costs: They aren't getting better



SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary.



## What will I do when I retire?

- Work part-time
- Travel
- Volunteer
- Recreation & Leisure
- Self-improvement
- Pursue hobbies





# Additional Support Material

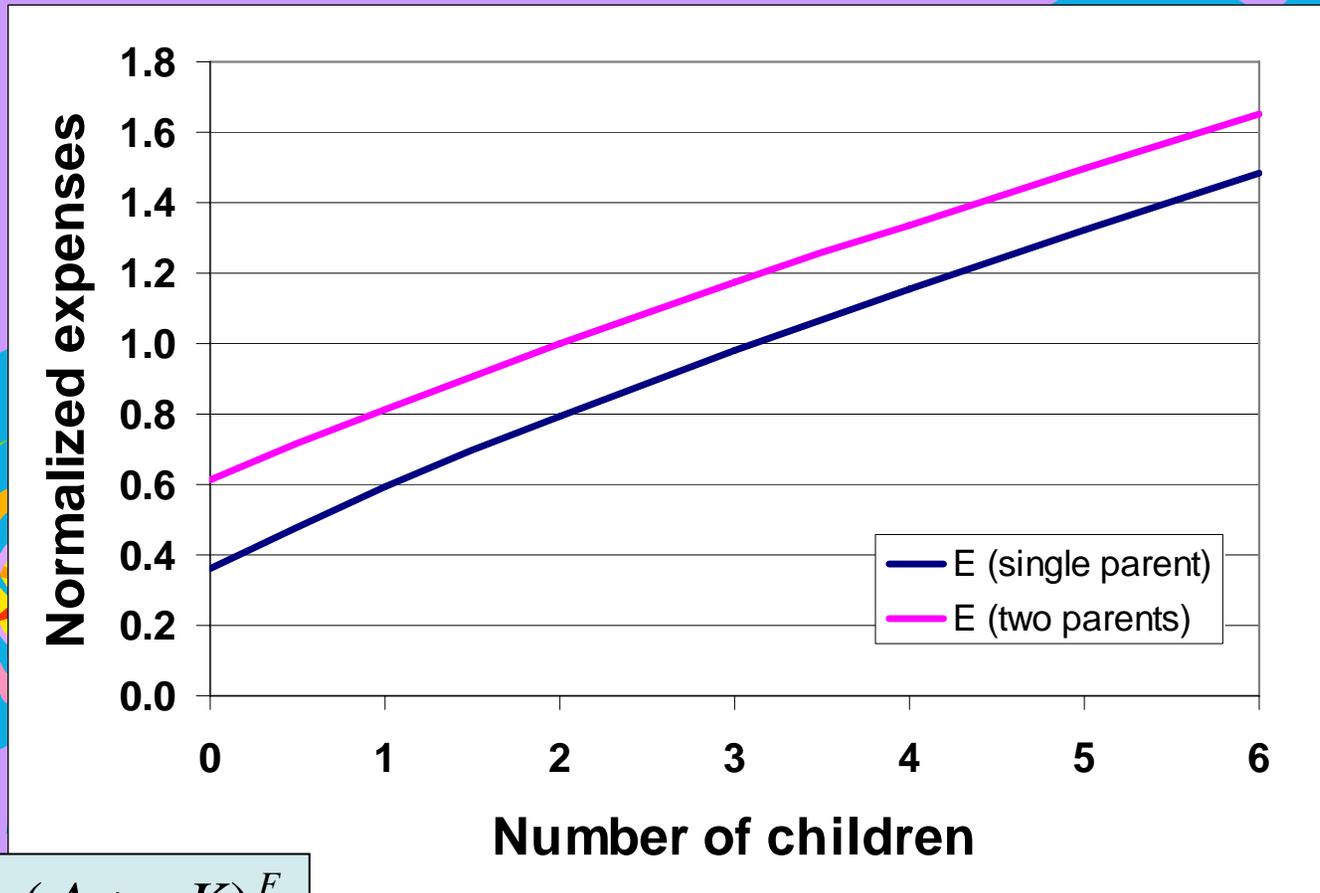


# Science and Engineering degreed individuals who have "retired" but continue to work *(National Science Foundation, 1999)*

<b>Age (years)</b>	<b>--- Bachelor's</b>		<b>--- -Master's</b>		<b>----- Ph.D.</b>	
	<i>Part time</i>	<i>Full time</i>	<i>Part time</i>	<i>Full time</i>	<i>Part time</i>	<i>Full time</i>
<b>50-55</b>	12.1	52.9	12.5	66.8	16.9	57.0
<b>56-62</b>	14.4	27.8	21.3	36.9	17.0	38.7
<b>63-70</b>	14.5	8.3	17.1	11.9	19.3	11.6
<b>71-75</b>	8.1	8.4	11.9	3.3	15.2	6.1



# Planning for the cost of a family



$$E = \frac{(A + pK)^F}{2.751}$$

US Bureau of Labor Statistics



# Recent Unemployment Rates of Different Sciences/Engineering

DISCIPLINE	BACHELORS DEGREE		MASTERS DEGREE		DOCTORAL DEGREE	
	2003	2006	2003	2006	2003	2006
	Social Sciences	4.6%	3.9%	2.6%	2.2%	2.9%
Life Sciences	3.5%	3.4%	3.9%	2.3%	2.7%	2.3%
Physical Sciences	4.0%	3.9%	2.8%	1.9%	1.6%	1.0%
Engineering	4.4%	2.3%	4.3%	2.5%	3.4%	1.5%

Source: National Science Foundation/Division of Science Resources Statistics, Scientists and Engineerins (SESTAT), 2003 & 2006